Assessing The Relationship Between Diabetes Causation Beliefs, Diabetes Risk, And Intent To Engage In Healthy Lifestyles Among Mexican American Men

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ASSESSING THE RELATIONSHIP BETWEEN DIABETES CAUSATION BELIEFS, DIABETES RISK, AND INTENT TO ENGAGE IN HEALTHY LIFESTYLES AMONG MEXICAN AMERICAN MEN

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ASSESSING THE RELATIONSHIP BETWEEN DIABETES CAUSATION BELIEFS, DIABETES RISK, AND INTENT TO ENGAGE IN HEALTHY LIFESTYLES AMONG MEXICAN AMERICAN MEN

by

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THESIS

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Abstract

Background: The Hispanic population is the largest growing ethnic group and is estimated to reach 27% of the US population by 2050. Compared to non-Hispanic groups and other racial/ethnic minority groups they have the highest diabetes related mortality rate. Income, education, and health insurance put the Hispanic population at greater risk for diabetes, diabetes related complications, and diabetes mortality. Objectives: The objective of this research is to: 1) identify which diabetes causation beliefs (i.e., biological, psychological, socioenvironmental, behavior, fatalistic) are the most common among Hispanic men; 2) examine the relationship between men’s diabetes causation belief and diabetes risk (HbA1c); and 3) examine the association between diabetes causation beliefs and men’s intent to follow healthy lifestyle behaviors after being presented with a hypothetical diabetes diagnoses. Hypothesis: This research proposes that men who endorse a biological diabetes causation belief (i.e. genetics, hereditary, aging) will be more likely to have an increased risk of diabetes and will be less likely to report an intent to follow a doctor’s recommendation. This may be due to the belief that genetics, hereditary, and aging are biological and non-modifiable compared to behavioral causes such as eating habits and smoking, thus leading to a perception that no behavior change is beneficial. Method: Data come from a cross-sectional study of 100 adult men residing in El Paso, Texas in 2018. To identify the most endorsed men’s diabetes causation beliefs, rank order statistical analysis of the IPQ-R survey was conducted. Separate linear regressions were conducted to examine: a) the association between men’s diabetes causation belief and diabetes risk (HbA1c); and b) the association between diabetes causation belief and participant’s intent to engage in healthy lifestyle behaviors. Results: 1) Behavioral and Psychological diabetes causation health beliefs were the top two most endorsed by men with diabetes; Behavioral and Biological causation health beliefs were the top two endorsed by men without diabetes. 2) Six linear regression analyses were conducted with each of the health belief independent variables on HbA1c variables as a dependent variable. After controlling for age, income, health insurance, education, and diabetes status, each linear regression model was statistically significant. Similarly, six linear regression analyses were conducted with each health belief variable and intent to engage in a healthy lifestyle. After controlling for age, income, health insurance, education, and diabetes status, each linear regression model was statistically significant. 3) Results of the linear regression did not show a statistically significant association between the independent variables and intent to follow doctor recommendations. Conclusion: Alone, each diabetes causation heath belief was not associated with HbA1c levels, intent to follow doctor recommendations, and intent to follow healthy lifestyles. However, the linear regression models indicated that diabetes causation beliefs may be associated with glucose management and men’s engagement in health behaviors. However, it is possible that low R-square values suggests a type 1 error, where statistical significance is reported when there may be none. Recommendation: Understanding the relationship between diabetes causation beliefs and diabetes risk could aid health care providers in understanding factors that facilitate men’s engagement in lifestyle modification via diabetes management programs. Moreover, asking men about their diabetes causation beliefs can assist health providers in understanding men’s readiness for change/engagement in lifestyle behavioral modification.

Keywords: diabetes causation beliefs, adult men, Hispanics
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1.1 Diabetes

Diabetes is a serious disease that causes prolonged high blood sugar levels, also known as blood glucose, in our body. This is due to not being able to fully produce or effectively use insulin. Insulin is a hormone made by the pancreas that helps glucose from food get into our cells to be used for energy. High levels of blood glucose in our body can cause severe health problems over time, such as diabetes (National Institute of Diabetes and Digestive and Kidney Disease NIDDK, 2016).

There are four main types of diabetes: pre-diabetes, type 1, type 2, and gestational. Pre-diabetes affects approximately 88 million adults in the United States (U.S.), and 80% of them don’t know they have it (Centers for Disease Control and Prevention (CDC), 2020c). Individuals with pre-diabetes have high levels of blood sugar, but not high enough to be diagnosed with type 2 diabetes. Type 1 diabetes occurs only among 5-10% of those who have diabetes. It is an autoimmune reaction where the body attacks the cells in the pancreas that make insulin (CDC, 2020d). The most common type is type 2 diabetes. The cells do not respond to insulin or make enough insulin (CDC, 2020e). Lastly, gestational diabetes affects pregnant women who did not have diabetes before they were pregnant. Blood sugar levels are usually high in the middle of the pregnancy (CDC, 2020f).

In the U.S., the prevalence was approximately 10.5% (3.4 million) in 2018, making it the seventh leading cause of death in the U. S. (CDC, 2020b). According to the American Diabetes Association (ADA;2018a), the number of undiagnosed individuals is 7.3 million and 34.2 million adults have been diagnosed. Diabetes in adults is most prevalent among Hispanics
(12.5%), non-Hispanic blacks (11.7%), and American Indians/Alaskan Natives (14.7%) compared to non-Hispanic whites (7.5%).

1.2 Symptoms

The most common symptoms for diabetes are urinating often (usually at night), often feeling thirsty and hungry, losing weight without trying, blurry vision, numbness or tingling in hands or feet, feeling tired, dry skin, having sores that heal slowly, and having more infections that usual (CDC, 2020g). Additional symptoms for type 1 diabetes include nausea, vomiting, or stomach pains (CDC, 2020g). Symptoms for diabetes can take years to show up and that is why it may go undiagnosed for some people. The best way to know if someone is at risk for diabetes is from a blood sugar test.

1.3 Risk Factors

The risk factors for developing type 1 diabetes are not as clear as they are for type 2 diabetes. It is known that family history, such as having a parent, brother, or sister with type 1 diabetes and age are the most common risk factors. Individuals with type 1 diabetes are more likely to become diagnosed during childhood, teenage years, or during young adulthood. Type 1 diabetes is more prevalent amongst non-Hispanic whites than in other races or ethnicities such as African Americans and Hispanics (CDC, 2020a). Type 2 diabetes is more common and is 90-95% of all types of diabetes cases. It mostly affects African Americans, Hispanic/Latino Americans, American Indians, and Alaska natives in the United States (CDC, 2020a). Being a racial or ethnic minority is a risk factor for diabetes along with being overweight, being over the age of 45, having immediate family with diabetes, having a sedentary lifestyle, and having gestational diabetes (CDC, 2020a). Most of the risk factors associated with type 1 diabetes are non-modifiable, or things we can’t change, such as age, family history, and ethnicity/race. On the
other hand, modifiable risk factors, or things we can change, are for the most part precursors of type 2 diabetes, such as living a sedentary lifestyle, unhealthy eating, or being overweight.

1.4 Management and Prevention

Management of blood glucose levels for people with diabetes is very important because they are twice as likely to have a stroke or heart disease at a young age compared to people without the disease (CDC, 2019b). Management involves change in lifestyle behaviors that can prevent the risk for heart diseases and diabetes-related complications among people who have diabetes. According to the CDC (2019b), lifestyle changes that can help lower the risk for diabetes and heart diseases are following a healthy diet by eating more fruits, vegetables, and lean protein. Eating less processed foods and trans-fats are also behaviors that reduce the risk of diabetes related health problems. Healthy eating behaviors can help maintain a healthy weight and lower blood sugar levels. In addition, it is recommended that individuals with diabetes be physically active for at least 150 minutes per week with moderate to intense physical activity. Other important management behaviors include regular monitoring of blood glucose levels, blood pressure, and cholesterol. Individuals can also have a regular Hemoglobin A1C (HbA1c) test to track blood sugar levels every three months. In addition, it is recommended that people with diabetes visit their medical provider for regular health checks, particularly for blood pressure, cholesterol, and triglycerides, eye disease, and other diabetes related conditions. Lastly, it is recommended to not smoke nor drink since it can lead to more conditions and diseases. Taking these types of precautions can lead an individual to a healthy life and, in the long run, also prevent massive healthcare expenses.
1.5 Cost of Diabetes to the Health Care System and People with Diabetes

Literature and national organizations such as the American Diabetes Association (ADA) and Centers for Disease Control and Prevention (CDC) indicate that the national costs for diabetes in the U.S. was more than $327 billion in 2017. This was an increase of $245 billion since 2012 (ADA, 2020). The medical expenditures for diabetes treatments can cost up to $16,752 per year. In context, for every dollar spent, seven dollars are spent treating diabetes and any complications that come with the disease (ADA, 2020). In addition, there are indirect costs that can accumulate due to absenteeism, reduced productivity at work, and inability to work. The high cost of this disease impact mostly individuals from a low socioeconomic status (SES).

Healthcare expenses per-capita for Hispanics is $8,050, $10,470 for non-Hispanic blacks, and $9,800 for non-Hispanic whites (ADA, 2020). Even though this data shows lower diabetes healthcare expenses for the Hispanic population, this could be due to the 41.5% of Hispanics lacking health insurance (Dominguez et al. 2015). Studies have shown that those who do not have health insurance have 60% fewer physician office visits, are prescribed 52% fewer medications than people with insurance coverage, and have 168% more emergency department visits than people who have insurance (ADA, 2020; Escarce et al 2016). The U.S. health care cost for diabetes is also high among other ethnic and racial minority groups.

