Improving Latino Diabetes Patients' Physiologic Measurements Utilizing Culturally Competent Interventions

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Improving Latino Diabetes Patients’ Physiologic Measurements Utilizing Culturally Competent Interventions

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Dedication

I dedicate this Doctorate of Nursing (DNP) project and degree to my late parents Janna and Charles M. Hoogasian. Thank you so much for all the endless love, support, wisdom, and guidance you have given to me in my childhood and early adulthood. From the bottom of my heart, I will forever be grateful for all you have both done for me.
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Abstract

**Problem:** Latinos have a high risk of developing poorly controlled type 2 diabetes which may be at least partly due to their cultural beliefs. **Purpose:** Many health care clinics lack consistent use of culturally competent educational interventions when providing diabetes education to Latinos. The literature demonstrates that clinics using culturally competent interventions tend to accomplish significant clinical improvements in diabetes outcomes such as lower glycosylated hemoglobin (A1C), weight loss, increase in daily steps walked, and improved diabetes knowledge. **Methods:** The purpose of this Doctorate of Nursing Practice (DNP) Project was to use Latino-tailored culturally competent diabetes education to achieve a reduction in weight, increase in steps walked daily, lower A1C levels, and improved diabetes knowledge by using four, ninety minute sessions for a group of five Latino adults with type 2 diabetes. Project participants took a diabetes knowledge test before and after the intervention. Participants’ score on the diabetes knowledge test, A1C levels, weight, and total average daily steps taken were measured before and after the intervention. **Results:** There was a decrease in mean weight and an increase in mean diabetes knowledge test scores post intervention. There were no improvements in mean A1C levels nor in mean daily average steps walked post intervention. **Conclusion:** Culturally competent interventions hold promise for improving diabetes and other health outcomes for Latino adults with type 2 diabetes. **Keywords:** Latino, diabetes, A1C, daily steps, weight, culture, education, culturally competent.
Introduction and Background

There is a great need to improve diabetes and health outcomes in the adult type 2 diabetes Latino population today (Vincent, 2009). Type 2 diabetes is a progressive illness and can result in many unpleasant health complications over time such as erectile dysfunction, increased risk of infection, peripheral neuropathy, foot and other limb amputations, retinopathy, blindness, kidney failure, and heart disease (Centers for Disease Control, 2014). Those with diabetes may also experience financial difficulties due to high cost of medications and treatments, increased risk of job loss and disability, decreased overall quality of life, and/or increased mortality (CDC, 2014; Vincent, 2009).

Latinos tend to have a greater risk of developing diabetes, more poorly controlled diabetes, and greater prevalence of debilitating diabetes complications than do non-Latinos (CDC, 2014; Cusi & Ocampo, 2011; Kollannoor-Samuel, Chhabra, Fernandez, Vega-Lopez, Perez, Damio, & Perez-Escamilla, 2011; Shreck, Gonzalez, Cohen, & Walker, 2013). The Latino population is steadily on the rise and will make up nearly half of the United States population in fifty years (CDC, 2014; Concha, Mezuk, & Duran, 2014). In addition to this, thirteen percent of Latinos currently have diabetes, compared to only 7.6 % of Caucasians; in addition, the number of Latinos with diabetes has been steadily increasing over the years (CDC, 2014; Vincent, 2009). This suggests that in the future there will be an even higher number of Latinos suffering from diabetes and its
complications which makes this a huge topic of concern for public health. In addition, Latinos with diabetes suffer overall worse control of blood glucose levels and glycosylated hemoglobin (A1C) levels than Caucasians as well as suffer from diabetes complications such as retinopathy, kidney failure, and/or death in higher numbers (Liebman, Heffernan, & Sarvela, 2007; Office of Minority Health, 2012; Rotberg, Greene, Ferez-Pinzon, Mejia, & Umpierre, 2016). Specifically, Latinos with diabetes are 1.6 times more likely to develop kidney disease, two times more likely to need foot amputations, and 1.3 times more likely to die than Caucasians (Kaplan, Billimek, Sorkin, Ngo-Metzger, & Greenfield, 2013; OMH, 2012).

In the entire state of Massachusetts, 9.3 % of Latino adults have diabetes; in Worcester county or Central Massachusetts this percentage is even greater at 11.9 % (Massachusetts Department of Public Health, 2010). Even more alarming is that 73.2 % of Latino men and 51.3 % of Latino women in Worcester County are overweight or have a body mass index (BMI) of 25 to 29.9 (Massachusetts Department of Public Health, 2010). 27.8 % of Latino men and 22 % of Latino women are diagnosed as being obese or having a BMI of 30 or greater (Massachusetts Department of Public Health, 2010). The age adjusted mortality rate for diabetes in Latinos in Worcester County is 28.1 compared to 17 in Caucasians (Massachusetts Department of Public Health, 2010). These statistics make a strong case that Latinos in Worcester county have a significant, unresolved problem with being overweight and having very poorly controlled diabetes.
It is acknowledged that there are major differences in cultural beliefs regarding health, wellness, and diseases existing between Latino patients with diabetes and their Caucasian providers, including cause of their diabetes diagnosis and appropriate diabetes treatments (Weller, Baer, Garcia de Alba Garcia, & Salcedo Rocha, 2012). Certain cultural beliefs and practices may be very important for Latinos in general to uphold, but may not be of any significance at all for Caucasians (Detz, Mangione, Nunez de Jaimes, Noguera, Morales, Tseng, & Moreno, 2014; Weller et al., 2012). Some examples of what are important cultural beliefs and practices to Latinos with regards to health include the following: having one’s family members and/or close friends at medical or educational appointments for support, discussion of the role of stress and how it affects health and diabetes management, and the role of traditional Latino folk medicine/remedies (Castillo, Giachello, Bates, Concha, Ramirez, Sanchez, Pinsker, & Arrom, 2010; Welch, Allen, Zagarins, Stamp, Bursell, & Kedziora, 2011). Also of importance to the Latino culture with regards to diabetes management are use of bilingual providers and or certified interpreters if there is any lack of English proficiency for the Latino patients, use of pictures and easy to understand reading material in case of low literacy levels, and incorporation of Latino diet and exercise preferences in advice given by diabetes providers and educators (Castillo et al., 2010; Martyn-Nemeth, Vitale, & Cowger, 2010; Vincent, Pasvogel, & Barrera, 2007; Welch et al., 2011).

Those diabetes health care providers and educators who routinely practice the above described Latino specific diabetes interventions are practicing Latino
specific culturally competent interventions (Welch et al., 2011). Many health care facilities and clinics lack consistent practice of the above described culturally competent interventions when providing medical care and/or education to Latinos with diabetes (Baig, Benitez, Locklin, Campbell, Schaefer, & Heuer, 2014). Use of these interventions has great potential for improving A1C levels, BMI, exercise habits, diabetes knowledge, and other health outcomes. An unwillingness to incorporate Latino culture into diabetes education sessions can possibly lead to misunderstanding between Latino patients and their non Latino health care provider/educator, lack of trust, high A1C levels, poor overall control of diabetes and health, as well as increased mortality (Kaplan et al., 2013). Therefore, it is important that culturally competent interventions be incorporated into diabetes educational sessions with Latino adults with type 2 diabetes in order to help improve diabetes management, promote high quality of life, and to potentially save lives.

**Problem Statement**

The risk of poorly controlled type 2 diabetes among adult Latinos in Worcester County, Massachusetts is indicated by a high prevalence of high BMI, high A1C levels, low number of daily steps walked, and poor diabetes knowledge and may likely result from a lack of culturally competent interventions used by diabetes health care providers and diabetes educators.
Research Question

Will use of culturally competent diabetes education classes for Latino adults with type 2 diabetes lower A1C levels, lower weight, increase total daily steps, and improve diabetes knowledge post intervention?

Review of the Literature

The literature review that was used for this DNP project proposal was an integrative literature review, as a thorough selection of both experimental and non-experimental studies were read and analyzed (Whittemore & Knafl, 2005). This type of literature review is quite appropriate for a quality improvement project such as a DNP project because it focuses on finding and using the best evidence available on any given nursing or medical topic (Whittemore & Knafl, 2005). The purpose of this literature review was to thoroughly examine, compare, and analyze the existing knowledge with regards to what is known and being practiced for culturally competent diabetes education interventions in adult Latinos with type 2 diabetes. The goal was to use the best possible interventions found in the literature and apply them in the DNP project to potentially improve health outcomes in Latinos: diabetes knowledge, A1C levels, daily steps taken and weight.

The keywords used in this evidence search were: diabetes, glucose, A1C, Hispanic, Latino, culture, body mass index, diabetes knowledge, education, and cultural competency. Inclusion criteria for research studies included in this
literature review were peer-reviewed studies from 2007-2016, in the English language, and included only patients ages 18 and older. Preference was especially given to studies focusing on pre test/post test differences before and after interventions, using randomized controlled trials. PubMed, CINAHL, and PsycINFO were used to search for studies, in addition to performing several general online searches through the University of Massachusetts Amherst (UMASS Amherst) library website www.umass.edu/library. The six final research studies chosen to be analyzed in this literature review were all from the general online searches through the UMASS Amherst library website www.library.umass.edu

PubMed search: the keywords “diabetes, Latino, and cultural competency” produced 38 studies. No studies were chosen for their interventions from the PubMed search because of the following reasons that did not work well given the goals of this DNP project: fourteen of the studies were on a different type of diabetes than type 2, four studies were only on preventing diabetes, one study was too old as it was performed in 2002, one study used a pharmacist only in their intervention as opposed to any other personnel, one study only assessed acculturation, one study only focused on improving depression in diabetes patients, one study did not use any Latinos in the research, one study focused on cardiovascular disease in Latinos and not on diabetes, four studies used non medical laypersons for their intervention, four studies were not available in English, one study only focused on measuring genetic knowledge of diabetes, two studies did not demonstrate any success with regards to improving A1C, weight,
exercise, or diabetes knowledge as a result of their intervention, and two studies were not peer reviewed.

CINAHL search: “diabetes, Hispanic, and culture” keywords generated 104 studies. “Diabetes, Latino, and culture” keywords produced 58 results in PsycINFO. Similar to reasons listed above, none of these studies’ interventions from CINAHL or PsycINFO were chosen to be in the DNP project because they contained one or more of the following problems that are not appropriate for use in the DNP project: subjects were only women, subjects were only children, studies not available in English, studies were older than 2007, studies focused only on language concordance between provider and patient, studies focused only on use of a community lay person to improve diabetes outcomes, studies focused only on other illnesses such as hypertension or depression or hyperlipidemia, studies used only non-Latinos in their research, studies used pregnant women with gestational diabetes, studies did not demonstrate improvement of A1C or weight or exercise or diabetes knowledge post intervention.

Four general UMASS Amherst library website online searches were performed. The first search used the keywords “diabetes and Latino and cultural competency” and generated 191 studies. Of these, only three studies were chosen to be used for their intervention: Martyn-Nemeth et al., 2010; Vincent, 2009; Welch et al., 2011. The remaining 188 studies were not chosen due to one or more of the following reasons: not available in English, older than 2007, focused only on type 1 diabetes, focused not on diabetes but on Alzheimers or cataracts or
breastfeeding or asthma or vaccination history, no use of Latinos in the study, or no success with improving A1C, weight, exercise, and/or diabetes knowledge post intervention.

