RELATIONSHIP BETWEEN ACCULTURATION STATUS AND DIABETES PREVALENCE IN HISPANIC IMMIGRANTS

By

Sandra Garcia

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Biomedical Informatics

Department of Health Informatics

School of Health Related Professions

Rutgers, the State University of New Jersey

April 8, 2016

RUTGERS
School of Health Related Professions

Final Dissertation Defense Approval Form

Relationship Between Acculturation And Diabetes Prevalence

In Hispanic Immigrants

BY

Sandra Garcia

Dissertation Committee:

Shankar Srinivasan PhD

Frederick Coffman PhD

Samer Kottiech MD

Approved by the Dissertation Committee:

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

Abstract

The purpose of the study was to explore the relationship between acculturation status and diabetes prevalence in U.S. Hispanics. Thus, the study goal was to determine if acculturation status predicts diabetes prevalence in Hispanics in the U.S. The main hypothesis for this study is: Acculturation status significantly predicts diabetes prevalence in Hispanic adults. This main hypothesis is based on the main research question**:** How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.? In addition, the study included an investigation into covariates that might influence the relationship between acculturation status and diabetes prevalence. Thus, the relationships between age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten and diabetes prevalence were explored. This study was therefore driven by the following research questions and associated statistical hypotheses:

Research Question #1: How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #2: How does age relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #3: How does gender relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #4: How does occupation relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #5: How does income relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #6: How does health insurance relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #7: How does physical activity and fitness relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #8: How does alcohol use relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #9: How does smoking and tobacco use relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #10: How does weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #11: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #11b: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #12: How does anyone on a special diet (any family member) relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #13: How does types of food available at home relate to diabetes prevalence in adult Hispanics in the U.S.?

Research Question #14: How does types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Quantitative archival research was used to gather data. Findings demonstrated that none of these factors significantly predicted diabetes prevalence.

ACKNOWLEDGEMENT

Firstly, I would like to express my deepest gratitude to Dr. Shankar Srinivasan for his continuous support of my PhD study and related research, for his encouragement and motivation. His constant guidance helped me throughout this thesis. I could not have imagined having a better advisor and mentor for my PhD study.

Also, would like to thank the rest of my thesis committee members Dr. Frederick Coffman, and Dr. Samer Kottiech for their insightful comments which encouraged me to widen my research from various perspectives.

Lastly, I would like to thank my children Steven, Anthony, and Cassandra for always making feel proud as a mother, and special thanks to my husband Wing Chu, for being my backbone and number one supporter.

TABLE OF CONTENTS

Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

1.1 Introduction

The topic for this study is the relationship between acculturation status and diabetes prevalence in Hispanic immigrants. Thus, the study goal is to determine if diabetes prevalence in Hispanic Immigrants in the U.S. is correlated with acculturation status. Around 100 years ago, Jewish peoples were believed to be most at risk to develop type 2 diabetes and today, it is the ethnic minorities to include the Hispanics/Latinos, Blacks, and Native Americans that are at the most risk (Chow, Foster, Gonzalez, & McIver,2012; Tuchman, 2011). Diabetes is a serious health problem for the Hispanic/Latino population (OMH, 2014). While there is some information about the tendency for time in the U.S. to increase prevalence rates of diabetes in Hispanics (Afable-Munsuz, Mayeda, Perez-Stable, & Haan, 2013), more is needed since these authors also found that acculturation was negatively related to diabetes prevalence. Since diabetes rates for Hispanics are higher than for other populations, this does not support the conclusion that increased acculturation reduces diabetes prevalence. Afable-Munsuz et al. did find however, that time in the U.S. was related to increased diabetes prevalence. A study is needed to help deal with inconsistent findings and determine if acculturation status is related to diabetes in the Hispanic population.

1.2 Goals and Objectives

The overall goal of this research is to determine the relationship between acculturation status and diabetes prevalence in Hispanics. Thus, the study goal is to determine if acculturation status predicts diabetes prevalence in Hispanics in the U.S.

1.3 Statement of the Problem

This dissertation is about determining if acculturation status of Hispanics predicts higher or lower prevalence of diabetes. Thus, the goal is to determine if these factors are related. The general problem is that rates of diabetes prevalence in Hispanics are disproportionately high. The specific problem for this study is that there is a lack of information relative to whether acculturation status of Hispanics living in the U.S. predicts diabetes prevalence. The general purpose of the study is therefore to explore the relationship between acculturation status and diabetes prevalence in U.S. Hispanics.

This problem can be explained by the theory of acculturation and assimilation (Kim, 2001; Wichert, 1996). This theory posits that foreign immigrants go from one culture to another and must adapt to the new culture. Acculturation describes this process of adopting new cultural norms and values of the host society. This assimilation process is dependent on the extent that immigrants actually change (Afable-Munsuz, Mayeda, Perez-Stable, & Haan, 2013). Since each generation of Hispanics would be exposed to a different level of acculturation and assimilation, it may be that this process explains diabetes prevalence rates.

1.4 Background of the Problem

Findings from the literature support the goals of this study. For example, studies show that Hispanics have higher rates of diabetes than other populations (Chow, Foster,

Gonzalez, & McIver, 2012; OMH, 2014; Tuchman, 2011), indicating the need to study this problem. Diabetes mellitus is considered a serious health problem for Hispanics as well as Latinos in the United States. In fact, diabetes mellitus is the sixth cause of death within the Hispanic community. The Hispanic population faces two times the risk of developing and dying from diabetes and they are also more likely to experience related complications (OMH, 2014, p. 1). More information is needed to help find solutions to reduce diabetes prevalence in U.S.-born Hispanics.

There is a lack of studies exploring the generational influence on diabetes prevalence in Hispanics. Results of one study demonstrated that length of time in the U.S. is related to increased prevalence rates of diabetes in Hispanics (Afable-Munsuz et al., 2013). However, this study included one group who had been born and raised in Mexico. Afable-Munsuz et al. concluded that acculturation was not related to diabetes prevalence since more time in the U.S. was related to increased rates of diabetes. However, it may be that acculturation is in fact related to diabetes and this is because assimilation into the American culture does lead to higher rates of diabetes. Afable-Munsuz et al. did find however, that time in the U.S. was related to increased diabetes prevalence and a study is needed to determine if this is true when all generations studied are born and raised in the U.S.

Braun, Huebschmann, Kim, Lezotte, Shupe, and Dabelea (2011) had also studied diabetes in Hispanics, with a focus on gestational diabetes, maternal country of birth, and Hispanic infant health outcomes. These authors found that GDM rates increased in US-born and Mexico-born Hispanics, but Mexico-born Hispanics had higher risks for this

disease, compared to U.S.-born Hispanics. This author concluded that education level was an influential factor (Braun et al., 2011). While Braun et al. did not examine diabetes in adults, these authors did show that Mexican-born Hispanics were at a greater risk for gestational diabetes. Thus, while Braun et al. demonstrated a decrease in risk for a type of diabetes for U.S.-born Hispanics, Afable-Munsuz et al. found that the risk for diabetes increases as Hispanics spend more time in the U.S. These studies examined different types of diabetes, but the authors presented inconsistent findings. A study is needed to further the work of Afable-Munsuz et al. and determine if acculturation status predicts diabetes prevalence in U.S. Hispanics.

There have been many studies of the impact of race/ethnicity on diabetes and related complications. Findings from these studies consistently reported that ethnicity/race is a factor related to diabetes (Choi, Liu, Palaniappan, Wang, & Wong, 2013; Chow et al., 2012). Ethnicity/race is also a factor related to diabetes complications such as kidney disease and depression (Bhalla, Zhao, Azar, Wang, Choi, Wong, & Palaniappan, 2013; Colon, Giachello, McIver, Pacheco, & Vela, 2013). However, studies also show that race/ethnicity is not related to other issues such as diabetic retinopathy (Bower, Brancati, & Selvin, 2013).

There have also been studies of factors that impact diabetes and these support conclusions that race/ethnicity is a factor, as is poverty (Gaskin, Thorpe, McGinty, Bower, Rohde, Young, & Dubay, 2014; Holmes, Hossain, Ward, & Opara, 2012). There are also factors such as glycemic control and overweight and obesity that are related to diabetes prevalence (Kim, Saraiva, Curtis, Wilson, Troyan, England, & Sharma, 2013;

Otiniano, Al Snih, Goodwin, Ray, AlGhatrif, & Markides, 2012; Pérez, Sánchez, & Ortiz, 2013; Suh, Choi, Plauschinat, Kwon, & Baron, 2010; The, Richardson, & Gordon-Larsen, 2013).

Literature findings are that Hispanic and other minorities have higher rates of all types of diabetes (Bentley-Lewis, Powe, Ankers, Wenger, Ecker, & Thadhani, 2014; Hedderson, Ehrlich, Sridhar, Darbinian, Moore, & Ferrara, 2012; Ma, Hébert, Manson, Balasubramanian, Liu, Lamonte, & Howard, 2012). Race/ethnicity is a factor related to this disease and while country of origin may have an impact of diabetes prevalence (Pabon-Nau, Cohen, Meigs, & Grant, 2010), it remains unclear whether spending more time in the United States as with first, second, and third generations, leads to increased diabetes prevalence.

There are multiple factors besides ethnicity/race that are linked to diabetes prevalence such as poverty and education (Braun et al., 2011; Gaskin et al., 2014; Holmes et al., 2012). However, the current study is focused on acculturation and assimilation which are also related to diabetes prevalence, but findings are inconsistent (Afable-Munsuz et al., 2013; Braun et al., 2011). Thus, it remains unclear whether time spent in the U.S., as demonstrated by different generations of U.S.-born Hispanics, is related to increased diabetes prevalence rates in this population.

In conclusion, while literature findings reveal some mixed results, consistent themes support the finding that race/ethnicity is related to diabetes prevalence and Hispanics have high rates of this disease. This supports the need to further study related issues such as the relationship between time spent in the United States, defined as acculturation status, and diabetes prevalence. This study would fill related gaps in the

literature and would extend knowledge in the discipline regarding impacts of length of acculturation time, which may or may not influence rates of diabetes in Hispanics.

1.5 Research Questions and Hypotheses

Hypothesis. The main hypothesis for this study is: Acculturation status significantly predicts diabetes prevalence in Hispanic adults. This main hypothesis is based on the main research question**:** How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.? Research questions and sub hypotheses are as follows:

Research Question #1: How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis #1: Acculturation status significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #2: How does age relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 2: Age significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #3: How does gender relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 3: Gender significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #4: How does occupation relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 4: Occupation significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #5: How does income relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 5: Income significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #6: How does health insurance relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 6: Health insurance significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #7: How does physical activity and fitness relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 7: Physical activity and fitness significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #8: How does alcohol use relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 8: Alcohol use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #9: How does smoking and tobacco use relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 9: Smoking and tobacco use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #10: How does weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 10: Weight history significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #11: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 11a: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history significantly predict diabetes prevalence in adult Hispanics in the U.S.

Research Question #11b: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 11b: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten significantly predict diabetes prevalence in adult Hispanics in the U.S.

Research Question #12: How does anyone on a special diet (any family member) relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 12: Anyone on a special diet significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #13: How does types of food available at home relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 13: Types of food available at home significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #14: How does types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 14: Types of food prepared-eaten significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Since later generations of Hispanics are assumed to have higher rates of accommodation and assimilation, it is predicted that acculturation status is related to diabetes outcomes and predicts diabetes outcomes. However, whether this acculturation status, with different acculturation and assimilation levels, is related to higher or lower levels of diabetes prevalence remains unclear, which supports the need for the current study.

1.6 Significance of the Study

Determining the relationship between acculturation status and diabetes prevalence in U.S. Hispanics is important since diabetes remains prevalent in this population (OMH, 2014). It is important to understand if acculturation of Hispanics living in the U.S. is a risk factor for diabetes. Further it is important to understand reasons for this phenomenon. The first step in understanding the problem is determining if the problem of high rates of diabetes prevalence exists, based on U.S. length of residence defined as acculturation status. The theory of accommodation and assimilation may help to explain findings. Results of this study provided information needed for further study of the

problem of high rates of diabetes in the U.S. Hispanic population. Study findings will benefit the health care industry since this information will help to understand and resolve the issue of high rates of diabetes in the Hispanic population. Findings will also contribute to my professional development since this information will provide an increased understanding of the potential for accommodation and assimilation to a host culture, to have an impact on disease outcomes.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

The overall goal of this research is to determine the relationship between acculturation status and diabetes prevalence in Hispanics. Thus, the study goal is to determine if acculturation status predicts diabetes prevalence in Hispanics in the U.S. The following presents the literature search strategy, theoretical foundation, and a synopsis of the current literature regarding topics of diabetes and prevalence, diabetes in Hispanics, studies of race/ethnicity and diabetes, studies of race/ethnicity and diabetes related complications, and studies of factors that impact diabetes. This is followed by a summary and conclusions.

2.2 Literature Search Strategy

The literature search strategy included gathering articles mostly within the last five years from databases that included peer-reviewed journals such as ProQuest and online resources. Key words used for the search included: diabetes and prevalence, diabetes in Hispanics, studies of race/ethnicity and diabetes, studies of race/ethnicity and diabetes related complications, and studies of factors that impact diabetes. The scope of literature review included an initial search with dates from 2010 onward, followed by a search of all years to further explore the issues. CINAHL, MedLine, PubMed, British Nursing Index, JSTOR Archive, Web of Science, and Google Scholar from 1985-2010.

