Assessment of Knowledge and Health Behavior in a Spanish Diabetes Self-Management Education

A Clinical Scholarly Project by

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Submitted in partial fulfillment of the requirements for the degree of
Doctor of Nursing Practice
August 2017

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August 2017
ACKNOWLEDGEMENTS

“For from Him and through Him and for Him are all things. To Him be the glory”-Romans 11:36. Thank you God for the strength you have bestowed upon me and being with me every day. To my dearest and greatest blessing of all, “My Family”, thank you for your continuous support, prayers, strength, and understanding throughout this journey. Indeed, you all “My Family” are the lights of my life and I thank the heavens the day I became yours. For there will be no me without you. Thank you! Thank you to the Armagno family for paving the way to this priceless moment. I am grateful for the foundation to study in this beautiful land of the brave.

To Dr. Angelia Sewer, thank you for your invaluable support, kindness, patience, and encouragement. To Dr. Linda Kerr, thank you for your patience and guidance. To the Brandman University staffs, thank you all for believing in me.
ABSTRACT

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The Hispanic population has a high prevalence of diabetes. The purpose of this study was to assess whether diabetes knowledge and health behavior change were improved using culturally based diabetes self-management education for Hispanic adults with type 2 diabetes. Diabetes self-management education is vital in cultivating knowledge, health behavior change, and prevention of diabetes complications. The project was conducted using a one-group pre and post-test design using the five Prochaska’s transtheoretical model of change as the theoretical framework. Twenty-Five Hispanic adults with a diagnosis of Type 2 diabetes were recruited for the project. The pre-and posttest data for the project were obtained using the Diabetes Knowledge Questionnaire (DKQ-24), and the Health Behavior Questionnaire (HBQ) derived and modified from the Diabetes Project Participation Questionnaire (DPPQ). A paired sample t test was used to compare the pretest and the post-test scores. Upon completion of the five-week diabetes self-management education, results demonstrated a significant difference (p <0.05) in the pre-and post-test scores. Significant improvements were shown on both diabetes knowledge and health behavior changes, leading to a recommendation that diabetes self-management education should be culturally based. This result is expected to embolden and assist medical practitioners in making timely decisions to use culturally based diabetes self-management education for diabetes treatment among Hispanics.

Keywords: Hispanics, diabetes, culturally diabetes self-management education, barriers
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Chapter 1

Diabetes mellitus (DM) is a chronic disease that requires the patient to make everyday decisions regarding their quality of life along with other factors. In achieving these objectives, patients with DM are introduced and trained through self-management education and support programs. Many of the activities involved in managing the complexities of DM can be done sufficiently outside of the clinic or hospital environment. The process of diabetes self-management education (DSME) includes the critical input of a health care provider (Funnell et al., 2010). Health care providers with clinical resources to ensure that the education and patient support process are consistent with other members of the healthcare community. The quality improvement project was focused on Type 2 diabetes mellitus (T2DM), and the education needed to appropriately self-manage this chronic disease (Funnell et al., 2010). The project is designed to offer Spanish-language diabetes education to adults with T2DM, whose primary language is Spanish.

The 21st century has been marked by an increasing rate of diabetes, and therefore awareness is paramount in the management and prevention of the disease. DM is a disease characterized by elevated levels of blood glucose caused by problems in insulin production, insulin resistance, or both, which results in severe complications and ultimately death (National Diabetes Education Program, 2007). T2DM occurs when the body cannot produce enough insulin or make use of insulin the body produces efficiently (National Diabetes Education Program, 2007). T2DM is the most common type, affecting 90 to 95% of all patients diagnosed with this disease and is often insidious in nature (Lopez, Bailey, Rupnow, & Annunziata, 2014). The United States (U.S.) experiences relatively a larger burden of diabetes in its population compared to other countries (Florez et al., 2009). A 2014 report from the National Diabetes
Statistics showed 29.1 million or 9.3% of individuals in the U.S. have diabetes mellitus, 21.0 million diagnosed, and 8.1 million undiagnosed (National Diabetes Statistics Report, 2014). DM is a major health concern in the U.S. and affects each ethnic group differently, particularly the Hispanic population (Chukwueke & Cordero-MacIntyre, 2010). Hispanics in the United States are twice as likely to develop diabetes, as compared to non-Hispanic whites, 12.8% versus 7.6% (National Diabetes Statistics Report, 2014).

**Background and Significance**

The prevalence of diabetes among Hispanic adults ages 20 and older is approximately 8.5% of Central and South Americans, 9.3% for Cubans, 13.9% for Mexican Americans, and 14.8% of Puerto Ricans (National Diabetes Statistics Report, 2014). The estimated total cost of diabetes in the U.S. in 2012 included the direct and indirect cost of $245 billion (National Diabetes Statistics Report, 2014). Direct medical expenses $176 billion, and indirect costs, including disability, work loss, and premature deaths total $69 billion (National Diabetes Statistics Report, 2014). The assessment of cost and prevalence of diabetes in the U.S. among the Hispanic population must be addressed. Particularly, since they are one of the largest and fastest growing populations in the U.S., and are experiencing a higher rate of diabetes (Chukwueke & Cordero-MacIntyre, 2010). Scientific reports showed 12.8 % of Hispanics had been diagnosed with the disease, with thousands either undiagnosed or unaware of their illness (National Diabetes Statistics Report, 2014; Zhao, 2014). According to Rosal et al. (2011), it is estimated that by 2031, DM will affect 20% of Hispanic adults. This data may reflect the lifestyle, cultural, and socioeconomic factors of the Hispanics (Rosal et al., 2011).

Hispanics represent approximately 30% of the total population in the U.S. and are growing at a rapid rate with projections showing the population to increase by 132 million by the
year 2050 (Zhao, 2014). According to Zhao (2014), the Hispanic groups are comprised of various subpopulations from different countries and regions. The term Hispanic refers to a group of diverse populations from Latin America, which consists of people from Cuba, Mexico, Puerto Rico, Central and South America (Juckett, 2013). This diverse population accounts for 50% higher prevalence of diabetes in the United States than any other ethnic groups (Coronado et al., 2007). The total annual cost of caring for Hispanics with diabetes and the complications is estimated to be $49.8 billion dollars (Institutes for Alternative Futures, 2011). Although all ethnic groups with diabetes suffer complications and mortality, Hispanics are reported to have a higher rate of complications and death rates from strokes, end-stage renal disease, cardiovascular disease, and amputations associated with diabetes when compared with the general population in the United States (Lopez et al., 2014).

Diabetes is a condition, which can be prevented and managed through proper education of the individuals living with the disease. However, there are many factors in the development and care of the Hispanic population with diabetes. Lifestyle and culture play a role and often inhibits diabetes self-management, thus preventing adequate glucose control, leading to mortality and complications (Valen, Narayan, & Wedeking, 2012). Cultural factors include but are not limited to; cultural beliefs, religion, family and social support, and diet (Valen et al., 2012). A study conducted by Castro-Rivas, Boutin-Foster, Milan, and Kanner (2014) found culture and family contributed an influential role in perpetuating unhealthy behavioral lifestyles. Current evidence suggests a diabetes education in the Spanish language will be favorable to the Hispanic population and can serve as a significant mediation of the unhealthy behavioral lifestyles (Castro et al., 2014; Gonzales, Berry, & Davison, 2013; Valen et al., 2012).
Healthy living is the primary factor in self-management of diabetes and includes both the diet and exercise patterns of an individual (Powers et al., 2017). Many research studies have shown education enhances the health of the person suffering from diabetes. Numerous evidence-based research studies have concluded that diabetes self-management education is pivotal and the need to develop culturally sensitive education programs is of the essence in diabetes management among the Hispanic population (Gonzales, Berry, & Davison, 2013; American Diabetes Association, 2013; Valen et al., 2012; Pena-Purcell & Boggess, 2013).

Diabetes self-management is a lifelong process, and the need for a culturally sensitive education, cost reduction, and health-promoting diabetes self-management in the Hispanic population is significant (Weiler & Crist, 2009). Knowledge about diabetes and its management should be provided to Spanish-speaking patients in their primary language (Fernandez et al., 2010). A lack of knowledge in addition to lifestyle and culture is another reason contributing to the elevated levels of diabetes in the Hispanic population (Hu, Amirehsani, Wallace, & Letvak, 2013). Hispanics with the disease have shown deficits in understanding the required health care behaviors of persons with the disease (Hu et al., 2013). The lack of awareness among Hispanics has affected the self-management of diabetes significantly, therefore, favorable outcomes are expected from providing Spanish-language diabetes education, which provide the necessary information needed in the management of diabetes (Fortmann, Gallo, & Philis-Tsimikas, 2011). Communication is essential in the understanding of the condition and throughout self-management. For proper diabetes management, the patient must understand the symptoms and the treatment modalities of diabetes, and health care providers when interacting with the Hispanic population must know both the Spanish culture and language (Ceballos, Coronado, & Thompson, 2010; Hatcher & Whittemore, 2007).
Problem Statement

Diabetes is a chronic disease that requires constant self-care management practices among patients with diabetes. The patients must make decisions that enable adherence to the strict diet and exercise plans involved with activities beneficial for their care and health (Ceballos et al., 2010). Diabetes self-management education (DSME) empowers patients with the skills, knowledge, and essential information for self-care, and has been shown to have a positive impact on the health of patients (Funnell et al., 2010; Haas, et al., 2013). The problem focus for this project is a lack of culturally sensitive diabetes self-management education for the Hispanic adult population, with diabetes, who receive care at a free clinic in Coachella Valley, California. Patients who have diabetes need information about their behavior and diet plans to help in the management and maintenance of proper blood glucose levels. Many adult Hispanic patients with diabetes lack the knowledge and resources needed to effectively self-manage this disease (Hu et al., 2013). Due to the lack of knowledge and resources, the patient living with diabetes often experiences poor glucose control, amputation, renal disease, cardiovascular disease, and retinopathy (Hu, Wallace, McCoy, & Amirehsani, 2014).

In their study, Cebellos, Coronado, and Thompson (2010) found there was a significant need to provide effective, culturally congruent intervention to reduce complication and mortality associated with diabetes in the Hispanic population. There has been a substantial amount of diabetes self-management education programs, but few are modified towards the Hispanic populace and culture (Gonzalez, Berry, & Davison, 2013). The inclusion of cultural components in a diabetes self-management education has been deemed successful (Gonzalez et al., 2013). Diabetes educators and health care providers continue to use the traditional method of one-size-fits-all education approach, which fails to address the need for cultural sensitivity (Weiler &
The lack of cultural based diabetes education can be detrimental and play a role in the prevalence of poor self-care management in the Hispanic population (Weiler & Crist, 2009). Barriers such as language and literacy hinder Hispanics from receiving the education needed to successfully self-manage this disease (Eskes, Salisbury, Johannsson, & Chene, 2013; White-Osborn, Gebretsadik, Kripalani, & Rothman, 2013; Pena-Purcell & Boggess, 2013). Language is one of the most identified significant barriers to diabetes self-management in the Hispanic population and many lack proficiency in English (Eskes et al., 2013). English used as a lingua franca of the U.S. and lacking expertise makes diabetes education difficult for Hispanic residents to learn (Eskes et al., 2013). Although, there are translators who assist patients in undertaking the essential training program, it has not proved to be an optimal solution to improving the outcome of self-management (Hanis et al., 1991). Many healthcare providers reported that they felt limited when working with a translator because it affected their ability to control the communication, and were unsure if the information was accurately communicated (Mayo, Sherrill, Sundareswaran, & Crew, 2007). A lack of good communication is not beneficial to any population and leads to poor disease management and compliance.

Literacy according to National Assessment of Adult Literacy found that 60% of Hispanics have below basic health literacy skills (White et al., 2013). Low levels of literacy combined with language barrier play a huge role and offer a significant challenge to diabetes self-management. White et al., (2013) found Hispanics experience less than the highest standard or quality related diabetes self-care outcomes due to health literacy. When developing diabetes self-management education, it is important to keep in mind knowledge of literacy level in the Hispanic population (Pena-Purcell & Boggess, 2013; White et al., 2013).
There are many barriers to diabetes self-management among the Hispanic population. However, literacy and language are recognized as obstacles to diabetes self-management at the study site. Socioeconomic status is not regarded as an impediment to diabetes self-management in this project because the clinic is a nonprofit, community-based free clinic. The current diabetes education program at the study organization is not culturally sensitive to accommodate the considerable number of Hispanic patients with diabetes. The organization’s diabetes program utilized the “one-size-fits-all” type of education based on current diabetes practice guidelines, taught in the English language, and translated by a non-medical staff. The program used volunteer providers, who are not medically trained, and a volunteer Spanish translator, who is not of Hispanic origin. The Spanish-Language diabetes self-management education (DSME) was developed, using a native-Spanish speaking certified diabetes educator as an instructor designed to address the barriers of language.

