

A QUALITY IMPROVEMENT INITIATIVE TO IMPROVE DIABETES SELF-CARE
EDUCATION FOR HISPANIC OLDER ADULTS USING CULTURALLY-SENSITIVE, AGE
SPECIFIC-APPROACH

A Doctor of Nursing Practice Project Report

by

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BS, Tennessee State University, 2004
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Submitted in Partial Fulfillment of the Requirements for the Degree of

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This Doctor of Nursing Practice Project Report meets the standards for scope and quality of Texas A&M University-Corpus Christi College of Nursing and Health Sciences and is hereby approved.

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AUGUST 2018

DEDICATION

I would like to dedicate this work to my husband, Olusola, my #1 cheerleader who provided unending support during my rigorous doctorate program. I truly believe that when God made you, He must have been thinking about me. Thank you for dedicating time to me, and our children. Thank you for making us your #1 priority (after God). I would also like to dedicate this work to our amazing children, Ileri and Tobi, who were understanding and supported me when I had to travel for my project intervention, when I was “married to my computer,” and when it seemed like I was so engulfed with school work. I am blessed and humbled to be your mother. The dedication of this work also goes to my parent, Dr. and Mrs. Adetunji, who instilled hard work, dedication, perseverance, and excellence in me, and never stopped praying for me.

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ABSTRACT

Introduction: The underuse of culturally-sensitive, age-specific diabetes education for older-aged Hispanic people likely contributes to deficits in diabetes knowledge, self-management and glycemic control. This quality improvement initiative applied evidence-based, culturally-competent, age-specific education methods to improve processes and health outcomes in a primary care setting. **Methodology:** A one-group, pre-test/post-test design was used to conduct this project at a large community clinic in Texas. Hispanic adults > 60 years, with T2DM (n=12) received three months of biweekly classes, including healthy Hispanic foods, family involvement, a Spanish interpreter using simultaneous earphone technology, and interactive, bilingual, large-print materials and tools. Paired sample t-tests were used to compare diabetes knowledge, self-management, and A1C levels, pre- and post-education. **Results:** There was a significant difference in pre- and post-education outcomes: knowledge ($t(11)=-7.969$, $p=.000$; $d=2.32$), self-management ($t(11)= -7.930$, $p=.000$; $d= 2.43$), and A1C levels ($t(11)=6.434$, $p=.000$; $d=0.78$). **Conclusion:** Culturally-competent, age-specific education can positively impact knowledge, self-management behaviors, and glycemic values in older-aged Hispanic people.

Keywords: Type 2 diabetes, older-aged Hispanics, self-management behavior, glycemic control, culturally-sensitive, age-specific.

A QUALITY IMPROVEMENT INITIATIVE TO IMPROVE DIABETES SELF-CARE EDUCATION FOR HISPANIC OLDER ADULTS

INTRODUCTION

Diabetes is the seventh leading cause of death in the United States (U.S.).¹ For Hispanics, diabetes is the fifth leading cause of death, and one of the leading causes of death in older-aged Hispanics in the U.S.²⁻⁴ Diabetes incidence rates among older-aged Hispanics have almost doubled in the last two decades (from 20.3% to 37.2%), and are two times higher for this group relative to their older non-Hispanic white counterparts.⁵⁻⁷ Older-aged adults have age-related conditions such as cognitive changes, vision changes, and physical changes which can impair their ability to comprehend and apply the content of diabetes education. In addition, many older adults are more comfortable learning in the native language of their culture and have deeply-rooted cultural beliefs which may impact diet and exercise behavior, and require culturally sensitive-age-specific education.^{8,9} which may help overcome some of the cultural and age barriers faced by older-aged Hispanic people when receiving diabetes education to improve their diabetes outcomes.

Background

The lack of culturally-sensitive, age-specific diabetes education for the Hispanic population 60 years and older has contributed to poor disease management and outcomes such as neuropathy, nephropathy, vision loss, and heart disease.^{6,10,11} Diabetes education for Hispanic groups should be culturally-sensitive and age-specific to promote adherence to lifestyle modification and treatment plans.¹¹⁻¹⁴ Interventions addressing the lack of effective diabetes

education for Hispanic older adults must take into consideration their cognitive, physical changes, and cultural beliefs.^{11,13,15}

The prevalence of diabetes in the Hispanic elderly population continues to rise in the U.S., making it essential to provide culturally-tailored and age-appropriate educational programs to improve diabetes knowledge and decrease the incidence of complications and even death. Between 2011 and 2014, 22% of the older-aged population aged 60 and older in the U.S. were diagnosed with diabetes.¹⁶ In the U.S., Hispanics make up 17% of the total population, and the prevalence of diabetes in Hispanics has been found to be higher (12.1 %) compared to Caucasians (7.4%)^{4,10,17}. The Hispanic population is approximately one and a half times more likely to develop diabetes-related complications than Caucasians, and they are approximately 50% more likely to die from diabetes than Caucasians.^{4,10} Diabetes complications such as diabetes retinopathy is higher in the Hispanic population when compared to other groups: Hispanics (36%), African Americans (29%), and non-Hispanic whites (22%).^{18,19} In Hispanics living in the U.S, 75–83% of all amputations occur in those diagnosed with type 2 diabetes mellitus (T2DM).^{18,19} Older-aged Hispanic people remain at high risk for T2DM, and the disease poses unique concerns for the patients' health, their families, and their healthcare providers.

Review of the Literature

Older-aged Hispanics with diabetes are a vulnerable sub-population of interest because of their increased susceptibility to chronic diseases.^{6,12,13} Several studies have suggested that a gap in current practice may be linked to a lack of diabetes education that takes into account patients' needs and preferences based on ethnicity, culture, and age.¹¹⁻¹⁴ This gap in practice may present a significant barrier to effective and adequate education for the Hispanic population. The recommendations from four high quality studies addressing diabetes education for Hispanics are

to deliver educational programs in a culturally competent, and age-specific manner.¹¹⁻¹⁴ Two of the studies included the majority of Hispanic participants over the age 60 years old, and they were included in the education intervention.^{13,14} Hu et al¹¹ studied Hispanic participants diagnosed with T2DM and their family members. Brown et al¹² conducted a seminal study that determined if a culturally competent diabetes self-management intervention in Mexican-Americans with T2DM can improve diabetes knowledge and metabolic status. All four studies found that older-aged Hispanic persons do not receive adequate diabetes education needed to manage diabetes. Older adults need tailored diabetes education for better health outcomes.

The interventions in these studies involved diabetes education techniques focused on teaching general diabetes knowledge, diet, self-monitoring, and physical activities. The types of diabetes education offered had an emphasis on culturally-tailored and family involved interventions with and without control groups. All four studies reported pre-and post-intervention values. The current guidelines from the American Association of Diabetes Educators (AADE) and the American Diabetes Association (ADA) recommend an effective diabetes education should include: healthy eating, being active, taking medications, monitoring, problem solving, healthy coping, and reducing risks.¹¹⁻¹⁴ Across the four studies, diabetes education interventions were performed and delivered to groups of Mexican-American heritage. All four primary research studies revealed that culturally competent and sensitive diabetes education improves health outcomes in the Hispanic population. This improvement is evident in the findings from the evaluation of diabetes knowledge, self-management, and glycemic control. The four studies used subjective knowledge-based questionnaires to assess diabetes knowledge pre-and post-intervention. All the studies had at least two objective measures such as weight, height, hemoglobin (A1C), fasting blood glucose, body-mass index (BMI), and blood pressure values.¹¹⁻

^{13,20} The search of literature did not reveal any evidence that there was any age specific education for older Hispanic adults.