2.3 Theoretical Foundation

The theoretical foundation for this study is based on the acculturation and assimilation theory. Y. Y. Kim's theory of acculturation (Kim, 2001; Wichert, 1996) posits that foreign immigrants go from one culture to another and they need to adapt to the new culture. Acculturation describes this process of the immigrant becoming more and more able to understand and adopt new cultural norms and values of the host society. As this process takes place, the immigrant develops an intercultural identity and the ability to live comfortably in the new culture. With this theory, as the immigrant takes part in interpersonal communications with those in the new culture, this increases acculturation. More recent views of the acculturation process view this as a reciprocal interaction where everyone is impacted (Kim, 2001; Wichert, 1996).

The assimilation process that takes place among United States immigrants is a result of increased exposure to U.S. social and cultural norms (Afable-Munsuz, Mayeda, Perez-Stable, & Haan, 2013). This assimilation process is also dependent on the extent that immigrants achieve social and economic equality with the host population (Afable-Munsuz et al., 2013). While Afable-Munsuz et al. found that acculturation was not related to diabetes increases, they also found that time spend in the U.S. was related to increased diabetes prevalence. Thus, acculturation theory can be used to help explain inconsistent findings.

2.4 Literature Review Related to Key Variables

The following provides a review of the current literature that includes studies related to the study constructs. The topics presented are consistent with the study variables of diabetes and prevalence, diabetes in Hispanics, studies of race/ethnicity and

diabetes, studies of race/ethnicity and diabetes related complications, and studies of factors that impact diabetes. This discussion is followed by a summary and conclusions.

2.5 Diabetes and Prevalence

Diabetes descriptions. Diabetes is a condition that involves too high levels of blood sugar or glucose (NIDDK, 2014). Blood glucose is the primary sugar found in the blood which is the major energy source. This blood glucose is made in the liver and muscles and comes from foods eaten. The glucose is carried by the blood to all cells for energy. The pancreas releases insulin into the blood and this hormone helps to carry the glucose to the cells. If the body does not make enough insulin, the glucose does not reach the cells and blood glucose levels increase to a level that can cause prediabetes or diabetes. This accumulation of blood glucose can result in health conditions (NIDDK, 2014).

Prediabetes is a state where glucose levels are high in the blood but not high enough to result in diabetes. Prediabetes is a risk factor for type 2 diabetes, stroke, and heart disease. Diet and exercise activities can change this glucose level and help prevent type 2 diabetes. Diabetes symptoms include excessive thirst and urination, hunger and tiredness, weight loss, slow healing sores, dry and itchy skin, blurry eyesight, and changes in feelings in feet (loss of feeling, pins feeling). While these signs may be present, in some people they are lacking. A blood test is needed to diagnose diabetes (NIDDK, 2014).

There are three main types of diabetes: type 1, type 2, and gestational (NIDDK, 2014). Any age and gender can develop diabetes. Type 1 diabetes (also called juvenile diabetes) tends to develops in young people but can also develop in adults. With this type

of diabetes, the body is not able to make insulin at all or enough. With this type of diabetes, injections of insulin are needed as well as the right diet and exercise program. Type 2 diabetes (also called adult-onset diabetes) is found in all ages but tends to develop in those middle-aged or older. Overweight and inactivity are related to this type. Type 2 diabetes tends to start with an insulin resistance where the pancreas cannot keep up with the demands of the body. Treatment for type 2 diabetes may include taking diabetes medicines, and it also includes changes in diet and exercise. Gestational diabetes develops in a pregnant female when insulin resistance takes place and typically ends when the baby is born. Overweight is a risk factor for this condition. Women with gestational diabetes are at a greater risk to develop type 2 diabetes later in life and babies born to these mothers are also at risk to develop obesity as well as type 2 diabetes (NIDDK, 2014).

Prevalence of diabetes. According to the CDC (2014a), there are 29.1 million people with diabetes in the United States, which is 9.3% of the population. It is estimated that 27.8% of the population remain undiagnosed. Further, of those 20 years or older, 28.9 million or 12.3% have diabetes. By age 20 years to 44 years, 4.3 million (4.1%) have diabetes, by age 45 years to 64 years, 13.4 million (16.2%) have diabetes, and by age 65 years+, 11.2 million (25.9%) have diabetes. This breaks down to 15.5 million men (13.6%) and 13.4 million women (11.2%) (CDC, 2014a).

Diabetes complications. Gregg, Li, Wang, Rios Burrows, Ali, Rolka, and Geiss (2014) explored diabetes complications using data from the National Health Interview Survey, the National Hospital Discharge Survey, the U.S. Renal Data System, and the U.S. National Vital Statistics System. Changes in complications due to diabetes from

1990 to 2010 in the United States were determined. Findings were that preventive care for adult diabetics improved. Results also showed that rates of stroke, acute myocardial infarction, lower-extremity amputation, end-stage renal disease, and death from hyperglycemic crisis declined with largest declines in acute myocardial infarction and death, followed by stroke and amputations, and end-stage renal disease. The greatest decline was in acute myocardial infarction and the smallest decline was in the number of deaths. These decreased rates were higher for diabetic adults than for non-diabetic adults. The authors concluded that there has been a decline in rates of diabetes-related complications, but the disease continues. Figure 1 shows the changes in complications due to diabetes from 1990 to 2010 in the U.S.

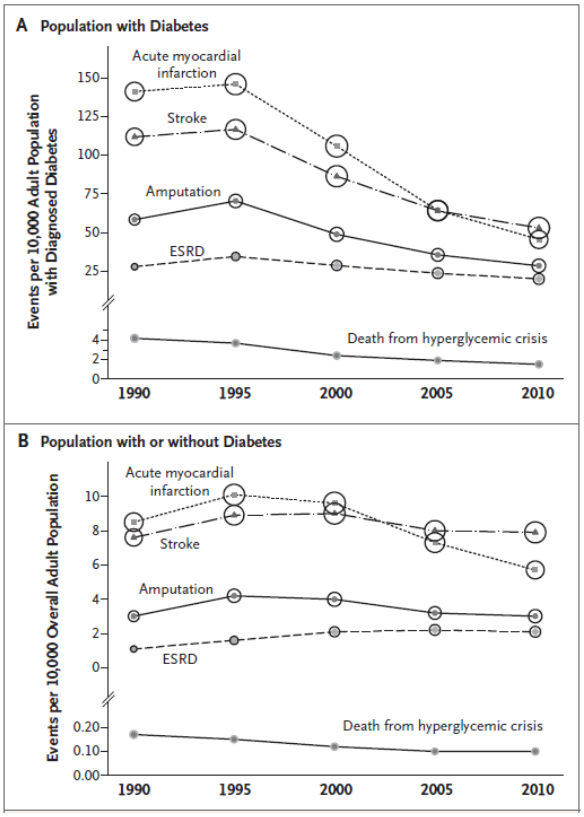
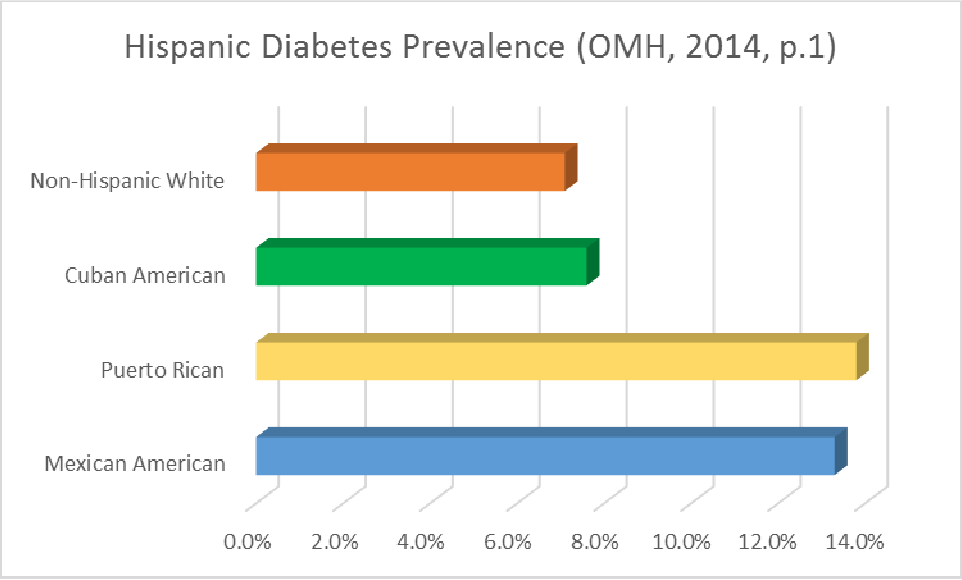


Figure 1: Trends in Age-Standardized Rates of Diabetes-Related Complications among U.S. Adults with and without Diagnosed Diabetes, 1990-2010, NEJM, 2014

2.6 Diabetes in Hispanics

Hispanic diabetes prevalence. Diabetes mellitus is a serious health problem for Hispanics and Latinos. In the United States, this condition is the sixth cause of death within the Hispanic and Latino community and it is the fourth leading cause of death for Hispanic females and Hispanic elderly. The Hispanic and Latino populations face twice the risk of developing and dying from diabetes, compared to other populations and they are more likely to experience complications of diabetes to include high blood pressure, heart disease, kidney disease, blindness, nerve damage, and amputations. In Hispanic and Latino populations, diabetes may have an earlier onset compared to other populations. Age of onset for Puerto Ricans and Mexican Americans, is 30 years to 50 years. Over 11% of Mexican Americans, ages 20 years or older suffer from diabetes. Diabetes prevalence rates for those 20 years and older, are: "13.3% for Mexican Americans, 13.8% for Puerto Ricans, 7.6% for Cuban Americans, and 7.1% for non-Hispanic whites" (OMH, 2014, p. 1).



Figures 2: Hispanic Diabetes Prevalence (OMH, 2014, p.1)

Generational diabetes in Hispanics. Afable-Munsuz, Mayeda, Perez-Stable, and Haan (2013) examined the process of acculturation and assimilation in Mexican immigrants to determine impacts on diabetes found in generations of Mexicans. These authors studied data from 1789 adults who were part of the Sacramento Area Latino Study on Aging (SALSA). Participants were ages 60 years to 101 years. Type 2 diabetes information was gathered from self-reports regarding a diagnosis by a physician, diabetic medication use, or a fasting glucose of 126 milligrams/deciliter or greater. Findings from logistic regression showed, after adjusting for age and gender, there were significant links between immigrant generation, acculturation, and diabetes risk. First-generation adults compared to second-generation, and third-generation adults had different rates of diabetes. There was a significant relationship between generation and diabetes, but not acculturation. The authors concluded that assimilation was not necessarily linked with an increased risk for diabetes in Mexican immigrants.

Afable-Munsuz et al. (2013) discussed study limitations. These authors used cross-sectional data which did not establish a causal link. The specific relationship between assimilation and diabetes risk was implied but the use of cross-sectional data did not allow individual immigration aspects to be studied that may have impacted outcomes. Despite limitations, study findings were that immigrant generation is significantly related to diabetes risk in aging adults of Mexican origin. Diabetes risk was even higher in U.S.-born second- and third-generation individuals as compared with these immigrants. These relationships were not significantly influenced by acculturation or other lifestyle and socioeconomic status (SES) factors assessed. While immigrant generation was positively associated with diabetes risk, and U.S.-born generations were linked to increased diabetic

risks, relationship between immigrant generation and diabetes risk remained after adjusting for other factors, except acculturation. Longer U.S. residence based on generation status, was therefore linked to increased risk of diabetes. While the finding related to acculturation was not consistent with overall findings, this may be explained by the complexity of the adaptation and assimilation process that immigrants to the United States experience. For this study, the first-generation participants migrated to the U.S. as adults, which implies that they were raised in a different culture, that later generations. This brings up the issue of culture and cultural beliefs as related to diabetes risk.

Braun, Huebschmann, Kim, Lezotte, Shupe, and Dabelea (2011) reported that maternal country of birth impacts Hispanic infant health outcomes. In fact, better birth outcomes have been found even though there is less prenatal care for Hispanic women born in Mexico. The impact of maternal birthplace on outcomes of gestational diabetes mellitus (GDM) is less clear and findings are inconsistent. Thus, Braun et al. explored the impact of maternal birthplace on the prevalence of gestational diabetes mellitus (GDM) in Colorado Hispanics. The authors conducted a retrospective population-based study using birth certificate data from 1995 to 2004. Findings were that GDM rates found in 154,957 births increased in both US-born (USWH) and Mexico-born (MWH), white Hispanic Colorado women. MWH had higher odds for GDM development, compared to USWH over the years. Maternal age and maternal education were factors that reduced GDM risk by birth country. GDM rates increased in USWH and MWH, white Hispanic Colorado women.

Mexico-born immigrant women have an increased risk for GDM compared with U.S. born counterparts and lower education attainment may be a related factor (Braun et

al., 2011). While the study was limited by the use of data from birth certificates and lacked individual details, the authors did provide support for their conclusion since findings were that Mexican-born Hispanic women had 30% higher odds for developing GDM, compared to Hispanic women born in the United States (Braun et al., 2011). Both Braun et al. and Afable-Munsuz et al. (2013) provided evidence to support the notion that country of birth and time spent in the United States, impacts diabetes prevalence. While education was shown to be a factor, cultural beliefs may also impact outcomes.

Beliefs and risk of diabetes in Hispanics. Santos, Hurtado-Ortiz, and Sneed (2009) presented an early study of the impact of cultural illness beliefs as a cause of diabetes. These authors examined the validity of the Klonoff and Landrine (1994) illness-belief scale with a sample of 156 Latino college students (34% male and 66% female). All participants were at high-risk for diabetes onset. Findings were that emotional, folk-beliefs, punitive, and gene/hereditary were perceived as predicting diabetes. The authors also found that age impacted emotional and folk illness factors, and there was a negative relationship between assimilation and views about the emotional factor. Santos et al. demonstrated that there are multiple ethnic/race factors that impact health outcomes.