Improving diabetes outcomes is important for the Hispanic population since it is the largest growing ethnic minority group in the U.S. and it is estimated to reach 27% of the U.S. population by 2050 (US Census Bureau, 2018). Currently, the Hispanic population is one of the ethnic minority groups with the highest diabetes prevalence at 12.5% (CDC, 2020b). The socioeconomic status, occupation, education, language proficiency of Hispanics act as barriers to access and quality healthcare. For example, Hispanics are twice more likely to live below the
poverty line than non-Hispanic whites. Neighborhoods in low-economic environments often lack the resources for supportive health behaviors (i.e., food desserts, less available high nutrient foods, substandard infrastructures to support outdoor physical activity, fewer health care facilities). Studies have shown that many Hispanics work in low-wage occupations, and they are four times as likely not to have completed high school than non-Hispanic whites (Domínguez et al, 2015; Escarce et al 2016). They are also 20 times as likely not to speak English proficiently compared to non-Latino whites, thus health information in Spanish may not be available to Spanish speakers. These language barriers lead to misinterpreting or not understanding diabetes information, having lack of information, and possible misunderstanding and disagreement between the health care provider and patient (Domínguez et al., 2015; Hue et al, 2013). Together, these circumstances put this growing population at most risk for diabetes, poor quality of care, diabetes related complications, and diabetes mortality. Thus, more research is needed to address healthcare barriers and understand how to engage high risk Hispanics in diabetes prevention and management behaviors.
Chapter 2: Diabetes in Mexican American Population

2.1 Diabetes among Mexican Americans

The Hispanic population in the U.S. includes diverse subgroups, including Hispanics of Mexican, Central American, South American, and Caribbean backgrounds. However, among all these groups, Hispanic of Mexican descent are at most risk for diabetes. Mexican Americans have the highest prevalence with 14.4% compared to Central and South Americans (8.3%), Cubans (6.5%), and Puerto Ricans (12.4%) (ADA, 2018a). Mexican Americans also have the highest diabetes associated mortality rates, estimated to be 51% higher, compared to non-Hispanic whites (Dominguez et al., 2015). The high rates have been attributed to genetics, unhealthy eating, weight, and high sedentary lifestyles. Family history of diabetes has shown to be a predictor of increased risk in this population. Additionally, the increased risk of diabetes in this group is associated with the consumption of high fat, caloric, and carbohydrate diets often found in traditional Mexican meals. These diets are also often linked to higher rates of obesity in this population (CDC, 2019a).

Gender Differences

Among Mexican Americans, research indicates that men are at greater risk of experiencing diabetes related complications and mortality rates compared to Mexican American females and non-Hispanic white males. Studies show diabetes prevalence is 25% higher in Mexican American males compared to Hispanic women (Dominguez et al., 2015). In fact, studies show that women have a lower prevalence of multiple conditions compared to men (Davis, 2017). This data is also reflected in data from El Paso, Texas. The prevalence rates for diabetes in females is 13% and 14.8% for males. Also, the age adjusted mortality rates for diabetes is 28.8% for females and 41.2% for males (Healthy Paso del Norte, 2017). Additionally,
Mexican American men have higher diabetes risk factors (i.e., obesity, cholesterol, and hypertension) and are three times more likely to die from these complications compared to non-Hispanic whites. Disparities for Mexican American men are higher when compared to Mexican American women and non-Hispanic white males.

2.2 Factors that Place U.S. Hispanic and Mexican American Men at High Risk for Diabetes and Associated Morbidity and Mortality Rates

Some of the contributing factors that put Hispanic men at risk are primarily obesity and lack of engagement in prevention behaviors. Dominguez et al. (2015) found that U.S born Hispanics were 23% more likely to be obese compared to non-Latino whites and 30% more likely that foreign-born Hispanics. Other research has shown that U.S. Hispanic males do not meet the physical activity recommendations (Bautista et al., 2011; Arredondo, 2016). It is recommended by the ADA and CDC that adults participate in 150 minutes of physical activity per week of moderate to intense aerobic activity. A task such as walking 30 minutes a day for 5 days a week can have positive health benefits to at-risk population such as Hispanic males.

Moreover, delayed medical care due to cost concerns was reported by 14.4% of male Hispanics (Dominguez et al., 2015). Apart from high healthcare costs and lack of insurance, other reasons for delayed medical care among men are due to the low-perceived risk of their illness/symptoms, lack of time, and unfavorable attitudes about seeking medical care (Taber et al., 2015). Unfavorable attitudes include the fear of getting bad news or having a poor relationship with their healthcare provider. In a study by Vaccaro et al. (2016), only 55.2% of Mexican American men in the study reported seeing a diabetes specialist compared to non-Hispanics Black men (84.9%) and non-Hispanic white men (74.7%) in the study. Delaying medical care leads to hospitalization and probable longer length of stay rates. Specifically,
studies have shown that Hispanics have higher hospital admissions and longer stays compared to non-Hispanic whites (Glantz et al., 2019a; Jiang et al., 2003). According to a study that examined 50,301 diabetic-related discharges, women were found to have fewer hospitalizations and shorter stays than men (Cook et al., 2006). The delay of medical care due to high healthcare costs and lack of health insurance are barriers from the health care system and policies.

The diabetes disparity between Hispanic men vs. Hispanic women and non-Hispanic males, respectively, may also be due to diabetes knowledge. González et al. (2009), found that Hispanic men were significantly less informed about diabetes than Hispanic women. Rustveld et al., (2009) conducted a focus groups with Hispanic men and found that men indicated they had difficulty following diet recommendations because they could not fully understand the ADA recommendations. Therefore, lacking basic knowledge about symptoms, resources, and healthy lifestyle modifications. Hispanic men have also been found to have access to less health resources compared to non-Hispanic white males. There are less tailored programs for men in general, and more so for Hispanic men (CDC, 2019).

Overall, men’s participation in diabetes programs are low compared to women’s participation. Mathew et al., (2012) found that women were most likely to use resources like support groups and educational classes compared to men. Men in this study relied more on self-learning, but they expressed to wanting more guidance. Likewise, among participants in Diabetes Education and Prevention programs, the participation rate is 25% for men and 75% for women (CDC, 2019).

2.4 The Importance of Patient Engagement on Hispanic Population

In 2001, the Institute of Medicine identified patient engagement as a priority because it was found to improve patient self-care behaviors and reduced health care costs (IOM, 2001; Greene
et al., 2015). Literature has shown that lack of resources (i.e. no childcare, transportation), cultural influences (i.e. male gender, difficulty to change diet), relationship with diabetes (i.e. lack of understanding, asymptomatic), relationship with clinics and educational classes (i.e. translation issues in class, no follow-up from care providers), and health beliefs (i.e. God’s will) can affect the way participants engage (Testerman & Chase, 2018; Hu, 2013; Francis & Litchfield, 2014). Likewise, engagement in healthy behaviors includes the individual’s role to understand the right steps in the care process and having the knowledge, skill, confidence, and having low-perceived severity of their disease (Hibbard & Greene, 2013; Larkey et al., 2001; Rustveld et al. 2009). Given that Hispanic men have high rates of diabetes and diabetes related mortality, and low engagement in diabetes care (i.e. health and educational), more effort is needed to identify strategies to engage this population. This includes identifying cultural factors that influence how men view their health and motivation for engaging in health behaviors. Understanding cultural barriers can also help health care providers tailor their care based on the health resource or personal needs of this population.

### 2.5 Diabetes Causation Health Beliefs

Some of the most important health beliefs to understand how to engage patients includes beliefs about how a disease is caused and how it progresses. The current models of diabetes causation in the U.S. are commonly explained by biological and behavioral factors. For example, the diabetes risk factors most identified for the development diabetes are categorized into non-modifiable (e.g., age, genetics, ethnicity/race) or non-modifiable (e.g., dietary intake, lack of physical activity). Non-modifiable risks are factors that individuals cannot change and are linked the person’s own biological characteristics. Modifiable diabetes risk factors are things that an individual can change. This include the things a person chooses to eat, a person’s level of
physical activity, or whether a person smokes or not. Research has shown that taking into consideration these diabetes causation health beliefs can promote engagement and management of a person’s diabetes, as well as seek treatment for the disease (Daniulaityte, 2004; Moreira et al, 2018; Weller et al, 1999).

Understanding a person’s diabetes causation beliefs are important because they can lead to whether a person engages or does not engage with the health care treatment or health behaviors. For example, if someone does not think the cause of a disease is preventable then they may not think it is worth it to engage in any health behavior. On the contrary, if a person believes the cause of a disease is preventable, they may be more likely to engage in prevention behaviors than someone who does not think a disease is preventable. However, these types of beliefs alone do not predict behavior. There are also many factors that influence health behaviors including if it is controllable, the severity of the disease, time course, prognosis of the disease, and resources available.