Description of the Project

A Quality Improvement (QI) project was conducted at a community clinic in Texas. The clinic is a large family practice clinic with over 96,000 unique visits per year and about 80 providers at 22 locations. The majority of the patients cared for at this community clinic are of Hispanic origin. The clinic has many patients with T2DM and was seeking innovative ways to improve health outcomes of their Hispanic patients with diabetes. A need for change in practice at the community clinic was established because the current diabetes education offered was not specifically tailored to culture and age, with a universal program for all ages and culture. For example, the diabetes education given to an 18-year-old was the same offered to a 65-year-old. The need for diabetes education practice and policy change was initiated by the leadership of the clinic because the incidence of diabetes continued to rise in their patient population. This was a significant problem for the clinic as their data confirmed the national data and revealed their patient population was at a high risk for T2DM. The clinic is staffed with a multidisciplinary team of endocrinologists, nurse practitioners, physician assistants, nurse educators, registered nurses, and medical assistants, who were supportive of evidence-based change in practice and policies on diabetes education. These professionals were capable of implementing and maintaining practice change.

The change in practice in diabetes education for the older-aged Hispanic population at the community clinic was expected to improve patient outcomes through improvement in patients' diabetes knowledge, self-management behaviors, and glycemic control. The cultural and age-

conscious intervention was expected to play an important role in improving patient outcomes, making a significant positive impact in the lives of older-aged Hispanics with T2DM in this area.

Goals for the Project

For diabetes education to be culturally modified for the Hispanic elderly population, there needs to be a unique support for behavioral modification to support and maintain life style changes.¹³ The project provided support and resources for the older-aged Hispanic population to impact their daily decisions on food intake, physical activities, monitoring of glucose levels and importance of follow-up with their primary care providers. The mission and strategic goals of the community clinic are to improve patient health outcomes, which is congruent with this project's goals.

The goals of the project were to:

- (a) Increase knowledge about diabetes as evidenced by a post-intervention Diabetes Knowledge Questionnaire-24 (DKQ-24) score at least by 10 points higher than the pre-intervention score;
- (b) Increase self-management behaviors as evidenced by a post-intervention Diabetes Self-Management Questionnaire (DSMQ) score at least 10 points higher than the pre-intervention score; and
- (c) Improve glycemic control by decreasing A1C level post-intervention by at least 0.5% lower than the pre-intervention value.

Purpose and Problem Statement

The purpose of this QI initiative was to improve the culturally-sensitive and age appropriateness of diabetes education provided to elderly Hispanic outpatients and to improve patient outcomes. The QI project sought to answer the following question: *In Hispanic*

outpatients, 60 years and older, does culturally-sensitive, age-specific diabetes management education increase diabetes knowledge, improve self-management behaviors, and improve glycemic control over a 3-month period? The findings of this project may encourage healthcare providers and organizations to advocate for and implement policies inclusive of culturally sensitive, age-specific diabetes education for this vulnerable population.

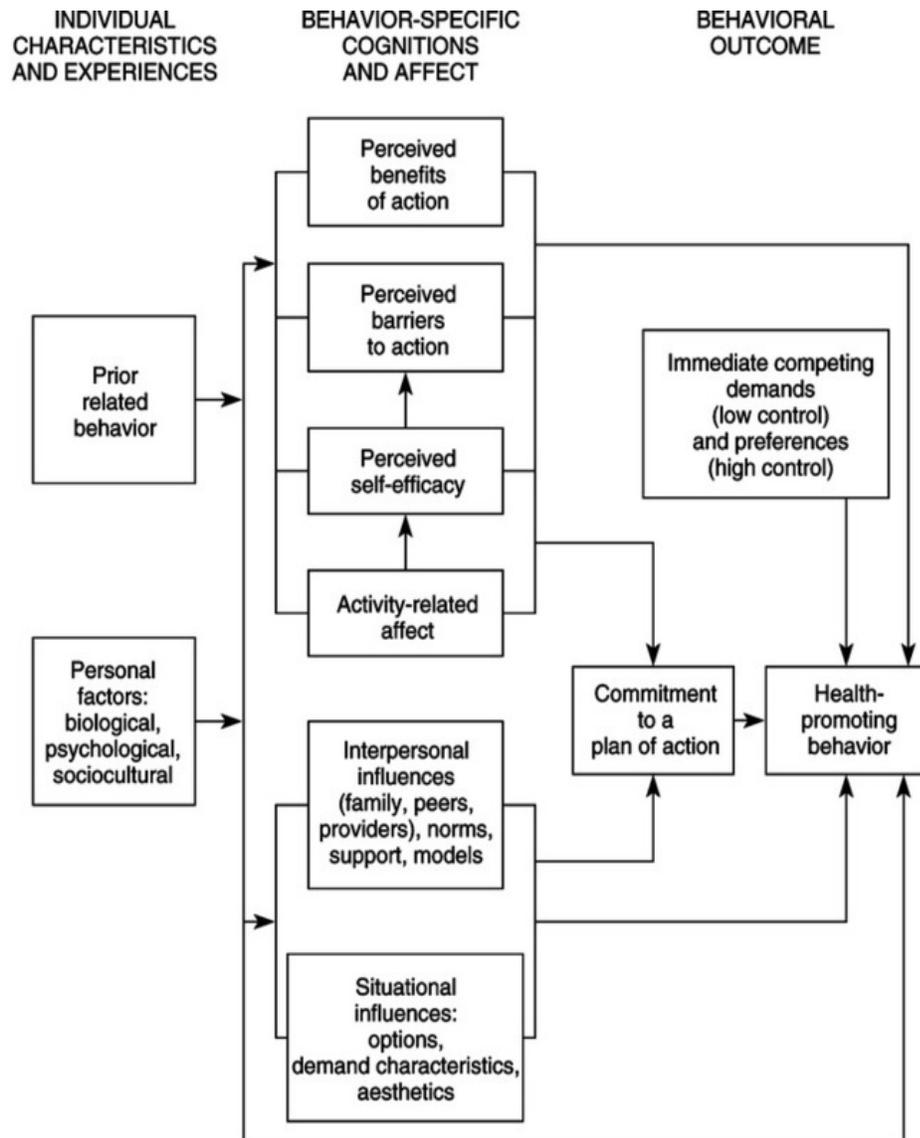
Conceptual Framework

Nola J. Pender, a nursing theorist, introduced the Health Promotion Model (HPM) as a complementary match to the models of health protection in the 1980s. The HPM was used as a guide for the QI project because it focuses on improving health, taking into consideration that people are unique and have diverse and different needs. In the older-aged population, the assessment process should recognize the educational needs of all individuals with diabetes, not just those who frequently attend clinic appointments. Diabetes education is a critical element of diabetes treatment, yet the majority of people with diabetes do not receive any formal diabetes education.²¹