2.7 Studies of Race/Ethnicity and Diabetes

Chow, Foster, Gonzalez, and McIver (2012) explored the impact of diabetes on different racial/ethnic minority groups. These authors reported findings that compared to whites, blacks or African Americans, Hispanics or Latinos, American Indians and Alaska Natives, and Pacific Islanders, Asian Americans, and Native Hawaiians, all have higher prevalence rates and more related burdens and complications. The American Diabetes

Association strives to deal with this impact of diabetes on ethnic minorities, with the help of the African American Diabetes Action Council, Asian Pacific American Diabetes Action Council, and Latino Diabetes Action Council. The finding that minority groups have higher diabetes prevalence rates has led to the study of this phenomenon.

Choi, Liu, Palaniappan, Wang, and Wong (2013) explored gender and ethnic differences with regard to type 2 diabetes. Differences between California Asian subgroups and other ethnic groups to include Filipino, South Asian, Japanese, Korean, Vietnamese, Mexican, Other Hispanic, African-American, Caucasian, and Native American groups were explored. The prevalence of diabetes mellitus (DM) and associated risk factors were explored in a group of 46,091 participants from an earlier survey. The authors found that age-adjusted DM prevalence was found at the following rates among men: 32.4% of Native Americans, 15.8% of Filipinos, and 11.8% of Japanese. In women, rates were 16.0% in Native Americans and 13.3% in African-Americans. Findings also revealed higher rates for Caucasian and Mexican men compared to women. When age and risk factors were adjusted, DM was more prevalent in female Koreans, Native Americans, and Other Hispanics, compared to Caucasians. For men, DM was more prevalent in Filipinos, South Asians, and Native Americans. Thus the authors concluded that there are ethnic and gender differences in DM which implies the need for different treatment approaches.

Ma, Hébert, Manson, Balasubramanian, Liu, Lamonte, and Howard (2012) explored differences in diabetes in postmenopausal women from different racial/ethnic groups in the United States. These women took part in the Women's Health Initiative. Data were collected for baseline prevalence of diabetes and incident diabetes for 158,833

women, an average of age 63 years at baseline. The women were gathered from 1993-1998 and followed until August 2009. The racial/ethnic distribution for the women included: non-Hispanic white (84.1%), non-Hispanic black (9.2%), Hispanic (4.1%), and Asian (2.6%). Whites, blacks, and Hispanics had 60%, 69%, and 63% lower risk for incident diabetes. While risk factors varied most findings were similar for all groups, and women with a healthy weight had the most physical activity, with less than one-third the diabetes risk, compared to obese and inactive women. Thus, while there were large racial/ethnic differences, most variability was attributed to lifestyle factors. The authors concluded that most of the diabetes was preventable with lifestyle changes, for all racial/ethnic groups.

Hedderson, Ehrlich, Sridhar, Darbinian, Moore, and Ferrara (2012) explored racial/ethnic differences in gestational diabetes mellitus rates by BMI. Data were from a cohort of 123,040 women without recognized pregravid diabetes. Each delivered a baby between 1995 and 2006. Findings were that for all racial/ethnic groups, the age-adjusted rates of GDM increased with higher BMI. Asian and Filipina women had a GDM rate of 9.9% and 8.5%, at a BMI of 22.0-24.9 kg/m^2. Hispanic, non-Hispanic white, and African American women had a GDM rate of >8.0% at a higher BMI. Findings imply that GDM rates could be lowered if pregnant women were normal weight since BMI thresholds are related to increased risk of GDM. However, this varies by racial/ethnic group.

Studies of race/ethnicity and diabetes continually support the conclusion that diabetes prevalence is higher for minority populations (Choi et al., 2013; Chow et al., 2012). Hispanic and other minority groups have higher rates of diabetes to include type 1 and 2 and gestational diabetes (Hedderson et al., 2012; Ma et al., 2012). This supports

the need to further study issues such as the relationship between time spent in the United States and diabetes prevalence.

2.8 Studies of Race/Ethnicity and Diabetes Related Complications

Diabetes and hypertension. Bentley-Lewis, Powe, Ankers, Wenger, Ecker, and Thadhani (2014) studied the impact of race/ethnicity on hypertension risk as related to gestational diabetes mellitus (GDM). These authors noted that this condition is more prevalent in racially/ethnically diverse groups as compared to non-Hispanic white populations. The study sample included 4,010 women who delivered at Massachusetts General Hospital from 1998 to 2007. Findings showed that GDM was more prevalent in nonwhite participants and it was linked to hypertension subsequent to delivery. The authors concluded that Hispanic women had a greater risk of hypertension compared to white women.

Pabon-Nau, Cohen, Meigs, and Grant (2010) studied diabetes and hypertension in U.S. Hispanics, exploring these issues by country of origin. These authors noted that since Hispanics come from many different cultural backgrounds, it is important to study this group based on their country of origin. It is also important to study the impact of socioeconomic status and acculturation on diabetes prevalence in these different subgroups. Data were from the National Health Interview Survey and findings were used to compare characteristics of Mexican-Americans with Hispanics who were from: Central/South America, Cuba, Dominican Republic, Mexico, and Puerto Rico. The sample included 31,240 participants. Findings were that these Hispanic subgroups were significantly diverse with regard to all variables. Foreign-born Puerto Ricans reported the highest prevalence rates of hypertension (32%) and diabetes (15%). Foreign-born

Hispanics, Puerto Ricans, and Dominicans had higher hypertension rates than Mexican-Americans after adjusting for age, socioeconomic status, acculturation, BMI, and smoking. Diabetes prevalence for foreign-born Hispanics was half that found in Cubans, Dominicans, and Central/South Americans, compared to Mexican-Americans. For the US-born Hispanic subgroups, the Cubans reported lower hypertension levels and Mexicans reported lower diabetes rates compared to Mexican-Americans. Thus, country of origin impacted the prevalence of hypertension and diabetes for Hispanics.

Diabetes and kidney disease. Bhalla, Zhao, Azar, Wang, Choi, Wong, and Palaniappan (2013) explored racial/ethnic differences with regard to the prevalence of proteinuric and nonproteinuric diabetic kidney disease (DKD). The authors analyzed electronic health records from 2008 to 2010, for 15,683 persons of Hispanic, non-Hispanic white (NHW), Asian (Asian Indian, Chinese, and Filipino), and non-Hispanic black (NHB) persons with type 2 diabetes and no history of kidney disease. Findings were that racial/ethnic minorities had higher rates of proteinuric DKD compared to NHWs and lower rates of nonproteinuric DKD. Chinese, Filipinos, Hispanics, and NHBs had significantly higher odds of proteinuric DKD compared to NHWs. Hispanic men and women, and Chinese and NHB women had significantly lower odds of having nonproteinuric DKD compared to NHWs.

Diabetes and retinopathy. Alternatively, Bower, Brancati, and Selvin (2013) reported findings that there were no ethnic differences regarding the link between glycated hemoglobin and retinopathy. These authors used data from the national health and nutrition examination survey 2005-2008. This study included data from ethnic groups representing a sample of 2,945 non-Hispanic white, 1,046 non-Hispanic black,

and 1,231 Hispanic American U.S. adults aged ≥40 years. Findings were that non-Hispanic blacks had the highest rates of retinopathy. HbA1c clinical categories were related to prevalence of retinopathy but this relationship did not differ by ethnic group.

Diabetes and depression. Colon, Giachello, McIver, Pacheco, and Vela (2013) explored the impact of diabetes on depression in the Hispanic/Latino population. Colon et al. noted that diabetes diagnosis ranges in prevalence among subgroups, from 7.6% for Cubans to 13.3% and 13.8% for Puerto Rican and Mexican Americans. Rates of complications also vary by subgroup but are higher for Hispanics than non-Hispanic whites. Depression rates are twice as high for adults with type 1 or 2 diabetes compared to those without diabetes. This depression is found in 15-30% of all diabetic adults and depression is positively related to worse glycémie control, poorer self-management, increased complications, lower quality of life, and mortality. Less than 25% of diabetics are adequately treated for this depression. Depression in Hispanic females is linked to number of psychosocial and environmental stressors (poverty, single parenting, lack of education, gender roles, social isolation, language barriers, migration, and acculturation and adaptation). Since Hispanics have strong family ties (familialismo) it may help protect them from depression and assimilation of other values may result in less protection against depression and other mental health problems.

Literature findings support the conclusion that race/ethnicity is related to hypertension and diabetes, and in particular Hispanic women are at greater risk for hypertension and gestational diabetes mellitus (Bentley-Lewis et al., 2014). Country of origin was shown to impact these outcomes as well (Pabon-Nau et al., 2010). Racial minority groups also have higher rates of complications related to diabetes such as kidney

disease (Bhalla et al., 2013) and depression (Colon et al., 2013). Alternatively, ethnicity was not found to be linked to diabetic retinopathy (Bower et al., 2013).

2.9 Studies of Factors that Impact Diabetes

Race/ethnicity and poverty predicts diabetes. Holmes, Hossain, Ward, and Opara (2012) studied risk factors related to racial/ethnic variability in diabetes mellitus rates in the United States. Prevalence and mortality rates differ across minority groups and reasons are not explained by lifestyle, sociodemographics, and prognostic factors. The authors used a large cross-sectional survey of 30,852 residents. Findings revealed statistically significant differences for ethnic/racial groups, regarding age, education, marital status, income, smoking, alcohol, body mass index, and physical activities. However, despite differences in these factors, race/ethnicity predicted diabetes mellitus. African Americans were more likely to be diagnosed for diabetes mellitus than non-Hispanic whites and Hispanics.

Gaskin, Thorpe, McGinty, Bower, Rohde, Young, and Dubay (2014) investigated factors that might impact diabetes rates and outcomes. Specifically, the authors examined factors of race, poverty, and place (neighborhood poverty and racial composition). Data used were from the 1999-2004 National Health and Nutrition Examination Survey and the 2000 U.S. Census. This data was used to determine impacts of race, poverty, and neighborhood racial composition on diabetes odds. Findings revealed a race-poverty-place relationship for Blacks and poor Whites, with diabetes odds being higher for Blacks compared to Whites. Individual poverty and living in a poor neighborhood led to an increase in diabetes for Blacks and Whites. More information is needed to determine if

these factors are related to higher diabetes prevalence in other minority groups such as the Hispanic/Latio population.

Glycemic control and diabetes. Suh, Choi, Plauschinat, Kwon, and Baron (2010) studied glycemic control among those with type 2 diabetes with consideration for comorbid conditions and race/ethnicity. Data were gathered from the National Health and Nutrition Examination Surveys (1988-1994 and 1999-2004) which included a sample of adults aged 30 years or older who had a diagnosis of type 2 diabetes. Findings were that type 2 diabetes prevalence increased from 5.8% to 7.1% and rates of treatment also improved, from 72.3% to 82.2%. Blood pressure and cholesterol level also improved. However, from 1999-2004, non-Hispanic blacks and Mexican Americans were 0.43 times as likely and 0.47 times as likely, respectively, to have A1C <7%, compared to non-Hispanic whites. Most type 2 diabetics also had obesity, hypertension, and or hyperlipidemia, and glycemic control rates were lowest when all three conditions were present. Non-Hispanic blacks and Mexican Americans were less likely to have glycemic control, compared to non-Hispanic whites.

Otiniano, Al Snih, Goodwin, Ray, AlGhatrif, and Markides (2012) explored prevalence of and factors related to poor glycemic control in Mexican American diabetics. The study sample included 2,069 adults aged 75 years and older. The authors used data from the 5th wave of the Epidemiological Study of the Elderly (H-EPESE), using the Hispanic Established Population data. Of this sample, 689 (33.5%) reported a diagnosis of diabetes and 209 (30.3%) agreed to having a blood test of HbA1c levels. Of those tested, 73 (34.9%) had good glycemic control and 136 (65.1%) had poor glycemic control. Those with poor control reported longer disease duration. This group also

reported lower education levels, more frequent use of the glucometer, and they reported more diabetes-related complications. Factors related to poor glycemic control included foreign-born, lower education levels (<8 years), obesity, smoking, longer disease duration, daily glucometer use, and macro-complications. The authors concluded that poor glycemic control is high in this Mexican American population as is the rising prevalence of diabetes in this group.

Overweight, obesity, and diabetes. Kim, Saraiva, Curtis, Wilson, Troyan, England, and Sharma (2013) studied gestational diabetes mellitus (GMD) to determine its relationship with overweight and obesity by race/ethnicity. Data were from 1,228,265 records of women aged 20 years or older who had at least one child in California from 2007 to 2009. Findings were that percentages of GDM deliveries due to overweight and obesity were: 17.8% for Asians/Pacific Islanders, 41.2% for Caucasians, 44.2% for Hispanics, 51.2% for Blacks, and 57.8% for American Indians. For all groups, elevated prepregnancy body mass index led to GDM. Thus, the authors concluded that decreased overweight and obesity has the potential to decrease GDM and related delivery complications, as well as future risk of diabetes in the mother and baby.

Pérez, Sánchez, and Ortiz (2013) explored the prevalence of overweight and obesity and related cardiometabolic comorbidities. The study sample included Hispanic adults ages 21-79 years, residing in Puerto Rico. Data were from a household survey that took place from 2005 and 2007 and included a sample of 840 adults. Data regarding BMI classified as normal weight, overweight, and obese were gathered. Findings showed that overweight and obesity prevalence was 35.9% and 41.5%, and findings were more than the combined U.S. adult population rates of 68.8%, but less than mainland Hispanics

rates of 78.8%. Cardiometabolic comorbidities were found significantly more often in overweight and obese adults. This tendency for overweight and obesity results in health outcomes such as diabetes.

