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Predictors of Obesity, Acculturation, and Perceived Stress in Meskhetian Turk (Ahiska) Immigrants in the United States

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Abstract

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by

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MA, Patten University, California, 2010

BS, Nigde University, Turkey, 2005

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Health Psychology

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Abstract

Obesity is a risk factor for chronic diseases among the ethnic minorities for adult immigrants in the United States**.** There have been many research studies conducted to examine the relationship between the predictors and obesity in minority groups in the United States, that relationship was unknown in Meskhetian Turk (Ahiska) immigrant populations. Guided by social ecological model and acculturation theory, this study examined the predictors of obesity in the Meskhetian Turk (Ahiska) immigrant population in the western United States. Data were collected from 109 participants using CDC's Behavioral Risk Factor Surveillance System, Stephenson Multigroup Acculturation Scale, and Perceived Stress Scale. Participants were recruited through flyers in a public setting and data were analyzed through SPSS using logistic regression and Spearman's correlation. The result of the study showed no statistical association between obesity and the predictors of age, gender, socio-economic status, physical activity, acculturation, and perceived stress. This study, however, showed a significant association between daily vegetable, fruit, and hamburger, cheeseburger or meat loaf consumption and obesity, and weekly vegetable consumption, monthly hamburger, cheeseburger or meat loaf consumption and moderate/morbid obesity. The study findings suggest that, through targeted community-based intervention and education programs, there is positive social change in the value of healthy lifestyle and the impact of the predictors of obesity, especially diet of Meskhetian Turk (Ahiska) immigrant population in the United States. Further investigation should focus into other causes of obesity using a larger sample size.

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Dedication

For my family…

Acknowledgments

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Chapter 1: Introduction to the Study

Background

Obesity is a chronic disease among ethnic minorities and a major health concern for adult immigrants in the United States (Albrecht & Gordon-Larsen, 2013). Obesity rates have increased rapidly from 14% to 34% over the past three decades among adults in the United States (Obisesan, 2015). According to the Centers for Disease Control (Centers for Disease Control and Prevention (CDC), 2014), one-third of adults in the United States are obese and over 70% of the population is expected to be overweight or obese by 2020. The prevalence of obesity has been linked to chronic health problems and consequences such as heart diseases, diabetes, hypertension, stroke, and cancer, which cancer was the leading cause of death (Ade, Rohrer, & Rea, 2011). According to World Health Organization (World Health Organization (WHO), 2014), obesity has been linked to nearly 3 million deaths in the adult population of the world, 44% of diabetes cases, 23% of cardiovascular diseases, and 7-41% of certain cancer cases.

The immigrant population in the United States has significantly increased from last three decades (Obesisan, 2015). The United States Census Bureau data showed that the number of ethnic groups in the United States continues to increase rapidly and will reach 14.8% of the total U.S. population by 2030 (Obesisan, 2015). The prevalence of obesity is higher among different ethnic groups after residing in the United States than their native counterparts who did not immigrate (Gele & Mbalilaki, 2013). Obesity research on ethnic minorities provides evidence that immigrants are particularly vulnerable to obesity (Ade et al., 2011). As of 2014, 39% of all adults aged 18 years and

older were obese in the United States. However, rates of overweight and obesity differed across ethnic groups; 49% of non-Hispanic African-American population, 44.5% of Hispanic population, 32.6% of non-Hispanic white population, and nearly 11% of non-Hispanic Asian population were identified overweight and obese in the United States (CDC, 2014).

Attention may be focused on health risks among new immigrants who are adapting to life in the United States, facing new lifestyles and acculturation pressures (Ade et al., 2011). For example, many studies have examined the immigrant groups in the United States. such as Latinos, African-Americans, Pacific Islanders and Asians, which they have been identified as vulnerable to obesity and obesity-related chronic diseases due to different predictors of obesity (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Kirby et al., 2012; Krueger et al., 2014). The prevalence of obesity among adult immigrants age 20 and older has increased over the years as they begin to adapt to American lifestyle (Obisesan, 2015). According to the CDC (2015) 78% of Hispanics, 76% of African-Americans, 66% of Caucasians, 43.5% of Pacific Islanders, 11.6% of Asian Americans, and 39.9 % of Alaska Natives and American Indians gained weight after migration to the United States.

As new groups of immigrants come to the United States, it is important to become familiar with their particular risk factors for obesity that may lead to chronic diseases. One ethnic group that has not received attention is Meskhetian Turk (Ahiska) immigrants. There is a gap in knowledge about the potential risks of obesity among this

group, including the roles of diet, socioeconomic status, physical activity, acculturation, and perceived stress, which have been found to be predictors of obesity among other immigrant groups (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Kirby et al., 2012; Krueger et al., 2014).

Problem Statement

Obesity is an epidemic health problem that has been identified as a significant factor of chronic disease among immigrant minorities in the United States (Lutsey, Diez et al., 2008). It is possible to predict obesity based on certain risk factors including different level of acculturation, perceived stress, diet, lack of physical activity, access to health care, socio-economic status (SES), and duration of the residency in the host culture. The prevalence of obesity has been associated with these risk factors, which trigger serious diseases including diabetes, high blood pressure, cholesterol, heart diseases, stroke, and cancer in immigrant groups (Sussner, Lindsay, Greaney, & Peterson, 2008). Many studies have found that acculturation risk factors, socioeconomic status, and environmental and cultural factors have been identified as contributing factors of obesity among immigrant groups (Ade et al., 2011). These obesity-contributing factors have been examined among different immigrant groups including Latinos, African-Americans, Asians, and Pacific Islanders. Ethnic minorities are at higher risk for being overweight and obese after residing in the United States (Ade et al., 2011; Gele & Mbalilaki, 2013; Krueger et al., 2014).

Meskhetian Turks (Ahiska) have lived in Central and Eastern Europe for centuries. They were densely populated around the Mekheti area in today's Georgia so they were named "Meskhetian." Ethnically, they are Turkish and they have lived in and around the land that goes beyond the borders of modern Georgia. The geography where they live changed power under the rule of The Russian Empire, the Ottoman Empire, and previously the Soviet Social Republic. The exchange of power and rule of their lands by these empires they were subjected to relocation, torture, oppression, isolation and violence. In the past century, the Meskhetian Turks (Ahiska) experienced two major forced relocations, discriminations, and oppressions. This was because they are different in their ethnicity, culture, lifestyle, and beliefs than others in the region. It is of crucial significance to elucidate that the Meskhetian Turks (Ahiska) have not relocated due their own choice or desire; unfortunately, they had no option as they were forced to leave their homeland by means of oppression, discrimination, violence, and inequity.

In 2004, via international agencies and humanitarian organizations, the United States government officially permitted 15,000 Meskhetian Turks (Ahiska) to enter the United States under refugee status (Bilge, 2012). Since then, more and more Meskhetian Turks (Ahiska) have followed their counterparts and entered the United States as refugees. It has been 12 years since their first arrival to the United States and it is uncertain how much stress, emotional discomfort, and psychological disturbance these people go through in their day to day lives in a foreign country where the language, culture, life-style, beliefs, and ethnicities are so diverse and different. Therefore, this

specifically unique group needs to be studied for acculturation, perceived stress, and other predictors of obesity after resettlement in the United States.

Meskhetian Turk (Ahiska) immigrants are one of the growing immigrant populations in the United States (Bilge, 2012). Many studies have been focused on Hispanic, African-American, Asian, European, and Pacific Islander immigrants, but to date, there have been no specific attempts to identify obesity as a chronic disease in Meskhetian Turk (Ahiska) immigrants in the United States. The prevalence of obesity is higher among immigrant groups in the United States, and according to CDC (2014), 47.8% of African-American populations, 42.5% of Hispanic populations, 32.6% of non-Hispanic white populations, and 10.8% of Asian populations of adults older than 18 years of age were obese (CDC, 2014).The CDC data anticipates the obesity rate among immigrant populations to increase by 33% by 2030 (CDC, 2014). Following these trends, this data applies to the Meskhetian Turk (Ahiska) immigrant population, filling a data gap in the current immigrant obesity literature.

It is anticipated that obesity rate will be increased by 33% by the year 2030 among immigrant populations in the United States (CDC, 2014). This study may be filled a gap in the literature about obesity among Meskhetian Turk (Ahiska) immigrants in the United States. Obesity research on ethnic minorities provides evidence that immigrants are particularly vulnerable to obesity due to acculturation, perceived stress, and other potential predictors (Ade et al., 2011). There was a gap in knowledge about the acculturation, perceived stress, and potential predictors of obesity among Mesketian Turk (Ahiska) immigrants and whether they are vulnerable to obesity (Adedoyin et al., 2010;

Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Kirby et al., 2012; Krueger et al., 2014). As mentioned, a number of researchers examined the immigrant groups in the United States such as Latinos, African-Americans, Pacific Islanders, and Asians, which they have identified as vulnerable to obesity and obesity-related chronic diseases due to different predictors of obesity (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Kirby et al., 2012; Krueger et al., 2014). However, it was unknown how Meskhetian Turk (Ahiska) immigrants experience obesity after they resettle in the United States. In this study, I identified the acculturation, perceived stress and other potential predictors of obesity among Meskhetian Turk (Ahiska) immigrants in the United States. The findings of this study may help community leaders, health practitioners, and health professionals to create strategic intervention plans to prevent obesity and obesity-related disease in this in society.

Studies on predictors of obesity have found that poverty, acculturation, duration of residency, lack of physical activity, consumption of fast food, and high caloric intake are common and significant factors that contribute to the increasing weight of individuals from minority groups (Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014). However, it was unknown whether the level of acculturation, perceived stress, age, gender, diet, physical activity, and SES were contributing factors of obesity on obesity among Meskhetian Turk (Ahiska) immigrants in the United States. A number of studies showed that the prevalence of obesity has increased among immigrant populations over the years and there is a relationship

between diet, physical activity, income, length of stay, age, gender, health care access, acculturation, perceived stress, and obesity (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Ike-Chinaka, 2013; Kaholokula et al., 2012; Kirby et al., 2012; Krueger et al., 2014). Further research was needed to understand the exact components that may contribute to obesity in Meskhetian Turk (Ahiska) immigrants. The purpose of this study was to identify the association of acculturation, perceived stress, age, gender, diet, SES, and level of physical activity and obesity in the Meskhetian Turk (Ahiska) immigrant population in the Western United States.

Purpose of the Study

The purpose of study was to evaluate factors that have been identified in previous research as predictors of obesity to study risk factors for obesity in Meskhetian Turk (Ahiska) immigrants (see Figure 1). The factors and their indicators were demographic, (gender, age, SES), lifestyle, (diet, exercise) and psychosocial (acculturation and perceived stress). Using a quantitative, cross-sectional survey design, a volunteer sample of Meskhetian Turk (Ahiska) immigrants were provided demographic information, as well as completed a series of measures of the predictor factors under study; the Behavioral Risk Factor Surveillance Survey questionnaire (BRFSS) to measure gender, age, SES, diet, and exercise, (Obisesan 2015), the Stephenson Multigroup Acculturation Scale (SMAS) to measure level of acculturation (Stephenson, 2000), and the Perceived Stress Scale (PSS) to measure perceived stress (Cohen, 1988). I calculated information on

height and weight from BMI and that was calculated for the dependent variable was gathered in the BRFSS.

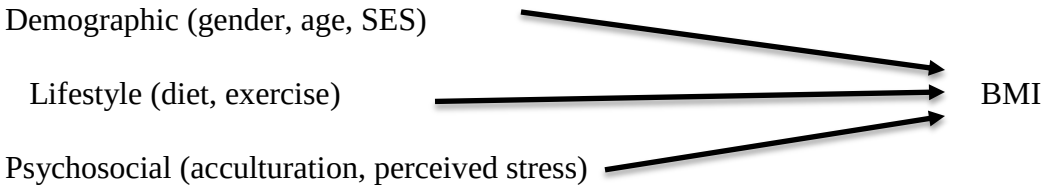

Figure 1: Factors to be studied as predictive factors for obesity in Meskhetian Turk (Ahiska) immigrants.

Research Questions and Hypotheses

Separate hypotheses were presented for the relationship between each of the predictor factors and the outcome (BMI), and an additional hypothesis were specific to the testing of the model where all factors were considered simultaneously as predictors of BMI.

Research Questions

The following research questions guided this study:

RQ1: Do demographic factors (age, gender, SES) as measured by the BRFSS predict obesity, as measured by the BMI, among Meskhetian Turk (Ahiska) immigrants?

$H_0$1: Demographic factors (age, gender, SES) do not predict BMI among Meskhetian Turk (Ahiska) immigrants.

H_a1: Demographic factors (age, gender, SES) do predict BMI among Meskhetian Turk (Ahiska) immigrants

RQ2: Do lifestyle indicators (diet, exercise), as measured by the BRFSS predict obesity, as measured by the BMI, among Meskhetian Turk (Ahiska) immigrants?

$H_0$2: Lifestyle indicators (diet, exercise) do not predict BMI among Meskhetian Turk (Ahiska) immigrants.

H_a2: Lifestyle indicators (diet, exercise) do predict BMI among Meskhetian Turk (Ahiska) immigrants.

RQ3: Do psychosocial indicators (acculturation, perceived stress), as measured by the SMAS and PSS, predict obesity, as measured by the BMI, among Meskhetian Turk (Ahiska) immigrants?

$H_0$3: Psychosocial indicators (acculturation, perceived stress) do not predict BMI among Meskhetian Turk (Ahiska) immigrants.

H_a3: Psychosocial indicators (acculturation, perceived stress) do predict BMI among Meskhetian Turk (Ahiska) immigrants.

RQ4: Taken together, do demographic, lifestyle, and psychosocial indicators predict obesity among Meskhetian Turk (Ahiska) immigrants?

$H_0$4: Taken together, demographic, lifestyle, and psychosocial do not predict BMI among Meskhetian Turk (Ahiska) immigrants.

$H_1$4: Taken together, demographic, lifestyle, and psychosocial do predict BMI among Meskhetian Turk (Ahiska) immigrants.

Theoretical Framework

In this study, I used the socioecological model and acculturation theory to explore possible relationships between socioecological factors and acculturation factors risks for obesity among Meskhetian Turk (Ahiska) immigrants in the western U.S. The socioecological model identified different level of human behavior interaction with

society while the acculturation theory more focused on cultural process after migration in the host country.

Social Ecology Model

By using the socioecological model, concepts of the levels of social influence of social ecology identified whether or not there is a behavioral change among Meskhetian Turk (Ahiska) immigrant population. Social ecological model allowed me to categorize the predictors into the individual level, community, and social level. Center for Diseases Control and Prevention (CDC, 2013) stated that the predictors of dietary and physical activity may refer to intrapersonal or physical level, social support may refer to interpersonal level, and education may refer to community level. In order to understand the interrelationships that exist between behaviors at the social level and health, socioecological model was the most appropriate model aligned with the acculturation theory in this study. According to the Center for Diseases Control and Prevention (CDC, 2013), the socioecological model identified behavioral changes within a population group of various levels including intrapersonal, interpersonal, organizational, community, physical environment, and the acculturation (CDC, 2013). This model also allowed me to understand how to improve health status and health behavior in immigrant groups through positive social interaction, increase physical activity, and healthy diet (Simons-Morten, McLeroy, & Wendel, 2012). Thus, this model helped me to identify possible social and environmental risk factors that may increase the vulnerability of the Meskhetian Turk (Ahiska) immigrant population to obesity. Therefore, I used the socioecological model to have a better understanding of the predictors (i.e., diet, age,

gender, SES, and level of physical activity) that could influence health-related behaviors and contribute to obesity in the Meskhetian Turk (Ahiska) immigrant populations in the western U.S.

Acculturation Theory

Acculturation theory helped me to understand of the acculturation process, engagement and transition into a new culture for the individuals (Berry, 2008). The level of acculturation and its health impact is different in immigrant groups due to social and economic resources. Many studies show that there is an association between acculturation and other predictors including socioeconomic, socio-demographic, and environmental factors that have been associated with obesity in immigrants in the United States (Ade et al., 2011, Ike-Chinaka, 2013, Obisesan, 2015). In addition to the socioecological model, which was the conceptual framework for this study, I used acculturation theory to understand the influence of income, physical activity, and diet, which could increase the possibility that immigrants would become obese as they gradually integrate into the host culture (Abraido et al., 2006). The acculturation phenomenon helped to understand the immigrants' behaviors as well as values that were measured by length of stay, language, foods, country of birth in the host culture (Berry et al., 2006). Since there was no literature about the Meskhetian Turk (Ahiska) immigrant population, I identified whether the acculturation, perceived stress, age, gender, diet, SES, and level of physical activity that would contribute to the prevalence of obesity in the sample immigrant group.

Nature of the Study

I used a cross-sectional quantitative survey design. I examined the acculturation, perceived stress, age, gender, diet, SES, and level of physical activity of obesity in Mesketian Turk (Ahiska) immigrants. The dependent variable was obesity (measured by BMI) and independent variables were acculturation, perceived stress, age, gender, diet, SES, and level of physical activity in the Western United States. I used the BRFSS, SMAS, and PSS surveys for the targeted sample of 109 volunteer Meskhetian Turk (Ahiska) immigrants who lived in the Western United States. The eligibility for participation was speaking the English language, being age 18 and older, legally living in the United States, and be a Meskhetian Turk (Ahiska) immigrant. After I received approval from the Walden Institutional Review Board (approval number 03-22-17-0458660), and community partners, recruitment was done through flyers and the flyers were posted with permission through neighborhood shops, churches/mosques, cultural centers, and other community gathering sites.

Definitions of Terms

Acculturation: Acculturation is the process of incorporating and adopting the cultural traits of another group, where cultural modification of an individual or group of people takes place in the host culture (Berry, 2008).

Behavioral Risk Factor Surveillance System (BRFSS): BRFSS is a type of survey system that is used by CDC to gather data of public health conditions and risky behaviors in the United States. population (CDC, 2014).

Body Mass Index (BMI): A measurement of the body fat that is calculated from individual height and weight (WHO, 2014).

Dietary Acculturation: Dietary acculturation is the process of adopting the dietary pattern in the host culture (Wandell, 2013).

Meskhetian Turk (Ahiska) Immigrants: Meskhetian Turk (Ahiska) immigrants are a group of people forced to relocate multiple times in their long history. Their original homeland is Central Asia and they have been granted refugee status by American government in recent years (Bilge, 2012).

Obesity: Obesity is defined of the individual's body mass index that is greater than 30 kg/m2. The body mass index is calculated from a ratio of the individual's weight and height (WHO, 2014).

Social Support: Social support is the perception of social network that is provided by the individuals or group of people who share the same values and lifestyle (Schneider, 2006).

Socioeconomic Status (SES): Socioeconomic status is a social class that is measured of the individual's income, education, and occupation (CDC, 2014).

Stress: Stress is defined as an inappropriate pressure and tension that is increased harmful effects (CDC, 2013).

Assumptions

I assumed that respondents would be obtained only from among Meskhetian Turk (Ahiska) immigrants, ages 18 years and older. I assumed that the participants would provide accurate information to measure their height and weight for BMI calculation. I

assumed that the sample population would be able to understand the questions and give accurate information on their demographics, age, gender, physical activity, diet, and socioeconomic status. I assumed that acculturation was the primary predictor that influences this immigrant group's language preference.

Limitations

This study was limited to Meskhetian Turk (Ahiska) immigrants in the Western United States, ages 18 years and older. I used the BRFSS questionnaire, the SMAS, and the PSS to collect data from participants about demographics, acculturation, perceived stress, age, gender, diet, physical activity, and SES. It was a challenge to gather accurate data for the study because of the increased risk of participant bias. Because of the lack of language proficiency, participants did not understand the questions relating to preference of food, income level, dietary habits, and physical activity levels (Adedoyin et al., 2010; Ade et al., 2011; Ike-Chinaka, 2013; Obisesan, 2015). This study was limited ages 18 years and older. The recruitment location was limited to Utah, Idaho and California States. This limits the generalizability of results to the general population of Meskhetian Turk (Ahiska) immigrants in the United States.

Scope and Delimitations

The responses to this study were obtained only from Meskhetian Turk (Ahiska) immigrants, ages 18 years and older, who resided in the Western United States specifically from Utah, Idaho and California States. The recruitment was done through flyers and the responses were received from the participants via mail and interview. I

excluded the participants who did not speak English and under 18 years old and other variable such as non-Meskhetian Turk (Ahiska) immigrant, which would be irrelevant for this study.

Significance of the Study

It is important to examine the predictors of obesity in this sample population because Meskhetian Turk (Ahiska) immigrants are fairly new in the United States and no specific study has focused on this immigrant group. As mentioned, obesity has been identified as contributing factor for chronic disease and affects more than 21% of the immigrant population in the United States (CDC, 2012). Because the Meskhetian Turk (Ahiska) immigrant population is one of the growing immigrant populations in the United States (Bilge, 2012), it is important to have better understanding of possible causes of obesity in this population. Understanding the potential predictors of obesity in this population may guide health professionals and health educators to address the needs for obesity interventions that are best initiated at an individual or community level (Obisesan, 2015). As mentioned, the immigrants in the United States such as Latinos, African-Americans, Europeans, Asians, and Pacific Islanders are vulnerable to obesity and obesity-related chronic diseases (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Kirby et al., 2012; Krueger et al., 2014), it was unknown whether this sample group is also vulnerable to obesity. No previous research has focused on association between acculturation, perceived stress and other predictors (i.e., diet, SES, and level of physical activity) of obesity in new Meskhetian Turk (Ahiska) immigrants prior to this study. By the end of

2012 more than 50,000 Meskhetian Turk (Ahiska) immigrants had settled in 32 states in the United States. (Cetinkaya & Koya, 2012), however, there was no existing research available to have a better understanding of the potential predictors of obesity for Meskhetian Turk (Ahiska) immigrants. I conducted this research to fill the gap in the current body of literature on the predictors of obesity in the Meskhetian Turk (Ahiska) immigrants. Because there is no specific study on obesity in general adult Meskhetian Turk (Ahiska) immigrant population residing in the United States, studying the association between acculturation, perceived stress, and the predictors (i.e., age, gender, diet, SES, and level of physical activity) of obesity in Meskhetian Turk (Ahiska) immigrants was necessary.

In this study, I analyzed the variables of acculturation, perceived stress, age, gender, diet, SES, and level of physical activity by administering the BRFSS, the SMAS, and the PSS. The participant's BMI was gathered from the existing BRFSS survey questionnaires. I calculated BMI using the WHO's recommendation, the BMI formula was expressed as weight (kg) / [height (m)]^2. With the metric system, the formula for BMI was weight in kilograms divided by height in meters squared. BMI was categorized as BMI < 25 (normal weight), BMI between 25 and 29.99 (overweight), BMI between 30 and 34.99 (obese), BMI between 35 and 39.99 (moderately obese), and BMI $\geq$ 40 (morbidly obese). I used descriptive statistics and multiple logistic regressions in this study to analyze the association between the acculturation, perceived stress, and the potential predictors (age, gender, diet, SES, and level of physical activity- independent variables), and obesity (dependent variable).

Social Change Implications

This study's findings provided new information and results that were specific to Meskhetian Turk (Ahiska) immigrant population. This study results showed certain predictors of obesity exist in this sample group. Although, these predictors have been associated with obesity and obesity-related health problems in other immigrant populations (Ade et al., 2011; Ike-Chinaka, 2013; Obisesan, 2015), health professionals may use the results of this study to develop obesity prevention plan in this specific population.

This study demonstrated a lack of association of the predictors (except diet) and obesity that would be unique protective factors of obesity to this immigrant group. The study findings may help researchers understand the potential predictors of obesity, which may help to improve positive health outcomes and healthy lifestyle of immigrant Meskhetian Turk (Ahiska) population in the United States. For example, organizational leaders of immigrant organizations (health providers and clinicians) may use the results of this study to help creating culturally health programs to reduce obesity as it relates to acculturation and build resilience in Meskhetian Turk (Ahiska) immigrants, which may prevent them from becoming obese and developing health problems resulting from obesity. I used survey instruments, such as the BRFSS, SMAS, and the PSS in this study to identify the food consumption, acculturation level, social stress, language use, and the influence of the host culture, which health professionals may develop appropriate community-based intervention for this group to choose healthier foods, interact with another group properly in the community, and reduce stress-related activities in general.

Knowing the cultural food consumption, lifestyle, and interaction with others groups in the community may bring awareness to screen for obesity and how these predictors specifically reduce/increase risk for obesity-related health problems in this sample population. Importantly, results of this study may promote health initiatives in Meskhetian Turk (Ahiska) immigrant communities in the United States that can connect individuals to needed healthcare services. Most significant contribution of this study is that it showed obesity rates and potential predictors that are associated with obesity in Meskhetian Turk (Ahiska) immigrants.

Summary

Obesity is epidemic among ethnic minorities and a major health concern that has been examined by many studies among different immigrant populations in the United States (Albrecht & Gordon-Larsen, 2013). Obesity has been linked to various diseases such as diabetes, cholesterol, heart diseases, sleep disorder, high blood pressure, stroke, and some forms of cancer (Ogden, Carroll, Kit, & Flegal, 2014). There was a need to investigate the association between acculturation, perceived stress and potential predictors of diet, physical activity, and level of physical activity and obesity in Meskhetian Turk (Ahiska) immigrants that would influence their weight and health status. The target population was from Meskhetian Turk (Ahiska) immigrants aged 18 years and older in the Western United States. The findings of this research found that there was no relationship between age, gender, SES, physical activity, acculturation, perceived stress, and obesity. However, the association was between diet (daily vegetable

consumption and obesity, and weekly vegetable consumption and moderate/morbid obesity) and obesity in this sample population.