Cultural factors also play an important role in a person’s engagement with their health. Within the Hispanic culture, there are diabetes related beliefs that may influence how they manage their condition. For example, there is an indigenous health belief in Hispanic culture that suggest that strong negative emotions (i.e. coraje/anger, susto/fright) can cause the onset of diabetes. There is substantial qualitative literature discussing these to be prominent beliefs among many Hispanics, even during these times (Daniulaityte, 2004; Moreira et al, 2018; Weller et al, 1999). Interestingly, in the past decade these historical beliefs have been shown to be scientifically correct. Longitudinal epidemiological research has shown that that depression/stress can cause the onset of diabetes and that diabetes can cause the onset of depression and anxiety. (Surwit et al., 1992).
One study by Daniulaityte (2004), found that high levels of the cultural beliefs that strong emotions cause diabetes, like susto and coraje, were associated to lower glucose levels among a sample of Mexican living in Guadalajara. Furthermore, the results showed that women had higher levels of these diabetes cultural beliefs than men. Although a small sample size was used, the author presents a possible explanation that the belief that psychological stressors such as susto can cause diabetes can lead to higher self-actualization and have a person play a more active role in diabetes management. The author further suggests that the idea that diabetes being caused by things other than a person’s own biology or behavior, may lessen the idea that the cause of diabetes is the person’s own fault and lead to less avoidance and acceptance of the disease. Given that Hispanics are an ethnic minority group that experiences discrimination and may often viewed as ‘less than’ by dominant power groups, Hispanics may not want to accept another stigmatizing condition, like diabetes. If the cause of diabetes is viewed as something outside of the individual, like psychological (stress due to impoverished conditions) or environmental (modernization-processed foods) stressors, it may be easier for some individuals to accept that they are not to blame and more accepting for them to engage in recommended diabetes management treatments.

Fatalism is another belief that is common in Hispanic culture. In research conducted by Moreira et al (2018), it was indicated that cultural diabetes causation beliefs, such as “susto (fright), coraje (anger), and fatalismo (fatalism)”, can affect the way Hispanics seek treatment and manage diabetes. The researchers describe how fatalism is the belief that things happen because it is people’s fate or God’s will. Fatalism, is a belief where people may think that there is not much they can do about their disease (non-modifiable), thus leading them to not taking an active role in their diabetes management.
In accordance, the Institute of Medicine (IOM) states a patient’s engagement in self-care can be influenced by health beliefs. Thus, further research examining specific cultural diabetes health beliefs and how they are associated with an individual’s engagement in diabetes management and engagement in following recommended treatments is very important. This is particularly important for Hispanic men because they have high morbidity and mortality risks of diabetes when compared to Hispanic women and non-Hispanic white males. This research aims to explore how health beliefs that are associated with diabetes and intent to prevent/manage diabetes among a sample of Hispanic men living in El Paso, TX.
Chapter 3: Goals and Objectives

3.1 Goals and Objectives

The goals of this study are to contribute to literature regarding Mexican American men, diabetes causation health beliefs, intent to engage in healthy lifestyles, and intent to follow doctor recommendations. The objective of this study is to determine the association between diabetes causation health beliefs and diabetes risk, intent to engage in healthy lifestyles and intent to follow doctor recommendations.
Chapter 4: Study Aims and Hypothesis

4.1 Aims

_Aim 1:_ Describe the diabetes causation beliefs (i.e., biological, psychological, socioenvironmental, behaviors, fatalistic) that are mostly endorsed among a sample of 100 adult men living in El Paso TX.

_Aim 2:_ Determine the association between men’s most endorsed diabetes causation belief and HbA1c levels

_Aim 3:_ Determine the association between diabetes causation beliefs, men’s intent to engage in healthy lifestyles and men’s intent to follow doctor recommendations

4.2 Hypothesis

_Hypothesis 1:_ Men will endorse biological diabetes causation beliefs more than behavioral, psychological, socioenvironmental, or fatalistic beliefs

_Hypothesis 2:_ Men with a low biological diabetes causation belief (i.e. Genetics, hereditary, aging) will be associated with a lower HbA1c.

_Hypothesis 3:_ Men with a high endorsement of biological diabetes causation (i.e. Genetics, hereditary, aging) will be associated with a lower intent to follow a healthy lifestyle and follow doctor recommendations.

4.3 Health Belief Model

The Health Belief Model (HBM) is a “conceptual formulation” to explain the reasons why individuals engage or not on health-related behaviors (Janz & Becker, 1984). It is used to predict the likelihood of behavior change depending on a person’s perception of threat of an illness or disease. It is a framework widely used for communication research to achieve behavioral change by targeting “barriers, benefits, self-efficacy, and threat” (Jones et al., 2015).
The Health Belief Model will be used to guide the research questions of this study. In Figure 1, the individual perceptions such as perceived risk and severity of diabetes are the primary predictors of an individual’s perceived threat of disease. An individual’s perceived threat are the modifying factors. Then, an individual’s perceived threat of diseases influences behavior change that, at last, improve the health outcomes. For this research, improved HbA1c are the health outcomes assessed. Furthermore, the modifying factors show the diabetes causation health beliefs influences a person’s individual perceptions and the likelihood of action. Studies have shown that low self-efficacy predicts the likelihood of engagement in educational programs (Realmuto et al., 2018). The likelihood of action includes perceived beliefs of preventive action minus perceived barriers to preventive action. Thus, it leads to the likelihood of engagement in diabetes programs and self-care behaviors. If an individual engages in self-care behaviors, they are most likely to improve diabetes symptoms such as improved HbA1c and metabolic syndrome indicators.

Figure 1. Health Belief Model Conceptual Framework for Engaging Hispanic/Latino Men
For this study, the blue boxes shown on figure 1 are the main variables of interest due to the fact that the other HBM constructs not available in the parent study. The variables of interest include diabetes causation health beliefs, which includes behavioral, socioenvironmental, fatalistic, psychological, and biological diabetes causation health beliefs. The outcome/dependent variables include the likelihood of engagement in diabetes programs and self-care behaviors, such as practicing healthy behaviors and following doctor recommendations. Lastly, the health outcome includes Hba1c levels.
Chapter 5: Methods

5.1 Study Sample

Data come from a secondary-data source, i.e., Expansion of a Community-Based Diabetes Risk Assessment in Men: Perceived vs. Biological Risk, cross-sectional study funded by the National Institute of Minority and Health Disparities via The University of Texas at El Paso (UTEP) Border Biomedical Center. The goal of the parent study is to examine the role of diabetes related biopsychosocial factors and pro-inflammatory conditions in association with diabetes risk and engagement in diabetes prevention and self-management among Mexican American adult men living in El Paso, Texas.

In 2018, 100 adult men (18 years and older, 81% Hispanic,) were recruited to complete a series of computer-based questionnaires relating to psychosocial life experiences (i.e., chronic stress, depressive symptoms, adverse childhood experiences, self-regulation to stressful events, diabetes risks and causation health beliefs, and intent to engage in healthy lifestyle modification) behaviors. The survey includes up to 40 questions and was made available both in English and Spanish languages. In addition, intravenous blood samples were collected from each participant to assess for metabolic syndrome indicators (i.e., triglycerides, cholesterol, random glucose, HbA1c) and pro-inflammatory molecules linked with diabetes risk factors (e.g., insulin resistance). Blood pressure, weight, height, and waist circumference were also assessed. Participants were recruited from male-targeted events in the community such as car shows/exhibits, and car clubs. Men were also recruited from local diabetes resource organizations, health clinics, and worksites. Men were invited to participate by the research team and through written informational flyers that were made available at local events, organizations,
and health clinics. Each participant received a $10 gas card for completing the series of surveys and an additional $50 for completing the clinical diabetes risk assessment.

The inclusion criteria included adult males over the age of 18. Given the goal of this project, females and children were excluded from participating the study. The consent process involved having participants agree on the computer-based screen and a hard copy was provided to each participant for their files.

5.2 Setting

El Paso, TX is located in the U.S./Mexican border region and has a predominately Mexican American population (82%) (U.S Census Bureau Quick Facts, 2018). The population of El Paso includes native Mexican residents through 5th generation Mexican American residents. It is the sixth largest city in Texas and the 20th largest city in the US with a county population of approximately 839,000 (50.7% female and 51.6% male) (U.S Census Bureau Quick Facts, 2018). El Paso is also adjacent to Juarez, Mexico, which has a population of 1.4 million (Healthy Paso del Norte, 2016). Between 20-30% of the El Paso population live below the federal poverty line and low levels of education are common. In 2013, the per capita income in El Paso, TX was $18,880 and nearly 24% of the population did not graduate from high school (Healthy Paso del Norte, 2018). Although El Paso is a low-income city, a high number of Hispanics in this region are represented across the socioeconomic gradient (Healthy Paso del Norte, 2018).

The state of Texas reports that 16.5% of the El Paso population have diabetes, however, local research indicates that one in four is reported to have diabetes and approximately 25% do not know they have the disease (Department of State and Health Services, 2013). Among the El Paso population 14.8% of males have diabetes in El Paso, Texas (Healthy Paso del Norte, 2018). Data from the Centers for Medicare and Medicaid Services report that 30% of their El Paso
beneficiaries is diagnosed with diabetes (Department of State and Health Services, 2013). Moreover, the diabetes age-adjusted mortality rate in El Paso County, is higher for males (41.2%) compared to females (28.2%), which may be indicative of men’s disengagement in diabetes medical and self-care (Department of State and Health Services, 2013).

5.3 Study Design

This design of the current research is a cross-sectionals study design using secondary data (N=100). The purpose of the current study is to examine the relationship between diabetes causation health beliefs, HbA1c levels, men’s intent to follow healthy lifestyle behaviors, and intent to follow doctor recommendations.