The, Richardson, and Gordon-Larsen (2013) studied obesity as it relates to diabetes in an ethnically diverse sample. Researchers, The et al. used data from the U.S. National Longitudinal Study of Adolescent Health (1996), which included a sample of 10,481 individuals aged 12-21 years. This group was followed with two visits during 18-27 years (2001-2002) and 24-33 years of age (2007-2009). Findings were that for 24- to 33-year-old participants, 4.4% reported having diabetes and half remained undiagnosed; there were more blacks and Hispanics reporting this diagnosis, compared to whites. Women who were obese prior to age 16 years were more likely to report diabetes compared to those who became obese at or after age 18 years. Persistent rather than adult onset of obesity was related to increased likelihood of diabetes in men and women. The risk for diabetes is higher in obese adolescents compared to those with obesity that begins in adulthood.

Studies of factors that impact diabetes show that race/ethnicity and poverty predict diabetes (Gaskin et al., 2014; Holmes et al., 2012). Factors such as glycemic control and overweight and obesity also impact diabetes prevalence (Kim et al., 2013; Otiniano et al., 2012; Pérez et al., 2013; Suh et al., 2010; The et al., 2013). Findings reveal this tendency in Hispanic and other individuals. While more Hispanics than whites have diabetes, obesity is found to be related to diabetes across groups (The et al., 2013).

Consumer behavior and dietary data predict diabetes. Yannakoulia (2006) reported on the need to understand consumer behaviors and dietary data since these factors are an important component of diabetes care. This author focused on type 2 diabetes and issues of dietary management. As noted by Yannakoulia, dietary management of diabetes requires changes in eating behaviors and changes in the planning of meals, the selection of foods and food preparation, changes in food portions and changes in behaviors such as dinning out. Patients must respond appropriately to eating challenges and this can be a problem for some. Diabetic patients face difficulties when attempting to comply with a new dietary regime. This can result in restrictive eating behaviors and feelings of dietary deprivation. Patients view rigid dietary control as the only way to have a proper diet and control their weight. This pressure to conform to strict nutritional guidelines may result in dietary under-reporting, accompanied with binge eating, eating restraint, and body dissatisfaction. Health professionals need to understand and help patients to overcome the problems faced when trying to accommodate diet and behavior changes needed to manage diabetes.

Oster (2014) reported that people with obesity issues may be reluctant to change their diets. This author reported that there is a lack of detailed data on behavior responses, necessary to evaluate the reasons for this reluctance. The author used data from the Nielson HomeScan panel. This is a household scanner dataset used in economics and marketing. Data are gathered by household participants on a panel, who scan the UPC codes of all grocery and drug store item purchases. Each household records quantity and the prices of items. The household panelists participate for varying periods, but they serve for at least one year. This data was used to estimate food purchase responses to a

diabetes diagnosis. This diagnosis was inferred within the scanner data based on new purchases of glucose testing products and the household engaging in small calorie reductions following diagnosis. The changes were shown to be enough to lose up to 10 pounds in the first year, but these changes were only 20% of doctor's suggestions. The first month following diagnosis resulted in changes by food line up that were consistent with doctor's advice. This included increases in fruits and vegetables and fewer unhealthy foods. While the tendency to purchase less unhealthy foods lasted awhile this was not true for the purchases of increases in healthy foods.

Agborsangaya, Gee, Johnson, Dunbar, Langlois, Leiter, Pelletier, and Johnson (2013) reported that lifestyle behavior modification is a critical part of self-management of type 2 diabetes. Therefore, these authors evaluated the prevalence of changing these lifestyle behaviors for diabetes management and the impact of healthcare professional support on the changing of these behaviors. Data were from 2682 adult respondents to the 2011 Survey on Living with Chronic Diseases in Canada's diabetes component. Participants were age 20 years or older. binomial regression models were used to analyze associations with "never engaging in and not sustaining self-management behaviors" (p. 451). These included "dietary change, weight control, exercise, and smoking cessation" (p. 451). The authors reported prevalence findings as follows: 89.7% for dietary change, 72.1% for weight control/loss, 69.5% for increased exercise, and 30.6%, for smoking cessation (among those who smoked since being diagnosed). Participants who reported not receiving health professional advice in the previous 12 months were also more likely to report never engaging in dietary change, exercise, or weight control/loss. Living with diabetes for over six years was related to not sustaining dietary change, weight loss and

smoking cessation. Thus, while health professionals' advice may support individual actions, patients living with diabetes for more than six years may require more to sustain recommended behaviors.

According to the Diabetes Research and Action Education Foundation (2016), the "adoption of a healthy lifestyle, especially good nutrition, is the cornerstone of diabetes treatment in type 1 and type 2 diabetes" (p. 1). However, changing to a healthy lifestyle with good nutrition can be a challenge to start and to maintain. The following of doctor's advice regarding this self-management can be difficult for many. People find it difficult to make changes due to emotional responses and a desire to maintain their way of living. Thus, emotions play a more important role than knowledge when it comes to making changes. People report their experience of psychosocial obstacles due to: "(1) stress, emotional states, and limitations in quality of their life; (2) disordered eating behaviors tied to underlying emotional disturbances, such as binge eating and night-eating syndrome; (3) restrictive diets that aim to control blood glucose, but may result in feeling deprived and may create an unhealthful attitude towards food" (p. 1). These behaviors are related to poor feelings of well-being, increased body weight, and failure to follow diet and exercise programs designed to manage blood sugar control. When people feel deprived, they resort to disordered eating such as binging. Around 13% of women with type 2 diabetes also report a binge eating disorder. When people feel deprived, they also feel out-of-control and this can result in restrictive eating. Seven eating styles were presented by Scherwitz and Kesten (2005).

Scherwitz and Kesten (2005) conducted a study to further understand the causes of overeating, overweight, and obesity. These authors used an 80-item questionnaire that

was designed to assess food, nutrition, and eating themes. The questionnaire was given to 5,256 participants who had registered for a Web-based integrative nutrition e-course. Factor analysis of the 80 items revealed seven factors or eating styles. A multiple regression analysis was used to demonstrate the ability of these eating styles to predict overeating frequency and body mass index (BMI). Findings were that each of the eating styles was independently related to self-reports of overeating frequency. In addition, five factors were significantly related to overweight and obesity. The eating styles included the following (Scherwitz & Kesten, 2005):

(1) "Emotional Eating" (eating to manage feelings);

(2) "Fresh Food, Fast Food" (eating mostly processed, high-calorie food);

(3) "Food Fretting" (judgmental thoughts and over concern about food);

(4) "Task Snacking" (eating while doing other activities);

(5) "Sensory, Spiritual Nourishment" ("flavoring" food with meaning);

(6) "Eating Atmosphere" (dining aesthetics and surroundings);

(7) "Social Fare" (eating alone versus with others). (p. 342)

Scherwitz and Kesten concluded that future research needs to explore eating behaviors as they relate to overeating, overweight, and obesity. As further noted by the Diabetes Research and Action Education Foundation (2016), people with diabetes, with anxiety and depression, who engage in emotional eating, have poorer diabetes control. The Diabetes Research and Action Education Foundation (2016) provided a further discussion of the eating styles.

Eating Style 1: Emotional Eating. The Diabetes Research and Action Education Foundation (2016) reported that emotional eating includes eating behaviors that take

place as a response to emotional cues rather than due to hunger. When a diabetic engages in emotional eating, he or she has poorer diabetes control. Psychosocial symptoms of anger, depression, worry, sadness, loneliness, or being upset are related to risk for abnormal eating patterns such as emotional eating. Strict dietary regimens, food restriction, and ideals of thinness all also factors faced by diabetics that may contribute to lowered self-esteem and body satisfaction, which leads to restrained eating and binging (Diabetes Research and Action Education Foundation, 2016).

Eating Style 2: Fresh Food vs. Fast Food. The eating style of fresh food, fast food, refers to the choice of fresh, whole food rather than the choice of processed convenience foods. Diabetes prevalence and obesity in America are related to an increased consumption of energy-dense convenience foods with larger portion sizes. In addition, consumer behaviors such as eating at fast-food, buffets, or large-chain restaurants, with choices of foods with high-fat sources of protein and high-fat menu selections lead to poorer metabolic control in type 2 diabetes, with higher HbA1c over a two- to three-month time span (Diabetes Research and Action Education Foundation, 2016).

Eating Style 3: Food Fretting. Food fretting is another eating style with includes the presence of judgmental thoughts about food and an over-concern about food. When a diabetic worried about food, this can lead to binge eating, restraint, and body dissatisfaction, which is a particular problem for those with type 2 diabetes. When a diabetic learns about dietary management this can lead to worrying about meal planning, and how to select and prepare foods. They may worry about portion controls and behaviors such as dining out. These worries lead to feelings of dietary

deprivation. A disregard for food choices due to this worry, leads to unhealthy eating behaviors to include choices for processed, convenience foods (Diabetes Research and Action Education Foundation, 2016).

Eating Style 4: Task Snacking. Task Snacking, refers to eating while doing other activities. With this type of eating, meals are skipped or eaten at inappropriate times. These types of eating behaviors are linked to higher HbA1c (Diabetes Research and Action Education Foundation, 2016).

Eating Style 5: Sensory-Spiritual Nourishment. Sensory-spiritual nourishment refers to savoring the sensory components of foods. For example, the color, texture, and aroma of the food would be savored. Even the preparation and eating of the food would be savored and appreciated with meditative consciousness. While this tendency may be less in Western cultures, increased enjoyment of food is linked to decreased HbA1c rates in adults with type 2 diabetes. Since the adherence to a strict dietary guideline can decrease mindful eating, this can result in food deprivation and related psychological deprivation and stress. This cycle can also result in hormonal changes and negative biochemical metabolism changes. Since type 2 diabetics may be counseled to monitor all foods, this can lead to risk for deprivation and disordered eating styles. A focus on the spiritual aspects of eating may help improve these psychological and physiological outcomes (Diabetes Research and Action Education Foundation, 2016).

Eating Style 6: Eating Atmosphere. The sixth style is eating atmosphere, which refers to the aesthetics and peacefulness or the mealtime rather than the stressfulness of the mealtime, which can influence metabolic control. For example,

a stressful mealtime can impact insulin resistance by activating stress hormones (fight or flight response) (Diabetes Research and Action Education Foundation, 2016).

Eating Style 7: Social Faire. Social faire, refers to eating alone versus eating with others. This eating style is important to consider since social support has been linked to helping those with type 2 diabetes to increase glycemic control. Social support improves quality of life in those with type 2 diabetes. Those with type 2 diabetes who live alone are less likely to be act appropriately and maintain a healthy diet. Eating alone serves as a barrier to healthy food preparation and healthy eating.

2.10 Summary and Conclusion

Major themes in the literature were that diabetes prevalence is higher for minority populations (Choi et al., 2013; Chow et al., 2012). In fact, Hispanic and other minority groups have higher rates of all diabetes types (Hedderson et al., 2012; Ma et al., 2012). Literature findings are also that race/ethnicity is related to hypertension and diabetes, and in particular Hispanic women are at greater risk for hypertension and gestational diabetes mellitus (Bentley-Lewis et al., 2014). While country of origin impacted these outcomes (Pabon-Nau et al., 2010), outcomes of spending more time in the United States remain unclear.

Literature themes were also that racial minority groups have higher rates of diabetes-related complications such as kidney disease and depression (Bhalla et al., 2013;

Colon et al., 2013). However, there are also findings that race/ethnicity is not related to other diabetes-related complications such as diabetic retinopathy (Bower et al., 2013). Thus, findings regarding race/ethnicity and complications are inconsistent. Literature themes regard factors that impact diabetes such as race/ethnicity and poverty (Gaskin et al., 2014; Holmes et al., 2012). Glycemic control and overweight and obesity were also factors noted in the literature that impact diabetes prevalence. While these factors impact diabetes rates across populations, Hispanics demonstrate stronger relationships between variables (Kim et al., 2013; Otiniano et al., 2012; Pérez et al., 2013; Suh et al., 2010; The et al., 2013). Consumer behaviors and dietary practices also impact diabetic outcomes (Agborsangaya et al., 2013; Diabetes Research and Action Education Foundation, 2016; Oster, 2014; Scherwitz & Kesten, 2005; Yannakoulia, 2006).

While literature findings reveal some mixed results, consistent themes support the conclusion that race/ethnicity is related to diabetes prevalence and Hispanics have high rates of this disease. This supports the need to further study issues such as the relationship between time spent in the United States and diabetes prevalence. This study would fill related gaps in the literature and would extend knowledge in the discipline regarding impacts of length of time spent in the United States, which may or may not influence rates of diabetes in Hispanics.

CHAPTER III

METHODOLOGY

3.1 Research Overview

The purpose of the study is to determine the relationship between acculturation status and diabetes prevalence in Hispanics. Thus, the study goal is to determine if diabetes prevalence in Hispanic adults is correlated with length of time in the country. Specific objectives of the proposed study include to determine if acculturation status predicts diabetes prevalence in Hispanics whose family was originally from Mexico. In addition, the study included an investigation into covariates that might influence the relationship between acculturation status and diabetes prevalence. Thus, the relationships between age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten and diabetes prevalence were explored. Findings demonstrated which factors most predict diabetes prevalence. Since literature regarding the acculturation effects on diabetes in Hispanic's, and related factors is lacking, this research study is designed to investigate these variables. This chapter presents a detailed description of the methodology and procedures used for this study. The research questions and hypotheses for the study are noted. This chapter discusses the subjects, instruments, reliability, validity, procedures, and data analysis.

3.2 Research Design

For the purpose of this study, quantitative archival research was used. Quantitative research methods yield a numeric or quantitative description of a

predetermined sample of a population. Quantitative research was chosen for this study since Afable-Munsuz, Mayeda, Perez-Stable, and Haan (2013) used quantitative research and found that acculturation was not related to diabetes prevalence since more time in the U.S. was related to increased rates of diabetes. As noted by Afable-Munsuz et al. however, time in the U.S. was related to increased diabetes prevalence. Thus, a study is needed to further understand if acculturation predicts diabetes prevalence. Quantitative methodology provided for this exploration of variables.

