A Culturally Appropriate Self-Management Program for Hispanic Adults with Type 2 Diabetes and Low Health Literacy Skills

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Abstract

The global diabetes epidemic has disproportionately affected the Hispanic population. Along with the prediction that within the next few decades a great proportion of population growth in the United States will be among the Hispanic population, the accompanying increase in type 2 diabetes (T2D) will greatly impact the U.S. health care system. To reduce the morbidity and mortality from diabetes in this population, culturally appropriate approaches to disease self-management are needed. This project assessed the feasibility of adapting a patient-centered educational intervention that addresses diet, physical activity, and meaningful self-monitoring of blood glucose for a Hispanic population with low health literacy skills. In four 2-hour class and focus group sessions, the educational program was presented in Spanish to nine Hispanic adults with T2D recruited within a rural community health care setting in central Virginia. The participants' feedback during the group sessions clustered around four themes: information and knowledge, motivation and barriers to change, experiences with new behaviors, and personal responsibility. The feedback supported the feasibility of the instructional approach within a group of low health literacy Hispanic adults with T2D. Findings from the project may help in the further development of tools and strategies for improved T2D self-management in the Hispanic American population.

Organization of the Capstone Project

This capstone project represents the culmination of a scholarly process that began with the candidate's clinical work, participation with a research team conducting an intervention in lifestyle modifications with persons with type 2 diabetes (T2D), a review of relevant literature, and progressed to testing the feasibility of a modified lifestyle educational program with a small group of Hispanic persons with T2D and low health literacy skills. This capstone project is presented in the usual five-section format. In Section I, the candidate presents the context of the problem studied; the core concepts and an overview of the project, including the purpose of testing the feasibility of an educational program in the targeted population; and the theoretical framework used in interpreting the data and presenting the findings. Section II focuses on a review of the literature conducted to determine what is known about patient-centered diabetes education in the U.S. Hispanic population and to identify the current evidence regarding effective lifestyle modification approaches in the treatment of T2D within the targeted population. Section III contains a description of the project design and methods, including definitions of terms and the protection of human subjects. In Section IV, the candidate presents the project findings. Section V contains a discussion of the project findings and identification of the strengths and potential limitations and cohesively ends the project with implications for nursing practice. Appendices include supporting documents relevant to the capstone project and a manuscript prepared for submission to a scholarly journal.

Table of Contents

Section I

Changing demographics, an obesity epidemic, and the ongoing health care crisis in the United States have created a perfect storm for diabetes to continue to increase among all populations, and particularly among Hispanic Americans. According to the U.S. Census Bureau, the Hispanic population grew from 35 million in 2000 to 50 million in 2011 (U.S. Census Bureau, 2011). The Pew Research Center predicts that Latinos will account for 60% of the population growth in the United States between 2005 and 2050 (Passel & Cohn, 2008).

The cost of diabetes in 2012 was estimated to be $245 billion—a 41% increase from the estimated $174 billion in 2007 (American Diabetes Association, 2013). From 2010 to 2012 diabetes affected 29.1 million Americans, or 9.3% of the total population (Centers for Disease Control, 2014). Hispanic Americans are at a 66% higher risk for being diagnosed with diabetes than the non-Hispanic White population (Centers for Disease Control, 2011), a statistic supported by the prevalence of diabetes among the Hispanic population of all ages in the United States, which is 13.3% for all Hispanics and 14.3% among those of Mexican origin (Schiller, Lucas, Ward, & Peregoy, 2012).

The ethnicity-related disparities in diabetes morbidity, mortality, and quality of care have been extensively documented (Centers for Disease Control, 2012). In a study of disparities in glycosylated hemoglobin (HbA1c) levels (among the gold standards in the assessment and management of diabetes) between Hispanic and non-Hispanic White adults with diabetes, Kirk et al. (2008) found that Hispanic adults have approximately 0.5% higher HbA1c levels than non-Hispanic White adults. Mexican Americans also are at a higher risk for microvascular diabetes complications than the non-Hispanic population. Mexican Americans are six times more likely to

develop end–stage kidney disease and 2.7 times more likely to have limb amputations than the non-Hispanic population with diabetes (Garcia & Benavides-Vaello, 2006).