**Purpose of the Study**

Diabetes has been identified as one of the leading chronic diseases in the United States. Unfortunately, the burden of the disease has been lying disproportionately on Hispanics to their disadvantage (Brown-Guion, Youngerman, HernandezTejeda, Dismunke, & Egede, 2013). Projections regarding diabetes in the United States indicate that if the historical and social perception and position of the adult Hispanics remain unchanged, approximately 20% of Hispanic adults will be affected directly by the disease by 2031 (Rosal et al., 2011). This may be due to the lifestyle and cultural practices unique to the Hispanic culture.

Historically, it is known that Hispanics evolved from various ancestries consisting of a Spaniards as well as Native Americans (Hanis et al., 1991). Hanis et al. (1991) indicated in their study 31 out of 100 randomly sampled genes in the Hispanic population were from the ancestral
Native Americans. The genetic link is proven to be a factor in the high rate of diabetes in the Hispanics as 16.1% of Native Americans are affected by diabetes (Centers for Disease Control and Prevention, 2013). Other factors, such as poor physical activity, obesity, and unhealthy diet, when combined with literacy, language barriers, cultural practices, beliefs, and poor access to health care, can lead to damaging results (Valen et al., 2012).

Recent studies have shown that Hispanics from a societal perspective suffer a higher rate of complications from diabetes such as: renal disease, amputation, blindness, stroke, and cardiovascular issues. Hispanics are 1.7 times likely to develop diabetes complications when compared to other ethnic groups and are expected to increase by 132 million by 2050 (Zhao, 2014; Weiler & Crist, 2009; Chukwueke & Cordero-MacIntyre, 2010). Additionally, there are different, unequal opportunities to access healthcare facilities, education, and good jobs for the average Hispanic, and as such, there is the likelihood of increasing cases of diabetes in Hispanic population (Alvarez, 2015). Therefore, Hispanic patients and families must have adequate access to Spanish language diabetes self-management resources.

Rationale and Relevance of the Study

Diabetes is a growing health issue primarily in the developed countries. The prevalence and number of diabetes cases are increasing steadily, and research shows that 422 million people in the world are living with the disease (Schneiderman et al., 2014). The cause of diabetes is multifactorial, but one of the major risk factors is obesity. Diabetes caused about 1.5 million deaths due to its complications and 2.2 million more deaths because of cardiovascular risks and stroke complications (American Diabetes Association, 2013). Diabetes is one of many chronic diseases whose incidence and prevalence are studied among Hispanics living in the United States. A longitudinal study conducted by the Center for Disease Control and Prevention (2015)
indicated there is an increasing trend in the number of reported cases of T2DM among the Hispanics living in the U.S. from 6.0% in 1997 to about 9.1% in 2013. Notably, while these rates were a generalization of the Hispanics, the various heterogeneous groups within the larger Hispanics grouping had different rates of prevalence. Particularly, those of Puerto Rican descent were at a higher risk with an average rate of 14.8% while those of the Cuban, Central, and South American descent had the least prevalence rate of approximately 9.3% and 8.5% (National Diabetes Statistics Report, 2014).

In the U.S., the rate of diagnosed cases of diabetes among Hispanics was 12.8% in 2012 with the possibility of increasing by 2031 (American Diabetes Association, 2016; Rosal et al., 2011). Moreover, data from the Center for Disease Control and Prevention (2016) indicated Hispanics have a 50% higher risk of dying from diabetes as compared to Whites. Notably, this rate was distributed over the substantial number of Hispanic subgroups that include Mexican Americans, Puerto Ricans, Central and South Americans, and Cubans among others (Center for Disease Control and Prevention, 2016).

Information learned from this study about the Hispanic populace may help to educate the public on the importance of screening and management of diabetes through control of behavior, proper diet, and exercise. The study may also assist in reducing discrepancies among the different ethnic groups and as a result, reduce the incidence and prevalence of diabetes. The information is best if presented to the Hispanic population in the Spanish language. Data from the National Diabetes Statistics Report, (2014) showed Hispanics should seek health care assistance and have knowledge of the risk factors for developing diabetes. These individuals must access screening services to become informed on healthy lifestyles required for living with diabetes. Handelsman et al. (2015) conducted a knowledge assessment study and risk factors for
developing diabetes for Hispanics, and found that 35% of Hispanics did not know the risk factors for developing diabetes.

The prevalence of Hispanics with pre-diabetes and diabetes is high. Therefore, the need for further knowledge and information on the symptoms and risk factors in developing diabetes is crucial in reducing the disease; the information should be culturally sensitive to be received and accepted by the Hispanic population (Handelsman et al., 2015). The success of diabetes prevention rests on an understanding of the various risk factors for diabetes (Handelsman et al., 2015). The populace must recognize the importance a health care system plays in ensuring proper lifestyle and behavior rather than just addressing and identifying the risk factors (Handelsman et al., 2015; Gonzales et al., 2013). Also, an expert team of specialists needs to be availed in monitoring and instructing affected individuals in order to move forward; forward movement is only possible after burdens are identified for the Hispanic population (Handelsman et al., 2015; Gonzales et al., 2013; Ceballos et al., 2010).

Healthcare Costs

The expenses occurring in the management of diabetes can be categorized as either direct or indirect. Direct costs incurred in the management of the disease are through medications, laboratory tests, physician, and nursing care while indirect costs, on the other hand, occur through a loss of productive individuals since there is an association with high mortality and morbidity (National Diabetes Statistics Report, 2014). In 2012, the American Diabetes Association reported that the cost of managing diabetes in 2002 was estimated to be $132 billion, while the cost of managing the disease in 2007 was estimated at $174 billion in the U. S. (American Diabetes Association, 2012).
The cost of health care in the management of diabetes is high due to the increase in population with the disease. Moreover, poorly controlled diabetes lowers immune system dysfunction and elevates the risk for diabetes related complications (Handelsman et al., 2015; Gonzales et al., 2013). The risks associated with development of diabetes include impairment of neurological, metabolic, ophthalmic, cardiovascular, and renal systems (Lopez, Bailey, Rupnow, & Annunziata, 2014). The 2012 study by the American Diabetes Association also ascertain that the total expenditure for managing diabetes had risen from 41% in the last five years (American Diabetes Association, 2012). Approximately, 23% of health care expenses were towards diabetes, and a total of $245 billion dollars was attributed to managing diabetes costs (American Diabetes Association, 2012; National Diabetes Statistics Report, 2014; American Diabetes Association, 2013).

In the U.S., more than a third of the health care expenditure is directed to diabetes care both as direct and indirect costs (American Diabetes Association, 2012). The costs include hospital stays, high rate hospital readmissions for screening and due to complications, and medications since diabetes medications are prescribed for maintenance and need to be taken regularly (National Diabetes Statistics Report, 2014; American Diabetes Association, 2012). Inpatient visits to the hospital are the leading drivers of cost in the disease management of diabetes (American Diabetes Association, 2013). The individuals who have diabetes are sicker and weaker when compared to the general population and the cost of their health care spending is higher than the cost for healthy individuals (Fu, Qiu, Radican, & Wells, 2009).

Studies have shown that the likelihood of developing disabilities due to complications of diabetes is quite high and the workforce is negatively affected and leads to a decline in the country’s economy (American Diabetes Association, 2012; Fu et al., 2009; Lopez et al., 2014).
The death reported in the year 2012, diabetes was named the primary cause amounting to 30% diabetes (American Diabetes Association, 2012; National Diabetes Statistics Report, 2014; American Diabetes Association, 2013). The premature deaths due to diabetes led to loss of income and loss of productivity in the country therefore, the public needs to be educated to reduce the cost of managing diabetes (American Diabetes Association, 2012; National Diabetes Statistics Report, 2014). Individuals with better glycemic control have lower levels of developing complications and report a decreased physician visits than those with uncontrolled diabetes having to visit the hospital three to eight times more (Handelsman et al., 2015).

Supporting Evidence for Advanced Practice Registered Nurses

Nurses play an integral role in the health care systems. Registered nurses provide a variety of services aimed at improving the management and prevention of diabetes. According to Funnell et al., (2010) the role of diabetes education has been in the past carried out by registered nurses and later on, due to the emergence of the medical nutrition therapy, dietitians who are registered become an important part of diabetes education. However, due to the increased incidence and impact of diabetes, more qualified nurses have been introduced to provide managed care required achieving optimum health results. According to the article by Partiprajak, Hanucharurnkul, Piaseu, Brooten, and Nityasuddhi (2011), there is current evidence regarding advanced practice nurses (APNs) on their effectiveness in dealing with a various group of patients in a diverse setting.

Based on the article, the primary roles of APNs in most nations are to provide direct care to patients exhibiting complicated health problems and careful management of a particular group of patients. Partiprajak et al. (2011), found that APNs were successful in dealing with diabetes patients. Among the roles they played on diabetes patients included, facilitating self-
management education, managing, and monitoring of the health challenges, coordinating the exercises by the groups, ensuring the progression of care and holistic care services and among other services. Moreover, Levich (2011) claim that nurses are the first people to interact with the patients and thus are encouraged to use their skills, training, and knowledge for education and motivation of diabetes patients.

Levich (2011) added that APNs play a leading role a significant role in self-management education, insulin therapy, and exhibits good listening skills, provided better education to patients, and spent most of the time with the patient. Registered nurses provide both primary and secondary care to the patients and always focus on self-management of the condition; therefore, they are integral in managing T2DM across all patients.

**Definition of Terms**

Hispanics – A Spanish-speaking individual living in the U.S. of Latin descent

Health Literacy- the ability for an individual to obtain, process, and understand basic health information and services to make appropriate medical choices.
Chapter 2

Literature Review

This project defines Hispanics as individuals who identify themselves of Spanish-speaking background able to trace their roots from Mexico, Puerto Rico, Cuba, and other Spanish-speaking countries (Passel & Taylor, 2009). The Hispanic culture is unique and includes many social factors and beliefs, which create barriers to diabetes self-management. Hence, due to these beliefs and social factors, the following project question was asked: Will a Spanish-language diabetes self-management education, improve diabetes knowledge and health behavior in adult Hispanics 18 years and old with Type 2 diabetes mellitus (T2DM) who receive care in a free clinic? The Spanish-language diabetes self-management education will be compared with the current standard of practice performed in the clinic. The goal is to notice improved knowledge base and health behavior changes in diet, laboratory results, medications yielding fewer diabetes complications and mortality rates. The literature review focuses on the barriers noted in the Hispanic culture such as; rural living, acculturation, access to health care, literacy, and language, all impacting adequate diabetes self-management.

Literature Search

A systematic review was performed to examine the effect of diabetes knowledge and health behavior management for Hispanic adults. The survey began December 1, 2016, and ended on March 30, 2017. The search included peer-reviewed articles written over the past ten years. Databases searched included Ovid, PubMed, Science Direct, Medline, CINAHL, and EBSCOHOST from 2007 to 2016. In total, 220 articles were identified for diabetes knowledge and health behavior management of Hispanics in the United States (U.S.). A total of 67 articles were reviewed for the clinical project, and 50 studies met the inclusion criteria. Evidence
summaries and experimental trials were utilized to include a broad range of proof from general, filtered, and unfiltered sources. Sources such as the American Diabetes Association, International Diabetes Federation, American Association of Clinical Endocrinologists and American College of Endocrinology-Clinical Practice Guidelines, and American Association Diabetic Educators were utilized.

The inclusion criteria included self-management and cultural considerations and the Hispanic community and cultural barriers. The exclusion criteria were studies older than ten years; studies focused on Hispanics with a new diagnosis of diabetes, Spanish written articles, and studies on Hispanics in other Latin countries. These articles were published in the English language found in academic and scholarly journals. The keywords and phrases used: Diabetes, Diabetes knowledge, Hispanic adults, cultural diabetes self-management education, barriers, behavior associated with T2DM, and Prochaska’s transtheoretical model.

Self-Management and Cultural Consideration

Many Hispanics have a language barrier related to speaking or understanding English; often their initial communication is in their local Spanish dialect (Eskes et al., 2013). The Spanish-speaking Hispanic population with T2DM, communication of self-management practices can be satisfied with the use of Spanish-language (Gonzales et al., 2013; Eskes et al., 2013). An assessment of the knowledge and health behavior between this group and others using English-speaking self-management, a consideration of what passes, as self-management is important. Chodosh and Morton (2005) defines self-management as a systematic intervention requiring the patient to be actively involved in the physiological processes associated with self-monitoring and decision-making affecting the patient’s health. The projection by Chodosh and

According to Fan and Sidani (2009), diabetes self-management education evolved from the academic traditional teaching program to a program using various psychological, educational, and behavioral interventions. Fundamentally, self-management involves a combination of interactive, didactic, and collaborating methods unique to the individual’s needs. The prediction stated by Fan and Sidani (2009) on what passes, as self-management is similar in definition offered by Chodosh and Morton (2005). Self-management has a broadened definition incorporating different attributes comprised in diabetes self-management education.