The second search used the keywords “A1C and Latino and culture” and generated 57 research studies. Of these, only one was chosen for its intervention: Rotberg et al., 2016. The studies by Welch et al., 2011 and Martyn-Nemeth et al., 2010 were also found for a second time in this search. The remaining 54 research studies were not chosen due to one or more of the following reasons: no use of Latinos, focus on depression and not diabetes, focus on type 1 diabetes only, focus on gestational diabetes only, focus on acculturation only, focus on children and not adults, and/or no success with improving A1C, weight, exercise, and/or diabetes knowledge post intervention.

The third search used the keywords “A1C and Hispanic and cultural competency” and generated 22 research studies. Of these, one research study (Vincent et al., 2007) was used for its intervention, and two other studies (Welch et al, 2011; Vincent et al., 2007) were found that were already discovered in previous searches already described. The other 19 studies’ interventions were not chosen due to one or more of the following reasons: study was too old, intervention focused on pharmacist guidance only, performed with African Americans and not Latinos, performed in a church setting, used only standardized patients, and focused on providing support to patients at the Mexican-US border.
The fourth search used the keywords “diabetes and Latino and education” and generated 96 research studies. Of these, only one study (Castillo et al., 2010) was used for its intervention. The other remaining studies were not chosen for their interventions due to one or more of the following reasons: the study was older than ten years, health outcomes such as A1C and weight and exercise and diabetes knowledge did not show any evidence of improvement, studies were not focused on Latinos but on other ethnic and/or racial groups, studies were only performed with children with type 1 diabetes, focus was on depression in diabetes and not on A1C or weight or diabetes knowledge, and focus on heart failure or hypertension instead of diabetes.

The final six studies were chosen based on the following: most recent publication, greatest number of research subjects used, success of culturally competent interventions improving A1C or weight or exercise or diabetes knowledge post intervention, and studies conducted in the United States. Information from the Centers of Disease Control and Prevention and the Office of Minority Health (2012) were chosen due to their ethnic and medical relevance. Exclusion criteria included: studies conducted outside of the United States, studies written in another language besides English, use of type 1 diabetes patients, use of pediatric patients under 18 years of age, and studies older than 2007.

All of the final six chosen research studies that were described above measured success of use of culturally competent interventions. The three studies
with 46 or more participants were able to achieve statistically significant improvements \((p< 0.05)\) in \(A_1C\) levels post intervention (Castillo et al., 2010; Rotberg et al., 2016; Welch et al., 2011); the remaining three studies had fewer than 20 participants and did not achieve a significant decrease in \(A_1C\) levels (Martyn-Nemeth et al., 2010; Vincent, 2009; Vincent et al., 2007). This indicates that the larger the sample size, the more one can trust that group is truly representative of the greater population and that there is a lesser risk of chance playing a part in determining the outcome of the study. Keeping this in mind, future projects should be conducted using as large of a sample size as possible in order to strengthen the probability of the results being significant. Another important reason to use as large a sample size as possible in a project or study would be to make sure that there are still enough participants left in the project after one considers that some may drop out before or during the course of the project and interventions.

Only a third of the research studies were able to demonstrate a meaningful and significant improvement in weight and/or BMI post intervention. This reinforces what many clinicians and health care providers know: lifestyle changes are very difficult to not only make, but to successfully sustain over an extended period of time. In fact, the only two studies that demonstrated improvement in BMI were the only two studies that were conducted for only two months (Vincent, 2009; Vincent et al., 2007); the remaining four studies performed their interventions for much longer periods of time, thus supporting the notion of the difficulty sustaining diet and exercise changes long term (Castillo et al., 2010;
Martyn-Nemeth et al., 2010; Rotberg et al., 2016; Welch et al., 2011). Knowing that achieving significant, clinically meaningful results with weight or BMI is very difficult, perhaps an alternative plan would be for future projects to focus more on project participants’ ability to improve health and diabetes knowledge post intervention. For instance, researchers can measure participants’ knowledge with regards to proper diet, exercise, and diabetes knowledge in general before and after the intervention, and can determine if there are any improvements once the project has concluded. This could be another way of determining “success” of the project.

Two thirds of the research studies analyzing improvements in blood pressure post intervention were able to demonstrate that their culturally competent interventions worked (Castillo et al., 2010; Rotberg et al., 2016). Three studies used as part of their interventions bilingual clinicians, multiple educational sessions over several months, and had fairly large sample sizes; however, the one study (Welch et al., 2011) indicating no improvement in blood pressure had an unusually high number of female participants of nearly 70%. This could skew their results if for instance some of the females had just given birth and/or were going through any other hormonal change that could potentially increase their blood pressure. Perhaps this third study (Welch et al., 2011) would have had more positive results had they included more equal numbers of men versus women.

With regards to studies analyzing diabetes self-care, two of three research studies did show a positive and/or significant improvement post intervention. It
was noteworthy to mention that of these two successful studies, one had a very large sample size (Castillo et al., 2010) and the other use a randomized controlled trial (RCT) (Vincent et al., 2007). Neither of the two studies analyzing for improvement in diabetes knowledge post intervention were able to demonstrate significant improvement. These two studies did seem to approach their education diabetes sessions “by the book” with regards to including appropriate components such as Latino traditional disease causes and beliefs, common folk remedies, preferred exercise and nutrition, use of a support person, and bilingual materials (Castillo et al., 2010; Vincent et al., 2007). However, neither study mentioned discussion of the role of stress management with regards to Latino diabetes care. Also, neither study specifically mentioned that they used pictures or diagrams in their educational materials. Perhaps using both or one of these elements could have improved the studies’ results with regards to diabetes self-care. Latinos often describe their lives as stressful, with regards to their disease status and/or family dynamics, and addressing this concern can help show respect to them and their concerns, thus improving potential for boosting their trust in providers, confidence and self-care abilities (Concha et al., 2015). Using educational pictures and diagrams to give to project participants as part of the intervention can help increase comprehension, in case of low literacy levels and/or limited English fluency if non bilingual materials are not readily available (Castillo et al., 2010).

In summary this literature review revealed that including culturally appropriate interventions when attempting to improve diabetes outcomes in Latino adults would likely improve chances of meeting health goals. These health
goals would potentially be one or more of the following: lower A1C levels, lower blood pressure, lower weight/BMI, increase in getting regular exercise, improved or increased diabetes knowledge, and improved diabetes self-care practices (Castillo et al., 2010; Martyn-Nemeth et al., 2010; Rotberg et al., 2016; Vincent, 2009; Vincent et al., 2007; Welch et al., 2011).

Several highly culturally sensitive clinics and medical practices have been using various culturally competent interventions when taking care of adult Latino patients with type 2 diabetes in order to achieve better diabetes and health outcomes (Castillo et al., 2010; Vincent, 2009). Some of the most common culturally competent interventions that demonstrated some degree of success in achieving better diabetes outcomes include the following: use of a community lay person to provide diabetes education and/or holding education sessions either in a clinic or within the Latino community, use of bilingual staff and educators, and encouragement of bringing a support person such as a family member or friend to educational sessions (Castillo et al., 2010; Welch et al., 2011). Other successful culturally competent interventions showing improvement in diabetes outcomes include: discussion of Latino cultural beliefs such as folk remedies as they relate to diabetes management, use of pictorial aids to accommodate for low literacy levels and/or English language difficulty, role of stress and stress management in diabetes control, and incorporation of Latino preferences for diet such as rice and beans, and exercise such as Salsa dancing (Castillo et al., 2010; Martyn-Nemeth et al., 2010; Rotberg et al., 2016; Vincent, 2009; Vincent et al., 2007; Welch et al., 2011). Therefore, it would be very appropriate for future Latino culturally
competent diabetes projects to incorporate one or more of the above described components in their educational interventions in order to improve diabetes health outcomes as well as diabetes knowledge. The number of these components that should be ideally used in a culturally competent diabetes educational intervention for Latinos would depend upon time frame of the project, financial funds available, availability of bilingual staff and/or certified interpreters, as well as specific goals of the project.

**Theoretical Framework**

An appropriate theoretical framework that can be used to address the problem of poorly controlled type 2 diabetes in adult Latino patients is the Hispanic Health Protection Model (HHPM). This HHPM (see Appendix A for a copy of this model) was developed by Latham & Calvillo (2007) in order to address many of the same barriers, beliefs, and features of the Health Belief Model. The Health Belief Model (HBM) states that a person will likely engage in a certain healthy behavior if she/he believes a disease state can be avoided, if she/he believes that doing a certain healthy behavior will help avoid the disease, and if she/he believes she/he is capable of performing the healthy behavior (Das & Evans, 2014). Building on the HBM, the HHPM is tailored to the values and characteristics unique to Latinos (see description in paragraphs below). The HHPM was created specifically to help health care providers understand that Latino patients may not necessarily have the same ideas and beliefs that Caucasians have with regards to
causes of a disease such as diabetes as well as what is a proper medication or treatment for that disease (Latham & Calvillo, 2007).

In the HHPM, the three main constructs are the sociocultural/physiological factors, the enabling factors, and outcomes (Latham & Calvillo, 2007). The traits and characteristics that fall under the sociocultural factors would be characteristics that describe the Latino patients in more detail to better understand their: income, level of education achieved, gender and age of patient, how acculturated the patient is to United States culture, exercise habits and dietary preferences, as well as how Latino patients envision their health state and how they feel they can control their health (Latham & Calvillo, 2007). Physiological factors may include: blood glucose levels, A1C levels, weight and BMI, blood pressure, and current cholesterol level (Latham & Calvillo, 2007). These physiological factors describe the health goals related to good control of diabetes and health.

Enabling factors may include: barriers to achieving control of one’s health, level of support from family and friends, support felt from health care providers, and sense of self-efficacy (Latham & Calvillo, 2007). These factors can either potentially help or hinder the achievement of the desired diabetes and other health goals.

Outcomes refers to how effectively one can care for oneself and achieve desired health outcomes; it can refer to a Latino patient’s blood glucose checking habits, adherence to taking prescribed medications, attending all scheduled
medical and diabetes education visits, as well as ability to achieve goals for $A_1C$, weight, lipids, BMI, and blood pressure (Latham & Calvillo, 2007).

In summary, the HPPM is a most ideal framework for considering, respecting, and addressing the culturally unique needs of Latino patients with poorly controlled diabetes. This model encourages providers and educators to assess the background, belief, barriers, and needs of Latino patients from the Latino specific cultural perspective and to then apply that knowledge towards improving weight, $A_1C$, exercise, and other diabetes and health outcomes. This HHHPM was utilized to assist the DNP student to continuously consider and respect the Latino patient’s cultural needs with regards to the manner in which the educational intervention was carried out for the DNP Project.