Specifically, quantitative archival research will be used for this study. The archival research design is appropriate for this proposed study since existing data can be used to examine issues such as relationships among variables. Descriptive findings will provide information regarding the relationship between the independent variable of acculturation status and the dependent variable of diabetes prevalence. Descriptive findings will provide information regarding the influence of covariates (age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten) on the relationship between acculturation status and diabetes prevalence. For this study data from the National Health and Nutrition Examination Survey, 1999-2014 will be used and statistically analyzed to test the hypotheses.

3.3 Research Questions and Hypotheses

The main hypothesis for this study is: Acculturation status significantly predicts diabetes prevalence in Hispanic adults. This main hypothesis is based on the main

research question**:** How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.? Research questions and sub hypotheses are as follows:

Research Question #1: How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis #1: Acculturation status significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #2: How does age relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 2: Age significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #3: How does gender relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 3: Gender significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #4: How does occupation relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 4: Occupation significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #5: How does income relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 5: Income significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #6: How does health insurance relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 6: Health insurance significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #7: How does physical activity and fitness relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 7: Physical activity and fitness significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #8: How does alcohol use relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 8: Alcohol use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #9: How does smoking and tobacco use relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 9: Smoking and tobacco use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #10: How does weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 10: Weight history significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #11: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 11a: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history significantly predict diabetes prevalence in adult Hispanics in the U.S.

Research Question #11b: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 11b: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten significantly predict diabetes prevalence in adult Hispanics in the U.S.

Research Question #12: How does anyone on a special diet (any family member) relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 12: Anyone on a special diet significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #13: How does types of food available at home relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 13: Types of food available at home significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #14: How does types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 14: Types of food prepared-eaten significantly predicts diabetes prevalence in adult Hispanics in the U.S.

3.4 Subjects

The study population is Hispanic adults residing in the United States. The study sample included data from a minimum of 217 male and female adults ages 18 years and older, chosen from the National Health and Nutrition Examination Survey, 1999-2014 data base. Data were from those subjects who qualify due to their status of being Hispanic adults who reside in the Unites States.

Specifically, the study subjects included those who are Hispanic, whose family was originally from Mexico, and who reside in the U.S. A power analysis was conducted to determine the sample size necessary to accurately reject a null hypothesis for a regression analysis with a power level of .95, a medium effect size and 19 predictor variables. The power analysis was calculated with the alpha level set at .05. As recommended by Cohen's (1977), with 19 independent variables, for a medium effect, a sample of about 217 yields a power of around 0.95 in testing hypotheses (Cohen, 1977). The actual sample far exceeded this estimate (Appendix A).

3.5 Instruments

The variables for this study include the dependent variable of diabetes prevalence, the independent variable of acculturation status, and the covariates: age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten. Each of these covariates have been linked to diabetes prevalence (Afable-Munsuz et al., 2013) and require further study to determine their influence on the relationship between acculturation status and diabetes prevalence.

Each of the variables are assessed on the National Health and Nutrition Examination Survey, 1999-2014.

National Health and Nutrition Examination Survey, 1999-2014 (NHANES). The National Health and Nutrition Examination Survey (NHANES) is a program with multiple studies that assess the health and nutritional status of adults and children who reside in the United States. The survey includes data gathered from interviews and physical examinations. The NHANES is a foremost program of the National Center for Health Statistics (NCHS), which is part of the Centers for Disease Control and Prevention (CDC). The NCHS is responsible for providing vital and health statistics for the Nation (CDC, 2014b).

The NHANES program has been conducted since the 1960s and as of 1999, the survey was conducted continuously. Each year, the survey assesses a nationally representative sample of around 5,000 individuals from counties nation-wide (15 counties are assessed each year). The NHANES interview is designed to assess "demographic, socioeconomic, dietary, and health-related questions" and the examination component includes "medical, dental, and physiological measurements, as well as laboratory tests administered by highly trained medical personnel" (p. 1). Survey findings reveal disease prevalence and related risk factors. NHANES data are used: to assess nutritional status and related health promotion and disease prevention; to set national standards regarding height, weight, and blood pressure; and for epidemiological studies and health sciences research (CDC, 2014b).

3.6 Reliability

Data from the NHANES are reliable. This survey is considered reliable and valid since it combines three sources of data from interviews, physical examinations, and laboratory studies. Use of these three data collection methods is considered effective to "maximize the efficiency, quality, and accuracy of data collected" (CDC, 2013).

3.7 Validity

Threats to internal validity include events outside the laboratory, maturation, testing effects, selection, and mortality. Maturation, selection, and mortality were not threats to the internal validity of this study since the study took place at one point in time and include the use of existing archival data. Events outside the laboratory and effects of testing were not an issue for this study due to the use of archival data. Threats to construct validity were not a threat since the data were reliable and reflected the variables studied with the use of existing valid data. External validity regards how well the findings can be generalized to other situations or populations. It is concluded that this study produced valid findings that can be generalized to other similar populations only.

Limitations of methodology. This proposed study was limited by the use of archival data, which means that the findings may generalize only to like populations.

3.8 Procedures

Following study approval, all data were gathered from the NHANES data. This data was chosen due availability and appropriateness of the data to explore the study variables and reach study goals. Procedures for the NHANES data gathering included that participants signed consent forms regarding their participation in the interview and physical examination (CDC, 2013).

NHANES data gathering included a large staff of trained interviewers and bilingual interviewers, who conducted the interviews in homes of the participants. All participants completed an interviewer-administered questionnaire (Computer-Assisted Personal Interview). Participants then took part in a physical examination within one to two weeks after their interview. All physical examinations were performed in specially-designed and equipped, traveling Mobile Examination Centers. The survey team included dietary and health interviewers, a physician, and medical and health technicians. This team ensures the standardized collection of all physical examination and lab data (CDC, 2013).

Standardized, environment, equipment, and specimen collection were ensured with the use of state-of-the-art exam equipment. All participants were assured privacy regarding exams and interviews. A full examination took approximately three to four hours, depending on age of the participant. Exam data was automatically transmitted into databases with digital scales and stadiometers. For the laboratory assessments, biological and environmental specimens such as blood (participants one year and older) and urine (six years and older) were collected. Pregnant women were excluded from examination components such as those involving "DEXA, BIA, and cardiovascular fitness testing" (CDC, 2013, p. 1).

Complete Blood Counts were performed and three medical technologists conduct laboratory tests on "biological and environmental specimens, record the results of the tests, and prepare and ship specimens to various laboratories" all on-site (CDC, 2013, p. 1). Federal, private, and university-based laboratories under contract to NCHS performed all other specimen testing. Participants completed additional interviewer-administered

survey questionnaires during their physical exam (dietary questionnaire, and questionnaires on selected special topics). Selected groups of participants completed questionnaires on other topics, such as sexual behaviors or illicit drug use. Participants filled out these sensitive material questionnaires themselves, with an Audio Computer-Assisted Self Interview. Follow-up nutrition questionnaires were conducted by telephone interviews with survey staff, using a Computer-Assisted Telephone Interview and participants were asked to fill out a food frequency questionnaire (CDC, 2013). The researcher used this data to compute the statistical results and test study hypotheses.

Since data were from an archival and existing public source**,** ethical issues regarding the subjects are not an issue. Specifically, since data are public record, and subjects are not identified, issues of anonymity, confidentiality, privacy, and consent of the participant are not a concern for the current study. Since archival data were used there is no expected risk for the use of subject's data.

3.9 Data Analysis

The independent variable for this study is acculturation status and the dependent variable is diabetes prevalence. The covariates for the study include: age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten.

Descriptive statistics, including frequencies and distributions were used to describe the sample and the data related to the research questions. In this case the frequencies and distributions were provided to show the percentages for participants regarding all variables studied. Tables also demonstrated results.

Chi square and logistic regression models were used to calculate acculturation and other factors that predict diabetes prevalence. Chi square allows for the examination of two categorical variables and to assess whether they are grouped in non-random patterns. Chi square was used to assess hypotheses 1, 3, 5, 6 and 9; the remainder were analyzed using logistic regression, a version of multiple regression used when the dependent variable is a dichotomous categorical variable. Multiple regression allows for one response variable and several explanatory variables and their predicted relationship. For example, the presence acculturation status can be used to predict diabetes outcomes. Assumptions are the same as for bivariate regression: the underlying relationship is linear. Dots in the scatterplot tend to be dispersed equally about all parts of the prediction line referred to the assumption of homoscedasticity (Moore & McCabe, 2006). Specifically, logistic regression was used for this study since the dependent variable is categorical or dichotomous. For this study, the effect of acculturation status on diabetes outcomes were analyzed. All demographic measures and lifestyle factors were added separately to determine influences on the relationship between acculturation status and diabetes. A full logistic regression model examined impacts of all covariates. Thus, logistic regression models were used to calculate acculturation and other factors that predict diabetes prevalence and test the hypotheses. Specifically, a hierarchical regression allowed for the testing of all variables to determine relationships among variables. Hierarchical regression helps to evaluate the contribution of predictors in the regression equation. This sequential process allows the researcher to examine individual contributions of factors studied. Factors are entered into the regression analysis based on theory of related importance. Thus, multiple analyses were conducted to determine the

predictive ability of acculturation status and which factors are most influential in this outcome, as follows:

Chi square was used to test Hypothesis 1: Acculturation status significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Logistic regression was used to test Hypothesis 2: Age significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Chi square was used to test Hypothesis 3: Gender significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Chi square was used to test Hypothesis 5: Income significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Chi square was used to test Hypothesis 6: Health insurance significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Logistic regression was used to test Hypothesis 7: Physical activity and fitness significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Logistic regression was used to test Hypothesis 8: Alcohol use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Chi square was used to test Hypothesis 9: Smoking and tobacco use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Logistic regression was used to test Hypothesis 10: Weight history significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Hierarchical logistic regression was used to test Hypothesis 11a: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness,

alcohol use, smoking and tobacco use, and weight history significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hierarchical logistic regression was used to test Hypothesis 11b: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten significantly predict diabetes prevalence in adult Hispanics in the U.S.

Logistic regression was used to test Hypothesis 12: Anyone on a special diet significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Logistic regression was used to test Hypothesis 13: Types of food available at home significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Logistic regression was used to test Hypothesis 14: Types of food prepared-eaten significantly predicts diabetes prevalence in adult Hispanics in the U.S.

3.10 Conclusion

The proposed study attempted to show whether acculturation status predicts diabetes prevalence. In addition, the study demonstrated which covariate factors influence this relationship most. NHANES data were used for the analysis of factors and testing of the hypotheses. It is expected that this analysis demonstrated whether acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten significantly predict diabetes prevalence in adult Hispanics in the U.S., and which of these factors was most influential in this outcome.

CHAPTER IV

PRELIMINARY RESULTS

In this chapter, preliminary results are presented. These include a summary of the operationalization of variables of the study (Appendix B). This is followed by a summary of tables and charts for preliminary results (Appendix C).

4.1 Operationalization of Variables of Study

The variables for this study included: Diabetes Prevalence (Doctor told you you had diabetes, Dichotomous); Acculturation Status (Language spoken at home, Categorical); Age (Age in years, Continuous); Gender (Gender, Dichotomous); Income 1 (Annual Household Income, Categorical); Income 2 (Annual Household Income, Dichotomous); Health Insurance (Covered by Health Insurance, Dichotomous); Physical Activity and Fitness (Days physically active at least 60 minutes in a typical week, Continuous); Alcohol Use (Avg number of alcoholic drinks per day over the past 12 months, Continuous); Weight History (Self-reported greatest weight, in pounds); Smoking and tobacco use (Smoked at least 100 cigarettes in life, Dichotomous; Consumer Behavior: Diet (Anyone in the family on a special diet?, Dichotomous); Consumer Behavior: Fruits (Fruits available at home, Categorical); Consumer Behavior: Dark Green Vegetables (Dark Green Vegetables available at home, Categorical); Consumer Behavior: Salty Snacks (Salty Snacks available at home, Categorical); Consumer Behavior: Fat Free/Low Fat Milk (Fat Free/Low Fat Milk available at home, Categorical); Consumer Behavior: Soft Drinks (Soft Drinks available at home, Categorical); Dietary Behavior: # of meals not at home (# of meals not at home, past 30

days, Continuous); Dietary Behavior: # of meals from fast food or pizza (# of meals from fast food or pizza, past 30 days, Continuous); Dietary Behavior: # of ready-to-eat foods (# of ready-to-eat foods, past 30 days, Continuous); and Dietary Behavior: # of frozen meals/pizza
(# of frozen meals/pizza, past 30 days, Continuous) (Appendix B).

4.2 Tables and Charts for Preliminary Results

In summary, for Diabetes Prevalence, 86.9% reported no. For Acculturation Status percentages were as follows: for Only Spanish (6.9%); for More Spanish than English (2.9%); for Both Equally (3.5%); for More English than Spanish (3.1%); and for Only English (2.8%). For Age at Screening, the mean age was 26.86. For Gender, 50.4% were female. For Household Income 1 percents were as follows: $25,000 to $34,999 (14.2%), followed by $35,000 to $44,999 (10.0%), and $20,000 to (9.5%); for Household Income 2 percentages were as follows: for Under $20,000 a year (27.9%) and for Over $20,000 a year (64.3%). For Health Insurance, most responded yes (71.5%). For Physical Activity and Fitness, the mean was 6.17. For Alcohol Use, the mean was 2.87. For Smoking and Tobacco Use, No was the most common response (32.1%). For Highest Self-Reported Weight, the mean was 192.39. For Consumer Behavior - Diet, No was the most common response (49.7%). For Consumer Behavior - Fruits, the most common response was Always (40.8%). For Consumer Behavior - Dark Green Vegetables, the most common response was Always (33.9%). For Consumer Behavior - Fat free/low fat milk, the most common response was Never (37.9%). For Consumer Behavior - Salty Snacks, the most common response was Always (19.6%) followed by Sometimes (17%). For Consumer Behavior - Soft Drinks, the most common response was Always (19%)

followed by Sometimes (14.9%). For Dietary Behavior: Meals not prepared at home, the mean was 2.45. For Dietary Behavior - Meals from fast food or pizza, the mean was 1.89. For Dietary Behavior - number of ready to eat foods, past 30 days, the mean was 1.35. For Dietary Behavior - number of frozen meals/pizza, past 30 days, the mean was 1.63 (Appendix C).