Fan and Sidani (2009) further noted self-management education should be individualized depending on the diabetes type and the recommended therapy. Other factors included the motivations to change and learn, available resources, literacy level, culture, barriers, and the patient’s self-management abilities. The statement by Fan and Sidani (2009) implies a self-management approach used on one patient cannot be replicated for another due to differing factors and influences. Self-management is a highly individualized process, implying the effectiveness within the Spanish-speaking Hispanic population is dependent on the ability to transcend the language and cultural barriers (Fan & Sidani, 2009).

As regards the effect that self-management has on health behavior and knowledge, several researchers have indicated that culturally tailored self-management education has led to a positive change in the patient's behavior and experience. Educating adult Hispanics with diabetes, one must understand their unique beliefs, health care practices, customs and traditions, food patterns, and preferences found in the Hispanic culture (Hatcher & Whittemore, 2007). Diabetes self-management is a lifelong process and needs a culturally sensitive education, cost
reduction, and health-promoting diabetes self-management in the Hispanic population is significant (Weiler & Crist, 2009).

Current evidence supports the need for diabetes self-management education (Gonzales, Berry, & Davison, 2013; Valen et al., 2012; Pena-Purcell & Boggess, 2011). The American Diabetes Association (ADA) has identified the need to develop culturally sensitive education programs to reach the Hispanic population (Pena-Purcell & Boggess, 2011). Knowledge about diabetes and self-management is best provided to Spanish-speaking patients in their primary language (Pena-Purcell & Boggess, 2011). The consequence of not addressing diabetes in the Hispanic population could lead to continued rates of morbidity and mortality associated with the disease (American Diabetes Association, 2013; Pena-Purcell & Boggess, 2011). The positive implications addressing this issue may result in improvement towards diabetes knowledge and self-management behavior (Pena-Purcell & Boggess, 2011).

**Hispanic Community and Cultural Barrier**

Acculturation is identified as an important variable to the health of the Hispanic population (Chang et al., 2013). Acculturation is defined as a cultural change process shaped by the interactions and experiences of individuals and their environment (Perez-Escamilla, 2011). Acculturation can be measured by the number of years an individual has lived in the United States or by generational status (Castro, Shaibi, & Boehm-Smith, 2014). Sobralske (2006) found Hispanics residing in the rural areas are less acculturated; retain more of their cultural beliefs and heritage than those living in the urban areas. Acculturation according to Perez-Escamilla, (2011) has been associated with poor lifestyle choices, poor nutrition, and increase body mass index.

Although acculturation has been shown to affect lifestyle choices, little data is known to show the direct effects on diabetes. A study conducted by Mainous et al., (2008) found minimal
evidence acculturation an adverse effect on diabetes in the Hispanic population. Healthy lifestyle choices along with traditional Hispanic foods, which promoted improved glycemic control were a focus in this project. Therefore, regardless of the limited data showing the acculturation in diabetes in the Hispanic population, consideration must be given to lifestyle choices affecting acculturation.

Access to health care was identified as a barrier to diabetes self-management (Hu, Wallace, & Tesh, 2010; Whittemore, 2007). Limited health care access is unique to Hispanics residing in the rural low-income areas, which results in a decrease in optimal health than those living in urban areas (Whittemore, 2007). Inadequate access to health care prevents Hispanics from receiving proper diabetes prevention education and self-care management (Hu, Wallace, & Tesh, 2010). Although many Hispanics are aware of community resources, they are not utilized because of fear in disclosure of immigration status leading to deportation, lack of income, and transportation (Long et al., 2012; Hardy et al., 2012). Transportation and restricted access to a medical clinic can be directly attributed to lack of access to health care affecting the Hispanic population residing in the rural area (Millard et al., 2011).

Hispanics are the largest ethnic group living in the rural areas in the United States, with approximately 11.1 million working on rural farms (Loi & McDermott, 2010). Hispanics living in the rural areas are disadvantaged and have a higher prevalence of diabetes and complications associated with the disease versus those living in the urban areas (Sadowski, Devlin, & Hussain, 2012). Brown-Guion et al. (2013) found higher diabetes prevalence in the rural Hispanic population could be attributed to the lack of diabetes self-management education. An understanding of the challenges and the prevalence of diabetes in the rural Hispanic populations was vital in this project because the prevalence of diabetes in Coachella Valley is higher than
other rates in the Riverside County (Health Assessment and Research for Communities, 2016).

Literacy is another contributing factor to poor diabetes self-management in the Hispanic population. Health literacy is defined as the degree to which an individual can obtain, process, and understand health information to make an appropriate healthcare decision (Aguirre, Wilhelm, & Joshi, 2012). The Hispanic populations in the United States have lower levels of health literacy and are more likely to have poor glycemic control (Aguirre, Wilhelm, & Joshi, 2012; Heinrich, 2010).

A study conducted by Heinrich (2010) found that none or minimal English-speaking Hispanics had lower levels of health literacy than Hispanics who spoke English. A descriptive study conducted by Chilton, Hu, and Wallace (2006) found lower educational concentrations in the Hispanic population could prevent early detection or prevention of the disease. The study further stated due to the affirmation above, Hispanics lacked adequate knowledge of diabetes management; therefore, diabetes self-management was difficult (Chilton et al., 2006).

Incorporating knowledge of diabetes and its effects are necessary for any diabetes self-management education to be successful (Chilton et al., 2006). A diabetes self-management education with a health literacy component of the Hispanic culture is a great channel to improve the population’s knowledge on diabetes, and the possible complications of the disease if not properly controlled (Funnell et al., 2010; Gonzales et al., 2013; Haas et al., 2013).

The single well-known characteristic associated with the welfare of many Hispanic immigrants is a language barrier (Ding & Hargraves, 2009). Fernandez et al., (2010) found 39% of Hispanics reported a poor understanding of the English language. A lack of effective communication due to low proficiency in English can have a harmful effect on Hispanic health and diabetes self-management. Poor communication and trust in the health care system serve as
a barrier preventing Hispanics from receiving information or care regarding their health (Walton, Snead, Collinsworth, & Schmit, 2012). Ding and Hargraves (2009) survey found language barrier played a part in the frustration and stress of the Hispanic population and led to poor health. The race-stratified randomized trial conducted by Fernandez et al. (2010) also found the language barrier in the Hispanic population was related to poor glycemic control. The language barrier was highly considered in this project. This project aim is to teach diabetes self-management to Spanish-speaking Hispanics with T2DM, whom diabetes self-management practices can only be effective with the use of Spanish language education.

**Scope of the Evidence**

Several studies have indicated culturally diabetes self-management education has led to a positive change in the patients’ behavior and knowledge. Scain, Friedman, and Gross (2009) conducted a research study related to a culturally structured education program. The study emphasized the effects of health related to behavior. Results specified teaching sessions on self-management led to a positive change in diabetes-associated knowledge (Scain et al., 2009). The study also indicated educational programs resulted in positive psychological and behavioral aspects associated with T2DM (Scain et al., 2009).

The authors Scain et al. (2009), noted some of the core competencies and knowledge areas improved following the education program in five critical areas. The areas included; monitoring of individual health parameters, physical activity, healthy eating, surveillance and prevention of complications, and pharmacotherapy. The results on the improvement in health based behavior were also similar from the study by Christian, Bessesen, and Byers (2008) who investigated the clinic-based support that helps increase physical activity and reduce weight in T2DM patients. The study noted self-management education led to an improvement in health-
related behavior and hence a direct positive outcome on the health of the patients. The evidence from the two studies Scain et al. (2009) and Christian et al. (2008) pointed to the notion that self-management education has a large contribution to the health behavior, skills, and knowledge of the patients suffering from T2DM.

Self-management education for many diseases has been perceived fruitful, minimizing the danger the disease possesses and reducing patient visits to a specialist. According to the study by Pena-Purcell, Boggess, and Jimenez (2011) stated self-education program among Hispanics with diabetes improves self-efficacy and self-care among the patients. Their study a quasi-experimental allowed researcher interested in evaluating the impact of culturally sensitive, empowerment-based diabetes self-management program regarding Hispanics or Latinos who speak Spanish. In this research, a sample of 144 participants was used to test the effectiveness of the program where the participants were assigned to either control or intervention group. The collected assessments were based on attitude, behavior, clinical hemoglobin A1c (HgbA1c), and culture, which were measured at baseline and after three months. The demography of the population was similar; the researcher found the treatment group had a significant reduction in hemoglobin A1c values and had improved in their self-care and efficacy scores. The findings depicted self-management education among Hispanics is vital in improving their diabetes self-efficacy and self-care behaviors.

The study conducted by Fortmann, Gallo, and Philis-Tsimikas (2011) posit that even though diabetes self-management is essential in acquiring glycemic control, adherence among ethnic minorities is poor especially in the Hispanic population. However, research shows that people subjected to an environmental support resource for diabetes management. In this study,
the researchers were interested in determining how support resources for diabetes management impact on the levels of Hemoglobin A1c in a sample of about 200 Hispanics with T2DM.

The study found that the participants who received more disease-management support resources had better diabetes management as well as reduced depression that emanate from the disorder. Thus, the control of glycemic among the patients was tighter than those who receive less or no support resources for disease management. Based on these result, the researchers conclude that support resources for diabetes management have a positive impact on patients and cultural relevance ought to be considered for programs that target diabetes self-management and glycemic control.

The role of family was found to have a significant effect on diabetes self-management in the Hispanic population. Hispanic patients find strength, positive health factors in diabetes self-management, and enhancing motivation to change lifestyle habit from spending time with family (Carbone et al., 2007). Weiler and Crist (2007) in their qualitative descriptive study found that family tradition could have both positive and negative on Hispanics with diabetes. The study further included that culturally diabetes self-management that include the family can improve diabetes outcomes (Weiler & Crist, 2007). A family is an essential unit in the Hispanic culture that needs to be included when developing or conducting diabetes self-management education (Carbone et al., 2007; Hu et al., 2014; Weiler & Crist, 2007). Although family support is essential in the management of diabetes, however, it can also be harmful to an individual diet.

Ramal et al. (2012) found that dietary changes among diabetic Hispanic patients were difficult because it affected the entire family and family members did not like the diabetic diet. Participants in their study indicated that many family members did not see the need to change their diet and was too difficult to adapt to healthy eating (Ramal et al., 2012). Hatcher and
Whittemore (2007) found family social events as a problem with diabetes self-management due to resentment built towards other family members who can eat what they want. The Hispanic family can be a strong anchor for a diabetic patient yet; can bring forth many challenges possibly affecting diabetes self-management. Patient families were encouraged to participate in the self-management education. Family involvement in the class showed family members to incorporate healthy cultural foods as part of food choices without hindering or changing their diet. Although family participation was encouraged, it was emphasized that family participation was not an inclusion in this Spanish-language diabetes self-management education project.

Physical activity plays a vital role in the self-management of diabetes (Martyn-Nemeth, Vitale, & Cowger, 2010). Martyn-Nemeth et al. (2010) performed a pilot study to investigate the effect and feasibility of a culturally focused diabetic exercise program on the hemoglobin A₁c, lipid levels, BMI, and psychological well-being in previously sedentary Hispanic adults with T2DM. The study was based on a pre-and post-test design which, used laboratory tests, body mass index (BMI) calculator, 12-item- Well-Being Questionnaire-12 (WBQ-12), and exercise pedometers. The participants consisted of 19 subjects who partook in weekly workout sessions for 12 weeks in English and Spanish.

The outcomes of the measures showed improved metabolic parameters and glycemic control, no change in overall BMI, and positive psychological well-being. The pilot study concluded a culturally focused exercise program is effective and feasible for previously sedentary Hispanic adults with T2DM in promoting regular physical activity and glycemic control (Martyn-Nemeth, et al., 2010). Physical activity is imperative in the self-management of diabetes. Suggestions offered for activities are to include family members and friends to make exercise less daunting and more enjoyable. Exercise and performance is a major component to
diabetes self-management and should not be eliminated in the teachings of any diabetes self-management education.

**Description of the Studies**

Lorig et al. (2008) conducted a randomized, controlled trial of the community-based, peer-led Spanish Diabetes Self-Management Program (SDSMP) to determine the effectiveness in improving health status, health behaviors, and self-efficacy and maintaining improvements on receiving automated telephone reinforcement. The participants were divided into three randomized groups consisted of 567 Spanish-speaking adults with T2DM. The subjects who were provided a 6-week community-based, peer-led SDSMP, 116 of the participants had monthly-automated telephone reinforcement, 219 without support, and 198 to the usual-care wait-list control group. The outcomes measured health status, health behaviors, health care utilization, self-efficacy, hemoglobin A1c levels using self-administered questionnaires. The results demonstrated that the program led to improvements in hemoglobin A1c (0.4%), health distress, symptoms of hypoglycemia and hyperglycemia, self-efficacy (p< 0.05) and self-rated health and communication with physicians. Lorig et al. (2008) study concluded a self-management program resulted in improved hemoglobin A1c, self- efficacy, and health status indicators without providing automated telephone reinforcement.