The HPM was used as a theoretical framework because it defines health as a positive progressive state rather than solely the absence of disease.^{22,23} The premise of the HPM focuses on individuals, experiences, characteristics, behavior-specific cognitions and affect, and behavioral outcomes. The set of variables for behavioral specific knowledge and affect have important motivational significance.^{22,23} Nola Pender developed the HPM as a framework to describe how nurses can motivate patients toward desired health outcomes. The HPM acknowledges each person has unique personal attributes and backgrounds that affect subsequent behavior or action. The set of variables for behavioral specific knowledge and affect have important motivational significance.²²⁻²⁴

The HPM framework was incorporated in this QI project by providing individualized support and materials to the participants. Since the participants were mostly from similar Hispanic background, their foods and lifestyles were similar. Examples of food intake was reviewed to provide food portion perspective and help with calorie and nutrient consumption using foods they consumed at home or were familiar with. The nature of their homestead and demographics was also discussed to explore dietary options and exercises that best suit their lifestyles. Reviewing what was personal to participants instead of the generalized literature content made it easy for participants to adopt the materials discussed and promoted sustainable health behavior after the completion of the diabetes education sessions. See figure 1 for image of the HPM.^{25,26}

Figure 1: Health Promotion Model



METHODS

Design

This QI project was a one-group, pre-test/post-test quasi-experimental design in a large community clinic. A quasi-experimental design was chosen for this project after careful consideration of ethical implications. The clinic preferred all participants receive the intervention, so no control or comparison group was used. This project was reviewed by the Institutional Review Board (IRB) at Texas A&M University Corpus Christi and deemed to be a QI project. See Appendix I for IRB letter.

Setting and Sample

The project was conducted to improve diabetes education processes and patient outcomes in a Texas community clinic. See Appendix II for letter of support from the community clinic. The clinic cares for a large number of Hispanic minorities and underserved persons. The participants were adults 60 years or older with T2DM (N=12). The inclusion criteria were patients aged 60 years or older, who have been diagnosed with T2DM. No exclusions were made based on ethnicity, gender or comorbidities. Family members were encouraged to attend the sessions as desired. A total of 13 participants were recruited, and six of their family members also attended sessions.

Recruitment

A convenience sample was recruited between January 12, 2018, and February 6, 2018, through the use of flyers placed in pre-approved designated areas in the clinic, by invitation from the project team during clinic visits, and by phone calls from the community health worker (CHW) to the participants who met criteria for the project. The CHWs were trained for two hours on how to recruit participants, and they were provided with a script for telephone

recruitment. The CHWs were made aware of the type of education to be provided, location of the classes, duration of each class, how many sessions, and for how many months. They were trained to encourage interested participants meeting criteria to attend all the sessions, inform the participants that snacks and meals would be provided at every session, and a raffle would be drawn for a glucometer. The CHWs were also asked to provide the name and contact information of the project director (PD) to participants, if questions arose. Forty-five patients who met criteria for inclusion were notified via phone calls or in-person during clinic visits. Twenty-five showed interest and thirteen enrolled for the project. The CHW recruited in Spanish and English. The scripts used for phone recruitment and flyers were in English and Spanish. Participants were informed participation was completely voluntary, and their participation or non-participation, would not affect their relationship with their primary care providers or with the clinic.

Project Team

The project team was comprised of an endocrinologist, three Nurse Practitioners (NPs), two certified medical interpreters, two Medical Assistants (MAs), one Registered Nurse (RN), and two CHWs. The project team members were assigned roles by the PD. The endocrinologist was the specialist at the community clinic that the PD consulted for resources to facilitate the success of the project. The PD was an NP responsible for teaching during the education sessions. The other two NPs and the PD provided individualized, hands-on support, and assisted participants completing questionnaires during the sessions. The two certified medical Spanish interpreters provided simultaneous earphone interpretive services during the education intervention. The interpreters worked on an alternating schedule, with only one interpreter present at each session. The two MAs collected point-of care A1C values before and after the sessions and participated in some of the clinic visit recruitment. One MA collected pre-

intervention A1C values and the other MA collected post-intervention A1C values. The RN collected questionnaires completed by participants and made sure all the questions were answered by all the participants. She notified participants that skipped some questions and encouraged them to answer all the questions. The two CHWs were responsible for phone and clinic visit recruitment.

Measurement Tools

The measurement tools used to measure outcomes were the DKQ-24²⁷, the DSMQ²⁸ and the Alere Afinion A1C machine. The DKQ-24 is a 24-item questionnaire measuring diabetes knowledge which is easy to use as a measure of general diabetes knowledge and is easy to administer to either English or Spanish speakers because the questionnaire is worded in simple terms and is easy to comprehend. See Appendix III for permission letter from DKQ-24 developer to use the tool. The DKQ-24 was used with Spanish-speaking participants in the Starr County Diabetes Education Study (SCDES),²⁷ reliability coefficient of 0.78 was obtained. Examples of the straight forward questions used are:

Eating too much sugar and other sweet foods is a cause of diabetes.

If I am diabetic, my children have a higher chance of being diabetic.

Regular exercise will increase the need for insulin or other diabetic medication.

The DSMQ is a 16-item questionnaire designed to assess self-care activities associated with glycemic control. The DSMQ was developed based on theoretical considerations and a process of empirical improvements.²⁸ The questionnaire was designed to measure four subscales: dietary control, physical activity, healthcare use, and glucose management. The researchers who developed the DSMQ obtained good internal consistency (Cronbach's alpha 0.84), which supports the reliability of this measurement of self-care behaviors.²⁸ See Appendix IV for

permission letter from DSMQ developer to use the tool. The Spanish version was performed by Dr. Calvo-Maroto. See Appendix V for permission letter to use the Spanish version. Like the DKQ-24, the DSMQ is simple and easy to administer to English and Spanish speaking participants. Examples of the simple questions from the DSMQ are:

The food I choose to eat makes it easy to achieve optimal blood sugar levels.

I keep all doctors' appointments (appointments with health professionals) recommended for my diabetes treatment.

I take my diabetes medication (e.g. insulin, tablets) as prescribed (very accurately).

The Alere Afinion A1C machine was used as a point-of-care testing device, which provides immediate test results needed to assess A1C values.²⁹ The machine enhances efficiency in healthcare clinics and provides efficiency in managing patients with diabetes, clinical decision-making, and improved patient outcomes.²⁹ The manufacturer of the Alere Afinion observed reliability and validity in the machine because there was no statistical significant difference between the values of the point of care machine and traditional laboratory values.³⁰

Intervention

The intervention for this project took place between February 6, 2018, and May 16, 2018. The classes were conducted biweekly in a single series of four different classes. At the beginning of the classes, participants and project team verbally identified critical barriers to performing diabetes self-care behaviors. The following factors were highlighted: lack of motivation, lack of resources for healthy food choices, lack of knowledge on what is healthy and what is not, inconsistency in attendance of diabetes education classes, lack of follow-up with primary care providers, lack of awareness of diabetes classes, and lack of the knowledge of long-term implications of diabetes. Collective input from health care providers and patients can make

interventions understandable, clinically feasible, and culturally appropriate.³¹ The intervention provided to the participants targeted: culturally sensitive modifications, age appropriateness and evidence-based content.