It was interesting to note that in the literature review conducted for this DNP project, many important research studies on culturally competent diabetes interventions for Latinos did not use any type of nursing model or theory upon which to guide their intervention. One study each used the following nursing models for their framework: The Chronic Disease Self-Management model, Social Cognitive Theory, Social Ecological Model (Martyn-Nemeth et al., 2010; Rotberg et al., 2016; Vincent, 2009). These nursing models are not specific for use in Latinos with diabetes because the models do not provide sufficient guidance (compared to the HHHPM) on how to tailor educational interventions specific to the Latino population. The HHHPM was referenced and used in three different research studies pertaining to improving health outcomes in Latinos with
diabetes (Latham and Calvillo, 2009; Latham and Calvillo, 2013; White, Osborn, Gebretsadik, Kripalani, & Rothman, 2013). Out of all the nursing models used in various studies, the HHPM appears to be the most specific one to have been used in this DNP project to guide Latino patients to successfully improve their diabetes knowledge, A1C levels, weight, and exercise habits.

Project Design and Methods

This was a pre-post test descriptive study. The general intervention of this DNP project consisted of holding weekly diabetes educational sessions that were culturally competent for a small group of Latino adults with type 2 diabetes. It was intended to have eight to ten participants in the project; though a total of thirteen patients agreed to be in the project, a total of only five actually attended the sessions. The sessions were ninety minutes long, and were held weekly for four weeks. The sessions were conducted in English primarily, though a bilingual Spanish-English endocrine fellow was available during the sessions to translate any content to project participants as needed.

The content of the sessions (see Appendix B for a list of which topics were shown in which education sessions) included discussion of the following: type 2 diabetes pathophysiology, diabetes complications, hypoglycemia and hyperglycemia signs and symptoms, hypoglycemia treatment, blood glucose monitoring, A1C test, proper diet, exercise and use of pedometers, foot exams, eye care, screening for diabetes complications, diabetes medications, wound care, role of stress in affecting diabetes management, specific Latino cultural beliefs as they
relate to diabetes, role of family support, relationships with diabetes and other health care providers, and safety of folk remedies.

In addition to discussion of these above listed topics, bilingual diabetes educational materials were also distributed to project participants. A bilingual telenuevo showing Latino adults with diabetes engaging in healthy behaviors was intended to be shown to project participants. However, due to technical difficulties during the education sessions, this video was not able to be shown to participants. Instead, the website for this video was given to participants so that they could watch it at home at their convenience.

**Setting and resources**

The setting was in a large medical center in the Northeast in their diabetes outpatient clinic. Patients in the study were already familiar with this setting from attending their routine diabetes clinic visits with their health care providers in the same building. It was intended that the project would consist of five, weekly, ninety-minute culturally competent diabetes educational sessions for selected Latino patients, held on either weeknights and/or on the weekends. However, due to an unexpected blizzard, the fourth of the five education sessions was cancelled to protect the safety of the participants. The material planned for that session was included in the fifth education session. It was intended that parking vouchers would be provided to patients that participate in the educational sessions, so that they would not have to pay for parking and thus financial hardships would not
prevent them from being in this project. However, unfortunately, the diabetes department was not able to give these free vouchers.

Resources: This project had the support of the entire diabetes department including all of the physicians and nurse practitioners, the nurse manager, and clinical staff. No additional costs were incurred for the facilities. The DNP student helped give patients incentives to be and stay in the project by providing each patient in the project with a free pedometer to track his/her daily steps walked, as well as a collection of healthy Latino inspired recipes. Public health leaders at Merck, Co. also served as resources for this project, as the DNP student met with them twice for ideas and support for this project, as well as assistance with obtaining appropriate educational materials for diabetes that were culturally competent for use with Latinos.

Description of the group, population, or community.

Out of a total of approximately 181,045 total people living in Worcester, Massachusetts, 60 % are Caucasians, and the Latino community is made up of approximately 20 % or 37,818 people (Suburban Stats, 2016). Latinos make up the largest single ethnic group in Worcester (Suburban Stats, 2016). In the 38 cities and towns in the greater Worcester county there is a total of 798,552 people, of which 85 % are Caucasian and 9 % are Latino (Suburban Stats, 2016); Latinos are still the largest minority group in the state.
The Joslin Center for Diabetes has an extensive program designed to help improve diabetes management specifically for Latinos with diabetes in the Boston, Massachusetts area. The Joslin Center created a Latino Diabetes Advisory Board over ten years ago. The goals of the board are to improve diabetes management in area Latinos via providing bilingual diabetes staff and providers at the Joslin Center, culturally appropriate educational materials for Latino patients with diabetes, health screenings, and other community outreach programs (Joslin, 2016).

The DNP student did not work with the Joslin Center of Diabetes for this project. However, the Joslin Center of Diabetes Latino Diabetes Advisory Board was mentioned here and described in detail because it is inspirational and is a great example of how a major center for diabetes took an important step towards tailoring diabetes management specifically for Latinos. Therefore, similar to that of the Latino Diabetes Advisory Board at Joslin Center, one intended intervention of the DNP project was to disseminate to patients in the project bilingual, culturally appropriate diabetes education materials with pictures for easy and maximum comprehension.

Within Worcester County the top available service to promote and protect the health of Latinos is “The Healthy Food Outreach Project” by the Hispanic-American Institute which also includes the Healthy Eating Workshop held in Worcester in March, 2016 (Hispanic American Institute, 2016). The Healthy Eating Workshop consisted of various Latino community leaders, government
officials, and diabetes health specialists giving Latino specific lectures and demonstrations on healthy eating, exercise and tips for optimal diabetes management (Hispanic American Institute, 2016). However, as of the present date and time there are yet no known culturally competent interventions in place at the DNP project site for the routine care and education for Latino adults with type 2 Diabetes.

This community project is being mentioned here because it is another great example of how to tailor traditional diabetes management towards Latino adults with diabetes. Therefore, a second intended intervention of the DNP project was similar to that of the Healthy Eating Workshop: to have community experts in diabetes and Latino health (such as an endocrinologist and also an endocrine fellow who is Latina) give expert, culturally appropriate advice to patients in the DNP project educational sessions on healthy eating and exercise to help manage their diabetes better.

**Sample**

Inclusion and Exclusion Criteria: The DNP project aimed to recruit approximately eight to ten Latino adult patients with type 2 diabetes who were over eighteen years of age, not pregnant and who were interested in obtaining more knowledge regarding how to better control their diabetes. Patients appropriate to be in this project included those who are social and enjoy being in a group setting; this was determined by asking potential participants before being in the project if they felt comfortable being around others in a group setting and
were willing to interact with other participants in the project. There were no upper or lower limits with regards to A1C levels, weight, exercise habits, and/or diabetes control of potential participants. It was preferred that patients fluent in English be in the study, however there was a bilingual Spanish endocrine fellow available at each of the project sessions for those who needed interpretation of any material.

Those not able to be in the project included: non Latinos, patients under the age of eighteen years, pregnant patients, patients not diagnosed with diabetes, and pre diabetic patients. Patients chosen to be in the project have had type 2 diabetes for at least one year or longer, and were all verbally asked for length of diagnosis during the selection process for the project.

A convenience sampling method was used to recruit patients to be in the project by the following methods: word of mouth by the DNP student who is also a diabetes nurse practitioner, word of mouth by various health care providers in the community, and/or use of posters describing the project that was displayed in the diabetes outpatient clinic waiting area as well as in several of the clinic rooms. A Latina, bilingual endocrine fellow was also available at each of the educational sessions to help with language comprehension and medical guidance.

Finally, all of the participants were either living in Worcester or in a nearby town in order to be sure that all project participants were able to get to the clinic easily for the educational sessions. Once the sample of interested participants were identified to be in the project, a written consent form was given to and reviewed with each participant. The consent form was read and signed by each
participant and mentioned the following: the purpose and goals of the project, who could be part of the project, project setting and timeline, what participants would do during the project, project benefits and risks, patient confidentiality and protection of personal information, the incentives to be in the project, how questions would be answered in the project, the right to quit the project at any time without penalty, what to do if injured as a result of being in the study, as well as the subject statement of voluntary consent.

**Organizational analysis of project site**

The four weekly, ninety minute culturally competent diabetes education sessions were held within the outpatient diabetes clinic on a day of the week and time that was the most convenient to the study participants. These sessions did not interfere with the operation of the regular working hours of the adult outpatient diabetes clinic. The project site of the adult diabetes clinic is a busy place in which adult diabetes patients are seen Monday through Friday 8 AM until 5:30 PM within the approximately ten to twelve separate exam rooms located within the adult diabetes clinic and sometimes also in the neighboring Endocrine Clinic, Pediatric Clinic, and Orthopedic Clinics.

The Diabetes Adult Outpatient Clinic providers include: nine attending physicians, four physician fellows, five nurse practitioners, one psychologist, one pharmacist, one nephrologist, and four diabetes educators. The staff include: a nurse manager, administrator, three licensed practical nurses, four front desk staff, five secretaries, and seven patient care assistants. The services offered by the
outpatient clinic include: medical management of diabetes, nutrition counseling, diabetes education, insulin pump and continuous glucose monitoring training, on site pharmaceutical consultation as needed, an on site nephrologist on Monday afternoons, and an on site clinical psychologist every day Monday through Friday. Staffing patterns are such that every weekday there are up to nine physicians, two to three NPs, usually three to four educators, and all of the staff at work in the clinic.

The general procedure in the outpatient diabetes clinic during regular patient visits is that the patient care assistants check in the patient by weighing the patient, measuring height, checking blood glucose fingerstick and point of care fingerstick A_1C levels, download glucometers and insulin pumps, and give the patient medication and review of system paperwork to fill out. The provider then sees the patient, reconciles medications, reviews blood sugar patterns, and does a history and physical exam on the patient, orders appropriate lab tests as needed, orders and/or adjusts medications, provides diet counseling, and refers to specialists and diabetes educators as needed. The above description is not a description of the capstone project, but instead is actually a description of how patients with diabetes are seen by health care providers during routine clinic visits.

The DNP student gave the consent form to each participant. The weight and A_1C levels were given to the DNP student by self-report, with permission of the patients. The DNP student also gave a diabetes knowledge pre test to all project
participants prior to the start of the project and then again at the conclusion of the project, in order to determine level of diabetes knowledge and improvement as a result of being in the project. Finally, the DNP student was the one running the educational sessions for the patients in the project with some guidance and help from the bilingual endocrine fellow.

**Goals, Objectives, and Expected Outcomes.**

The goals of this DNP project were to use culturally competent diabetes educational interventions to improve diabetes management post intervention. Specifically, a SMART (specific, measurable, assignable, realistic, and time specific) goal concerning A1C levels was to show a decrease in A1C of at least 0.5 % or greater, from before the project was begun until the end of the project. This improvement of at least 0.5 % in A1C is most reasonable over the span of four weeks even if patients were following only some of the recommended lifestyle and diabetes changes advised.

The next goal of improving weight includes the following components: the goal was to decrease the weight of patients by at least 5 pounds from the beginning of the project until the end of it, which was a span of four weeks. This was a realistic goal as patients would need to lose approximately one to one and a half pounds each week for 4 weeks to reach this goal, which is quite manageable if they adhered to recommended guidelines provided in the educational sessions. The weight of each participant was given to the DNP student at the start of the project and at the end by each project participant.
A third goal was to demonstrate any degree of increase in diabetes knowledge from the start of the project until its end. This goal was measured by asking patients to fill out a written, 23 item, multiple choice test on diabetes knowledge (see Appendix C for a copy of this test) at the beginning of the project and at its end; the DNP student looked for an overall improvement in diabetes knowledge scores as a result of being in the project. It is realistic to expect an improvement in diabetes knowledge, if participants attended all scheduled educational sessions and were actively listening, participating and enjoying them.