In addition, Hispanics in the United States reportedly suffered disproportionately during the economic crisis of 2007-2009, with the Hispanic household's median wealth falling by 66% compared to 16% in White households (Kochclar, Fry, & Taylor, 2011). Financial constraints reportedly affect access to care, access to exercise facilities, and the Hispanic head-of-household's ability to purchase quality foods (Ramal, Petersen, Ingram, & Champlin, 2012). U.S. Census data published in 2011 estimate the poverty rate among Hispanics to be 25%, and approximately 30% among the Hispanic population under the age of 65—regardless of socioeconomic status—are without health insurance.

In response to staggering rates of chronic disease and reports of poor treatment-related outcomes, there has been a growing interest in moving from a prescriptive delivery of care to a more patient-centered approach with various models of health care. A common theme in the discussion of these models of care is the realization that current health problems require a shift from an acute care model to a chronic care model that is more community based and emphasizes a provider-patient relationship that is geared towards lifestyle and environmental changes (Jones, Hofmann, & Quinn, 2010).

The current challenge in managing chronic illnesses remains balancing evidence-based practice with the needs and values of the patient. In the report *Crossing the Quality Chasm*, the Institute of Medicine calls for a focus on patient-centered care, which the Institute defines as "providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient values guide all clinical decisions" (Institute of Medicine, 2001, p. 6). Anderson and Funnell (2000, 2005) have worked for more than 20 years towards such a

paradigm shift in diabetes education, advocating a more patient-centered approach than has existed. These authors contend that health care professionals, having been trained in an acute care model, are frustrated with poor outcomes in the management of diabetes because those trained with this perspective erroneously believe that they are personally responsible for the glycemic control of the diabetic patients they are treating. In reality, however, unlike the acute care setting where the providers are primarily in control of patients' disease management for the period of time the patient is in this environment, practitioners in the community setting have no control over their patients' behaviors and lifestyle choices. The paradigm shift that needs to happen would move the provider from being responsible *for* the patient to being responsible *to* the patient. Thus, Anderson and Funnell describe an approach to diabetes education that moves away from patient compliance to patient empowerment and collaboration in the management of their disease.

In the context of the diversity of patient care environments where there may be great cultural discord between health care providers and patients, patient-centered diabetes care would mean attending to the language, cultural, and literacy barriers to diabetic patients' self-management of their blood glucose levels. We know that the cornerstone for glycemic control is diet and physical activity and yet our current models of diabetes self-management patient education are producing sub-optimal results. Data show that almost one-quarter of all self-reported diabetic persons ages 18-39 have poor glycemic control (HbA1c levels of >9%) and that Hispanics are disproportionately affected (Centers for Disease Control, 2012). Given these findings, the purpose of this current project was to determine the feasibility of adapting a patient-centered educational intervention for self-management of T2D being conducted at the University of Virginia Health System for a Hispanic population with low health literacy skills (Cox, Taylor,

McCall, Singh, & Yancy, personal communication, September 1, 2013). The two aims of this capstone project were to (1) provide a lifestyle modification educational opportunity to Hispanic patients with T2D being seen at Blue Ridge Medical Center and (2) gather data through focus group sessions regarding the cultural applicability of the lifestyle modification program referred to as the GEM (**G**lycemic load diet, **E**xercise, and self-blood glucose **M**onitoring) program.