Culturally-Sensitive Modifications

The families of the participants were encouraged to attend the classes to support participants and accentuate cultural-competence in the project. Findings from Hu et al¹¹ suggest that including family members in educational interventions for the older Hispanic population may provide psychological and emotional support to patients with diabetes, help to develop healthy family behaviors, and promote diabetes self-management. The classes were interactive, and participants were provided opportunities to ask questions. A certified medical Spanish interpreter provided interpretive services during the education intervention from English to Spanish using simultaneous earphone technology. The PD taught in English and, the interpreter translated to Spanish during the session. Follow-up phone calls were made by the PD and the Spanish interpreter in-between diabetes education sessions to discuss the progress and challenges from the participants. The participants also had access to call the PD as needed to enhance support and encouragement. The PD and the Spanish interpreter made a 3-way call to the participants who were Spanish speaking only, and the PD made one-to-one calls to those who spoke English.

During all sessions, participants were provided healthy foods to eat, many of which were congruent with the Hispanic culture such as tacos, rice, and beans. Recipes for healthy Hispanic foods were provided, and participants were taught how to read and interpret food labels, using both Spanish and English, ensuring they used reading glasses if needed. Participants were taught about types of foods to which they were culturally accustomed, and how those foods could impact blood glucose levels. They were also taught the importance of controlling food portion sizes throughout

the day to control carbohydrate intake. To supplement ethnic dietary content, participants were provided with a leaflet of culturally familiar foods, organized in different food groups, with recommended serving sizes.^{32,33} Bilingual written materials were used to enhance comprehension. To reinforce bilingual written materials and new skills such as the proper way to check blood glucose, role-play was introduced. Role-play provided the opportunity for hands-on practice and development, and for enhancement of self-efficacy to promote intercultural communication.³³

Age-Appropriate Modifications

Age-specific diabetes education interventions addressed medication reconciliation, healthcare literacy, diet, and physical activity in the older-aged population.³⁴ Handouts related to diabetes education were provided in bolded and enlarged print. Lessons were provided in simple context with the PD talking in a clear tone and at a moderate to slow pace to promote comprehension. Videos and digital visual aids were used and projected on a large screen to promote visibility. The classroom was well lit with comfortable seating, and there was easy wheelchair accessibility.

Evidence-Based Content

The diabetes education content was based on the AADE and the ADA guidelines, and incorporated the following in the teaching objectives: healthy eating, physical activity, glucose monitoring, medication adherence, problem solving, complication and risk reduction, and healthy coping techniques.^{20,35} The educational materials for diabetes management were provided in both Spanish and English obtained from the AADE website. These materials have been previously developed and shown to be successful with adherence to evidence-based clinical practice guidelines developed by the AADE and the ADA.^{20,35,36}

Given the staggering prevalence of diabetes in the Hispanic population, relevant community and national statistics were provided, and subsequent discussions were encouraged. An interactive discussion led to a review of the complications associated with diabetes in older-aged Hispanics. Discussion on misconceptions or myths about diabetes were also interactively discussed.^{13,14,33} To enhance information on physical activity, participants were taught how simple increases in physical activity such as walking a dog and walking around the neighborhood can reduce blood glucose level and risk of diabetes-related complications. The PD also provided the participants with information regarding Hispanic healthy foods on sale in the local grocery store, which provided support and resources on healthy options available at affordable prices.

Risks and Resources

The following risk factors which could have negatively affected the success of completing the project intervention were considered: (a) Lack of consistency in diabetes session attendance; (b) Lack of adequate transportation to and from project location site; (c) Lack of sufficient project team members to conduct intervention; and (d) Lack of effective communication from the non-bilingual project team members. The following actions were taken to mitigate the aforementioned risks: (a) Participants were provided with healthy snacks and meals during each session, and a glucometer was provided to the winner of a raffle draw courtesy of the clinic as a budgeted expense as an incentive to motivate or encourage the participants to complete the education intervention sessions; (b) Participants with transportation issues were asked to involve family members who may be able to assist with transportation; if this option was not feasible for them, they were asked to inquire about other methods of assistance from the social worker at the clinic (c) Back-up project team members were prepared

in case a team member was not able to perform his or her role due to unforeseen reasons; (d) Ensured a Spanish speaking interpreter was present during all the education sessions.

Data Collection

The project was conducted in a systematic and organized manner from recruitment to data analysis. Training was conducted a week before the intervention with participating professionals to ensure understanding of project goals and intervention procedures. The training addressed the roles and responsibilities of each individual and data collection in a trustworthy and unbiased manner.

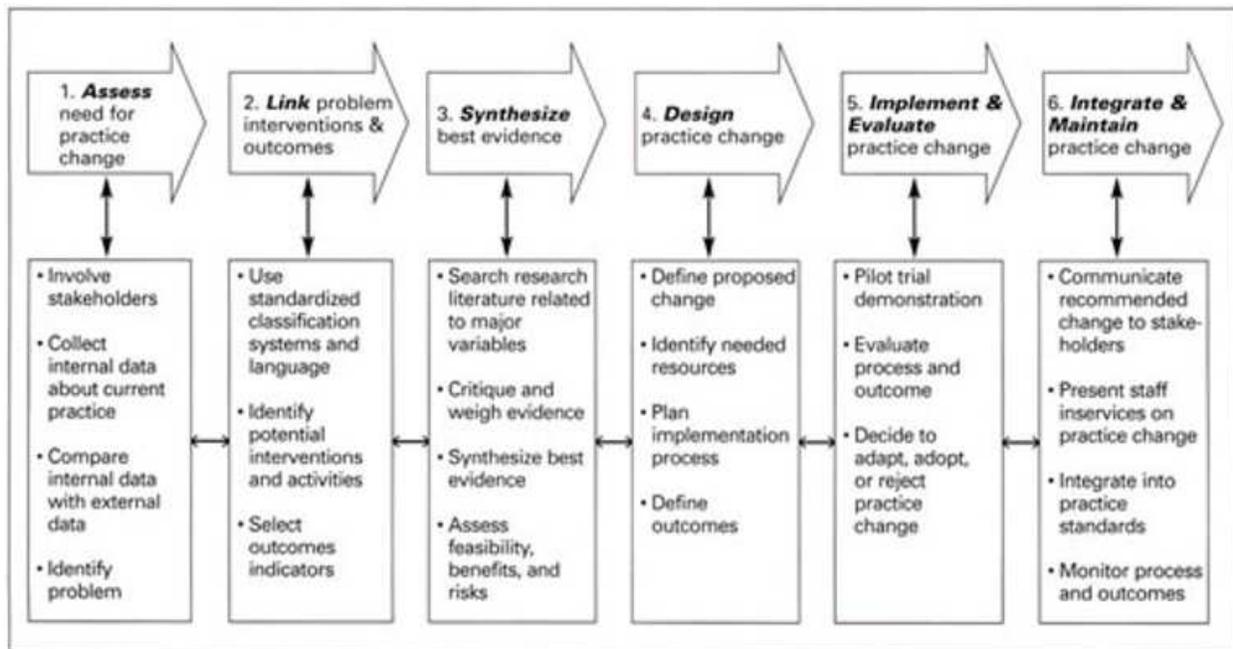
At the start of the first session, before education commenced, questionnaires (DKQ-24 and DSMQ) were given to participants to complete as part of the pre-intervention assessment. The questionnaires were read aloud in English by the PD, and in Spanish by the certified Spanish interpreter, to ensure understanding. The bilingual MA obtained the point-of-care A1C values on the participants pre-intervention. On the last day of the diabetes education session, the same questionnaires were provided for the participants to complete, and the A1C levels were assessed again for post-intervention results.