Finally, a fourth goal was to demonstrate an increase in total daily steps post intervention compared to pre intervention. This information was obtained by comparing the average total daily steps pre intervention reported by participants with the average total daily steps walked post intervention, using their pedometer. Participants in the project were asked to keep a log of their daily steps walked. Changes from pre to post educational intervention were described using means, medians, and standard deviations.

The “Michigan Diabetes Research and Training Center’s Revised Diabetes Knowledge Test” (Fitzgerald, Funnell, Anderson, Nwanko, Stansfield, & Piatt, 2016) was the specific diabetes knowledge test given to patient participants before and after the educational intervention. The Michigan Diabetes Research and Training Center’s Revised Diabetes Knowledge Test was found to be both a reliable (0.77) and valid (0.736) tool for measuring diabetes knowledge (Fitzgerald et al., 2016).
Project Design

The first steps of the DNP Capstone Project implementation plan included writing the project proposal, receiving approval of this proposal by the Capstone Committee members, and applying for and obtaining Institutional Board Review (IRB) approval as deemed appropriate. The next step after that was to choose which diabetes and health topics, telenuevos (videos showing Latino people eating healthy and exercising regularly to promote healthier habits in viewers), and educational materials and handouts would make up the four weekly, ninety-minute culturally competent Latino diabetes education sessions. It was essential that the educational sessions be conducted with materials and in a manner that was acceptable to and approved by the United States Department of Agriculture (USDA) and/or the National Diabetes Education Program (NDEP), in addition to the DNP Capstone Project Committee members.

The curriculum of the educational sessions included the following topics that were reviewed and discussed with project participants: project confidentiality (see Appendix D for a copy of the consent form), type 2 diabetes pathophysiology, diabetes complications, hypoglycemia and hyperglycemia signs and symptoms, hypoglycemia treatment, blood glucose monitoring, A1C test, proper diet, exercise, foot exams, eye care, screening for diabetes complications, medications, wound care, role of stress in affecting diabetes management, specific Latino cultural beliefs as they relate to diabetes, role of family support, relationships with diabetes and other health care providers, and safety of folk remedies. Several of
the above listed topics were discussed in each of the four classes, which were held in December to January 2017. Please see the following websites to see a sample of the education materials (shown in Appendices E, F, & G) which were available in both English and Spanish to patients during the project:


The next step was to search for and approach appropriate patients to be in the project. Patients chosen to be in the project were from patients already seen previously by the DNP student in the role of diabetes nurse practitioner in the project site’s adult outpatient diabetes clinic, recruited by word of mouth by other diabetes and primary care providers, and/or by posters displayed in the outpatient diabetes clinic waiting area and in the clinic rooms. The DNP student then asked approximately thirty-five patients if they were interested in being in the project; a total of thirteen patients agreed to be in the project. However, only eight of these patients were able to be reached to meet with individually to discuss the project in detail, to review and sign the consent form (see Appendix D for a copy of the consent form), and to give the pre project Diabetes Knowledge test and pedometer to. The DNP student then created a
database of these patients’ information using Microsoft Excel with regards to: name, medical record number, date of birth, gender, date of diabetes diagnosis, most recent A1C level, current weight, daily steps walked before the start of the project, and score on pre project Diabetes Knowledge test. Each patient was then assigned a numerical code from one to five, and from that point on was referred to by that code, to protect his/her privacy.

The DNP student next asked the group of eight participants for their preferences for the dates and times of the educational sessions, and then determined the finalized chosen dates and time information to give to all of the project participants. The location of the educational sessions was in a large conference room within an outpatient adult diabetes clinic. Prior to the first educational session, the DNP student recorded each participant’s weight and A1C level. One week later, the DNP student also called each participant on the telephone and asked him/her to estimate the total number of steps daily she/he walked on average, before the start of the project, using the pedometer given to them by the DNP student. The DNP student then gave the Michigan Diabetes Research and Training Center’s Revised Diabetes Knowledge Test to each of the participants in the project before the start of the project, and recorded these scores. A certified Spanish telephone interpreter was used to translate the Diabetes Knowledge test for patients not fluent in English.

At each of the four education sessions, the educational material was presented by the DNP student, with help by the bilingual endocrine fellow, to the
participants for 60 minutes, and the rest of the session was dedicated towards questions and answers among the DNP student, endocrine fellow, and the participants on any group discussion related to being Latino and having diabetes. The project mentor, an attending endocrinologist, was also present at the first diabetes education session to help answer any medical questions that the patients had. Each of the educational sessions included hands on material, pictures, and/or diagrams on diabetes management to make the sessions more interesting and to accommodate for low literacy levels. Whenever possible the DNP student focused the teaching of the diabetes education topics towards Latino cultural preferences and beliefs. Please see the following link to see the telenuevo entitled “Program for Health Professionals-Sugar, Heart and Life” that was also given to patients to watch at home at their leisure: https://www.bcm.edu/shl/dbts_edu.cfm

Plan for Data Analysis

At the conclusion of the project at the fourth education session, the DNP student asked each participant what his/her current weight was, obtained the most recent A1C from the patient and/or nursing staff, and asked each patient what his/her average of total daily steps walked were during the project; all of these results were compared with the results from before the start of the project to see if there were any differences. The DNP student gave the same Michigan Diabetes Research and Training Center’s Revised Diabetes Knowledge Test to each participant in the project, at the conclusion of the educational sessions. The bilingual Spanish speaking endocrine fellow was available to help translate
questions and answers on the test, as needed for those patients not fluent in English. The scores pre intervention and post intervention were compared for each project participant. All individual scores were analyzed using descriptive statistics. Please see Appendix H for the project participant demographics template. See Appendixes I & J for the project participant pre test post test biomarker template, and the project participant pre test post test exercise and survey template, respectively.

The DNP student thanked all of the participants that were in the project at the final session presenting each participant who completed the sessions with a $20 gift card to a local organic food store in appreciation of their participation.

The final step of the project was to write a scholarly final paper on this project including the background of the project, importance of the project, how the project was carried out, results, and plans to continue the work in the future. The findings of the project will be presented to the department of nursing at the DNP student’s graduate school. The DNP project results may also be presented to the department of diabetes at the project site, using a power point presentation.

**Ethics and Human Subjects Protection**

The possible ethical considerations with regards to this DNP Capstone project can also be seen listed in the attached Consent Form file. These ethical considerations included: maintaining patient participant privacy during educational sessions, and whether the participants benefited with regards to
improvements in weight, A1C, daily steps walked and/or diabetes knowledge gained from being in the project.

The best way to ensure that participants did not experience the risk of patient information breach was by the DNP student doing the following actions: asking all participants to sign a contract to maintain privacy and confidentiality to not disclose any patient information outside of the educational session, and to explain the importance of this to all of them prior to the start of the first educational session. The DNP student attempted to decrease risk of participants feeling like being in the project was a waste of time by frequently checking in with each participant during and after each educational session to ask for feedback regarding what was learned, what the participant would like to discuss, and if she/he felt satisfied with progress. In addition, each participant in the project was assigned to a numerical code and was referred to only by this code during and after the project; the purpose of using codes to identify patients was to protect patient confidentiality and privacy. These codes and all data were kept in a lockbox, to further ensure that participant confidentiality was kept.

Possible benefits of being in this project included: participants forming new and lasting, close relationships with other Latino diabetes patients and giving each other support and advice; improvement of weight, daily steps walked, and/or A1C levels; increased motivation to continue to learn about one’s health and diabetes; increased motivation to continue to improve one’s diet and exercise and blood glucose monitoring habits; and improved diabetes knowledge.
Cost-Benefit Analysis/Budget

The following items were necessary for the conduction of the DNP project and all had an associated cost: paper used to make copies of the patient education brochures, paper used to make copies of the Latino recipes, four $20 gift cards to a local grocery store, a pedometer given to each project participant, and use of a conference room at the project site for the four educational sessions. There was no cost for use of the DNP student’s expertise in diabetes education/management because she conducted these sessions outside of regular work hours. The bilingual endocrine fellow also volunteered her medical and translation services free of charge.

The DNP student paid the cost of the Latino recipe collections (total cost for each recipe collection was $1 x 8 copies= $8), the pedometers ($10 x 8 possible participants= $80 total) as well as the four grocery store gift cards (total of $80). The project site’s outpatient clinic paid the cost of the paper used to make copies of the education brochures for the participants (20 pieces of paper x 8 estimated participants= $5), and cost of the usage of the conference room for the four educational sessions ($30 per hour x 6 hours= $180). The total budget for the DNP project was $353, from the sum of the above mentioned items. This total cost of only $353 for potentially improving the health of and reducing the likelihood of diabetes complications for five people with diabetes is a real bargain, compared to the cost of managing diabetes complications from an economic and societal perspective. For instance, there is an estimated cost of nearly $8,000 to medically manage each patient with poorly controlled diabetes (American Diabetes Association, 2013). In addition, there is the
added benefits in this DNP project of avoiding the excessive pain, suffering, missed days at work, and/or reduced number of productive hours of work common to those with poorly controlled diabetes (ADA, 2013). Perhaps these unpleasant effects from poorly controlled diabetes can be reduced and/or avoided by spending the small amount of money in this DNP project budget to potentially improve the A1C levels, weight, exercise, and diabetes knowledge in a small group of people with type 2 diabetes.

Though there were costs to the DNP student and the project site’s outpatient clinic, the potential benefits are worthwhile indeed. The most obvious benefit would be that the project site’s outpatient clinic would be “rewarded” with seeing their patients achieve better health and diabetes results in the form of successful weight loss and/or lower A1C levels. Another benefit would be that the Latino patient participants in the project would be very pleased that their culture was being respected, celebrated, and taken into careful consideration with regards to diabetes management; as a result, these participants would possibly be likely to spread the word to friends and family who also have diabetes that they too should choose to be patients at the project site’s outpatient clinic due to the wonderful, culturally competent care being given in the clinic. The community at large would benefit from potentially having better educated, healthier citizens who can help others similar to them achieve good diabetes health outcomes as well.
Timeline

The proposal for this DNP project was approved by IRB in the fall of 2016. The recruitment of project participants, followed by the actual intervention of the educational sessions occurred in late fall 2016 to mid winter 2017. Data was collected and analyzed in winter to spring 2017. The final steps involved writing the final paper for this DNP project results and then presenting the project results via power point presentation in spring 2017.

Results and Outcomes

The following are the results of how many participants showed up for each of the education sessions, with a total of five participants throughout the DNP project (Table 2). Only one participant attended all of the education sessions. Another participant missed only one education session, due to a family emergency. Three of the participants only attended one education session each. The patient demographics (Table 3) are also listed below. Participants were all between the ages of 53 to 68, had diabetes for 9 to 33 years, and all of them also suffered from HTN, neuropathy, and overweight/obesity (Table 3).

Table 2. Project participant attendance at each of the education sessions.

<table>
<thead>
<tr>
<th>Code</th>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
<th>Session 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Patient demographics.