A study based on the effectiveness of culture-based intervention strategies for diabetes self-management among the Hispanic population was a pilot study performed by (Mauldon et al., 2006). The study tested the feasibility, acceptability, and efficacy of a culturally relevant cognitive behavioral diabetes intervention for Hispanic patients with T2DM. Participants comprised of 16 Latino patients with T2DM who participated in six weekly, three-hour, cognitive behavioral, educational sessions conducted in Spanish. The study investigated the
participant satisfaction, glycemic control, dyslipidemia, diabetes knowledge, diabetes-related psychological distress, and health beliefs using questionnaires, laboratory data, and chart review.

The results demonstrated the participants had great satisfaction, reduction in hemoglobin A1c levels, increased levels of knowledge, lower psychosocial distress, and improved belief regarding diet and medication to control diabetes at the end of the intervention. Thus, the study confirmed the exceptional acceptance for and the feasibility of this intervention for adult Hispanic patients with T2DM.

Effective diabetes self-management begins with the ability to recognize and understand the disease (Long et al., 2012). Culturally diabetes self-management education is a cornerstone to the management of diabetes in the Hispanic population (Coronado et al., 2007). Peña-Purcell et al. (2011) conducted a pilot study to evaluate the effects of a culturally sensitive, empowerment-based diabetes self-management education (DSME) program for Spanish-speaking Hispanic patients. The study used a prospective quasi-experimental method to investigate the effectiveness of a five-week DSME program called Yo Puedo on 83 participants from Starr and Hidalgo Counties, Texas. The intervention group included 22 subjects and 61 subjects for the control group. The outcomes of the pre-and post-test assessments, hemoglobin A1c levels, and oral surveys were analyzed for self-efficacy, and diabetes self-care and knowledge. Results showed the intervention group had significantly higher diabetes self-care scores, self-efficacy, and reduced hemoglobin A1c levels. Hence, the study concluded that a culturally sensitive DSME program for Hispanics improved participants’ engagement and metabolic, and self-care behavioral benefits.

The impact of traditional Hispanic belief system and culture must be understood and integrated into any diabetes self-management education program. Walton et al. (2012) found
cultural attitudes can negatively affect diabetes self-management. Chukwueke and Cordero-MacIntyre (2010) found that culturally sensitive health education provided to Hispanics with T2DM improved glucose control and health outcome. Smith et al. (2015) conducted a similar study, which supported the cultural preference among the Hispanic population to deliver programs in the Spanish language for greater attendance and completion of self-management programs.

The aim of the study was to identify the factors associated with Hispanic adults attending and successfully completing a Spanish-language diabetes self-management education. A sample of 12,208 Hispanic adults who attended a Chronic DSME workshop were analyzed using two logistic regression analyses to investigate two dependent variables, successful program completion and workshop language. Results showed the factors associated with successful program completion were younger and female participants, fewer chronic conditions, and the workshops were held in more urban and affluent settings. The study concluded Hispanic adults showed preference to Spanish-language workshops and provided greater insight into the factors associated with successful workshop completion.

Toobert et al. (2011) conducted a blind randomized study on 280 Hispanic women with diabetes. The study result found 32 culturally appropriate lifestyle interventions reduced disparities in diabetes outcomes. The study can be deemed biased because it was conducted using only Hispanic females. However, the result findings are significant as Hispanic women are the primary food preparer in the Hispanic household (Carbone et al., 2007).

In a randomized trial of 250 Hispanic patients with diabetes, Rosal et al. (2009) emphasized that culturally tailored DSME can improve diabetes self-management. McCloskey and Flenniken (2010) demonstrated a similar practical connection between culturally tailored
education and prevention of the disease. Rosal et al. (2011) conducted a randomized control trial to test the impact of a theory-based cultural tailored literacy sensitive diabetes self-management intervention on glycemic control among low-income Latino patients with T2DM. In this study, 252 patients received a group-based intervention of 12 weekly and eight monthly sessions in English or Spanish languages. The subjects were assessed for hemoglobin A1c levels, diabetic behavioral measures like self-glucose monitoring and physical exercise via an oral survey, and diabetes knowledge using the 17-item tool based on the Audit of Diabetes Knowledge. The findings of the study indicated the intervention group had lower hemoglobin A1c levels, increased self-blood glucose monitoring and physical exercise, improved dietary quality, and increased diabetes knowledge and self-efficacy. To conclude, the study disclosed that intensive cultural intervention tailored to low-income Latino patients successfully enhanced their self-management, self-efficacy, and diabetes knowledge.

A study conducted by Salto et al. (2011) assessed the dietary intake habits, glycemic control, and physical activity of Mexican-American Hispanic adults with T2DM. The subjects participated in the En Balance diabetes education program for underserved areas of San Bernardino and Riverside Counties. The study performed a three-month intervention study on 39 Hispanic patients in two phases was tested for fasting blood glucose, hemoglobin A1c, insulin, and lipid profiles using the University of Arizona Southwest Food Frequency Questionnaire. The results of the study demonstrated there was a definite clinical increase in all three blood glucose management markers, decrease in overall dietary intake, lower total fat intake, decrease in overall antioxidant mean intake, and decrease in serum hemoglobin A1c. This study confirmed a culturally appropriate approach to diabetes education was effective in improving glycemic control and lipid profiles and reducing dietary fat and cholesterol intake.
among the Hispanic participants with T2DM.

Brunk et al. (2015) performed a descriptive qualitative study to determine the feasibility of a patient-centered culturally appropriate educational intervention for T2DM self-management for the Hispanic population. The class and focus group method consisted of nine participants to assess the lifestyle modification program that consisted of four weeklies, two-hour evening education sessions where the glycemic load, exercise, and monitoring blood glucose (GEM) manual was presented in Spanish. The results were analyzed using the hermeneutical phenomenology approach, and four themes were generated; information and knowledge, motivation and barriers to changing behaviors, experiences with new self-management behaviors, and personal responsibility for disease management. The study determined a culturally and linguistically appropriate approach was feasible for diabetes patients in self-management by improving knowledge on glycemic control, providing motivation for a lifestyle change, successful experiences of blood glucose self-monitoring and empowerment, and self-determination in disease management. Diabetes self-management education is one of the cornerstones of diabetes care.

Multiple studies have indicated the benefits of using culturally tailored diabetes self-management education to improve knowledge of diabetes, self-management behavior, as well as improve clinical outcomes (Ramal, Petersen, Ingram, & Champlin, 2012). Hispanics will take ownership and will participate in diabetes self-management education that is tailored to their culture (Millard et al., 2011). Therefore, this project is designed to provide diabetes self-management education that is culturally tailored and appropriate to empower Hispanics to become active participants in diabetes care while improving overall health.
Gap in Literature

During a literature search, the principal investigator found over 100 qualitative studies on diabetes self-management. Approximately 50 quantitative studies were found and less than ten related to the Hispanic population and culture was found to have scientific findings. There is a substantial amount of research conducted regarding diabetes self-management education interventions among whites and African-Americans as some of the racial groups with high rates, incidence, and prevalence of the disease (Aguirre, Wilhelm, & Joshi, 2012). However, little is known about the self-management education among Hispanic population and culture due to the lack of sufficient research studies (Gonzalez, Berry, & Davison, 2013). This can be attributed to several reasons; a substantial proportion of adult Hispanics suffering from Type 2 Diabetes Mellitus (T2DM) have low access to healthcare facilities. Other factors include their low health literacy skills compared to other racial groups, low proficiency in the English language, hold a diverse view concerning diabetes and healthcare in general, and the lack of culturally linguistic diabetes educators.

Although there are translators who assist the patients in undertaking the necessary education programs, this method has not provided optimum results in improving the outcome of the self-management education program (Hanis et al., 1991). Furthermore, there are minimal studies highlighted whether there is a significant difference between adult Hispanics who use self-education materials in English and Spanish. Consequently, based on the result of the literature review, this study is plausible to assess knowledge and health behavior of adult Hispanics with T2DM in a Spanish-language Diabetes Self-Management Education (DSME).
Synthesis of the Evidence

The consistencies found in all the studies are the use of culturally sensitive diabetes self-management education to improve nutrition, physical activity, knowledge, and health behavior for Hispanics. The American Diabetes Association (2014) gave a thorough summary of the state of scientific research and evidence-based practice when treating patients with diabetes, which included the use of physical activity, self-management education, and nutritional interventions. This information is useful in this project to help support the idea for high-risk patients or those already suffering from T2DM to improve their disease management utilizing these interventions.

The International Diabetic Federation (2012) provided similar clinical practice guidelines. This thorough, 100 additional page document defined at-risk populations, the nature of the diabetes disease process, and gave healthcare practitioners and their patients a wealth of useful knowledge and recommendations to manage the disease effectively.

Compared to the American Diabetes Association guidelines, the International Diabetes Federation guidelines showed different countries and regions such as Canada, New Zealand, and Europe, with slightly different standards for diabetes diagnoses and treatment plans. This information is relevant to the project because multicultural patients may view diabetes differently, in primary or minor ways. In addition, to these two-informative broad clinical practice guidelines, a growing body of research continues, which looks specifically at Hispanics adults and possible indications and interventions for diabetes in these groups.

Culturally relevant diabetes self-management education is important in promoting positive health behavior as well as improved health outcomes. In a study by Whittemore (2007), the author explored the importance of culturally relevant interventions for the Hispanic adults with T2DM and the outcomes from the study indicate an improvement in clinical outcomes, self-
management behaviors, and diabetes related knowledge. Results from the study by Whittemore (2007) also indicated a reduction in hemoglobin A1c of 0.5 percent to 1.8 percent. The research study was directed on the importance of culturally relevant self-management education. The study went beyond the tailoring of diabetes self-management education in the native language and towards the incorporation of religious and cultural beliefs in the dietary advice. While the study showed that cultural tailoring is important in self-management education, it also demonstrated an improvement in behavior and clinical outcomes in Hispanic adults with T2DM.

The study by Brown et al. (2002) focused on cultural competence in promoting self-management. The study indicated that Hispanics with T2DM have a change in health-related behavior and health outcomes following self-management education. Long et al. (2012) note that for the Hispanic population, the effectiveness of diabetes self-management begins with the ability to understand the disease. The understanding of the illness is fostered by the promotion of self-management practices, and this can only be possible in a culturally competent environment. Guccuardi et al. (2013) conducted a literature review that analyzed 13 randomized control trials where results indicated a positive rate in culturally competent diabetes self-management as compared to general education on diabetes. The outcomes from the literature review by Guccuardi et al. (2013) are the conclusions from a study by Toobert et al. (2011) who conducted a random study of 280 Hispanic women with T2DM. The results from the study by Toobert et al. (2011) indicated culturally competent lifestyle interventions helped reduce disparities in diabetes outcomes. In the analysis of these two studies and all other studies, it is evident that a culturally competent self-management intervention that goes beyond the language barrier is effective in influencing positive rate differences in health-related behavior and diabetes knowledge.
**Review of Literature Summary**

Diabetes self-management is an ongoing burden in the Hispanic population. A literature review was conducted using keywords that provided enormous diabetes problems within the Hispanic population. The evidence suggested that culturally sensitive diabetes self-management education is fundamental to ensure patient outcomes. The evidence also proved that the one size fits all diabetes self-management education is not as effective as culturally based when dealing with the Hispanic population. For a diabetes self-management education to be successful, the strong family bond, cultural beliefs, and barriers seen in the Hispanic culture must be taken into consideration (Carbone et al., 2007; Martyn-Nemeth, et al., 2010; Millard et al., 2010, Whittemore, 2007).

Education that is tailored to include the preferred Hispanic cultural practices, which includes language, cultural foods, and lifestyle is vital to successful diabetes self-management education in ethnic groups. The Prochaska’s transtheoretical model of change was utilized in the project to facilitate diabetes education. Change can be daunting, does not come quickly, but it is a powerful process that progresses with knowledge and empowerment (Hu et al., 2010). This model fosters step-by-step plan and a lifestyle change to achieve diabetes self-management success.

**Theoretical Framework**

The theoretical background for this project is Prochaska’s transtheoretical model of change. The transtheoretical model is a change process that involves progression across five stages: pre-contemplation, contemplation, preparation, action, and maintenance (Prochaska & Velicer, 1997). A general rule for at-risk populations to embrace change is 40% pre-contemplation, 40% contemplation, and 20% preparation (Prochaska & Velicer, 1997). A
diabetes self-management education utilizing this theory and based on culture nuances is an appropriate way to improve the diabetes health literacy and behavior. The model is directed towards the exploration of human behavioral motivation and how individuals can create goals and influence their behavior based on the observations of aspects around them or previous experiences (Glanz, Burke, & Rimer, 2015).

The Prochaska transtheoretical model describes a person’s willingness to change. The level of readiness determines an individual’s chance of success in transforming an undesirable, unhealthy behavior (Prochaska & Velicer, 1997). To assist behavior, change in the Hispanic population, health practitioners must re-evaluate their practices. Assessing an individual’s readiness to change and developing realistic goals to reach the desirable goal is imperative for success. Oldenburg, Glanz, and French (1999) stated understanding a person’s readiness and motivation to change is an important aspect of developing an effective intervention in the clinical setting.