Evaluation Framework

The Rosswurm and Larrabee evidence-based practice (EBP) model guides EBP in healthcare organizations and was used as the evaluation framework for this project. This model incorporates elements of EBP, research utilization, and enforced change theory.³⁷ The project evaluation focused on the six elements of the model: (a) assessing the need for practice change, (b) relating problems with the right interventions and outcomes, (c) gathering all of the evidence, (d) designing a practice change, (e) evaluating and implementing the practice change, and (f) maintaining and integrating the practice change.^{38,39} Each of the elements in the model were

addressed in the planning and implementation of the project. Evaluation of outcomes took place through careful consideration of findings from data analysis and discussions with leadership team at the community clinic. A plan for integrating and maintaining the targeted diabetes education intervention was developed through discussions with facility leadership See figure 2 for Rosswurm and Larrabee model.

Figure 2: Rosswurm and Larrabee Evidence Based Practice Change Model



Analysis

Participants were assigned an alphanumeric code, and all surveys were labeled by that code. The key to the codes (with participant names) were kept in a locked file cabinet in the PD's office, separate from the surveys. Statistical analyses were performed on a password encoded computer kept in the PD's office, and only the PD had access to the computer. Collected data was input into SPSS 25. The data was checked for normality. Frequencies were conducted, and characteristics of the data was determined. The data was further analyzed using paired T-tests, comparing pre-and post-intervention knowledge levels, diabetes self-care behaviors, and A1C

levels. Significance was established at $p < 0.05$. A Cohen's d was calculated to determine effect size.

RESULTS

Over three months, 12 participants who were 60 years and older completed all biweekly sessions of diabetes education and all surveys and pre-and post-A1C point-of-care testing. One participant dropped out due to elective surgery. Participants' mean age was 68.3 years and 83.33% were female. Among the participants, 25% were employed and 75% were either retired or unemployed. The preferred language was Spanish (75%). Two were insulin dependent. See demographics, Table 1.

Statistical comparisons were made using paired t-tests. There was a significant difference in pre- and post-education outcomes: knowledge ($t(11) = -7.97, p = .000; d = 2.32$); self-management ($t(11) = -7.93, p = .000; d = 2.43$); and A1C levels ($t(11) = 6.43, p = .000; d = 0.78$). These results indicate participants' diabetes knowledge after the education ($M = 20.75, SD = 1.82$) was significantly higher than their knowledge prior to the education ($M = 14.67, SD = 3.23$). The participants' self-management behavior after the education ($M = -43.46, SD = 4.21$) was significantly higher than their self-management behavior prior to the education ($M = -29.42, SD = 7.15$) and their A1C after the education ($M = -7.36, SD = 0.91$) was significantly lower than A1C prior to the education (See Table 2). The effect sizes for knowledge ($d = 2.32$), self-management behavior ($d = 2.43$), and A1C ($d = 0.78$), exceed Cohen's convention for a large effect ($d = 0.80$).²² (Figures 3,4, and 5).

Table 1: Participant Demographics

Patient	AGE	GENDER	EMP.STAT	INSULIN	LANG
1	68	F	EMPL	NO	Spanish
2	63	F	EMPL	YES	Spanish
3	65	F	UNEMP	NO	Spanish
4	65	F	UNEMP	NO	Spanish
5	76	F	UNEMP	NO	English
6	72	M	UNEMP	NO	English
7	73	F	UNEMP	NO	Spanish
8	82	F	UNEMP	NO	Spanish
9	70	F	EMPL	NO	Spanish
10	61	F	UNEMP	NO	Spanish
11	65	F	UNEMP	NO	Spanish
12	60	M	UNEMP	YES	English

Footnote: Employment (EMP); Language (LANG); Employed (EMPL); Unemployed (UNEMP)

Table 2: Comparison of Values from Measurement Tools

	n	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Pre-intervention A1C	12	3.6	5.9	9.5	8.142	1.0344	1.070
Post-intervention A1C	12	3.2	5.4	8.6	7.358	.9150	.837
Total Score on Pre-DKQ	12	10	10	20	14.67	3.229	10.424
Total Score on Post-DKQ	12	6	18	24	20.75	1.815	3.295
Total Score on Pre-DSMQ	12	26	15	41	29.42	7.154	51.174
Total Score on Post-DSMQ	12	13	35	48	43.67	4.207	17.697

Footnote: Hemoglobin A1C (A1C); Diabetes Knowledge Questionnaire (DKQ-24); Diabetes Self-Management Behavior (DSMQ)