<table>
<thead>
<tr>
<th>Code</th>
<th>Gender</th>
<th>Age (years old)</th>
<th>Duration of diabetes (in years)</th>
<th>Co-morbidities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>68</td>
<td>15</td>
<td>HTN, obesity, neuropathy</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>58</td>
<td>33</td>
<td>HTN, hyperlipidemia, obesity, neuropathy, retinopathy</td>
</tr>
<tr>
<td>3</td>
<td>Female</td>
<td>57</td>
<td>9</td>
<td>HTN, hyperlipidemia, obesity, neuropathy</td>
</tr>
<tr>
<td>4</td>
<td>Female</td>
<td>53</td>
<td>22</td>
<td>HTN, hyperlipidemia, overweight, neuropathy</td>
</tr>
<tr>
<td>5</td>
<td>Male</td>
<td>59</td>
<td>11</td>
<td>HTN, hyperlipidemia, obesity</td>
</tr>
</tbody>
</table>

HTN= hypertension

The following are the raw data (Table 4 and Table 5) from the project participants with regards to A1C level, weight, daily steps walked, and Diabetes Knowledge test score before and after the intervention. Only two out of the five patients experienced an improvement (decrease) in A1C post intervention (Table 4). Two out of five patients experienced a decrease in weight post intervention (Table 4). Only one patient experienced an increase in daily steps walked post intervention (Table 5). Three participants experienced an increase in diabetes knowledge test score post intervention.
Weight decreased by more than one pound in only 20% of the participants (Table 4). In the one participant who lost a total of 12 pounds, it is noteworthy to mention that he not only attended all of the education sessions, but that he was also limited in how many steps he could walk daily due to severe neuropathy pain.

Table 4. A1C and weight data collected before and after the intervention.

<table>
<thead>
<tr>
<th>Code</th>
<th>Pre A1C (mg/dl)</th>
<th>Post A1C (mg/dl)</th>
<th>Pre weight (lbs)</th>
<th>Post weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.9</td>
<td>8</td>
<td>253</td>
<td>241</td>
</tr>
<tr>
<td>2</td>
<td>6.4</td>
<td>7.1</td>
<td>196</td>
<td>196</td>
</tr>
<tr>
<td>3</td>
<td>7.7</td>
<td>7.2</td>
<td>163</td>
<td>166</td>
</tr>
<tr>
<td>4</td>
<td>8.3</td>
<td>9.1</td>
<td>155</td>
<td>162</td>
</tr>
<tr>
<td>5</td>
<td>7.3</td>
<td>7.4</td>
<td>196</td>
<td>195</td>
</tr>
</tbody>
</table>

Table 5. Daily steps walked and Diabetes Knowledge Test scores before and after the intervention.

<table>
<thead>
<tr>
<th>Code</th>
<th>Pre steps (daily)</th>
<th>Post steps (daily)</th>
<th>Pre score (%)</th>
<th>Post score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1000</td>
<td>700</td>
<td>56.5</td>
<td>78.2</td>
</tr>
<tr>
<td>2</td>
<td>3520</td>
<td>2670</td>
<td>52.1</td>
<td>*</td>
</tr>
<tr>
<td>3</td>
<td>200</td>
<td>858</td>
<td>47.8</td>
<td>56.5</td>
</tr>
<tr>
<td>4</td>
<td>1046</td>
<td>800</td>
<td>82.6</td>
<td>69.5</td>
</tr>
<tr>
<td>5</td>
<td>*</td>
<td>*</td>
<td>73.9</td>
<td>82.6</td>
</tr>
</tbody>
</table>

* = missing data (due to participants failing to provide these data)

The following display the means, medians, and standard deviations (Tables 6, 7, & 8) calculated from the data in the project, comparing data from before and after...
the intervention. There was a small improvement (a decrease) in mean in weight and a larger improvement (an increase) in mean in diabetes test score before and after the intervention (Table 6). Median scores for A1C, weight, and diabetes test score improved after the intervention (Table 7). There was a decrease in standard deviation in A1C, weight, daily steps walked, and diabetes test score after the intervention (Table 8). It is noteworthy to mention that 75 % of the participants who took the post intervention diabetes knowledge test improved their scores (Table 5) by nearly 10 points or greater; this was very encouraging to see that the intervention did improve the diabetes knowledge test outcome in so many of the participants, even after holding only a total of four education sessions.

Table 6. Means in outcomes before and after the intervention.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Pre intervention</th>
<th>Post intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C (mg/dl)</td>
<td>7.72</td>
<td>7.76</td>
</tr>
<tr>
<td>Weight (lbs)</td>
<td>192.6</td>
<td>192</td>
</tr>
<tr>
<td>Diabetes test score (%)</td>
<td>62.5</td>
<td>71.7</td>
</tr>
<tr>
<td>Steps per day</td>
<td>1441.5</td>
<td>1257</td>
</tr>
</tbody>
</table>

Table 7. Medians in outcomes before and after the intervention.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Pre intervention</th>
<th>Post intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C (mg/dl)</td>
<td>7.7</td>
<td>7.4</td>
</tr>
<tr>
<td>Weight (lbs)</td>
<td>196</td>
<td>195</td>
</tr>
</tbody>
</table>
### Table 8. Standard deviations in outcomes before and after the intervention.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Pre intervention</th>
<th>Post intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C (mg/dl)</td>
<td>0.9549</td>
<td>0.8264</td>
</tr>
<tr>
<td>Weight (lbs)</td>
<td>38.6</td>
<td>31.63</td>
</tr>
<tr>
<td>Diabetes test score (%)</td>
<td>14.95</td>
<td>11.5</td>
</tr>
<tr>
<td>Steps per day</td>
<td>1439.07</td>
<td>944.25</td>
</tr>
</tbody>
</table>

**Facilitators and barriers.**

Some of the facilitators of this project included: holding educational sessions at a day of the week and time convenient for participants, and incentives to join the sessions and attend all the sessions such as rewarding patients with free healthy Latino recipes, free diabetes education, free pedometers, and a gift card to a local supermarket to all those who attended most or all of the education sessions. Suggestions from the literature on how to attract and maintain patients to be in projects included the following: encouraging the formation of close, trusting relationships and friendships between project participant and educator and between project participants, addressing stress and emotional concerns or participants, and holding educational sessions within the community in easy access to Latino patients (Rotberg et al., 2016; Welch et al., 2011). An unexpected benefit of this education intervention was how talkative and open several of the participants were, with regards to their experience of living with diabetes. They
were very willing to discuss what worked for them with regards to diet, exercise, health, and beliefs and encouraged each other to improve their habits.

Barriers to this project may have included the following: lack of interest to be a part of the educational sessions, participants not showing up for all the sessions, competing priorities such as child care and taking care of one’s elders as well as a busy work schedule, transportation difficulties, holding the education sessions in the middle of winter during a cold and snowy period of time, holding the education classes at night and so close to the busy winter holidays, and reluctance to discuss one’s health in a public group setting. In addition to this, several of the patients who originally promised to be in the project but then did not show up to any and/or all of the education sessions did not show up due to unexpected problems such as severe pain, health emergencies leading to a hospitalization, having surgery, and/or having to travel out of the area to take care of ill family members.

Despite several phone calls, emails, and letters mailed to the five project participants, only 80 % of the post intervention test results were obtained. The one participant (he was fluent in English) who did not take the post test was called twice and the test with instructions was mailed to the participant along with a self-addressed stamped envelope. Data on the daily steps walked before and after the intervention were successfully obtained on 80 % of the project participants; the remaining participant neglected to return any of the phone calls placed to him via
Discussion

There were both positive and negative results obtained from before and after the education intervention. The successful, positive results were the decrease in mean weight and the increase in mean diabetes knowledge test score, before versus after the intervention. It is possible that the increase in diabetes knowledge occurred as a result of the DNP student successfully teaching participants the many detailed topics pertaining to proper diabetes management; in that case, the participants may have paid close attention to and retained much of the knowledge they learned from the sessions. It may also have been very helpful to have had available a Spanish speaking endocrine fellow who ensured that those participants not fluent in Spanish would still be given the opportunity to learn and understand the material well. Previous research has shown that use of language concordant health care providers can improve non English speaking patients’ comprehension of medications (Wilson, Chen, Grumbach, Wang, & Fernandez, 2005).

Another successful outcome of this education intervention was that nearly all of the participants in this project were very excited during the sessions and enthusiastic about sharing their own personal thoughts, beliefs, and health practices with the DNP student, the endocrine fellow, but also with the other participants. The participants shared stories of their Latino upbringing, family life, and tips for how they improved their dietary habits, exercise, and/or blood glucose
monitoring habits. This very likely gave the participants a strong sense of support and community, to know that each one of them was not alone in their daily struggles with diabetes management. Similarly, previous research has also shown improvement in personal health habits when patients are given social support and encouragement from friends and/or others who have the same health problem (Marquez, Anderson, Wing, West, Newton, Meacham, Hazuda, Peters, Montez, Broyles, Walker, & Evans-Hudsnall, 2016). It is also likely that this shared information between participant to participant also helped to improve the overall mean diabetes knowledge test score, post intervention.

Though the mean overall weight only improved by a very small amount post intervention, it is still a hopeful finding for the future. Specifically, two out of the five participants experienced a decrease in weight post intervention. It is possible that weight improved in these instances due to being influenced by immersion into a positive environment in which the DNP student and the other participants were also encouraging one another to exercise regularly to improve health, not wanting to let others in the project down by not exercising, and/or being given free pedometers as an incentive to exercise regularly.

Mean A1C levels did not decrease post intervention. This could be due to not enough participants attending most/all of the education sessions and therefore not learning enough medical information to improve their A1C levels. Alternatively, A1C levels may not have improved overall post intervention if participants
understood what they needed to do to improve their glucose control but were not actually able to carry through their intended, healthier actions.

Mean daily steps taken did not increase post intervention. One possible factor contributing to this could be due to poor quality and accuracy of the pedometers given to the participants, and/or misunderstanding or improper use of the pedometers. Additionally, the cold, snowy winter weather throughout the duration of this project may also have been a barrier to exercising for project participants. These reasons could explain why it appeared that the participants did not walk very many steps daily, if the pedometer was not properly and accurately counting each step taken. Financial funds for this project were very limited unfortunately; the DNP student needed to purchase a relatively inexpensive pedometer model in order to be afford to give them all out to all the people who originally promised they would be in the project. Previous research showed that use of pedometers helped motivate Latino patients to exercise more, but not significantly more than before the intervention (Hu, Wallace, Amirhsani, McCoy, Coley, Wiseman, Silva, & Hussami, 2015). But even a small improvement in daily exercise is better than no improvement at all, significant or otherwise.

It was very disappointing that not all of the original thirteen people who promised to be in the project actually attended any of the education sessions; it was equally disappointing that most of the five participants who did show up to the sessions did not attend all of the sessions. Lack of participation was not due to lack of notice, as participants were given written reminders of the dates, times,
and location of the education sessions twice, and were also given telephone
reminders as well. Previous research has shown that the direct in person method is
the best method to recruit and retain Latino patients for projects and/or research
studies (Garcia, Zuniga, & Lagon, 2016); it showed that use of indirect methods
such as telephone calls, flyers, and/or electronic mail were not as effective in
recruiting patients.