In Chapter 2, I will review existing literature on different predictors such as acculturation factor, stress and obesity, diet, physical activity, income, age, gender, and length of stay that may influence immigrant behaviors and lead to obesity in different immigrant populations. Chapter 3 includes information about the research design, research methodology, sample size, data collection and statistical analysis. Chapter 4 includes the research findings. In Chapter 5, I will summarize the significance and importance of the results for further research.

Chapter 2: Literature Review

According to the CDC (2014), obesity has been identified as a contributing factor of chronic health problems and has been associated with significant morbidity and mortality in different populations (Albrecht & Gordon-Larsen, 2013). Studies have focused on different socio-demographic predictors of obesity in many minority populations such as African-American, Nigerian, Asian, Alaska Native, Hispanic, Vietnamese, Pacific Islander, and European immigrants (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Kirby et al., 2012; Krueger et al., 2014).

Researchers investigated different predictors (i.e., food acculturation, diet, physical activity, duration of residency, and SES in the United States, that are associated with social, cultural, and behavioral factors (Adedoyin et al., 2010). The results indicated that overall, obesity was associated with acculturation, dietary change in the host culture, stress, physical inactivity, and low income for immigrant populations (Jamil et al., 2014). The obesity rate and its negative health outcomes are significantly greater in African-American immigrants than in other immigrant populations (Ade et al., 2011). Because there is no existing research about Meskhetian Turk (Ahiska) immigrants, the association of acculturation, perceived stress and the predictors of obesity in Meskhetian Turk (Ahiska) immigrant population I will be examined in this study. This study's aim was to determine whether acculturation, perceived stress, age, gender, diet, level of physical activity, and SES directly related to obesity for Meskhetian Turk (Ahiska) immigrants.

Krueger and colleagues examined the acculturation process and other predictors that contribute to obesity in different ethnic minorities including Asian, Hispanic, Nigerian, Pacific Islander, and European immigrants after arrival in the United States (Krueger et al., 2014). The minority groups listed above showed that the number of obese immigrants increased after arrival in the United States and obesity is associated with the acculturation risk factors such as language, length of living, and food preferences (Albrecht & Gordon-Larsen, 2013). The findings from the different immigrant populations supported the importance of examining acculturation risk factors in Meskhetian Turk (Ahiska) immigrant population in the United States.

Literature Strategy

This literature review includes relevant and current peer-reviewed articles from different databases including MEDLINE, PsycARTICLES, Health and Medical Complete, Health Sciences, Journal of the American Medical Association, Academic Search Complete, CINAHP Plus with Full Text, and Center for Disease Control and Prevention. I used the Walden University library database to search relevant and current peer-reviewed articles. The following keywords were used to search in the databases*: obesity and immigrants, obesity and education, perceived stress and obesity, stress and immigrants, immigrants and socioeconomic status, acculturation and obesity, acculturation and immigrants, body mass index and immigrants, age, gender, education, and physical activity.* I expanded the search of the key words including obesity in Asian, African-American, Hispanic, Nigerian, Arabic and European, and residing in the United

States. I reviewed the year of the publication of the articles after 2000 for the literature. This reasonable time scope provided recent findings to support this study.

Obesity

Obesity is a serious health condition that is a significant public health concern in the United States (Leung, Williams, & Villamor, 2012). The prevalence of obesity has grown dramatically over the past several decades (Gele & Mbalilaki, 2013) and affects minority populations disproportionately due to acculturation factors, low income, physical inactivity, poor dietary patterns, and consumption of high calories in fat and carbohydrates (Lokuruka, 2013). In 2004, nearly 24.5% of Americans were obese and this number increased to 35.9% in 2010 (CDC, 2012). The prevalence of obesity is 47.8% in the non-Hispanic African-American population, 42.5% in the Hispanic population, 10.8% in the non-Hispanic Asian population, and 32.6% in non-Hispanic white population (CDC, 2014).

Obesity is defined as having excessive body fat higher than normal body weight, which a BMI is described with less than or greater than average height and weight of the person (CDC, 2014). If the BMI is equal to or greater than 30 (BMI $\geq$ 30 kg/m^2) (CDC, 2013) is under obese category. The BMI is proportional to the body weight that describes a weight to height ratio in adults, adolescents, and children (CDC, 2013). The number of obese and overweight people continues to increase in all populations and approximately half of the United States population will be obese by 2030 (Jamil et al., 2014). Widespread obesity is associated with a greater risk of unhealthy diets, high calorie intake, consumption of soda and fast food, and lack of physical activity in ethnic

minorities in the United States (Leung et al., 2012). For example, the prevalence of African-American minorities is the highest among minority groups and nearly 51% of African-American adults are obese compare to 33% Caucasian adults (Kirby et al., 2012). Similarly, the prevalence of obesity is also very high in Mexican (40%) and non-Hispanic African-Americans (47.8%) as compared to non-Hispanic Caucasian (32.6%; Long, Mareno, Shabo, & Wilson, 2012).

Approximately 1.2 billion people are overweight in the world and nearly 300 million people are obese (CDC, 2013). Obesity reached epidemic proportions in 2012 when the prevalence rates nearly doubled (Kirby et al., 2012). The prevalence of obesity increases the number of obesity-related morbidities and mortality (Ogden, Carroll, Kit, & Flegal, 2014). Studies have shown that migration is associated with assimilation into the host culture, which triggers change of eating habits, diet, lifestyle, physical activity in general among immigrant populations in the United States (Gele & Mbalilaki, 2013). In addition, socioeconomic status, length of stay, employment, and access to health care in the host culture are associated with obesity (Albrecht & Gordon-Larsen, 2013). Albrecht and Gordon-Larsen (2013) and Gele and Mbalilaki (2013) noted that it is important to consider other social, behavioral, and environmental determinants that promote obesity in individuals (Booth et al., 2013, Branscum & Sharma, 2011; Jamil et al., 2014; Rendall et al., 2012). Rendall and colleagues (2012), for example, studied the relationship between convenient access to fast food and obesity among African-American and low-income populations. The study found that fast food restaurants were associated with predominantly African-American and low-income neighborhoods and a prevalence of

obesity 13 times denser in African-American and low-income population than Caucasian neighborhoods (Rendal et al., 2012). Similarly, Booth and colleagues (2013) stated that more fast food consumption, purchases away from home, exposure to more unhealthy food advertisement, easy access to unhealthy foods, and intake of sugar-sweetened sodas significantly increased obesity rate in African-American neighborhoods than Caucasian neighborhoods. According to CDC (2014), African-Americans were 70% less likely to engage in physical activity than Caucasian due to lack of access to parks, playgrounds and recreational centers, which have a 20% to 45% greater risk of becoming obese.

Obesity and Immigrants in the United States

The number of immigrant populations continues to increase in the United States over the years and one in every five residents in the United States. will be immigrants by 2050 (CDC, 2013). The diverse immigrant population will increase in the United States (Choi et al., 2011), which can result in health disparities among different immigrant groups (Migration Policy Institute, 2012). Obesity is the most common health problem among the health disparities in various immigrant groups in the United States (Edberg, Cleary, & Vyas, 2011). Due to the changing of demographics, the numbers of obese and overweight immigrants are increased and associated with obesity-related chronic diseases such as diabetes nationwide (Oza-Frank & Narayan, 2010). Researchers reported that migration from low-income countries to high-income countries is associated with weight gain after a length of residency of 5 to 10 years (Delavari, Sønderlund, Swinburn, Mellor, & Renzaho, 2013). The obesity rate is also related to age, gender, acculturation pattern, and socioeconomic status in the new country for immigrants (Delavari et al., 2013).

Several studies showed that an association between the prevalence of obesity, gender, SES, and age exist as significant predictors in immigrant populations (Choi et al., 2011; Delavari et al., 2013; Rendall et al., 2012). Ike-Chinaka (2013) investigated the role of the factors age, gender, length of time, and income level, and the results indicated that the amount of total caloric and fat intake was associated with SES and obesity. In addition, women are less likely to be physically active than men in African-American immigrants due to cultural factors, lack of transportation, educational level, limited financial resources and specific clothing needs to participate in physical activities (Ike-Chinaka, 2013). The gender difference may be a contributory factor to obesity in immigrant populations (Ike-Chinaka, 2013).

Schaefer and colleagues (2009) reported that Mexican immigrant women had higher rates of obesity over Spanish speaking American-born women. Similarly, Averett, Argys, and Kohn (2010) reported that female immigrants have 10% increased susceptibility to obesity than native-born counterparts upon arrival into the host country. However, immigrants are less likely to be overweight or obese as compared to American-born non- Spanish-speaking people (Choi, 2011). This study found that gender was not associated with obesity in Meskhetian Turk (Ahiska) immigrant population.

Researchers have documented the role of different predictors, including length of stay, a high dietary acculturation, access to health care, physical activity, and SES and health disparities associated with the prevalence of obesity in immigrant populations (Choi, 2011; Delavari et al., 2013; Rothe et al., 2010). Length of stay was found to be a significant predictor of overweight and obesity status in immigrant populations (Averett

et al., 2012; Delavari et al., 2013; Kirby et al., 2012; Lokuruka, 2013; Schaefer et al., 2009). For example, Hispanic immigrants with prolonged stays of 10 to 15 years have a greater risk of obesity (Kaplan et al., 2004). The studies showed that immigrants tend to become less healthy than individuals born in the host country upon arrival (Edberg et al., 2011). While length of residency is associated with obesity and non-healthy dietary patterns in Mexican and African-American immigrants (Carter-Pokras & Bethune, 2009) in the United States, it is not positively associated with obesity for European, United States, Canadian and Latin American immigrants who resided in Spain (Gtierre-Fisac, Marin-Guerrero, Regidor, Guallar-Castillon, Banegas, & Rodriquez-Artalejo, 2009). Akresh (2008) examined new immigrant health status upon arrival in the United States. Interviews were used to investigate how migration affects immigrants' health status in different immigrant groups. Results showed that 87% of Western European immigrants and 78% of African immigrants were the most likely population to have excellent health while 61% of Mexican immigrants were the least likely to experience positive health status (Akresh, 2008). More research was needed for Meskhetian Turk (Ahiska) immigrants due to the lack of literature on their health status.

Singh, Siahpush, Hiatt, and Timsina (2011) investigated acculturation risk factors and socio-demographic factors including age, gender, physical activity, employment, marital status, duration of residency, occupation, and income in 30 different minority groups such as Latino, African-American, Asian, Pacific Islander, and European. These authors found that immigrants in 30 different social groups have different healthy dietary patterns and consumed less significant calories/fat than individuals born in the United

States. Sussner, Lindsay, Greaney, and Peterson (2008) found similar findings for Su mothers and Liberian immigrants who noted that access to healthier food and food choices such fruits and vegetables were much better in their native countries. Moreover, Ade and colleagues (2011) reported that immigrants who migrated to the host culture were found to be physically less active and less knowledgeable about the risk factors of eating unhealthy foods. Sussner and colleagues (2008) found that dietary change was also significantly associated with longer residency, consumption of high fat diet, and decreased consumption of vegetables and fruits (Sussner et al., 2008). Many researchers identified that the consumption and easy access to fast foods and unhealthy dietary habits were significant contributors to the prevalence of obesity in immigrant populations (Wen, Kowaleski-Jones, & Fan, 2013).

Acculturation Process of Arab Immigrants in the United States

Arab immigrants have been migrating to the United States last three decades. According to the United States Census Bureau, the Arab American population is approximately 4 million and it is larger than some minority groups such as Native Hawaiians and Pacific Islanders (Tan, 2014). Although the list of differences among cultures, adaptation processes in the host culture, lifestyles, and other social and demographic factors can be long between Arab immigrants and Meskhetian Turks (Ahiska) immigrants, it might be helpful to compare similarities and differences of both immigrant groups as they have been immigrating to the United States due to similar reasons. Acculturation is the inevitable process that may be perceived differently by each group due to differences of backgrounds and experiences in the host culture (Ibrahim &

Case, 2011). However, Arab immigrants and Meskhetian Turks (Ahiska) immigrants may have some similarities during adaptation process due to their belief in the same religion, which directly influences the acculturation process of both immigrant groups. Therefore, it is reasonable to argue that positive and negative factors influence the acculturation process in these immigrant groups.

Ibrahim and Case (2011) examined the relationship between religion, lifestyle, gender, age, and marriage and the process of acculturation among Arab immigrant after resetting in the United States. Such variables among Arab immigrants in the United States seem to be negatively correlated with the process of acculturation in the United States (Ibrahim & Case, 2011). A negative correlation among Arab immigrants was found between older ages and the level of acculturation and gender and level of acculturation (Ibrahim & Case, 2011). There are several studies that provide similar negatively correlated results between variables such as intermarriage, religion, language, attitude and the acculturation process in the United States (Ali, 2010; Ammar, 2000; Tan, 2014). Today, however, due to various reasons, including a less traditional family structure, intermarriage with non-Arabs, changes in their everyday and personal lives, and lower level of religiosity and remaining longer in their host culture, Arab immigrants tend to be highly acculturated in the host culture of the United States (Nobles & Sciarra, 2000). Arab immigrants who are highly acculturated in the United States compared to less acculturated counterparts expressed different moral and ethical values, dietary change, and westernized cultural and religious differences (Nobles & Sciarra, 2000). The authors found that Arab immigrants who arrived in the United States at a younger age

were better acculturated than their less acculturated counterparts because they preferred a westernized lifestyle and American food (Nobles & Sciarra, 2000).

Arab immigrants and Meskhetian Turk (Ahiska) immigrants tend to have some common norms and values because they have traditional Middle Eastern culture, eating habits, lifestyle, religious beliefs, and the moral values (Ibrahim & Case, 2011). It is possible to expect that family values and religious practices play an important role in the professional lives and personal interests of Meskhetian Turk (Ahiska) immigrants in the United States. As mentioned, Arab immigrants who have longer residency in the United States are more assimilated and experienced cultural changes in terms of language, culture, religious practices, and the relationship with others in society (Tan, 2014). It is reasonable to argue that the Meskhetian Turk (Ahiska) immigrants may experience similar changes in the dominant culture in the United States. According to Tan (2014) the process of acculturation and assimilation was influenced by social and economic factors among Arab immigrants in the United States. Arab immigrants have had experienced many difficulties and barriers with life at the initial stages of migration and acculturation (Tan, 2014). Thus, they were exposed to different social, cultural, and economic factors that played important roles in the acculturation process of immigrants (Tan, 2014). It was important to explore the process of acculturation, perceived stress, and other potential predictors of obesity among Meskhetian Turk (Ahiska) immigrants in the United States as they would have experience the same or similar difficulties in their lives. On the other hand, due to different reasons it was still unknown to scholars, the rate of obesity, the

relationship between acculturation and obesity, and perceived stress and obesity among Arab as well as Mekhetian Turk (Ahiska) immigrants in the United States.

Although the relationship between acculturation, eating habits, perceived stress, and obesity has not been studied sufficiently among Meskhetian Turk (Ahiska) immigrant and similar immigrant population (e.g., Arab immigrants and Turkish immigrants), there was a gap in the literature to show the relationship between acculturation, perceived stress, and other predictors and obesity. The influence of acculturation, diet, perceived stress, socioeconomic status, length of stay, and physical exercise on the obesity of these immigrant groups remains largely unexplored. Thus, the aim of this study was to explore the relation between acculturation, perceived stress, and other predictors of obesity among the Meskhetian Turk (Ahiska) immigrants in the United States.

Literature Review Related to Key Variables

Studies show that obesity has been associated with environmental, cultural, socio-demographic, and physical issues in different populations that faced health disparities (Berry, 2008). The findings of the studies show that there was a significant relationship between obesity and acculturation, stress, age, gender, length of stay, physical inactivity, and income in immigrant populations (Bertera, Bertera, & Shankar, 2003; Drewnowski & Specter, 2004; Ike-Chinaka, 2013). There was a lack of research about obesity in the Meskhetian Turk (Ahiska) immigrants after arrival in the United States. However, diet, physical activity, acculturation, income, gender, age, length of stay, and education is associated with obesity in Hispanic, Asian, Nigerian, African-American, and European

immigrants in the United States (Carter-Pokras & Bethune, 2009). I reviewed the key variables including acculturation, diet, and physical activity, length of stay, age, gender, perceived stress and socioeconomic status that have contributed to the increase in obesity among other immigrant populations.

Acculturation and Obesity

Acculturation is defined as the process of interaction and cultural change with others in another cultural environment (Berry, 2008). Researchers have investigated acculturation and obesity in different minority populations such as African-American, Latino, and Nigerian immigrants (Ike-Chinaka, 2013). Studies investigated a relationship among obesity and different acculturation risk factors as a result of adaptation to the host culture (i.e., poor socioeconomic status, lack of access to health care, length of stay, physical activity, and immigration status; Corral & Landrine, 2008). There is evidence that socioeconomic status, which is associated with acculturation, triggers a significant change in obesogenic behaviors in the host culture for immigrant populations (Delavari et al., 2013). Obesogenic behavior is tending and pertaining to obesity by demonstrating unhealthy eating habits and sedentary lifestyle (CDC, 2014).43.6% immigrants live in poor neighborhoods because they have little income, which they are susceptible to health-related behaviors that contribute to a higher prevalence of obesity (Delavari et al., 2013).

Ike-Chinaka (2013) studied acculturation risk factors (i.e., access to health care, duration of stay, and socioeconomic status) and obesity among Nigerian immigrant children in Northern California. The author found that physical activity, SES, and length of stay is associated with obesity and increased BMI among Nigerian children. The

association was attributed to changes in food preferences, social preferences, and behavioral changes (Ike-Chinaka, 2013). In addition, Barcenas (2007) studied acculturation and obesity on Mexican-American adults and the study showed that there is a relationship between BMI, gender, and birthplace and acculturation level. The study showed that the length of residency was significantly associated with the risk factors of obesity in men and women in the US by 2% and 1% respectively (Barcenas, 2007). There was also high correction between obesity and highly acculturated men and women among Mexican-Americans, which was 4% and 3% respectively. Similarly, Khan, Sobal, and Martorell (1997) reported that Mexican-American second and third generation immigrants are highly acculturated to the host culture and have higher BMI than first generation immigrants (Khan et al., 1997). Studies show that acculturation factors (e.g., longer duration, high acculturation, gender, and BMI) have been linked to obesity in studies conducted with Mexican-American immigrants (Barcenas, 2007; Khan et al., 1997).

Other studies examined on African-American, Nigerian, Salvadoran, and Hmong American immigrants to understand how acculturation affects dietary patterns and overall health. For instance, Ade and colleagues (2011) found that acculturation was positively associated with obesity in African-American immigrants in the United States compared to less acculturated American born African-Americans. The authors found that lack of physical activity, low income, consumption of high calories/soda, and behavioral changes in diet due to the adaptation to the host culture attributed to the risk of obesity in African-American immigrants (Ade et al., 2011). The study by Berter, Bertera, and Shankar

(2003) about Salvadoran immigrants showed the similar results. The authors found that acculturated Salvadoran men and women were more likely to become overweight or obese due to fat intake, consumption of soda and high calories of food, eating less fruits and vegetables. In addition, higher degree of acculturation was significantly associated with obesity in Hmong American immigrants (Franzen & Smith, 2009) and Puerto Ricans immigrants in the United States compared to their less acculturated counterparts (Fitzgeral, 2006).

Chen, Juon, and Lee (2012) examined acculturation and BMI in three different minority groups Chinese, Korean, and Vietnamese. The authors found that younger age at arrival was associated with increased BMI among Chinese and Korean immigrants while it was not associated with increased BMI in Vietnamese immigrants. Younger age arrival in the host culture among Chinese and Korean immigrants was associated with high acculturation, which is linked to obesity (Chen et al., 2012). The authors noted that gender was a significant factor for obesity among Korean and Chinese immigrants who highly acculturated because of early arrival in the host culture (Chen et al., 2012). The likelihood of obesity was 5 times more likely in Korean males than females. Similarly, Chinese males are more prone to be obese compared to females due to consumption of high fatty foods, sodas, sugary snacks, and fast foods (Chen et al., 2012). Ade and colleagues (2011) noted that obesity and its health effects are more prevalent in African-American immigrants but did not find an effect for gender. Since gender was found to be significant predictor of obesity in some immigrant populations (Chen et al., 2012), it was

important to compare of the prevalence of obesity in Meskhetian male and female participants in this study.

Asian immigrants who are highly acculturated in the United States compared to less acculturated counterparts experienced dietary change along with the acculturation process (Chen et al., 2012). The authors found that Asian immigrants who arrived at younger age in the United States preferred American food, more fats or high calorie intake, less consumption of fruits and vegetables and higher BMI than less acculturated Asian immigrants (Chen et al., 2012). Similarly, Unger, Reynolds, Shakib, Spruijt-Metz, Sun, and Anderson (2004) found decreased physical activity, decreased consumption of fish, fruits, and vegetables, increased intake of sugary foods, high fat, and fast food among Asian American and Hispanic adolescents in Southern California. The authors stated that acculturation was significantly associated with a lower frequency of physical activity and a higher frequency of fast food consumption (Unger et al., 2004). Immigrants who are less acculturated may not benefit from the amenities in their community due to language and cultural barriers, which may lead to sedentary lifestyle and loneliness, which has been shown to be an independent risk factor for physical inactivity (Shi et al., 2015). Tovar, Must, Metayer, Gute, Pirie, Hyatt, and Economos (2013) found similar results in Brazilian, Latin American, and Haitian female immigrants. For example, busy work schedule, acculturation, income, high level of stress, less social support, and isolation were associated with obesity and physical inactivity in all three-immigrant populations (Tovar et al., 2013). Studies have found that immigrants who are highly

acculturated are more likely to become overweight and obese compared to those who are less acculturated in immigrant populations (Abraido-Lanza, Chao, & Florez, 2005).

The effects of acculturation seemed to differ for various ethnic groups in diet, physical activity, morbidity, and health status in Asian, Hispanic, African-American, Nigerian, and European immigrants in the United States (Corral & Landrine, 2008). For example, Type 2 diabetes is the common chronic health problem for those who are highly acculturated among Hispanic immigrants (9.7%) while it is less prevalent among Chinese immigrants (3.4%; Kandola, Diez-Roux, Chan, Daviglus, Jackson, Ni, & Schreiner, 2008). Zeigler-Johnson and colleagues (2013) noted that acculturation risk factors (e.g., gender, younger age at arrival, longer stay in the host culture, and low income) were more important risk factors for obesity than immigrant status in ethnic groups.

Perceived Stress and Obesity

Stress is a psychosocial factor that affects individuals' eating habit directly or indirectly (Blundell & Gillett, 2001). Eating habits are one of the potential predictors that are associated with obesity and overweight (Blundell & Gillett, 2001). Stress can be a detrimental psychosocial factor that is commonly associated with anxiety, sadness, negative feelings, emotions, and frustration that can influence behaviors (Drewnowski & Specter, 2004). Perceived stress may differ from stress where the individuals perceive inner feelings of stress (Daniel, Moore, Decker, Belton, DeVellis, Doolen, & Campbell, 2006). Perceived stress is associated with environmental, cultural, social, and socioeconomic factors that directly influence individuals' experiences, feelings, and perceptions of stress (Daniel et al., 2006). It is important to understand health outcomes

of perceived stress whether it triggers from physiologically, socially, or psychosocially. Perceived stress evaluates individuals' stressful experiences, cognitive appraisal, and coping techniques with stressors (Drewnowski & Specter, 2004). Many studies showed that stressful situations influence the persons' eating behaviors which is associated with obesity and overweight (Blundell & Gillett, 2001; Drewnowski & Specter, 2004).

Rohrer and Rohland (2004) indicated that food choices and eating behavior are two main predictors that are associated with stress and emotional well-being. The authors concluded that eating behavior and food choices are associated with loss of appetite when the person exposed to stressful and emotional situations. Thus, poor food choice, lack of food, and unhealthy eating behavior contribute to weight gain, overweight, and obesity directly and indirectly (Rohrer & Rohland, 2004). The study by Glans, Rimer, and Lewis (2002) showed that stress is a main predictor of excessive dietary intake, soda consumption, dietary restrain, and eating disorder. Unhealthy eating and weight gain have been well documented and supported by many studies (Daniel et al., 2006; Rohrer & Rohland, 2004), the individuals who do not have ability to cope with stressors engage in eating as an alternative way of fully eating behavior. In stressful situations, individuals may ingest more calories; consume more soda, and high fat foods which increase the risk of becoming overweight and obese (Drewnowski & Specter, 2004).

Studies examined work-related stress and obesity and concluded that stressful situations and overeating may result to lead to weight gain and obesity related health problems (Macht & Simons, 2000). The study by Overgaard, Gamborg, Gyntelberg, & Heitmann (2006) examined associations between stress and daily food intake during low

and high workload in the office environment. The authors showed that workload is a greater indicator that is associated with high level of stress, higher energy, sugar intake, soda consumption, and saturated fat. The results of the study showed that the person who has high workload experienced high stress and energy intake as compared to the person has low workload (Overgaard et al., 2006)

Sammel, Grisso, Freeman, Hollander, Liu, Nelson and Battistini, (2003) examined weight gain and stress in African-American and Caucasian American women. The authors used PSS to measure stress level and another instrument to assess BMI. The result of the study showed that there is an association between stress, anxiety, and BMI (Sammel et al., 2003). The level of stress was significantly associated with weight gain in African-American and Caucasian American women (Sammel et al., 2003). The authors also investigated social stressors including low SES, physical exercise, mental health, social support, and education to figure out the effects of variable such as stress on obesity (Sammel et al., 2003). The study findings showed that social stressors (e.g., low SES, physical exercise, mental health, social support, and education) may affect obesity depending on the stressful events (Sammel et al., 2003). Most studies on stress and obesity were associated with eating behavior, social stressors, eating disorders, diet, psychological and physiological predictors (Daniel et al., 2006; Rohrer & Rohland, 2004; Samuel et al., 2003). However, there are still many gaps to support the role of stress as predictor of obesity in different population groups. Throughout the history, Meskhetian Turk (Ahiska) immigrants have experienced a stress in their life due to the different factors. However, there is no study of this subject in Meskhetian Turk (Ahiska)

immigrants, where perceived stress may promote obesity. There is a lack of literature that examines rates of obesity in Meskhetian Turk (Ahiska) immigrants. Therefore, current research examined the extent to which perceived stress would predict obesity in Meskhetian Turk (Ahiska) immigrants. The existing written PSS used to collect data from Meskhetian (Ahiska) immigrants to examine whether or not perceived stress was associated with obesity in this sample group. Since there was no specific scale to measure perception of stress in this sample population, the PSS was the most appropriate scale to understand the participants' feelings and thoughts about life situations as stressful.