Figure 3: Diabetes Knowledge Pre vs Post Intervention

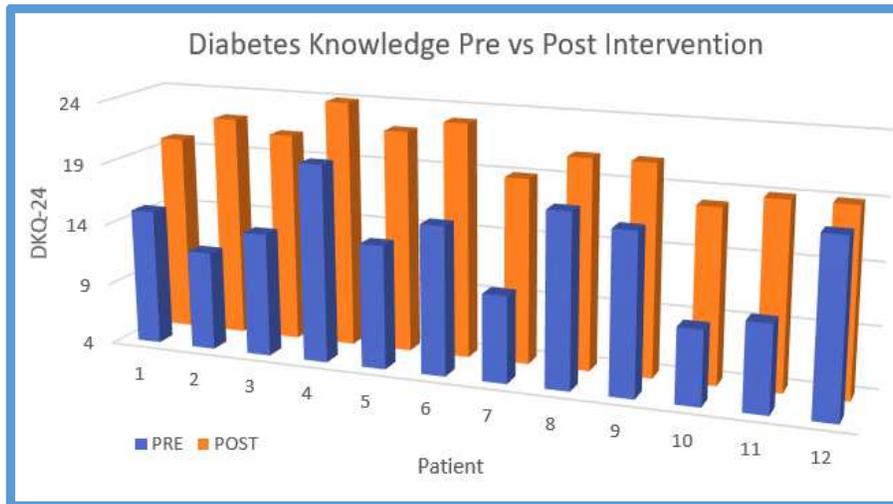


Figure 4: A1C Pre vs Post Intervention

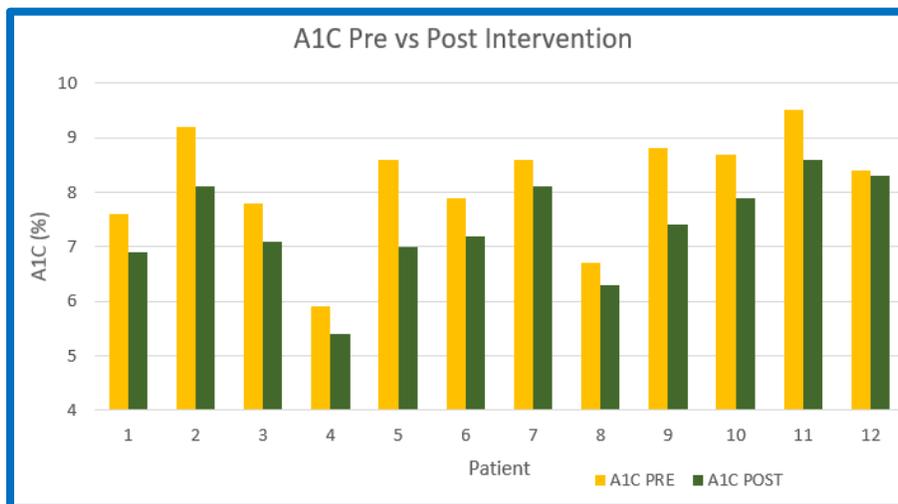
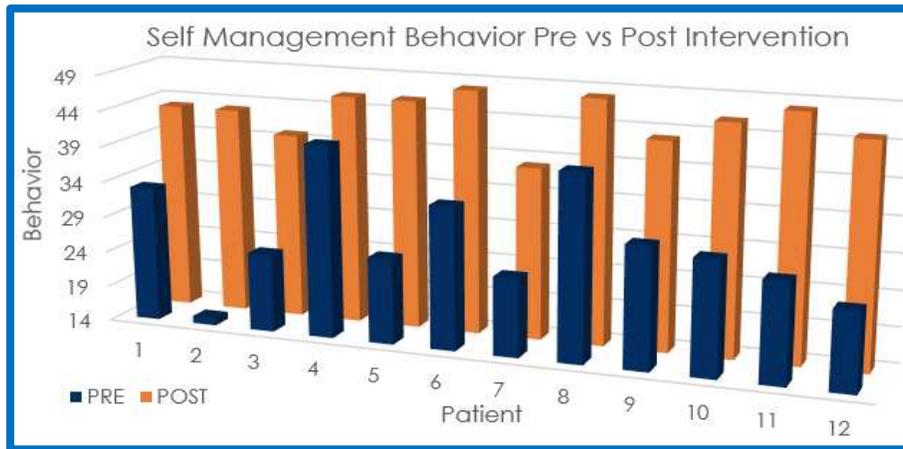


Figure 5: Self-Management Behavior Pre vs Post Intervention



DISCUSSION

The measurable goals for this QI project were met. The findings of significant increase in knowledge and self-management behaviors, and the significant decrease in A1C answered the QI project question. Applying a culturally-sensitive, age-specific approach to diabetes management education can increase diabetes knowledge, improve self-management behaviors, and improve glycemic control over a 3-month period. Some of the project facilitators that promoted goal attainment were: (a) 100% attendance rate from 12 out of 13 participants, (b) commitment and dedication of the PD and the project team members, (c) clear description of roles and expectations of the team members, (d) support from the leadership team at the community clinic, (e) education intervention tailored to age, ethnicity, and culture, and (f) encouragement from family members that supporting participants. A barrier observed was an attrition rate of 7.7% because of one participant who dropped out. An unintended goal not measured in the project was weight loss from some of the family members, who accompanied the participants and verbalized they lost weight following the instructions from the education intervention.

The QI project intervention was feasible and replicable because several measures from the project could easily be adopted into clinic practice and policy changes. The leadership team

at the community clinic could replace the PD with a nurse, nurse practitioner or a physician assistant currently employed at the clinic, who is trained in diabetes education. The clinic can provide healthy, culturally appropriate snacks during the session to replace the meals provided during the intervention and provide recipes for full meals. The clinic can also adopt using an interpreter or using one of the medical professionals employed at the clinic trained in medical terminology to interpret from English to Spanish during the sessions. Another aspect the clinic can incorporate into diabetes education intervention is telephone communication and counseling occurring during the intervention. Participants were able to call the PD during normal business hours and received support and encouragement during the calls. The community clinic could assign a nurse or rotate nurses to take calls for diabetes education- related questions during clinic hours. The clinic can also integrate all education materials, content, and approaches utilized in the project to improve education practices.

Effect of Diabetes Education on Knowledge

General diabetes knowledge is recognized to be useful and effective in preventing diabetes-related complications and achieving diabetes control. Research on significant aspects of diabetes suggest variables such as knowledge, attitudes, and self-management could contribute to predicting diabetes.⁴⁰ Diabetes knowledge tests provide a valid assessment of diabetes-related knowledge.^{40,41}

Two studies used the DKQ-24 to assess for diabetes knowledge.^{12,42} Brown et al¹² conducted a diabetes education intervention which consisted of 52 contact hours over 12 months. The intervention from the study involved bilingual nurses, dieticians, and CHWs. Similar to this QI project, the instructional session topics were on nutrition, exercise, self-monitoring, and self-care. The study sample size was n=256 Mexican Americans with diabetes, and between ages 35

and 70 (mean age of 50). The education intervention used in the study was similar to this QI project intervention. Like this QI project, the intervention from Brown et al¹² involved the application of culturally competent approaches to diet, language, and family involvement in education intervention. The findings from the experimental group showed an increase in scores of diabetes knowledge from 3.6% to 14.4%, which was a significant finding.

Castillo et al⁴² also conducted a similar experiment with 2-hour sessions of diabetes education for ten weeks with a sample size of 70. A total of 108 community residents enrolled in 12 courses between May 2006 and March 2007. Of these, 70 were Hispanics/Latinos with a diagnosis of diabetes, and mean age of 58.2 years. Their results revealed a 26% increase in diabetes knowledge score: pre-test: 68.8 (11.2); post-test: 86.4 (11.2); $p < .000$. Although the two studies did not report effect sizes, the studies included participants 60 years and older and had improvement in diabetes knowledge scores. This QI project reported a significant improvement in diabetes knowledge with a large effect size of ($d=2.32$), and these findings suggest culturally-competent diabetes intervention can improve diabetes knowledge.

Diabetes Education influence on Self-Management Behaviors

Diabetes self-management behaviors are categorized into seven areas: healthy eating, being active, monitoring, medication adherence, problem-solving, risk reduction, and healthy coping.³⁶ This QI project provided diabetes education focusing on the seven categories with emphasis on age and cultural approach, which yielded a significant increase in self-management behavior and a large effect size ($d=2.43$). Salto et al⁴³ conducted a three-month culturally-tailored diabetes education intervention for Spanish-speaking participants. Of the 46 participants enrolled, 39 were Mexican American adults with T2DM with a mean age of 53.95 years. The

study findings showed a significant reduction in dietary fat intake ($p = .045$) and dietary cholesterol ($p = .033$) after the diabetes intervention.⁴³

Rotberg et al⁴¹ conducted a quasi-experimental study over five years with participants who were of Hispanic origin, had T2DM, and mean age of 47.2 years. The study was conducted at seven local clinics with a sample size of $n=142$, and reported that after diabetes education, participant's yearly ophthalmic exams increased from 43% to 56% ($p < .001$), daily self-foot inspection increased from 49% to 71% ($p < .001$). Daily exercise increased from 50% at baseline to 87% at follow-up ($p < .001$), glucose monitoring at home increased from 60% at baseline to 90% at follow-up ($p < .001$), and keeping and tracking a blood glucose log increased from 42% at baseline to 69% at follow up ($p < .001$).⁴¹ Although the studies did not report the effect size for comparison, evidence from the studies support culturally-tailored education intervention can produce positive self-management outcomes similar to this QI project.

