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Diabetes Education for the Hispanic Population

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ABSTRACT

The purpose of this study is to investigate the effects, if any, of utilizing Spanish language on the efficacy of an education program for type 2 diabetes among the Hispanic population in the twin-cities Minneapolis/St. Paul metro area. In the United States adult Hispanics over the age of twenty have a 5.2% higher incidence of type 2 diabetes than Non-Hispanic Whites, a number that keeps rising despite preventability. In this study, a diabetes education program was delivered in Spanish based on material developed by the Centers for Disease Control and Prevention and the National Diabetes Education Program. The program focused on diabetes disease basics and complications along with healthier lifestyle modification suggestions. It was presented at Incarnation/Sagrado Corazon de Jesus Catholic Church in Minneapolis, Minnesota. Study participants completed a pre-test and a post-test to assess how much they understood and retained from the diabetes educational program. There were 18 participants in this study. The data analysis yielded a mean difference between the pre and post-test of 3.14 ($p<0.05$). All questions were answered correctly at least 78% of the time in the post-test, compared to the pre-test where only 2 questions were answered correctly 78% of the time. Over 80% of the participants indicated they were going to make at least one of the suggested lifestyle modifications. While limited by a small population size, this study shows statistically significant improvement in knowledge of type 2 diabetes following a Spanish language delivered education program.

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Chapter 1: Introduction

Background

The Centers for Disease Control and Prevention (CDC) defines diabetes mellitus as, "a group of diseases marked by high levels of blood glucose resulting from problems in how insulin is produced, how insulin works, or both" (CDC, 2014, p. 9). Varying types of the disease are based on medication requirements and time of onset. All types carry a risk of common complications that can lead to life-altering conditions and even death. Since the types of diabetes vary greatly, an understanding of the differing types of diabetes aids in the proper diagnosis, tailoring of appropriate treatment plans, and guidance of relevant patient education materials most applicable for each individual patient.

Prediabetes is a term utilized to describe individuals who have higher than normal levels of blood glucose, but the blood glucose is not elevated enough to be classified as diabetes. These people have a high risk of developing diabetes unless lifestyle modifications are implemented (CDC, 2014).

Type 1 diabetes mellitus (DM1) is often referred to as insulin-dependent or juvenile-onset diabetes because patients require exogenous insulin and are commonly younger in age at onset. Those diagnosed with DM1 require insulin injections since the beta cells in their pancreas, destroyed by their own immune system, do not produce the hormone insulin like a normally functioning pancreas would (CDC, 2014). Insulin is required for proper blood glucose regulation, so it must be added to the body. Currently methods for prevention of DM1 are unknown (CDC, 2014).

Type 2 diabetes mellitus (DM2) is, "a chronic metabolic disease characterized by insulin resistance and elevated blood glucose levels" (Dugan et al., 2014, Introduction section, para. 1). Type 2 diabetes mellitus is often referred to as non-insulin dependent or adult-onset because exogenous insulin is not always required and patients are often of an adult age when diagnosed. Type 2 diabetes mellitus can be described as a progressive disease that usually begins with insulin resistance and improper usage by body tissues. The resistance requires more insulin to be produced by the beta cells in the pancreas which eventually become unable to keep up and produce enough insulin, so the insulin must be supplemented (CDC, 2014).

Gestational diabetes (GD) is a condition seen in pregnant women who develop an inability to properly regulate glucose. Gestational diabetes typically develops in the second or third trimester and can create problems for both the mother and the fetus during the pregnancy and after the birth, including increasing the risk of developing type 2 diabetes (CDC, 2014).

The Hispanic population in the United States (US) is growing every year. Most publications and reports use the term Hispanic or Latino to describe people who identify themselves as Mexicans, Mexican Americans, Central and South Americans, Cubans, and Puerto Ricans. These publications also use the term Non-Hispanic Whites (NHW) when referring to the Caucasian population (CDC, 2014). For consistency and better understanding, the same terms will be used here. The latest US census report shows that the Hispanic population makes up 16.3% of the total population in the US. The growth rate from 2000 to 2010 of the Hispanic population was 43.0%, which is over four times higher than the total population growth rate (Ennis, Rios-Vargas, & Albert, 2011). The

authors of this report emphasize that, “More than half of the growth in the total population of the United States between 2000 and 2010 was due to the increase in the Hispanic population” (Ennis et al., 2011, p. 2). As indicated by the US census report, the Hispanic population is on an increasing trend that appears to be speeding up rather than slowing down. This trend indicates there is a great need to meet the demands of the Hispanic population as it relates to health care.

The Hispanic population in the US has a markedly higher incidence of DM2 than the rest of the population. The latest National Diabetes Statistic Report published by the CDC shows 12.8 to be the percentage of people aged twenty and older with diagnosed diabetes in the Hispanic population. In comparison, the percentage for NHW is only 7.6 (CDC, 2014). According to the same report, during 2008-2009 the rate of new cases of DM2 in people less than twenty years was 20 per 100,000 per year for the Hispanic population, which is about four times higher than the rate for NHW (CDC, 2014). These statistics only report the diagnosed cases of DM2, but the CDC estimates that 27.8% of people with diabetes are undiagnosed (CDC, 2014). These numbers are staggering and show that diabetes poses a significant threat to the health and well-being of the Hispanic population in this country. Type 2 diabetes mellitus was thought to be a disease that only affected the older population, but as indicated by the numbers it is now affecting the younger population. Overall, the statistics indicate that both the incidence of DM2 in the Hispanic population and the Hispanic population itself are increasing in this country.

Many factors have contributed to the increase of DM2 in the Hispanic population. Some factors that seem to have a large impact on this issue are genetics, access to care, economic status, language barriers and understanding of the Hispanic

culture by healthcare providers (Caballero, 2005). Although the mechanism is not well understood, many studies have shown that Hispanics have a higher insulin resistance in comparison to NHW. This occurrence, along with the tendency of Hispanics to accumulate fat in the abdominal area, account for the non-modifiable genetic factors that influence the incidence of DM2 in this population (Caballero, 2005). In order to improve the health of Hispanic patients affected by this condition, all efforts should be focused on the modifiable factors that contribute to the incidence of DM2 in the Hispanic population.

Access to proper healthcare is one of the most important factors that affects the well-being of any type of person, regardless of background or ethnicity. People who have health insurance are more likely to visit their doctor for preventive care and to manage their current illnesses. According to the Health Insurance Coverage report published by the Census Bureau, health insurance coverage is directly proportional to household income. In other words, as the household income goes up so does the percentage of people with health insurance coverage (Smith & Medalia, 2014). This report showed that in 2013, Hispanics had the highest uninsured rate among all other ethnic/racial groups at 24.3%. In contrast NHW had an uninsured rate of only 9.8% (Smith & Medalia, 2014). The report points to significant disparities in health care coverage, and thus health care access, between Hispanics and NHW. Hispanics who do not have access to health care visit their healthcare provider less often and do not get the routine screening and management needed for chronic conditions such as DM2 (Cersosimo & Musi, 2011). Limited access to care forces people to overlook or minimize their ailments, which leads to more serious health issues in the future.

Language and cultural barriers are two additional factors that play an important role in the incidence of DM2 in the Hispanic population. Many Hispanics who immigrate to this country have a hard time learning the language (Cersosimo & Musi, 2011). This puts Hispanics at a disadvantage when it comes to health care. Due to their lack of English proficiency, many Hispanics are unaware of the risks and complications associated with DM2 (Cersosimo & Musi, 2011). As Caballero (2005) points out "the Hispanic culture is rich in fascinating traditions, beliefs, practices, and attitudes that influence the perception and understanding of disease processes as well as their treatment" (p. 222). Providers now, more than ever, need to be trained on how to present information pertaining DM2 to Hispanic patients in a way that is understandable and relatable to them.

Problem Statement

As illustrated above, the incidence of type 2 adult-onset diabetes among the Hispanic population continues to increase despite its preventability. The continued increase of DM2 illustrates a need for diabetes education programs specifically tailored to the needs of Hispanics.

Research Question

This study addresses the following question: What effect, if any, does providing diabetic education materials in Spanish have on the understanding of the disease by Hispanics?

Significance of the Problem

According to the Centers for Disease Control and Prevention, in 2010, diabetes was the seventh leading cause of death in the United States and that is thought to be a

dramatically under-reported number (2004). Despite increasing public awareness, the incidence of DM2 continues to rise with a reported 1.7 million new cases of diabetes diagnosed in 2012 in those over 20 years of age (CDC, 2014). Along with the disease state in the pancreas itself and the insulin resistance of the tissues, there are some common complications seen in those diagnosed with diabetes that increase the overall cost of DM2 (CDC, 2014). The CDC estimates that in 2012, the total cost of diabetes in the United States was $245 billion including both the direct medical costs and the indirect disability costs (2014). After being adjusted for normal non-diabetic health care expenditures, a diabetic individual spends an average of 2.3 times more money on healthcare costs annually than a non-diabetic individual (CDC, 2014). A significant amount of those expenditures are spent on common conditions associated with diabetes progression including the following: hypercholesterolemia, hypertension, heart disease, stroke, vision loss, kidney disease, neuropathies and amputation of limbs (CDC, 2014).

Most of the Hispanic population resides within the South and West regions of the United States, but recent data shows an interesting phenomenon involving the growth pattern of this population in other parts of the country. According to the census bureau, between 2000 and 2010 the Hispanic population grew the most in the South and Midwest regions of the country (Ennis et al., 2011). As a whole the Midwest region had a growth of 49% in the Hispanic population, and in particular, Minnesota had a growth of 74.5% (Ennis et al., 2011). The increasing number of Hispanics in Minnesota means there are more Hispanic patients seeking healthcare to treat conditions such as DM2. As established earlier, Hispanics have a higher incidence of DM2 than NHW, so providers need to prepare to meet the needs of this growing population as it pertains to the care and

management of DM2. Research in this area will add to increasing the efficacy of medical care and patient education.