Diet and Obesity in Immigrant Populations

Diet and obesity differs among immigrant populations depending on various factors such as socioeconomic status, cultural backgrounds, psychological, physiological, environmental, and behavioral factors (Wen, Kowaleski-Jones, & Fan, 2013). Many studies examined the interaction between diet and obesity in general population as well as minority groups and the results showed that obesogenic environment, consumption of fast food, high intake calories, eating unhealthy foods, and less consumption of fruits and vegetables were associated with obesity (Obisesa, 2015). The researchers identified that these social, psychological, and environmental factors are significant contributors of obesity in immigrant groups (Wen et al., 2013). The study by Castellanos, Connell, and Lee (2011) examined acculturation, dietary intake, psychological factors, and weight gain among Latino male population in the United States. The authors examined sociodemographic variables and other variables to figure out the interaction of obesity

and these variables among Latino male population residing in the United States (Castellanos et al., 2011). The result of the study showed that there is an association between acculturation and obesity, increased consumption of soda, high intake fats, fast foods, decreased consumption of fruits and vegetables and obesity among Latino male population after residing in the United States (Castellanos et al., 2011). The results indicated that assimilation/acculturation in the host's culture was found to have a significant association of eating habit, consumption of unhealthy foods, and decreased of fruits and vegetables among Latino male population in the United States (Castellanos et al., 2011).

Tseng and Fang (2011) examined the interaction between dietary behaviors, stress, and obesity among Chinese female immigrants. The results indicated that there is an association between stress, higher dietary intake, and obesity among Chinese female immigrants (Tseng & Fang, 2011). The authors provided evidence that when immigrant Chinese females were gradually acculturated in the host culture, their eating habits, behaviors, and overall dietary intake gradually changed, which was also associated with migration-related and live stressors (Tseng & Fang, 2011). The study results showed that stress and level of acculturation were significant contributors of obesity among immigrant Chinese females in Philadelphia (Tseng & Fang, 2011).

In addition, many studies indicate that there is a direct association between diet and obesity among different immigrant populations (Castellanos et al., 2011; Gele & Mbalilaki, 2013; Tseng & Fang, 2011). The consumption of higher amount of soda, sugar, fats, fast-food meals, decreased consumption of fruits, vegetables, fish, and other

healthy products were significantly associated with obesity in general (Sharkey, Johnson, and Dean, 2011; Obisesan, 2015).

Obesity and Physical Activity in Immigrant Populations

Sedentary lifestyle and lack of physical activity have been attributed to obesity in immigrant populations (Lokuruka, 2013). Due to different barriers immigrants experience sedentary lifestyle, which triggers an increased rate of obesity (Drummond, Mizan, Burgoyne, & Wright, 2011). The prevalence of obesity and overweight is associated with chronic diseases (i.e., type 2 diabetes, stroke, heart disease, and psychological problems), morbidity and mortality for individuals (Drummond et al., 2011). Gualdi-Russo, Zaccagni, Manzon, Masotti, Rinaldo, and Khyatti (2014) found that there is a significant association between increased sedentary lifestyle and unfavorable changes in eating habits, which are the main cause of decreased physical activity and the development of overweight and obese immigrants. Gualdi-Russo and colleagues (2014) investigated barriers to physical activity and obesity for those who migrated from North Africa in European countries. The authors noted that lack of knowledge about exercise, lack of time, lack of access to play areas, and lack of interest in doing exercise were common barriers, which are linked to overweight and obese immigrant populations (Gualdi-Russo et al., 2014). Also, Reichert, Barros, Domingues and Hallal (2007) found that one-third of immigrants did not exercise at all and know the potential benefits of exercise after arrival in the host country so the 1/3 that did not exercise knew the benefits. The barriers of physical activity needed to be investigated whether or not they were predictors of obesity in the Meskhetian Turk (Ahiska) immigrants.

A number of studies showed that migration to European countries were a risk factor of being overweight and obese among immigrant children as result of acculturation and lifestyle changes (i.e., changes in dietary patterns, intake more fat, sugary foods, consumption of soda, and sedentary lifestyle; Russo et al., 2014). Singh, Kogan, and Yu (2009) studied the prevalence of obesity among US immigrants and found that sedentary lifestyle and physical inactivity levels were higher for immigrant children than native-born children. The authors reported that nearly 22% of Hispanic immigrant children were physically inactive compared to 15% of Hispanic native born children (Singh et al., 2009). Similarly, Rothe and colleagues (2010) examined on different barriers, including weather condition and obesity in African immigrants. The findings indicate many African immigrants found it difficult to get used to the weather and engage in regular physical activity in the host country, thus disengage in regular physical activity is linked to the increased risks of obesity (Rothe et al., 2010). Moreover, the authors reported that socioeconomic status, lack of transportation, gender, cultural norms, and certain misconception about physical activity were associated with physical inactivity in African immigrants.

Urbanization is associated with less physical activity among immigrants, which increases the risk of obesity (Mungreiphy & Kapoor, 2010). Brisson (2011) reported that level of physical inactivity and weight among Hispanic children was associated with parental physical activity pattern. The author stated that more than 40% of Hispanic children less likely to engage physical activity or receive regular health care as compared to non-Hispanic white children (Brisson, 2011). Since lack of knowledge about physical activity

is associated with increased risk factor of overweight and obesity in immigrant groups (Russo et al., 2014), parents' knowledge about healthy lifestyle may increase to engaging in physical activity and reduce the potential risk factors of obesity and its health effects in the Meskhetian Turk (Ahiska) immigrants.

Socioeconomic Status and Obesity

A number of studies have shown that socioeconomic status is related to level of physical activity in many ethnic populations (Berger, Der, Mutrie, & Hannah, 2005). Socioeconomic status influences physical activity behaviors differently in lower and higher socioeconomic people (Berger et al., 2005). The immigrants who have lower-income are particularly vulnerable to obesity and obesity related diseases (Berger et al., 2005). Lower SES immigrants are less likely to afford sports equipment and facilities, have access to parks, gardens, and other facilities to exercise; thus they are more likely to experience sedentary lifestyle as compared to those with highest SES (Dawson, Sunquist, & Johansson, 2005). People from lower SES are more prone to gain weight and experience chronic health problems such as high blood pressure, cholesterol, cardiovascular disease, cancer, diabetes, stroke, and arthritis (Zaninotto, Head, Stamatakis, Wardle, & Mindell, 2009). Shi, Zhang, Van Meijgaard, MacLeod, and Fielding (2015) reported that richer communities may have better recreational activities, transportation, and sports facilities that are better integrated into the community design, which provides opportunity for individuals to be physically active (i.e., walk, bicycle, run) as compared to a low income communities. The authors found that low-income communities may have limited resources and barriers to access public health resources

and sports facilities (Shi et al., 2015). According to CDC (2014), 43.6% of immigrants live in low-income communities compared to 31.1% non-immigrant natives; thus, immigrants are at a higher risk for becoming obese. In addition, Caramota (2012) found that nearly 23% of the immigrants live in poor neighborhood as compared to 13.5% of Americans citizens. Due to the low-income and high cost of healthy foods, the immigrants are more prone to intake high caloric fat and sugar that is linked the risk of being obese (Caramota, 2012).

Obisesan (2015) examined the predictors of obesity such as age, education level, gender, occupation, diet, and level of physical activity, and income and found that lower socio-economic status contribute significantly to obesity in immigrant population. The author also concluded that not only low income, but also other predictors including age, gender, education level, and physical activity are influential factors of obesity. Ade and colleagues (2011) carried out a cross-sectional study on 303 African-American adults using Behavioral Risk Factors Surveillance System (BRFSS) questionnaires and examined the association between socioeconomic status and obesity prevalence. The author found that African-American women with low-income had an increased risk for obesity as compared to white women (Ade, 2011). Layton, Parker, Hermann, and Williams (2009) added that higher household income (e.g., $34,999-$50,000 and more) increases the immigrants perceived health status as compared to lower household income (e.g., $15,000-$24,999) increases the immigrants vulnerability to poor health status such as obesity. In support, Shi and colleagues (2015) pointed out that low-income is associated with negative and detrimental health challenges in immigrant populations

because of other predictors related to their health status such as lack of access to health care, unemployment, and sedentary lifestyle. Shi and colleagues (2015) agreed with Obisesan (2015) that no one factor may significantly contribute to obesity in immigrant groups and holistic approach is needed to understand the different predictors with respect to low income. Studies show that obesity has been associated with low SES in different immigrant groups (Ade et al., 2011; Caramota, 2012; Layton et al., 2009; Shi et al., 2015; Obisesan, 2015) and the SES predictor must be considered as major contributor of obesity in the Meskhetian Turk (Ahiska) immigrant population. Therefore, this study examined the socioeconomic status as predictor of obesity in Meskhetian Turk (Ahiska) immigrants and no association was found between SES and obesity in this sample population.

Length of Stay and Obesity in Immigrant Population

Research shows that length of stay in a host culture deteriorates immigrants' health (Ro, 2014; Sacnhez-Vaznaugh et al., 2008; Yeh et al., 2009). Duration of stay in the host culture is linked to poorer health, unhealthy dietary pattern, and the negative acculturation effect (e.g., health behavior) on the new population (Averett et al., 2012; Oza-Frank, 2010; Ro, 2014; Torres & Wallace, 2013). Ro (2014) investigated the length of residency, acculturation, and body weight in Asian immigrants, as it was related to obesity and weight trends in Asian immigrants. The research showed that immigrants had an increased likelihood of a higher BMI and obesity as compared to their native born counterparts (Ro, 2014). Also, Ro examined socio-demographic factors including age, gender, education, and dietary preferences, which were associated with obesity and

increased body weight in Asian immigrants in the United States for those who stayed 0-5 years and 6 to 10 years duration (2014). Asian immigrants who stayed 6-10 years had an increased likelihood of being overweight and obese due to exposure to high acculturation as compared to those who stayed 0-5 years (Ro, 2014). Sanchez-Vaznaugh and colleagues (2008) examined the duration of stay and obesity among Hispanic immigrants in the United States. The researchers reported that newly arrived Hispanic immigrants are healthier than their U.S. born counterparts and longer duration of stay tends to diminish the healthy aspects in dietary patters, healthy eating, and low calorie intake in Hispanic immigrants (Sanchez-Vaznaugh et al., 2008).

Kaplan, Huguet, Newsom, and McFarland (2004) found that length of stay increased the likelihood for a higher body mass index and obesity rates for Hispanic immigrants (Kaplan et al., 2004). Obesity rates for the 0-4 years in residence was 9.4%, 5-9 years in residence was 14.5%, 10-14 years in residence was 21%, and over 15 years in residence was 24.2% due to assimilation, acculturation, unhealthy eating habits and sedentary lifestyle in the United States (Kaplan et al., 2004).

Length of stay is also related to obesity in Chinese immigrants residing in the US (Afable et al., 2015; Yeh et al., 2009). Afable et al. (2015) examined duration of residency in the United States among Chinese immigrants for residences of 0-5 years, 6-15 years and 15 years and more and found that increased time in the United States was found a greater risk factor of obesity in Chinese immigrants. Similarly, Yeh and colleagues (2009) found increased BMI and obesity in Chinese immigrants who stayed longer in the United States than who were born in the United States.

Higher prevalence rates of obesity have consistently been associated with length of residency in immigrant populations (Afable et al., 2015). The different results of studies in Chinese, Hispanic, and Asian immigrant populations suggest that the effect of length of residency on obesity may be quite different depending on the economic, social, and environmental factors. There was no study of this subject in Meskhetian Turk (Ahiska) immigrants, where length of residency could promote obesity. There was a lack of literature that examined rates of obesity in Meskhetian Turk (Ahiska) immigrants. Therefore, current research examined the extent to which length of stay could predict of acculturation subfactor (length of stay, SES, language use, food) that would related to obesity in Meskhetian Turk (Ahiska) immigrants.

Age of Migration and Obesity

The prevalence of obesity dramatically increases in all age groups, especially in minority populations in the United States (Ogden et al., 2006). Antecol and Bedard (2006) found that age is an important factor associated with an increased risk of becoming overweight or obese among immigrant populations. The authors found that younger age of arrival (20 years and less) arrival to the host country was significantly associated with greater odds of overweight and obesity in Mexican American and non-Hispanic African-American immigrants. The authors examined the relationship between weight gain, age, gender, and race and further concluded that the prevalence of obesity was significantly increased among non-Hispanic African-American men and women during the 6 years period before the age of 20 years (Goel et al., 2004). Choi (2012) also found that younger age arrival to the host country is more likely to experience dietary

change, high acculturation, and unhealthy eating habits than who arrive at older ages. The researchers also found that younger immigrants who arrived at the age of 20 and younger are more likely to be highly acculturated, build new social networks, intake high calories and sugar, and less consumption of fruits and vegetables than that of older aged immigrants (Goel et al., 2004). In addition, Roshania and colleagues (2008) found that the prevalence of obesity and overweight was significantly associated with age at arrival for Latin American, Caribbean, and Asian immigrants. Prevalence of obesity and rates of being overweight differed among the immigrant groups depending on at arrival in the United States (Roshania et al., 2008). For example, 23.74% of people at the age of 20 years and younger in Asian immigrants reported higher levels of dietary change which was associated with overweight and obesity as compared to those who arrived at older ages (Roshania et al., 2008). The researchers further concluded that among Latin Americans, the Caribbean and Asian immigrants 20 years and younger age of arrival, those having resided in the United States. for ≥10 years are more likely to self –report being overweight and obese as compared to those who arrived at older ages ($P = 0.42$) (Roshania et al., 2008).

Goel and colleagues (2004) investigated BMI, acculturation, and the length of stay in the United States for immigrants aged 18-59 years old in Mexican American immigrants and found that the obesity rate increased from 8% for foreign-born who lived in the United States less than 1 year to 19% of foreign-born with at least 15 years of U.S. residence. The authors showed that obesity was associated with age of migration as well as length of residency in Mexican American immigrants.

On the other hand, Wolin, Colangelo, Chiu, and Gapstur (2009) conducted a survey to investigate the association of obesity with language acculturation and years in the United States. in 388 Hispanic women aged 40 years and older (mean average age= 52 years). These authors concluded that 37.8% of women the aged of 40 years and older who lived in the United States. for 10 years or less were obese (Wolin et al., 2009). They also found that women the aged of 40 years and older who lived in the United States. for 20 years and more had twice the odds of being obese and overweight in Hispanic women (Wolin et al., 2009) Short-term immigrants in all age groups are less likely to become overweight and obese than long-term immigrants in the United States. (CDC, 2014).

Furthermore, Bustamante and colleagues (2010) stated that lack of health care insurance, undocumented living, and unknown of health care access were associated with prevalence of obesity among Mexican Hispanic and African-American population. Chio (2012) also found that undocumented living, immigration status, lack of health insurance, and limited access to health care influence the health status and increase the potential risk of obesity in Nigerian immigrants and non-Hispanic African-American people. The result of the studies indicated that BMI was the same across the subgroups except Hispanic children and the dietary patterns was also varied among different ethnic groups (Albrecht & Gordon-Larsen, 2013; Sing et al., 2009). Rashania, Venkat-Narayan, and Oza-Frank (2008) studied the length of stay and age of immigrants who arrived in the host culture 20 years old or younger and 50 years old and older. These authors found that immigrants who were 20 years old and younger and stayed 15 years or more in the host culture are 11 times more likely to become obese than their native counterparts who were born and

lived at the same time in the host country for 15 years or more. Adversely, immigrants who were 50 years old and older did not indicate significant different in the prevalence of obesity (Rashania et al., 2008). Research indicates that immigrants who arrive in the host country at a younger age (20 years and younger) are at a higher risk for obesity than those who arrive at older ages. Due to the lack of literature, the relationship of age and obesity in the Meskhetian Turk (Ahiska) immigrant population was unknown, this study examined age and obesity and no association was found between age and obesity.

Gender and Obesity

Studies examined gender-specific disparities in obesity in different minority populations (Borders, Rohrer, & Cardarelli, 2006; Sanchez-Vaznaugh et al., 2008) by adjusting SES, acculturation, ethnicity, physical activity, diet, alcohol consumption, education, high calorie intake, consumption of vegetables, and access to health care. Gender is not the primary factor that may significantly contribute to obesity in immigrant groups (Sanchez-Vaznaugh et al., 2008). Borders and colleagues (2006) examined gender, socioeconomic status, and race/ethnicity on 5078 participants. The authors found that Hispanic and African-American males are less likely to become obese as compared to Hispanic and African-American females. On the other hand, the study results showed that the obesity rate was higher among Hispanic and African-American females as compared to non-Hispanic European American females (Border et al., 2006). In support, Rohrer and Rohland (2004) examined the predictors of socio-economic status among low-income females and males in urban areas. The authors found a different association between gender and income level for the risk of obesity (Rohrer & Rohland, 2004). The

study showed that household incomes higher ($25,000-$74,499) in males were more likely to become obese as compared to the household incomes were lower in males ($25,000 or less). However, the household incomes lower among females were more likely to become obese as compared to the household incomes lower (Rohrer & Rohland, 2004). Result of the household income showed that having a higher household income was the predictor factor of obesity in males than females (Rohrer and Rohland 2004). Obesity differed significantly by the household income, education level, physical activity, and race/ethnicity for males and females (Rohrer and Rohland 2004). Due to the lack of literature, the relationship of gender and obesity in the Meskhetian Turk (Ahiska) immigrant population was unknown, this study examined the relationship between gender and obesity.

Theoretical Foundation Framework

This study examined the association between acculturation, perceived stress, and predictors (e.g., diet, socioeconomic status, and level of physical activity) of obesity in the Meskhetian Turk (Ahiska) immigrant population by using social ecological model with acculturation theory. Both of models/theories will provide a broad insight to understand the social influences that may contribute to obesity in this sample population.

Social Ecological Model

Many studies use the social ecological model to address the social ecological factors that are linked to behavioral change and obesity in different minority populations (Ade et al., 2011). Like in other studies, the social ecological model helped to understand the importance of the social environment that may be significant contributor to obesity in

the Meskhetian Turk (Ahiska) immigrants at the intrapersonal level. Many studies showed that physical environment, social support, social relationship, and behavioral changes are associated with obesity (Ade et al., 2011, Layton et al., 2013; Obisesan, 2015). Thomas (2009) found that social support was associated with acculturation, which enabled African-American immigrants to adopt in the society to prevent from obesity. Adopting in the society is associated with high acculturation level, which influenced the immigrants' behaviors, dietary patterns, and physical activity that contribute to obesity (Oza-Frank & Narayan, 2010). Therefore, social ecological model provided better understanding how influences at the individual, cultural, and organizational level contribute to obesity in the Meskhetian Turk (Ahiska) immigrants in this study. The study was examined the variables of acculturation, perceived stress, diet, SES, and physical activity that may contribute to obesity in this sample population by using Behavioral Risk Factor Surveillance System (BRFSS), Stephenson Multi-group Acculturation Scale (SMAS) and Perceived Stress Scale (PSS) and BMI. The BRFSS used to gather data about the sociodemographic variables, BMI, diet, SES, and physical activity. Social ecological model helped to understand which level of social influence contributes to obesity in Meskhetian Turk (Ahiska) immigrants. This model also helped to understand if there is an association between perceived stress (measured by PSS) and obesity among Meskhetian (Turk) Ahiska immigrants. The collected data from BRFSS, SMAS, and PSS helped to understand if there is a dietary acculturation and obesity in this sample population after seeing the result by an increase in the consumption of a high fat and diet. Therefore, in order to have a better understanding the relationship between the social

influences and the obesity rate in this sample population, the theoretical framework was based on social ecological model and acculturation theory in this study.

Acculturation Theory

Acculturation theory helped to understand the level of engagement and integration in the host culture (Abraido, Armbrister, Florez, & Aguirre, 2006). The level of acculturation is associated with obesity in many minority populations (Abraido et al., 2006; Ade et al., 2011; Gordon-Larsen et al., 2003). Due to the high or low level of acculturation, immigrants experienced and adapted to different barriers including environmental and socioeconomic, which was linked to health-related behaviors that contribute to higher or lower prevalence of obesity (Abraido et al., 2006). The study by Ade and colleagues (2011) applied the acculturation theory to determine whether the immigration status and acculturation risk factors are associated with obesity in African-American adults residing in the United States. The authors found that the predictors of obesity including age, length of residency, gender, physical activity has been associated with acculturation level and the prevalence of obesity, which was also associated with dietary behaviors and health outcomes (Ade et al., 2011). Acculturation theory helped to understand if there is a change from the Meskhetian (Turk) Ahiska food preference, language preference, and dietary change in the host culture after residing in the United States.

Literature Related to the Research Design and Methodology

A number of studies used logistic regression method to analyze cross-sectional data, which includes more independent variables (e.g., diet, physical activity, health

access, socioeconomic status, immigration status, gender, age, dietary habits, and length of stay) of obesity in different immigrant populations (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Kirby et al., 2012; Krueger et al., 2014). Ade and colleagues (2011) focused on investigating the different acculturation risk factors and obesity in 303 African-American adults residing in the United States. Ade and colleagues (2011) focused on the socio-economic, socio-demographic and other potentially confounding variables in African-American adults residing in the United States. The authors used the existing BRFSS questionnaires that have been conducted on a web-based survey design on a convenience sample of 303 African-American adults. The data obtained on socio-demographic characteristics, socio-economic characteristics, immigration status, frequency of food consumption and alcohol consumption, smoking, frequency of mental distress, and other personal variables. Body mass index (BMI) was measured the CDC's recommendation to classify BMI between 18-24 normal weight, 25-29 overweight, 30-35 moderately obese, and 35 and above morbidly obese. The authors applied descriptive statistics for each variable. Chi-square test was used of association between categorical independent variable and moderately obesity and morbid obesity. Multiple logistic regressions were then used to test for any association between independent and dependent variables for comparison of mean, standard measures of central tendency, and variances. There was no association found between immigration status, years of residency in the United States. and obesity. The results also indicated that gender was not a significant contributor of obesity and morbidly obesity among the participants. In addition, the results of the study

showed that other independent variables such as education, income level, medical care, and mental distress were not significantly contributor factor of obesity in African-American immigrants in the United States.

Summary and Conclusions

It is known that obesity is a growing health problem, especially for the immigrant groups, in the United States. (CDC, 2013). Many studies have been focusing on obesity and its predictors in different populations, but no attention was given to the Mesketian Turk immigrant population. The research in obesity will continue to expand to the different predictors in different groups in the United States. Many studies have found significant similarities in Latino, African-American, Asian, European, and Pacific Islander immigrants and the prevalence of obesity after resettled in the United States (Ade et al., 2011; Castellanos et al., 2011; Oza-Frank & Narayan, 2010; Singh et al., 2011; Sussner et al., 2008). Therefore, this research was important to compare the predictors of obesity in the Meskhetian Turk (Ahiska) immigrant and other minority groups. In this chapter, I identified a gap in literature by examining the predictors of obesity in different minority groups in the United States, whether the predictors were the increased or decreased risk factor of the prevalence of obesity. Lack of literature about obesity for the Meskhetian Turk (Ahiska) immigrant population makes them to be vulnerable to obesity and obesity-related health problems. More research needs to be done about the risk factors of obesity for this sample to prevent from negative health effects of obesity.

This study was the first step to increase public awareness and improve health literacy on the negative health effects of obesity and its associated risk factors in the Meskhetian Turk (Ahiska) immigrants. The studies carried out on many of these potential risk factors in different immigrant groups, however, prior to this study, none have studied the predictors (e.g., acculturation, perceived stress, age, gender, diet, SES, and physical activity) of obesity in the Meskhetian Turk (Ahiska) immigrant population in the United States. Increasing awareness of public about obesity and its risk factors may bring positive social change in the Meskhetian Turk (Ahiska) immigrant population. In chapter 3, I provided a description of the research methodology and statistical methods that was used to measure the prevalence of obesity in the Meskhetian Turk (Ahiska) immigrants. Also, I described the dependent (obesity) and independent variables (acculturation, age, gender, perceived stress, diet, SES, and level of physical activity), sample population, sampling strategy, method of data collection and analysis.

Chapter 3: Research Method

I used cross-sectional quantitative method in this study and examined the association between acculturation, perceived stress, and the potential predictors of obesity in the Meskhetian Turk (Ahiska) immigrant population in the United States. Although there are many predictors of obesity, this study examined how acculturation, perceived stress, diet, age, gender, socioeconomic status, and level of physical activity influence obesity among Meskhetian Turk (Ahiska) immigrants. I used an existing Behavioral Risk Factor Surveillance System (BRFSS) questionnaire to collect information on demographics, the Stephenson Multigroup Acculturation Scale (SMAS) to collect information of behavioral and attitudinal aspects of acculturation, and Perceived Stress Scale (PSS) to collect information regarding stress level among this sample population. In this chapter, I described the research design, sample population, sampling method, data collection and analysis methods, and threats to validity, and ethical procedures.