Glycemic Control Outcomes in Diabetes Education

Glycemic control can be a delicate balancing act. The patients with diabetes are tasked with maintaining euglycemic blood glucose levels, which requires diabetes education, self-management, and decision strategies.^{44,45} Prezio et al⁴⁶ recruited adults who were predominately of Mexican-American origin with T2DM from a community clinic into randomized intervention ($n = 90$) and control ($n = 90$) groups. The participants' mean age was 47.9 years. The intervention group participated in a culturally-tailored diabetes education program over a 12-month period. The primary outcome of interest was A1C. The A1C values decreased significantly from baseline (1.6%, $p < .001$), which was significant.

Garcia et al⁴⁷ conducted a randomized controlled trial with 72 Mexican-Americans adults ages 25–75 years with T2DM. The experimental group ($n = 39$), with 50 ± 8.7 had culturally-

tailored educational and behavior modification sessions, which demonstrated a significant decrease in A1C from baseline $M= 8.6$ (70) to $M=7.8$ (62). The effect sizes were not reported for comparison. This QI project reported a significant improvement in diabetes knowledge with a large effect size of ($d=0.78$). Considering the findings from these studies and this QI project, diabetes intervention tailored to culture can improve glycemic control.

Limitations

The first identified limitation was the lack of measures for weight loss among the participants. Height and weight measurements were not collected during the project intervention phase. This data could have been an important piece by correlating weight loss, self-management behaviors, and A1C. A second limitation was the small sample size ($n=12$). The sample size was small, but there was a minimal attrition rate (7.7%). A third limitation is the generalization of self-management behaviors. Further analysis could have been made on characteristics of behaviors such as physical activities, diet, and appointments with primary care provider. Another limitation is the sustainability of using a medical certified interpreter with ear phone technology. This type of interpretive services may not be sustainable at the community clinic due to cost. The community clinic could consider using one of its bilingual nurses to assist in interpreting during the sessions. Despite these limitations, the QI findings provided evidence to support the importance of age-appropriate and culturally sound diabetes education for Hispanic older-aged adults.

Conceptual Framework and Evaluation Framework

The major concept of the HPM is to motivate patients to desire optimal health potential and well-being, promote healthy behaviors, and positive health outcomes. This QI project motivated participants, supported and provided them with information and resources that led to

significant outcomes as evidenced by the findings in diabetes knowledge, self-management behaviors, and glycemic control. The Rosswurm and Larrabee model was used to evaluate the outcomes of the project from the assessment of the need for practice change to integrating practice change at the community care clinic. The findings from this QI project were accomplished by assessing the need for change in practice and relating the need to appropriate interventions and outcomes. The findings clearly show significance of the proposed practice change. A plan for integrating and maintaining the targeted diabetes education intervention was developed through discussions with facility leadership at the community clinic.

Implications for Practice

The findings from this QI project could impact the lack of age and culturally appropriate diabetes education at the community clinic where the project was conducted. The leadership team can consider adopting several measures from the project to impact a change in policy and practice to help improve diabetes education for the target population. Barriers encountered during the project implementation phase were direct access to the point-of-care machine and inability to operate the projector screen on the first day of the intervention, which delayed the start of the session. These barriers were discussed with the leadership team and were resolved before the subsequent sessions. Overall, these barriers were minor and did not hinder the success of the project. The recommendations are to plan accordingly and have alternative plans for major risks or barriers.

The findings from this QI project support the need for change in diabetes education practice policies for the older-aged Hispanic population in a clinic setting. The significant improvements in diabetes knowledge, self-management behaviors, and glycemic control in this sample strongly suggest that emphasis on age and cultural appropriateness may impact the

disparities in diabetes outcomes for this population. The large effect sizes found in this project imply a potential to improve overall health outcomes and decrease complications associated with T2DM such as heart disease, neuropathy, nephropathy, and blindness. This project's findings should encourage clinicians in the community or clinic practice setting to advocate for policies supporting diabetes education tailored to the needs of the older-aged Hispanic population. Further research needs to be conducted on the Hispanic elderly population to determine how age and culturally appropriate diabetes education impacts the population.

CONCLUSION

The analyses from this QI project reinforce the importance of controlling T2DM through diabetes education to reduce the rates and risks of diabetes-related complications, especially in the older-aged Hispanic population. The escalating importance of the need for age-appropriate and culturally competent diabetes education for the older-aged Hispanic population is evident in the growing number of elderly in the U.S and the competing growth of the diabetes epidemic in this population. In caring for patients with T2DM, the challenges of balancing self-management practices with everyday life should be considered. Interventions that facilitate the integration of risk factor recognition, diet, exercise, glucose monitoring and medication adherence need to be developed at all levels of care.

To delay or avoid complications and provide optimal quality of life for this population with T2DM, it is imperative to provide diabetes education that is sound, appropriate for age, and culturally competent. The result of this project and other peer-reviewed studies support the findings that culturally sensitive and age-appropriate diabetes education can improve knowledge, self-management behaviors, and glycemic control. However, no intervention studies were found that examined the effect of diabetes education only on the older-aged Hispanic population with T2DM in the U.S. Such intervention research studies should address age-related impairments and how culturally competent diabetes education can be tailored to the needs and expected outcomes for the target population. Future studies should address how physical, cognitive, and visual changes can impact diabetes education in older Hispanic adults with T2DM.

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APPENDIX I: IRB Letter



TEXAS A&M UNIVERSITY
CORPUS CHRISTI

OFFICE OF RESEARCH COMPLIANCE
Division of Research, Commercialization and Outreach
6300 OCEAN DRIVE, UNIT 5844
CORPUS CHRISTI, TEXAS 78411
O 361.825.2497 • F 361.825.2

Human Subjects Protection Program Institutional Review Board

Date: January 10, 2018

TO: Olubanke Babalola, FNP, RN, RRT, DNP student
College of Nursing and Health Sciences, TAMU-CC

CC: Dr. Theresa J. Garcia, PhD, RN
Assistant Professor, Doctor of Nursing Practice Program Coordinator

Elizabeth Sefcik, RN, PhD, GNP-BC
Professor, College of Nursing & Health Sciences

FROM: Office of Research Compliance Institutional Review Board

SUBJECT: Not Human Subjects Determination

Activities meeting the DHHS definition of research or the FDA definition of clinical investigation and involves one or more human subjects are subject to IRB review and approval.