Prochaska’s transtheoretical model states that change is a gradual process, which proceeds through distinct stages; each stage represents an essential characteristic (Parker & Parikh, 2001). By following these Parker and Parikh (2001) stages of change, community health practitioners can work with Hispanics, set realistic goals for them to implement, tailor interventions accordingly, and help them sustain positive lifestyle changes. The transtheoretical model focuses on intentional changes as opposed to a planned change (Brinthaupt & Lipka, 1994). The assumption of the theory states people remains in a continuum of readiness of change and can spiral going through this cycle. The concept of stages becomes important because it represents how change occurs and sets tasks to move onto the next stage.
The first stage pre-contemplation; an individual has no desire to change an unhealthy behavior and does not perceive adverse effects from the present lifestyle (Oldenburg et al., 1999). The lack of desire may be a lack of mindfulness of the behavior problem, lack of motivation, or resistance to change the present lifestyle. Rosal et al. (2011) found Hispanics have a limited diabetes self-management basic knowledge; factors related to poor diabetes management but fail to improve or prevent diabetes. Hispanics with diabetes need to be taught and made aware of the negative impact of diabetes using culturally sensitive self-management education (Rosal et al., 2011). The second stage contemplation; an individual is aware of the unhealthy habit; they are aware of the pros and cons and intend to change behaviors (Oldenburg et al., 1999). In this stage, the diabetes self-management education can focus on the advantages of healthier lifestyle changes. The diabetes self-management education can offer Hispanics necessary tools and knowledge required to prepare for lifestyle changes and diabetes management (Rosal et al., 2011). The third stage preparation; an individual intends to change undesirable behavior in the immediate future (Oldenburg et al., 1999). A desired plan of action and necessary steps are taken to fulfill this change (Oldenburg et al., 1999). The fourth phase is action; the individual has consciously made some changes in their lifestyles. During this stage, commitment to the change is necessary to prevent relapse (Oldenburg et al., 1999). The last stage is maintenance; an individual actively practices the desired behavior, and take steps to prevent regression into old habits (Oldenburg et al., 1999). At this point, the positive conduct continues without any conscious effort (Prochaska, 2008).

Anticipation and fear create obstacles and stressors, which can lead to decreased motivation or change. Evidence indicated cultural diabetes self-management education is needed to manage diabetes in the Hispanic population successfully. For a successful intervention,
Hispanics with diabetes must be aware of the change needed and the willingness to implement change. Bridle et al. (2005) found interventions tailored to the individual stages of change are more effective to promote the desired behavioral change. Hence, Prochaska’s transtheoretical model of change provides the required tools to create healthier lifestyle behavioral changes for diabetes self-management among Hispanic adults with T2DM.
Chapter 3

Methodology Overview

The rising costs, incidences, and increased complications from diabetes require the need for additional evidence-based research related to diabetes control and management (Center for Disease Control Prevention, 2016). According to the Center Control Prevention (2016) taking part in a DSME helps patients to remain compliant with diabetes control, symptoms, and complications. Powers et al. (2017); Sheeran, Klien, and Rothman, (2017) stated DSME improves health outcomes, through an individual’s increased knowledge, health behavior change, and reduction in diabetes complication. While, this claim is true in some research, DSME efficacy as a diabetes control management tool needs ample investigations in many other populaces. One of the ways to promote a person’s actions is through teaching. Patient education in particular communities encourages behavior changes, but few studies have examined the use of one’s dialectal as an intervention to assess the impact of diabetes knowledge and health behavior changes demographically (Sheeran, Klein, & Rothman, 2017).

Diabetes in the Hispanic population continues to rise; evidence indicates culturally appropriate DSME would promote health behavior, knowledge, and decrease complications associated with the disease. A needs assessment was conducted before the start of the project with collaboration efforts of the physicians, registered nurses, medical assistants, and senior administration to determine the current needs of the clinic and the patient population. The assessment illuminated the one-size-fits-all type of DSME on current diabetes guidelines taught in English and translated by non-medical personnel. The program utilized volunteer non-trained medical providers and volunteer Spanish translators (not of Hispanic origin), which was ineffective in meeting the populations’ needs.
Purpose Statement

The purpose of this project was to assess if culturally appropriate DSME would improve diabetes knowledge and promote behavior change among adult Hispanics with T2DM. Furthermore, the project’s goal assessed and confirmed findings from previous studies, which consisted of culturally tailored DSME increasing knowledge, health behavior changes, and better health care outcomes of the Hispanic population (Powers et al., 2017; Guccuardi et al., 2013; Salto et al., 2011; Brunk et al., 2015). Additionally, project outcomes were expected to offer greater insight on diabetes knowledge education correlating with two variables. The two variables were health behavior change and the prevalence of diabetes among particular populations or groups. Information gathered from the project was expected to provide useful tools for improving treatment, outcomes, and health providers’ practices in diabetes intervention and self-management education for the patients.

Introduction of PICOt Foundation

The PICOt question is a framework within which clinical nursing research is conducted for reliable results through a standard methodology. A PICOt question was designed to identify the impact of education on self-management of diabetes related to the short and long-term effects. The PICOt study was conducted as follows; In adult Hispanics with T2DM (P) does the use of Spanish- language diabetes self-management education (I) compared to current practice (C) improve knowledge and health behavior change (O) over a period of five weeks (t) re-assessment of knowledge and changes in health behavior.

The Hispanic population was used in the project. A total of 30 adult patients between 18 years of age and over with T2DM were educated on the self-management of diabetes in the Spanish-language. The fundamental problem focused on the project was self-management of
diabetes thus the patients were taught on self-care to improve the provision of health care services to the Hispanic population. All the patients that participated in the project volunteered and were not coerced.

The participants in the project were trained on the diabetes self-management to improve knowledge and health behavior. The training was done in the Spanish-language, to include topics such as an overview of diabetes, healthy eating, physical activity and medication adherence. At the conclusion of the five-week education session, the participants were assessed for any improvement. The level of understanding was measured by employing the use of a questionnaire to assess the knowledge and health behavioral changes. However, education alone was not the only element required in changing the current trend of diabetes among Hispanics. The duration of the assessment was five weeks after which patients were assessed for any improvement in knowledge and health behavior.

**Protection of Human Rights**

Due diligence was taken to protect the right of all participants. To safeguard the privacy of the participants, each participant was given a unique identifier one through 30 and was identified with the number throughout the project. No names or personal data with identifiers were used in the project. Paper surveys were stored in a locked file cabinet in a secured office. The electronic data was stored on a password protected computer folder and secured cloud-based encrypted server. The principal investigator and medical director had access to the participants’ information during the project. All data and documents will be stored for five years (March 18, 2022), and then properly destroyed.
Project Design

A quantitative design, convenience sampling with two groups named Educational Section One (ES1) and Education Section Two (ES2) were given the pre-and post-Diabetes Knowledge and Health Behavior Test. Participants were allocated to either section with services and Spanish translation provided by a certified diabetes nurse educator. The participants underwent two-hour training once a week for five weeks. The sessions provided participants with empowerment, informed decision-making; self-caring behaviors, managing medications, problem solving and collaborating with the clinic’s health care team. The content was complemented with educational materials such as books and brochures. A native Spanish-speaking certified diabetes educator interpreted, reinforced, and answered questions related to the project. The results were analyzed immediately after the five-week intervention. The Institutional Review Board (IRB) from Brandman University and Coachella Valley Volunteers in Medicine (CVVM) clinic approved the project.

Participants were provided informed consent processes before their participation in the project components and prior to data collection. The consent process included a consent written in English and Spanish regarding the study purpose, details, and expectations. All participants were informed they could withdraw from the project without any disclosure of data or consequences. After the Spanish consent review, the participants signed the consent form, which acknowledged the information provided (Appendix E).

Population and Sample Size

Thirty participants were recruited from a free clinic located in Coachella Valley, California. The clinic’s patient population consists of documented and non-document
Hispanics, non-U.S. citizens, no health insurance, or do not qualify for state and local health programs, and poor English proficiency.

**Inclusion and Exclusion Criteria**

Participants were 18 years and older with T2DM, current patients of the clinic, without any mental debilitating disease. Exclusion criteria were; non-Hispanics, and individuals with Type 1 DM, pregnant women, or had a mental debilitating disease such as neurocognitive disorders, which according to the American Psychiatric Association (2013) are examples of mental debilitating disorders.

**Recruitment Procedure**

Project participants were recruited through announcement flyers placed in clinic’s workstations, health care provider referrals, or face-to-face contact with the participants. Written referral form for the project (Appendix F) was made after the patient’s healthcare provider identified them with a lack of diabetes knowledge and non-compliant behavior. The principal researcher prescreened potential participants referred from their primary physicians or providers and asked those who meet the inclusion criteria to participate in the project. Face-to-face patients who had contact with the principal investigator were given an invitation letter written in Spanish and English with a brief description of the project (Appendix G).

**Instrumentation**

The instruments used in the project assessed the participant’s diabetes knowledge and health behaviors. The Diabetes Knowledge Questionnaire (DKQ-24), and the Health Behavior Questionnaire (HBQ) derived and modified from the Diabetes Project Participation Questionnaire (DPPQ) were used. These instruments were selected for use in this project because of their reliability and validity to measure outcomes both in clinical and research
settings. Diabetes knowledge and health behavior are two variables associated with the significant clinical outcomes of diabetes self-management (Jezewski & Poss, 2002).

The bilingual (English and Spanish) DKQ-24 item (Appendix H) was developed as a screening tool to measure the effect of interventions (diabetes knowledge) among Hispanic adults with T2DM (Brown, Garcia, Kouzekanani, & Hanis, 2001). The DKQ-24 item is based on the idea definition of diabetes knowledge “as the retention of cognitive information about the etiology, manifestations, diagnosis, treatment, and complications of diabetes mellitus” (Lujan, 2008). The DKQ-24 was used to obtain information about the participant understanding of diabetes, types of diabetes, self-management skills, and diabetes complications. Participants could choose response choices in the DKQ-24 on the 3-point Likert Scale: (see Appendix H). The test scores of the DKQ-24 can range from 0 to 100, by calculating the percentage of correct answers, with a maximum score of 100% and a minimum score of 0.

The Diabetes Project Participation health behavior Questionnaire (DPPQ) (Appendix I) was developed with a focused use on the Diabetes project at The Center for African American Health in Denver Colorado with the support from Robert Wood Johnson Foundation (RWJF) 2002 through 2009 (Diabetes Initiative, 2009). The questionnaire was adapted and modified from the Diabetes Initiative Focus on Diabetes Project at the Center for African American for use in this project. The DPPQ has been approved by the experts at the Robert Wood Johnson Foundation (RWJF) as part of the Diabetes Initiative (Robert Wood Johnson Foundation, 2009). The subject matter experts from the Robert Wood Johnson Foundation endorsed the questionnaire to be used in a national quality improvement projects (Robert Wood Johnson Foundation, 2009). Although there is no published validity or reliability data on the questionnaire, a review by RWJF suggested adequate benefits and approved its use in small
educational programs such as this project. The six-item health behavior questionnaire measured participants overall diabetes health behavior in Likert scale. The test scores range from 0 to 100, by calculating the percentage of correct answers, with a maximum score of 100% and the minimum score of 0.

**Description of Variables**

Demographic data for this project (Table A1) were; age, gender, duration of diagnosis (years), education, Language preferred, and Spanish diabetes education attended in the last 12 months. The average age of the participants was 45.1 (SD =9.74). Nearly two-thirds of the project participants were females (60.0%). The participants reported diagnosis greater than five years 5.2 (SD =2.86). More than half (48%) of the participants have high school education. Three-fourths (76%) of the participants preferred education in the Spanish language. None of the participants attended a Spanish-language diabetes self-management education within the last 12 months.

**Data Collection and Analysis**

The Diabetes Knowledge and Health Behavior Test (DKHBT) (Appendix H and I) pre-test was given to each participant and allowed 45 minutes to complete. Upon completion of the five weeks class, the participants were given the DKHBT posttest to evaluate their knowledge and behavior. A higher score signified an increased level of diabetes knowledge and health behavior changes. The analysis was performed using Statistical Package for Social Sciences SPSS 22 software to create graphs and tables.

Descriptive statistics ran on data variables for the pre and posttests. The information assisted in identifying data entry errors and outliers. Also, the descriptive statistics were used to describe the project participants and summarize the demographic data for the convenience
sampling. The descriptive statistics included; mean, median, and mode (when appropriate) and frequencies of certain responses.

The paired sample t-test was used to analyze the data. The procedure was chosen to confirm the mean of the differences between two paired samples differ from 0 (Kim, 2015). The paired sample t-test allowed each participant to be measured twice, which resulted in pairs of observations. This test is commonly utilized in case-control studies or repeated–measures designs. The Diabetes Knowledge and Health Behavior Test (DKHBT) scores were compared by subtracting the pre-data from the post-data to obtain differences or change data, which is either positive, zero, or negative. The paired sample t-test was appropriate and applied to determine whether the Spanish-language diabetes self-management education was adequate, when the pre-and post-Diabetes Knowledge and Health Behavior Test (DKHBT) sample scores from the same participants were analyzed for statistical mean differences and significance of mean changes.