Research Design and Approach

I examined the relationship between the multiple variables (e.g., age, gender, SES, diet, physical activity, acculturation, and perceived stress) and obesity among the Meskhetian Turk (Ahiska) immigrant population in the United States in this study. In order to have a better understanding of the relationship between these multiple variables and obesity in this sample population, I used (the BRFSS, SMAS, and PSS) to collect information about acculturation, perceived stress, diet, SES, physical activity, other sociodemographic variables, and BMI. The independent variables were acculturation, perceived stress, age, gender, diet, SES, and physical activity and the dependent variable

was obesity. I used a quantitative design to evaluate the independent variables and obesity (dependent variable). In order to have a better understanding of the association that exists between the independent variables and obesity, I chose the cross- sectional research design as the most appropriate and effective design to answer the research questions (Obisesan, 2015). Therefore, I used descriptive analysis, bivariate analysis, cross tabulation, chi-square, multiple logistic regressions and Spearman's correlation to determine the association between independent variables and dependent variable. As mentioned, I used the BRFSS questionnaire, SMAS, and PSS in collecting primary data for the variables. According to Creswell (2013) with the quantitative cross sectional approach, the study was conducted quicker, less expensive, and efficiently. Other research methods would have required more time and expenditure, and were not ideal methods to conduct this study. The quantitative method was the most effective method of investigating acculturation, perceived stress, age, gender, diet, SES, and level of physical activity) of obesity in Meskhetian Turk (Ahiska) immigrant population in the United States.

Research Methodology

Sample Population

The sample population for this study was the Meskhetian Turk (Ahiska) immigrants, ages 18 years and older, and who had migrated in the United States. Although the number of Meskhetian Turk (Ahiska) immigrant population is uncertain in western part of the United States, Bilge (2012) stated that more than a couple thousand

people live in Western United States including California, Utah, and Idaho, where the participants recruited.

Sampling and Setting Method

In this study, I used a convenience sampling method, which is one of the main and common types of non-probability sampling methods used to recruit participants (Creswell, 2013). With convenience sampling, the samples are selected because they are accessible to the research. I chose subjects because they are easy to recruit. This technique is the most common sampling technique for this study. I chose the convenience non-probability sampling because it was more feasible, considered easiest, least time consuming and cheapest for the research (Creswell, 2013). Because I used the convenience sampling method for this research, the participants were not chosen at random. With the Walden University Institutional Review Board approval (approval number 03-22-17-0458660), I recruited the Meskhetian Turk (Ahiska) immigrants as participants in the states of Utah, Idaho, and California. I recruited the participants through flyers. The flyers were posted at different locations (e.g., library, cultural center, grocery stores, and mosques) that were frequently visited by the Meskhetian Turk (Ahiska) immigrants in Utah, Idaho, and California. The participation in this research was voluntary and the participants could choose to withdraw from the study at any time without any consequences.

Eligibility Criteria

This study included Meskhetian Turk (Ahiska) immigrants as research participants. The selection criteria was based on the participants who were Meskhetian

Turk (Ahiska) immigrants, speak English, and age 18 years and older. For this study, I excluded Meskhetian Turk (Ahiska) immigrants who did not speak English and who were less than 18 years old.

Procedures for Participants

In this study, participation was voluntary and the participants had the right to withdraw from the study at any time. I did not personally know any of the participants, which avoided potential conflict. The participants were recruited through flyers that explained the intent and significance of the study (See Appendix D). The flyers contained the researcher contact information for the participants to reach out (See Appendix D). The participants took the BRFSS, SMAS, and PSS questionnaire surveys (See Appendix A, B, and C), which did not include any personal identity information. The participants contacted me by phone. This information was available on the flyer (See Appendix D). The interview time was scheduled to complete the surveys on paper in individual and/or group sessions in Utah, Idaho, and California. The participants signed the informed consent form when they agreed to participate in this research. The existing written survey of the BRFSS, SMAS, and PSS, (See Appendix A, B, and C) which has been used in other such studies, were given participants to gather results that could be compared with other immigrant populations. The surveys (BRFSS, SMAS, and PSS) had no identifying information, and were kept confidential at every stage. The written surveys are stored according to the regulations of Walden University IRB.

Sample Size Calculation

Power Analysis: I chose a convenience sample of 109 Meskhetian Turk (Ahiska) immigrants and used G* power analysis when calculating the sample for the study. In consideration of the variables, setting the effect size set at medium, f^2=0.15, power (1-β err prob) set at 0.80, the probability level set at $p< 0.05$. The required sample size for the study was 109 participants. To reject and accept the hypotheses, the level of significance (α err prob) was used. The effect size of the study can be small, medium, and large. The total sample size of participants was 109 and I determined statistical significance, where there was an 80% probability over 109 participants were enough to find a statistical effect (effect size of 0.15) between variables where alpha=0.05 (Raudenbush & Liu, 2000). After I performed statistical power analysis with G*power software program, I found the following results for power analysis; F tests - Multiple Regression: Special (R^2 increase), Analysis: A priori: Compute required sample size, Input: Effect size $f^2 = 0.15$, α err prob = 0.05, Power (1-β err prob) = 0.80, Numerator df = 8, Number of predictors = 8, Output: Noncentrality parameter λ = 16.350000, Critical F = 2.032328, Denominator df = 100, Total sample size = 109, and Actual power = 0.804099. I used convenience sampling in this study for participants with the existing written surveys (BRFSS, SMAS, and PSS).

Instrumentation and Materials

The BRFSS questionnaire (See Appendix A) contains questions about demographics, dietary, lifestyle, health risk behaviors, diseases prevention, and social context (CDC, 2013). The BRFSS is one of the common survey tools that allow

researchers to gather data to identify health issues, and develop and evaluate health policies and procedures (CDC, 2013).

A BRFSS questionnaire used to collect data on adult Meskhetian Turk (Ahiska) immigrant population. The BRFSS questionnaire was the most appropriate instrument for this study because it contained crucial information on the potential predictors (diet, socioeconomic status, length of stay, and level of physical activity) of obesity. There is evidence that supports the BRFSS validity and reliability in collecting health data (Obisesan, 2015) with high reliability and validity indices, with reported Cronbach's alphas of .95 and .72 (Cohen, 1988). Yore and colleagues (2007) measured moderate and vigorous physical activities by using a modified BRFSS instrument and the result of the Kappa statistics (test-retest reliability) indicated of 0.35-0.53 for moderate activity, 0.80-0.86 for vigorous activity, and the test for validity of a 0.40-0.52. According to Yore and colleagues (2007) the test-retest reliability of the BRFSS is moderate to substantial. Therefore, a BRFSS instrument was used to measure the variables in this study. Although the BRFSS is in the public domain and does require having permission for usage, I obtained a permission to use the BRFSS instrument for this study.

The second instrument is that I used in this study was the Stephenson Multi-Group Acculturation Scale (SMAS, See Appendix B), which has been used by many studies for different ethnic groups (Ike-Chinaka, 2013). Many studies used SMAS to explore the relationship between acculturation and obesity among adults, adolescent, and children in Arab Americans, Nigerian children, and African-American adults (Dixon, 2002; Ike Chinaka, 2013; Soliman, 2008). Since there is no specific acculturation scale

designed for the Meskhetian Turk (Ahiska) immigrant population, the SMAS was the most appropriate acculturation scale to address the research question and hypothesis (Stephenson, 2000).

The SMAS has been used for different ethnic groups of adults as well as adolescents. The SMAS is the first acculturation scale that was designed to explore level of acculturation of ethnic groups (Stephenson, 2000). Soliman (2008) used the SMAS instrument in Arab immigrants in the United States to examine acculturation process after they migrated. The author used the SMAS instrument to examine the relationship between ethnic identity, wellness, acculturation and its influence on Arab immigrant parents and their children (Soliman, 2008). The results showed that there was a negative correlation between age, gender, and level of acculturation among Arab immigrants in the United States. (Soliman, 2008). Due to some similarities between Arab immigrants and Meskhetian Turk (Ahiska) immigrants, and the SMAS being the first instrument to be used to examine the process of acculturation, it was reasonable to use the SMAS in this study.

The SMAS is a 32- item Likert type questionnaire that I used to assess behavioral and attitudinal aspects of acculturation among the Meskhetian Turk (Ahiska) immigrants (Stephenson, 2000). The participants answered the SMAS questionnaires based on a 4-point Likert type response such as A=true, B=partly true, C= partly false, and D= false (Stephenson, 2000). According to Stephenson (2000) the SMAS has strong inter-item reliability where Cronbach's alphas of .80s in the high and .90s in the low. The SMAS indicated strong construct validity and significantly correlating with other measures of

acculturation and related construct such as socio-economic status, family structure, diet, and obesity (Ade et al., 2011; Stephenson, 2000; Obisesan, 2015). SMAS was the most appropriate scale to use in this study. The SMAS helped me to understand acculturation level by looking at food preference, length of stay, SES, and adaptation in the host culture (Stephenson, 2000) among the Meskhetian Turk (Ahiska) immigrants in the United States. I obtained permission to use the SMAS instrument for this study.

The third instrument that I used in this study was the Perceived Stress Scale (PSS, Cohen, 1988; See Appendix C), which has 10-item survey questionnaire to measure the degree of life situations as stressful and perception of stress (Cohen, 1988). Since there is no specific scale to measure perception of stress in this sample population, the PSS was the most appropriate scale to understand the participants' feelings and thoughts about life situations as stressful. The PSS questionnaires is based on a 5-point Likert type response such as 0- Never, 1= Almost Never, 2=Sometimes, 3= Fairly Often, and 4= Very Often (Cohen, 1988). The total score could range from 0 to 40, with higher scores indicating greater perceived stress and low scores indicating lower perceived stress among the participants (Cohen, 1988). The reliability of coefficient alpha for the PSS is .84, .85, and .86. Therefore, I used the PSS to address the research question and hypothesis for the relationship between perceived stress and obesity among the Meskhetian Turk (Ahiska) immigrants in the United States. I obtained permission to use the PSS instrument for this study. All permissions have been provided in Appendix A, B, and C for the measures. One measure BRFSS was in the public domain, so permission was not required.

Measurement of Variables

Operationalization

Variables are defined by operational definitions that allow the researcher to understand how variables will be measured (Creswell, 2013). Operationalization helps to define each variable and connects to the research concepts to improve the outcome of the design (Creswell, 2013). Socioecological model and acculturation theory were the theoretical frameworks in this study.

The study hypothesis was that obesity in Meskhetian Turk (Ahiska) immigrants in the United States would vary based on acculturation, perceived stress, diet, age, gender, socioeconomic status, and level of physical activity. I used socioecological model to understand which level of social influence such as gender, age, dietary and physical activity, social support, and education contributes to obesity in this sample population. I also used acculturation theory to understand the level of acculturation such as food preference, length of stay, and language that may contribute to obesity.

Dependent Variable: Obesity (dependent variable) is calculated by BMI, which is less or greater than 30 for this study; and moderate obesity and morbid obesity (BMI $\geq$30, BMI<30).

Independent Variables**:** The primary independent variables were acculturation, perceived stress, diet, age, gender, socioeconomic status, and level of physical activity.

Reliability and Validity of Instrument

Many researchers have used the BRFSS in many populations and found it a fairly and moderately valid and reliable instrument to measure independent and dependent

variables (Ade et al., 2011, Obisesan, 2015, Evenson & McGrinn, 2005). Reliability and validity of the BRFSS measured repeatedly with common statistical tests (e.g., kappa statistics, Cronbach's alpha, Person's correlation coefficient, Spearman's rho) in any number of trials and the results generalized to the population in the United States (CDC, 2013). The BRFSS has been used by many public studies and successfully predicted the expected dependent variable. Ade and colleagues (2011) used a BRFSS survey in a cross-sectional study in a convenience sample to test the hypotheses that whether immigrant status and socioeconomic factors were associated with obesity after adjusting other covariate variables. The authors found that immigration status was not associated with obesity while socioeconomic status was associated in African-American immigrant populations in the United States (Ade et al., 2011).

The second instrument of the study, the SMAS, was found very reliable and valid. The reliability and validity of the SMAS is reported Cronbach's alpha of .94 to .75 from the African-American immigrants (Cohen, 1988; Ike-Chinaka, 2013). Many studies used the SMAS instrument to support the SMAS' validity, reliability, and internal consistency as valuable tool (Ike-Chinaka, 2013). The SMAS provided a chance to assess ethnic-society immersion and dominant-society immersion for the level of acculturation in this sample population.

The third instrument of the study, PSS, is a global indicator to measure the individual's feelings, thoughts, and perceived stress (Cohen, 1988). The coefficient alpha reliability of PSS is reported of .84, .85, and .86 for the three samples (Cohen, 1988). High scores demonstrate greater perceived stress, while low scores represent lower stress.

The PSS internal consistency of Cronbach's alpha is reported of .80, indicating adequate internal consistency (Field, 2005). A sample question from the PSS is "In the last month, how often have you been upset because of something that happened expectantly? In the last month, how often have you felt that you were unable to control the important things in your life?"

Data Analysis Plan

The study used the BRFSS, SMAS, and PSS to measure independent variables and dependent variable. The independent variables were age, gender, diet, SES, and level of physical activity, acculturation, and perceived stress, and the dependent variable was obesity. The BRFSS used to measure demographic variables such as age, gender, SES, length of stay, diet, and physical activity, the SMAS used to measure acculturation level by looking at food preference, language use, SES, and length of stay, and the PSS used to measure stress level and obesity as measured by BMI in this sample population. The data analysis was run using SPSS version 21. By using SPSS version 21, descriptive statistics summarized the characteristics of this immigrant population. The percentage distribution, central tendencies and frequency distribution was computed. This study used logistic regression to answer the research questions and hypotheses. This statistical method analyzed the association between the independent variables (acculturation, perceived stress, diet, age, gender, SES, and level of physical activity) and dependent variable (obesity). Dependent variable of body mass index was categorical, SES (income) was categorical, diet was categorical, level of physical activity was continuous, food preference, language, age, gender, and social preference were continuous. Descriptive

analysis of independent variables was interpreted by univariate analysis. By bivariate analysis, I looked at BMI by gender, BMI by age, BMI by SES, BMI by diet, BMI by physical activity, BMI by perceived stress, and BMI by acculturation. The relationship between any two variables may have been positive or negative depending on correlation (Creswell, 2013). This study used multiple logistic regressions to examine the relationship that exists between possible predictors of obesity (acculturation, perceived stress, diet, age, gender, SES, and level of physical activity) and obesity outcomes. Also, obesity was measured as a categorical variable (BMI ≥30, BMI<30). Therefore, descriptive statistics and linear/multiple logistic regressions were the most appropriate statistical model for statistical analysis. The aim of this data analysis was generate new knowledge about what obesity predictors exist in the Meskhetian Turk (Ahiska) immigrant population and how these predictors compare to what is already known about other immigrant population.

Threats to Validity

The BRFSS, SMAS, and PSS survey questionnaires have reliability and validity assessed by the CDC and other studies in different population in the United States (Ade et al., 2011; CDC, 2011; Cohen, 1988; Ike-Chinaka, 2013, Stephenson, 2000). All three instruments were conducted through face-to-face interviews, web survey, and mail interviews in public health research and the results considered very reliable (CDC, 2011; Cohen, 1988; Stephenson, 2000). Nelson and colleagues (2003) reviewed and summarized the result form the National Health Interview Survey (NHIS) and the BRFSS. The authors found small differences between NHIS and the BRFSS according to

demographic, characteristics, and social factors (Nelson et al., 2003). Thus, the authors found that the core questions of the BRFSS are moderately reliable and valid (Nelson et al., 2003). In 2004, via international agencies and humanitarian organizations, the United States Government officially permitted 15,000 Meskhetian Turks (Ahiska) to enter the United States under the refugee status (Bilge, 2012). Since then, more and more Meskhetian Turks have followed their comrades and entered the United States as refugees. To the best of my knowledge, since this immigrant population has refugee status given to them by the United States government (Bilge, 2012), they are in the country legally and do not have to be concerned about their status being jeopardized by answering the survey questions. In addition, I am not asking any questions about their immigrant status. Also, the researcher may not able to control whether the participants of the study are ages 18 or over and the participants provide truthful information on the surveys. This fact may be limitation of the study and threat to internal validity.

Ethical Considerations

In this study, all ethical considerations and procedures were followed to meet the requirement of confidentiality rights of participants. Since this study was on human subjects, the permission was obtained from the Internal Review Board (IRB) of Walden University (approval number 03-22-17-0458660) before the research data collection. The consent form from the participants was obtained from each participant and a BRFSS, the SMAS, and the PSS questionnaire used after the Walden University IRB approval. The permissions were obtained to use the BRFSS, the SMAS, and the PSS measurement tools. The participants' identity and names were anonymous and they could withdraw

from the study at any time without consequences of any kind. I was the only one who handled all information to import and protect data in my personal computer. The computer was password protected and the data will be stored in a secure folder in my home for a 5 year period, as required by Walden University.

Summary

This chapter provided information about the research design and methodology of the study. This study was a quantitative cross-sectional design to examine what predictors may be significantly contributing to obesity in Meskhetian Turk (Ahiska) adult immigrants in the United States. The dependent variable was obesity while the independent variables were acculturation, perceived stress, age, gender, diet, socioeconomic status, and level of physical activity. The BRFSS, the SMAS, and the PSS used in collecting data and statistical analysis included descriptive statistics, cross tabulation, chi-square, multiple logistic regressions, and Spearman's correlation. The ethical considerations and procedures described in this chapter.

Chapter 4: Results

In this chapter, I examine the predictors of obesity including age, gender, SES, diet, physical activity, acculturation, and perceived stress within the Meskhetian Turk (Ahiska) immigrant population in states of Utah, Idaho, and California in the United States. The sample recruitment was done through the flyers invitation and the flyers were posted in civil buildings, libraries, grocery stores, mosques, and cultural centers. The data collected from a convenience sample of 109 Mesketian Turk (Ahiska) immigrants living in western in the United States. The data analyzed to identify the relationship between independent variables (age, gender, SES, diet, physical activity, acculturation, and perceived stress) and dependent variable (obesity) in the sample population. A total of 109 respondents filled the survey of BRFSS, SMAS, and PSS. In order to obtain the number of required subjects, I mailed 250 surveys to potential participants. Fifty-six (22%) surveys were returned by prospective participants. I mailed 146 surveys (58%) in California and received 32 as completed (21%), 64 surveys (25.6%) in Utah and received back 17 as completed (26.5%), and 22 surveys in Idaho and received seven as completed (31.8%).

The respondents sent their home addresses via mail without any identifying information. The confidentiality procedures maintained for their privacy. I scheduled 82 interviews and 53 (64%) surveys were obtained through the interviews in Utah, Idaho, and California. Among a total of 82 interviews, 46 interviews (56%) were scheduled in California of 31 (64.5%) showed up. Twenty-eight interviews (34%) were scheduled in Utah, 14 (50%) showed up; in Idaho eight interviews (9.7%) were scheduled and 8

(100%) showed up. Overall, 56 surveys were completed (51.4%) via mail (22% completion rate respectively) in comparison to 53 (48.6%) interviews (64% completion rate respectively). There was no statistical difference between each submethod of data collection (Mean=1.48, SD= .502).

I used the participants' responses from the completed surveys and entered them into SPSS 21.0 version to analyze the data. The BRFSS, SMAS, and PSS surveys and informed consent forms were sent to each respondent. Demographic measures and lifestyle measures including age, gender, SES, diet and physical activity were obtained from BRFSS, acculturation measures were obtained from SMAS and perceived stress measures were obtained from PSS. All respondents of all three surveys were volunteers in the sample population. The aim of this study was to generate new knowledge about the predictors of obesity in Meskhetian Turk (Ahiska) immigrant population in the United States. This chapter includes information regarding the sample descriptive statistic information, univariate analysis, bivariate analysis, logistic regression, and Spearman correlation between independent and dependent variables.

Independent Variables

A convenience sample of 109 Meskhetian Turk (Ahiska) immigrants was recruited from Meskhetian Turk (Ahiska) community in Western United States including Utah, Idaho, and California. Independent variables were included demographic variables (age, gender, SES), lifestyle variables (diet and physical activity), and psychosocial variables (acculturation and perceived stress).

Dependent Variables

The participants' BMI was calculated from self-reported weight and height data. I used to calculate BMI based on WHO's recommendation and BMI is categorized into different groups including BMI < 25 (normal weight), BMI between 25 and 29.99 (overweight), BMI between 30 and 34.99 (obese), BMI between 35 and 39.99 (moderately obese), and BMI ≥ 40 (morbidly obese). BMI <30 (not obese), BMI ≥ 30 (obese), BMI <40 (not moderately/morbid obese) and BMI ≥ 40 (moderately/morbid obese).

Research Questions

The following research questions guided this study:

RQ1: Do demographic factors (age, gender, SES) as measured by the BRFSS predict obesity, as measured by the BMI, among Meskhetian Turk (Ahiska) immigrants?

$H_0$1: Demographic factors (age, gender, SES) do not predict BMI among Meskhetian Turk (Ahiska) immigrants.

H_a1: Demographic factors (age, gender, SES) do predict BMI among Meskhetian Turk (Ahiska) immigrants

RQ2: Do lifestyle indicators (diet, exercise), as measured by the BRFSS predict obesity, as measured by the BMI, among Meskhetian Turk (Ahiska) immigrants?

$H_0$2: Lifestyle indicators (diet, exercise) do not predict BMI among Meskhetian Turk (Ahiska) immigrants.

H_a2: Lifestyle indicators (diet, exercise) do predict BMI among Meskhetian Turk (Ahiska) immigrants.

RQ3: Do psychosocial indicators (acculturation, perceived stress), as measured by the SMAS and PSS, predict obesity, as measured by the BMI, among Meskhetian Turk (Ahiska) immigrants?

$H_0$3: Psychosocial indicators (acculturation, perceived stress) do not predict BMI among Meskhetian Turk (Ahiska) immigrants.

H_a3: Psychosocial indicators (acculturation, perceived stress) do predict BMI among Meskhetian Turk (Ahiska) immigrants.

RQ4: Taken together, do demographic, lifestyle, and psychosocial indicators predict obesity among Meskhetian Turk (Ahiska) immigrants?

$H_0$4: Taken together, demographic, lifestyle, and psychosocial do not predict BMI among Meskhetian Turk (Ahiska) immigrants.

$H_1$4: Taken together, demographic, lifestyle, and psychosocial do predict BMI among Meskhetian Turk (Ahiska) immigrants.

The purpose of this study was examined to the relationship between age, gender, SES, diet, physical activity, acculturation, perceived stress, and two sets of dichotomized dependent variables of BMI <30 (not obese), BMI ≥ 30 (obese) and BMI <40 (not moderately/morbid obese) and BMI ≥ 40 (moderately/morbid obese).

Univariate Analysis

Descriptive Analysis of Independent Variables

Table 1 shows the sample population comprised of a disproportionate number of men (56%) and women (44%).

Table 1

Distribution of Gender of Study Participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	61	56	56	56
	Female	48	44	44	44
	Total	109	100	100	

Table 2 shows that age breakdown of participants. Twenty-six (23.9%) were between 18 to 30 years of age, 31 (28.4%) were between 31 to 45 years of age, 31 (28.4%) were between 46 to 65 years of age, and 21 (19.3%) were above 65 years of age.

Table 2

Distribution of Age of Study Participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 to 30	26	23.9	23.9	23.9
	31 to 45	31	28.4	28.4	52.3
	46 to 65	31	28.4	28.4	80.7
	Above 65	21	19.3	19.3	100
	Total	109	100	100	

Table 3 shows the socio economic (income) breakdown of participants. Twenty-five persons (22.9%) were in the income category $10,000 to less than $15,000, 41

persons (37.6%) were in the income category $15,000 to less than $20,000, 20 persons (18.3%) were in the income category $20,000 to less than $25,000, 12 persons (11%) were in the income category $25,000 to less than $35,000, 5 persons (4.6%) were in the income category $35,000 to less than $50,000 and 6 persons (5.5%) were in the income category $50,000 to less than $75,000.

Table 3

Distribution of Annual Household Income of Study Participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	$10,000 to less than $15,000	25	22.9	22.9	22.9
	$15,000 to less than $20,000	41	37.6	37.6	60.6
	$20,000 to less than $25,000	20	18.3	18.3	78.9
	$25,000 to less than $35,000	12	11	11	89.9
	$35,000 to less than $50,000	5	4.6	4.6	94.5
	$50,000 to less than $75,000	6	5.5	5.5	100
	Total	109	100	100	

Table 4 shows that participants reported who lived in the United States between 1 to 3 years (27.5%), 3 to 5 years (15.6), 5 to 8 years (30.3%), and 8 and more years (26.6).