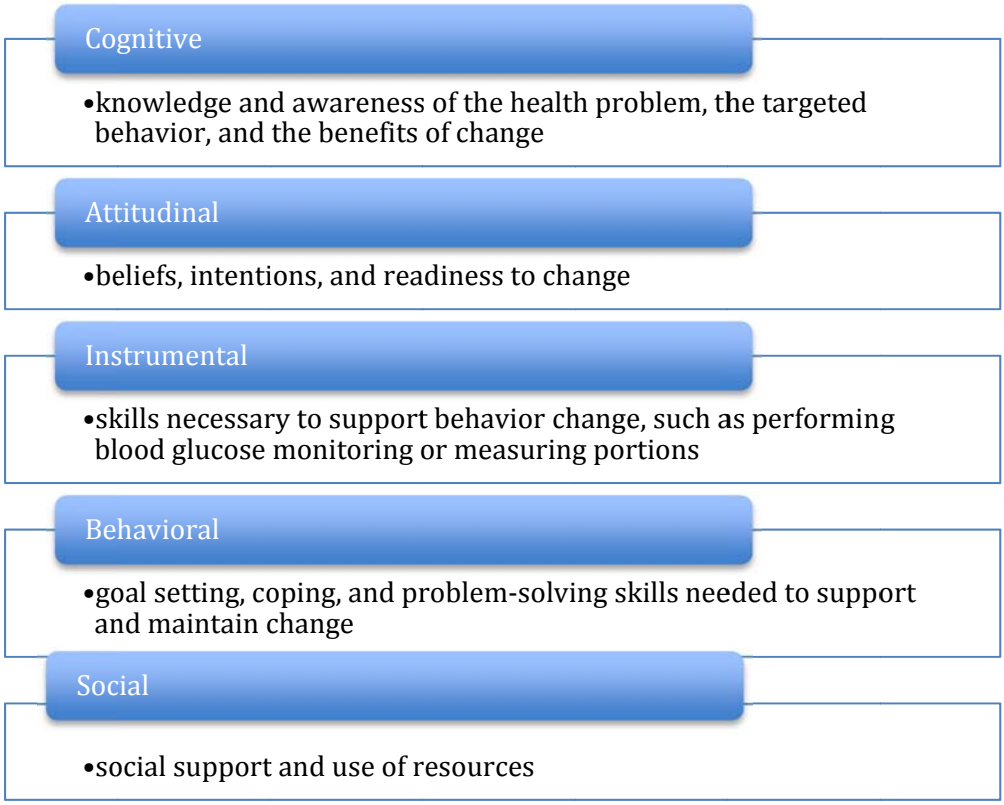
Theoretical Framework

Adapted from work to address disease self-management assessment and education for patients with hypertension (Grueninger, Goldstein, & Duffy, 1989), Whittemore (2006) described a patient-centered model for diabetes education that incorporates the theories of behavioral change that are commonly used in discussing diabetes self-management education with a patient-centered approach. This model identifies five levels for assessment and intervention to address diabetes self-management: cognitive, attitudinal, instrumental, behavioral, and social levels. Factors identified in the literature that affect Hispanic patients' diabetes self-management address these five levels (see Figure 1 on next page).

Cognitive Level

The cognitive level of the model addresses the individual's knowledge of the disease, of the behaviors required to treat it, and of possible outcomes. Many in the Hispanic population believe that diabetes is triggered by a stressful or emotionally intense event, or "susto," although most Hispanic individuals surveyed also describe diabetes as hereditary and affected by diet and exercise (Davis, Peterson, Rothschild, & Resnicow, 2011; Heuer & Lausch, 2006; Lynch, Fernandez, Lighthouse, Mendenhall, & Jacobs, 2012; Sullivan, Hicks, Salazar, & Robinson, 2010).

Figure 1. Patient-centered Model of Diabetes Self-management Assessment and Intervention*



*Adapted from "Behavioral Interventions for Diabetes Self-Management" by R. Whittemore, 2006, *Nursing Clinics of North America, 41*, p. 646.

Attitudinal Level

The attitudinal level refers to the person's beliefs, motivation, and readiness to change. Some Hispanic patients believe their illness is God's will, or trust that God will provide a cure, and thus these individuals use prayer as a supportive modality and are receptive to education received through their churches (Carbone, Rosal, Torres, Goins, & Bermudez, 2007; Early, Shultz, & Corbett, 2009; Hatcher & Whittemore, 2007). In a qualitative study exploring the health beliefs and experiences of individuals with diabetes belonging to three ethnic groups (Hispanic, Hmong, and African American), Hispanic focus group participants expressed mistrust of the health care system because they perceived that the quality of care they had received in the

past was affected by their language, culture, and economic constraints. They related experiences of not being provided with interpreters in the hospital, for example, and believed that this limited their access to care as well as the best quality of care, increasing their mistrust in the health system (Devlin, Roberts, Okaya, & Xiong, 2006).