Purpose of the Study

The purpose of this study is to investigate the effects, if any, of utilizing Spanish language on the efficacy of an education program for type 2 diabetes among the Hispanic population in the twin-cities Minneapolis/St. Paul metro area. Many people believe that DM2 can be prevented, delayed or even slowed in progression by lifestyle modifications such as dietary improvements and increased physical activity levels. Education about DM2 has been suggested to be more effective when delivered using a culturally appropriate education program (Dugan et al., 2014). Patient education, which is what this study will investigate, is a key component in the management of DM2. Patients need to know how DM2 affects their body and learn ways to diminish the effects of this disease as much as possible and for as long as possible.

The way in which the information is presented will affect the patient's understanding of the material. As pointed out by Cersosimo and Musi, Hispanic patients with low English-proficiency are less likely to receive advice from their healthcare provider regarding lifestyle changes needed to manage DM2 (2011). In addition, it is detrimental to the health of Hispanic patients when providers do not consider the influence of cultural factors in the treatment of DM2 (Caballero, 2005). Therefore, Hispanic patients could benefit significantly from an education program that has material in Spanish, uses an adequate literacy level, and incorporates cultural aspects to make the information more relatable to the patient.

Chapter 2: Literature Review

Introduction

This literature review contains existing information on the topic of diabetes education for the Hispanic population. The following is discussed in this literature review: the relevance of health literacy, recent diabetes education programs, language barriers, utilization of community health workers, and available resources of diabetes education for Hispanics in Minnesota.

Relevance of Health Literacy

A study by Okosun and Lyn (2010) explores the response of patients to their prediabetes status and to healthcare provider advice regarding lifestyle modifications for diabetes prevention. In this study, lifestyle modifications are defined as increased weight management, increased physical activity, and decreased consumption of fats/calories (Okosun & Lyn, 2010). In this study, 70-80% of the participants with a prediabetes status received healthcare provider advice on lifestyle modifications and 44% received information about the health risk for developing diabetes (Okosun & Lyn, 2010). The researchers found that 42.8% of the participants with prediabetes reported making lifestyle modifications, in contrast to only 27.9% of the participants with normal glucose levels. They also found that participants who received advice from their healthcare providers were even more likely to make lifestyle modifications (Okosun & Lyn, 2010). This study indicates that patient education is important and aids patients in making appropriate lifestyle choices in order to have better health (Okosun & Lyn, 2010).

An example of health literacy aimed towards Hispanics is presented by Almendarez, Boysun, and Clark (2004) in their study of the Thunder and Lightning and Rain campaign. This article is about the influence that the Thunder and Lightning and Rain campaign had on diabetes awareness of the Hispanic population in five counties in the state of Washington (Almendarez et al., 2004). The counties selected had a high Hispanic population and the campaign lasted four months during 2002 (Almendarez et al., 2004). It consisted of public service announcements on television, 30-60 second messages on five different Spanish speaking radio stations, and printed material distributed all over the five county area. The researchers also had a toll-free number set up for people to request more information about diabetes, which was sent in the mail (Almendarez et al., 2004). The slogan of the campaign was "Control your diabetes. For Life." The main message of the campaign was that diabetes is a serious illness, but controllable and that it is important to get treatment (Almendarez et al., 2004). All of the information was presented in Spanish. At the end of the campaign, the researchers did a random telephone survey of the Hispanic population living within the five county area. In the survey, the people were asked if they remembered the slogan of the campaign and also whether the information prompted them to take any action on their health (Almendarez et al., 2004). Almendarez et al. (2004) found that most of the participants who had diabetes were able to recall the slogan of the campaign (75%), but only half of the non-diabetic participants were able to recall it. Overall, the survey indicated that the campaign message was best recalled by the participants when it was heard on the radio. The majority of the participants who decided to take action on their health received the campaign message from all three sources (Almendarez et al., 2004).

The studies presented in this section highlight the importance of health literacy by providing insight on how patients respond to education regarding their health. Patients who have more information about their health status tend to be healthier or at least try to make better choices about their health. Patients who make lifestyle modifications to reduce their risk of developing diabetes are also reducing their risk of developing other chronic illnesses, such as hypertension and high cholesterol (Okosun & Lyn, 2010). As illustrated above, patients who receive more information make better choices about their health.

Diabetes Education Programs

Type 2 diabetes can be prevented or slowed in progression by lifestyle interventions aimed at improving glycemic control. These interventions are extremely important for Hispanics as they more commonly have poor glycemic control and are less likely to seek medical management (Duggan et al., 2014). Duggan (2014) suggests that "interventions successful in one racial/ethnic group may not be generalizable to others because of specific cultural barriers" (Duggan et al., 2014, Introduction section, para. 2). A literature review of diabetic education programs aimed at minority populations indicates that culturally appropriate programs are more effective (Duggan et al., 2014).

One study investigating the effectiveness of a diabetic education program for the Hispanic population was conducted in the Lower Yakima Valley, Washington (Duggan et al., 2014). The study described utilized 320 adult Hispanic men and women with a glycosylated hemoglobin (HbA1C) of over 6%, and randomly distributed them into two groups. The program consisted of one education session per week for five weeks. It included an immediate start group and a delayed entry control group that began the

program three months after initiation of the study (Duggan et al., 2014). The education program was delivered by bilingual educators who provided materials in both English and Spanish in easy to understand language, ensuring there were no language barriers or health literacy issues. The sessions were delivered within community member's homes and family and friends were encouraged to attend, which reduced costs for the participants and embraced family relationships (Duggan et al., 2014). The sessions focused on topics such as diabetes and complications, self-management, and lifestyle modifications (Duggan et al., 2014). Participants were encouraged to be interactive by participating in class activities such as hands-on demonstrations of portion control and discussion of Mexican food recipes from diabetes cookbooks (Duggan et al., 2014). Measured outcomes included HbA1c levels to evaluate glycemic control, self-reported dietary intake, and physical activity frequency. The participants were evaluated at baseline, three month, and six month intervals (Duggan et al., 2014). The study then compared the results from the immediate entry group with the delayed entry group to check if the education program was effective. Outcomes demonstrated a reduction in HbA1c levels in the immediate versus the delayed entry group of 0.64% at three months which was maintained at six months post intervention (Duggan et al., 2014). No significant changes in diet and exercise were reported to account for the slightly better glycemic control, which the investigators possibly contribute to the self-reporting nature of those two outcome measures (Duggan et al., 2014).

Yates, Davies, Sehmi, Gorely and Khunti (2011) investigated the effects of a program study called PREPARE, which stands for pre-diabetes risk education and physical activity recommendation and encouragement. People who participated in the

program had been previously categorized as having prediabetes and all were either obese or overweight (Yates et al., 2011). The participants of the study were randomly divided into three groups. Group one only received a brochure with advice on diabetes prevention. Group two received a three hour class on diabetes prevention and group three received the same class plus instructions on how to use a pedometer to track their physical activity. Groups two and three also received short individual counseling sessions at three months and six months after taking the class (Yates et al., 2011). Participants had their glucose level measured at baseline and then again two years after taking the class. There was no change in the glucose level for people in groups one and two. People in group three had a 1.6 mmol/L decrease in their glucose level at the two year follow-up (Yates et al., 2011). According to Yates et al. (2011) the results of the study indicated that the use of self-monitoring tools, such as a pedometer, can aid in the prevention of diabetes. This study does not take into consideration race or ethnicity, but it would be interesting to investigate how Hispanics might respond to a similar approach.

Language Barriers

Good communication is essential for patients to have appropriate health care and build strong relationships with providers. A study done by Ngo-Metzger et al. in 2007 investigates the effects of language barriers on the provider-patient relationship. The researchers surveyed 2,746 Chinese and Vietnamese patients, who belonged to 11 different urban communities, about their recent encounters with different providers. The survey included questions regarding the following: if the provider spoke the same language as the patient, if the patient received health education, if there was an interpreter

present during the encounter, the quality of interpersonal care, and the overall rating of the provider. The researchers found that patients that had a provider who did not speak the same language received less health education. When an interpreter was present then all patients received the same amount of health education regardless of their language or the provider's language. In addition, providers received a lower rating and lower quality of interpersonal care score when they did not speak the same language as their patients. The rating of the provider and quality of interpersonal care score did not change when an interpreter was present.

The study presented in this section, shows the effects that language barriers can have in health education, and the relationship between patients and providers. The presence of an interpreter made a significant impact on the amount of health education received by patients who did not speak English. In contrast, the presence of an interpreter had no effect on the patient's perception about their provider and the quality of interpersonal care received. Hence, the researchers concluded that "Language barriers are associated with less health education, worse interpersonal care, and lower patient satisfaction" (Ngo-Metzger et al., 2007).

Utilization of Community Health Workers

Community health workers (CHWs) is a blanket term used to describe a varying group of healthcare workers who are, "selected, trained and working in the communities from which they come" (Lehmann & Sanders, 2007, p. 3). The utilization of CHWs in delivering diabetes education to Hispanics in community settings has been shown to be an effective educational method (Castillo et al., 2010). Community health workers are described as being "members of the community they serve, they understand the

community's values, speak the same language, and incorporate cultural beliefs and practices into their work in the community" (Valen, Narayan & Wedeking, 2012, p. 11). Because of these attributes, CHWs are often used for healthcare purposes in minority populations as CHWs can often gain access and trust that other healthcare professionals cannot (Valen et al., 2012).