Table 4

Distribution of Years in the United States of Study Participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 to 3 years	30	27.5	27.5	27.5
	3 to 5 years	17	15.6	15.6	43.1
	5 to 8 years	33	30.3	30.3	73.4
	8 and more	29	26.6	26.6	100
	Total	109	100	100	

Table 5 shows that 109 participants reported daily vegetable consumption (Mean =1.66, Median =1, SD =0.87), weekly vegetable consumption (Mean = 2.61, Median =3, SD = 0.93), and monthly vegetable consumption (Mean =2.85, Median = 3, SD = 1.10). One-hundred-five participants reported daily fruit consumption (Mean = 1.67, Median = 2, SD= .59). One hundred four participants reported weekly fruit consumption (Mean= 2.63, Median = 3, SD= 0.95), and 103 participants reported monthly fruit consumption (Mean= 3.30, Median = 4, SD= .86). One hundred seven participants reported daily hamburger, cheeseburger or meat loaf consumption (Mean= 2.07, Median = 2, SD= 0.73), 109 participants reported weekly hamburger, cheeseburger or meat loaf consumption (Mean= 3.07, Median= 3, SD= 0.889) and one hundred two participants reported monthly hamburger, cheeseburger or meat loaf consumption (Mean= 3.39, Median= 4, SD= 0.79).

Table 5

Distribution of Selected Measures of Diet of Study Participants

	Mean	Median	SD	Min.	Max.	N(Valid)	Missing
Veg_Daily	1.6697	1	0.87194	1	4	109	0
Veg_Weekly	2.6147	3	0.93203	1	4	109	0
Veg_Monthly	2.8532	3	1.10408	1	4	109	0
Fruit_Daily	1.6762	2	0.59639	1	4	105	4
Fruit_Weekly	2.6346	3	0.9559	1	4	104	5
Fruit_Monthly	3.301	4	0.86131	1	4	103	6
Meat_Daily	2.0748	2	0.73589	1	4	107	2
Meat_Weekly	3.0748	3	0.8893	1	4	109	0
Meat_Monthly	3.3922	4	0.79798	1	4	102	7

Table 6 shows that 109 participants reported daily vegetable consumption. 59 participants (54.1%) reported that they consumed daily less than one, 33 participants (30.4%) reported that they consumed daily one or three times, 11 participants (10.1%) reported that they consumed daily three or five times, and 6 participants (5.5%) reported that they consumed daily more than five times.

Table 6

Distribution of Vegetable Consumption- Daily

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1	59	54.1	54.1	54.1
	1-2	33	30.3	30.3	84.4
	3-5	11	10.1	10.1	94.5
	>5	6	5.5	5.5	100
	Total	109	100	100	

Table 7 shows that 109 participants reported weekly vegetable consumption, 14 participants (12.8%) reported that they consumed weekly less than one, 34 participants (31.2%) reported that they were consumed weekly one or two times, 41 participants (37.6%) reported that they were consumed weekly three or five times, 20 participants (18.3%) reported that they were consumed weekly more than five times.

Table 7

Distribution of Vegetable Consumption-Weekly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1	14	12.8	12.8	12.8
	1-2	34	31.2	31.2	44
	3-5	41	37.6	37.6	81.7
	>5	20	18.3	18.3	100

Total	109	100	100	

Table 8 shows that 109 participants reported monthly vegetable consumption. 19 participants (17.4) reported that they consumed vegetables monthly less than one, 18 participants (16.5%) reported that they consumed vegetables monthly one or two times, 32 participants (29.4%) reported that they consumed vegetables monthly three or five times, and 40 participants (36.7%) reported that they consumed vegetables monthly more than five times.

Table 8

Distribution of Vegetable Consumption-Monthly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1	19	17.4	17.4	17.4
	1-2	18	16.5	16.5	33.9
	3-5	32	29.4	29.4	63.3
	>5	40	36.7	36.7	100
	Total	109	100	100	

Table 9 shows that 105 participants reported daily fruit consumption. 40 participants (36.7%) reported that they consumed fruit daily less than one, 60 participants (55%) reported that they consumed daily one or two times, 4 participants reported that they consumed daily three or five times and 1 participant (0.9%) consumed more than five times. The missing value was four.

Table 9

Distribution of Fruit Consumption-Daily

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	<1	40	36.7	38.1	38.1
	1-2	60	55	57.1	95.2
	3-5	4	3.7	3.8	99
	>5	1	0.9	1	100
	Total	105	96.3	100	
Missing	System	4	3.7		
Total		109	100		

Table 10 shows that 104 participants reported weekly fruit consumption. 14 participants (12.8%) reported that they consumed fruits weekly less than one, 31 participants (28.4%) reported that they consumed fruits weekly one or two times, 38 participants (34.9%) reported that they consumed fruits weekly three or five times, and 21 participants (19.3%) reported that they consumed fruits weekly more than five times. The missing value was five.

Table 10

Distribution of Fruit Consumption-Weekly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1	14	12.8	13.5	13.5
	1-2	31	28.4	29.8	43.3
	3-5	38	34.9	36.5	79.8
	>5	21	19.3	20.2	100
	Total	104	95.4	100	
Missing	System	5	4.6		
Total		109	100		

Table 11 shows that 103 participants reported monthly fruit consumption. 3 participants (2.8%) reported that they consumed fruit monthly less than one time, 18 participants (16.5%) reported that they consumed fruits monthly one or two times, 27 participants (24.8%) reported that they consumed fruits monthly three or five times, and

55 participants (50.5%) reported that they consumed fruits monthly more than five times. The missing value was six.

Table 11

Distribution of Fruit Consumption-Monthly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1	3	2.8	2.9	2.9
	1-2	18	16.5	17.5	20.4
	3-5	27	24.8	26.2	46.6
	>5	55	50.5	53.4	100
	Total	103	94.5	100	
Missing	System	6	5.5		
Total		109	100		

Table 12 shows that 107 participants reported daily hamburger, cheeseburger or meat loaf consumption. 22 participants (20.2%) reported that they consumed daily less than one, 58 participants (53.2) reported that they consumed daily one or two times, 24 participants (22%) reported that they consumed daily three or five times, and 3 participants (2.8%) reported that they consumed daily more than five times. The missing value was two.

Table 12

Distribution of Hamburger, Cheeseburger or Meat Loaf – Daily

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1	22	20.2	20.6	20.6
	1-2	58	53.2	54.2	74.8
	3-5	24	22	22.4	97.2
	>5	3	2.8	2.8	100
	Total	107	98.2	100	

Missing	System	2	1.8	
Total		109	100	

Table 13 shows that 109 participants reported weekly hamburger, cheeseburger or meat loaf consumption. 9 participants (8.3%) reported that they consumed weekly less than one, 12 participants (11%) reported that they consumed weekly one or two times, 50 participants (45.9%) reported that they consumed weekly three or five times, and 38 participants (34.9%) reported that they consumed weekly more than five times.

Table 13

Distribution of Hamburger, Cheeseburger or Meat Loaf – Weekly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1	9	8.3	8.3	8.3
	1-2	12	11	11	19.3
	3-5	50	45.9	45.9	65.1
	>5	38	34.9	34.9	100
	Total	109	100	100	

Table 14 shows that 102 participants reported monthly hamburger, cheeseburger or meat loaf consumption. 6 participants (5.5%) reported that they consumed monthly less than one, 2 participants (1.8%) reported that they consumed monthly one or two times, 40 participants (36.7%) reported that they consumed monthly three or five times, and 54 participants (49.5%) reported that they consumed monthly more than five times. The missing value was seven.

Table 14

Distribution of Hamburger, Cheeseburger or Meat Loaf – Weekly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1	6	5.5	5.9	5.9
	1-2	2	1.8	2	7.8
	3-5	40	36.7	39.2	47.1
	>5	54	49.5	52.9	100
	Total	102	93.6	100	
Missing	System	7	6.4		
Total		109	100		

Table 15 shows how many of the 109 participants exercised 20 minutes weekly. 47 participants (43.1%) reported that they exercised 1 or 2 times weekly, 30 participants (27.5%) reported that they exercised 2 or 3 times weekly, 13 participants (11.9%) reported that they exercised 3 or 5 times weekly, eight participants (7.3%) reported that they exercised 5 or more times weekly. Eleven participants (10.1%) did not report anything. After excluding the missing value (11), the valid percentage of those who reported that they did exercise weekly was 89.8%. The percent of those who reported that they did not exercise weekly was 10.1%.

Table 15

Distribution of 20 Min Exercise Category/Weekly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 or 2	47	43.1	48	48
	2 or 3	30	27.5	30.6	78.6
	3 or 5	13	11.9	13.3	91.8
	5 or more	8	7.3	8.2	100
	Total	98	89.8	100	
Missing	System	11	10.1		
Total		109	100		

Table 16 shows that of one hundred nine participants, ninety-seven participants (89%) reported that they participated in moderate activity for 10 minutes each week. Sixty-three participants (57.8%) reported that they participated in moderate activity for 10 minutes. Nineteen participants (17.4%) reported that they did not participate in moderate activity for 10 minutes. Fifteen participants (13.8%) reported that they were unsure of their participation in moderate activity. The missing value was twelve (11%). After excluding the missing value (12), participation in moderate activity for 10 minutes each week was (64.9%) reported. The percent of those who reported that they did not participate in moderate activity for 10 minutes each week was 19.6%. The percent of those who reported that they were unsure of their participation in moderate activity was 15.5%. Table 16 also shows that of one hundred two participants, thirty-seven participants (33.9%) reported participating in vigorous activity for 10 minutes each week. Thirty-four participants (31.2) reported no participation in vigorous activity for 10 minutes. Thirty-one participants (28.4%) reported that they were unsure of their participation in vigorous activity. After excluding the missing value (7), participation in vigorous activity for 10 minutes each week was (36.3%) reported. Those who reported not participating in vigorous activity for 10 minutes each week was 33.3%. The percent of those participants who stated that they were unsure of their participation in vigorous activity was 30.4%.

Table 16

Moderate and Vigorous Physical Activity Reported by Participants

	Frequency	Percent	Valid Percent	Cumulative Percent

	Yes	63	57.8	64.9	64.9
	No	19	17.4	19.6	84.5
Mod. Act.	Do not know/Not sure	15	13.8	15.5	100
	Total	97	89	100	
Missing	System	12	11		
Total		109	100		

		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	37	33.9	36.3	36.3
	No	34	31.2	33.3	69.6
Vig. Act.	Do not know/Not sure	31	28.4	30.4	100
	Total	102	93.6	100	
Missing	System	7	6.4		
Total		109	100		

Descriptive Analysis of Dependent Variable

Table 17 shows that calculated BMI from self-reported weight and height measurements ranged (in unit of kg/m^2) from minimum of 11.48 to maximum of 55.75, (Mean=28.1812, Median= 26.4921, SD= 6.25111). The BMI is defined as the body mass divided by the square of the body height (in unit of kg/m^2) resulting from mass in kilograms and height in meters (WHO, 2012).

Table 17

Distribution of Calculated BMI of Study Participants

N	Valid	109
Mean		28.1812
Median		26.4921
Mode		32.23
Std. Deviation		6.25111
Variance		48.632
Range		44.27

Minimum	11.48
Maximum	55.75

Table 18 shows that twenty-one participants (19.3%) were normal weight, 25 participants (22.9%) were overweight, 29 participants (26.6%) were obese, 23 participants (21.1%) were moderately obese, and 11 participants (10.1%) were morbidly obese.

Table 18

Distribution of General BMI Category of Study Participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<25 normal weight	21	19.3	19.3	19.3
	25-29.99 overweight	25	22.9	22.9	42.2
	30-34.99 obese	29	26.6	26.6	68.8
	35-39.99 moderate obese	23	21.1	21.1	89.9
	≥40 morbid obesity	11	10.1	10.1	100
	Total	109	100	100	

Table 19 shows the obese and not obese category of participants. Forty-five participants (41.3%) were not obese while 64 participants (58.7%) were obese.

Table 19

Distribution of Obese/Not Obese BMI Category of Study Participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Obese BMI<30	45	41.3	41.3	100
	Obese BMI≥30	64	58.7	58.7	58.7
	Total	109	100	100	

Table 20 shows that when categorized as not moderate/morbid obese and moderate/morbid obese, 72 participants (66.1%) were not moderate/morbid obese while 37 participants (33.9%) were moderate/morbid obese.

Table 20

Distribution of Not Moderate/Morbid Obese and Moderate/Morbid Obese

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<35 not moderate/morbid obese	72	66.1	66.1	66.1
	≥ 35 moderate/morbid obese	37	33.9	33.9	100
	Total	109	100	100	

Table 21 shows that 109 participants reported food, language, socioeconomic status and length of stay as acculturation subfactors. Acculturation was measured by food, language, SES, and length of stay. For each subfactor mean, median, standard deviation, variance, skewness, and kurtosis numbers were calculated. Among participants, food (Mean=1.367, SD= 0.4842), language (Mean=1.6789, SD=0.469), SES (Mean=2.5321, SD=1.3714), and length of stay (Mean=2.5596, SD=2.5596).

Table 21

Distribution of Acculturation Subfactors

		Food	Language	SES	Length of Stay
N	Valid	109	109	109	109
	Missing	0	0	0	0
Mean		1.367	1.6789	2.5321	2.5596
Median		1	1	3	2
Std. Deviation		0.4842	0.469	1.3714	1.1581

Variance	0.234	0.22	1.881	1.341
Skewness	0.56	-0.777	0.985	-0.166
SE of Skewness	0.231	0.231	0.231	0.231
Kurtosis	-1.1719	-1.423	0.376	-1.425
SE of Kurtosis	0.459	0.459	0.459	0.459
Minimum	1	1	1	1
Maximum	2	2	6	4

Table 22 shows the mean values for perceived stress scores. Perceived stress scale (PSS) scores were calculated based on guidelines published by Cohen (1988). Table 13 shows that 98 participants reported their perceived stress level (Mean=26.1451, SD=4.2411). PSS was missing in 11 cases. The mean score for perceived stress was 26.14, which was considered moderate stress among the participants (Cohen, 1983).

Table 22

Distribution of Perceived Stress Scale Values

N	Valid	98
	Missing	11
Mean		26.1451
Median		24.4832
Mode		30.22
Std. Deviation		4.2411
Variance		45.631
Range		42.2
Minimum		10.56
Maximum		52.76

Bivariate Analysis

BMI by Gender

Of the 61 male participants, 13 participants (21.30%) were normal weight, 15 participants (24.60%) were overweight, 19 participants (31.10%) were obese, 8 participants (13.10%) were moderately obese and 6 participants (9.80%) were morbidly obese. Of the female participants, 8 participants (16.70%) were normal weight, 10 participants (20.80%) were overweight, 10 participants (20.80%) obese, 15 participants (31.30%) were moderately obese, and 5 participants (10.40%) were morbidly obese. Statistically, there is no significant association between BMI/Obesity and gender.

Table 23

Cross-Tabulation and Chi-Square Analysis of Association between Gender and BMI

			BMI Category					
			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Gender	Male	Count	13	15	19	8	6	61
		% within Gender	21.30%	24.60%	31.10%	13.10%	9.80%	100.00%
	Female	Count	8	10	10	15	5	48
		% within Gender	16.70%	20.80%	20.80%	31.30%	10.40%	100.00%
Total		Count	21	25	29	23	11	109
		% within Gender	19.30%	22.90%	26.60%	21.10%	10.10%	100.00%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.736[a]	4	0.220
Likelihood Ratio	5.75	4	0.219

Linear-by-Linear Association	1.769	1	0.184
N of Valid Cases	109		

BMI by Age

Table 24 shows that among participants the aged of 18 to over 65 years old. 26 participants reported that they were aged between 18 to 30, 6 participants (23.10%) were normal weight, 8 participants (30.80%) were overweight, 7 participants (26.90%) were obese, 4 participants (15.40%) were moderately obese, and 1 participant (3.80%) was morbidly obese. 31 participants reported that they were aged between 31 to 45, 5 participants (16.10%) were normal weight, 8 participants (25.80%) were overweight, 10 participants (32.30%) were obese, 6 participants (19.40%) were moderately obese, and 2 participants (6.50%) were morbidly obese. 31 participants reported that they were aged between 46 to 65, 5 participants (16.10%) were normal weight, 8 participants (25.80%) were overweight, 8 participants (25.80%) were obese, 7 participants (22.60%) were moderately obese, and 3 participants (9.70%) were morbidly obese. 21 participants reported that they were aged over 65, 5 participants (23.80%) were normal weight, 1 participant (4.80%) was overweight, 4 participants (19%) were obese, 6 participants (28.60%) were moderately obese, and 5 participants (23.80%) were morbidly obese. Total of 109 participants, 21 participants (19.30%) were normal weight, 25 participants (22.90%) were overweight, 29 participants (26.60%) were obese, 23 participants (21.10%) were moderately obese, and 11 participants (10.10%) were morbidly obese. Statistically, there is no significant association between BMI/obesity and age.

Table 24

Cross-Tabulation and Chi-Square Analysis of Association between Age and BMI

			BMI Category					
			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Age	18-30	Count	6	8	7	4	1	26
		% within Age	23.10%	30.80%	26.90%	15.40%	3.80%	100.00%
	31-45	Count	5	8	10	6	2	31
		% within Age	16.10%	25.80%	32.30%	19.40%	6.50%	100.00%
	46-65	Count	5	8	8	7	3	31
		% within Age	16.10%	25.80%	25.80%	22.60%	9.70%	100%
	Over 65	Count	5	1	4	6	5	21
		% within Age	23.80%	4.80%	19.00%	28.60%	23.80%	100.00%
Total		Count	21	25	29	23	11	109
		% within Age	19.30%	22.90%	26.60%	21.10%	10.10%	100.00%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.88[a]	12	0.455
Likelihood Ratio	12.552	12	0.402
Linear-by-Linear Association	4.231	1	0.04
N of Valid Cases	109		

BMI by Socioeconomic Status (Income)

Table 25 shows that among participants in the socioeconomic status (income level) category. Twenty-five participants were in the income category of $10,000 to less than $15,000, 8% was normal weight, 8% was overweight, 44% was obese, 36% was

moderately obese, and 4% was morbidly obese. Among participants in the income category $15,000 to less than $20,000 was 41, 14.60 % was normal weight, 31.70% was overweight, 22% was obese, 17.10% was moderately obese, and 14.60% was morbidly obese. Among participants in the income category $20,000 to less than $25,000 was 20, 35% was normal weight, 35% was overweight, 15% was obese, 5% was moderately obese, and 10% was morbidly obese. Among participants in the income category $25,000 to $35,000 was 12, 16.70% was normal weight, 8.30% was overweight, 33.30% was obese, 25% was moderately obese, and 16.70% was morbidly obese. Among participants in the income category $50,000 to less than $75,000 was 6, 33.20% was normal weight, 0% was overweight, 16.70% was obese, 50% was moderately obese, and 0% was morbidly obese. Statistically, there was no significant association between BMI/obesity and socioeconomic status (income).

Table 25

Cross-Tabulation and Chi-Square Analysis of Association between SES and BMI

		BMI Category					
		< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
$10,000 to less than $15,000	Count	2	2	11	9	1	25
	% within SES	8%	8%	44%	36%	4%	100%
$15,000 to less than $20,000	Count	6	13	9	7	6	41

		% within SES	14.60%	31.70%	22%	17.10%	14.60%	100%
SES	$20,000 to less than $25,000	Count	7	7	3	1	2	20
		% within SES	35%	35%	15%	5%	10%	100%
	$25,000 to less than $35,000	Count	2	1	4	3	2	12
		% within SES	16.70%	8.30%	33.30%	25%	16.70%	100%
	$50,000 to less than $75,000	Count	2	0	1	3	0	6
		% within SES	33.20%	0%	16.70%	50%	0%	100%
	Total	Count	21	25	29	23	11	109
		% within SES	19.30%	22.90%	26.60%	21.10%	10.10%	100%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.649[a]	20	0.470
Likelihood Ratio	35.41	20	0.180
Linear-by-Linear Association	2.309	1	0.129
N of Valid Cases	109		

Length of Stay and BMI

Table 26 shows that among participants who have lived in the United States between 1 to 5 years (15), 20% was normal weight, 13.30% was overweight, 46.70% was obese, 20% was moderately obese, and 0% was morbidly obese. Among participants who have lived in the United States between 5 to 10 years (52), 17.30% was normal weight, 30.80% was overweight, 23.10% was obese, 21.20% was moderately obese, and 7.70%

was morbidly obese. Among participants who lived in the United States more than 10 years (42), 21.40% was normal weight, 16.70% was overweight, 23.80% was obese, 21.40% was moderately obese, and 16.70% was morbidly obese. Statistically, there was no significant association between BMI/obesity and length of stay.

Table 26

Cross-Tabulation and Chi-Square Analysis of Association between Length of Stay and BMI

			BMI Category					
			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Length of Stay	1-5 years	Count	3	2	7	3	0	15
		% within Stay	20.00%	13.30%	46.70%	20.00%	0.00%	100.00%
	5 to 10 years	Count	9	16	12	11	4	52
		% within Stay	17.30%	30.80%	23.10%	21.20%	7.70%	100.00%
	more than 10	Count	9	7	10	9	7	42
		% within Stay	21.40%	16.70%	23.80%	21.40%	16.70%	100.00%
Total		Count	21	25	29	23	11	109
		% within Stay	19.30%	22.90%	26.60%	21.10%	10.10%	100.00%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.180[a]	8	0.327
Likelihood Ratio	10.066	8	0.260
Linear-by-Linear Association	0.893	1	0.345
N of Valid Cases	109		

BMI by Diet (Vegetable Consumption)

Table 27 shows that among participants who consumed green vegetables daily, weekly, and monthly. Among participants who consumed zero servings of green vegetable daily was 58, 20.70% was normal weight, 13.80% was overweight, 28.90% was obese, 27.60% was moderately obese, and 12.10% was morbidly obese. Among participants who consumed one to two servings of green vegetables daily was 32, 21.90% was normal weight, 37.50% was overweight, 28.10% was obese, 6.30% was moderately obese, and 6.30% was morbidly obese. Among participants who consumed three to five servings of green vegetables daily was 10, 20% was normal weight, 30% was overweight, 40% was obese, 0% was moderately obese, and 10% was morbidly obese. Among participants who consumed more than five servings of green vegetables daily was 6, 0% was normal weight, 16.70% was overweight, 16.70% was obese, 66.70% was moderately obese, and 0% was morbidly obese.

Table 27 shows that among participants who consumed zero servings of green vegetables weekly were 13, 23.10% was normal weight, 15.40% was overweight, 38.50% was obese, 7.70% was moderately obese, and 15.40% was morbidly obese. Among participants who consumed one to two servings of green vegetables weekly was 30, 23.30% was normal weight, 23.30% was overweight, 16.70% was obese, 26.70% was moderately obese, and 10% was morbidly obese. Among participants who consumed three to five servings of green vegetables weekly was 42, 9.50% was normal weight, 21.40% was overweight, 33.30% was obese, 23.80% was moderately obese, and 11.90% was morbidly obese. Among participants who consumed more than five servings of green

vegetables weekly was 24, 29.20% was normal weight, 29.20% was overweight, 20.80% was obese, 16.70% was moderately obese, and 4.20% morbidly obese.

Table 27 shows that among participants who consumed zero servings of green vegetables monthly was 21, 19% was normal weight, 14.30% was overweight, 38.10% was obese, 19% was moderately obese, 9.50% was morbidly obese. Among participants who consumed one to two servings of green vegetables was 17, 17.60% was normal weight, 23.50% was overweight, 23.50% was obese, 23.50% moderately obese, and 11.80% was morbidly obese. Among participants who consumed three to five servings of green vegetables was 29, 10.30% was normal weight, 17.20% was overweight, 27.60% was obese, 31% was moderately obese, 13.80% was morbidly obese. Statistically, there was no significant association between BMI/obesity and green vegetable consumption (diet).

Table 27

Cross-Tabulation and Chi-Square Analysis of Association between Diet (Green Vegetable Consumption) Category and BMI

		BMI Category					
		< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
<1	Count	12	8	15	16	7	58
	% within Veg. Con.	20.70%	13.80%	28.90%	27.60%	12.10%	100.00%
	Count	7	12	9	2	2	32

	1-2	% within Veg. Con.	21.90%	37.50%	28.10%	6.30%	6.30%	100.00%
		Count	2	3	4	0	1	10
Green Veg.Cat. Daily	3-5	% within Veg. Con.	20.00%	30.00%	40.00%	0.00%	10.00%	100%
		Count	0	1	1	4	0	6
	>5	% within Veg. Con.	0.00%	16.70%	16.70%	66.70%	0.00%	100.00%
		Count	21	25	29	23	11	109
Total		% within Veg. Con.	19.30%	22.90%	26.60%	21.10%	10.10%	100.00%

			BMI Category					
			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
	<1	Count	3	2	5	1	2	13
		% within Veg. Con.	23.10%	15.40%	38.50%	7.70%	15.40%	100.00%
	1-2	Count	7	7	5	8	3	30
		% within Veg. Con.	23.30%	23.30%	16.70%	26.70%	10.00%	100.00%
	3-5	Count	4	9	14	10	5	42
Green Veg.Cat. Weekly		% within Veg. Con.	9.50%	21.40%	33.30%	23.80%	11.90%	100%
		Count	7	7	5	4	1	24

	>5	% within Veg. Con.	29.20%	29.20%	20.80%	16.70%	4.20%	100.00%
		Count	21	25	29	23	11	109
Total		% within Veg. Con.	19.30%	22.90%	26.60%	21.10%	10.10%	100.00%

			BMI Category					
			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
	<1	Count	4	3	8	4	2	21
		% within Veg. Con.	19.00%	14.30%	38.10%	19.00%	9.50%	100.00%
	1-2	Count	3	4	4	4	2	17
		% within Veg. Con.	17.60%	23.50%	23.50%	23.50%	11.80%	100.00%
Green Veg.Cat. Monthly	3-5	Count	3	5	8	9	4	29
		% within Veg. Con.	10.30%	17.20%	27.60%	31.00%	13.80%	100%
	>5	Count	11	13	9	6	3	42
		% within Veg. Con.	26.20%	31.00%	21.40%	14.30%	7.10%	100.00%
		Count	21	25	29	23	11	109
Total		% within Veg. Con.	19.30%	22.90%	26.60%	21.10%	10.10%	100.00%

Chi-Square Tests Green Vegetables Day-Weekly-Monthly

Chi-Square Tests Green Vegetable Daily

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24.812[a]	16	0.173
Likelihood Ratio	28.284	16	0.129
Linear-by-Linear Association	0.071	1	0.079
N of Valid Cases	109		

Chi-Square Tests Green Vegetable Weekly

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.485[a]	12	0.573
Likelihood Ratio	11.363	12	0.498
Linear-by-Linear Association	0.466	1	0.495
N of Valid Cases	109		

Chi-Square Tests Green Vegetable Monthly

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.257[a]	12	0.681
Likelihood Ratio	9.278	12	0.679
Linear-by-Linear Association	1.524	1	0.217
N of Valid Cases	109		

BMI by Diet (Fruit Consumption)

Table 28 shows that among participants who consumed fruits daily, weekly, and monthly. Among participants who consumed zero servings of fruits daily was 40, 15% was normal weight, 25% was overweight, 30% was obese, 20% was moderately obese and 10% was morbidly obese. Among participants who consumed one to two servings of fruits daily was 60, 25% was normal weight, 21.70% was overweight, 25% was obese, 23.305 was moderately obese, and 5% was morbidly obese. Among participants who

consumed three to five servings of fruits daily was 4, 0% was normal weight, 25% was overweight, 50% was obese, 25% was moderately obese and 10% was morbidly obese. Among participants who consumed more than five servings of fruits daily was 1, 100% was overweight.