Instrumental Level

Behavioral change for the self-management of health problems requires that the individual have the skills needed to perform these behaviors. A recent survey of 134 Latinos in a rural underserved area (Sadowski, Devlin, & Hussain, 2012) revealed glaring deficiencies in self-management of diabetes, with less than half of the respondents indicating that they performed blood glucose self-monitoring, adhered to diet recommendations, or had ever attended a diabetes self-management education class. A 2003 assessment of adult health literacy conducted by the U.S. Department of Education ranked the level of health literacy among Hispanic adults at the lowest of all ethnic and racial groups, with 41% of Hispanics surveyed scoring below basic literacy level and only 4% being proficient in interpreting complex prose and quantitative data (Kutner, Greenberg, Jin, & Paulsen, 2006).

Behavioral Level

The behaviors needed for self-management of diabetes include self-monitoring, goal setting, and problem solving. Patients must be able to learn coping skills and strategies to be successful in implementing the lifestyle changes needed and to maintain these changes over time (Cox et al., 2013; Grueninger, Goldstein, & Duffe, 1990).

Social Level

The social level addresses social support, social environment, and resources. Family life is central to the Hispanic culture, and many find that the lifestyle changes needed for diabetes

self-management are difficult to fit into their daily lives, including the diet of the Hispanic family (Early et al., 2009; Hatcher & Whittmore, 2006). The prevalence of poverty in the Hispanic community and how the lack of resources affects disease management are addressed above.

The educational strategy assessed in this project addresses the cognitive, attitudinal, instrumental, behavioral, and social levels of diabetes self-management by providing information and inviting the participants to engage in self-assessment in each of these levels.

In light of the above information regarding the socioeconomic realities within the Hispanic population, the significant burden of disease from T2D, and the evidence supporting a patient-centered approach to diabetes care, the purpose of this project was to answer the following question: Is it feasible to adapt a current University of Virginia Health System research study intervention (IRB-HSR #16293) for use in an individualized lifestyle modification program (involving self-monitoring of blood glucose to motivate and prompt behaviors, instruction on low glycemic load foods, and the importance of reduction of sedentary behaviors and increasing moderate and vigorous exercise) for a population of Hispanic persons with T2D and low health literacy skills?

Section II

Review of the Literature

The purpose of this literature review was to determine what is known about patient-centered diabetes education and examine the current evidence regarding effective lifestyle modification approaches in the treatment of T2D within the Hispanic population in the United States.

Search Strategy

The search terms *diabetes mellitus, patient or health education, and Hispanic-Americans* were combined to search for articles from 2006 to 2013 in OVID Medline, CINAHL, and the Cochrane Library. OVID Medline identified 120 titles; of those, 59 abstracts appeared relevant to the project. CINAHL yielded 55 articles and one Cochrane Review on the subject. After deleting duplicates, 68 titles remained for further review, 18 of which are included in the literature review: eight randomized controlled trials, eight observational or quasi-experimental studies, and two systematic reviews. The remaining articles did not meet inclusion criteria of the targeted population of Hispanic American non-pregnant adults and diabetes self- management educational intervention.

Culturally Tailored Interventions

The effects of culturally appropriate health educational interventions for minority populations with T2D were evaluated in a Cochrane Review by Hawthorn, Robles, Cannings-John, and Edwards (2008). This systematic review included 11 randomized controlled trials from which the authors concluded that culturally tailored educational interventions, meaning ones that took into consideration the targeted group's language, cultural and religious beliefs, and literacy skills, had a significant impact on HbA1c levels and diabetes knowledge in minority populations.

Educational programs with culturally tailored interventions such as adapting traditional foods, emphasizing social support, and acknowledging health beliefs were tested in a series of small, non-experimental studies (see Table 1, page 53). All of these educational interventions ($N = 6$) were conducted in Spanish, and four studies measured HbA1c as the primary outcome. Significant decreases in HbA1c levels were found in all studies in which this variable was measured; serum lipid levels were reported in three of the studies. In addition, improvements in knowledge scores, weight, and diet quality were achieved in several studies (Mauldon, Melkus, & Cagganello, 2006; Metghalchi et al., 2008; Salto et al., 2011).