Independent Variables

Diabetes Causation Health Beliefs

Diabetes causation health beliefs were assessed using the Illness Perception Questionnaire-Revised (IPQ-R) (Appendix A) (Moss-Morris et al., 2002). The IPQ-R is an adaptation of the original Illness Perception Questionnaire (IPQ) by Weinman et al. (1996) established from Leventhal’s Self-Regulatory Model (Leventhal et al., 1984, 1997). Leventhal’s Self-Regulatory Model includes items that measure different conditions such as diabetes, cancer, pulmonary diseases, etc. It is primary used to describe how someone’s symptoms and emotions while having a health condition influences their behavior and perception of the health condition (Browning et al., 2009). Weinman et al (1996) developed the IPQ in order to quantify the components from Leventhal’s Self-Regulatory Model (Moss-Morris et al., 2002). The IPQ-R is further developed to improve the IPQ test by adding subcategories.

The IPQ-R consists of three sections, but for the purpose of this research, the causal items section was the focus. This section represents the possible causes for diabetes. It consists of 21
diabetes causal items that can be categorized into behavioral (e.g., smoking, alcohol, behavior, diet/eating habits), socioenvironmental (e.g., environmental pollution, germs/viruses, poor medical care in past, overwork), fatalistic (e.g., chance or bad luck, God’s will, punishment from God), psychological (e.g. Stress/worry, emotional state, family problems/worries) and biological (e.g., aging, altered immunity, heredity) causes (Moss-Morris et al., 2002). The original diabetes causal items consist of 20 items, though, the parent study added “God’s will” as an additional response making it 21 diabetes causal items. Also, the original response categories for each listed cause use a 5-point Likert scale; strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree. However, for reducing participant survey burden, the parent study used a dichotomous response category. For the creation of an index for each category of diabetes causation beliefs the dichotomous response options were coded as “1= strongly agree/agree” and “0 = strongly disagree/disagree=”. A diabetes causation index was created for each health belief category by summing up corresponding IPQ items.

**Biological Diabetes Health Belief Index**

Four IPQ-R items that indicate a biological diabetes causation belief were included in the index. These included questions regarding aging, altered immunity, heredity, and personality. These were combined and put under the biological diabetes health belief index. The biological diabetes causation health belief was created by summing the scores for these three IPQ-R scores. The range for this is 0 to 3. A high index score indicates a higher level of agreement that biological factors cause diabetes compared to a lower score.

**Behavioral Diabetes Health Belief Index**

Four IPQ-R items were specific to behavioral factors as a cause for diabetes. These include behaviors such as smoking, alcohol drinking, behavior overall, and/or diet/eating habits.
A behavioral diabetes causation health belief index was created by adding the scores for each of these items. The range for this index is 0 to 4. A high index score indicates a higher level of agreement that behavioral factors cause diabetes compared to a lower score.

**Psychological Diabetes Health Belief Index**

Four IPQ-R items were specific to psychological diabetes causation health beliefs. These includes behaviors based on stress/worry, emotional state, family problems/worries, and/or mental attitude. A psychological diabetes causation health belief was created by adding the scores for each of these items. The range for this index is 0 to 4. A high index score indicates a higher level of agreement that psychological factors cause diabetes compared to a lower score.

**Socioenvironmental Diabetes Health Belief Index**

Five IPQ-R items were specific to socioenvironmental diabetes causation health beliefs. These behaviors were based on environmental pollution, germs/viruses, poor medical care in past, overwork, and/or accident or injury. A socioenvironmental diabetes causation health belief was created by adding the scores for each of these items. The range for this index is 0 to 5. A high index score indicates a higher level of agreement that socioenvironmental factors cause diabetes compared to a lower score.

**Fatalistic Diabetes Health Belief Index**

Three IPQ-R items were specific to socioenvironmental diabetes causation health beliefs. These behaviors were based on chance or bad luck, God’s will, and/or punishment from God. A fatalistic diabetes causation health belief was created by adding the scores for each of these items. The range for this index is 0 to 3. A high index score indicates a higher level of agreement that socioenvironmental factors cause diabetes compared to lower scores.
Assessment of the IPQ-R involves ranking diabetes causation responses based on the most frequently endorsed diabetes causation. The parent study allowed each participant to endorse multiple diabetes causations. Validity testing for this the IPQ-R demonstrates internal consistency ($\alpha=.67-.86$) (Morris-Moss etc., 2002).

**Dependent Variables**

**Biological Risk-Glycosylated Hemoglobin A1c**

Qualified clinical staff from the parent study obtained 16 ml (1 tablespoon) of blood sample according to the best-practice guidelines set forth by the World Health Organization. According to Malkani & Mordes (2011), testing for HbA1C levels is convenient compared to using glucose testing for diabetes because the blood samples are not affected by any “fasting or timed samples” nor any “dietary changes or activity.” Nonetheless, intravenous blood samples were collected from each participant to assess plasma for metabolic syndrome indicators (i.e., triglycerides, cholesterol, random glucose, HbA1c). This will allow a quantifiable measure associated with risk for diabetes. The Glycosylated Hemoglobin A1C levels (Appendix B) were assessed as a continuous variable. The range for the glucose levels ranged between 4.9-12%.

**Intent to Engage in Healthy Lifestyles Behaviors and Following Doctor Recommendations**

The Risk Perception Survey for Developing Diabetes (RPS-DD) (Appendix C) was used in order to estimate the participant’s intent to engage in healthy lifestyle behaviors and intent to follow doctor recommendations. The parent study used only questions from the section Intention and Motivations to Change Lifestyle by Hivert et al. (2009) in the RPS-DD questionnaire. There were a total of three questions used for the present study. The question that was added in the parent study is a question intended for all men without and with diabetes; 1) Now imagine that your doctor tells you that you are at high chance for developing *complications* due to Diabetes
and advise you to eat a healthier diet, lose weight and increase your physical activity. How likely is that you would do what the doctor suggests? In addition, a question intended for men without diabetes; 2) Now imagine that your doctor tells you that you are at high chance for developing Diabetes and advise you to eat a healthier diet, lose weight and increase your physical activity. How likely is that you would do what the doctor suggests? The last question was intended for men with diabetes; 3) Now imagine that your doctor tells you that you are at high chance for developing complications due to Diabetes and advise you to eat a healthier diet, lose weight and increase your physical activity. How likely is that you would do what the doctor suggests? For each question, the participants were to answer a 4=Currently maintaining a healthy lifestyle, 3= Very likely, 2= Somewhat likely, 1=Not likely at all. These questions were assessed as ordinal variables for statistical analysis. However, there was data missing for the second question intended for men without diabetes, so it was not used for analysis. The only questions used were the first one to measure intent to follow a healthy lifestyle and the third one to measure intent to follow doctor recommendations. All men with and without diabetes were included in both questions. On the 4-point scale, participants that were to answer a 1 or 2 are at less likely to engage compared to a 3 or 4 are considered more likely to engage in healthy behaviors (Hivert, et al., 2009). Validity testing for this the RPS-DD demonstrates high internal reliability with a Cronbach’s alpha = <.80 (Walker et al., 2003).

**Control Variables**

Control variables were used in the study to control for our main independent variable, diabetes health beliefs. For example, diabetes status, health insurance, age, income, and ethnicity can aid in determining the outcome being measured by minimizing the effects of variables other than the independent variables. For instance, diabetes status, health insurance, age, income, and
ethnicity were controlled to estimate their effects on the dependent variable. Then, the variables can be statistically isolated to determine the effect of the variable of interest.

*Diabetes Status*

In order to determine the diabetes status of everyone in the study. The participant’s HbA1c levels were coded as 1=normal (no diabetes), 2=prediabetes (at-risk), and 3=diabetes categories (yes diabetes). Individuals under the no diabetes or normal Glycosylated Hemoglobin A1C levels have 5.7% or lower glucose levels, at risk men had glucose levels between 5.7%-6.4%, and for individuals in the yes diabetes category were based upon their self-reported answers, regardless if their have glucose levels. This was done to prevent overlap in categorizing the men. For example, there were some people that had already reported being diagnosed with diabetes, but their glucose levels would have categorized them under no diabetes because they had normal glucose under 5.7%. The diabetes status of an individuals as a control variable can help determine its effects on glucose levels, intent to engage in healthy lifestyles, and intent to follow doctor recommendations. For example, diabetes status can influence on determining if the participants have high or low glucose levels. It can be predicted those on the yes diabetes category have high glucose levels, thus leading them to participate in healthy behaviors to normalize glucose levels.

*Health Insurance*

This nominal variable was coded as 1=yes and 0=No/Do not know. The ‘No’ and ‘Do not know’ categories were combined due to a small number of responses in those two categories. A small number did not allow for statistical analysis. Health insurance status was also divided between no diabetes, at risk and yes diabetes categories for the purpose of examining the sample characteristics. This variable can help determine its effects on glucose levels, intent to engage in
healthy lifestyles, and intent to follow doctor recommendations. For example, individuals with health insurance could potentially have better glucose levels because they can access to healthcare.

**Age**

This variable was self-reported and used as a continuous variable. The age ranges between 18-70. Increasing age is highly correlated with diabetes, therefore it may influence the association between health beliefs and glucose levels, intent to engage in healthy lifestyles, and intent to follow doctor recommendations. Also, the older an individual is, the more they are willing to follow doctor recommendations, and vice versa. Age was stratified by the diabetes status categories, ‘diabetes’, ‘at risk for diabetes’ and ‘yes diabetes’ for the purpose of describing the sample characteristics.