Perhaps the participants who promised to be in the project did not really want
to be in the project, but said yes because they wanted to please the DNP student
and appear to be a “good patient.” It is also possible that the participants who
attended the first or second session lost interest in attending the remainder of the
sessions. There were also plenty of potential medical reasons why participants did
not attend all of the sessions as many were struggling with severe neuropathy
pain, asthma exacerbation requiring hospitalization (for one participant in
particular), family medical emergencies that needed to be tended to, and difficulty
with ease of ambulation. Though family members and/or friends of participants
were invited and welcomed by the DNP student to attend the education sessions
along with the participants, not one family or friend support person attended the
sessions. One participant promised that his sister would attend the next education
session along with himself, but he himself neglected to attend the remainder of the
sessions. Perhaps if more support people attended the sessions, there would have
been better attendance at the sessions by the participants themselves; support
people could make the participants more comfortable and secure, and serve as a
reminder of the importance of attending the sessions in the first place. The fact
that these education sessions were held in the cold, icy winter evenings around the winter holidays may also have prevented more participants from attending all of the sessions. Finally, lack of reliable transportation and/or not being able to provide free parking vouchers to participants may also be other reasons why participation was so poor.

**Project Limitations**

The major limitations of this project were: finances, time, difficulty with scheduling the education sessions for the project intervention, small number of project participants, and lack of family member/friend support at the education sessions. Finances were very limited because this was not a research study funded by a grant; therefore, the DNP student had to either use free resources and/or pay for expenses herself. Limited finances were why a very inexpensive pedometer was given to project participants instead of a more accurate, more expensive pedometer model. Limited finances were also why a conference room within the DNP student’s place of employment was used to hold the education sessions since the DNP student was able to get this room with no extra cost; otherwise, if cost was not a problem, a better location for the education sessions may have been to rent out a room in a local church, senior center, or community center: doing that may have made it easier for participants to attend to the sessions, if they were closer to where they lived and had free parking.

Time was also a major limiting factor in this project. After the project proposal was accepted, there was only a small window of time to recruit patients
to be in the project, and to then actually hold the education sessions. This time frame ended up being during the winter months, which is not the best time to hold a project due to many patients not feeling eager to venture out in the dark, cold, icy winter nights for fear of slipping and falling. The time the education sessions were held was immediately before and after Christmas the New Year’s Day, which also likely caused many participants to not come to the sessions due to being busy with last minute holiday preparations.

The ability to schedule the actual education sessions was also a limitation in this study. The DNP student had to choose dates and times for all of the sessions that worked for: the DNP student, the endocrine fellow, the project participants, and also the hospital in which the project was conducted. It was very difficult trying to work with so many different constraints on scheduling. In addition, one of the five education sessions had to be cancelled due to very severe winter weather.

It was very unfortunate that there were only a total of five participants who attended one ore more of the education sessions, and that only one participant attended all of the education sessions. This very small number of participants does make it difficult to draw conclusions from the project data, namely how effective the education intervention was on average daily steps walked, A1C level, weight, and diabetes knowledge. In addition, though the DNP student invited each project participant to invite his/her friends or family to the education sessions for support, not one support member came. This was unfortunate because previous studies
have shown that presence of a support person can greatly improve one’s exercise habits, weight loss, and other health outcomes (Marzuez et al., 2016).

**Conclusion**

In conclusion, health care professionals in the United States today need to be aware of the fact that Latino adults are more likely to develop poorly controlled type 2 diabetes than Caucasians. It can be difficult to nearly impossible to help improve health outcomes of Latinos with type 2 diabetes for many reasons, including the lack of culturally competent diabetes medical/educational interventions by health care providers and educators. If a lack of culturally competent interventions is making the diabetes outcomes worse for Latinos, then they are more likely to suffer from diabetes complications, decreased quality of life, and increased mortality. The time is now for healthcare providers and educators everywhere in this country to be sure they are using culturally competent interventions to best help their Latino patients achieve their diabetic management goals.

This DNP Project used ADA approved diabetes education materials and adapted them to the cultural beliefs of Latino adults, as the DNP student conducted four, ninety minute educational sessions with a small group of Latino patients with diabetes. In summary, the ways in which the educational intervention was geared towards the cultural needs of Latinos was the following: inclusion of each patient’s desired family member or friend support person in the educational sessions, discussion of how to improve diet and exercise habits.
especially with regard to Latino preferred foods and activities, liberal use of pictures in the educational intervention, discussion of role of family support for health in Latino culture, role of stress management, and discussion of traditional Latino folk medications and remedies with regards to diabetes and health. The anticipated outcome of this project was to achieve improved weight, A1C levels, total daily steps, and diabetes knowledge after the intervention compared to before the intervention.

The major findings obtained as a result of this project were: decrease in mean weight and increase in mean diabetes knowledge score post intervention. There were no improvements in A1C levels or with daily steps walked as a result of the intervention. However, these negative results may be due to a small number of participants in the project as well as severe co-morbidities such as asthma exacerbation, and severe diabetic peripheral neuropathy, as previously mentioned.

The plan for dissemination of project outcomes at the termination of this project includes to present the project on site to the department of outpatient diabetes to providers and staff at the project site via a power point presentation in the spring or summer of 2017. Regionally, the project will also be presented via power point presentation to the department of nursing at University of Massachusetts Amherst in spring of 2017. However, it is the goal of the DNP student to continue working on expanding this project with the Latino type 2 diabetes population in central Massachusetts, even after the completion of the
DNP degree. This DNP project helped provide preliminary feasibility data that will inform a next larger study.

**Implications and Recommendations**

Future projects may want to focus on holding a similar format of these culturally competent education interventions, but over a longer period of time of perhaps three to six months; this longer period of time would give additional opportunities for participants to learn and retain the material discussed in the sessions for optimal diabetes knowledge and diabetes management. It would be more desirable for future, similar projects to also be held in the non winter months, so that sessions do not have to be cancelled due to winter storms.

One major limitation in this project was the low number of participants who attended the education sessions; in addition, it was also difficult to retain all five of the participants to attend each of the four education sessions. Some useful tips to strengthen patient recruitment and retention for future projects include establishing trust with Latino patients as well as key Latino community stakeholders such as priests, leaders of community centers, and Latino local politicians (De La Rose, Babino, Rosario, Martinez, & Aijaz, 2012; Wallace & Bartlett, 2013). It is well known that Latinos and other minority groups may be suspicious of the purpose behind projects and research studies, and therefore must first become familiar and comfortable with the project leaders before agreeing to being in a project (Wallace & Bartlett, 2013). Latinos may fear mistreatment and/or may confuse immigration leaders with project leaders; for these reasons, it is essential to get to know the Latino patient well.
over a period of time, in order to ensure he/she will agree to attend and remain in a project (Wallace & Bartlett, 2013).

Problems with lack of transportation and/or limited funds for transportation can also be a reason why it is difficult to recruit and retain Latinos for research and projects (De La Rosa et al., 2012; Larkey, Ogden, Tenorio, & Ewell, 2008; Wallace & Bartlett, 2013). Therefore, it may be helpful to provide potential patients in a project with a parking voucher, cash for public transportation, and/or conduct the project within walking distance and within the local community of the patients at a senior center, church, or grocery store (Larkey et al., 2008).

It is essential to remain very flexible when scheduling sessions for project interventions. For instance, Latino women especially may have to juggle many daily responsibilities including work, child care, elder care, cooking, and other errands (Wallace & Bartlett, 2013). Therefore, in order to ensure adequate patient participation in future projects, it may be helpful to schedule project sessions after school, at night, and/or on the weekends (Wallace & Bartlett, 2013).

Future, similar projects may want to emphasize to project participants the importance of family and social support and encourage each participant to bring someone with them to the education sessions. This inclusion of a support person may help improve participant retention in the project as well as reinforce important diabetes concepts and motivate participants to adopt healthier lifestyles.
Another idea for future projects is to place greater emphasis on improving daily steps taken for each participant. This could be achieved by creating a “contest” among all the project participants to see who can walk the most number of steps daily on average, and then award this person a small prize. Doing this would bring fun to the project, in addition to inspiring participants to work towards reaching a goal.

In general, diabetes educators and health care providers should take care to be sure that they are using culturally competent interventions when providing care to Latino patients with type 2 diabetes. Specifically, they should be sure to use certified interpreters when needed, be sure to include the family in any decisions to be made regarding the patient’s health care, ask about and incorporate any Latino preferences with regards to beliefs, diet and exercise, and use diagrams and pictures to help improve patient comprehension of the material being presented.
References


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Appendix A. Hispanic Health Protection Model (Latham & Calvillo, 2007)
Appendix B. Outline of Education Sessions

I. Session # 1
   A. Introduction to the format of the session
   B. Discussion of project goals and confidentiality
   C. Type 2 diabetes pathophysiology
   D. Diabetes complications
   E. Hypoglycemia and Hyperglycemia

II. Session # 2
   A. Blood glucose monitoring
   B. A1C test
   C. Diet & Exercise

III. Session # 3
   A. Medications
   B. Wound care

IV. Session # 4
   A. Family support
   B. Safety & efficacy of folk remedies
   C. Stress management
   D. Relationships with health care providers
### Appendix C. Diabetes Knowledge Test

**Michigan Diabetes Research and Training Center’s Revised Diabetes Knowledge Test**

1. The diabetes diet is:
   - a. the way most American people eat
   - b. a healthy diet for most people
   - c. too high in carbohydrate for most people
   - d. too high in protein for most people

2. Which of the following is highest in carbohydrate?
   - a. Baked chicken
   - b. Swiss cheese
   - c. *Baked potato
   - d. Peanut butter

3. Which of the following is highest in fat?
   - a. *Low fat (2%) milk
   - b. Orange juice
   - c. Corn
   - d. Honey

4. Which of the following is a "free food"?
   - a. Any unsweetened food
   - b. Any food that has "fat free" on the label
   - c. Any food that has "sugar free" on the label
   - d. *Any food that has less than 20 calories per serving

5. A1C is a measure of your average blood glucose level for the past:
   - a. day
   - b. week
   - c. 6-12 weeks
   - d. 6 months

6. Which is the best method for home glucose testing?
   - a. Urine testing
   - b. *Blood testing
   - c. Both are equally good

7. What effect does unsweetened fruit juice have on blood glucose?
   - a. Lowers it
   - b. *Raises it
   - c. Has no effect

8. Which should not be used to treat a low blood glucose?
   - a. 3 hard candies
   - b. 1/2 cup orange juice
   - c. 1 cup diet soft drink
   - d. 1 cup skim milk

9. For a person in good control, what effect does exercise have on blood glucose?
   - a. *Lowers it
   - b. Raises it
   - c. Has no effect

10. What effect will an infection most likely have on blood glucose?
    - a. Lowers it
    - b. *Raises it
    - c. Has no effect

11. The best way to take care of your feet is to:
    - a. *Look at and wash them each day
    - b. Massage them with alcohol each day
    - c. Soak them for one hour each day
    - d. Buy shoes a size larger than usual

12. Eating foods lower in fat decreases your risk for:
    - a. nerve disease
    - b. kidney disease
    - c. *heart disease
    - d. eye disease

13. Numbness and tingling may be symptoms of:
    - a. kidney disease
    - b. *nerve disease
    - c. eye disease
    - d. liver disease