In an integrated literature review on vulnerable populations with diabetes, Garcia and Benavidez-Vaello (2006) revealed that the use of community health workers is a frequent and effective culturally appropriate educational intervention strategy for the Hispanic population.

Community health worker interventions. The community health worker, referred to as "promotora" in the Hispanic community, has been described in the literature as someone from the community who serves as a lay educator and a bridge to the health care system and other community resources (Babamoto et al., 2009). Community health workers lead group education sessions; conduct one-on-one interventions in the home, clinic, or community center; and coordinate physical activity programs and support groups (McCloskey, 2009). Deitrick et al. (2010) reported that Hispanic patients appreciated the relationship with Spanish-speaking community health workers, whom they considered "one of them," and that they gained a sense of empowerment through being able to understand better their treatment plans and how to talk with added confidence to their medical providers.

Nine articles that reported on experimental or quasi-experimental design studies and one mixed-methods study of diabetes education interventions administered by community health

workers in the Hispanic population were included in the review (see Table 1, page 53). Of these studies, all but one resulted in lowered HbA1c levels in the intervention group. The study that was the exception (Sixta & Ostwald, 2008) had significant limitations, including a 50% attrition rate and enrollment of participants with low baseline mean HbA1c levels, leaving little to no room for further lowering of glycemic levels. The duration of the interventions ranged from 6 to 12 months, with one study reporting 2-year outcomes. Most interventions included 8 to 12 weekly group education sessions complemented with varying types of follow-up and case management (Babamoto et al., 2009; Culica, Walton, Harker, & Prezio, 2008; Lujan, Ostwald, & Ortiz, 2007; Ockene et al., 2012; Philis-Tsimikas, Fortmann, Lleva-Ocana, Walker, & Gallo, 2011; Rosal et al., 2011; Ryabov, 2011; Spencer et al., 2011). Level of improvement in glycemic control was found to be dose-related in several studies, showing an inverse relationship between level of participation and HbA1c levels (Culica et al., 2008; Philis-Tsimikas et al., 2011). That is, the greater the level of subject participation, the lower their HbA1c levels. Each study tended to include a homogenous group with particular characteristics (e.g., Mexican border community, rural Mexican farm workers, or Puerto Rican urban population); however, it is notable that the results were consistent across all groups and levels of acculturation.

Other types of interventions. Three of the interventions reviewed were specifically designed to address access to care, problems of poor class attendance, and literacy barriers. In a small study of Hispanic patients ($N = 8$) in a free clinic, a short one-on-one interaction with a nurse practitioner combined with group educational activities had a significant effect on knowledge gained and a moderate yet statistically significant effect on self-efficacy measures (Esden & Nichols, 2013). In a randomized controlled study ($N = 35$), a Hispanic sample with longstanding, poorly controlled diabetes was assigned to an intervention group ($n = 17$) that was

offered culturally tailored education sessions concurrent with visits to their providers every 3 months with measures at baseline, months 3 and 6, and at a 3-month follow-up. Compared to a control group (n = 18) that received standard care alone, the intervention group had significant decreases in HbA1c levels (Gold et al., 2008). A small feasibility study (N = 26) targeting a group of diabetic Hispanic women with low health literacy skills assessed the use of several simple, non-didactic tools for tracking diet and physical activity. These participants were instructed on the use of a simple tool for recording food intake and were given pedometers with instructions to log steps taken each day with the goal of increasing the number of daily steps. To aid in recording food intake each day, participants were given the Idaho Plate diagram, which consists of two circles, representing a lunch and dinner plate. Participants shaded the portion of the plate that they filled with vegetables at each meal. Instructions were given using models as examples of portion sizes and food choices. The authors found that the study participants were accepting of these simple tools and used the tools to record their daily intake and mobility (Coffman, Ferguson, Steinman, Talbot, & Dunbar-Jacob, 2013).