**Income**

Income was categorized into a nominal variable. The categories were: 1=Less than $10,000, 2=$10,001-$20,000, 3=$20,001-$30,000, 4=$30,001-$40,000, 5=$40,001-$50,000, 6=$50,001-$60,000, 7=$60,001-$80,000, 8=$80,001-$100,000, and 9=more than $100,000. These categories were also stratified by the three diabetes status categories for the purpose of describing the sample characteristics. Income was used as a control variable as it can also influence glucose levels, intent to engage in healthy lifestyles, and intent to follow doctor recommendations. For example, those with a higher income may have more resources to engage and manage glucose levels.

**Education**

Educational attainment was coded as categorical variables. The categories were Elementary/Primary school/ High School/ Preparatory/GED, Trade school/Vocational school,
University/College, and other. These categories were stratified by diabetes status for the purpose of describing the sample characteristics. However, for statistical analysis education was coded as an ordinal variable with increasing values indicating higher levels of education compared to lower values. : 1=Elementary/Primary school/ High School/ Preparatory/GED, 2=Trade school/Vocational school, 3=University/College, and 4=other. Education plays an important role regarding diabetes management and glycemic outcomes, therefore, it was used as a control variable. For example, research has suggested that people with lower education have lower diabetes prevalence compared to individuals of higher education.

5.4 Database Management

The parent’s study data was collected was secured and downloaded to a secured USB drive and transferred to the PI’s secure network system at UTEP. The data was also reviewed for inconsistencies and/or errors and fixed accordingly. Lastly, the data was merged into a single file in preparation for statistical analysis. For the purpose of this study, the data was reviewed to determine the normal distributions for each of the variables of interest and calibrated if needed to conduct the proposed statistical analysis.

5.5 Statistical Analysis

Descriptive statistics was used to describe the characteristics of our data. Apart from describing the controlled variables (i.e. age, education, diabetes status, income, and health insurance), ethnicity, nativity, and age were also included. This was done with a frequency of each variable. They were also separated by diabetes status (i.e. no diabetes, at risk, yes diabetes).

The ranking of diabetes causation health beliefs were ranked based on the most endorsed responses. Separate linear regression for each diabetes causation health belief were performed controlling variables that are typically correlated with the outcomes variables (i.e., age, diabetes
status, income, education, and health insurance). The separate linear regressions were exploratory and conducted to determine how each diabetes causation is exclusively associated with the outcome variables (i.e. HbA1c, intent to engage in health behaviors, and intent to follow doctor recommendations). Lastly, a multiple linear regression including all diabetes causation health beliefs was conducted to examine the association collectively on the outcomes variables. Due to a small sample size the number of variables that would be included, results may not be valid.

In table 3-5, models 1-5, a linear regression was performed to examine the association between each of the diabetes causation health beliefs separately (i.e. biological, behavioral, psychological, socioenvironmental, fatalistic) and the controlled variables (i.e. income, age, diabetes status, income, education) to each glucose levels (HbA1c), intent to follow healthy lifestyles, and intent to follow doctor recommendations. A linear regression was used to find the relationship between a continuous dependent variable and one or more independent variables. It predicts the value of one variable based on the value of another variable. It allows for simple analysis and understanding of the variables. However, linear regression assumes a straight-linear relationship between the variables. This statistical analysis helps analyze each of the diabetes causation health beliefs as exploratory analysis.

In table 3-5, models 6, a multiple linear regression was performed to examine the association between each of the diabetes causation health beliefs collectively (i.e. biological, behavioral, psychological, socioenvironmental, fatalistic) and the controlled variables (i.e. income, age, diabetes status, income, education) to each glucose levels (HbA1c), intent to follow healthy lifestyles, and intent to follow doctor recommendations separately. A multiple linear regression was used to find the relationship between two or more independent variables and one
dependent variable. A multiple linear regression allows analysis between the relationship of multiple variables in the same frameworks, as well as control for important confounding variables. However, potential limitations are it also assumes a straight-linear relationship between the variables.

A significance level of p < .05 were used for all statistical analysis. The secondary data will be analyzed using SPSS software 26.

5.6 IRB Approval

The secondary data analysis, Asses the Relationship Between Diabetes Causation Beliefs, Diabetes Risk, and Intent to Engage in Healthy Lifestyles Among Mexican American Men, was submitted to The University of Texas at El Paso International Review Board (IRB) for Exemption consideration. IRB [1670686-1].
Chapter 6: Results

6.1 Sample Characteristics by Diabetes Status

The sample characteristics on Table 1. show that from the total participants, 50 men are categorized as not having diabetes, 33 men were categorized as at risk for diabetes, and 17 men were categorized as having diabetes. The average age for our sample size is 44.98 (SD=13.974) and the majority indicated (82%) a Hispanic ethnicity.

The highest educational attainment is 39% for university or college. More than half of the participants make $40,000 dollars a year or less. The highest endorsed income is $10,000-$20,000 with 19% of the total sample.

6.2 Illness Perception Questionnaire (IPQ-R): Causes of my Diabetes Ranking

Table 2. shows the results of the most endorsed diabetes causation beliefs ranking. Among both individuals with diabetes and without diabetes, behavioral causation belief was the most endorsed, meaning smoking, alcohol, my own behavior and diet or eating habits are believed to be the most causes of diabetes. In sequence, among men with diabetes the next most endorsed diabetes causation health belief are psychological, biological, socioenvironmental, and fatalistic. In sequence, among men without diabetes, the following most endorsed diabetes causation health beliefs are biological, psychological, socioenvironmental and fatalistic.

6.3 Models of Diabetes Causation Health Beliefs on HbA1c

Model 1:

The linear regression revealed that behavioral diabetes causation health belief, diabetes status, age, income, education, and health insurance were statistically significant in predicting HbA1c levels at the p < .05 criterion. The independent variables contributed to 23 percent in shared variability (R²=.232, p=.001). This higher the index for behavioral diabetes causation
health beliefs, the lower the HbA1c levels. However, the variables contributing most to this association includes diabetes status ($\beta=.595, \text{p-value}=0.002$), education ($\beta=-.407, \text{p-value}=0.003$), age ($\beta=-.021, \text{p-value}=0.046$), and health insurance ($\beta=-.682, \text{p-value}=0.045$) ($* = \text{p < .05}$).

$$HbA1c = 8.631 + .595 \text{(diabetes status)}* + -.021 \text{(age)}* + -.042 \text{(income)} + -.407 \text{(education)}* + -.682 \text{(health insurance)}*$$

**Model 2:**

The linear regression revealed that biological diabetes causation health belief, diabetes status, age, income, education, and health insurance was statistically significant in predicting HbA1c levels at the p < .05 criterion. The independent variables contributed to 21 percent in shared variability ($R^2=.212, \text{p}=0.002$). The higher the index for biological diabetes causation health beliefs, the lower the HbA1c. However, the variables contributing most to this association includes diabetes status ($\beta=.579, \text{p-value}=0.002$) and education ($\beta=-.393, \text{p-value}=0.005$) ($* = \text{p < .05}$).

$$HbA1c = 8.274 + .579 \text{(diabetes status)}* + -.020 \text{(age)} + -.048 \text{(income)} + -.393 \text{(education)}* + -.640 \text{(health insurance)}$$

**Model 3:**

The linear regression revealed that psychological diabetes causation health belief, diabetes status, age, income, education, and health insurance was statistically significant in predicting HbA1c levels at the p < .05 criterion. The independent variables contributed to 23 percent in shared variability ($R^2=.232, \text{p}=0.001$). The higher the index for psychological diabetes causation health belief, the lower the HbA1c. However, the variables contributing most to this association includes diabetes status ($\beta=.588, \text{p-value}=0.002$), age ($\beta=-.021, \text{p-value}=0.047$), health insurance ($\beta=-.722, \text{p-value}=0.036$) and education ($\beta=-.408, \text{p-value}=0.003$) ($* = \text{p < .05}$).
HbA1c = 8.535 + .588 (diabetes status)* + -.021 (age)* + -.047 (income) + -.408
(education)* + -.722 (health insurance)*

Model 4:

The linear regression revealed that socioenvironmental diabetes causation health belief, diabetes status, age, income, education, and health insurance was statistically significant in predicting HbA1c levels at the p < .05 criterion. The independent variables contributed to 21 percent in shared variability (R² = .214, p = .002). The higher the index for socioenvironmental diabetes causation health beliefs, the lower the HbA1c levels. However, the variables contributing most to this association includes diabetes status (β = .560, p-value = .004) and education (β = -.401, p-value = .004) (* = p < .05).

HbA1c = 8.406 + .560 (diabetes status)* + -.021 (age) + -.054 (income) + -.401
(education)* + -.645 (health insurance)

Model 5:

The linear regression revealed that fatalistic diabetes causation health belief, diabetes status, age, income, education, and health insurance was statistically significant in predicting HbA1c levels at the p < .05 criterion. The independent variables contributed to 22 percent in shared variability (R² = .221, p = .001). The higher the index for fatalistic diabetes causation health belief, the lower the HbA1c. However, the variables contributing most to this association includes diabetes status (β = .550, p-value = .004), age (β = -.022, p-value = .037) and education (β = -.407, p-value = .004) (* = p < .05).