The effectiveness of CHWs was shown in a study conducted by Valen, Narayan and Wedeking in 2012. The Spanish language education program utilized culturally relevant strategies such as encouraging friends and family to attend, using cultural foods for recipe instruction, and using dancing as physical activity. (Valen et al., 2012). The program consisted of six interactive sessions focusing on diabetes basics, disease complications, diet, and exercise. The program also addressed common cultural beliefs regarding diabetes and common lifestyle modifications needed by Hispanics (Valen et al., 2012). Measured outcomes included body mass index (BMI), HbA1c levels, and a twenty-two question diabetic basics questionnaire, which were all recorded at baseline, post program, and at a three month interval. The study was small and did not show significant improvement in quantitative data, however, feedback collected indicated program satisfaction and increased knowledge and confidence in self-management of their diabetes (Valen et al., 2012).

A study conducted by Castillo et al. in 2010 also investigated the effectiveness of CHWs in delivering diabetes education. The ten week program utilized a curriculum provided by the Diabetes Empowerment Education Program (DEEP) which focuses on empowering individuals to become more active in the self-management of their diabetes (Castillo et al., 2010). Outcomes were measured at the end of the program and included

general diabetes knowledge, self-management behaviors, HbA1c levels, weight, and blood pressure. The data revealed a significant decrease in HbA1c levels and blood pressure along with an increase in self-management behaviors such as glucose testing and medication adherence (Castillo et al., 2010). The study also went on to develop focus groups consisting of study participants in an effort to gain deeper understanding of the program and its effectiveness. Discussion topics included evaluating the DEEP program for cultural appropriateness and acceptability along with any perceived social or community barriers to diabetes control (Castillo et al., 2010).

Diabetes Education Programs Available in Minnesota

Determining the availability of diabetes education programs for Minnesota (MN) residents is important. The Minnesota Department of Health (MDH) divides diabetes education into two different areas (MDH, n.d.). One area deals with diabetes prevention and the other area deals with diabetes management.

According to the MDH about 1.4 million people in MN have prediabetes, but the data indicates that only 210,000 actually know they have this condition (MDH, 2012). The Centers for Disease Control and Prevention (CDC) has established a National Diabetes Prevention Program (NDPP) that is available to MN residents through different clinics, hospitals, and associations (MDH, n.d.). Participants of the NDPP attended sixteen core sessions and six post-core sessions throughout a year, where they receive information and advice on lifestyle modifications to prevent diabetes (CDC, 2014). A study done by the CDC on the NDPP showed that participants who lost 5-7% of their initial body weight, which is about 10-14 pounds for a 200 pound person, decreased their risk of developing diabetes by 50% (CDC, 2014). It is important to mention that all of

the material needed for the NDPP classes is available in Spanish through the CDC website (2014). The MDH website has a directory to find places in MN that offer the NDPP for people with prediabetes.

Management of diabetes is just as important as its prevention. Both the American Association of Diabetes Educators (AADE) and the American Diabetes Association (ADA) have DM2 management education programs available at different sites in MN (MDH, n.d.). The name of the main program is Diabetes Self-Management Education (DSME). According to the MDH, the program "emphasizes problem solving and decision making related to core diabetes self-care skills like healthy eating, physical activity, proper dental care, and monitoring blood glucose levels" (MDH, n.d., para. 7). The directory of places where the program is available can be accessed through the MDH website. There is no discernible information that indicates availability of the program in Spanish, but many of the places that offer the program, such as clinics and hospitals, have access to interpreters (MDH, n.d.).

Conclusion

The research indicates that DM2 is often preventable or at least delayable by implementing lifestyle modifications, thus diabetic education programs could be a great clinical tool. Keeping in mind the health literacy level of the program's audience is incredibly important for ensuring the information can be understood and applied. Furthermore, these education programs are more effective when implemented by utilizing culturally appropriate information and removing language barriers greatly improves the understanding of the material. Utilizing community health workers to deliver the education program increases cultural sensitivity and can also add to program

effectiveness. Many sites offer the NDPP and DSME programs, but the number of places that actually offer these programs in Spanish for the Hispanic population in MN is uncertain. Taking all of these aspects into consideration can result in a more effective diabetes education program for the Hispanic population in the twin-cities Minneapolis/St. Paul metro area of Minnesota.

Chapter 3: Methods

Introduction

The purpose of this study is to investigate the effects, if any, of utilizing Spanish language on the efficacy of an education program for type 2 diabetes mellitus (DM2) among the Hispanic population in the twin-cities Minneapolis/St. Paul metro area. The method chosen for this research project is a measurement of the participants' baseline knowledge about diabetes, followed by a diabetes education class presented in Spanish, and another measurement of the participants' knowledge immediately after the class. The remainder of this section covers the following: study design, participants, data collection tools, data analysis, validity and reliability, and study limitations and delimitations.

Study Design

The study design utilized a pre-test, a diabetes education class, and a post-test immediately following the diabetes education class. The target population for the study were Hispanics interested in learning more about DM2. The information presented in the education class was based on the information provided by the National Diabetes Education Program (NDEP), "You are the Heart of Your Family, Take Care of It" campaign created by the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC). Permission to use the educational material just mentioned was granted by the appropriate agency (Appendix F). The class focuses on diabetes disease basics and complications along with healthier lifestyle modification suggestions (see Appendix A). All education and testing material was provided in

Spanish. The information in the class was presented by one of the researchers, who is fluent in Spanish.

The pre-test and post-tests consisted of ten identical questions designed to test diabetes knowledge of the participants before and after the class. In addition, the post-test included three qualitative questions regarding the following topics: planned utilization of the information provided with regards to lifestyle modifications particularly, and impressions/helpfulness of the information provided. The pre-test was performed to assess initial disease knowledge and the post-test was given following the class to assess knowledge gained.

Participants

The study was conducted at Incarnation/Sagrado Corazon de Jesus Catholic Church located at 3817 Pleasant Ave, Minneapolis, MN. This church has a large number of Spanish speaking members and it organizes many events for the Hispanic community in the Minneapolis and Saint Paul area of Minnesota. The study was open to any consenting adult who decided to attend the diabetes education class and was willing to participate. The participant demographics were aimed to consist of pre-diabetic or diabetic Hispanics. A demographic question was included in the pre-test and post-test to determine if the subjects were pre-diabetic or had been diagnosed with diabetes, high blood pressure, or high cholesterol.

Proper permission to use the facilities at Incarnation/Sagrado Corazon de Jesus Catholic Church were obtained prior to performing the study (Appendix G). Participants were recruited by placing an ad in the church's weekly bulletin 3 weeks prior to the event (Appendix H). In addition, one of the researchers made an announcement after mass, the

day of the event to invite parishioners to attend the education program. The only people excluded from this study were minors, which is defined as people under 18 years old. Otherwise, no other participant exclusions were made.

Data Collection Tools

The participants were first asked to read and sign an informed consent (see appendix D & E). The signed consent indicated that the participants understood they had agreed to be part of the study and may withdraw at any time without consequences. The participants then completed a pre-test to assess their baseline knowledge of type 2 diabetes mellitus and lifestyle modifications needed for control of the disease. The education class was then presented to all participants as a group (appendix A). Lastly, participants completed a post-test to assess how much they understood and remembered from the class. The pre-test and the post-test consisted of ten identical questions (see appendix B & C). In addition, the post-test included three additional qualitative questions to gage the participant's perception of the class and plan to utilize the information presented. The participants were given a handout, which outlined the main points of the education program, to take home at the end of the study (Appendix I).

As stated in the informed consent, the pre-test and post-test used in this study will remain stored for three years at a secure location in the Physician Assistant Program at Bethel University. No names were collected, instead the participants were assigned an identification number in order to keep track of the pre-test and post-test data while maintaining participant confidentiality.

Data Analysis

Study participants completed a pre-test before the education class, which provided information about their previous DM2 knowledge. The answers from the pre-test were scored and compared to the post-test to assess the effects the class had on the participants' knowledge of the subject. The data obtained from the pre-test and post-test questionnaires was utilized for statistical analysis. Each question was equivalent to one point and there were ten quantitative questions total, which made the maximum possible score a ten. For the purpose of this study, the researchers decided that a 2-point difference between the pre-test and post-test would be considered significant. According to MedCalc statistical software v15.2.2, to assess the significance of a 2-point difference (SD = 2, 80% power, and $\alpha = 0.05$) a sample size of at least 17 participants were needed. Microsoft Excel 2013 program data pack was used to analyze the data obtained from the pre-test and post-test. A paired t-test was performed using the collected scored data.

The data analysis illustrated the difference between the mean of the pre-test versus the post-test and the significance of the study. After this analysis, the data will be saved in a password protected file, which will be stored in a flash drive. For security reasons, the flash drive along with any other materials used for this study will remain securely stored for three years at the Physician Assistant Program facilities of Bethel University.

Validity and Reliability

To ensure reliability ten identical pre-test and post-test questions were given to all of the participants in the study. The pre-test and post-test questions were reviewed by

both an interpreter and a medical professional to ensure proper translation and validity. For validity, the test questions were based off of the material that was presented in the diabetes education class, which was based on the National Diabetes Education Program (NDEP). The NDEP material was created by the NIH and CDC to serve as a reliable and valid diabetes education program for both Spanish and English speaking individuals.

Limitations and Delimitations

Several limitations have been identified as potential weakness of the study. One such limitation was that since the study will only be conducted on a small sample of the Hispanic population in the Minneapolis/Saint Paul metro area, the findings may not apply to the larger population in general. Also, the test scores might have been influenced by previous knowledge regarding diabetes and not just what the participants learned and/or remembered from the delivered education class. Another limitation of the study was that the pre-test and post-test answers may not necessarily be the truth, since people often want to give the perceived right answer for fear of judgment. This can especially be true in answers regarding plans to implement healthier lifestyle choices. However, the use of patient identifiers and informed consent stating confidentiality were provided in an attempt to reduce this limitation. Lastly, the study cannot determine the long term understanding or use of the information presented in the class.