14. Which of the following is usually *not* associated with diabetes?
    - a. vision problems
    - b. kidney problems
    - c. nerve problems
    - d. *lung problems

15. Signs of ketoacidosis (DKA) include:
    - a. sluggishness
    - b. *sweating
    - c. vomiting
    - d. low blood glucose

16. If you are sick with the flu, you should:
    - a. Take less insulin
    - b. Drink less liquids
    - c. *Eat more proteins
    - d. Test blood glucose more often

17. If you have taken rapid-acting insulin, you are most likely to have a low blood glucose reaction in:
    - a. *Less than 2 hours
    - b. 3-5 hours
    - c. 6-12 hours
    - d. More than 13 hours

18. You realize just before lunch that you forgot to take your insulin at breakfast. What should you do now?
    - a. Skip lunch to lower your blood glucose
    - b. Take the insulin that you usually take at breakfast
    - c. Take twice as much insulin as you usually take at breakfast
    - d. *Check your blood glucose level to decide how much insulin to take

19. If you are beginning to have a low blood glucose reaction, you should:
    - a. *Exercise
    - b. Lie down and rest
    - c. Drink some juice
    - d. Take rapid-acting insulin

20. A low blood glucose reaction may be caused by:
    - a. *Too much insulin
    - b. Too little insulin
    - c. Too much food
    - d. Too little exercise

21. If you take your morning insulin but skip breakfast, your blood glucose level will usually:
    - a. Increase
    - b. *Decrease
    - c. Remain the same

22. High blood glucose may be caused by:
    - a. *Not enough insulin
    - b. Skipping meals
    - c. Delaying your snack
    - d. Skipping your exercise

23. A low blood glucose reaction may be caused by:
    - a. *Heavy exercise
    - b. Infection
    - c. Overeating
    - d. Not taking your insulin

*Correct answers:*

Note: For non-US patient populations, we recommend reviewing the terms used in items 1, 2, 3, 4 and 5 for appropriateness.
Appendix D. Consent Form

Appendix D. Consent Form for Participation in DNP Capstone Project

University of Massachusetts Amherst

Researchers: Dr. Samir Malhani, Dr. Cristina Alvarado-Nieves, Dr. Donna Zucker, and Christine Hoogasian, DNP student

Study title: Improving Latino Diabetes Patients’ Physiologic Measurements Utilizing Culturally Competent Interventions

1. WHAT IS THIS FORM?
This form is a Consent Form. It will provide you with information about the project to help you make a good, informed decision about whether or not you want to be in this project or not.

2. WHO CAN BE IN THIS PROJECT?
Subjects who can participate in this project must be of Latino descent, have a diagnosis of type 2 diabetes, not be pregnant, and be at least 18 years old.

3. WHAT IS THE PURPOSE OF THIS PROJECT?
The purpose of this project is to help improve knowledge of diabetes, weight, and A1C levels as a result of participating in the Latino culturally competent diabetes education classes.

4. WHERE AND WHEN WILL THE PROJECT BE?
The project will be held at the University of Massachusetts Memorial Medical Center-University Campus, Worcester, Massachusetts in the 2nd floor in the conference room in the ACC Building. The project time is TBA, but will likely be for 90 minutes once per week in the evening hours, for five consecutive weeks. The classes will be held in November and December, 2017.

5. WHAT WILL SUBJECTS IN THE PROJECT DO?
If you agree to take part in the study, you will be asked for permission for the study team to look at your weight and A1C levels in your medical chart. You will also be asked to take a diabetes knowledge test that is multiple choice and has 23 questions. This test will be taken before the study starts and then again after the end of the education classes in the study. You will also be asked to attend all five 90 minute diabetes education classes and to listen to the material being presented, and discuss any comments or ask any questions on the material that you wish. The classes will cover the following topics: type 2 diabetes pathophysiology, diabetes complications, hypoglycemia and hyperglycemia, blood glucose monitoring, A1C test, diet, exercise, medications, wound care, role of family support, safety and efficacy of folk remedies, stress management, and relationships with diabetes health care providers. These topics will all be presented by lecture and group discussion and the topics will be pertaining especially to Latines.
6. **WHAT ARE THE BENEFITS OF BEING IN THIS PROJECT?**
Some of the benefits of being in this project include the following: improving your knowledge of diabetes and good diabetes management, improving weight, improving your diabetes control, meeting other Latinos with diabetes and being able to socialize and exchange helpful diabetes hints with them.

7. **WHAT ARE THE RISKS OF BEING IN THIS PROJECT?**
There are no significant risks associated with participating in education sessions in this project. However, there may be the following inconveniences associated with being in this project such as: having to spend the time to attend five, 90 minute education sessions, cost of transportation to the education sessions, and the chance of not improving weight, A1C levels, and/or diabetes knowledge after completing the project.

8. **HOW WILL MY PERSONAL INFORMATION BE PROTECTED?**
Many procedures will be used to protect the confidentiality of your project records. For instance, each participant in the study will be assigned to a numerical code and will then be referred in any written material by only this code during and after the project; the codes and all patient participant data will then be kept in a locked box in a secure location. A master key that links names and codes shall be kept in a separate, secure location. The master key and all data will be destroyed after three years after the completion of the project. All electronic files containing any project participant data shall be password protected. This password will only be known to authorized users who are part of this study. At the conclusion of this study the members of the project team may publish or present the findings of this project to help improve management of Latino diabetes patients and may present project findings to the department of diabetes staff and providers at UMASS Memorial Medical Center, the department of nursing at UMASS Amherst, and/or at the American Diabetes Association Scientific Sessions in 2017. However, at no point shall specific names or other participant identifiers be shared with others not part of the project.

Please be advised that although the project team members will take every precaution to maintain confidentiality of the data, the nature of the diabetes education sessions prevents the team members from guaranteeing confidentiality. The project team members would like to remind project participants to respect the privacy of your fellow participants and not repeat what is said in the education sessions to others.

9. **WILL I RECEIVE ANY PAYMENT OR GIFTS FOR BEING IN THIS PROJECT?**
There will be no cash payment as part of this project. However, participants may receive free parking vouchers to drive to and attend the education sessions, a free pedometer, free glucometer, free Latino healthy cookbook, and a $20 gift card to a local whole foods/organic grocery store. One participant demonstrating the greatest improvement in diabetes knowledge, weight, and/or A1C as a result of being in this project will also receive a free “FitBit” bracelet.
10. WHAT IF I HAVE ANY QUESTIONS?
   Take as long as you feel necessary to decide to be in this project. The members of the project team will be very happy to answer your questions you may have with regards to this project. If you have any further questions, feel free to ask the project investigator Christine Hoogasian at 508-498-0195. If you have any questions with regards to your rights as a project participant, you are welcome to contact the University of Massachusetts Amherst Human Research Protection Office (HRPO) at 413-545-3428 or humansubjects@ora.umass.edu.

11. CAN I STOP BEING IN THE STUDY?
   You are under no obligation to be in this project if you do not want to. If you agree to be in the project, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

12. WHAT IF I AM INJURED?
   The University of Massachusetts does not have a program for compensating subjects for injury or complications related to human subjects research/projects, but the project personnel will assist you in getting treatment.

13. SUBJECT STATEMENT OF VOLUNTARY CONSENT

   "When signing this form I am agreeing to voluntarily enter into this project. I have had a chance to read the consent form, and it was explained to me in a language which I use and understand. I have had the opportunity to ask questions and have received satisfactory answer. I understand that I can withdraw at any time. A copy of this signed Informed Consent Form has been given to me."

   [ ] I agree to maintain the confidentiality of the information discussed by all participants and project team members during the diabetes education sessions.

   If you cannot agree to the above stipulation please see the project investigator Christine Hoogasian, as you may be ineligible to participate in this project.

   Participant Signature: ___________________________ Print Name: ___________________________ Date: ___________________________

   By signing below, I indicate that the participant has read, and to the best of my knowledge, understands the details contained in this document and has been given a copy.

   Signature of Person Obtaining Consent: ___________________________ Print Name: ___________________________ Date: ___________________________
LA DIABETES Y USTED:
¡Tener unos ojos sanos es importante!

Es importante cuidar bien los ojos cuando se tiene diabetes. ¿Sabía que la diabetes puede dañar sus ojos? La buena noticia es que usted puede hacer algo para ayudar a mantener sus ojos sanos. Los siguientes consejos lo ayudarán a empezar a cuidarlos.

Consejos para mantener sus ojos sanos

1. Hágame un examen de los ojos con dilatación de las pupilas por lo menos una vez al año. Comparta los resultados con su médico de atención primaria:
   - Durante este examen le pondrán gotas en los ojos para hacer que las pupilas se agranden. Las pupilas son los círculos negros en el medio de sus ojos. Las gotas no duelen y ayudan a su especialista de los ojos a ver sus ojos por dentro. Así ellos pueden notar si hay señales de algún problema.
   - Un examen de los ojos con dilatación de las pupilas puede ayudar a su especialista de los ojos a detectar y tratar problemas. De esta forma se podría evitar que usted pierda la visión por causa de la diabetes.
   - Su especialista de los ojos pondrá fotografía de su retina. Este examen ayuda a ver la retina, que está en la parte de atrás del ojo.
   - ¡Asígúrese de ir a la próxima cita con su especialista de los ojos!

2. Vaya al especialista de los ojos de inmediato si:
   - Ve pequeñas líneas o manchas negras que no desaparezcan.
   - Ve manchas rojas.
   - Ve una nube roja.
   - Nota un cambio repentino en su vista y no ve con la misma claridad.
   - Le toma más tiempo de lo normal ajustarse a la oscuridad.

¿Cómo la diabetes puede dañar sus ojos?

- La diabetes es la principal causa de ceguera entre las personas menores de 74 años.
- Los problemas serios de los ojos son más comunes entre las personas con diabetes.
- Ayude a detectar y tratar los problemas en los ojos a tiempo. Esto lo ayudará a proteger su visión.

¿Dónde me puedo hacer un examen de los ojos con dilatación de las pupilas?

- Usted debe hacer una cita con un especialista de los ojos. Pida que le hagan un examen de los ojos con dilatación de las pupilas una vez al año.
¿Cuáles son las enfermedades de los ojos comunes en las personas con diabetes?

- La retinopatía diabética causa que los pequeños vasos sanguíneos en la retina (en la parte de atrás del ojo) se debiliten. Esto puede causar goteras de sangre. Esta enfermedad puede causar ceguera si no se trata. Cuando comienza, no tiene síntomas. Por eso es importante que le revisen los ojos regularmente.

- Las cataratas causan una "nube" en el cristalino del ojo que hace que la visión sea borrosa. Las personas con diabetes tienen más probabilidades de presentar cataratas.

- El glaucoma causa presión dentro del ojo. Si no se trata, el glaucoma puede causar pérdida de la visión o ceguera.

¿Qué debe hacer para tener unos ojos sanos?

- Hágase un examen de los ojos con dilatación de las pupilas al menos una vez al año.
- No falle a la próxima cita con su especialista de los ojos.
- Anote los cambios que tenga en su visión y dígalos a su especialista de los ojos.
- Hable con su especialista de los ojos sobre las mejores maneras de mantener sus ojos sanos.
- Pidale a su especialista de los ojos que les envíe a todos sus médicos los resultados de sus exámenes luego de cada visita.
- Mantenga la glucosa (azúcar) en la sangre a un nivel saludable.