CHAPTER V

RESULTS

5.1 Introduction

The purpose of the study was to determine the relationship between acculturation status and diabetes prevalence in Hispanics. Thus, the study goal is to determine if acculturation status predicts diabetes prevalence in Hispanics in the U.S. This chapter describes the research findings of the study as follows: description of the analysis; and the results of the data relating to the research questions and hypotheses.

5.2 Analysis Description

Two cycles analyzed included a total N = 5948. Of that, 3517 are from the 2009-10 collection cycle and 2431 are from 2011-12. The N in each individual hypothesis is different because it depends on the number of people who answered each question. The household income variable included response categories for 12 levels of income, plus two other for Under $20,000 per year and Over $20,000 per year. The single variable was re-coded into two variables. Income 1 is the 12 level one, Income 2 is the other. Neither one was significant. For the regression (hypothesis 11), only the 12 level variable was used. Of the variables analyzed in Hypotheses 12 and 13: CBQ010 through CBQ060 were only collected in the 2009-10 cycle. An analysis of those variables alone was included, but they were not included in the regression because it would have dropped all 2011-12 respondents. CSFII REC.340 and REC345 were interview questions with verbal answers, which were too hard to code and also only was from the 09-10 cycle, so it was

not included. DBD895-DBD910 were included both as stand-alone analysis and also in a 2nd version of the regression, but none were significant.

5.3 Research Questions and Hypotheses

Hypothesis. The main hypothesis for this study is: Acculturation status significantly predicts diabetes prevalence in Hispanic adults. This main hypothesis is based on the main research question**:** How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.? Research questions and sub hypotheses are as follows:

Research Question #1: How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis #1: Acculturation status significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #2: How does age relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 2: Age significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #3: How does gender relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 3: Gender significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #4: How does occupation relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 4: Occupation significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #5: How does income relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 5: Income significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #6: How does health insurance relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 6: Health insurance significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #7: How does physical activity and fitness relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 7: Physical activity and fitness significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #8: How does alcohol use relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 8: Alcohol use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #9: How does smoking and tobacco use relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 9: Smoking and tobacco use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #10: How does weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 10: Weight history significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #11: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 11a: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history significantly predict diabetes prevalence in adult Hispanics in the U.S.

Research Question #11b: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 11b: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten significantly predict diabetes prevalence in adult Hispanics in the U.S.

Research Question #12: How does anyone on a special diet (any family member) relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 12: Anyone on a special diet significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #13: How does types of food available at home relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 13: Types of food available at home significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Research Question #14: How does types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 14: Types of food prepared-eaten significantly predicts diabetes prevalence in adult Hispanics in the U.S.

5.4 Findings Related to Research Questions and Hypotheses

Research Question 1. How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis #1: Acculturation status significantly predicts diabetes prevalence in adult Hispanics in the U.S. A chi square analysis comparing the expected and observed frequency of acculturation status related to diabetes demonstrated with 4 df, a chi square of 2.916 not significant at p = .572 (1-sided) (Table 1).

Table 1

Chi Square: Acculturation Status and Diabetes

	Chi Square Value	Sig. (2-sided)
Acculturation Status	2.916	.572

Research Question #2: How does age relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 2: Age significantly predicts diabetes prevalence in adult Hispanics in the U.S. A logistic regression analysis showed the effect of age on diabetes prevalence was not significant at p = .905 (Table 2).

Table 2

Regression: Age and Diabetes

Variable	Chi Sq	Sig.
Age	.014	.905

Research Question #3: How does gender relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 3: Gender significantly predicts diabetes prevalence in adult Hispanics in the U.S. A chi square analysis comparing the expected and observed frequency of gender related to diabetes demonstrated with 1 df, a chi square of .081 not significant at p = .380 (1-sided).

Table 3

Chi Square: Gender and Diabetes

	Chi Square Value	Sig. (2-sided)	Sig. (1-sided)
Gender	.126	.726	.380

Hypothesis 4: Occupation significantly predicts diabetes prevalence in adult Hispanics in the U.S. Hypothesis 4 was dropped from the final analysis because the coding used in the NHANES data set were found to be unworkable.

Research Question #5: How does income relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 5: Income significantly predicts diabetes prevalence in adult Hispanics in the U.S. The income categories for the analysis were: 1) under $5,000; 2) $5,000 to $9,999; 3) $10,000 to $14,999; 4) $15,000 to $19,999; 5) $20,000 to $24,999; 6) $25,000 to $34,999; 7) $35,000 to $44,999; 8) $45,000 to $54,999; 9) $55,000 to $64,999; 10) $65,000 to $74,999; 14) $75,000 to $99,999; and 15) Over $100,000. For the first analysis, 12 and 13 were dropped because they were different variables: 12 was "under $20,000" and 13 was "over $20,000." For the second analysis, these two values were tested separately.

For the first analysis, a logistic regression analysis showed the effect of income on diabetes prevalence was not significant at p = .481 (Table 4).

Table 4

Regression: All Incomes and Diabetes

Variable	Chi Sq	Sig.
Income	10.562	.481

For the second analysis, a chi square analysis comparing two levels of income demonstrated with 1 df, a chi square of .006 not significant at p = .493 (1-sided) (Table 5).

Table 5

Chi Square: Specific Incomes and Diabetes

	Chi Square Value	Sig. (2-sided)	Sig. (1-sided)
Income	.006	.955	.493

Research Question #6: How does health insurance relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 6: Health insurance significantly predicts diabetes prevalence in adult Hispanics in the U.S. A chi square analysis comparing the expected and observed frequency of health insurance related to diabetes demonstrated with 1 df, a chi square of .012 not significant at p = .481 (1-sided) (Table 6).

Table 6

Chi Square: Health Insurance and Diabetes

	Chi Square Value	Sig. (2-sided)	Sig. (1-sided)
Health Ins	.012	.956	.481

Research Question #7: How does physical activity and fitness relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 7: Physical activity and fitness significantly predicts diabetes prevalence in adult Hispanics in the U.S. A logistic regression analysis showed the effect of physical activity on diabetes prevalence was not significant at p = .617 (Table 7).

Table 7

Regression: Physical Activity and Diabetes

Variable	Chi Sq	Sig.
Phy Act	.250	.617

Research Question #8: How does alcohol use relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 8: Alcohol use significantly predicts diabetes prevalence in adult Hispanics in the U.S. A logistic regression analysis showed the effect of alcohol use on diabetes prevalence was not significant at p = .313 (Table 8).

Table 8

Regression: Alcohol Use and Diabetes

Variable	Chi Sq	Sig.
Alcohol	1.019	.313

Research Question #9: How does smoking and tobacco use relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 9: Smoking and tobacco use significantly predicts diabetes prevalence in adult Hispanics in the U.S. A chi square analysis comparing the expected and observed frequency of smoking and tobacco use related to diabetes demonstrated with 1 df, a chi square of .206 not significant at p = .349 (1-sided) (Table 9).

Table 9

Chi Square: Smoking and Diabetes

	Chi Square Value	Sig. (2-sided)	Sig. (1-sided)
Smoking	.206	.699	.349

Research Question #10: How does weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 10: Initial analysis indicated that weight history did not predict diabetes prevalence. The measure was changed to Body Mass Index, as measured at time of survey. BMI did not significantly predict diabetes prevalence at p = .383 (Table 10).

Table 10

Regression: Body Mass Index and Diabetes

Variable	Chi Sq	Sig.
BMI	.762	.383

Research Question #11a: How do acculturation status, age, gender, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 11a: Acculturation status, age, gender, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history

significantly predict diabetes prevalence in adult Hispanics in the U.S. A logistic regression analysis showed the effect of these variables taken together on diabetes prevalence was not significant at p = .438 (Table 11a).

Table 11a

Regression: Original Variables and Diabetes

Variable	Chi Sq	Sig.
Variables	.022	.438

Research Question #11b: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 11b: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten significantly predict diabetes prevalence in adult Hispanics in the U.S. A logistic regression analysis showed the effect of these variables taken together on diabetes prevalence was not significant at p = .235 (Table 11b).

Table 11b

Regression: New and Multiple Variables and Diabetes

Variable	Sig.
Variables	.235

Research Question #12: How does anyone on a special diet (any family member) relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 12: Anyone on a special diet significantly predicts diabetes prevalence in adult Hispanics in the U.S.

Anyone on a special diet was not found to predict diabetes prevalence at p = .479 (1-sided), at a statistically significant level (Table 12).

Table 12

Regression: Anyone on a Special Diet and Diabetes

Variable	Chi Sq	Sig. (2-sided)	Sig. (1-sided)
Anyone on a Special Diet	.030	.920	.479

Research Question #13: How does types of food available at home relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 13: Types of food available at home significantly predicts diabetes prevalence in adult Hispanics in the U.S. Types of food available at home was not found to predict diabetes prevalence at p = .622 (2-sided), at a statistically significant level (Table 13).

Table 13

Regression: Types of Food Available at Home and Diabetes

Variable	Chi Sq	Sig. (2-sided)
Types of Food Available at Home	2.627	.622

Research Question #14: How does types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Hypothesis 14: Types of food prepared-eaten significantly predicts diabetes prevalence in adult Hispanics in the U.S. Types of food available at home was not found to predict diabetes prevalence at p = .381, at a statistically significant level (Table 14).

Table 14

Regression: Types of Food Prepared-Eaten and Diabetes

Variable	Chi Sq	Sig.
Types of Food Prepared-Eaten	4.192	.381

In summary, none of the variables for the study: age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten significantly predicted diabetes prevalence in adult Hispanics in the U.S., which did not support the hypotheses.

CHAPTER VI

DISCUSSION, CONCLUSIONS, NEXT STEPS

6.1 Introduction

The purpose of the study was to explore the relationship between acculturation status and diabetes prevalence in U.S. Hispanics. Thus, the study goal was to determine if acculturation status predicts diabetes prevalence in Hispanics in the U.S. The main hypothesis for this study is: Acculturation status significantly predicts diabetes prevalence in Hispanic adults. This main hypothesis is based on the main research question**:** How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.? In addition, the study included an investigation into covariates that might influence the relationship between acculturation status and diabetes prevalence. Thus, the relationships between age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten and diabetes prevalence were explored. This section presents a discussion of findings with a summary of research objectives and findings related to research questions and hypotheses. The discussion also includes an interpretation of the findings and explains the significance of the findings and their relevance to previous research. Following this study conclusions, study limitations, and recommendations are presented.

6.1. Interpretation of the Findings

Research Question #1: How does acculturation status relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis #1: Acculturation status significantly does not predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis #1: Acculturation status significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a chi square analysis were that acculturation status did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .572$). Thus, findings do not support the hypothesis. Findings are in line with mixed results from the literature. For example, there is a tendency for time spent in the U.S. to increase prevalence rates of diabetes in Hispanics (Afable-Munsuz et al., 2013), but these authors also found that acculturation was negatively related to diabetes prevalence.

Research Question #2: How does age relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 2: Age does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 2: Age significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a logistic regression showed that age did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .905$). Thus, findings do not support the hypothesis. Findings are somewhat consistent with literature findings. As noted by NIDDK (2014), there are three main types of diabetes: type 1, type

2, and gestational and while Type 1 diabetes tends to develops in young people, any age and gender can develop diabetes.

Research Question #3: How does gender relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 3: Gender does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 3: Gender significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a chi square showed that gender did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .380$). Thus, findings do not support the hypothesis. Findings are also not consistent with literature findings. For example, Choi et al. (2013) explored gender and ethnic differences as related to type 2 diabetes and reported findings that this diabetes was related to ethnicity and gender. The fourth research question and hypothesis was dropped.

Research Question #5: How does income relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 5: Income does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 5: Income significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from logistic regression showed that income did not significantly predict diabetes prevalence in adult Hispanics in the U.S. $p = .481$). Findings from a second analysis, were that a chi square analysis comparing two levels of

income demonstrated not significant results (p = .493). Thus, findings do not support the hypothesis. Findings are also not consistent with literature findings. For example, Gaskin et al. (2014) investigated factors that might impact diabetes rates and outcomes and reported findings that individual poverty and living in a poor neighborhood led to an increase in diabetes for Blacks and Whites.

Research Question #6: How does health insurance relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 6: Health insurance does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 6: Health insurance significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a chi square showed that health insurance did not significantly predict diabetes prevalence in adult Hispanics in the U.S. (p = .481). Thus, findings do not support the hypothesis but provided new insights.

Research Question #7: How does physical activity and fitness relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 7: Physical activity and fitness does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 7: Physical activity and fitness significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a logistic regression showed that physical activity and fitness did not significantly predict diabetes prevalence in adult Hispanics in the U.S. (p = .617). Thus, findings do not support the hypothesis. Findings are also not

consistent with literature findings. For example, Holmes et al. (2012) studied risk factors related to racial/ethnic variability in diabetes mellitus rates in the United States and found that there were statistically significant differences for ethnic/racial groups, regarding age, education, marital status, income, smoking, alcohol, body mass index, and physical activities. Ma et al. (2012) reported findings that risk for diabetes was related weight and physical activity.