On January 10, 2018, the Texas A&M University-Corpus Christi Institutional Review Board reviewed the following submission:

Type of Review:	Not Human Subjects Determination
Title:	Improving Diabetes Self-care Behaviors in Hispanic Elderly Using a Culturally-sensitive, Age-specific Approach
Project Lead:	Olubanke Babalola, FNP, RN, RRT, DNP student
IRB ID:	NHS 01-18
Funding Source:	None
Documents Reviewed:	Human Ethics Oversight Review Form dated 11/29/2017 Community Care Health Centers Site Letter of Support dated 11/17/2017 Diabetes Take Control Flyer

Texas A&M University-Corpus Christi Institutional Review Board determined that the proposed activity does not meet the DHHS definition of research or the FDA definition of a clinical investigation. Therefore, this project does not require IRB approval. You may proceed with this project.

This determination applies only to the activities described in the documents reviewed. Any planned changes requires submission to the IRB to ensure that the research continues to meet criteria for a non-human subject research determination.

Please do not hesitate to contact me with any questions at Rebecca.Ballard@tamucc.edu or 361-825-2497.

Respectfully,
Rebecca Ballard, JD, MA, CIP
Director, Research Compliance
Division of Research, Commercialization and Outreach

APPENDIX II: Letter of Support



November 17, 2017

Dr. Susan Dyess
Associate Dean for Graduate Nurse Programs
College of Nursing and Health Sciences
Texas A&M University – Corpus Christi
6300 Ocean Drive
Corpus Christi, TX 78412

Dear Dr. Dyess,

The purpose of this letter is to provide Olubanke Babalola, a Doctor of Nursing Practice (DNP) student at Texas A&M University College of Nursing and Health Sciences, support in conducting a quality improvement project at CommUnity Care, Austin, TX. The project entails a single series of four different diabetes education classes, twice each on culturally-sensitive, age-specific diabetes education for Hispanics who are 60 years and older. The project will assess for diabetes knowledge, hemoglobin A1c, and self-management behaviors pre- and post-intervention.

The purpose of this project is to improve diabetes knowledge, self-management behaviors, and glycemic control in older-aged Hispanic population. CommUnity Care was selected for this project because of the high percentage of target population at this facility. Olubanke Babalola is not employed at this institution, but has an interest in improving care at this facility.

I, Alan Schalscha, do hereby fully support Olubanke Babalola in conducting her DNP project at CommUnity Care in Austin, TX.

A handwritten signature in black ink, appearing to read "Alan Schalscha".

Sincerely,
Alan Schalscha, DO
Chief Medical Officer, CommUnityCare

APPENDIX III: Permission to Use DKQ-24

Re: Permission to use diabetes questionnaire tool

Garcia, Alexandra A <agarcia@mail.nur.utexas.edu>

Fri 11/10/2017 4:19 PM

To: Babalola, Olubanke <obabalola@islander.tamucc.edu>;

Cc: Garcia, Theresa <Theresa.Garcia@tamucc.edu>;

2 attachments (255 KB)

DKQ-24_Eng&Span.docx; DKQ-24_Eng&Span_KEY.docx;

Dear Banke and Terrie,

Thank you for your patience and for your interest in the Diabetes Knowledge Questionnaire, DKQ-24 (attached with answer key). You are welcome to use it in your study with elderly rural-dwelling Hispanics. The DKQ was developed for Mexican Americans and has been used in several studies with people with diabetes. It is written for low literacy readers and we have always administered it in one-on-one interviews. While I expect it will perform reliably and validly with your sample, I would like to hear about its usefulness and psychometrics in your study.

Please be aware that the Diabetes Care article with the items was published several errors in the Spanish translation that were later corrected in an erratum and then modified by other team members. Here is the citation for the published article to use in your report:

Garcia, A. A., Villagomez, E., Brown, S. A., Kouzekanani, K., & Hanis, C. L. (2001). The Starr County Diabetes Education Study: Development of the Spanish language diabetes knowledge questionnaire. *Diabetes Care*, 24, 16-21. Erratum in *Diabetes Care*, 24, 972.

To score the DKQ-24, assign one point for each correct response (correct responses are noted in the original article and in the answer key, attached). The score is the percentage of the total items scored as correct. The scores are useful as descriptive indicators and to use in correlation and regression analyses. There is no determined diagnostic threshold for the necessary level of knowledge needed for effective diabetes self-management.

Please let me know if you have any questions as you proceed. I look forward to receiving a summary of your findings.

Thanks again for your interest in the DKQ-24. Please tell Dr. Dubois hello for me!

Best wishes for a successful project,
Alexandra Garcia

Alexandra A. Garcia, PhD, RN, APHN-BC, CNE, FAAN
The University of Texas at Austin
Director of Community Engagement and Public Health, Dell Medical School
Associate Professor, School of Nursing
[1710 Red River](#)

[Austin, TX 78701](#)
254-251-1555 (t) 254-251-7077

APPENDIX IV: Permission to Use DSMQ

AW: Permission to use DSMQ tool



Schmitt Andreas <schmitt@diabetes-zentrum.de>

Fri 10/20/2017, 3:02 AM

Babalola, Olubanke

👍 🔄 Reply all | ▾

inbox

You forwarded this message on 6/9/2018 6:49 PM



DSMQ_engl.docx
20 KB



DSMQ-R_engl.docx
29 KB



DSMQ-scoring guide.pdf
29 KB



✓ Show all 4 attachments (797 KB) Download all Save all to OneDrive - Texas A&M University - Corpus Christi



Action Items



Dear Mr. Babalola,

Thank you for your kind request. I appreciate your interest in the DSMQ. You have my permission to use it for your research. Please find attached the original 16-item version together with a scoring guide. Please also note that we also developed a revised scale including some additional items, but there is no article describing the revised version yet (psychometric properties within German samples are good). Please decide yourself which one to use.

I am also sending you a recent paper in which we used the DSMQ for assessing self-care activities, as this might be of interest.

Best regards from Germany,
Andreas

Dr. Andreas Schmitt

Clinical Psychologist, Post-doc Researcher

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Research Institute of the Diabetes Academy Mergentheim
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Email: schmitt@diabetes-zentrum.de
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APPENDIX V: Permission to Use DSMQ-Spanish Version

Re: Permission to use DSMQ -Spanish version



Ana Maria Calvo Maroto <amacalma@alumni.uv.es>

Thu 2/22, 10:39 AM

Babalola, Olubanke ↵



Inbox

You forwarded this message on 6/6/2018 1:45 PM

Good morning Olubanke Badalola,

You have permission to use my Spanish version of DSMQ!

I would like that in your study appear "Spanish version was performed by Dr. Calvo-Maroto"

I'm sorry but I changed of email. If you have any questions, you can write me: acalvom@unav.es

El Lunes 12 Febrero 2018 20:33 CET, "Babalola, Olubanke" <obabalola@islander.tamucc.edu> Ha escrito:

- > Good day Dr. Ana Calvo Maroto,
- > I am checking to see if you had a moment to read my previous emails regarding permission to use the Spanish version of the DSMQ that you developed as a questionnaire tool for my Hispanic focused population in a diabetes education intervention.
- >
- > I hope to hear back from you soon.
- >
- > Thank you,
- > Banke Babalola
- > Nurse Practitioner
- > DNP student
- > Texas A&M University, Corpus-Christi, TX