¡Conozca los factores clave de la diabetes para mantener su diabetes bajo control!

Pidale a su equipo de atención médica que lo ayude a establecer y alcanzar metas para controlar sus factores clave de la diabetes. Estos son el nivel de glucosa (azúcar) en la sangre, la presión arterial y el colesterol. Hable con su familia sobre su diabetes y dígale cómo debe controlarla para que lo puedan ayudar.

- Prueba A1c: La meta para muchas personas es obtener un valor de menos de 7% en esta prueba de sangre. Aun así, su médico podría fijar una meta diferente para usted.
- Presión arterial: Tener la presión arterial alta causa enfermedades del corazón. Para la mayoría de las personas, la meta es tener menos de 140/90 mm de Hg. Aun así, su médico podría fijar una meta diferente para usted.
- Colesterol: El colesterol malo se conoce como lipoproteína de baja densidad o LBD. Este colesterol se acumula en los vasos sanguíneos y los tapa. El colesterol bueno se conoce como lipoproteína de alta densidad o LAD. Este colesterol ayuda a sacar el colesterol malo de los vasos sanguíneos. Pregunte en cuánto debería tener sus niveles de colesterol.
LA DIABETES Y USTED:
¡Tener unos pies sanos es importante!

Consejos para mantener sus pies sanos

1. Visite a un podólogo para que le revise los pies al menos una vez al año. Un podólogo es un médico que se especializa en detectar y tratar problemas en los pies y tobillos.
   * Haga junto con su podólogo un plan que lo ayude a cuidar sus pies.
   * Pregúntele a su podólogo si usted debe usar zapatos especiales. Es posible que Medicare o su compañía de seguro de salud cubran el costo.
   * Pida a su podólogo que les envíe a todos sus médicos los resultados de sus exámenes luego de cada visita.
   * ¡Asegúrese de no faltar a la próxima cita con el podólogo!

2. Revise sus pies todos los días.
   * Fije una hora todos los días para observar sus pies descalzos. Busque callos, cortes, llagas, ampollas, puntos rojos e hinchazón.
   * Si tiene problemas para verse la planta de los pies, use un espejo. También puede pedirle ayuda a un familiar.

3. Lávese los pies todos los días.
   * Use agua tibia, no caliente, para lavarse los pies. No deje sus pies en remojo.
   * Siempre revise la temperatura del agua con sus manos primero para asegurarse de que no esté demasiado caliente. A veces, las personas con diabetes no pueden sentir con sus pies qué tan caliente está el agua.
   * Séquese bien los pies. Asegúrese de secarse bien entre los dedos.

¿Cómo la diabetes puede dañar sus pies?

* La diabetes es la principal causa de la pérdida de un dedo, pie o pierna que no sea por causa de un accidente. Casi la mitad de estos casos podrían prevenirse con el cuidado diario de los pies.
* Las personas que tienen diabetes pueden perder la sensibilidad en los pies. Cuando eso sucede, puede que sea difícil darse cuenta si se tiene un problema como una ampolla, llaga, callo o corte en el pie.
* La diabetes también puede reducir el flujo de la sangre en los pies. El adormecimiento y el tener menos flujo de sangre en los pies pueden dar lugar a problemas en los pies.

4. Mantenga la piel suave y lisa.
   * Aplíquese una fina capa de loción en la parte de arriba y abajo de los pies.
   * No se ponga loción entre los dedos. La humedad entre los dedos puede causar una infección.
LA DIABETES Y USTED: ¡tener unos pies sanos es importante!

5. Consulte a su podólogo sobre la mejor manera de cortarse las uñas de los pies. Pregunte cómo tratar callos y callosidades.
   * Los productos que se venden sin receta para tratar callos y callosidades y los objetos filosos pueden dañar su piel. No los utilice.
   * Use zapatos y medias en todo momento.

6. No camine descalzo. Es fácil pisar algo y lastimarse los pies.
   * Use zapatos que le calcen bien (que no lastimen). Asegúrese de que le protejan sus pies.
   * Revise el interior de sus zapatos antes de ponerlos. Fíjese que el interior de sus zapatos esté liso y que no haya ningún objeto adentro.

7. Proteja sus pies del calor y del frío.
   * Use zapatos en la playa y en el pavimento caliente.
   * No use bolsas de agua caliente ni almohadillas térmicas en los pies. Podría quemarse la piel de los pies.

8. Mantenga la sangre en los pies fluyendo.
   * Ponga los pies en alto sobre una silla, sofá o reposapiés al sentarse.
   * Mueva los dedos de los pies y los tobillos hacia arriba y abajo por 5 minutos. Hágalo dos o tres veces al día.
   * No se cruce de piernas por largos periodos de tiempo.

¿Qué debe hacer para tener unos pies sanos?
- Visite a un podólogo para que le revise los pies por lo menos una vez al año.
- Asegúrese de no faltar a su próxima cita con el podólogo.
- Pidale al podólogo que le envíe a todos sus médicos los resultados de sus exámenes luego de cada visita.
- Pidale a su proveedor de atención primaria que le revise los pies en cada visita.
- Revise sus pies todos los días.
- Mantenga la glucosa (azúcar) en la sangre en un nivel saludable.

¡Conozca los factores clave de la diabetes para mantener su diabetes bajo control!

Pídale a su equipo de atención médica que lo ayude a establecer y alcanzar metas para controlar sus factores clave de la diabetes. Estos son el nivel de glucosa (azúcar) en la sangre, la presión arterial y el colesterol. Hable con su familia sobre su diabetes y dígales cómo debe controlarla para que lo puedan ayudar.

* Prueba A1c: La meta para muchas personas es obtener un valor de menos de 7% en esta prueba de sangre. Aun así, su médico podrá fijar una meta diferente para usted.
* Presión arterial: Tener la presión arterial alta causa enfermedades del corazón. Para la mayoría de las personas, la meta es tener menos de 140/90 mm de Hg. Aun así, su médico podrá fijar una meta diferente para usted.
* Colesterol: El colesterol malo se conoce como lipoproteína de baja densidad o LBD. Este colesterol se acumula en los vasos sanguíneos y los tapa. El colesterol bueno se conoce como lipoproteína de alta densidad o LAD. Este colesterol ayuda a sacar el colesterol malo de los vasos sanguíneos. Pregunte en cuánto debería tener sus niveles de colesterol.

Programa Nacional de Educación sobre la Diabetes
LA DIABETES Y USTED:
¡Todos los medicamentos son importantes!

Consejos para administrar sus medicamentos

1. Tome sus medicamentos como le hayan indicado.
   Hable con su farmacéutico y su médico de cabecera si:
   * Tiene una reacción alérgica a uno de sus medicamentos.
   * Tiene cualquier problema con sus medicamentos.
     Por ejemplo, olvida tomarlos o tiene dificultad para tragarlos, problemas para leer las etiquetas o para pagar por ellos.
   * Hay algún cambio en su dieta o salud.
   * Está embarazada o amamantando.

2. Mantenga una lista de todos los medicamentos que toma. Dele una copia a su farmacéutico y a todos sus proveedores de atención médica. Asegúrese de que la lista incluya:
   * Los medicamentos que su médico le haya recetado.
   * Vitaminas, remedios caseros y suplementos herbarios.
   * Productos que se venden con o sin receta médica. Por ejemplo, la aspirina, otros medicamentos para el dolor (analgésicos) o para el resfriado.

3. Digale a su farmacéutico la información que reciba en las visitas a sus especialistas. Estas pueden ser la visita a su dentista, especialista de los ojos, podólogo o cualquier otro miembro de su equipo de atención médica.
   * Digale a su farmacéutico si tiene cualquier problema nuevo de salud.
   * Compara los resultados de sus análisis nuevos con su farmacéutico.

¿Cómo los medicamentos pueden ayudarlo con su diabetes?

* Los medicamentos pueden ayudarlo a controlar su diabetes y su nivel de glucosa (azúcar) en la sangre. Un nivel muy alto o muy bajo de azúcar en la sangre puede causar problemas de salud. Por ejemplo, puede causar problemas con los dientes, ojos y pies. También puede ocasionar otros problemas graves de salud.
* Muchas personas con enfermedades crónicas (que duran toda la vida), como la diabetes, no toman sus medicamentos como deben. Esto las pone en riesgo de tener problemas más graves de salud.
* Hay diferentes tipos de medicamentos para la diabetes. Estos pueden ser pastillas o insulina que se coloca mediante inyecciones, una pluma o lapicero de insulina, o mediante una bomba de insulina.
* Es posible que las personas con diabetes tengan que tomar muchos medicamentos al mismo tiempo. Los médicos eligen los medicamentos de acuerdo con las necesidades de las personas con diabetes.

¿Cómo pueden ayudar los farmacéuticos?

* ¿Sabía que los pacientes ven a sus farmacéuticos hasta siete veces más a menudo que a sus médicos?
* Por lo general, los farmacéuticos están disponibles todo el día, por la noche y los fines de semana.
**LA DIABETES Y USTED:** Todos los medicamentos son importantes!

¿Conozca los factores clave de la diabetes para mantener su diabetes bajo control!

Pidale a su equipo de atención médica que lo ayude a establecer y alcanzar metas para controlar sus factores clave de la diabetes. Estos son el nivel de glucosa (azúcar) en la sangre, la presión arterial y el colesterol. Hable con su familia sobre su diabetes y déjales cómo debe controlarla para que lo puedan ayudar.

- **Prueba A1c:** La meta para muchas personas es obtener un valor de menos de 7% en esta prueba de sangre. Aun así, su médico podría fijar una meta diferente para usted.
- **Presión arterial:** Tener la presión arterial alta causa enfermedades del corazón. Para la mayoría de las personas, la meta es tener menos de 140/90 mm de Hg. Aun así, su médico podría fijar una meta diferente para usted.
- **Colesterol:** El colesterol malo se conoce como lipoproteína de baja densidad o BLD. Este colesterol se acumula en los vasos sanguíneos y los tapa. El colesterol bueno se conoce como lipoproteína de alta densidad o LAD. Este colesterol ayuda a sacar el colesterol malo de los vasos sanguíneos. Pregunte en cuánto debería tener sus niveles de colesterol.
- **No fume:** Llame al 1-855-DÉJELO YA (1-855-355-3569). Pida apoyo para dejar de fumar.

**Programa Nacional de Educación sobre la Diabetes**

### Appendix H. Project Participant Demographics Template

<table>
<thead>
<tr>
<th>Code</th>
<th>Gender</th>
<th>Age (years old)</th>
<th>Duration of Diabetes (years)</th>
<th>Comorbidities</th>
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Appendix I. Project Participant Pre test Post test Biomarker Template

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<th>Code</th>
<th>Pre A1C (mg/dl)</th>
<th>Post A1C (mg/dl)</th>
<th>Pre weight (lbs)</th>
<th>Post weight (lbs)</th>
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Appendix J. Project Participant Pre test Post test Exercise & Survey Template

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<th>Code</th>
<th>Pre steps (average daily)</th>
<th>Post steps (average daily)</th>
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<th>Post score (%)</th>
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