Conclusion

The purpose of this diabetes education program was to help participants understand the disease better and the results of the pre-test and post-test were used to determine the effectiveness of the program. The material presented is based on the

information provided by the NDEP and it was delivered in Spanish. The only people excluded from the study were minors and non-consenting adults. The data collected was analyzed with the Microsoft Excel 2013 program data pack. The results of the study are presented and discussed in the following chapters.

Chapter 4: Results

Introduction

This chapter presents the results of the data collection from the pre-test and post-test questionnaires regarding participant knowledge before and after the delivery of a Spanish language education program about type 2 diabetes mellitus (DM2). Disease knowledge, specific demographic information including age, gender and comorbidities, along with qualitative information regarding utilizing Spanish language delivery and proposed lifestyle modifications were analyzed and presented in tables and figures.

Data Analysis

The DM2 education program was delivered at Incarnation/Sagrado Corazon de Jesus Catholic Church in Minneapolis, MN. There were 18 participants, who completed the pre-test, attended the Spanish language education program, and completed the post-test after signing the informed consent. Of the 18 study participants, 17 identified themselves as Hispanic and 1 as non-Hispanic. Figure 1 shows the gender distribution of the participants was 14 women and 4 men (Figure 1). Figure 2 illustrates the age breakdown of the participants. All of the participants were 18 years old or older with the majority falling within the 41-50 age range (Figure 2). The mean age was 45 years old. Figure 3 illustrates the diagnoses reported by the participants. Among the participants, 22 % reported having high cholesterol, 17% reported having hypertension, 17% reported having diabetes, and none of them reported having pre-diabetes (Figure 3).

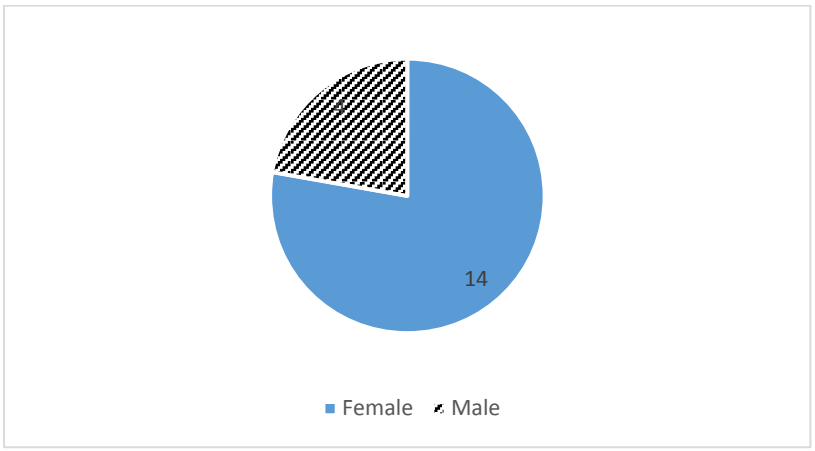

Figure 1. Gender Distribution.

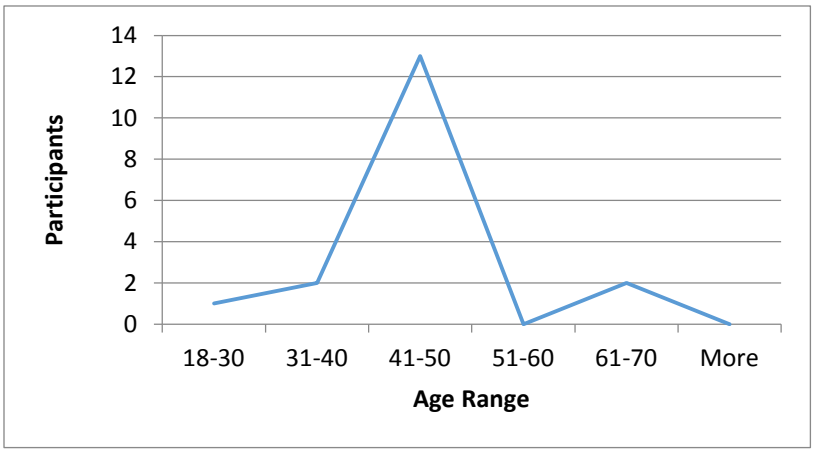

Figure 2. Age Distribution.

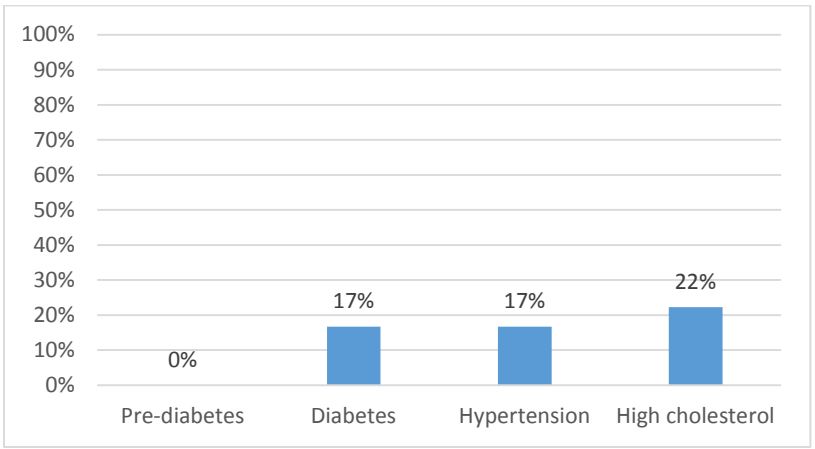

Figure 3. Reported diagnoses.

The objective of this study was to investigate the effects, if any, of utilizing Spanish language on the efficacy of an education program about DM2 among the Hispanic population in the Minnesota twin-cities area. In order for this study to produce statistically significant results, a minimum of 17 participants was needed along with a 2-point difference between the pre-test and post-test scores. Since there were 18 participants in the study, a paired t-test using Microsoft Excel 2013 program data pack was performed to analyze the first 10 questions of the pre-test and post-test (Table 1). Table 1 illustrates the total number of participants, their individual scores for the pre-test and post-test, the mean for all the pre-test scores, the mean for all the post-test scores, and the mean difference between the pre-test and post-test scores. The mean difference was 3.17 (SD =2.48, N= 18), which is greater than 2, ($t=5.42$, $p=0.000046$). The 95% confidence interval about mean difference between the pre-test and post-test is (2.00, 4.33). Since the paired t-test yielded a $p<0.05$, the findings support the initial hypothesis that utilizing Spanish language to deliver a DM2 education program increases its efficacy.

Analysis of individual question scores was performed keeping in mind that the maximum test score that a participant could receive was a 10. Among the participants the mean pre-test score was 5.33 and the mean post-test score was 8.50 with a mean improvement of 3.17 overall. Figure 4 illustrates the percentage of correct and incorrect answers in the pre-test. Pre-test analysis revealed that questions 2, 3, 5, 6 and 9 were answered incorrectly by 50% or more of the participants (Figure 4). Figure 5 illustrates the percentage of correct and incorrect answers in the post-test. Post-test analysis revealed that all questions were answered correctly at least 78% of the time with every

participant correctly answering questions 7 and 10 (Figure 5). Figure 6 illustrates the comparison between the percentage of correct answers in the pre-test and the post-test. When comparing pre and post-test answers, the greatest improvement was shown in questions 5, 6, and 9 (Figure 6).

Participant	Pretest Score	Posttest Score	Difference
1	8	9	1
2	9	10	1
3	7	9	2
4	4	6	2
5	3	7	4
6	2	10	8
7	5	7	2
8	0	7	7
9	6	10	4
10	9	10	1
11	5	10	5
12	6	7	1
13	2	9	7
14	8	10	2
15	9	10	1
16	4	4	0
17	7	10	3
18	2	8	6
Mean	5.33	8.50	3.17

Table 1. Difference between pre-test and post-test scores.

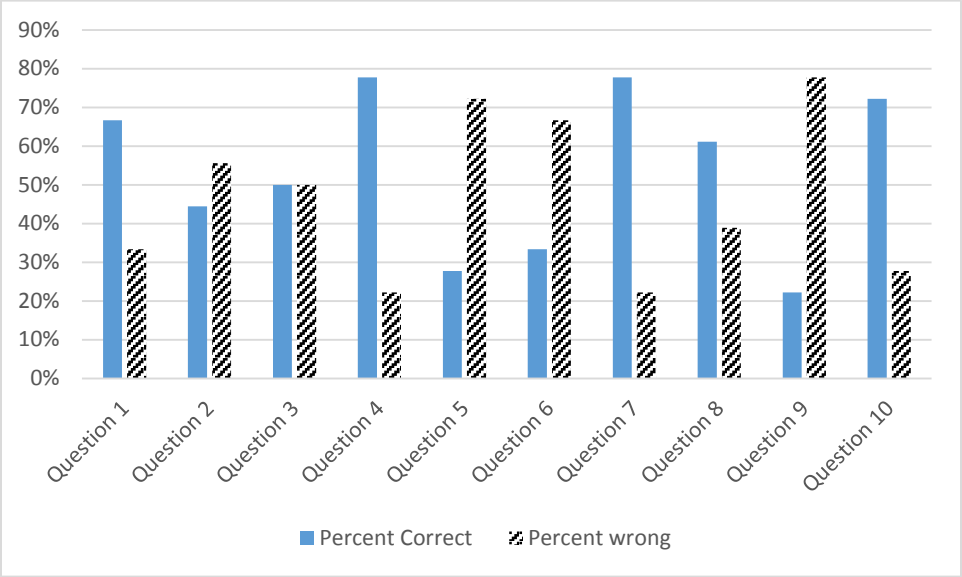

Figure 4. Pre-test question breakdown.