Table 28 shows that among who consumed zero servings of fruit weekly were 14, 21.40% was normal weight, 21.40% was overweight, 28.60% was obese, 21.40% was moderately obese, and 7.10% was morbidly obese. Among participants who consumed one to two servings fruits weekly were 31, 12.90% was normal weight, 35.50% was overweight, 29% was obese, 19.40% was moderately obese and 3.20% was morbidly obese. Among participants who consumed three to five servings fruits weekly were 38, 23.70% was normal weight, 13.20% was overweight, 23.70% was overweight, 18.40% was moderately obese, and 21.10% was morbidly obese. Among participants who consumed five or more servings fruits weekly was 21, 19% was normal weight, 28.60% was overweight, 23.80% was obese, 23.80% was moderately obese, and 4.80% was morbidly obese.

Table 28 shows that among who consumed zero servings of fruit monthly were 3, 33.30% was normal weight, overweight, and obese while 0% was moderately and morbid obese. Among participants who consumed one to two servings of fruits monthly were 18, 16.70% was normal weight, 11.10% was overweight, 22.20% was obese, 27.80% was moderately obese, and 22.20% was morbidly obese. Among participants who consumed three to five servings fruits monthly were 27, 18.50% was normal weight, 40.70% was overweight, 29.60% was obese, 11.10% was moderately obese, and 0% was morbidly

obese. Among participants who consumed more than 5 servings fruits monthly were 55, 20% was normal weight, 16.40% was overweight, 27.30% was obese, 25.50% was moderately obese, and 10.90% was morbidly obese. Statistically, there was no association between BMI/obesity and diet (daily, weekly, and monthly fruit consumptions).

Table 28

Cross-Tabulation and Chi-Square Analysis of Association between Diet (Daily, Weekly and Monthly Fruit Consumption) Category and BMI

			BMI Category					
			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Fruit.Cat. Daily	<1	Count	6	10	12	8	4	40
		% within Fruit. Con.	15%	25%	30%	20%	10%	100.00%
	1-2	Count	15	13	15	14	3	60
		% within Fruit. Con.	25%	21.70%	25%	23.30%	5%	100.00%
	3-5	Count	0	1	2	1	0	4
		% within Fruit. Con.	0%	25%	50%	25%	10.00%	100%
	>5	Count	0	1	0	0	0	1
		% within Fruit. Con.	0.00%	100%	0%	0%	0.00%	100.00%

Total	Count	21	25	29	23	17	105
	% within Fruit. Con.	20%	23.80%	27.60%	21.90%	6.70%	100.00%

			BMI Category					
			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Fruit .Cat. Weekly	<1	Count	3	3	4	3	1	14
		% within Fruit. Con.	21.40%	21.40%	28.60%	21.40%	7.10%	100.00%
	1-2	Count	4	11	9	6	1	31
		% within Fruit. Con.	12.90%	35.50%	29%	19.40%	3.20%	100.00%
	3-5	Count	9	5	9	7	8	38
		% within Fruit. Con.	23.70%	13.20%	23.70%	18.40%	21.10%	100%
	>5	Count	4	6	5	5	1	21
		% within Fruit. Con.	19%	28.60%	23.80%	23.80%	4.80%	100.00%
Total		Count	20	25	27	27	11	104
		% within Fruit. Con.	19.20%	24%	26%	20.20%	10.60%	100.00%

			BMI Category

			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Fruit.Cat. Monthly	<1	Count	1	1	1	0	0	3
		% within Fruit. Con.	33.30%	33.30%	33.30%	0%	0%	100.00%
	1-2	Count	3	2	4	5	24	18
		% within Fruit. Con.	16.70%	11.10%	22.20%	27.80%	22.20%	100.00%
	3-5	Count	5	11	8	3	0	27
		% within Fruit. Con.	18.50%	40.70%	29.60%	11.10%	0%	100%
	>5	Count	11	9	15	14	6	55
		% within Fruit. Con.	20%	16.40%	27.30%	25.50%	10.90%	100.00%
Total		Count	20	23	28	22	10	103
		% within Fruit Con.	19.40%	22.30%	27.20%	21.40%	9.70%	100.00%

Chi-Square Tests Fruit Consumption Day-Weekly-Monthly

Chi-Square Tests Fruit Consumption Daily

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.671[a]	12	0.810
Likelihood Ratio	8.199	12	0.769
Linear-by-Linear Association	0.606	1	0.436
N of Valid Cases	105		

Chi-Square Tests Fruit Consumption Weekly

	Value	df	Asymp. Sig. (2-sided)

Pearson Chi-Square	11.686[a]	12	0.471
Likelihood Ratio	11.783	12	0.463
Linear-by-Linear Association	0.104	1	0.747
N of Valid Cases	104		

Chi-Square Tests Fruit Consumption Monthly

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.452[a]	12	0.218
Likelihood Ratio	17.894	12	0.119
Linear-by-Linear Association	0.045	1	0.832
N of Valid Cases	103		

BMI by Diet (Hamburger, Cheeseburger or Meat Loaf Consumption)

Table 29 shows that among who consumed zero serving hamburger, cheeseburger or meat loaf daily were 22, 18.20% was normal weight, 31.80% was overweight, 27.30% was obese, 13.60% was moderately obese, and 9.10% was morbidly obese. Among participants who consumed one to two servings of hamburger, cheeseburger or meat loaf daily were 58, 25% was normal weight, 21.70% was overweight, 25% was obese, 23.30% was moderately obese and 5% was morbidly obese. Among participants who consumed three to five servings of hamburger, cheeseburger or meat loaf daily were 24, 16.70% was normal weight, 16.70% was overweight, 33.30% was obese, 25% was moderately obese, and 8.30 was morbidly obese. Among participants who consumed more than five servings hamburger, cheeseburger or meat loaf daily was 3, 0% was normal weight, overweight, obese, and morbidly obese, but 100% was moderately obese.

Table 29 shows that among participants who consumed zero serving of hamburger, cheeseburger or meat loaf weekly were 9, 11.10% was normal weight,

33.30% was overweight, 22.20% was obese, 33.30% was moderately obese and 0% was morbidly obese. Among participants who consumed one to two servings of hamburger, cheeseburger or meat loaf weekly were 12, 25% was normal weight, 8.30% was overweight, 25% was obese, 33.30% was moderately obese, and 8.30% was morbidly obese. Among participants who consumed three to five servings of hamburger, cheeseburger or meat loaf weekly were 50, 16% was normal weight, 20% was overweight, 32% was obese, 14% was moderately obese and 18% was morbidly obese. Among participants who consumed more than five servings of hamburger, cheeseburger or meat loaf weekly were 38, 23.70% was normal weight, 28.90% was overweight, 21.10% was obese, 23.70% was moderately obese, and 2.60% was morbidly obese.

Among participants who consumed zero serving of hamburger, cheeseburger or meat loaf monthly were 6, 16.70% was normal weight, 33.30% was overweight, and 16.70% was obese, moderately and morbidly obese. Among participants who consumed one to two servings of hamburger, cheeseburger or meat loaf monthly were 2, 50% were overweight and obese and rest of them were 0%. Among participants who consumed three to five servings of hamburger, cheeseburger or meat loaf monthly were 17.50% was normal weight, 22.50% was overweight, 30% was obese, 25% was moderately obese and 5% was morbidly obese. Among who consumed more than five servings of hamburger, cheeseburger or meat loaf monthly were 54, 20.40% were normal weight and overweight, 25.90% obese, 20.60% was moderately obese and 10.80% was morbidly obese. Statistically, there was no association between BMI/obese and diet (daily, weekly, and monthly hamburger, cheeseburger or meat loaf consumption).

Table 29

Cross-Tabulation and Chi-Square Analysis of Association between Diet (Hamburger, Cheeseburger or Meat Loaf Consumption) Category and BMI

			BMI Category					
			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Meat. Cat. Daily	<1	Count	4	7	6	3	2	22
		% within Meat. Con.	18.20%	31.80%	27.30%	13.60%	9.10%	100.00%
	1-2	Count	12	14	15	10	7	58
		% within Meat Con.	25%	21.70%	25%	23.30%	5%	100.00%
	3-5	Count	4	4	8	6	2	24
		% within Meat. Con.	16.70%	16.70%	33.30%	25%	8.30%	100%
	>5	Count	0	0	0	3	0	3
		% within Meat. Con.	0%	0%	0%	100%	0%	100.00%
Total		Count	20	25	29	22	11	107
		% within Meat. Con.	18.70%	23.40%	27.10%	20.60%	10.30%	100.00%

			BMI Category

			< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Meat.Cat. Weekly	<1	Count	1	3	2	3	0	9
		% within Meat. Con.	11.10%	33.30%	22.20%	33.30%	0%	100.00%
	1-2	Count	3	1	3	4	1	12
		% within Meat. Con.	25%	8.30%	25%	33.30%	8.30%	100.00%
	3-5	Count	8	10	16	7	9	50
		% within Meat. Con.	16%	20%	32%	14%	18%	100%
	>5	Count	9	11	8	9	1	38
		% within Meat. Con.	23.70%	28.90%	21.10%	23.70%	2.60%	100.00%
Total		Count	21	25	29	23	11	109
		% within Meat. Con.	19.30%	22.90%	26.60%	21.10%	10.10%	100.00%

		BMI Category					
		< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
<1	Count	1	2	1	1	1	6
	% within Meat Con.	16.70%	33.30%	16.70%	16.70%	16.70%	100.00%
	Count	0	1	1	0	0	2

							107	
Meat.Cat. Monthly	1-2	% within Meat. Con.	0%	50%	50%	0%	0%	100.00%
		Count	7	9	12	10	2	40
	3-5	% within Meat. Con.	17.50%	22.50%	30%	25%	5%	100%
		Count	11	11	14	10	8	54
	>5	% within Meat. Con.	20.40%	20.40%	25.90%	18.50%	14.80%	100.00%
		Count	19	23	28	21	11	102
Total		% within Meat.Con.	18.60%	22.50%	27.50%	20.60%	10.80%	100.00%

Chi-Square Tests Hamburger, Cheeseburger or Meat Loaf Consumption Daily-Weekly-Monthly

Chi-Square Tests Hamburger, Cheeseburger or Meat Loaf Consumption - Daily

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.649[a]	12	0.261
Likelihood Ratio	12.577	12	0.401
Linear-by-Linear Association	2.038	1	0.153
N of Valid Cases	107		

Chi-Square Tests Hamburger, Cheeseburger or Meat Loaf Consumption- Weekly

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.511[a]	12	0.333
Likelihood Ratio	14.957	12	0.244
Linear-by-Linear Association	0.955	1	0.328
N of Valid Cases	109		

Chi-Square Tests Hamburger, Cheeseburger or Meat Loaf Consumption - Monthly

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.767[a]	12	0.927

			108
Likelihood Ratio	6.703	12	0.877
Linear-by-Linear Association	0.091	1	0.762
N of Valid Cases	102		

BMI by Physical Activity

Table 30 shows that among participants who exercised for at least once or twice a week for 20 minutes was 47, 14.90% was normal weight, 27.70% was overweight, 25.50% was obese, 21.30% was moderately obese, and 10.60% was morbidly obese. Among participants who exercised for at least 20 minutes two to three times a week was 30, 33.30% was normal weight, 26.70% was overweight, 20% was obese, 10% was moderately obese, and 10% was morbidly obese. Among participants who exercised for at least 20 minutes three to five times a week was 13, 15.40% was normal weight, 7.70% was overweight, 23.10% was obese, 30.80% was moderately obese, and 23.10% was morbidly obese. Among participants who exercised for at least 20 minutes more than five times a week was 8, 0% was normal weight, 25% was overweight, 25% was obese, 50% was moderately obese, and 0% was morbidly obese.

Table 30 shows that among participants who performed moderate activities for at least 10 minutes at a time in a week was 63, 22.20% was normal weight, 22.20% overweight, 30.20% was obese, 19% was moderately obese, and 6.30% was morbidly obese. Among participants who did not perform moderate activities for at least 10 minutes at a time in a week was 19, 10.50% was normal weight, 10.50% was overweight, 26.30% was obese, 26.30% was moderately obese, and 26.30% was morbidly obese. Among participants who were unsure of their moderate activity level was 15, 20% was

normal weight, 40% was overweight, 20% was obese, 20% was moderately obese, and 0% was morbidly obese.

Table 30 shows that among participants who performed vigorous activities for at least 10 minutes at a time in a week was 37, 24.30% was normal weight, 18.90% was overweight, 29.70% was obese, 18.90% was moderately obese, and 8.10% was morbidly obese. Among participants who did not perform vigorous activities for at least 10 minutes at a time in a week was 34, 17.60% was normal weight, 23.50% was overweight, 23.50% was obese, 23.50% was moderately obese, and 11.80% was morbidly obese. Among participants who were unsure of their vigorous activity level was 31, 16.10% was normal weight, 25.80% was overweight, 25.80% was obese, 19.40% was moderately obese, and 12.90% was morbidly obese. Overall, statistically there was no significant association between BMI/obesity and physical activity.

Table 30

Cross-Tabulation and Chi-Square Analysis of Association between Physical Activity Category and BMI

		BMI Category					
		< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
1-2	Count	7	13	12	10	5	47
	% within 20Min. Exercise	14.90%	27.70%	25.50%	21.30%	10.60%	100.00%
	Count	10	8	6	3	3	30

	2-3	% within 20Min. Exercise	33.30%	26.70%	20.00%	10.00%	10.00%	100.00%
		Count	2	1	3	4	3	13
20 Min. Exercise	3-5	% within 20Min. Exercise	15.40%	7.70%	23.10%	30.80%	23.10%	100%
		Count	0	2	2	4	0	8
	> 5	% within 20Min. Exercise	0.00%	25.00%	25.00%	50.00%	0.00%	100.00%
		Count	19	24	23	21	11	98
Total		% within 20Min. Exercise	19.40%	24.50%	23.50%	21.40%	11.20%	100.00%

Moderate Activity 10 Minutes Weekly

		BMI Category					
		< 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Yes	Count	14	14	19	12	4	63
	% Count.	22.20%	22.20%	30.20%	19.00%	6.30%	100.00%
No	Count	2	2	5	5	5	19
	% Count.	10.50%	10.50%	26.30%	26.30%	26.30%	100.00%
Do not know/Not Sure	Count	3	6	3	3	0	15
	% Count.	20.00%	40.00%	20.00%	20.00%	0.00%	100%
Total	Count	19	22	27	20	9	97
	% Count.	19.60%	22.70%	27.80%	20.60%	9.30%	100.00%

Vigorous Activity 10 Minutes Weekly

		BMI Category < 25 normal weight	25-29.99 overweight	30-34.99 obese	35-39.99 moderate obesity	≥ 40 morbidly obese	Total
Yes	Count	9	7	11	7	3	37
	% Count.	24.30%	18.90%	29.70%	18.90%	8.10%	100.00%
No	Count	6	8	8	8	4	34
	% Count.	17.60%	23.50%	23.50%	23.50%	11.80%	100.00%
Do not know/Not Sure	Count	5	8	8	6	4	31
	% Count.	16.10%	25.80%	25.80%	19.40%	12.90%	100%
Total	Count	20	23	27	21	11	102
	% Count.	19.60%	22.50%	26.50%	20.60%	10.80%	100.00%

Chi-Square Tests 20Min Exercise Weekly

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.140[a]	12	0.234
Likelihood Ratio	16.821	12	0.156
Linear-by-Linear Association	1.061	1	0.303
N of Valid Cases	98		

Chi-Square Tests Moderate Activity 10Min Weekly

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.013[a]	8	0.111
Likelihood Ratio	12.588	8	0.127
Linear-by-Linear Association	0.053	1	0.818
N of Valid Cases	97		

Chi-Square Tests Vigorous Activity 10Min Weekly

	Value	df	Asymp. Sig. (2-

			sided)
Pearson Chi-Square	1.940[a]	8	0.983
Likelihood Ratio	1.939	8	0.983
Linear-by-Linear Association	0.424	1	0.515
N of Valid Cases	102		

Bivariate Analysis – Logistic Regression

The logistic regression model showed that no statistical significant between gender and obesity when gender is considered alone, OR.882 (95% CI=.409, 1904), p=.749, or between gender and moderate and morbid obesity, OR.573 (95% CI=.253, 1.298), p=.182. No association was found between gender and obesity using Spearman correlations, r_s (109) = -0.786, p=.312. This result supports that gender was not a predictor of obesity in the Meskhetian Turk (Ahiska) immigrant population. This result supports Null Hypothesis 1 and does not support Alternative Hypothesis 1 under Research Question 1.

Table 31

Logistic Regression Analysis – Obesity and Gender

Logistic Regression Analysis- Obesity and Gender Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Gender	-0.126	0.393	0.102	1	0.749	0.882	0.409	1.904
	Constant	-0.172	0.596	0.083	1	0.773	0.842		
Logistic Regression Analysis-Moderate/Morbid Obesity and Gender Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Gender	-0.558	0.417	1.785	1	0.182	0.573	0.253	1.298
	Constant	0.125	0.617	0.041	1	0.840	1.133		

The logistic regression model showed that there was no statistical significant association between obesity and age, OR.670 (95% CI =.459, 0.977), p= .138, or between age and moderately/morbid obesity, OR.1.002 (95% CI =.687, 1.460), p=.993. No association was found between age and obesity using Spearman correlations, r_s (109) =

0.777, p=.144. This result supports that demographic factor of age was not a predictor of obesity in the Meskhetian Turk (Ahiska) immigrant population. This result supports Null Hypothesis 1 and does not Alternative Hypothesis 1 under Research Question 1.

Table 32

Logistic Regression Analysis – Obesity and Age

Logistic Regression Analysis - Obesity and Age Variables in Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Age	-0.401	0.193	4.327	1	0.138	0.670	0.459	0.977
	Constant	0.607	0.495	1.503	1	0.220	1.835		
Logistic Regression Analysis-Moderate/Morbid Obesity and Age Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Age	0.002	0.192	0	1	0.993	1.002	0.687	1.460
	Constant	-0.67	0.509	1.73	1	0.188	0.512		

The logistic regression model showed that there was no statistical significant association between obesity and socioeconomic status (SES), OR 1.278 (95% CI =.962, 1.698), p=.191, or between SES and moderate/morbid obese, OR.713 (95% CI = 0.510, 0.997), p=.218. No association was found between SES and obesity using Spearman correlation, r_s (109) = 0.781, p= 0.436. These findings, combined, provide support for Null Hypothesis 1 under Research Question 1 of this study which predicted that demographic factor of socioeconomic status (SES) was not a predictor of obesity in the Meskhetian Turk (Ahiska) immigrant population.

These findings, combined, provide support for Null Hypothesis 1 under Research Question 1 of this study; demographic factors (gender, age, and SES) were not predictors of obesity in the Meskhetian Turk (Ahiska) immigrant population.

Table 33

Logistic Regression Analysis – Obesity and Socioeconomic Status (Income)

Logistic Regression Analysis- Obesity and SES Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	SES	0.245	0.145	2.863	1	0.191	1.278	0.962	1.698
	Constant	-0.980	0.422	5.388	1	0.020	0.375		
Logistic Regression Analysis-Moderate/Morbid Obesity and SES Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	SES	-0.338	0.171	3.92	1	0.218	0.713	0.510	0.997
	Constant	0.152	0.444	0.118	1	0.732	1.165		

The logistic regression model showed that there was no statistical association between obesity and daily vegetable consumption, OR 1.121 (95% CI = 0.772, 1.628), p=.547. However, the logistic regression model showed statistical significant association between daily vegetable consumption and moderate/morbid obesity, OR 1.739 (95% CI = 1.159, 2.611), p= .008. No association was found between daily vegetable consumption and obesity using Spearman correlation, r_s (109) = 0.287, p= 0.164. This result supports that there was no association between daily vegetable consumption and obesity; however, there was an association between daily vegetable consumption and moderate/morbid obesity.

Table 34

Logistic Regression Analysis – Obesity and Daily Vegetable Consumption

Logistic Regression Analysis- Obesity and Daily Vegetable Consumption Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Veg.Con. Daily	0.114	0.19	0.362	1	0.547	1.121	0.772	1.628
	Constant	-0.554	0.389	2.029	1	0.154	0.575		

Logistic Regression Analysis- Moderate/Morbid obesity and Daily Vegetable Consumption Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Veg. Con. Daily	0.553	0.207	7.131	1	0.008	1.739	1.159	2.611
	Constant	-1.667	0.434	14.769	1	0.00	0.189		

The logistic regression model showed that there was statistical association between obesity and weekly vegetable consumption OR 1.125 (95% CI = 0.811, 1.561), p= .011. However, the logistic regression model showed that there was no statistical association between moderate/morbid obesity and weekly vegetable consumption, OR .887 (95% CI = 0.603, 1.249), p= .492. No association was found between obesity and weekly vegetable consumption using Spearman correlation, r_s (109) = 0.134, p =0.126. This result supports that there was an association between weekly vegetable consumption and obesity, however, there was no association between weekly vegetable consumption and moderate/morbid obesity.

Table 35

Logistic Regression Analysis – Obesity and Weekly Vegetable Consumption

Logistic Regression Analysis- Obesity and Weekly Vegetable Consumption Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Veg.Con. Weekly	0.118	0.167	0.496	1	0.011	1.125	0.811	1.561
	Constant	-0.704	0.538	1.712	1	0.191	0.495		

Logistic Regression Analysis- Moderate/Morbid Obesity and Weekly Vegetable Consumption Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Veg.Con. Weekly	-0.12	0.174	0.473	1	0.492	0.887	0.603	1.249
	Constant	-0.312	0.548	0.324	1	0.569	0.732		

The logistic regression model showed that there was no statistical association between obesity and monthly vegetable consumption OR.888 (95% CI = 0.665, 1.185), p= .419, or between moderate/morbid obesity and monthly vegetable consumption, OR.804 (95% CI= 0.597, 1.083), p= 0.152. No association was found between obesity and monthly vegetable consumption using Spearman correlation, r_s (109) = -0.052, p =0.175.

Table 36

Logistic Regression Analysis – Obesity Monthly Vegetable Consumption

Logistic Regression Analysis- Obesity and Monthly Vegetable Consumption Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Veg. Con. Monthly	-0.119	0.147	0.652	1	0.419	0.888	0.665	1.185
	Constant	0.078	0.565	0.019	1	0.891	1.081		

Logistic Regression Analysis- Moderate/Morbid Obesity and Monthly Vegetable Consumption Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Veg. Con. Monthly	-0.218	0.152	2.055	1	0.152	0.804	0.597	1.083
	Constant	0.113	0.574	0.039	1	0.843	1.12		

The logistic regression model showed that there was no statistical association between obesity and daily fruit consumption OR, 1.258 (95% CI = 0.574, 2.757), p= .0567 or moderately/morbid obese and daily fruit consumption, OR, 0.999 (95% CI= 0.833, 1.198), p= .993. No association was found using Spearman correlation for obesity and daily fruit consumption, r_s (105) =0.312, p= 0.617.

Table 37

Logistic Regression Analysis – Obesity and Daily Fruit Consumption

Logistic Regression Analysis- Obesity and Fruit Variables in the Equation- Daily

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)

								95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Fruit. Con.Daily	0.229	0.04	0.328	1	0.567	1.258	0.574	2.757
	Constant	-0.096	0.34	0.080	1	0.777	0.908		

Logistic Regression Analysis- Moderate/Morbid Obesity and Fruit Consumption Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Fruit. Con. Daily	-0.001	0.093	0.236	1	0.993	0.999	0.833	1.198
	Constant	-0.662	0.356	0.346	1	0.063	0.516		

The logistic regression model showed that there was statistical association between obesity and weekly fruit consumption OR. 872 (95% CI = 0.449, 1.691), p= .008. The logistic regression model also showed that there was statistical association between moderate/morbid obesity and weekly fruit consumption OR. 1.452 (95% CI = 1.040, 2.028), p= .028. No association was found using Spearman correlation for obesity and weekly fruit consumption, rs(104)=0.752, p= 0.412.