Shaw, Huebner, Armin, Orzech, and Vivian (2009) analyzed the role of culture and health literacy in the management of chronic disease, and their conclusions support the findings of this literature review: that to have a positive impact on chronic illnesses in minority populations, it is necessary that interventions be culturally appropriate and that the interventions address language and health literacy issues.

Lifestyle Modification Approaches to the Treatment of Diabetes

Researchers who developed the GEM (**G**lycemic load diet, **E**xercise, and self-blood glucose **M**onitoring) program at the University of Virginia Health System reviewed the literature published from 2010 to 2013 to identify recent trials of lifestyle modification interventions for

the management of adults with T2D (Cox et al., 2013). These researchers found that effective interventions for lowering HbA1c levels included the use of low carbohydrate or low glycemic load diets, physical activity that combined resistance training with aerobic exercise, and the use of glucose self-monitoring. However, the authors did not identify any studies that combined all three elements in a T2D self-management program. Although the low glycemic load diet has been shown to be an effective strategy to improve glycemia in people with T2D (Livesey, Taylor, Hulshof, & Howlett, 2008), an Ovid Medline search that combined the terms *diet, glycemic, glycemic load diet, glycemic index,* and *Hispanic Americans* resulted in only two studies in English. One study, a 6-week intervention using a flexible, Mexican-style diet, emphasized the use of low glycemic load foods, which resulted in lower HbA1c levels and a reduction of body mass index in the participants (Jimenez-Cruz et al., 2003). The second study focused on adolescent Hispanics and concluded that even a moderate change in diet that reduced carbohydrate intake equivalent to one can of soda and increased dietary fiber equivalent to one cup of beans had a significant impact on diabetes risk in this population (Ventura et al., 2009). A subsequent literature search that included Spanish language articles revealed a recent descriptive study completed in Chile correlating glycemic load composition of the participants' diet with their HbA1c levels. A significant positive correlation was found between the number of daily portions of high glycemic load foods consumed and HbA1c levels (Varela, Vega, & Valenzuela, 2012). Similarly, the effectiveness of using blood glucose self-monitoring to achieve improved glycemic control in non-insulin dependent diabetics has been debated extensively (Aakre, Watine, Bunting, Sandberg, & Oosterhuis, 2013; Benhalima & Chantal, 2013) although not in the context of the Hispanic population with T2D and low health literacy skills. The third component of the GEM program, physical activity, although addressed in many of the culturally

tailored interventions reviewed, has not been studied in the context of purposeful blood glucose self-monitoring in the Hispanic population with T2D.

Conclusions from the Literature Review

Clear evidence exists that culturally tailored educational interventions are effective in improving knowledge and glycemic control in Hispanic diabetic populations. Ability to adapt the traditional Hispanic diet while considering concerns related to social structures and recognizing the spiritual beliefs of the Latino community are important components of successful diabetes self-management educational interventions in this ethnic patient population. Literacy barriers have been successfully overcome by using novel, non-didactic methods such as soap opera-type audiovisuals, bingo games, and other experiential methods (Rosal et al., 2011), and simple and easy to use tools such as the Idaho Plate (Coffman et al., 2013).

Although the literature reveals consistently positive results from culturally tailored interventions in the short-term, few studies report outcomes extending more than 12 months. In addition, despite evidence correlating lower HbA1c levels with fewer complications (American Diabetes Association, 2013), no studies were identified that measured microvascular changes related to culturally tailored care. There is limited literature about the adaptability of low glycemic load diet principles and the use of blood glucose self-monitoring to guide behavior and decision-making within the Hispanic population. Therefore, the objective of this capstone project was to examine the feasibility of adapting an existing moderate literacy, self-monitoring intervention for use in an individualized lifestyle modification program that includes self-monitoring of blood glucose to motivate and prompt behaviors, instruction on low glycemic load foods, and the importance of reduction of sedentary behaviors and increasing moderate and vigorous exercise for a population of Hispanics with T2D and low health literacy skills.