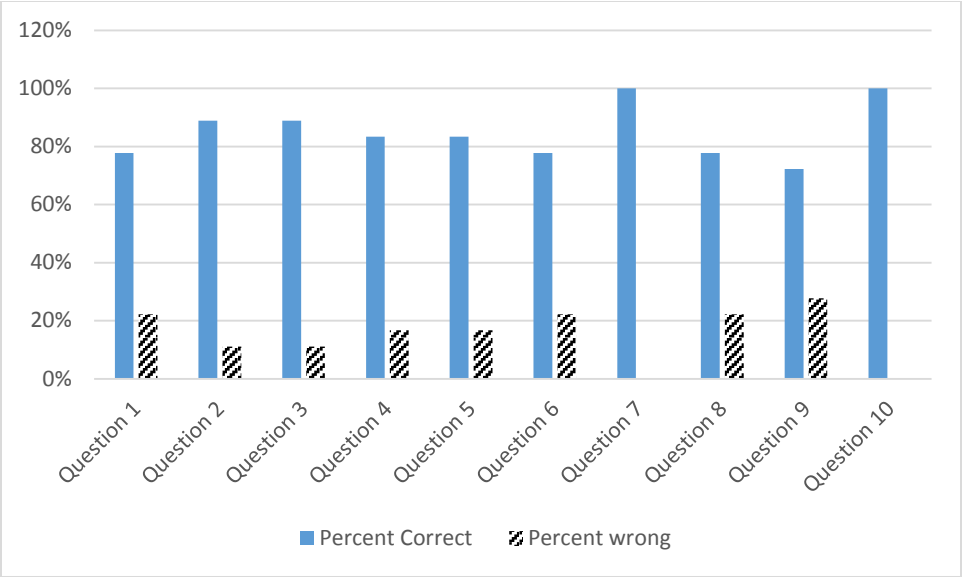

Figure 5. Post-test question breakdown.

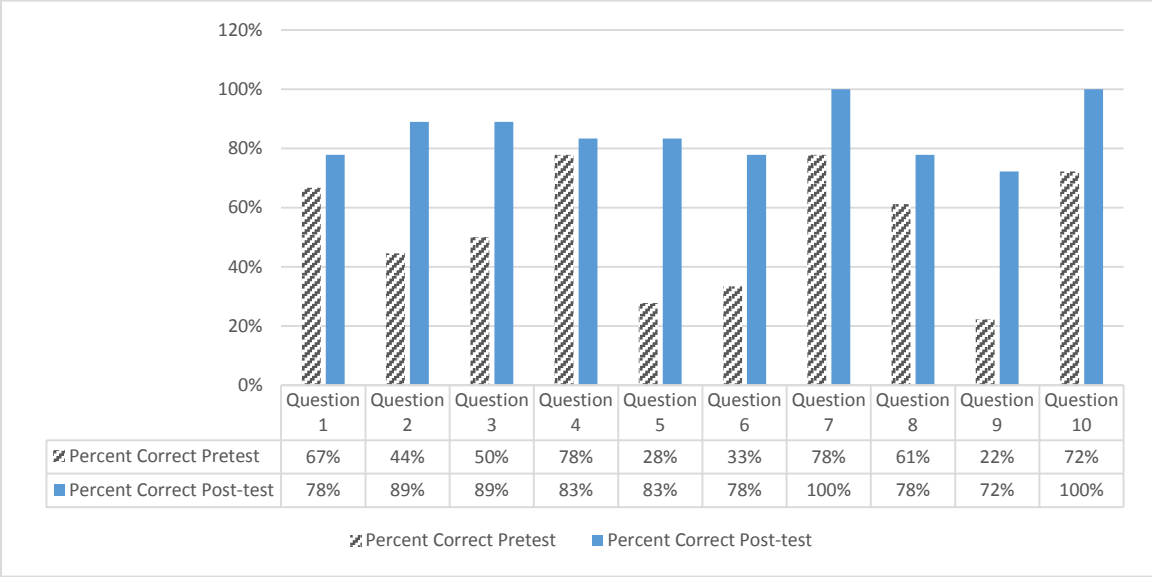

Figure 6. Pre-test versus post-test.

In addition to the demographic and quantitative data collected, a series of three qualitative responses were also included for analysis. The participants were asked about intended lifestyle modifications following completion of the education program. Table 2 illustrates participant intended lifestyle modifications following completion of the education program. Of respondents, 2 of the 18 or 11% reported that they did not intend to make any changes following the program. Alternatively, 12 of the 18 or 67% reported that they intended to make all 4 of the changes suggested including eating fresh vegetables, getting daily exercise, checking blood pressure regularly and checking blood sugar regularly (table 2). Figure 7 illustrates the participant's opinions regarding whether the information presented in the education program was relevant and helpful in the understanding of diabetes (question II) and if the presentation of the materials in Spanish made the material easier to understand (question III). None of the participants disagreed with the statement that the information presented was both relevant and helpful to the

understanding of diabetes. Also, all of the participants agreed or strongly agreed that having the materials presented in Spanish made the material easier to understand (Figure 7). One of participants did not respond either question.

Lifestyle Modification	Number of Participants	Percentage
Eat fresh Veggies	15	83%
Exercise	15	83%
Check blood pressure	13	72%
Check blood Sugar	13	72%
None	2	11%

Table 2. Intended Lifestyle Modifications.

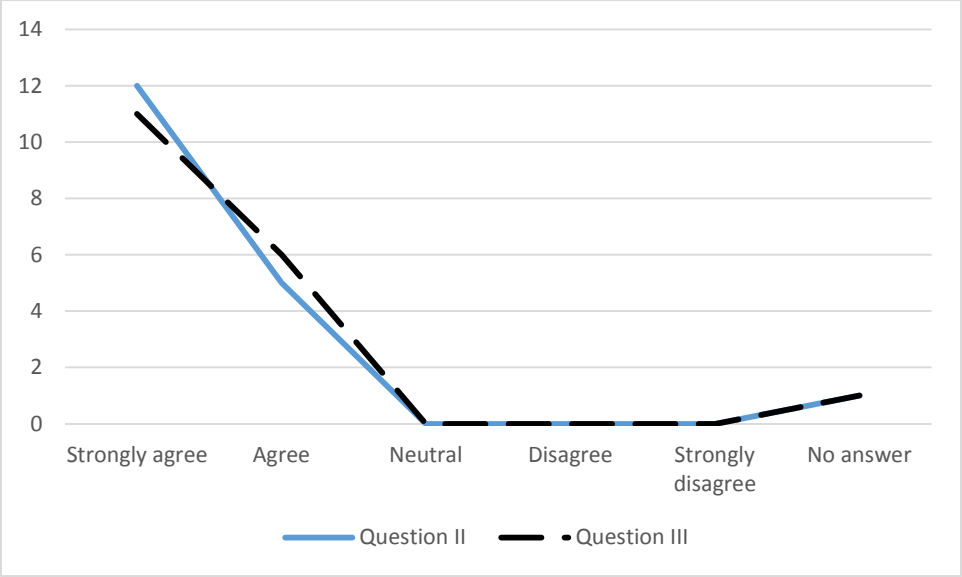

Figure 7. Qualitative responses.

Conclusion

In conclusion, the data collected indicates that utilizing Spanish language does increase the efficacy of a DM2 education program among the Hispanic population in MN. In regards to demographics, more women than men attended the education class and most of the participants were in the 41-50 year old age range. None of the participants

reported having pre-diabetes. Only 17% reported having diabetes, which means most of the participants where non-diabetics. The mean difference between the pre and post-test was 3.17, which is higher than the hypothesized 2-point difference. Findings were shown to be statistically significant with a $p<0.05$. In addition, the results showed that all questions were answered correctly at least 78% of the time in the post-test, compared to the pre-test where only 2 questions were answered correctly 78% of the time. Over 80% of the participants indicated they were going to make at least one of the suggested lifestyle modifications. The majority of the participants either agreed or strongly agreed that the information presented was relevant and helpful to their understanding of DM2 and that presenting the material in Spanish made the information easier to understand. The following chapter will discuss the data collected as well as study limitations and further recommendations for future research.

Chapter 5

Introduction

The purpose of this study was to investigate the effects of utilizing Spanish language on the efficacy of an education program for type 2 diabetes mellitus (DM2) among the Hispanic population in MN. In this study a DM2 education program was delivered and the results from a pre and post-test were analyzed. This chapter further discusses the data collected and presented in the previous chapter including the changes in overall test scores as well as individual questions. In addition, specific demographic and qualitative information was collected and discussed along with potential study limitations and recommendations for further research.

Discussion

In order to investigate the research question, a test made up of 10 questions was developed based on an education program created by the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC) called "You are the Heart of Your Family, Take Care of It" (Appendix A). The education program was delivered at Incarnation/Sagrado Corazon de Jesus Catholic Church in Minneapolis, MN. The test was administered to the participants before and after the presentation of the DM2 education program. For all participants, the answers collected from the pre-test were compared to the answers collected from the post-test. In addition, the post-test participants were asked to answer 3 additional questions regarding lifestyle modifications, relevance and helpfulness of the education program, and whether the use of Spanish language made the information easier to understand. Demographic data for age, gender, and disease status was also collected from all participants. A paired t-test

was used to assess the significance of the mean difference between the pre and post-test. Microsoft Excel 2013 program data pack was used to analyze the data collected, and to create tables and figures to illustrate the results of this study.