Research Question #8: How does alcohol use relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 8: Alcohol use does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 8: Alcohol use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a logistic regression showed that alcohol use did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .313$). Thus, findings do not support the hypothesis. Findings are also not consistent with literature findings. For example, Holmes et al. (2012) studied risk factors related to racial/ethnic variability in diabetes mellitus rates in the United States and found that there were statistically significant differences for ethnic/racial groups, regarding alcohol and other factors.

Research Question #9: How does smoking and tobacco use relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 9: Smoking and tobacco use does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 9: Smoking and tobacco use significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a chi square showed that smoking and tobacco use did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .349$). Thus, findings do not support the hypothesis. Findings are also not consistent with literature findings. For example, Holmes et al. (2012) studied risk factors related to racial/ethnic variability in diabetes mellitus rates in the United States and found that there were statistically significant differences for ethnic/racial groups, regarding smoking and other factors. Otiniano et al. (2012) reported factors related to poor glycemic control in Mexican American diabetics included foreign-born, lower education levels (<8 years), obesity, smoking, longer disease duration, daily glucometer use, and macro-complications.

Research Question #10: How does weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 10: Weight history does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 10: Weight history significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a logistic regression showed that BMI did not significantly predict diabetes prevalence ($p = .383$). Thus, findings do not support the hypothesis. Findings are also not consistent with literature findings. For example, Researchers, The et al. (2013) reported findings from the U.S. National Longitudinal Study of Adolescent Health (1996) data, which included a sample of 10,481 individuals

aged 12-21 years: the risk for diabetes was higher in obese adolescents compared to those with obesity that begins in adulthood. However, the current study may have assessed current weight which might have been different from weight problems that were related to diabetes. Thus, current study findings need to be interpreted with caution.

Research Question #11: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 11a: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history do not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 11a: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history significantly predict diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a logistic regression showed that acculturation status, age, gender, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, and weight history did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .438$). Thus, findings do not support the hypothesis. Findings are also not consistent with literature findings as noted.

Research Question #11b: How do acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at

home, and types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 11b: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten do not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 11b: Acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten significantly predict diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a logistic regression showed that acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .235$). This regression was run since new factors were added to the analysis as reflected in research questions and hypotheses 12-14. Study findings did not support the hypothesis. Findings are also not consistent with literature findings as noted.

Research Question #12: How does anyone on a special diet (any family member) relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 12: Anyone on a special diet does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 12: Anyone on a special diet significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a logistic regression showed that anyone on a special diet did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .479$). Thus, findings do not support the hypothesis. Findings are also not consistent with literature findings.

Research Question #13: How does types of food available at home relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 13: Types of food available at home does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 13: Types of food available at home significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a logistic regression showed that types of food available at home did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .622$). Thus, findings do not support the hypothesis. Findings are also not consistent with literature findings.

Research Question #14: How does types of food prepared-eaten relate to diabetes prevalence in adult Hispanics in the U.S.?

Null Hypothesis 14: Types of food prepared-eaten does not significantly predict diabetes prevalence in adult Hispanics in the U.S.

Hypothesis 14: Types of food prepared-eaten significantly predicts diabetes prevalence in adult Hispanics in the U.S.

In the present study, findings from a logistic regression showed that types of food prepared-eaten did not significantly predict diabetes prevalence in adult Hispanics in the U.S. ($p = .381$). Thus, findings do not support the hypothesis. Findings are also not consistent with literature findings.

Research questions 12, 13, and 14 and hypotheses 12, 13, and 14 are related to eating and diet behaviors. Non-significant findings from the current study were not consistent with literature findings. For example, Yannakoulia (2006) reported that consumer behaviors and dietary practices are an important component of diabetes care. Agborsangaya et al. (2013) reported that lifestyle behavior modification is a critical part of self-management of type 2 diabetes. According to the Diabetes Research and Action Education Foundation (2016), the ″adoption of a healthy lifestyle, especially good nutrition, is the cornerstone of diabetes treatment in type 1 and type 2 diabetes" (p. 1). However, while these authors noted the importance of diet and eating behaviors to control diabetes, this may help explain current study findings. It is possible that the current study assessed changed behaviors and did not measure the actual diet and eating behaviors that were related to diabetes. In summary, none of the variables significantly predicted diabetes prevalence in adult Hispanics in the U.S., which did not support the hypotheses.

6.2 Limitations

Study limitations regard the design, sample, and data instrument. Since the study variables were not directly manipulated and archival data were from existing groups, findings are descriptive. The use of the NHANES for data gathering limited findings. In summary, none of the variables significantly predicted diabetes prevalence in adult Hispanics in the U.S., which did not support the hypotheses. The fact that no individual variables were found to be significant may be due in part to the conceptualization of the variables which may be a study limitation. For example, Language Spoken at Home might be a good proxy for acculturation in many circumstances, but it may not be the best proxy when considering health issues. Also, most of the data was concerned with current practices and for diabetes, it may be more important to look at behaviors when growing up rather than right now, which is another study limitation. If someone has received a diagnosis of diabetes, it is likely that they have changed their lifestyle already, which is why none of the variables were found to be significantly predictive. A retrospective questionnaire, asking about previous behaviors, should find stronger relationships.

6.3 Conclusions

Conclusions for the study are as follows: none of the variables significantly predicted diabetes prevalence in adult Hispanics in the U.S. Therefore, acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten did not significantly predict diabetes prevalence. None of the hypotheses were supported.

Implications. Implications of findings are that acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten may not be significant predictor of diabetes prevalence. However, these conclusions must be considered with caution due to study limitations.

6.4 Next Steps: Recommendations

Recommendations for future research. Since there are study limitations due to the sample, instrument, and design it is recommended that it be replicated in a future study that includes a random sample selected from multiple geographic locations and different instruments. Since conceptualization of the variables may also have limited findings it is recommended that the factors studied be assessed with different instruments. For example, rather than Language Spoken at Home, acculturation status needs to be assessed with a more specific question directly assessing this status. In addition, data gathered for the variables needs to measure behaviors when growing up rather than current behaviors. Since the study is limited by its design, it is recommended that a future study explore the

study variables using a mixed survey and quasi experimental design. In this manner, while the sample is likely to be smaller, it can include generational family members and data regarding early eating behaviors that led to diabetes.

While this study provided important and useful information regarding factors that did not predict diabetes, due to the study limitations all findings must be viewed with caution. Initial attempts for a large sample to explore variables led to severe study limitations. A more comprehensive understanding of the topic is needed to fully understand the predictive ability of factors explored. It is therefore recommended that a future study further investigate the variables and findings from this study. For example, a study is needed to investigate the ability of acculturation status, age, gender, occupation, income, health insurance, physical activity and fitness, alcohol use, smoking and tobacco use, weight history, anyone on a special diet, types of food available at home, and types of food prepared-eaten to predict diabetes prevalence and reasons for these outcomes. A mixed study design would allow for the gathering of qualitative information to help explain quantitative findings.

References

Afable-Munsuz, A., Mayeda, E. R., Perez-Stable, E., & Haan, M. N. (2013). Immigrant generation and diabetes risk among Mexican Americans: The Sacramento area Latino study on aging. *American Journal of Public Health, 103*(5), e45-e52. doi: 10.2105/AJPH.2012.300969. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3686633/

Agborsangaya, C. B., Gee, M. E., Johnson, S. T., Dunbar, P., Langlois, M. F., Leiter, L. A., Pelletier, C., & Johnson, J. A. (2013). Determinants of lifestyle behavior in type 2 diabetes: Results of the 2011 cross-sectional survey on living with chronic diseases in Canada. *BMC Public Health, 13*, 451. DOI**:** 10.1186/1471-2458-13-451. Retrieved from http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-13-451

Bentley-Lewis, R., Powe, C., Ankers, E., Wenger, J., Ecker, J., & Thadhani, R. (2014). Effect of Race/Ethnicity on hypertension risk subsequent to gestational diabetes mellitus. *The American Journal of Cardiology, 113*(8), 1364-1370. doi:http://dx.doi.org/10.1016/j.amjcard.2014.01.411

Bhalla, V., Zhao, B., Azar, K., Wang, E. J., Choi, S., Wong, E. C., & Palaniappan, L. (2013). Racial/Ethnic differences in the prevalence of proteinuric and nonproteinuric diabetic kidney disease. *Diabetes Care, 36*(5), 1215-21. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1353342876?accountid=6749

Bower, J., Brancati, F., & Selvin, E. (2013). No ethnic differences in the association of glycated hemoglobin with retinopathy: The national health and nutrition examination survey 2005-2008. *Diabetes Care, 36*(3), 569-73. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1318734545?accountid=6749

Braun, P. A., Huebschmann, A. G., Kim, C. A., Lezotte, D. C., Shupe, A., & Dabelea, D. (2011). Effect of maternal birthplace on gestational diabetes prevalence in colorado Hispanics. *Journal of Immigrant and Minority Health, 13*(3), 426-33. doi:http://dx.doi.org/10.1007/s10903-010-9370-4

Centers for Disease Control and Prevention (CDC). (2013). Survey overview. Retrieved from http://www.cdc.gov/nchs/tutorials/nhanes/SurveyOrientation/SurveyOverview/intro.htm

Centers for Disease Control and Prevention (CDC). (2014a). National Diabetes statistics report, 2014. 2009–2012 National health and nutrition examination survey and 2012 U.S. census data. Retrieved from http://www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf

Centers for Disease Control and Prevention (CDC). (2014b). National Health and Nutrition Examination Survey. Retrieved from http://www.cdc.gov/nchs/nhanes/about_nhanes.htm

Choi, S. E., Liu, M., Palaniappan, L. P., Wang, E. J., & Wong, N. D. (2013). Gender and ethnic differences in the prevalence of type 2 diabetes among Asian subgroups in California. *Journal of Diabetes and its Complications, 27*(5), 429-35. doi:http://dx.doi.org/10.1016/j.jdiacomp.2013.01.002

Chow, E. A., Foster, H., Gonzalez, V., & McIver, L. (2012). The disparate impact of diabetes on Racial/Ethnic minority populations. *Clinical Diabetes, 30*(3), 130-133. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1033045289?accountid=6749

Cohen J. (1977). *Statistical power analysis for the behavioral sciences (*Rev. ed.). New York, NY: Academic Press.

Colon, E., Giachello, A., McIver, L., Pacheco, G., & Vela, L. (2013). Diabetes and depression in the Hispanic/Latino community. *Clinical Diabetes, 31*(1), 43-45. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1287026516?accountid=6749

Diabetes Research and Action Education Foundation (2016). Your eating style profile. Seven styles of eating behavior - understanding the emotional and social dimensions of eating and nutrition. Retrieved from http://www.diabetesaction.org/site/PageServer?pagename=complementaryEatingStyles

Gaskin, D. J., Thorpe, R. J., McGinty, E. E., Bower, K., Rohde, C., Young, J. H., & Dubay, L. (2014). Disparities in diabetes: The nexus of race, poverty, and place. *American Journal of Public Health, 104*(11), 2147-55. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1619996382?accountid=6749

Gregg, E. W., Li, Y., Wang, J., Rios Burrows, N., Ali, M. K., Rolka, D., & Geiss, L. (2014). Changes in diabetes-related complications in the united states, 1990-2010. *The New England Journal of Medicine, 370*(16), 1514-23. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1517454207?accountid=6749

Hedderson, M., Ehrlich, S., Sridhar, S., Darbinian, J., Moore, S., & Ferrara, A. (2012). Racial/Ethnic disparities in the prevalence of gestational diabetes mellitus by BMI. *Diabetes Care, 35*(7), 1492-8. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1024828594?accountid=6749

Holmes, L., Hossain, J., Ward, D., & Opara, F. (2012). Racial/Ethnic variability in diabetes mellitus among united states residents is unexplained by lifestyle, sociodemographics and prognostic factors. *ISRN Public Health,* Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1038934081?accountid=6749

Kim, Y. Y. (2001). *Becoming intercultural: An integrative theory of communication and cross-cultural adaptation.* Thousand Oaks, CA: SAGE Publications. doi: http://dx.doi.org/10.4135/9781452233253

Kim, S. Y., Saraiva, C., Curtis, M., Wilson, H. G., Troyan, J., England, L., & Sharma, A. (2013). Fraction of gestational diabetes mellitus attributable to overweight and obesity by Race/Ethnicity, California, 2007-2009. *American Journal of Public Health, 103*(10), e65-72. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1441294623?accountid=6749

Ma, Y., Hébert, J.,R., Manson, J. E., Balasubramanian, R., Liu, S., Lamonte, M. J., & Howard, B. V. (2012). Determinants of Racial/Ethnic disparities in incidence of diabetes in postmenopausal women in the U.S.: The women's health initiative 1993-2009. *Diabetes Care, 35*(11), 2226-34. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1223844356?accountid=6749

National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). (2014). Diabetes. National Institutes of Health (NIH). Retrieved from http://diabetes.niddk.nih.gov/dm/pubs/type1and2/index.aspx

Office of Minority Health (OMH). (2014). 2012 National Healthcare Disparities Report. Table T2_4_1_3-2b. U.S. Department of Health and Human Services. Retrieved from http://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlID=63

Oster, E. (2014). Diabetes and diet: Behavioral response and the value of health. University of Chicago Booth School of Business and NBER, 1-42. Retrieved from http://faculty.chicagobooth.edu/emily.oster/papers/diabetes.pdf

Otiniano, M. E., Al Snih, S., Goodwin, J. S., Ray, L., AlGhatrif, M., & Markides, K. S. (2012). Factors associated with poor glycemic control in older Mexican American diabetics aged 75 years and older. *Journal of Diabetes and its Complications, 26*(3), 181-6. doi:http://dx.doi.org/10.1016/j.jdiacomp.2012.03.010