Section III

Methods

The University of Virginia Health System researchers' protocol (IRB-HSR #16293), referred to as GEM, which underpins this current project, presents an individualized lifestyle modification program that is structured to be a sustainable, simple, and positive approach based on principles of active learning that include:

- self-monitoring of blood glucose to motivate and prompt behaviors,
- instruction on low glycemic load foods, and
- instruction on the importance of reducing sedentary behaviors and increasing moderate and vigorous exercise.

The GEM manual also instructs on dietary strategies, referred to as "sugar blockers," which have been found to blunt postprandial blood glucose spikes and therefore improve HbA1c levels. The use of protein, fiber, healthful fats, vinegar, and cinnamon have all been found in studies to have a mitigating effect on blood glucose when consumed either before or with a high glycemic load meal (Hlebowicz, Darwiche, Björgell, & Almér, 2007; O'Keefe, Gheewala, & O'Keefe, 2008).

Definition of Terms

Literacy. Although the term literacy refers to the ability of an individual to read and write, health literacy has been described as the ability of an individual to effectively use the health care system through a series of skills that include print literacy (the ability to use written materials), numeracy (the ability to understand and use quantitative information), and oral literacy (the ability to speak and listen effectively to verbal communication) (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011).

Culturally tailored education. Culturally tailored diabetes education refers to patient education that is adapted to meet the language and cultural needs of the targeted population. This concept is also referred to as cultural competence. Cultural competence in health care is defined as care "that meet[s] the social, cultural, and linguistic needs of patients" (Georgetown Health Policy Institute, 2004). Culturally congruent and culturally appropriate are also terms used to describe care or education that is adapted to the language, culture, and literacy level of the targeted individual or group.

Glycemic load. The glycemic load of a food is derived from its glycemic index, which is a measure of the rate at which a single 50-gm serving of a carbohydrate increases the blood glucose level compared to white bread as a standard. The glycemic load is obtained by taking the glycemic index of a usual serving of the food times its total carbohydrate divided by 100 (Bell & Sears, 2003). Foods that have the highest glycemic load include breads, rice, potatoes, and sugar.

Hispanic. For the purposes of sample selection, the Centers for Disease Control definition of Hispanic was used, which describes Hispanic or Latino as a person of Cuban, Mexican, Puerto Rican, Central American, or any other Spanish origin or culture regardless of race as defined by the Office of Management and Budget (Centers for Disease Control, 2012). The terms Hispanic, Hispanic American, and Latino are interchangeable in this paper, as found in the literature, and all refer to Hispanic persons residing in the United States. The term Mexican American is used when referring specifically to persons of Mexican origin residing in the United States.

Design

The study used a descriptive qualitative study design and phenomenological analysis and methods as described by Creswell (2013) to seek to understand the phenomenon being studied

and what it means to those who are experiencing it. This method was used in the current study to explore the perspectives of a group of Hispanic adults with low health literacy skills and T2D when presented orally in Spanish with a lifestyle self-management program adapted from the GEM intervention currently being used by a group of researchers at the University of Virginia Health System. The candidate was interested in the feedback sought through four class sessions and focus groups that could provide information regarding the feasibility of adapting the GEM intervention for diabetic education in Spanish for this population.

Description of Sample

The nature of phenomenological studies suggests a small sample size of 10 or fewer having a common experience (Patten, 2012; Polit & Beck, 2008) from which rich descriptive data are collected.

The sample included nine participants between the ages of 30 to 66 recruited from the Blue Ridge Medical Center in Nelson County in central Virginia. All participants were either diagnosed with T2D (range 1 to 7 years) or were accompanying a family member who had T2D. For the participants who had HbA1c measured within the last year (n = 6), these values ranged from 6.1 to 9.5 with a mean HbA1c of 7.03. Four participants were male and all reported being married or partnered. Most participants originated from Mexico, with the exception of two women from El Salvador. The length of time residing in the United States ranged between 1 to 30 years. Spanish was the primary language for all the group members. Four participants had no formal education, four reported 2 to 12 years of schooling, and one did not respond to the question about educational level.