Table 38

Logistic Regression Analysis – Obesity and Weekly Fruit Consumption

Logistic Regression Analysis- Obesity and Weekly Fruit Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Fruit. Con. Weekly	-0.137	0.338	0.165	1	0.008	0.872	0.449	1.691
	Constant	-0.735	0.390	3.548	1	0.060	0.479		

Logistic Regression Analysis- Moderate/Morbid Obesity and Weekly Fruit Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Fruit. Con. Weekly	0.373	0.170	4.804	1	0.028	1.452	1.040	2.028
	Constant	-1.531	0.424	13.018	1	0.063	0.216		

The logistic regression model showed that there was no association between obesity and monthly fruit consumption, OR. 1.118 (95% CI= 0.505, 2.477), p= .783, or moderately/morbid obese and monthly fruit consumption, OR. 430 (95% CI= 0.180, 1.029), p= .328. No association was found between obesity and monthly fruit consumption using Spearman correlation, rs(103)=0.652, p= 0.715.

Table 39

Logistic Regression Analysis – Obesity and Monthly Fruit Consumption

Logistic Regression Analysis- Obesity and Monthly Fruit Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Fruit. Con. Monthly	0.112	0.406	0.076	1	0.783	1.118	0.505	2.477
	Constant	-0.731	0.290	3.246	1	0.080	0.379		

Logistic Regression Analysis- Moderate/Morbid Obesity and Monthly Fruit Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper

Step 1a	Fruit. Con. Monthly	0.671	0.210	4.614	1	0.328	0.430	0.180	1.029
	Constant	1.115	0.943	0.150	1	0.903	1.122		

The logistic regression model showed that there was no statistical association between obesity and daily hamburger, cheeseburger or meat loaf consumption, OR. 678 (95% CI= 0.350, 1.313), p=0.249. However, the logistic regression showed that there was an association found between moderately/morbidly obesity and daily hamburger, cheeseburger or meat loaf consumption, OR. 3.366 (95% CI= 1.426, 7.950), p= 0.006. There was also no association found between obesity and daily hamburger, cheeseburger or meat loaf consumption using Spearman correlation, rs(107)=0.568, p= 0.312.

Table 40

Logistic Regression Analysis – Obesity and Daily Hamburger, Cheeseburger or Meat Loaf Consumption

Logistic Regression Analysis- Obesity and Daily Hamburger, Cheeseburger or Meat Loaf Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Meat. Con. Daily	-0.389	0.338	1.328	1	0.249	0.678	0.350	1.313
	Constant	-0.098	1.256	0.078	1	0.970	0.753		

Logistic Regression Analysis- Moderate/Morbid Obesity and Daily Hamburger, Cheeseburger or Meat Loaf Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Meat. Con. Daily	1.214	0.438	7.665	1	0.006	3.366	1.426	7.950

Constant	0.650	1.520	0.026	1	0.459	1.387	

The logistic regression model showed that there was no statistical association between obesity and weekly hamburger, cheeseburger or meat loaf consumption, OR. 1.315 (95% CI= 0.774, 2.235), p= 0.311, or moderately/morbidly obesity and weekly hamburger, cheeseburger or meat loaf consumption, OR. 935 (95% CI= 0.545, 1.605), p= 0.808. No association was found between obesity and weekly hamburger, cheeseburger or meat loaf consumption using Spearman correlation, rs(109)=0.156, p= 0.378.

Table 41

Logistic Regression Analysis – Obesity and Weekly Hamburger, Cheeseburger or Meat Loaf Consumption

Logistic Regression Analysis- Obesity and Weekly Hamburger, Cheeseburger or Meat Loaf Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Meat. Con. Weekly	0.274	0.270	1.028	1	0.311	1.315	0.774	2.235
	Constant	-0.130	1.380	0.290	1	0.680	0.480		

Logistic Regression Analysis- Moderate/Morbid Obesity and Weekly Hamburger, Cheeseburger or Meat Loaf Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Meat. Con. Weekly	-0.067	0.276	0.069	1	0.808	0.935	0.545	1.605
	Constant	-0.150	1.920	0.226	1	0.919	1.050		

The logistic regression model showed that there was no association between obesity and monthly hamburger, cheeseburger or meat loaf consumption, OR. 1.381 (95% CI= 0.183, 1.546), p= 0.659. However, the logistic regression model showed that there was statistical association found between moderately/morbidly obesity and monthly hamburger, cheeseburger or meat loaf consumption, OR. 361 (95% CI= 0.183, 0.714), p= 0.003. No association was found between obesity and monthly hamburger, cheeseburger or meat loaf consumption using Spearman correlation, rs(102)=0.102, p= 0.277.

Table 42

Logistic Regression Analysis – Obesity and Monthly Hamburger, Cheeseburger or Meat Loaf Consumption

Logistic Regression Analysis- Obesity and Monthly Hamburger, Cheeseburger or Meat Loaf Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Meat. Con. Monthly	-0.127	0.287	1.195	1	0.659	1.381	0.502	1.546
	Constant	-0.168	1.067	0.300	1	0.268	0.240		

Logistic Regression Analysis- Moderate/Morbid Obesity and Monthly Hamburger, Cheeseburger or Meat Loaf Consumption *Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Meat. Con. Monthly	-1.118	0.347	6.592	1	0.003	0.361	0.183	0.714
	Constant	-1.320	1.410	1.367	1	0.616	1.510		

The logistic regression model showed that there was no statistical association between obesity and at least 20 minutes physical exercise once a week when 20 minutes

physical exercise was considered alone, OR .729 (95% CI = 0.476, 1.116), p= 0.146, or moderately/morbid obese and at least 20 minutes physical exercise once a week, OR 1.458 (95% CI= 0.962, 2.208), p= 0.075. No association was found between obesity and 20 minutes physical exercise once a week using Spearman correlation, r_s (98)= 0.057, p= 0.650.

Overall, these findings, combined, diet (daily vegetable consumption, fruit consumption, and hamburger, cheeseburger or meat loaf consumption and also weekly vegetable consumption and monthly hamburger, cheeseburger or meat loaf consumption) was a predictor of obesity in Meskhetian Turk (Ahiska) immigrant population. These findings partially support to reject Null Hypothesis 2 under Research Question 2 of this study.

Table 43

Logistic Regression Analysis – Obesity and Physical Exercise (20 Minutes)

Logistic Regression Analysis- Obesity and Exercise for 20 Min Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Phy_20Min	-0.316	0.217	2.118	1	0.146	0.729	0.476	1.116
	Constant	0.215	0.43	0.25	1	0.617	1.24		

Logistic Regression Analysis- Moderate/Morbid Obesity and Exercise 20 min Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Phy_20	0.377	0.212	3.162	1	0.075	1.458	0.962	2.208
	Constant	-1.371	0.454	9.125	1	0.003	0.254		

The logistic regression model showed that there was no association between obesity and 10 minutes moderate physical activity at least 10 minutes once a week when 10 minutes moderate physical activity was considered alone, OR. 0.992 (95% CI = 0.596, 1.650), p= 0.975, or moderate/morbid obesity and at least 10 minutes moderate physical activity once a week, OR. 1.756 (95% CI= 1.042, 2.958), p= 0.340. Also, using Spearman correlation for obesity and 10 minutes moderate physical activity once a week, no association was found, r_s (97)= 0.159, p= 0.817.

Table 44

Logistic Regression Analysis – Obesity and Moderate Exercise

Logistic Regression Analysis- Obesity and Moderate Exercise for 10 Min Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Phy_Mod. Act. 10 Min	-0.008	0.26	0.001	1	0.975	0.992	0.596	1.650
	Constant	-0.34	0.438	0.601	1	0.438	0.712		

Logistic Regression Analysis- Moderate/Morbid Obesity and Moderate Exercise for 10 min Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Phy_Mod. Act. 10 Min	0.563	0.266	4.477	1	0.340	1.756	1.042	2.958
	Constant	-1.541	0.47	10.753	1	0.001	0.214		

The logistic regression model showed that there was no statistical association between obesity and weekly vigorous physical exercise for at least 10 minutes when vigorous activity was considered alone, OR. 1.153 (95% CI= 0.720, 1.847), p= 0.553, or

moderate/morbid obesity and vigorous physical activity at least 10 minutes weekly, OR. 486 (95% CI= 0.287, 0.825), p= 0.180. No association was found between obesity and 10 minutes vigorous activity weekly using Spearman correlation, $r_s(102)=-0.068$, p= 0.189.

Overall, these findings, combined, although there was no statistical association between obesity and physical activity, there was a statistical association between daily vegetable consumption, hamburger, cheeseburger or meat loaf consumption and moderate/morbid obesity. There was also a statistical association between weekly vegetable consumption, fruit consumption and obesity. These findings support to reject Null Hypothesis 2 under Research Question 2 of this study which predicted that lifestyle indicator of physical exercise was not a predictor and diet was a predictor of obesity in Meskhetian Turk (Ahiska) immigrant population.

Table 45

Logistic Regression Analysis – Obesity and Vigorous Exercise

Logistic Regression Analysis- Obesity and Vigorous Exercise for 10 Min. Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Phy_Vig_Act 10 Min	0.143	0.24	0.353	1	0.553	1.153	0.72	1.847
	Constant	-0.631	0.51	1.531	1	0.216	0.532		

Logistic Regression Analysis- Moderate/Morbid obesity and Vigorous Exercise for 10 Min. Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Phy_Vig_Act 10 Min	-0.721	0.27	7.134	1	0.180	0.486	0.287	0.825

	Constant	0.681	0.527	1.67	1	0.196	1.976	

The logistic regression model showed that there was no association between obesity and acculturation when acculturation was considered alone, OR. 1.456 (95% CI= 0.860, 1.987), p= 0.668, or moderate/morbid obesity and acculturation, OR. 0.648 (95% CI= 0.186, 0.925), p= 0.289. No association was found between obesity and acculturation using Spearman correlation, r_s (109)= 0.269, p= 0.160

This findings support Null Hypothesis 3 under Research Question 3 of this study which predicted that psychosocial indicator of acculturation was not a predictor of obesity in Meskhetian Turk (Ahiska) immigrant population.

Table 46

Logistic Regression Analysis- Obesity and Acculturation

Logistic Regression Analysis- Obesity and Acculturation Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Acculturation	0.245	0.35	0.436	1	0.668	1.456	0.86	1.987
	Constant	-0.621	0.51	1.631	1	0.326	0.432		

Logistic Regression Analysis- Moderate/Morbid Obesity and Acculturation Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Acculturation	-0.638	0.39	6.167	1	0.289	0.648	0.186	0.925
	Constant	0.678	0.628	1.78	1	0.296	1.876		

The logistic regression model showed that there was no association between obesity and perceived stress when perceived stress was considered alone, OR. 0.688

(95% CI= 0.765, 1.285), p= 0.409, or moderate/morbid obesity and perceived stress, OR. 0.804 (95% CI= 0.597, 1.083), p= 0.152. No association was found between obesity and perceived stress using Spearman correlation, $r_s(109)=0.109$, p= 0.487. This findings support Null Hypothesis 3 under Research Question 3 of this study which predicted that psychosocial indicator of perceived stress was not a predictor of obesity in Meskhetian Turk (Ahika) immigrant population.

Overall, these findings, combined, support that psychosocial indicators of acculturation and perceived stress were not a predictor of obesity in Meskhetian Turk (Ahiska) immigrant population. The Null Hypothesis 3 under Research Question 3 was supported.

Table 47

Logistic Regression Analysis – Obesity and Perceived Stress

Logistic Regression Analysis- Obesity and Perceived Stress Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Perceived Stress	-0.128	0.177	0.552	1	0.409	0.688	0.765	1.285
	Constant	0.072	0.595	0.01	1	0.591	1.061		

Logistic Regression Analysis- Moderate/Morbid Obesity and Perceived Stress Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Perceived Stress	-0.218	0.152	2.055	1	0.152	0.804	0.597	1.083
	Constant	0.113	0.574	0.039	1	0.843	1.12		

Table 48

Spearman Correlations

			BMI	Obese/Not Obese	Moderate/Morbid Obese
Spearman's Rho	Gender	Correlation	0.010	-0.786	-0.156
		Coefficient Sig (2-tailed)	0.981	0.312	0.471
		N	109	109	109
	Age	Correlation	0.081	0.777	0.866
		Coefficient Sig (2-tailed)	0.092	0.144	0.369
		N	109	109	109
	SES	Correlation	0.164	0.781	0.117
		Coefficient Sig (2-tailed)	0.265	0.436	0.122
		N	109	109	109
	Length of Stay	Correlation	0.06	0.033	0.130
		Coefficient Sig (2-tailed)	0.316	0.467	0.583
		N	109	109	109
	Veg-Con. Daily	Correlation	0.345	0.287	0.518
		Coefficient Sig (2-tailed)	0.001	0.164	0.18
		N	109	109	109
		Correlatio	0.206	0.134	0.189

	n			
Veg-Con. Weekly	Coefficient Sig (2-tailed)	0.323	0.126	0.296
	N	109	109	109
Veg-Con. Monthly	Correlation	-0.067	-0.052	-0.157
	Coefficient Sig (2-tailed)	0.231	0.175	0.101
	N	109	109	109
Physical Act.20Min	Correlation	-0.008	0.057	0.017
	Coefficient Sig (2-tailed)	0.871	0.65	0.815
	N	98	98	98
Moderately Act 10 min	Correlation	0.211	0.159	0.027
	Coefficient Sig (2-tailed)	0.927	0.817	0.67
	N	97	97	97
Vigorous Act-10Min	Correlation	-0.017	-0.068	-0.0169
	Coefficient Sig (2-tailed)	0.210	0.189	0.134
	N	102	102	102
Acculturation	Correlation	0.310	0.269	0.408
	Coefficient Sig (2-tailed)	0.021	0.160	0.001
	N	109	109	109
Perceived Stress	Correlation	0.990	0.109	0.217
	Coefficient Sig (2-	0.116	0.487	0.28

	tailed)			
	N	109	109	109
Fruit Con. Daily	Correlation	0.200	0.312	0.117
	Coefficient Sig (2-tailed)	0.455	0.617	0.180
	N	105	105	105
Fruit Con. Weekly	Correlation	0.502	0.752	0.216
	Coefficient Sig (2-tailed)	0.160	0.412	0.291
	N	104	104	104
Fruit Con. Monthly	Correlation	0.604	0.652	0.127
	Coefficient Sig (2-tailed)	0.112	0.715	0.290
	N	103	103	103
Hamburger, Cheeseburger or Meat Loaf Con. Daily	Correlation	0.306	0.568	0.163
	Coefficient Sig (2-tailed)	0.263	0.312	0.182
	N	107	107	107
Hamburger, Cheeseburger or Meat Loaf Con. Weekly	Correlation	0.871	0.156	0.117
	Coefficient Sig (2-tailed)	0.130	0.378	0.219
	N	109	109	109
Hamburger, Cheeseburger or Meat Loaf Con. Monthly	Correlation	0.762	0.102	0.401
	Coefficient Sig (2-tailed)	0.459	0.277	0.130
	N	102	102	102

Multivariate Analysis

Predictors for Obesity

A multivariate logistic regression model analyzed the effect of age, gender, socioeconomic status, diet (daily, weekly, monthly vegetable consumption, daily, weekly, and monthly fruit consumption, and daily, weekly, and monthly hamburger, cheeseburger or meat loaf consumption), physical activity (exercise 20 minutes, moderate and vigorous level of physical activity), acculturation and perceived stress on obesity in Meskhetian Turk (Ahiska) immigrant population (N= 109). The logistic regression model showed no statistical significance when all seven predictor variables were considered and obesity; however significance at $p<0.05$ level was demonstrated statistical association for diet (daily vegetable consumption) and obesity, OR. 2.952 (95% CI= 1.259, 5.370), p= .008, (daily fruit consumption), OR. 2.162 (95% CI= 0.274, 7.048), p= .002, (daily hamburger, cheeseburger or meat loaf consumption), OR.0.122 (95% CI= 0.072, 0.642), p= 0.019.

Table 49

Multivariate Logistic Regression Results- Predictors of Obesity Variables in the Equation (N=109)

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Gender	-0.230	0.216	0.922	1	0.368	0.574	0.172	1.920
	Age	-0.548	0.310	1.658	1	0.235	0.692	0.377	1.271
	SES (Income)	0.039	0.236	0.857	1	0.904	1.029	0.647	1.635
	Veg_Cat_Day	0.668	0.379	4.369	1	0.008	2.952	1.259	5.370
	Veg_Cat_Weekly	0.267	0.335	1.548	1	0.236	1.488	0.772	2.868
	Veg_Cat_Monthly	0.305	0.25	0.120	1	0.676	1.110	0.680	1.813

Fruit Con. Daily	0.991	1.053	0.305	1	0.002	2.162	0.274	7.048
Fruit Con. Weekly	-1.504	1.186	1.708	1	0.195	0.216	0.021	2.201
Fruit Con. Month.	0.264	0.914	0.950	1	0.773	1.302	0.217	7.807
Meat. Con.Daily	-2.719	1.161	5.025	1	0.019	0.122	0.072	0.642
Meat. Con.Week.	0.557	1.136	0.750	1	0.386	1.746	0.495	6.162
Meat.Con.Month.	0.021	0.0501	0.002	1	0.967	1.021	0.387	2.674
Phy_20Min	-0.628	0.320	2.041	1	0.149	0.437	0.192	0.995
Phy_Mod_Act	-0.238	0.544	0.367	1	0.421	0.645	0.222	1.875
Phy_Vig_Act	-0.190	0.410	0.201	1	0.341	0.677	0.303	1.511
Acculturation	0.359	0.385	0.709	1	0.574	0.356	0.487	1.463
Perceived Stress	0.482	0.745	0.804	1	0.733	0.852	0.987	2.785
Constant	1.367	1.900	0.362	1	0.502	3.579		

Predictors for Moderate/Morbid Obesity

A multivariate logistic regression model analyzed the effect of age, gender, socioeconomic status, diet (daily, weekly, monthly vegetable consumption, fruit consumption, and hamburger, cheeseburger or meat loaf consumption), physical activity (exercise 20 minutes, moderate and vigorous level of physical activity), acculturation and perceived stress on moderate/morbid obesity in Mesketian Turk (Ahiska) immigrant population (N= 109). The logistic regression model showed no statistical significance between seven variables and moderate/morbid obesity; however significance at $p<0.05$ level was demonstrated for vegetable consumption weekly and moderate/morbid obesity, OR. 1.520 (95% CI= 1.156, 4.755), p= .011 and monthly hamburger, cheeseburger or meat loaf consumption, OR. .635 (95% CI= 0.598, 1.615), p= 0.003. These results

provide support for Null Hypotheses 1 and 3under Research Question 1 and 3 which predicted that age, gender, SES, psychosocial factors of acculturation and perceived stress were not predictors of obesity in Meskhetian Turk (Ahiska) within this sample population.

Table 50

Multivariate Logistic Regression Results- Predictors of Moderate/Morbid Obesity Variables in the Equation (N=103)

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Gender	-2.350	0.604	1.836	1	0.264	0.450	0.082	1.536
	Age	0.552	0.807	1.387	1	0.225	1.554	0.704	3.433
	SES (Income)	-0.685	0.602	2.638	1	0.176	0.515	0.282	1.130
	Veg_Cat_Day	0.384	0.210	3.892	1	0.097	1.322	1.011	5.322
	Veg_Cat_Weekly	0.975	0.320	4.155	1	0.011	1.520	1.156	4.755
	Veg_Cat_Monthly	-0.221	0.324	2.322	1	0.195	0.706	0.331	1.111
	Fruit Con.Daily	0.890	0.105	1.277	1	0.284	0.303	0.123	0.963
	Fruit Con. Weekly	0.241	0.170	1.444	1	0.399	0.621	0.487	1.114
	Fruit Con. Monthly	0.806	0.520	1.024	1	0.276	0.874	0.658	1.736
	Meat.Con.Daily	0.158	0.603	1.082	1	0.144	0.255	0.477	0.933
	Meat.Con.Weekly	2.140	0.403	0.821	1	0.254	0.744	1.120	2.744
	Meat.Con.Monthly	1.410	0.782	1.466	1	0.003	0.635	0.598	1.615
	Phy_20Min	0.650	0.452	0.550	1	0.456	1.405	0.374	3.438
	Phy_Mod_Act	-0.780	0.579	0.988	1	0.122	0.568	0.156	1.639
	Phy_Vig_Act	-1.906	0.429	5.187	1	0.321	0.303	0.139	0.946
	Acculturation	1.201	0.380	3.320	1	0.531	0.452	0.423	1.858
	Perceived Stress	0.354	0.460	1.751	1	0.255	0.362	0.592	1.532
	Constant	0.804	2.378	0.246	1	0.608	2.477		

Conclusion

This study examined age, gender, SES, diet, physical activity, acculturation, perceived stress and obesity in a sample of 109 Meskhetian Turk (Ahiska) immigrants in Utah, Idaho, and California States in the United States. Seven main predictors (age, gender, SES, diet, physical activity, acculturation, and diet) were tested against obesity and moderate/morbidly obesity in a binary logistic regression and multivariate regression model using Spearman's correlation model. The logistic regression analysis showed no statistical significant association between age, gender, SES, physical activity, acculturation, and perceived stress on obesity outcomes in the sample population. However, diet (daily vegetable consumption, fruit consumption and hamburger, cheeseburger or meat loaf consumption) showed statistical association with obesity and diet (weekly vegetable consumption and monthly hamburger, cheeseburger or meat loaf consumption) showed statistical association with moderate/morbid obesity. Diet was measured on the BRFSS measure by asking questions about the frequency of vegetable consumption, fruit consumption, and hamburger, cheeseburger or meat loaf consumption. Diet (daily vegetable consumption, fruit consumption and hamburger, cheeseburger or meat loaf consumption) was the only predictor variable with statistical significant association with obesity and diet (weekly vegetable consumption and monthly hamburger, cheeseburger or meat loaf consumption) was the only predictor variable with statistical significance with moderate/morbid obesity. These results support the Null Hypothesis 1, 3, and 4 that age, gender, SES, physical activity, acculturation and

perceived stress were not predictors of obesity; however, diet was the only predictor of obesity in this sample population. In Chapter 5, I interpret these results and provide recommendations for future research and implications for social change based on the findings of this research study.

Chapter 5: Discussions, Recommendations, Conclusion and Summary

The purpose of this research was to investigate the relationship between age, gender, SES, lifestyle indicators (diet, physical activity), psychosocial indicators (acculturation, perceived stress) and obesity in the Meskhetian Turk (Ahiska) immigrant population. The quantitative methodology used to determine the study outcome in consideration of these predictor variables and obesity. The findings of this study were important to see if there was an interaction between variables and obesity in this sample group. As mentioned, obesity is a chronic health problem that may trigger different health issues in immigrant populations including heart diseases, stroke, diabetes, stress, high cholesterol and high blood pressure (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Ike-Chinaka, 2013; Kaholokula et al., 2012; Kirby et al., 2012; Krueger et al., 2014). Many studies showed that immigrant populations are vulnerable to obesity and they need to have a better understanding of obesity and its health implications (Ade et al., 2011; Gele & Mbalilaki, 2013; Ike-Chinaka, 2013). Due to negative health implications of obesity in different immigrant populations (Obisesan, 2015), there was a need to examine the association between different variables and obesity.

The study findings showed that obesity is a significant health problem and its prevalence is higher in minority immigrant populations in the United States (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Ike-Chinaka, 2013; Obisesan, 2015). Although the interaction of obesity and some demographic factors, cultural, dietary, and physical activity patterns

were examined in different immigrant groups, there are still variables that are unknown (Delavari, Sønderlund, Swinburn, Mellor, & Renzaho, 2013). The findings of this study may help public health professionals create a health plan to prevent and address obesity in this sample population.

Data collected from the participants and entered to SPSS for data analysis. I used univariate, binominal, multivariate logistic regression and Spearman's correlation to test the association between each independent variable including, age, gender, SES, diet, physical activity, acculturation, perceived stress and the dependent variable, obesity outcome. I used binominal logistic regression to investigate the effect of age, gender, SES, diet, physical activity, acculturation, and perceived stress on the predictive likelihood of obesity in Meskhetian Turk (Ahiska) immigrant population.

Results showed diet (daily vegetable, fruit, and hamburger, cheeseburger or meat loaf consumptions and weekly vegetable and monthly hamburger, cheeseburger or meat loaf consumptions) as the only independent variable that was statistically significant with respect to obesity and moderate/morbid obesity. Diet was measured on the BRFSS measure by asking questions about the frequency of vegetable consumption; fruit consumption; and hamburger, cheeseburger or meat loaf consumption. Fruits, vegetables and meat loaf consumptions are important components of a healthy diet (Kaiser et al., 2014). Reduced fruit and vegetable consumption is linked to poor health and increased risk of obesity (Kaiser et al., 2014; Esmailzadeh et al., 2006).

This study demonstrated that eating a variety of vegetables and fruit clearly ensures an adequate intake of most micronutrients, dietary fibers and a host of essential

non-nutrient substances (Kaiser et al., 2014). The study of Esmailzadeh et al. (2006) showed that obesity is associated with receiving a low quantity of vitamins. Increasing the consumption of fruit and vegetables and decreasing the consumption of fat and sugar was not associated with becoming obese and among men and women (Esmailzadeh et al., 2006).