For the purpose of this study it was initially stated that a 2 point difference would be considered significant. The lowest and highest score in the pre-test were 0 and 9, respectively. In comparison the lowest and highest score in the post-test were 4 and 10, respectively. Most of the participants improved their score at least by one point, and the highest improvement was 8 points. On average, the participants' knowledge about DM2 increased by 3.17 points ($p<0.05$). These results support that utilizing Spanish language improves the efficacy of a DM2 education program delivered to the Hispanic population of the in the twin-cities Minneapolis/St. Paul metro area.

Each question tested different aspects of DM2 including definitions, complications, and appropriate lifestyle choices. Question 1 asked about the general definition of DM2, and it improved from 67% correct in the pre-test to 78% in the post-test. Question 2 asked about serious complications of DM2, and the scores improved from 44% correct in the pre-test to 89 % in the post-test. Question 3 inquired about leading cause of death in people with DM2, and the scores improved from 50% correct in the pre-test to 89% in the post-test. Question 4 inquired about healthy eating choices, and scores improved from 78% correct in the pre-test to 83% correct in the post-test. Question 5 tested knowledge about the hemoglobin glycosylated (HbA1c) value, and scores went from 28% correct in the pre-test to 83% in the post test. Question 6 asked about healthy beverages, and scores improved from 33% in the pre-test to 78% in the post-test. Question 7 inquired about weight loss recommendations, and scores improved

from 78% in the pre-test to 100% in the post-test. Question 8 tested the recommended length for daily exercise, and scores improved from 61% in the pre-test to 78% in the post-test. Question 9 asked about the ideal HbA1c value, and scores improved from 22% in the pre-test to 72% in the post-test. Finally question 10 asked about the importance of hypertension and cholesterol management in people with DM2, and scores improved from 72% in the pre-test to 100% in the post-test (Chapter 4, Figure 6).

The information in the previous paragraph is helpful to determine how much information the participants already knew about DM2 and what knowledge was gained from the education program. The pre-test results from questions 1, 4, 7, 8, and 10 indicate that most of the participants had a good general idea of what it means to have DM2, healthy food choices, weight loss and exercise recommendations, and the importance of appropriate management of blood pressure and cholesterol for people with DM2. In contrast, the majority of the participants missed the pre-test questions 2, 3, 5, 6, and 9, which indicates the participants lacked knowledge about complications due to DM2, HbA1c definition and normal values, and appropriate beverages for people with DM2. Overall, the percentage of correct answers improved for all questions when comparing the pre and post-test. The results of the study suggest all the participants were able to gain some knowledge from the information presented, even those who scored relatively well in the pre-test.

Participants were asked to choose among 4 different lifestyle modifications that they were most likely to make. They were allowed to choose more than one lifestyle modifications or none at all. Out of all the participants, only 2 or 11% said they did not plan to make any changes, but the rest chose at least one of the proposed lifestyle

modifications. Eating fresh vegetables and daily exercise were chosen by 15 or 83% of the participants, while checking blood pressure or blood sugar more regularly were chosen by only 13 or 72 % of the participants. In their study Okosun and Lyn concluded that educating patients about appropriate lifestyle choices can greatly improve their health (2010). Lifestyle modifications can help to reduce the risk of developing DM2 and other chronic conditions, such as hypertension and high cholesterol (Okosun & Lyn, 2010). These results and previous research suggest that the DM2 education program delivered could possibly have a positive long term influence in the lives and health of the participants.

Participants answered 2 qualitative questions to help assess relevance and usefulness of the information presented, as well as the impact of utilizing Spanish language to deliver the DM2 education program. When asked whether or not the information presented was relevant and helpful to their understanding of DM2, 17 out of the 18 participants either strongly agreed or agreed with the statement. The results suggest that the majority of the participants felt the information presented was useful and helped them to better understand DM2. When asked whether or not presenting the education program in Spanish made the information easier to understand, with the exception of one participant who did not answer, all of the participants marked either agree or strongly agree with this statement. Previous research, which was introduced in the literature review, found that language barriers are associated with lower health education (Ngo-Metzger et al., 2007). Cersosimo and Musi found that many Hispanics do not know the risks and complications associated with DM2 due to language barriers (2011). Therefore, the results of this study and previous research suggest that removing

language barriers improves health education and yields better understanding of diseases like DM2.

Demographic data for ethnicity/race, age, gender, and disease status was collected in this study. All of the participants were Hispanic, with the exception of one participant who reported being non-Hispanic. Nonetheless, the non-Hispanic participant was fluent in Spanish and very familiar with the Hispanic population and culture, so she was welcomed to participate in the study. The majority of the participants fell within the 41-50 year old age range with a mean of 45 years old. There were 14 women and 4 men among the participants. The age and gender distribution for this study was narrow since most of the participants were women between the ages of 41 and 50. As stated earlier, in the US the Hispanic population has a 12.8% incidence of DM2, which is notably higher than for Non-Hispanic Whites (NHW) who have only a 7.6 % incidence of DM2 (CDC, 2014). In this study 3 of the participants or 17% reported having DM2, which is a little higher than the CDC's report, however the sample size was fairly small and could account for the discrepancy. None of the participants reported having pre-diabetes. The CDC estimates that almost 30% of people with prediabetes or DM2 are undiagnosed (2014). Therefore, it is likely that some of the participants had pre-diabetes without knowing it. The incidence of hypertension and high cholesterol in the participants were 17% and 22%, respectively. According to the National Institutes of Health (NIH), both hypertension and high cholesterol are common comorbidities in people with DM2 and increase the risk of complications (2014).

Limitations

As previously noted in chapter three, several limitations have been identified as potential weakness of the study and are pertinent to address. One such limitation is that the study was only conducted on a small sample of the Hispanic population in the Minneapolis/Saint Paul metro area, which is also compounded by the small sample size of only 18 participants. While the sample size, although small, did indeed provide enough data for significant statistical analysis, both of these could pose as restricting factors to the generalizability of the study results to the larger Hispanic population in general.

The next limitation was the possibility of the test scores being influenced by previous DM2 knowledge and not just by what the participants learned and/or remembered from the delivered education class. The study was designed, and the data analyzed, in an effort to minimize this limitation. With regards to study design, the participants were initially given a pre-test to assess their baseline knowledge prior to being presented the DM2 education program after which a post-test was immediately administered in an attempt to assess knowledge gained from the provided education program. This design method helped to minimize this limitation by providing a way to analyze score changes from the pre and post-test which was more representative of knowledge gained from the education program instead of just DM2 knowledge in general.

Another limitation of the study was that all the data gathered was self-reported by the participant. This required the assumption that all participants were honest in the responses. This might not have been true, especially with regards to the qualitative

questions regarding plans to implement healthier lifestyle choices. While the use of patient identifiers to assure confidentiality was provided in an attempt to reduce this limitation, the fact that it could still exist has to be admitted as a possibility.

Additionally, this data from the study was limited to collecting and analyzing only the immediate DM2 knowledge gained by the participants since the only data collected from the participants was done immediately following the completion of the education program. Therefore, the study cannot determine the long term knowledge gained, understanding, or actual use of the information presented in the class. This limitation could have been addressed by following up with the participants at various later intervals.

Recommendations for Future Research

Based on the data collected and analyzed and limitations previously discussed, recommendations for further research can be formed. As previously mentioned, one limitation of the study and thus recommendation for further research would be taking into consideration the small sample size (n = 18) of the study conducted on a small subset of Hispanics in the Minneapolis/Saint Paul metro area who attended Incarnation/Sagrado Corazon de Jesus Catholic church in Minneapolis, MN. Performing additional studies to increase the sample size, as well as recruiting participants from differing subsets, would be beneficial in determining if the statistically significant results attained are reproducible and thus applicable to a larger population of Hispanics in general.

An additional recommendation for further research centers on the fact that only immediate knowledge gained from the DM2 education program was collected. This limitation could be addressed by following up with the participants at various intervals following the completion of the initial post-test to assess what gained knowledge was

maintained and what initially intended lifestyle modifications were indeed implemented. This would require further research methodically different from this study as the participants would have to be accessible for a pre-determined amount of time following the delivery of the education program. As previously discussed in the literature review, a study conducted in Washington did just that by evaluating participants at baseline, three month, and six month intervals and found a continued reduction in HbA1c (Duggan et al., 2014). While that study also differed by delivering one education session per week for five weeks, it would be beneficial to see if similar sustained results could also be found following just a one session DM2 education program.

Conclusion

As pointed out by Cersosimo and Musi, Hispanic patients with low English-proficiency are less likely to receive advice from their healthcare provider regarding lifestyle changes needed to manage DM2 (2011). This study, while limited by small population size, geographic area and longevity studies, did indeed show statistically significant improvement in DM2 knowledge gained following a Spanish language delivered education program. Therefore, Hispanic patients could possibly benefit from an education program that has material in Spanish and thus the impetus for further research and implementation of such programs is of great importance. This significance is further emphasized when considering that the Hispanic population in the US has a markedly higher incidence of DM2 than non-Hispanic whites as confirmed by the latest National Diabetes Statistics Report published by the CDC. This report shows that 12.8 percent of people aged twenty and older with diagnosed diabetes in the Hispanic population in comparison to only 7.6 in NHW (CDC, 2014). Also according to this

report, during 2008-2009, the rate of new cases of DM2 in Hispanic people under twenty years of age was about four times higher than the rate for NHW (CDC, 2014). These staggering statistics indicate that continued research and education is indeed needed in an attempt to reduce this large and growing health concern in the Hispanic population.

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Appendix A: Education Materials

National Diabetes Education Program, "You are the Heart of Your Family, Take Care of It" campaign created by the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC). NIH Pub. No. 11-73925S.