Summary

The purpose of this project was to determine if a Spanish diabetes self-management education, could improve diabetes knowledge and health behavior changes among adult Hispanics with T2DM. In order, to achieve this purpose, a quantitative methodology involving a population, intervention, comparison, outcome and time (PICOt) research design was used. The project was designed to ensure approval from Brandman University Institutional Review Board (IRB) was carefully considered and maintain patient privacy and confidentially for project participants were met. The instruments used for data collection were used in previous studies and deemed valid and reliable. All educational material was written at a sixth-grade level easily understood by all participants. The paired sample t-test was chosen for data analysis to test the
one group pretest and posttest. The findings of this project have the possibility to change
evidence-based practice and decrease health disparities among Hispanic adults with T2DM at
this clinic.
Chapter 4

Results

This clinical scholarly project is a single center, comparative analysis of diabetes self-management knowledge and health behavior following participation in Spanish language class for adult Spanish speaking participants with type 2 diabetes (T2DM). The total number of participants in this study is 30, with five participants failing to complete the intervention. In the project, participants respond to a bilingual Diabetes Knowledge Questionnaire (DKQ-24) survey establishing a baseline T2DM knowledge level. Next, the participants completed a Diabetes Project Participation health behavior questionnaire, a six-question survey to determine personal T2DM health behavior. The study participants then receive instruction regarding T2DM and proper T2DM behaviors for healthy living. Upon completion of training, study participants complete the same 24-question survey and six-question survey to determine knowledge and health behavior growth. The results of the project are shown in (Table B2). Paired sample t test was used to determine whether there is a statistically significant difference in the mean scores of a single group pre and post test scores taken at different times.

Data Analysis

Statistical analysis of post-intervention knowledge and behavior using a paired-sample t-test demonstrated that the training was successful in improving participant knowledge of T2DM. The mean scores and t-statistics for diabetes knowledge following the educational intervention were $M_{\text{before}} = 9.28$ ($S_{\text{before}} = 2.34$); $M_{\text{after}} = 15.16$ ($S_{\text{after}} = 3.44$). The mean difference was -5.88. The t-test score was $t (24) = -8.45$, $p = .05$. The mean scores and t-statistics for health behavior following the educational intervention were $M_{\text{before}} = 1.68$ ($S_{\text{before}} = 1.44$); $M_{\text{after}} = 2.80$ ($S_{\text{after}} = 1.08$). The mean difference in scores was -1.12. The t-test score was $t (24) = -3.78$, $p = .05$. The
post-test p-value for T2DM knowledge was .001, and the post-test p-value for health behavior is .001. These p-value data strongly suggested no bias in participant survey responses. The 95% confidence interval (CI) range of mean scores was between -7.32 and -4.44 points for T2DM knowledge and -1.73 and -.509 for health behavior. Since both p-values are well below the 95% CI threshold, the results were considered statically significant (Table B2).

The “Spanish diabetes self-management education” was clinically significant because the education intervention proved useful in improving participant knowledge of T2DM from $M_{\text{before}} = 9.28$ to $M_{\text{after}} = 15.16$. As a result, the participant’s health behavior scores also improved from $M_{\text{before}} = 1.68$ to $M_{\text{after}} = 2.80$. Overall, the resulting analysis of this project showed a significant 63.7% increase in T2DM knowledge and 66.7% increase in health behavior knowledge. The increased diabetes knowledge and health behavior knowledge may result in helping diabetes patients live a healthier lifestyle and reduced unscheduled hospital visits due to diabetes related complications. Therefore, the null hypothesis was rejected, accepting the alternate hypothesis because of the significant difference in mean T2DM knowledge and health behavior post intervention.
Chapter 5

Discussion

A part of the recommendations by the American Diabetes Association (2017) was to ensure timely treatment decisions based on guidelines derived from evidence-based research. These guidelines should include one’s individual preferences, cultural practices, beliefs, diagnoses, and self-efficacy. The American Diabetes Association (2017) also recommended a team-based approach to care, community involvement, and the use of decision support tools to meet patient needs. These recommendations underscored the need for evidence-based research, their importance, and the significance of this project. This evidence-based project demonstrated a significant difference between pre- and post-diabetes knowledge and health behavior after an educational intervention. The interventions yielded positive changes in diabetes knowledge and improved health behaviors.

The findings from this project emboldened and assisted practitioners in making timely decisions to use the culturally based diabetes self-management education (DSME) for diabetes treatment among Hispanics. The discoveries in this project serve as a confirmation that culturally sensitive diabetes self-management education, as an intervention, is useful for increasing diabetes knowledge and health behavior. This project not only responded to the need for more studies by the Center for Disease Control and Prevention (2016); it validated assertions that taking part in a culturally sensitive DSME program helps diabetes patients control diabetes symptoms (Center for Disease Control and Prevention, 2017). Practitioners with the knowledge that diabetes knowledge and health behavior education helps diabetes patients control diabetes symptoms will not hesitate in recommending DSME.
Responses to the DSME intervention were categorized by demography gender, age, education, year of diagnoses, Spanish diabetes education attended in the last 12 months, and language preference. As revealed by this project, these decision support tools, provided quick action, and targeted interventions to improve treatment outcomes. These tools allow a practitioner to readily recognize how effective DSME in diabetes care. The finding of a DSME is more efficient among newly diagnosed patients with diabetes than patients diagnosed more than 11 years. A correlation should be noted since newly diagnosed patients are more engaged in finding solutions. Choosing to learn in a preferred language is synonymous with choosing the correct mode of communication to increase an individual’s health literacy skills. Other complex factors, such as socioeconomic status, poor access to health care, education, and lack of health insurance are positively affected by this intervention (American Diabetes Association, 2017).

**Implications for Optimized Care**

The process of making care effective through a strategy or system that determines the best mix of procedures to implement successful interventions is known as optimized care (Hammouda & Hammouda, 2012). Optimized care as a process parallels a system of a continuous cycle of evidence-based research, planning, implementation of findings, and evaluation to improve outcomes in every spectrum of the nursing practice (Hammouda & Hammouda, 2012). Findings from this project provide a platform for the evaluation and revision of current practice in diabetes management and expected treatment outcomes for diabetes patients. The findings elevated culturally sensitive DSME as preventative care practices to improve clinical outcomes.

A greater use of culturally sensitive DSME for continual education, research, implementation, and evaluation of research findings for the improvement and optimization of
care is the new direction in preventative medical research and therapy (Hammouda & Hammouda, 2012). Preventative studies, which examine the DSME approach to nutrition, medication and insulin therapy, stress management and exercise will dominate the research arena and include nursing care and higher-quality treatment (Hammouda & Hammouda, 2012). The result of this project is encouraging; with an increase in diabetes knowledge, there will be a parallel increase in health behavior, decrease comorbidities, and hospital visits, and even death.

**Implications for Advanced Practice Registered Nursing**

Innovation and change have become critical components of nursing care, because healthcare is rapidly transforming. According to Hain and Fleck (2014), nurse practitioners (NPs) are expected to play leading roles in innovating, as well as participate effectively improving practice and patient outcomes for various populations. Thus, NPs need to be well trained, knowledgeable, and prepared as change agents to meet the expectations and challenges of healthcare now and in the future (Hain & Fleck, 2014). At no time in history other than current times, has there been hype in the demand for evidence based-practice, better care, better access, and improved outcome at lower costs, underpinned by many statutory regulations that magnified expectations from advanced practice registered nurse (APRN) (Hain & Fleck, 2014). Examples of regulations that magnified expectations from APRNs and heighten the demand for healthcare are the Licensure, Accreditation, certification and education standards, and the Patient Protection and Affordable Care Act (Hain & Fleck, 2014).

Findings from this project and similar studies add to the existing knowledge and expand the scope of guidelines for practice and necessities or requirements for training APRNs. For example, the efficacy of diabetes education in reducing symptoms of diabetes in different demographic populations was not known before expanding the necessary APRNs training and
practice. Such knowledge may trigger additions or changes in guidelines for practice, and may improve healthcare once implemented.

Stevens (2013) observed that never before in healthcare history has the focus and formalization of moving evidence-into-practice been as sharp as is seen in today’s research on healthcare transformation efforts. Research and data continue to emerge with a focus on ways to improve many aspects of healthcare delivery systems, safety, service, treatment outcomes among populations, and know how among practitioners (Stevens, 2013). The push to move evidence into practice, noted by Stevens (2013), emphasizes the need to develop innovation and improvement leadership skills among APRNs. An expansion of the scope of knowledge, guidelines, regulations, and expectations from APRNs, and widens the scope and needs for their training to meet the challenges in healthcare (Hain & Fleck, 2014; Stevens, 2013). Therefore, this project may help APRNs to become equipped and culturally sensitive in encouraging DSME combined with a person’s culture can affect their general health.

**Limitations**

This project had several limitations that affected the outcomes, first was the sample size. The power analysis was not performed due to sample size, which could lead to statistical errors and difficulty in detecting differences in the pre-test and post-test results. Although the minimal requirement of the population was attained, a larger sample size would have provided an improved outcome regarding the Spanish diabetes self-management education. Despite the sample, it was encouraging to see a mean increase in the diabetes knowledge and health behavior of the participants.

The second limitation, which affected the sample size, was the timing of recruitment. Data collection was limited to the Hispanic adult population with T2DM receiving medical care
at a free clinic in Coachella Valley California. The recruitment period started when the United States (U.S.) immigration laws and changes resurged. Nearly half of the Hispanic patients seen at the clinic are undocumented and not a United States citizen. Many of the possible participants declined project involvement due to the fear of deportation and revelation of their immigration status, unemployment, and a lack of transportation access. The project lost five members due to this reason.

The third limitation was the constricted time frame. Many of the clinic practitioners felt the project was rushed and lacked sufficient time to refer more potential patients to benefit from the educational intervention. Time and financial constraints limited other populaces and free clinics to be included in the project. Hence, due to the sample size generalization of the results of the populations would be authenticated or justified. Increased time would have allowed health care providers to monitor growth, diabetes knowledge, and diabetes self-management health behavioral skills of the patients after the educational intervention.

The fourth limitation, the educational intervention was limited to five weekly sessions, which was not enough to benefit in the behavior change process. Although a thorough and rigorous intervention was implemented, there was insufficient time to test the efficacy of the data collection instruments used. The principle investigator relied on the validity accounts for the DKQ-24 and DDPQ instrument rendered in previous studies and from approval and support from the Robert Wood Johnson Foundation (RWJF) experts. The project did not examine family engagement measures, which would have tested the levels of engagement influences outcome. The project also found that two-thirds of the project samples were female participants and results might have differed if the gender ratio was different.
Lastly, there was no further follow-up after the project was completed. A follow-up would have reinforced the diabetes self-management education and allowed participants to ask any questions related to the project. The follow-up would provide a support to continue the diabetes self-management health behavioral skills.

**Incorporating Doctor of Nurse Practice Essentials**

Evidence-based practice (EBP) has been a long time focus of healthcare, highlighting the urgency for the need to improve healthcare. The American Association of College of Nursing (2006) requires Doctor of Nurse Practice (DNP) programs to impart sound knowledge of the scientific process and research methodology. Evidence-based practice and innovation in practice are emphasized and have become the foundation of which all DNP program requirements are built upon (American Association of College of Nursing, 2006). Healthcare requires a great deal of knowledge in a decision-making processes to improve outcomes in many populations and improve overall general health (Zaccagnini & White, 2014). Guidelines and regulations require high-level educational training to get DNPs ready because their jobs need high decision-making abilities (American Association of College of Nursing, 2006).

The Essentials published by the American Association of Colleges of Nursing (2006) outlined eight topics to guide the Doctoral Nursing Education. The eight indispensable topics include: scientific underpinnings for practice, organizational and systems leadership for quality improvement and systems thinking. Continued areas are clinical scholarship and analytical methods for evidence-based practice, Information systems/technology and patient- care technology for the improvement and transformation of health care (American Association of College of Nursing, 2006). The last topics encompass health-care policy for advocacy in health care, interprofessional collaboration for improving patient and population health outcomes,
clinical prevention and population health for improving the nation’s health, and advanced nursing practice (American Association of College of Nursing, 2006).

All eight essentials serve as a foundation to guide advanced practice nurses to engage in advocacy, quality improvement projects that could potentially advance the health of the nation, and skills integration and collaboration (Zaccagnini & White, 2014). This project applied all eight DNP essentials to develop the Spanish DSME as a guide to research and improve diabetes care among Hispanics with T2DM.

The principal investigator used the process of research utilization to critique, synthesize, implement, and measure outcomes as well as putting in place processes to sustain and disseminate results from this project. DNPs need to know not only how to use decision support tools, but build on existing ones or produce new ones through their own research of the topic of interest and population. The Spanish DSME is an innovative evidenced-based intervention that could potentially bring about change on the diabetes care management among the Hispanic population.