HbA1c = 8.406 + .550 (diabetes status)* + -.022 (age)* + -.053 (income) + -.407
(education)* + -.605 (health insurance)
Model 6:

The linear regression collectively revealed that fatalistic, psychological, socioenvironmental, behavioral, biological diabetes causation health belief, diabetes status, age, income, education, and health insurance was statistically significant in predicting HbA1c levels at the p < .05 criterion. The independent variables contributed to 24 percent in shared variability (R² = .246, p = .007). However, the variables contributing most to this association includes diabetes status (β = .614, p-value = .003), health insurance (β = -.744, p-value = .039) and education (β = -.412, p-value = .004) (* = p < .05).

\[
\text{HbA1c} = 8.545 + .614 (\text{diabetes status}) + -.021 (\text{age}) + -.040 (\text{income}) + -.412 (\text{education}) + -.744 (\text{health insurance})
\]

6.4 Models of Diabetes Causation on Intent to Engage in Healthy Lifestyles

Model 1:

The linear regression revealed that behavioral diabetes causation health belief, diabetes status, age, income, education, and health insurance was statistically significant in predicting intent to engage in health lifestyles at the p < .05 criterion. The independent variables contributed to 15 percent in shared variability (R² = .153, p = .024). The lower the index for behavioral diabetes causation health beliefs, the higher the men’s intent to engage in healthy lifestyles. However, the variables contributing most to this association includes age (β = .014, p-value = .011) and health insurance (β = -.503, p-value = .005) (* = p < .05).

\[
\text{Intent to engage in health lifestyles} = 2.762 + -.091 (\text{diabetes status}) + .014 (\text{age}) + -.029 (\text{income}) + .056 (\text{education}) + -.053 (\text{health insurance})
\]
**Model 2:**

The linear regression revealed that *biological diabetes causation health belief, diabetes status, age, income, education, and health insurance* was statistically significant in predicting intent to engage in health lifestyles at the p < .05 criterion. The independent variables contributed to 15 percent in shared variability ($R^2 = .152, p = .025$). The higher the index for biological diabetes causation health beliefs, the higher the men’s intent to engage in healthy lifestyles. However, the variables contributing most to this association includes *age* ($\beta = .014, p\text{-value} = .010$) and *health insurance* ($\beta = -.505, p\text{-value} = .005$) (* = p < .05).

$$\text{Intent to engage in health lifestyles} = 2.686 + -.093 \, (\text{diabetes status}) + .014 \, (\text{age})^* + -.030 \, (\text{income}) + .058 \, (\text{education}) + -.505 \, (\text{health insurance})^*$$

**Model 3:**

The linear regression revealed that *psychological diabetes causation health belief, diabetes status, age, income, education, and health insurance* was statistically significant in predicting intent to engage in health lifestyles at the p < .05 criterion. The independent variables contributed to 15 percent in shared variability ($R^2 = .157, p = .020$). The higher the index for psychological diabetes causation health beliefs, the higher the men’s intent to engage in healthy lifestyles. However, the variables contributing most to this association includes *age* ($\beta = .014, p\text{-value} = .010$) and *health insurance* ($\beta = -.478, p\text{-value} = .007$) (* = p < .05).

$$\text{Intent to engage in health lifestyles} = 2.634 + -.096 \, (\text{diabetes status}) + .014 \, (\text{age})^* + -.030 \, (\text{income}) + .062 \, (\text{education}) + -.478 \, (\text{health insurance})^*$$

**Model 4:**

The linear regression revealed that *socioenvironmental diabetes causation health belief, diabetes status, age, income, education, and health insurance* was statistically significant in
predicting intent to engage in health lifestyles at the p < .05 criterion. The independent variables contributed to 18 percent in shared variability (R² = .183, p = .007). The higher the index for socioenvironmental diabetes causation health beliefs the higher the men’s intent to engage in health lifestyles. However, the variables contributing most to this association includes age (β = .015, p-value = .005) and health insurance (β = -.500, p-value = .004) (* = p < .05).

Intent to engage in health lifestyles = 2.364 + -.051 (diabetes status) + .015 (age)* + -.018 (income) + .075 (education) + -.500 (health insurance)*

**Model 5:**

The linear regression revealed that fatalistic diabetes causation health belief, diabetes status, age, income, education, and health insurance was statistically significant in predicting intent to engage in health lifestyles at the p < .05 criterion. The independent variables contributed to 15 percent in shared variability (R² = .156, p = .021). The higher the index fir fatalistic diabetes causation health beliefs, the higher the men’s intent to engage in healthy lifestyles. However, the variables contributing most to this association includes age (β = .015, p-value = .008) and health insurance (β = -.513, p-value = .004) (* = p < .05).

Intent to engage in health lifestyles = 2.634 + -.083 (diabetes status) + .015 (age)* + -.028 (income) + .062 (education) + -.513 (health insurance)*

**Model 6:**

The linear regression revealed that fatalistic, psychological, behavioral, socioenvironmental, biological diabetes causation health belief, diabetes status, age, income, education, and health insurance was statistically significant in predicting intent to engage in health lifestyles at the p < .05 criterion. The independent variables contributed to 19 percent in shared variability (R² = .194, p = .047). However, the variables contributing most to this
association includes age ($\beta = .015$, p-value=.006) and health insurance ($\beta = -.518$, p-value=.005) (* = p < .05).

Intent to engage in health lifestyles = $2.433 + -.032 \times$ (diabetes status) + .015 (age)* + -.011 (income) + .075 (education) + -.518 (health insurance)*

6.5 Models of Diabetes Causation on Intent to Follow Doctor Recommendations

Results of the linear regression did not significantly associate to intent to follow doctor recommendations and fatalistic, behavioral, psychological, biological, socioenvironmental diabetes causation health belief. However, income was statistically significant in every model at the p<.05 criterion (Model 1: $\beta = -.053$, p-value=.017, Model 2: $\beta = -.056$, p-value=.012, Model 3: $\beta = -.053$, p-value=.017, Model 4: $\beta = -.053$, p-value=.020, Model 5: $\beta = -.050$, p-value=.022, Model 6: $\beta = -.048$, p-value=.040).
Chapter 7: Discussion

7.1 Conclusions

Among a sample of men living in El Paso, TX, men reported that they believed in several diabetes causations and not just one cause (i.e., behavioral, psychological, biological, socioenvironmental, and fatalistic). However, the most endorsed diabetes causation health belief ranking by both men with and without diabetes was behavioral diabetes causation health beliefs, followed by psychological for men with diabetes and biological diabetes causation health beliefs for men without diabetes. The last two endorsed causation beliefs for both men with and without diabetes were socioenvironmental and fatalistic causes.

While this research found that each diabetes causation health belief was associated with HbA1c and men’s intent to engage in a healthy lifestyle when given a hypothetical of having diabetes or having diabetes related complications, the models for each health belief and outcomes explained less than 30% of the predicted outcomes. The low $R^2$ and statistically significant p-values may suggest the possibility of type 1 error or false-positive. The models examining the relationship between diabetes causation health beliefs and HbA1c, show that men’s diabetes status (i.e., having diabetes vs. not having diabetes) and education level, along with diabetes causation beliefs, may play an important role in glycemic management. The models examining the relationship between diabetes causation health beliefs and intent to engage in a healthy lifestyle, show that age and health insurance, along with diabetes causation beliefs, may play a role in preventive health behaviors. These findings show that diabetes is a disease that involves many factors at play when it comes to preventing and managing the condition. One important factor is men’s diabetes status, as men who have the disease may have a better understanding of the condition, therefore, reporting slightly different diabase causation beliefs
compared to men without diabetes. This research may not have been able to adequately capture these complexities.

The HBM suggest that health beliefs play an important role in the perceived susceptibility, severity, and threat of a disease, in turn, influencing a person’s engagement in health behaviors and health outcomes. While this research was unable to examine how perceived susceptibility, severity, and threat, play a role in men’s intent to engage in a healthy lifestyle or HbA1c levels, understanding specific beliefs such as diabetes causation can give a better understanding how these factors contribute to positive health. Not much research has examined how non-modifiable beliefs like biological causes (age, heredity, personality, altered immunity) or fatalistic beliefs (luck, god’s will) influence behavior. As suggested, if someone feels there is nothing that can be done to prevent the disease, they may be less likely to make efforts to make behavioral changes. On the contrary, if someone believes that behaviors cause diabetes (modifiable), then they may be more willing to make behavior changes to prevent or manage the disease.

More interestingly, are cultural health beliefs. Specifically, the belief that emotions cause diabetes, which is common within Latin American cultures. This research, in fact showed that men do believe that psychological factors (stress/worry, emotions, family worries, mental attitudes) can cause diabetes. Men with diabetes endorsed psychological causes more frequently than men without diabetes. However, men without diabetes also recognized psychological factors as a cause. This is important because diabetes management programs often put less emphasis on psychological factors and mainly emphasize behavioral management. If a group of people, as discussed by (Daniulaityte) 2004 have a specific cultural belief it is important to incorporate such beliefs in discussions about diabetes management. Both Daniulaityte (2004) and
Concha (2016) suggest that cultural beliefs also influence how people engage with their disease. Daniulaityte (2004) states that shared beliefs between groups may promote more self-actualization leading people to accept their condition and take action. Whereas, if a group feels their beliefs are not in alignment with the majority they may feel less self-actualized and less willing to engage in taking action to manage their condition.

Concha (20016), suggest that focusing on emotional states as a first step in diabetes management may improve a person’s psychological state or motivation to engage in diabetes management. For example, if someone is depressed or stressed, they may have less motivation to engage in health supporting behaviors. Concha (2016) also suggest that the cultural belief that stress causes diabetes may be less self-depreciating because the cause of diabetes is not internal to one’s personal being, like biological causes. For ethnic minority groups in the U.S., who are often perceived as ‘less than’ groups, the idea that the person themselves is the cause of their disease may lead to a self-depreciating belief that may lead to non-acceptance or avoidance coping. This may then lead to non-engagement in behavioral management of the disease.