Appendix B: Pre-test/Post-test (English)
Pretest/Posttest (circle one)

Participant ID number:
Age:
Gender:
Ethnicity/Race (circle one): Hispanic Non-Hispanic

Have you ever been diagnosed with any of the following (circle all that apply):

Pre-Diabetes Diabetes High Blood Pressure High Cholesterol

---

1. What does having diabetes mean?
   a) your blood cholesterol is too high
   b) your blood cholesterol is too low
   c) your blood sugar is too high
   d) your blood sugar is too low

2. Which of the following is a serious complication of diabetes?
   a) Hearing problems
   b) Stomach ache
   c) Amputation
   d) Joint pain

3. True or False: The leading causes of death for people with diabetes are heart attacks and stroke.

4. True or False: Eating canned food is just as healthy as eating freshly cooked food.

5. What does the A1c value represent?
   a) Average level of sugar in the body for the past year
   b) Level of sugar in the body today
   c) Average level of sugar in the body during the last 2-3 months
   d) None of the above

6. True or False: Drinking juice is good for a person with diabetes.

7. True or false: For overweight/obese people, losing 10 pounds will significantly improve their health.

8. What is the minimum amount of physical activity recommended per day?
   a) 45 minutes
   b) 10 minutes
   c) 30 minutes
   d) 2 hours

9. What is an ideal A1C value?
   a) 10
   b) 6
   c) 9
   d) 15

10. True or False. Controlling blood pressure and cholesterol are particularly important for people with diabetes.

Answer the following questions <u>after</u> completing the class

I. Which of the following changes are you likely to make after today's class (circle all that apply)?

   a) Eating fresh vegetables
   b) Getting daily exercise
   c) Checking your blood pressure regularly
   d) Checking your blood glucose/sugar regularly
   e) I am not planning on making any changes

II. The information presented was relevant and helpful to my understanding of diabetes (circle one):

Strongly agree Agree Neutral Disagree Strongly disagree

III. Presenting the educational materials in Spanish made the information easier to understand (circle one):

Strongly agree Agree Neutral Disagree Strongly disagree

Thank you for your participation

Appendix C: Pre-test/Post-test (Español)
Cuestionario Antes/Después
Favor de circular la opción/opciones correcta

Número de identificación del participante:
Edad:
Sexo: Femenino Masculino
Su raza es: Hispano/Latino Otros

Alguna vez le han dicho que tiene alguna de las enfermedades siguientes (circule todo lo que aplique):
Pre-Diabetes Diabetes Presión arterial alta Colesterol alto

---

1. ¿Que significa tener diabetes?
   e) El nivel de colesterol en la sangre es demasiado alto
   f) El nivel de colesterol en la sangre es demasiado bajo
   g) El nivel de azúcar en la sangre es demasiado alta
   h) El nivel de azúcar en la sangre es demasiado baja

2. ¿Cuál de lo siguiente, es una complicación grave de la diabetes?
   e) Problema para escuchar
   f) Dolor de estomago/panza
   g) Amputación (perdida de alguna extremidad)
   h) Dolor en las articulaciones

3. Las causas más frecuentes de muerte entre las personas que tienen diabetes son: ataques de corazón y embolias (infarto cerebral).
   a) Verdadero
   b) Falso

4. El consumo de alimentos enlatados es tan saludables como comer comida recién preparada.
   a) Verdadero
   b) Falso

5. ¿Sabe usted que representa el valor de la prueba A1c?
   e) Representa el promedio de azúcar en su sangre durante el año pasado.
   f) Representa el nivel de azúcar en su sangre el día de hoy.

g) Representa el promedio de azúcar en su sangre durante los últimos 2-3 meses.
h) Ninguna de las opciones anteriores.

6. Es bueno para las personas con diabetes tomar jugo de frutas.
a) Verdadero
b) Falso

7. Para las personas con sobre peso/obesidad perder 10 libras hace que su salud mejore notablemente.
a) Verdadero
b) Falso

8. ¿Cuál es el tiempo mínimo de actividad física recomendada por día?
e) 45 minutos
f) 10 minutos
g) 30 minutos
h) 2 horas

9. ¿Cuál es el valor ideal de la prueba A1c? What is an ideal A1C value?
e) 10
f) 6
g) 9
h) 15

10. Un buen control de la presión arterial y el colesterol son especialmente importantes para las personas con diabetes
a) Verdadero
b) Falso

Conteste las siguientes preguntas después de completar la clase

I. ¿Cuáles de los siguientes son los cambios que usted piensa realizar después de escuchar esta clase? (circule todo lo que aplique)
f) Comer vegetales frescos
g) Hacer ejercicio diario
h) Checar su presión arterial más a menudo
i) Checar su nivel de azúcar más a menudo
j) No está planeando hacer ningún cambio

II. La información presentada en esta clase fue importante y útil para mejorar su comprensión de la diabetes (circule una opción):

Totalmente de acuerdo -- De acuerdo – Neutro --En desacuerdo -- Totalmente en desacuerdo

III. La presentación de esta clase en español ayudo a que fuera más fácil de entender el material explicado (circule una opción):

Totalmente de acuerdo -- De acuerdo – Neutro --En desacuerdo -- Totalmente en desacuerdo

Muchas gracias por su participación

Appendix D: Informed Consent Form (English)

Informed Consent for Incarnation/Sagrado Corazon de Jesus Church Participants
Diabetes Education Program for Hispanics in Saint Paul/Minneapolis, MN
Researchers: Nohemi Haben and Misty Schmitz

You are invited to participate in a study about diabetes education for the Hispanic population in Minnesota. We hope to learn whether providing materials in Spanish makes a difference in the understanding of diabetes. You were selected as a possible participant in this study because you are attending this class, live in Minnesota, and are Hispanic/Latino adult (18 years or older). This study is to complete the research requirement for the degree of Master of Science in Physician Assistant at Bethel University.

If you decide to participate, we will ask you to complete a pretest made up of 10 questions, followed by a diabetes education class that will last 30 minutes, and then complete a posttest made up of the original 10 questions and 3 additional questions about the presentation. The research will be completed in one day and altogether it will take about 90 minutes. The one problem you may experience while participating in this study is completing the pretest and posttest. We will provide clear instructions in Spanish on how to complete the tests, and you may ask for clarification of any questions. The benefit of participating is receiving information on diabetes. No gifts or money will be given to any of the participants.

The information obtained in this study will not be connected to your name nor will any personal information will be collected. We will assign you a participant number in order to keep track of the data collected and maintain the information anonymously. In any written reports or publications, no one will be identified or identifiable and only data will be presented. This signed consent along with the pretest and posttest will remain at a secure location in the Physician Assistant program for 3 years. After the 3 year period all documents will be destroyed in accordance with the program policies.

Your decision whether or not to participate will not affect your future relations with Incarnation/Sagrado Corazon de Jesus Church or Bethel University in any way. If you decide to participate, you are free to discontinue participation at any time without affecting such relationships.

This research project has been reviewed and approved by Bethel University's review of research with humans. If you have any questions about the research and/or research participants' rights or wish to report a research related injury, please call this project's research chair Mary Schulze Michener, Ed.D. with Bethel University at 651-635-8001.

You will be given a copy of this form to keep.
You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and have decided to participate. You may withdraw at any time without consequences after signing this form should you choose to discontinue participation in this study.

_____

Signature Date

Appendix E: Informed Consent Form (Spanish)

Consentimiento informado para los participantes de la Iglesia Encarnación/Sagrado Corazón de Jesús

Programa de educación sobre la diabetes para hispánicos en Saint Paul/Minneapolis, MN

Investigadores: Nohemi Haben y Misty Schmitz

Le invitamos a participar en un estudio sobre educación de la diabetes para la población hispánica de Minnesota. Con este estudio deseamos conocer si proveer materiales en español hace una diferencia en el entendimiento de la diabetes. Usted fue seleccionado como un posible participante en este estudio porque está asistiendo a esta clase, vive en Minnesota, y es un adulto hispánico/latino mayor de 18 años. Este estudio es para completar un requisito de investigación para el título de Maestría en Ciencias en Asociado Médico (PA) en Bethel University.

Si decide participar, le pediremos que complete un examen preliminar que consiste de 10 preguntas, seguido de una clase de educación sobre la diabetes que durará 30 minutos, y luego que complete otro examen que consiste de las 10 preguntas originales y 3 preguntas adicionales sobre la presentación. Toda la investigación durará un día y llevará aproximadamente 90 minutos. El único problema que puede tener al participar de este estudio es completar el examen preliminar y el examen posterior. Recibirá instrucciones claras en español sobre cómo completar los exámenes, y usted puede preguntar cualquier duda que tenga sobre las preguntas. El beneficio de participar es recibir información sobre la diabetes. Los participantes no recibirán obsequios ni dinero.

La información obtenida en este estudio no se conectará con su nombre ni recopilaremos ninguna información personal. Le asignaremos un número de participante para llevar un seguimiento de los datos recopilados y mantendremos su información anónima. Nadie será identificado ni identificable en ningún informe o publicación, y solo se presentará la información. Este consentimiento firmado junto con el examen preliminar y el examen posterior permanecerán en un sitio seguro en el programa de Asociado Médico por 3 años. Luego de un periodo de 3 años se destruirán todos los documentos de acuerdo con las políticas del programa.

Su decisión de participar o no, no afectará de ninguna manera sus relaciones futuras con la Iglesia Encarnación/Sagrado Corazón de Jesús o con Bethel University. Si decide participar, usted es libre de interrumpir su participación en cualquier momento sin afectar dichas relaciones.

Este proyecto de investigación ha sido revisado y aprobado por la revisión de investigaciones con humanos de Bethel University. Si tiene alguna pregunta sobre la investigación o sobre los derechos de los participantes o desea informar una lesión relacionada con el estudio de investigación, comuníquese con el catedrático de investigación de este proyecto, la Doctora en Educación (Ed.D.) Mary Schulze Michener con Bethel University al 651-635-8001.