Bazzano's (2006) study showed that eating larger amounts of fruits and vegetables increases the feeling of satiety and results in the displacement of more energy dense food. Energy density is reduced by higher intake of fruit and vegetables (Bazzano, 2006) and has an impact on the daily energy intake. In addition, according to Morgenstern, Sargent, and Hanewinkel (2009) excessive consumption of hamburger, meat loaf and fast food was associated with obesity in men and women in immigrant groups. The study by Morgenstern et al. (2009) showed that consumption of fat is the main factor of obesity. This study demonstrated that there was a positive association between exposure to excessive consumption of hamburger, meat loaf, and fast food substantially increased body fat: All of these studies Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Ike-Chinaka, 2013; Morgenstern et al., 2009; Obisesan, 2015 above suggested that excessive consumption of high calorie hamburger, meat loaf, and fast food, as well as more fat intake are associated with obesity. The result of this study was consistent with the findings of Morgenstern et al.'s (2009) study that showed that there was an association between hamburger, cheeseburger, or meat loaf consumption and obesity.

Morgenstern and colleagues (2009) showed that reduced intake and consumption of legumes, vegetables, and fruit triggered obesity and weight gain for both genders. Therefore, this is the primary reason why the BRFSSS questionnaire implemented in measuring the relationship between diet and obesity in this study. The BRFSS was measured diet by vegetable consumption, fruit consumption, and hamburger, cheeseburger, or meat loaf consumption. Six independent variables including age, gender, SES, physical activity, acculturation, and perceived stress were not statistically significant with obesity and moderate/morbidly obesity.

Interpretation of the Findings

I examined the association between independent variables (age, gender, SES, diet, physical activity, acculturation, and perceived stress) and dependent variable (obesity) in a sample of Meskhetian Turk (Ahiska) immigrant population in the Western United States. The purpose of this research was to fill a gap about possible obesity predictors in the immigrant populations in the Western United States. The Meskhetian Turk (Ahiska) immigrant population was specifically chosen because it has never been studied before. Although there has been attention given to other immigrant groups including African-American, Latinos, Asian, European, and Pacific Islander immigrants (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Ike-Chinaka, 2013; Kaholokula et al., 2012; Kirby et al., 2012; Krueger et al., 2014), this sample group has never been studied about obesity predictors alone. The research questions and hypotheses that guided this study developed to provide baseline

information of what exists in a sample population of Meskhetian Turk (Ahiska) immigrants.

The relationship between age, gender, SES, diet, physical activity, acculturation, perceived stress and obesity/moderate-morbid obesity studied in this dissertation research. I found that there were no association between age, gender, SES, physical activity, acculturation, perceived stress and obesity. However, there was a statistically significant association between diet (daily vegetable, fruit and hamburger, cheeseburger or meat loaf consumption and obesity; weekly vegetable and monthly hamburger, cheeseburger or meat loaf consumption and moderately/morbid obesity) and obesity in this sample.

Diet measured by daily, weekly, and monthly vegetable consumption, fruit consumption, and hamburger, cheeseburger or meat loaf consumption. This result was consistent with Lin and Morrison's (2002) study, in which the researcher found that there was an association between fruit and vegetable consumption and obesity among adult men and women age of 19 years and older in the United States. The study findings showed that overweight and obese men and women consumed significantly less fruits and vegetables than healthy weight men and women (Lin and Morrison, 2002). Ludwing et al. (2001) found similar results that there was an association between less consumption of fruits and vegetables in men and children in the United States. The results of the study showed that healthy men and children consumed significantly more fruits and vegetables than either overweight or obese individuals (Ludwing et al., 2001). These results were also consistent with the results of Lesser, Gasevic, and Lear's (2014) study, which

showed that decreased consumption of fruits and vegetables and an increased consumption of high fat/fried food, hamburger, and meat loaf were associated with obesity in South Asian immigrants (Lesser et al., 2014). In addition, this conclusion was consistent with the finding of Abou El Hassan and Hekmat (2012), who found an association between an increased consumption of fruit and vegetable and BMI in Arab immigrants in the United States and Canada.

In this study, logistic regression performed to show the relationship of age, gender, SES, diet, physical activity, acculturation, and perceived stress on the likelihood that participants will be obese. Logistic regression did not show any statistical relationship between age, gender, SES, physical activity, acculturation, perceived stress and obesity; however, it identified the relationship between diet and obesity (daily vegetable consumption, fruit consumption, and hamburger, cheeseburger, or meat loaf consumption) and diet and moderate/morbid obesity (weekly vegetable consumption, and hamburger, cheeseburger, or meat loaf consumption).

In this study, there was no statistical significant association found between gender and obesity. The study of Zeigler-Johnson et al. (2013) showed that gender was a significant predictor of obesity in African-American immigrants, and Hispanic and European American males, Ade et al. (2011) and Obisesan (2015) on the other hand, found that no significant statistical association exists between gender and both obesity and morbidly obese status in African immigrants and Nigerian immigrants in the United States. Although, there are some contradicting results on similar studies between gender as a significant predictor of obesity in different immigrant groups, the majority of these

studies have suggested that there is little to no relationship between the two. The findings of this study showed that there was no association between gender and obesity in this immigrant group. The result showed that there was no difference among vegetable, fruit, and meat consumption among gender.

I found no statistical association between socio-economic status (income) and obesity in this sample population. As mentioned earlier, food stamp use rate was high among immigrant groups due to low socioeconomic status; however, this study did not focus on the food stamp use or whether it was related to diet specifically vegetable, fruit, hamburger, cheeseburger, or meat loaf consumption. This result was consistent with Ade et al.'s (2011) study of African-American immigrants and Obisesan's (2015) study of Nigerian immigrants that there was no statistical association between socioeconomic status and obesity in African-American immigrants and Nigerian immigrants. Salsberry and Reagan (2009) found that there was no strong evidence to suggest that there is an association between socioeconomic status and obesity in Mexican American and Caucasian women. Obayashi, Bianchi, Houang, and Song (2007) found that the risk for obesity increased in low income women and middle-income women in comparison to high income women in Mexican American immigrants. The study did not find a similar result for male Mexican-American immigrants (Obayashi et al., 2007). A similar result was found by Choi, (2011) who stated that the risk of obesity was higher in immigrants who lived below the poverty level. According to U.S. Census Bureau (2015) the official poverty rate is 13.5% in the United States and the poverty level rate among all immigrant populations including Hispanic, African-American, Asian, and White is 19.9%. In

addition, 69% of all immigrants were using food stamps for purchasing food (U.S. Welfare, 2012). Taking into consideration the high poverty level in the United States as well as the high food stamp usage among immigrants, it is reasonable to argue that there might be an association between obesity and SES. However, further research needs to consider these facts show the relationship between obesity and SES statistically.

I found no association statistical association between age and obesity in this sample population. The result was consistent with Roshania, Narayan, and Oza-Frank (2008) in immigrant groups varied by different age that showed that there was no association found between age and obesity among immigrant groups who had resided in the United States. Contrary to the results of this study, some study results have indicated that there is some association between age and obesity. The younger age of arrival (20 years or less) of the Mexican American, non-Hispanic African-American immigrants to the host country was significantly associated with greater likelihood of becoming overweight and obesity (Goel et al., 2004). To further support this, Roshania and colleagues (2008) found that the prevalence of obesity and being overweight was significantly associated with age at arrival for Latin American, Caribbean, and Asian immigrants. Although some studies found association between age and obesity, such as, Mexican American, and non-Hispanic African-American immigrant groups, this study did not find any relationship between age and obesity. This could be attributed to two main reasons; firstly, my study targeted only participants who were 18 years of age and older and only states of Utah, Idaho, and California in the United States, whereas, those

studies including Goel et al, 2004; Roshania et al, 2008 targeted age of 20 years and younger and much larger groups in the United States.

A distinctive finding of this study was that no association was found between physical activity and obesity. However, the findings by Gordon-Larsen et al. (2008) and Ladabaum, Mannalithara, Myer, and Singh (2014) showed that there was an association between physical activity and obesity. Physical activity lowered the risk of obesity (Gordon-Larsen et al., 2008). The studies found that keeping a physically active life may help people to stay healthy (Gordon-Larsen et al., 2008). It can also lower the risk of chronic diseases including cardiovascular diseases, stroke, high blood pressure, diabetes and certain cancers (Ladabaum et al., 2014).

The study's findings support that staying active could more likely keep the weight steady while sedentary lifestyle could trigger weight gain over time (Ade et al., 2011; Castellanos et al., 2011; Franco & Cardoso, 2008; Obisesan, 2015). Vigorous and moderate exercise can help promote weight loss, but it works best when combined with a healthy eating habits. Recently, Gualdi-Russo and colleagues (2014) carried out a study to find the relationship between physical activity and obesity on North African immigrants. The results showed that there is no relationship between physical activity and obesity in this sample population (Gualdi-Russo et al., 2014).

I found no statistical association between acculturation and obesity in this population. The concept of acculturation has been analyzed in a different way by many researchers in African-American, Hispanic, Arab, European, and Nigerian immigrants (Ade et al., 2011; Ahluwalia, 2007; Fitzgerald, 2006; Ike-Chinaka, 2013; Lee, Sobal, &

Frongillo, 2000; Obisesan, 2015). The results of this study are consistent with Paris's (2015) study with Hispanic young adults that showed no significant association found between acculturation and obesity. However, Ahluwalia (2007) found that there was a positive relationship between the degree of acculturation and obesity in Mexican-American adults living in the United States. This result was consistent with Ike-Chinaka's (2013) findings that among Nigerian immigrants, acculturation is a subfactor of duration of residency in the United States and dominant society immersion were showing significant relationship between obesity and acculturation.

Lee, Sobal, and Frongillo (2000) showed similar result in Asian immigrant in the United States that there was a positive relationship between acculturation and obesity. In another research conducted by Goel (2004) there were no statistical significant associations to suggest that a correlation between acculturation and obesity in African immigrant in the United States. In a similar study conducted by Ibrahim and Case (2011) on Arab immigrants settling in the United States have also revealed that there is no association between acculturation and obesity.

I found no statistical association between perceived stress and obesity. Similar results found by Viera (2005) that there was no association between perceived stress and obesity in young immigrants in the suburbs of central Virginia. Tseng and Fang (2011) found that migration-related perceived stress did not associate with energy intake and total grams and obesity in Chinese immigrant women in the Philadelphia. In a study conducted by Sammel and colleagues (2003) there is no association between perceived stress and obesity in African-American and Caucasian American women. These results

were consistent with the finding of Drewnoski and Specter's (2004) study on European immigrants settling in the United States has also shown that there is no association between perceived stress and obesity. However, Isasi et al. (2015) examined the association of psychosocial stress with obesity and found that there was an association between stress and obesity in Hispanic/Latino adults. To sum up, this study found no statistical significant association between age, gender, SES, physical activity, acculturation, perceived stress and obesity in Meskhetian Turk immigrant group. Nevertheless, this study has found statistical significant association between diet and obesity in this sample group.

Limitations of the Study

Even though the results of this study could provide information regarding eating habits that are associated with obesity in Meskhetian Turk (Ahiska) immigrant population in Utah, Idaho, and California States, there are a number of limitations to be considered. One limitation of this study could be using convenience sample for this research. Although the data was collected only from Meskhetian Turk (Ahiska) immigrant population, the sample population was limited to only three states of Utah, Idaho, and California. Because this sample population represents small number and limited locations of the Meskhetian Turk (Ahiska) immigrant population, the results of this study may not be generalized for the larger population in the United States. A quantitative cross-sectional design was appropriate to investigate the relationship between independent and dependent variables. However, it cannot prove cause and effect relationships between

age, gender, SES, diet, physical activity, acculturation, perceived stress and obesity outcomes in the sample population (Obisesan, 2015).

This study used BRFSS to obtain information about height and weight (BMI), the possibility of inaccurate self-report data from participants could limit accurate data collection, analysis, and interpretation Although BRFSS was moderately reliable measurement tool to obtain information about BMI, diet, physical activity, and other demographic factors, due to the participants' language barrier could result in an inaccurate report for data collection. BRFSS measured only frequency of vegetable, fruit, hamburger, cheeseburger or meat loaf consumption. While other methods for assessing intake include direct observation, food records, and dietary histories, the BRFSS only measured self-reported fruit, vegetable, and hamburger, cheeseburger or meat loaf intake. A brief dietary assessment tools like the BRFSS was easier to collect data that could be asked in a relatively short amount of time. The brevity could be a limitation for this study.

The data collection was only the states of Utah, Idaho, and California, a limited geographical area. Therefore, the results of this study may be generalizable among immigrant Meskhetian Turk (Ahiska) adults, age of 18 years and older in western United States. In this study, I conducted the interview for survey completion and mailed out the survey upon the participant's request. The interview method was one wherein the participants could communicate to the interviewer orally. However, there was not an option for participants to ask question directly while filling out the survey. The collection of data through the method of mail-out was relatively cheap and economical, as money

was spent only on the preparation and mailing of the survey to the participants. However, an interview was a little expensive method since the participants had to come to the interview individually. It could be possible that in the mailing method, it was not known as to who responded the questions, which was not in the case of an interview. This bias or inaccurate information could limit data collection, analysis, and interpretation.

It is noteworthy to state that this study has some limitations. Although BRFSS, SMAS and PSS are reliable and valid in collecting data, there are still deficiencies which need to be considered, such as- the risk of under -and over-reporting of self-report data. Subsequently, language barrier could also have been another limitation, which may have led to misunderstandings and misinterpretations of the questions. Although using self-report was the easiest and fastest way to collect data, it could subject to social desirability bias where the participants could answer the questions by the person's feelings at the time they filled out the survey. This could cause that if the respondent felt bad or good at time, the answer either could be negative or positive. The results could be biased. In spite of its limitations, this research is very beneficial and important because it contributes valuable findings about the relationship between obesity and its predictors among immigrant Meskhetian Turk (Ahiska) immigrant in western United States such as Utah, Idaho and California.

Recommendations

Despite the differences in the results obtained from the existing literature of immigrant populations in the United States the findings of this study are important to Meskhetian Turk (Ahiska) immigrant communities. . The results of this study provide

information into the associations between acculturation, perceived stress, age, gender, diet, physical activity, SES and obesity for this sample immigrant group. Because this is a new research in this sample population about obesity and its predictors, additional studies needs to be carried out about new and unanswered questions. Future research may give more attention on this sample group other than other immigrant minorities, such as African-American, Hispanic, Asian, and European immigrants in the United States. Researchers may also carry out future research by reaching out the larger sample size in entire the United States, instead of a limited location and small sample size. Future researchers should also consider including internet and online platforms for data collections, which would provide opportunity to reach out more participants and the participants to access the survey.

This study used social ecological model and acculturation theory, which helped to understand better how acculturation and social factors influence health outcomes in Meskhetian Turk (Ahiska) immigrants. Perhaps the most significant contribution of this study is its investigation of demographics, lifestyle, and psychosocial factors and obesity outcomes in this sample group. Although the study did not provide generalizable results to the entire United States, future studies may consider obesity health risk factors in relation to the construct of acculturation, resilience, and other psychosocial factors in this immigrant population at large. It is also recommended that future research may include examining of other cultural factors, prolonged stress, assimilation, psychological and demographic factors that may be associated with obesity and health risks related to obesity.

Implications for Social Change

As a new study, this study may provide new information about age, gender, SES, physical activity, diet, acculturation, and perceived stress and of obesity in Meskhetian Turk (Ahiska) immigrant population in United States. The result of this study provided information that is associated with obesity in this sample population such as Meskhetian Turk (Ahiska). Many research showed that immigrant minorities are vulnerable to obesity and obesity-related diseases after arrival in the United States. (Adedoyin et al., 2010; Ade et al., 2011; Albrecht & Gordon-Larsen, 2013; Gele & Mbalilaki, 2013; Jamil et al., 2014; Ike-Chinaka, 2013; Kaholokula et al., 2012; Kirby et al., 2012; Krueger et al., 2014), but the results of this study demonstrated that predictors of obesity are varied in different immigrant populations. Therefore, it is important that this study provided new knowledge and awareness about the unknown Meskhetian Turk (Ahiska) immigrant population and compare on what already exists previously in other immigrant populations.

The positive social change implication, therefore, is that a public health professional may use this information to determine the types of education and intervention programs that are needed to reduce obesity risk factors and predictors in the Meskhetian Turk (Ahiska) immigrant populations. Interventions for positive social change may include community-based educational program that needs to increase awareness about predictors of obesity and obesity related diseases. In addition, public health professionals should promote educational programs and projects to increase healthy lifestyle as well as healthy diet to prevent the risk factors of becoming obese.

Because this study has identified the relationship between diet and obesity in Meskhetian Turk (Ahiska) immigrants, health professionals who may work with this group use this information to develop culturally healthy diet programs. By creating and promoting educational programs and interventions, immigrants will learn to positively acculturate into the host culture in terms of food preferences, social preferences, psychosocial preference and overall health for positive social change. To this end , this new knowledge will be useful to public health professionals and health organizations in formulating educational programs to promote healthy lifestyle such as consumption of fruit, vegetables and hamburger, cheeseburger or meat loaf that will reduce and avoid of obesity risk factors in this Meskhetian Turk (Ahiska) immigrant population .

Conclusion

This study examined the relationship between age, gender, SES, diet, physical activity, acculturation, perceived stress and obesity in the Meskhetian Turk (Ahiska) immigrant population in the United States. The result of the study showed that there was no association between age, gender, SES, physical activity, acculturation, perceived stress and obesity. However, the results showed that an association exists between diet (daily vegetable consumption, fruit consumption, hamburger, cheeseburger or meat loaf consumptions and obesity; weekly vegetable consumption and monthly hamburger, cheeseburger or meat loaf consumption and moderate/morbid obesity) obesity. These results show that the predictors of obesity may exist in all minority populations differently. The results of this study also support that certain predictors of obesity could be unique to certain immigrant populations. Since every immigrant population has same

or similar challenges in the host culture, future studies could examine other predictors that may be associated with obesity and obesity-related health problems.

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Appendix A: The Behavioral Factor Surveillance System Questionnaires (BRFSS)

1. Are you a Meskhetian Turk (Ahiska) immigrant?

___Yes ___No

2.What is your age?
……
3.What is your gender?

___Male ___Female

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

5.What is your annual household income from all sources?

___ $10,000 to less than $15,000
___ $15,000 to less than $20,000
___ $20,000 to less than $25,000
___ $25,000 to less than $35,000
___ $35,000 to less than $50,000
___ $50,000 to less than $75,000
___ $75,000 or more

6.About how much do you weight without shoes?

Weight (pound/kilograms)_____ ____Do not know/Not Sure

7.About how tall are you without shoes?

Round fractions up _____/_____Height (ft/inches/meters/centimeters)
_____Do not know /Not sure
Fruits/Vegetables

8.How many times per day did you drink fruit juices? (say on average)

9.During the past month, not counting juice, how many times per day, week, or month did you eat fruit? Count fresh, frozen, or canned fruit.

___ Per day
___ Per week

___ Per month
___ Less than one time per month
___ Never
___ Do not know/Not sure
___Refused

10. Not counting juice, how often do you eat fruits?
___ Per day
___ Per week
___ Per month
___ Per year
___ Never
__ Do not know/Not sure
___ Refused

11. How often do you eat hamburgers, cheeseburgers, or meat loaf?
___ Per day
___ Per week
___ Per month
___ Per year
___ Never
__ Do not know/Not sure
___ Refused

12.Not counting carrots, potatoes, or salad, how many servings of vegetables do you usually eat? (For example, a serving of vegetables at both lunch and dinner would be two servings.)
___ Per day
___ Per week
___ Per month
___ Per year
___ Never
__ Do not know/Not sure
___ Refused

Physical Activity

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

_____times in the last week

14. Now, thinking about the moderate activities you do, when you are not working, in a usual week, do you do moderate activities for at least 10 minutes at a time, such as brisk

walking, bicycling, vacuuming, gardening, or anything else that causes some increase in breathing or heart rate?
___ Yes
___ No
___ Do not know/ Not sure

15.How many days per week do you do these moderate activities for at least 10 minutes at a time?
___ Days per week
___ Do not do any moderate physical activity for at least 10 minutes at a time?
___ Do not know/Not sure

16. Now, thinking about the vigorous activities you do, when you are not working, in a usual week, do you do vigorous activities for at least 10 minutes at a time, such as running, aerobics, heavy yard work, or anything else that causes large increases in breathing or heart rate?
___ Yes
___ No
___ Do not know/ Not sure

Social Context

17) How often in the past 12 months would you say you were worried or stressed about having enough money to pay your rent/mortgage? Would you say you were worried or stressed:
__ Always ___Usually ___Sometimes ___Rarely ___Never

18) How often in the past 12 months would you say you were worried or stressed about having enough money to buy nutritious meals? Would you say you were worried or stressed:

__ Always ___Usually ___Sometimes ___Rarely ___Never

19) How often do you get the social and emotional support you need from any source?
__ Always ___Usually ___Sometimes ___Rarely ___Never

Appendix B:Stephenson Multigroup Acculturation Scale (SMAS)

(Stephenson, 2000)

Below are a number of statements that evaluate changes that occur when people interact with others of different cultures or ethnic groups. For questions that refer to "COUNTRY OF ORIGIN" or "NATIVE COUNTRY," please refer to the country from which your family originally came. For questions referring to "NATIVE LANGUAGE," please refer to the language spoken where your family originally came.

Circle the answer that best matches your response to each statement

1) I understand English, but I'm not fluent in English.
False b) Partly false c) Partly true d) True

2.I am informed about current affairs in the United States
False b) Partly false c) Partly true d) True

3. I speak my native language with my friends and acquaintances from my country of origin.
False b) Partly false c) Partly true d) True

4.I have never learned to speak the language of my native country.
a) False b) Partly false c) Partly true d) True

5. I feel totally comfortable with (Anglo)American people.
a) False b) Partly false c) Partly true d) True

6. I eat traditional foods from my native culture.
a) False b) Partly false c) Partly true d) True

7. I have many (Anglo)American acquaintances.
a) False b) Partly false c) Partly true d) True

8. I feel comfortable speaking my native language.
a) False b) Partly false c) Partly true d) True

9. I am informed about current affairs in my native country.
a) False b) Partly false c) Partly true d) True

10. I know how to read and write in my native language.
a) False b) Partly false c) Partly true d) True

11. I feel at home in the United States.

a) False b) Partly false c) Partly true d) True

12. I attend social functions with people from my native country.
a) False b) Partly false c) Partly true d) True

13. I feel accepted by (Anglo) Americans.
a) False b) Partly false c) Partly true d) True

14. I speak my native language at home.
a) False b) Partly false c) Partly true d) True

15. I regularly read magazines of my ethnic group.
a) False b) Partly false c) Partly true d) True

16. I know how to speak my native language.
a) False b) Partly false c) Partly true d) True

17. I know how to prepare (Anglo) American foods.
a) False b) Partly false c) Partly true d) True

18. I am familiar with the history of my native country.
a) False b) Partly false c) Partly true d) True

19. I regularly read an American newspaper.
a) False b) Partly false c) Partly true d) True

20. I like to listen to music of my ethnic group.
a) False b) Partly false c) Partly true d) True

21. I like to speak my native language.
a) False b) Partly false c) Partly true d) True

22. I feel comfortable speaking English.
a) False b) Partly false c) Partly true d) True

23. I speak English at home.
a) False b) Partly false c) Partly true d) True

24. I speak my native language with my spouse or partner.
a) False b) Partly false c) Partly true d) True

25. When I pray, I use my native language.
a) False b) Partly false c) Partly true d) True

26. I attend social functions with (Anglo) American people.
a) False b) Partly false c) Partly true d) True

27. I think in my native language.
a) False b) Partly false c) Partly true d) True

28. I stay in close contact with family members and relatives in my native country.
a) False b) Partly false c) Partly true d) True

29. I am familiar with important people in American history.
a) False b) Partly false c) Partly true d) True

30. I think in English.
a) False b) Partly false c) Partly true d) True

31. I speak English with my spouse or partner.
a) False b) Partly false c) Partly true d) True

32. I like to eat American foods.
a) False b) Partly false c) Partly true d) True

Appendix C: Perceived Stress Scale (Cohen, 1988)

The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, you will be asked to indicate your response by placing an "X" over the circle representing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

1-In the last month, how often have you been upset because of something that happened unexpectedly?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

2) In the last month, how often have you felt that you were unable to control the important things in your life?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

3) In the last month, how often have you felt nervous and "stressed"?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

4) In the last month, how often have you felt confident about your ability to handle your personal problems?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

5) In the last month, how often have you felt that things were going your way?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

6) In the last month, how often have you found that you could not cope with all the things that you had to do?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

7) In the last month, how often have you been able to control irritations in your life?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

8) In the last month, how often have you felt that you were on top of things?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

9) In the last month, how often have you been angered because of things that were outside of your control?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

10) In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
0= Never 1= Almost Never 2= Sometimes 3= Fairly Often 4= Very Often

Appendix D: Invitation Flyer

Title: Predictors of Obesity, Acculturation, and Perceived Stress in Meskhetian Turk (Ahiska) immigrants in the United State

My name is Zekeriya Temircan a doctoral candidate at Walden University conducting a research on the predictors of obesity, acculturation, and perceived stress among Meskhetian Turk (Ahiska) immigrants in the United States. Are you a Meskhetian Turk (Ahiska) immigrant in the US? Are you 18 years old or older? If yes, you might be interested in participating in a voluntary research study. Please do not consider participating in this study if you are not a Meskhetian Turk (Ahiska) immigrant and below the aged of 18 years old and older. Also, eligibility of participation should be on reading comprehension in English in order to understand survey questions and answer them. Obesity is a health condition characterized by a body mass index (BMI) of ≥ 30 kg/m2, and has been identified as a risk factor for the development of chronic diseases such as diabetes, heart diseases, and certain cancers. The study only involves surveys. Please know that participation in this survey is voluntary and you are not obligated to complete the survey, even if you change your mind after you start the survey. This process will take 15 to 20 minutes. This survey does not contain any identifying information allowing for confidentiality and protection of your privacy. This data will be kept in locked cabinet and password protected computer.