Incorporating cultural health beliefs like the diabetes causation belief that strong negative emotions cause diabetes in diabetes management program may be able to reframe how to engage in diabetes management behaviors. For example, if a group believes stress causes diabetes, this can be the starting point on where to engage patients in their diabetes management.

This research did not examine the multifaceted and complex relationship between cultural health beliefs, diabetes perceptions, diabetes management/prevention behaviors, or all diabetes related outcomes but is one of few studies to examine specific diabetes causation health beliefs, intent to engage in health behaviors, and HbA1c among a predominant sample of Hispanic men.
7.2 Strengths

The strengths for this study include having a strong Mexican American sample size from the parent study. Diabetes status in this group was similar to the U.S rates. This thesis study found 50% of the total participants do not have diabetes, 33% are at risk, and 17% have diabetes. Schneiderman et al (2014) had similar outcomes for their participants with 18.3% of Mexican Americans having diabetes.

There were a total of 100 men that contributed to understand health disparities among men. Research with this sample contributes to literature in terms of representation a more diverse sample of Mexican American men and diabetes. Mexican American men are an underrepresented population in literature. Additionally, this population is also a representation of El Paso, Texas, a predominantly Hispanic ethnic population in the US-Mexico border.

The collection of Glycosylated Hemoglobin A1c (HbA1c) levels to determine the biological risk of type 2 diabetes is a clinically appropriate measure which is used for diabetes diagnosis. Having this clinical measure as an indicator of diabetes risk is a strength for this study.

7.3 Limitations

The sample size of this study was large compared to other studies on men, however, certain categories, such as education, did not have a sample size large enough without having to be combined with other categories to meet the minimum requirement for statistical analysis. For example, under education category, Elementary Primary School, High School, Preparatory, and GED were combined into one to meet minimum 5 participants per column (Table 1.) Thus, certain characteristics were not fully represented in this study. In addition, a convenient sample is a limitation due to its inability to selectively randomize the participants, thus increasing sampling
bias. A convenient sample also limits the studies ability to generalize to everyone, which increases the possibility of under or over representing the population as a whole. Also, the sample size is based on a city in the US-Mexico borderland region, El Paso, Texas. The population shows unique characteristics such as being predominantly Hispanic and Spanish-speaking, thus not generalizable to non-border cities in the U.S..

Also, self-reported questions can lead to response bias. For example, giving answers to questions that are not understood, the participant does not want to share, or they feel it is not the answer the investigators are looking for.

Furthermore, the sample characteristics do not match the characteristics of Hispanics overall. For example, among the national Hispanic population only 41.5% of the population have health insurance in El Paso. However, in this study 82% of the participants have health insurance. Additionally, the percentage of people with a High school/Primary school/High school/Preparatory or GED education is 26% and for a University/College degree is 39%. In El Paso, Texas the percentage of people with a High school diploma or higher (but lower than a bachelor’s degree) is 78% and for University/College degree is 23%. The difference between these statistics could also have a bias impact between the association of main independent and dependent variables because it is not a representation of our study.

**7.4 Future Directions**

Future research should establish, a large randomized sample size consisting of border regions and non-border regions that can generalize the Hispanic/population to further understand diabetes causation health beliefs. A larger sample will allow for better generalizability of similar characteristics of El Paso, Texas and the U.S.
Additionally, future research should examine how diabetes causation health beliefs differ across Mexican American men and women, and how acculturation influences health beliefs by studying acculturation processes. This research and research by Danuilatey (2004), reveals that more work should be done to understand how beliefs about socioenvironmental factors (i.e. modernization) impact psychological health and how they play a role in diabetes prevention and management behaviors. For example, addressing stress and worry can help build a stronger relationship between health care providers and patients, as it may be perceived by the patient that the provide is interested in their psychological well-being.

Policy makers that build strategic frameworks at the national and local level such as the Healthy Border 2020, Healthy People 2030, and Regional Strategic Health Framework 2012, should add objectives and policies that emphasize and prioritize cultural competency training in medical education. Currently, there are trainings that involve asking patients about their diabetes health beliefs, but their trainings are not mandated and often not required as part of the medical education curriculum. Funding for culturally tailored programs that take a holistic approach to included psychological factors may be more attended by Hispanics and Hispanic men. Part of the objectives of the aforementioned strategic frameworks, are to increase diabetes knowledge, reduce diabetes prevalence and mortality rates, increases free screenings for preventative diseases (such as diabetes) amongst others, however, with the right funding and policies, these objectives are attainable. Additionally, among health care providers and curriculums in medical school, culturally competent courses that will help address cultural barriers to optimal health should be made a priority.
Chapter 8: Strategic Framework

8.1 Healthy People 2030

Healthy people 2030 aims to improve the health of Americans by using 10-year national objectives. The objectives include lowering mortality rates and improving quality of life in different diseases, conditions and behaviors. Diabetes-related objectives in relation to this study include:

1. D-14 Increase the proportion of persons with diagnosed diabetes who receive formal diabetes education
2. D-16 Increase prevention behaviors in person at high risk for diabetes with prediabetes
   a. D-16.1 Increase the proportion of persons at high risk for diabetes with prediabetes who report increasing their levels of physical activity
   b. D-16.2 Increase the proportion of persons at high risk for diabetes with prediabetes who report trying to lose weight
   c. D-16.3 Increase the proportion of persons at high risk for diabetes with prediabetes who report reducing the amount of fat or calories in their diet

Even though these objectives are related to diabetes, include improving diabetes education, and increasing the prevention behaviors of individuals at risk, there could be improvements that could be added or modified. For example, objectives could specifically target improving diabetes education among underrepresented minorities. Also, increasing the amount of intervention and educational programs for people at risk of diabetes to increase diabetes knowledge. Objectives can be improved by using evidence-based research.
8.2 Healthy Border 2020

The Healthy Border 2020 objectives aim to improve the U.S-Mexico border health and quality of life. The goals and objectives of this binational initiative focus on public health issues. The area covered includes Texas, New Mexico, Arizona, and California from the U.S. From Mexico, Tamaulipas, Nuevo Leon, Coahuila, Chihuahua, Sonora, and Baja California. The objectives for diabetes aim to improve screening, have patients receive treatment, reduce the number of adults with diabetes, reduce death rates, and reduce hospitalizations. These objectives are broad, and they do not aim to increase diabetes educational programs and knowledge. For future objectives, increasing education programs, increasing diabetes knowledge, health care costs, and people who seek care after being diagnosed should be part of the goals for the Healthy Border 2020 initiative.

8.3 Paso del Norte Regional Strategic Health Framework 2012

The Paso del Norte Health Foundation and the City of El Paso Department of Public Health partner in order to improve the health in El Paso, Texas, Las Cruces, New Mexico, and Juarez, Chihuahua, Mexico. There are goals and objectives implemented in order to target areas of priority. One of the main areas of priority includes targeting Obesity/Diabetes/Fitness/Nutrition. Under diabetes the objectives include:

1. Objective 5.4 Increase access to evidence-based clinical preventive health care services in the Paso del Norte Region
   a. 5.4.1: Identify preventive health care services available at no or low cost to highest risk populations in the Paso del Norte Region
   b. 5.4.3: Develop effective communication and coordination of preventive care to ensure patient receives seamless best quality of care at lowest cost
These objectives serve to improve health care access and quality for individuals living in the region. In order to improve these objectives, they could also target increasing the number of education programs for individuals at risk in the region.
Chapter 9: MPH Core Competencies

9.1 Evidence-Based Approaches to Public Health

1. Apply epidemiological methods to the breadth of settings and situations in public health practice
2. Select quantitative and qualitative data collection methods appropriate for a given public health context
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
4. Interpret results of data analysis for public health research, policy or practice

9.2 Hispanic/Border Health Concentration Competencies

1. State the principles of prevention and control of disease and discuss how these can be modified to accommodate cultural values and practices in Hispanic and border communities.
2. Differentiate quantitative health indicators in major communicable and non-communicable diseases in US/Mexico border vs non-border communities.
References


Centers for Disease Control and Prevention (CDC) (2020-e). Type 2 Diabetes. From https://www.cdc.gov/diabetes/basics/type2.html


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*Morbidity and mortality weekly report, 64*(17), 469–478.