Usted recibirá una copia de este formulario para sus registros.
Usted está tomando una decisión sobre si desea participar o no. Su firma indica que ha leído la información anterior y ha decidido participar. Si luego de firmar este formulario decide interrumpir su participación en el estudio, puede hacerlo en cualquier momento sin sufrir consecuencias.

_____ _____

Firma Fecha

Appendix F: Permission to use education material

National Institute of Diabetes and Digestive and Kidney Diseases

NDEP

You Are the Heart of Your Family...Take Care of It. (Usted es el corazón de la familia...cuide su corazón.) Flip Chart

This bilingual flip chart can help promotoras, community health workers, and other health educators teach Hispanic and Latino Americans about the link between diabetes and heart disease. The flip chart includes easy-to-understand illustrations, scripted presentations in Spanish and English, and questions to facilitate discussion. The flip chart also contains four copier-ready handouts, available in hard copy and on the accompanying CD.

Esta rotafolio bilingüe sirve para ayudar a los promotores de salud comunitarios educar a personas o grupos hispanos o latinos sobre la conexión existente entre la diabetes y las enfermedades del corazón. Incluye ilustraciones de fácil comprensión acompañadas de una presentación escrita (en español e inglés) y preguntas de discusión para ayudar a guiar la conversación. Cuatro copias maestras de volantes también están incluidas tanto en el rotofolio como en el CD anexo para que pueda sacar cuantas copias necesite.

Last reviewed: 09/01/2014

Contact Us

Health Information Center

- Phone: 1-800-860-8747
- TTY: 1-866-569-1162
- Email: healthinfo@niddk.nih.gov
- Hours: 8:30 a.m. to 5 p.m. eastern time, M-F

Find Us on Facebook

Follow Us on Twitter

Appendix G: Permission to use facilities at Incarnation Catholic church

BETHEL UNIVERSITY

Nohemi Haben <noh49242@bethel.edu>

Diabetes Education for the Hispanic/Latino Community

McGirkm@aol.com <McGirkm@aol.com> Wed, Feb 3, 2016 at 7:46 AM
To: noh49242@bethel.edu
Cc: mcdonoughk@archspm.org

Dear Nohemi,

Father McDonough forwarded me your e-mail regarding Diabetic Education. I am coordinating the wellness activities in the parish and we are interested in working with you on a diabetes education class. Yes, it would work best if it took place here at the parish. Please call me and we can set up an appointment.

Sincerely,

Sister Margaret McGuirk
Incarnation / Sagrada Corazon Church
3801 Pleasant Avenue S.
Minneapolis, MN 55409
612-822-2101
612-247-4426 (Cell)
mcgirkm@aol.com

Appendix H: Bulletin announcement - Participant recruiting tool

BETHEL UNIVERSITY

Nohemi Haben <noh49242@bethel.edu>

March 6th Sunday at 12:30

McGirkm@aol.com <McGirkm@aol.com> Tue, Feb 16, 2016 at 12:56 PM
To: noh49242@bethel.edu

Dear Nohemi,
I was able to confirm that you can give the presentation in the basement on March 6th after the 11:30 Mass. (More of less at 12:30.) Here is the announcement. Is this okay?

You are the heart of the family...take care of it.
Having diabetes can lead to a heart attack or stroke
but it doesn't have to.

Usted es el Corazón de la familia...cuide su Corazón
La diabetes puede producir
un ataque al corazón o una embolia
Pero no tiene que ser así.
Learn more about diabetes. *Aprender mas sobre diabetes*

6 de Marzo, Domingo a las 12:30 PM
Nohemi Haben, PA-S2 va a dar la platica

Sagrado Corazon de Jesus
3801 Pleasant Avenue S
Minneapolis, MN 55409
612-822-2101

Appendix I: Education program handout (English)

You are the heart of your family
...take care of it.

Having diabetes can lead to a heart attack or stroke — *but it doesn't have to.*

You can live longer for your family by taking care of your heart. Over time, high sugar levels in the blood can damage vital organs, such as your kidneys, your eyes, and your heart. High blood pressure is a serious disease that makes your heart work too hard. And bad cholesterol (LDL cholesterol) builds up and clogs your heart's arteries. Controlling these three medical problems leads to a longer and healthier life.

Ask your doctor these questions:

1. What are my blood sugar, blood pressure, and cholesterol numbers?
2. What should they be?
3. What actions should I take to reach these goals?

You can live longer for your family, improve your health, and reduce your risk of heart disease.

Take action now:

- Eat more fruits, vegetables, beans, and whole grains.
- Eat tasty foods that have less salt, saturated fat, and *trans* fat. Order a free recipe booklet and meal planner for making healthy meals by calling 1-888-693-NDEP (1-888-693-6337).
- Get at least 30 minutes of physical activity on most days or every day. Physical activity helps you keep a healthy weight.
- Stop smoking—ask for help to quit. Call 1-800-QUIT-NOW (1-800-784-8669).
- Take medicines the way your doctor tells you.
- Ask your doctor about taking medicine to protect your heart, such as aspirin or a statin.

Ask your family and friends to help you take care of your heart and your diabetes.

Use this chart to keep track of your A1C, blood pressure, and cholesterol numbers when you visit your doctor. Work with your doctor, friends, and family to reach your goals.

GOAL: TAKE CARE OF YOUR HEART

Talk to your doctor about what your goals should be.

1. A1C

The A1C test—short for hemoglobin A1C—measures your average blood sugar over the last three months.

Suggested A1C Goal for Many People: **Below 7**

Test at least twice a year

Date _____

Result _____

2. BLOOD PRESSURE

High blood pressure makes your heart work too hard.

Suggested Blood Pressure Goal for Most People: **Below 140/90** unless your doctor helps you set a different goal.

Test at every visit

Date _____

Result _____

3. CHOLESTEROL

Bad cholesterol, or LDL cholesterol, builds up and clogs your heart arteries.

Suggested Goal: **Ask what your cholesterol numbers should be.**

Test at least once a year

Date _____

Result _____

1-888-693-NDEP (1-888-693-6337) • TTY: 1-866-569-1162
www.YourDiabetesInfo.org
Revised July 2014 NIH Pub. No. 14-5058 NDEP-58

NDEP National Diabetes Education Program

A program of the National Institutes of Health and the Centers for Disease Control and Prevention

Appendix J: Education program handout (Spanish)

Usted es el corazón de la familia ...cuide su corazón.

La diabetes puede producir un ataque al corazón o una embolia, *pero no tiene que ser así.*

Usted puede vivir más tiempo y disfrutar de su familia si cuida su corazón. Controle el azúcar en la sangre, la presión arterial y el colesterol. Las concentraciones altas de azúcar en la sangre pueden, con el tiempo, dañar sus órganos vitales, tales como sus riñones, sus ojos y su corazón. La presión alta es una enfermedad grave que hace que su corazón trabaje más. El colesterol malo (el colesterol LDL) se acumula y tapa las arterias. Si controla estos tres problemas médicos podrá tener una vida más larga y más sana.

Pregúntele al médico lo siguiente:

1. ¿Cuáles son los resultados de mis pruebas de azúcar en la sangre, presión arterial y colesterol?
2. ¿Cuáles deberían ser los resultados ideales?
3. ¿Qué debo hacer para lograr esos resultados?

Usted puede vivir más y disfrutar de su familia, mejorar su salud y reducir el riesgo de sufrir de enfermedades del corazón.

Actúe ahora mismo:

- Consuma más frutas, vegetales, granos y cereales integrales.
- Coma alimentos sabrosos bajos en sal, grasas saturadas y grasas *trans*. Llame al 1-888-693-6337 (1-888-693-NDEP) y pida gratis el libro de recetas y plan de comidas.
- Haga por lo menos 30 minutos de actividad física todos o casi todos los días. La actividad física le ayudará a mantener un peso sano.
- Deje de fumar. Busque ayuda para dejar el tabaco. Llame al 1-800-784-8669 (1-800-QUIT-NOW).
- Tome los medicamentos como se los receta el médico.
- Pregúntele a su médico si es aconsejable tomar medicinas para proteger su corazón, tales como la aspirina o la estatina.

Pida a sus familiares y amigos que le ayuden a cuidar su corazón y su diabetes.

Cuando vaya a consulta con el médico, lleve este registro y anote los resultados de sus pruebas de A1C, presión arterial y colesterol. Trate de alcanzar los resultados ideales con la ayuda de su médico, familiares y amigos.

META: CUIDE SU CORAZÓN

Hable con su médico sobre cuáles deben ser sus resultados ideales.

1. A1C

La prueba A1C (A-uno-C), manera abreviada de referirse a la prueba de la hemoglobina A1C, mide el promedio de azúcar en la sangre durante los últimos tres meses.

Resultado deseable para la A1C para muchas personas: **Por debajo de 7**

Hágase la prueba por lo menos dos veces al año
Fecha _____
Resultado _____

2. PRESIÓN ARTERIAL

La presión arterial alta hace que el corazón trabaje demasiado.

Resultado deseable para la presión arterial para la mayoría de las personas: **Por debajo de 140/90**, a no ser que su médico le indique un nivel diferente.

Hágase la prueba cada vez que vaya a consulta médica
Fecha _____
Resultado _____

3. COLESTEROL

El colesterol malo, o colesterol LDL, se acumula y tapa los vasos sanguíneos.

Resultado deseable: Pregunte cuáles deberían ser sus niveles de colesterol.

Hágase la prueba por lo menos una vez al año
Fecha _____
Resultado _____

1-888-693-6337 (1-888-693-NDEP) • TTY: 1-866-569-1162
www.diabetesinformacion.org
Revisada en julio del 2014 Publicación NIH No. 14-50585 NDEP-58

NDEP National Diabetes Education Program

Un programa de los Institutos Nacionales de la Salud y los Centros para el Control y la Prevención de Enfermedades