Pabon-nau, L., Cohen, A., Meigs, J. B., & Grant, R. W. (2010). Hypertension and diabetes prevalence among U.S. Hispanics by country of origin: The national health interview survey 2000-2005. *Journal of General Internal Medicine, 25*(8), 847-52. doi:http://dx.doi.org/10.1007/s11606-010-1335-8

Pérez, C.,M., Sánchez, H., & Ortiz, A. P. (2013). Prevalence of overweight and obesity and their cardiometabolic comorbidities in Hispanic adults living in Puerto Rico. *Journal of Community Health, 38*(6), 1140-6. doi:http://dx.doi.org/10.1007/s10900-013-9726-5

Santos, S. J., Hurtado-Ortiz, M. T., & Sneed, C. D. (2009). (2009). Illness beliefs regarding the causes of diabetes among Latino college students. *Hispanic Journal Behavioral Science, 31*(3), 395–412. doi: 10.1177/0739986309339911. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2827852/

Scherwitz, L., & Kesten, D. (2005). Seven eating styles linked to overeating, overweight, and obesity. *Explore (NY), 1*(5), 342-359. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/16781565

Suh, D., Choi, I., Plauschinat, C., Kwon, J., & Baron, M. (2010). Impact of comorbid conditions and race/ethnicity on glycemic control among the US population with type 2 diabetes, 1988-1994 to 1999-2004. *Journal of Diabetes and its Complications, 24*(6), 382-91. doi:http://dx.doi.org/10.1016/j.jdiacomp.2009.07.001

The, N. S., Richardson, A. S., & Gordon-Larsen, P. (2013). Timing and duration of obesity in relation to diabetes: Findings from an ethnically diverse, nationally representative sample. *Diabetes Care, 36*(4), 865-72. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/1332740371?accountid=6749

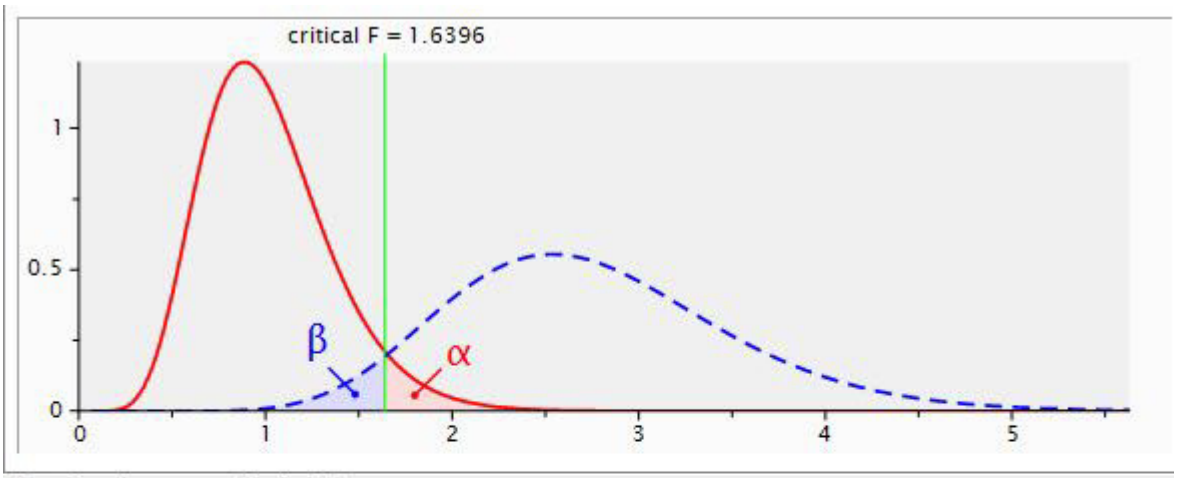
Tuchman, A. M. (2011). Diabetes and RACE: A historical perspective. *American Journal of Public Health, 101*(1), 24-33. Retrieved from http://ezproxy.lapl.org/login?url=http://search.proquest.com/docview/822931998?accountid=6749

Wichert, R. (1996). Acculturation and intercultural identity in the post-modern world. Retrieved from http://www.wichert.org/icid.html

Yannakoulia, M. (2006). Eating behavior among type 2 diabetic patients: A poorly recognized aspect in a poorly controlled disease. *Review of Diabetic Studies, 3*(1), 11–16. doi: 10.1900/RDS.2006.3.11. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1783576/

Appendix A

Power Analysis



Test family: F tests

Statistical test: Linear multiple regression: Fixed model, R^2 increase

Type of power analysis: A priori: Compute required sample size – given α, power, and effect size

Input Parameters

Determine => Effect size f^2	0.15
α err prob	0.05
Power (1–β err prob)	0.95
Number of tested predictors	19
Total number of predictors	19

Output Parameters

Noncentrality parameter λ	32.5500000
Critical F	1.6395969
Numerator df	19
Denominator df	197
Total sample size	217
Actual power	0.9503271

Appendix B

Operationalization of Variables of Study

Operationalization of Variables of Study

Variable Name	Description	Type	Coding	NHANES Variable
Diabetes Prevalence	Doctor told you you had diabetes	Dichotomous	0, no 1, yes	DIQ010
Acculturation Status	Language spoken at home	Categorical	1, Only Spanish 2, More Spanish than English 3, English and Spanish Equally 4, More English than Spanish 5, Only English	
Age	Age in years	Continuous	01/01/50	RIDAGEYR
Gender	Gender	Dichotomous	1, Male 2, Female	RIAGENDR
Income 1	Annual Household Income	Categorical	1-15	INCOME1
Income 2	Annual Household Income	Dichotomous	1, Under $20,000 2, Over $20,000	INCOME2
Health Insurance	Covered by Health Insurance	Dichotomous	1, yes 2, no	HIQ011
Physical Activity and Fitness	Days physically active at least 60 minutes in a typical week	Continuous	0-7	PAQ706
Alcohol Use	Avg number of alcoholic drinks per day over the past 12 months	Continuous	0-24	ALQ130
Smoking and tobacco use	Smoked at least 100 cigarettes in life	Dichotomous	1, yes 2, no	SMQ020
Weight History	Self-reported greatest weight, in pounds	Continous	85-585	WHD140
Consumer Behavior: Diet	Anyone in the family on a special diet?	Dichotomous	1, yes 2, no	CBD010
Consumer Behavior: Fruits	Fruits available at home	Categorical	1, Always 2, Most of the Time 3, Sometimes 4, Rarely 5, Never	CBD020
Consumer Behavior: Dark Green Vegetables	Dark Green Vegetables available at home	Categorical	1, Always 2, Most of the Time 3, Sometimes 4, Rarely 5, Never	CBD030

Variable Name	Description	Type	Coding	NHANES Variable
Consumer Behavior: Fat Free/Low Fat Milk	Fat Free/Low Fat Milk available at home	Categorical	1, Always 2, Most of the Time 3, Sometimes 4, Rarely 5, Never	CBD050
Consumer Behavior: Soft Drinks	Soft Drinks available at home	Categorical	1, Always 2, Most of the Time 3, Sometimes 4, Rarely 5, Never	CBD060
Dietary Behavior: # of meals not at home	# of meals not at home, past 30 days	Continuous	0-21	DBD895
Dietary Behavior: # of meals from fast food or pizza	# of meals from fast food or pizza, past 30 days	Continuous	0-21	DBD900
Dietary Behavior: # of ready-to-eat foods	# of ready-to-eat foods, past 30 days	Continuous	0-150	DBD905
Dietary Behavior: # of frozen meals/pizza	# of frozen meals/pizza , past 30 days	Continuous	0-180	DBD910

Appendix C

Tables and Charts for Preliminary Results

Variable: Diabetes Prevalence

Doctor told you have diabetes

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Yes	431	7.2	7.7	7.7
	No	5168	86.9	92.3	100.0
	Total	5599	94.1	100.0	
Missing	System	350	5.9		
Total		5949	100.0		

Variable: Acculturation Status

Language(s) usually spoken at home

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Only Spanish	410	6.9	35.9	35.9
	More Spanish than English	173	2.9	15.1	51.1
	Both Equally	208	3.5	18.2	69.3
	More English than Spanish	185	3.1	16.2	85.5
	Only English	166	2.8	14.5	100.0
	Total	1142	19.2	100.0	
Missing	System	4807	80.8		
Total		5949	100.0		

Variable: Age

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age at Screening Adjudicated - Recode	5948	0	80	26.86	23.134
Valid N (listwise)	5948				

Variable: Gender

Gender

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Male	2952	49.6	49.6	49.6
	Female	2996	50.4	50.4	100.0
	Total	5948	100.0	100.0	
Missing	System	1	.0		
Total		5949	100.0		

Variable: Household Income 1

Household Income 1

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	$0 to $4,999	152	2.6	3.0	3.0
	$ 5,000 to $ 9,999	272	4.6	5.3	8.3
	$10,000 to $14,999	433	7.3	8.5	16.8
	$15,000 to $19,999	532	8.9	10.4	27.3
	$20,000 to $24,999	568	9.5	11.2	38.4
	$25,000 to $34,999	845	14.2	16.6	55.0
	$35,000 to $44,999	595	10.0	11.7	66.7
	$45,000 to $54,999	430	7.2	8.4	75.1
	$55,000 to $64,999	258	4.3	5.1	80.2
	$65,000 to $74,999	214	3.6	4.2	84.4
	$75,000 to $99,999	380	6.4	7.5	91.9
	$100,000 and Over	415	7.0	8.1	100.0
	Total	5094	85.6	100.0	
Missing	System	855	14.4		
Total		5949	100.0		

Variable: Household Income 2

Household Income 2

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Under $20,000 a year	1657	27.9	30.2	30.2
	Over $20,000 a year	3828	64.3	69.8	100.0
	Total	5485	92.2	100.0	
Missing	System	464	7.8		
Total		5949	100.0		

Variable: Health Insurance

Covered by health insurance

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	yes	4251	71.5	71.6	71.6
	no	1687	28.4	28.4	100.0
	Total	5938	99.8	100.0	
Missing	System	11	.2		
Total		5949	100.0		

Variable: Physical Activity and Fitness

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Days physically active at least 60 min	1283	0	7	6.17	1.825
Valid N (listwise)	1283				

Variable: Alcohol Use

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Avg # alcoholic drinks/day -past 12 mos	2014	1	64	2.87	2.946
Valid N (listwise)	2014				

Variable: Smoking and Tobacco Use

Smoked at least 100 cigarettes in life

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Yes	1536	25.8	44.6	44.6
	No	1910	32.1	55.4	100.0
	Total	3446	57.9	100.0	
Missing	System	2503	42.1		
Total		5949	100.0		

Variable: Highest Self Reported Weight

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Self-reported greatest weight (pounds)	3535	85	585	192.39	52.937
Valid N (listwise)	3535				

Variable: Consumer Behavior - Diet

Anyone in the family on a special diet

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Yes	468	7.9	13.7	13.7
	No	2956	49.7	86.3	100.0
	Total	3424	57.6	100.0	
Missing	System	2525	42.4		
Total		5949	100.0		

Variable: Consumer Behavior - Fruits

Fruits available at home

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Always	2428	40.8	70.1	70.1
	Most of the time	605	10.2	17.5	87.6
	Sometimes	347	5.8	10.0	97.6
	Rarely	75	1.3	2.2	99.8
	Never	7	.1	.2	100.0
	Total	3462	58.2	100.0	
Missing	System	2487	41.8		
Total		5949	100.0		

Variable: Consumer Behavior - Dark Green Vegetables

Dark green vegetables available at home

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	2014	33.9	58.2	58.2
	Most of the time	638	10.7	18.4	76.6
	Sometimes	625	10.5	18.1	94.7
	Rarely	126	2.1	3.6	98.3
	Never	58	1.0	1.7	100.0
	Total	3461	58.2	100.0	
Missing	System	2488	41.8		
Total		5949	100.0		

Variable: Consumer Behavior - Fat free/low fat milk

Fat-free/low fat milk available at home

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	760	12.8	22.0	22.0
	Most of the time	94	1.6	2.7	24.7
	Sometimes	164	2.8	4.7	29.4
	Rarely	186	3.1	5.4	34.8
	Never	2256	37.9	65.2	100.0
	Total	3460	58.2	100.0	
Missing	System	2489	41.8		
Total		5949	100		

Variable: Consumer Behavior - Salty Snacks

Salty snacks available at home

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	1166	19.6	33.7	33.7
	Most of the time	499	8.4	14.4	48.1
	Sometimes	1013	17.0	29.3	77.4
	Rarely	581	9.8	16.8	94.2
	Never	202	3.4	5.8	100.0
	Total	3461	58.2	100.0	
Missing	System	2488	41.8		
Total		5949	100.0		

Variable: Consumer Behavior - Soft Drinks

Soft drinks available at home

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	1132	19.0	32.7	32.7
	Most of the time	469	7.9	13.6	46.3
	Sometimes	886	14.9	25.6	71.9
	Rarely	495	8.3	14.3	86.2
	Never	476	8.0	13.8	100.0
	Total	3458	58.1	100.0	
Missing	System	2491	41.9		
Total		5949	100.0		

Variable: Dietary Behavior: Meals not prepared at home

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
# of meals not home prepared	5565	0	21	2.45	3.357
Valid N (listwise)	5565				

Variable: Dietary Behavior - Meals from fast food or pizza

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
# of meals from fast food or pizza place	3856	0	21	1.89	2.455
Valid N (listwise)	3856				

Variable: Dietary Behavior - number of ready to eat foods, past 30 days

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
# of ready-to-eat foods in past 30 days	5560	0	150	1.35	5.286
Valid N (listwise)	5560				

Variable: Dietary Behavior - number of frozen meals/pizza, past 30 days

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
# of frozen meals/pizza in past 30 days	5571	0	180	1.63	6.046
Valid N (listwise)	5571				