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## Table 1. Sample Characteristics by Diabetes Status (N=100)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total (N=100)</th>
<th>No Diabetes (A1c &lt;5.7%) (n=50)</th>
<th>At Risk (A1c 5.7% - 6.4%) (n=33)</th>
<th>Diabetes (Self-Report) (n=17)</th>
</tr>
</thead>
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<td><strong>Age</strong></td>
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<td>45.21 (SD=13.319)</td>
<td>57.24 (SD=6.676)</td>
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<tr>
<td>Elementary/PrimarySchool/HighSchool/Preparatory/GED</td>
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<td>12 (48%)</td>
<td>11 (44%)</td>
<td>3 (8%)</td>
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<td>Trade School/Vocational</td>
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<td>13 (48.1%)</td>
<td>9 (33.3%)</td>
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<td>University/College</td>
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<td>21 (53.8%)</td>
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<td>9 (23.1%)</td>
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<td>Hispanic/Latino</td>
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<td>42 (51.2%)</td>
<td>25 (30.5%)</td>
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<tr>
<td>Black or African-American/More than one race</td>
<td>7 (7%)</td>
<td>4 (57.1%)</td>
<td>2 (28.6%)</td>
<td>1 (14.3%)</td>
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<td>White</td>
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<td>4 (44.4%)</td>
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<tr>
<td><strong>Nativity</strong></td>
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<td>US Born</td>
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<td>Foreign Born</td>
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<td>16 (48.5%)</td>
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<td><strong>Health Insurance</strong></td>
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<td>Count (%)</td>
<td>Count (%)</td>
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<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
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<td>Less than $10,000</td>
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<td>5 (55.6%)</td>
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<td>$50,001-$60,000</td>
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<td>5 (62.5%)</td>
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<td>More than $100,000</td>
<td>8 (8%)</td>
<td>7 (87.5%)</td>
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Table 2. Illness Perception Questionnaire (IPQ-R): Causes of my Diabetes Ranking

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<th>Possible Causes by Category</th>
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<th>Possible Causes by Category</th>
<th>No Diabetes Ranking (n=81)</th>
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<tr>
<td>• Smoking</td>
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<td>• Smoking</td>
<td>142</td>
</tr>
<tr>
<td>• Alcohol</td>
<td></td>
<td>• Alcohol</td>
<td></td>
</tr>
<tr>
<td>• My own behavior</td>
<td></td>
<td>• My own behavior</td>
<td></td>
</tr>
<tr>
<td>• Diet or eating habits</td>
<td></td>
<td>• Diet or eating habits</td>
<td></td>
</tr>
<tr>
<td>Psychological</td>
<td></td>
<td>Biological</td>
<td></td>
</tr>
<tr>
<td>• Stress/worry</td>
<td>20</td>
<td>• Aging</td>
<td>99</td>
</tr>
<tr>
<td>• My emotional state (e.g. feeling down, anxious, empty)</td>
<td></td>
<td>• Altered immunity</td>
<td></td>
</tr>
<tr>
<td>• Family problems or worries</td>
<td></td>
<td>• Hereditary-it runs in the family</td>
<td></td>
</tr>
<tr>
<td>• My mental attitude (e.g. thinking about life negatively)</td>
<td>20</td>
<td>• My personality</td>
<td></td>
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<tr>
<td>Biological</td>
<td></td>
<td>Psychological</td>
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<tr>
<td>• Aging</td>
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<td>• Stress/worry</td>
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<td>• Altered immunity</td>
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<td>• Hereditary-it runs in the family</td>
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<td>• Family problems or worries</td>
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<tr>
<td>• My personality</td>
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<td>• My mental attitude (e.g. thinking about life negatively)</td>
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<tr>
<td>Socioenvironmental</td>
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<td>• Pollution in the environment</td>
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<td>• Pollution in the environment</td>
<td>56</td>
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<tr>
<td>• A germ or virus</td>
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<td>• A germ or virus</td>
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<tr>
<td>• Poor medical care in my past</td>
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<td>• Poor medical care in my past</td>
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<tr>
<td>• Overwork</td>
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<td>• Overwork</td>
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<td>• Accident or injury</td>
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<td>• Chance or bad luck</td>
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<tr>
<td>• God's will</td>
<td></td>
<td>• God's will</td>
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<td>• Punishment from God</td>
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Table 3. Models of Diabetes Causation Health Beliefs on HbA1c

Table 3. Models of Diabetes Causation Beliefs on Men’s HbA1c

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<tr>
<th></th>
<th>Model* (1)</th>
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<td>.232</td>
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p-value < .05 = *
p-value < .001 = **
Table 4. Models of Diabetes Causation on Intent to Engage in Healthy Lifestyles

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p-value < .05 = *
p-value < .001 = **
Table 5. Models of Diabetes Causation on Intent to Follow Doctor Recommendations

Table 5. Models of Diabetes Causation Beliefs on Men’s Intent to follow their Doctor Recommendation

<table>
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<th></th>
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<th>Model (3)</th>
<th>Model (4)</th>
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<td>.250*</td>
</tr>
<tr>
<td>Diabetes Status</td>
<td>-.058</td>
<td>-.056</td>
<td>-.057</td>
<td>-.057</td>
<td>-.036</td>
<td>-.019</td>
</tr>
<tr>
<td>Age</td>
<td>.001</td>
<td>.002</td>
<td>.001</td>
<td>.001</td>
<td>.003</td>
<td>.004</td>
</tr>
<tr>
<td>Income</td>
<td>-.053*</td>
<td>-.056*</td>
<td>-.053*</td>
<td>-.053*</td>
<td>-.050*</td>
<td>-.048*</td>
</tr>
<tr>
<td>Education</td>
<td>-.019</td>
<td>-.020</td>
<td>-.022</td>
<td>-.019</td>
<td>-.009</td>
<td>-.012</td>
</tr>
<tr>
<td>Health Insurance</td>
<td>-.067</td>
<td>-.090</td>
<td>-.083</td>
<td>-.067</td>
<td>-.100</td>
<td>-.161</td>
</tr>
<tr>
<td>(R^2)</td>
<td>.074</td>
<td>.088</td>
<td>.080</td>
<td>.074</td>
<td>.115</td>
<td>.147</td>
</tr>
<tr>
<td>N</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
</tr>
</tbody>
</table>

p-value < .05 = *
p-value < .001 = **
Appendices

Appendix A. Illness Perception Questionnaire (IPQ-R): Causes of my Diabetes

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Strongly agree/agree (1 point)</th>
<th>Strongly disagree/disagree (2 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress or worry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hereditary—it runs in the family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A germ or virus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diet or eating habits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chance or bad luck</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor medical care in my past</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overwork</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pollution in the environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gods will</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My own behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My mental attitude (e.g. thinking about life negatively)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family problems or worries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My emotional state (e.g. feeling down, anxious, empty)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accident or injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My personality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Altered immunity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Punishment from God</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Original IPQ-R consisted of 5-point Likert-type scale with a neutral category (strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree.)
### Appendix B. Biological Risk - Glycosylated Hemoglobin A1C

<table>
<thead>
<tr>
<th>Biological Risk - Glycosylated Hemoglobin A1C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal+ below 5.7%</td>
</tr>
<tr>
<td>Prediabetes 5.7-6.4%</td>
</tr>
<tr>
<td>Diabetes 6.5%</td>
</tr>
</tbody>
</table>
## Appendix C. Diabetes Risk Perception Survey: Intent to Adopt a Healthy Lifestyle

### Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Point Determinant</th>
<th>Write Score in the Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (all men) In the coming year, what is the likelihood that you will</td>
<td>4=Currently maintaining a healthy lifestyle</td>
<td></td>
</tr>
<tr>
<td>change your lifestyle to adopt a healthier diet and increase physical</td>
<td>3= Very likely</td>
<td></td>
</tr>
<tr>
<td>activity?</td>
<td>2= Somewhat likely</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=Not likely at all</td>
<td></td>
</tr>
<tr>
<td>2. (men without diabetes) Now imagine that your doctor tells you that</td>
<td>4=Currently maintaining a healthy lifestyle</td>
<td></td>
</tr>
<tr>
<td>you are at high chance for developing Diabetes and advise you to eat a</td>
<td>3= Very likely</td>
<td></td>
</tr>
<tr>
<td>healthier diet, lose weight and increase your physical activity. How</td>
<td>2= Somewhat likely</td>
<td></td>
</tr>
<tr>
<td>likely is that you would do what the doctor suggests?</td>
<td>1=Not likely at all</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. (men with diabetes) Now imagine that your doctor tells you that you</td>
<td>4=Currently maintaining a healthy lifestyle</td>
<td></td>
</tr>
<tr>
<td>are at high chance for developing complications due to Diabetes and</td>
<td>3= Very likely</td>
<td></td>
</tr>
<tr>
<td>advise you to eat a healthier diet, lose weight and increase your</td>
<td>2= Somewhat likely</td>
<td></td>
</tr>
<tr>
<td>physical activity. How likely is that you would do what the doctor</td>
<td>1=Not likely at all</td>
<td></td>
</tr>
<tr>
<td>suggests?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>1 or 2= High risk</strong></td>
<td><strong>3 or 4= Low risk</strong></td>
</tr>
</tbody>
</table>
Vita

Brisa Evet Rodriguez Alcantar has a bachelor’s degree in Kinesiology from Our Lady of the Lake University (OLLU). As an undergraduate student researcher in the Ronald E. McNair Postbaccalaureate Achievement Program, she had the opportunity to do research in eating behaviors, physical activity and mental health among first-year college students “The Infamous Freshman 15”.

In 2017, she conducted research in Managua, Nicaragua after being accepted into the Minority Health and Health Disparities International Research Training (MHIRT) from Christian Brothers University. Her research “Combating Chronic Diseases by Analyzing Behavior Change” studied cultural barriers and the relationship to obesity, hypertension, and diabetes.

Since her graduate studies in 2018, she has been a research assistant for the Healthy Mind, Healthy Life program at The University of Texas at El Paso (UTEP). Her work primarily focused on mental health, substance use disorders, co-occurring disorders, HIV, and Hepatitis C. Furthermore, in Summer 2020, she participated as a practicum student for The Diabetes Garage, a diabetes management program for men. Currently, she works as the Outreach Program Coordinator for The Diabetes Garage.

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This thesis was typed by Brisa E. Rodriguez A.