Findings from this project, which indicate the efficacy levels of culturally sensitive self-management diabetes education in reduced symptoms of the disease, builds on existing knowledge about treatment and treatment outcomes for diabetes. These findings were incorporated in treatment decision-making tools for recommending appropriate care that practitioners need to know and can use as decision-making support tools. Stevens (2013) noted that DNPs are perceived as important actors in the knowledge transformation cyclical process (Figure J1). As providers, advance quality improvement in healthcare; they should partake in the production of resources for developing and advancing evidence-based practice.
Recommendations

Recommendations from this project were based on the results and observations noted from the culturally sensitive DSME and used when conducting diabetes education for the Hispanic population with diabetes. Culturally sensitive based diabetes education serves as a support tool for enhancing treatment outcomes. Culturally sensitive based diabetes education should be offered throughout the community, especially communities with a significant prevalence of Hispanic population. Furthermore, the primary investigator recommends conducting quarterly culturally sensitive diabetes education to the community. A proactive quarterly diabetes education program could overcome transportation issues, which prevented patients from attending the DSME.

An assessment of health literacy among the Hispanic population is vital before any self-management education is initiated. Many Hispanics have lower educational attainment, which illuminates their difficulties of reading and comprehension. Health literacy ensures that the content of the DSME is presented, understood, and comprehensible for this population. Follow-up and monitoring of the participants to measure knowledge and healthcare behavior after a year of completing the educational intervention may be beneficial. This project would have yielded greater outcomes if the Spanish language self-management education was implemented longer than five weeks, and with a greater sample size. Therefore, future research recommendations include larger sample size, sessions offered in different counties, and a longer education time frame.

Sustainability

Practical sustainability of evidence-based findings from research as a process has two paths. First, is via cyclical knowledge transformation and dissemination in which new evidence
is summarized, translated into guidelines, integrated into practice, and adopted with many outcome evaluations (Stevens, 2013). The second is by effective dissemination of efficacy information through multiple communication channels (Stevens, 2013). The cyclical knowledge transformation process is crucial for sustainability in the dissemination and application of evidence based findings from research (Stevens, 2013). Sustainability, for the most part, depends upon the rate at which an important finding or findings go through the cyclical process to generate further research and guidelines that sustain its adoption. Sustaining the application of culturally diabetes self-management education in the treatment and prevention of diabetes involves making sure that it becomes part of a summarized evidence that goes through the cyclical process of knowledge transformation (Stevens, 2013).

Finding creative ways to disseminate information regarding diabetes education and its effectiveness to all healthcare practitioners and populations in public and private places are a sustainability strategy. Methods for publications should include through journals, books, magazines, and newspaper. The use of advanced technology utilizing text messages, email, social networks, and video or voice phone calls, and the media are ways to sustain the flow and retrieval of information for further research and practice (Stevens, 2013).

**Dissemination**

The success of dissemination comes from implementing a dissemination plan comprised of multiple strategies to reach the patients (Schipper et al., 2016). Dissemination is essential in assisting patients with diabetes in managing obstacles from the disease process. Advocacy, individuals, and organizations help reduce the challenges and complications of diabetes. An organization such as the American Diabetes Association (ADA) is an example of using this method as their cardinal goal. Health organization could adopt multiple strategies for
dissemination, such as Internet social media, text messaging, emails, websites, You Tube, and word of mouth.

Each of the strategies mentioned is suitable for DSME dissemination. What is not known is the best channel, which calls for research to determine the optimal channel. More needs to be done in disseminating information through publishing evidence-based and peer-reviewed articles in journals about culturally sensitive diabetes self-management education, and the conditions under which it is most effective as an intervention. Dissemination should be far-reaching and done in schools, childcare centers, and correctional establishments even in political arenas.

Conclusion

Type 2 diabetes in the Hispanic population is a genuine problem that poses a risk to communities and the United States health care system. As the Hispanic population increases, so will the number of diabetes cases. Several studies indicated that the cultural beliefs of Hispanics often play a significant role for the treatment and self-management of diabetes. There is an urgent need to examine how the Hispanic patient understands and experiences behavioral changes in relation to diabetes care and to integrate culturally sensitive diabetes self-management interventions (Aponte, Campos-Dominguez, & Jaramilla, 2015). This project demonstrated that the Hispanic population has cultural beliefs which influence knowledge and management of health care behavior. Diabetes self-management education for the Hispanic population should be based on cultural aspects such as religious beliefs, traditional foods, family, and community (Carbone et al., 2007; Hu et al., 2014; Weiler & Crist, 2007).

The positive increase in knowledge and health behavior demonstrated by this project validated the effectiveness of cultural DSME among Hispanic adults living with diabetes. Evidence from this project confirmed assertions by the Center for Disease Control and
Prevention (2017) that an individual participating in a self-management education program can improve diabetes symptoms. Diabetes self-management education improves health outcomes through health behavior change and reduces diabetes symptoms. Study outcomes were supported by existing studies and, may improve diabetes self-management.
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Appendix A

Table A1

Sample Participant Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n (%)</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>45.1 (9.74)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6 (24)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>19 (76)</td>
<td></td>
</tr>
<tr>
<td>Duration of Diagnosis (years)</td>
<td>5.2 (2.86)</td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle or Junior High</td>
<td>1 (4)</td>
<td></td>
</tr>
<tr>
<td>Some High school</td>
<td>8 (32)</td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>12 (48)</td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>2 (8)</td>
<td></td>
</tr>
<tr>
<td>College Graduate</td>
<td>2 (8)</td>
<td></td>
</tr>
<tr>
<td>Language Preferred</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish</td>
<td>19 (76)</td>
<td></td>
</tr>
<tr>
<td>Spanish and English</td>
<td>6 (24)</td>
<td></td>
</tr>
<tr>
<td>Spanish diabetes education attended in the last 12 months</td>
<td>0 (0)</td>
<td></td>
</tr>
</tbody>
</table>

Appendix B

Table B2

Paired samples t-test comparing Pre and post diabetes knowledge and health behavior change

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Pre-education Intervention</th>
<th>Post-education Intervention</th>
<th>Mean range for 95% CI</th>
<th>t</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic knowledge</td>
<td>M 2.34 SD 25</td>
<td>M 3.44 SD 25</td>
<td>-7.32, -4.44</td>
<td>-8.45*</td>
<td>25</td>
</tr>
<tr>
<td>Health behavior</td>
<td>1.68 1.44 SD 25</td>
<td>2.80 1.08 SD 25</td>
<td>-1.73, -.509</td>
<td>-3.78*</td>
<td>25</td>
</tr>
</tbody>
</table>

Note. M=mean; SD=standard deviation; n=number of participants; CI = confidence interval; *p < .05, df=degree of freedom.
Appendix C
Institutional Review Board (IRB) Approval

BRANDMAN UNIVERSITY INSTITUTIONAL REVIEW BOARD
IRB APPLICATION ACTION – APPROVAL
COMPLETED BY BUIRB

IRB ACTION/APPROVAL

Name of Investigator/Researcher: **Isioma Utebor**

- [ ] Returned without review. Insufficient detail to adequately assess risks, protections and benefits.
- [ ] Approved/Certified as Exempt from IRB Review.
- [ ] Approved as submitted.
- [x] Approved, contingent on minor revisions (see attached)
- [ ] Requires significant modifications of the protocol before approval. Research must resubmit with modifications (see attached)
- [ ] Researcher must contact IRB member and discuss revisions to research proposal and protocol.

Level of Risk:  
- [ ] No Risk
- [x] Minimal Risk
- [ ] More than Minimal Risk

IRB Comments:

1. Change “participants are not at risk” on application under Risk to read “at minimal risk”.
2. Change Informed consent to state “minimal risk”.
3. Review all other documents to assure you are consistent with “minimal risk”.

**Michael Moodian**

IRB Reviewer

Telephone: __________________________ Email: __________________________

BUIRB Chair: **Doug DeVore**  
Date: 12/22/2016

---

**REVISED IRB Application**  
[ ] Approved  
[ ] Returned

Name: **Doug DeVore**

Telephone: [REDACTED]  
Email: [REDACTED]  
Date: 1-4-17

BUIRB Chair: **Douglas DeVore**

Brandman University IRB Rev, 11.14.14  
Adopted November 2014
November 29, 2016

Brandman University
16355 Laguna Canyon Rd
Irvine, CA 92618

Dear Sir or Madam;

We are very pleased to have Isioma Utebor, NP completing her doctorate degree. She will be assessing whether participants in the Spanish diabetes self-management class will improve knowledge and health behavior pre and post diabetes self-management education.

The Coachella Valley Volunteers in Medicine clinic is a free medical and dental clinic providing care to the most underserved residents of Eastern Riverside County. Her work will augment the education and services provided to our patient population managing their Type 2 Diabetes and individuals who are identified with pre-diabetes. The timeframe of the research project is from January – April 2017. If additional information is needed, please do not hesitate to contact me.

Anna Lisa Vargas
Clinic Operations Coordinator
Appendix E

Informed Consents

CONSENTIMIENTO INFORMADO DE LOS PARTICIPANTES
PARTICIPANT’S INFORMED CONSENT FORM

PROYECTO ACADÉMICO: Evaluar si los participantes en la clase del Programa de Educación de Auto Manejo de la Diabetes en Español mejorará el conocimiento y comportamientos de salud antes y después de la educación.

INVESTIGADOR RESPONSABLE: Isioma Utebor, FNP

OBJETIVOS DEL ESTUDIO: Usted se le ha pedido participar en un estudio de investigación realizado por Isioma Utebor, FNP, estudiante de doctorado del Musco escuela de enfermería y profesiones de la salud en Brandman University. El objetivo de este estudio es evaluar si los adultos hispanos en el Programa de Educación de Auto Manejo de la Diabetes en Español que se basa en el estándar de cuidado de diabetes de acuerdo a la Asociación Americana de Diabetes American Diabetes Association (ADA), mejorará el comportamiento de salud y conocimiento de diabetes. Dado el aumento de diabetes tipo dos en la población hispana y el incumplimiento en la atención de diabetes, este estudio se basa en la presunción de que la implementación del programa de Educación de Auto Manejo de la Diabetes en Español mejorará el conocimiento y compartimiento de salud de los adultos hispanos con respecto al auto-manejo de la diabetes. Los resultados de este estudio pueden ayudar a la Asociación Americana de educadores de Diabetes en el rediseño y aplicación de programas de Educación de auto-manejo del Diabetes en Español en hospitales y clínicas, dirigida a satisfacer la demanda de esta población a la que resulta difícil acceder. Al participar en este estudio de investigación, estoy de acuerdo en participar en una encuesta antes de la educación de Auto Manejo de la Diabetes semanalmente durante un mes y de llenar la encuesta después de la educación.

Yo entiendo que:

a) Hay riesgos mínimos asociados en participar en esta investigación. Entiendo que el investigador protegerá mi confidencialidad guardando toda la información personal y materiales del estudio en un cajón de archivo con llave y que sólo está disponible para el investigador.

b) El posible beneficio de este estudio para mi es que mi contribución puede ayudar a añadir a la investigación sobre la influencia en el Programa de Educación de Auto Manejo de la Diabetes en Español entre adultos hispanos. Los resultados estarán disponibles para mí cuando se termine el estudio y esos resultados proporcionarán nueva información sobre el Programa de Educación de Auto Manejo de la Diabetes. Entiendo que no seré compensado por mi participación.

c) Si usted tiene alguna pregunta o inquietud acerca de la investigación, no dude en contactar a Isioma Utebor [redacta el número] o por teléfono en el [redacta el número] o a Dr. Linda Kerr (Asesor) en [redacta el número]

d) Mi participación en este estudio de investigación es voluntaria. Puedo decidir no participar en el estudio y puedo retirarme en cualquier momento sin consecuencias negativas. Puedo también
decidir no responder a ciertas preguntas durante la entrevista. Además, el investigador puede dejar el estudio en cualquier momento.

e) Ninguna información que me identifique saldrá sin mi consentimiento y que toda la información personal se protegerá de acuerdo a la ley. Los cuestionarios no van a ser los mismos asignados con las formas de consentimiento para evitar identificación accidental de los participantes. Si el diseño del estudio o el uso de los datos debe ser cambiado, yo voy a ser tan informado y el investigador debe volver a obtener mi consentimiento. Yo entiendo que si tengo preguntas, comentarios o preocupaciones sobre el estudio o el proceso de consentimiento informado, puedo escribir o llamar a la oficina de la Vice Canciller de asuntos académicos, Brandman University, en 16355 Laguna Canyon Road, Irvine, CA 92618. Recibiré una copia de este formulario de consentimiento y la declaración de "Derechos del Participante para la Investigación no-Médico". Yo declaro que hé leído, entendido, y estoy de acuerdo con toda la información declarada anteriormente.

Firma del participante o responsable
Signature of Participant or Responsible Party

Firma del investigador Principal
Signature of Principal Investigator

Fecha
Date

PARTICIPANT’S INFORMED CONSENT FORM

CLINICAL SCHOLARLY PROJECT: To assess whether participants in the Spanish Diabetes self-management class will improve knowledge and health behavior pre and post diabetes self-management education.

RESPONSIBLE INVESTIGATOR: Isioma Utebor, FNP

OBJECTIVE OF STUDY: You are being asked to participate in a research study conducted by Isioma Utebor, FNP, a doctoral student from the Musco School of Nursing and Health Professions at Brandman University. The objective of this research study is to assess whether Hispanic adults in the Spanish Diabetes self-management education program that is based on the American Diabetes Association (ADA) diabetes care standard, will improve diabetes knowledge and health behavior. Due to the rise in type-two diabetes and the noncompliance rate in diabetes care among the Hispanic population, this study will establish the assumption that the Spanish diabetes self-management education will improve knowledge and health behavior in diabetes self care. The results of this study may assist the American Association of Diabetes Educators in redesigning and implementing Spanish Diabetes self-management education program targeted to meet the demands of this hard to reach population in the hospitals and clinics. By participating in this research study, I agree to participate in a before education survey, weekly diabetes self-management education program for four weeks, and after education survey. I understand that:
a) There are minimal risks associated with participating in this research. I understand that the Investigator will protect my confidentiality by keeping all personal information and research materials in a locked file drawer that is available only to the researcher.

b) The possible benefit of this study to me is that my input may help add to the research regarding the influence of Spanish Diabetes self-management education programs among Hispanic adults in the type 2-diabetes self-management care. The findings will be available to me at the conclusion of the study and will provide new insights about the Spanish Diabetes self-management education program in which I participated. I understand that I will not be compensated for my participation.

c) If you have any questions or concerns about the research, please feel free to contact Isioma Utebor at [contact information] or by phone at [contact information] or Dr. Linda Kerr (Advisor) at [contact information].

d) My participation in this research study is voluntary. I may decide to not participate in the study and I can withdraw at any time. I can also decide not to answer particular questions during the interview if I so chose. I understand that I may refuse to participate or may withdraw from this study at any time without any negative consequences. Also, the Investigator may stop the study at any time.

e) No information that identifies me will be released without my separate consent and that all identifiable information will be protected to the limits allowed by law. Questionnaires will not be matched with the consent forms to avoid accidental identification of participants. If the study design or the use of the data is to be changed, I will be so informed and my consent re-obtained. I understand that if I have any questions, comments, or concerns about the study or the informed consent process, I may write or call the Office of the Vice Chancellor of Academic Affairs, Brandman University, at 16355 Laguna Canyon Road, Irvine, CA 92618, [contact information]. I acknowledge that I have received a copy of this form and the “Research Participant’s Bill of Rights.” I have read the above and understand it and hereby consent to the procedure(s) set forth.

______________________________
Signature of Participant or Responsible Party

______________________________
Signature of Principal Investigator

______________________________
Date
Appendix F

Formulario de Referencia del Proyecto
Project Referral Form

1. Nombre del Paciente:_________
   1. Name of Patient:____________

2. Última clase de educación para la diabetes atendida:_________
   2. Last diabetes education class attended:________

3. Fecha de remisión:_________
   3. Date of referral:____________

4. Fecha de su próxima cita:_________
   4. Date of Return Appointment:_________
Diciembre 1, 2016
Querido participante, Soy una estudiante de doctorado de enfermería práctica de la escuela de enfermería de Musco y profesión sanitaria en Brandman University, y estoy llevando a cabo un estudio para determiner si los adultos hispanos podrían demostrar un mejoramiento en el conocimiento a cerca de la diabetes y comportamientos que afectan la salud, con el Programa de Educación de Auto Manejo de la Diabetes. Estoy pidiendo su ayuda en el estudio, participando en forma individual, en el cuál se require participar en una encuesta de 15 a 30 minutos antes y después de la educación de automanje de la Diabetes en español, cuando lo crea conveniente. Si usted acepta participar, le seguro de que toda su información será totalmente confidencial. No se relacionarán los nombres de los participantes con los datos reunidos en la encuesta. Toda la información permanecerá bajo llave en un archivador que sólo es accesible para el investigador. Usted puede decidir participar o dejar de participar en el proyecto en cualquier momento. Además, usted estará seguro que el investigador no está afiliado con Brandman University, aparte de ser un estudiante. El investigador, Isioma Utebor, está disponible por teléfono ó email para contestar cualquier pregunta que tenga. Su participación será muy apreciada y valorada.
Sinceramente,
Isioma Utebor, FNP-C, MSN, RN.

December 1, 2016
Dear participant,
I am a Doctorate of Nursing Practice student from the Musco school of Nursing and Health Profession at Brandman University, who is conducting a study to determine whether Hispanic adults in Spanish Diabetes Self-Management Education program would demonstrate improvement in diabetes knowledge and health behavior.
I am asking for your assistance in the study by participating on an individual basis, in which you are require taking a 15 to 30 minutes survey before and after the Spanish Diabetes Self-
management Education set up at your convenient. If you agree to participate, you are assured that all information will be completely confidential. No names will be attached to any notes or records from the survey. No one will have access to the information. All information will remain locked in a file cabinet that is only accessible to the researcher. You will be free to stop participating at any time and withdraw from the study at any time. Further, you will be assured that the researcher is not affiliated with Brandman University, other than being a current student. The researcher, Isioma Utebor, is available by phone to answer any questions you may have. Your participation would be greatly appreciated and valued.

Sincerely,
Isioma Utebor, FNP-C, MSN, RN.
Appendix H
Diabetes Knowledge Questionnaire

Cuestionario de Cuestionario de Pre-prueba y Post-Prueba de Diabetes
Pretest and Posttest Diabetes Knowledge Questionnaire

INSTRUCCIONES: Por favor lea estas frases cuidadosamente mientras yo las leo en voz alta y marque su respuesta con círculo de acuerdo a la siguiente escala: Sí = 2, No = 1, No sé = 0
DIRECTIONS: Read the following statements below carefully and circle your response according to the following scale: Yes = 2, No = 1, I don't know = 0

<table>
<thead>
<tr>
<th>Item #</th>
<th>Preguntas/Questions</th>
<th>Sí</th>
<th>No</th>
<th>No sé</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>El comer mucha azúcar y otras comidas dulces es una causa de la diabetes.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1.</td>
<td>Eating too much sugar and other sweet foods is a cause of diabetes.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>La causa común de la diabetes es la falta de insulina efectiva en el cuerpo.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>The usual cause of diabetes is lack of effective insulin in the body.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>La diabetes es causada por la incapacidad del riñón para mantener la orina libre de azúcar. Diabetes is caused by failure of the kidneys to keep sugar out of the urine.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>Los riñones producen la insulina. Kidneys produce insulin.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5.</td>
<td>En la diabetes sin tratamiento, la cantidad de azúcar en la usualmente sube.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5.</td>
<td>In untreated diabetes, the amount of sugar in the blood usually increases.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6.</td>
<td>Si yo soy diabético, mis hijos tendrán más riesgo de ser diabéticos.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6.</td>
<td>If I am diabetic, my children have a higher chance of being diabetic.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7.</td>
<td>Se puede curar la diabetes. Diabetes can be cured.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8.</td>
<td>Un nivel de azúcar de 210 en prueba de sangre hecha en ayunas es muy alto.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8.</td>
<td>A fasting blood sugar level of 210 is too high.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9.</td>
<td>La mejor manera de chequear mi diabetes eshaciendo pruebas de orina.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9.</td>
<td>The best way to check my diabetes is by testing my urine.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td><strong>10.</strong></td>
<td>El ejercicio regular aumentará la necesidad de insulina u otro medicamento para la diabetes. Regular exercise will increase the need for insulin or other diabetic medication.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>11.</strong></td>
<td>Hay dos tipos principales de diabetes: tipo 1 (dependiente de insulina) y tipo 2 (no-dependiente de insulina).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>11.</strong></td>
<td>There are two main types of diabetes: type 1 (insulin-dependent) and type 2 (non-insulin dependent)</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>12.</strong></td>
<td>Una reacción de insulina es causada por mucha comida.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>12.</strong></td>
<td>An insulin reaction is caused by too much food.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>13.</strong></td>
<td>La medicina es más importante que la dieta y el ejercicio para controlar mi diabetes.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>13.</strong></td>
<td>Medication is more important than diet and exercise to control my diabetes.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>14.</strong></td>
<td>La diabetes frecuentemente causa mala circulación.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>14.</strong></td>
<td>Diabetes often causes poor circulation.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>15.</strong></td>
<td>Cortaduras y rasguños cicatrizan mas despacio en diabéticos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>15.</strong></td>
<td>Cuts and abrasions on diabetics heal more slowly.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>16.</strong></td>
<td>Los diabéticos deberían poner cuidado extra al cortarse las uñas de los dedos de los pies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>16.</strong></td>
<td>Diabetics should take extra care when cutting their toenails.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>17.</strong></td>
<td>Una persona con diabetes debería limpiar una cortadura primero con yodo y alcohol.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>17.</strong></td>
<td>A person with diabetes should cleanse a cut with iodine and alcohol.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>18.</strong></td>
<td>La manera en que preparo mi comida es igual de importante que las comidas que como.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>18.</strong></td>
<td>The way I prepare my food is as important as the foods I eat.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>19.</strong></td>
<td>La diabetes puede dañar mis riñones.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>19.</strong></td>
<td>Diabetes can damage my kidneys.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>20.</strong></td>
<td>La diabetes puede causar pérdida de sensibilidad en mis manos, dedos y pies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>20.</strong></td>
<td>Diabetes can cause loss of feeling in my hands, fingers, and feet.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>21.</strong></td>
<td>El temblar y sudar son señales de azúcar alta en la sangre.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>21.</strong></td>
<td>Shaking and sweating are signs of high blood sugar.</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>22.</strong></td>
<td>El orinar seguido y la sed son señales de azúcar baja en la sangre.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>22.</strong></td>
<td>Frequent urination and thirst are signs of low blood</td>
<td>2 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>sugar.</td>
<td>Los calcetines y las medias elásticas apretados son adecuados para los diabéticos.</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>---</td>
<td>--------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----</td>
<td>---</td>
</tr>
<tr>
<td>23.</td>
<td>Tight elastic hose or socks are not bad for diabetics</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>24.</td>
<td>Una dieta diabética consiste principalmente de comidas especiales.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>24.</td>
<td>A diabetic diet consists mostly of special foods.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Appendix I

Health Behavior Questionnaire

Cuestionario de Comportamiento de Salud Pretest y Posttest
Pretest and Posttest Health Behavior Questionnaire

25. ¿Con qué frecuencia le han dicho a usted que chequee su azúcar en la sangre?
25. How often have you been told to check your blood sugar?
   a. 1-2 veces al día           b. 3-4 veces al día
   a. 1-2 times a day          b. 3-4 times a day
   c. 1-3 veces a la semana   d. No reviso mi nivel de azúcar en la sangre
   c. 1-3 times a week        d. I do not check my blood sugar

26. ¿Cuántas veces seguíste el horario para chequearte el nivel de azúcar en la sangre durante la semana pasada?
26. How often did you follow that schedule for checking blood sugar during the past week?
   a. Nunca                          b. algunas veces
   a. None of the time             b. Some of the time
   c. Una buena parte del tiempo   d. todo el tiempo
   c. A good bit of the time      d. All of the time

27. ¿Qué tipo de plan de comidas le han dicho que siga para controlar su diabetes?
27. What type of meal plan have you been told to follow to manage your diabetes?
   a. comidas pequeñas frecuentes   b. El método del plato
   a. Small frequent meals         b. Plate Method
   c. cinco al día                 d. contando los carbohidratos
   c. Five a day                   d. Counting Carbohydrates

28. Pensando en su plan de comidas, ¿con qué frecuencia siguieron este plan durante la semana pasada?
28. Thinking about your meal plan, how often did you follow this plan during the past week?
   a. Nunca                          b. algunas veces
   a. None of the time             b. Some of the time
   c. Una buena parte del tiempo   d. todo el tiempo
   c. A good bit of the time      d. All of the time

29. ¿Cuántas veces le han dicho que haga ejercicio por lo menos de 15 a 30 minutos?
29. How many times have you been told to exercise at least 15 -30 minutes?
   a. No hice ejercicio en absoluto   b. 1-2 veces a la semana
   a. I did not exercise at all      b. 1-2 times a week
   c. 3-4 veces a la semana          d. 5 días o más
30. During the past week, how often did you participate in regular exercise?

- a. Nunca
- b. algunas veces
- c. Una buena parte del tiempo
- d. todo el tiempo

30. Durante la semana pasada, ¿con qué frecuencia participó en el ejercicio regular?

- a. None of the time
- b. Some of the time
- c. A good bit of the time
- d. All of the time
Figure J1. ACE Star Model of Knowledge Transformation. “Quality improvement of healthcare processes and outcomes is the goal of knowledge transformation. Important new knowledge resources have been developed and advanced owing to the EBP movement (Stevens, 2013).