Setting

Participants were recruited from a community health center in rural Virginia, specifically, Blue Ridge Medical Center (BRMC) in Nelson County, which provides primary health care to an underserved and underinsured population, including a small number of Hispanics and seasonal migrant farm workers. A total of 920 adult Hispanic or Latino patients are registered at BRMC and another 23, who do not report ethnicity, list Spanish as their primary language (Sommers, personal communication, Jan. 20, 2014). Nelson County has a total population of 15,020, with 459 of these reporting Hispanic or Latino ethnicity in the 2010 census data (U.S. Census Bureau, 2010). However, the actual number of Hispanics living in Nelson County is difficult to ascertain given that many in this population are transient and undocumented agricultural workers. The educational program was conducted at the BRMC during evening hours to accommodate working participants' schedules.

Measures

Each of the four instructional sessions and focus groups was audio recorded, and the dialogue was translated and transcribed following each session. Demographic data, including participants' age, education, gender, marital status, years of residence in the United States, primary language spoken, and nationality were collected from participants using an information sheet that was filled out at the first session following the consenting process. To direct the discussion within the focus groups, leading questions were introduced at each session based upon the content that was provided during the particular session (see Appendix B).

Procedures

Recruitment. Potential participants were identified through BRMC providers and staff, who informed Hispanic patients or those who identified Spanish as their first language about the

study. The candidate (a) made telephone calls to those who expressed interest in the study, providing more information about the study; (b) made personal visits to the migrant farm camps with the Latino outreach coordinator from BRMC to talk with those interested in learning more about the study; and (c) mailed program flyers to potential participants' homes. Interested individuals who had T2D, reported Spanish as their primary language, were 18 years of age or older, and, if female, were not pregnant were enrolled. The goal was to recruit 10 participants, which is the number supported in the literature as being optimal for data collection in a focus group setting (Patten, 2012).

Educational program. The candidate conducted four 2-hour evening education sessions over 4 weeks at the BRMC. Each session was attended by seven to nine individuals, with five participants attending all four sessions. The candidate, a native Spanish speaker, presented the contents of the GEM manual in Spanish in an interactive format at each of the sessions.

The GEM manual (Cox, Taylor, McCall, Singh, & Yancy, 2012), on which this project was based, consists of chapters that provide information on T2D and its management, self-monitoring of blood glucose and how to use the data to guide management, low glycemic load diet, and physical activity. The indexes to each chapter are shown in Appendix A. Two of the principal investigators of the GEM project served as faculty advisors for this project. The presenter used minimal handouts and prepared those that were used at a low literacy level. These materials were adapted further during the course of the 4 weeks, with words being replaced with pictures and diagrams wherever possible because several participants had no reading or writing abilities. Leading questions to elicit feedback following each focus group session were directed towards gleaning information on the cultural fit of the GEM program to the Hispanic population. These questions, in addition to more details on session content, are shown in Appendix B.

Data collection. Data were collected through the four 2-hour discussion and focus group sessions described above, each of which was recorded using digital audio recording equipment. The first session began with participants sharing how they were currently managing their T2D and each session thereafter started with a discussion about the prior week's experiences with trying out the diabetes self-management ideas that they had implemented from the previous week's session. Then the current week's topic was presented in an interactive format, which allowed for more input and comments from the group participants. Following a short break during which refreshments were served, the study coordinator facilitated the focus group discussions using leading questions such as: "What was most helpful about today's session from your perspective?" "What do you consider to be least helpful to you about the session today?" "Which suggestions for being less sedentary do you think you can include in your daily life?"

Data explication and analysis. The data were analyzed using a hermeneutical phenomenology approach to explore how a group of Hispanic adults with T2D experienced a lifestyle modification educational program (Creswall, 2013). After an initial review of the digital recording from each focus group session, the candidate translated and transcribed the participants' feedback and any germane interactions and comments from the group. Sections of the recordings that were unintelligible because multiple participants may have been speaking at the same time were omitted from the transcriptions, as were unnecessary conversational elements such as "you know," "like," and "uh" (Polit & Beck, 2008). The transcribed text from the four sessions was loaded into the NVivo software program, which was used to organize and analyze the data. The transcripts were read multiple times and codes (referred to as nodes in NVivo) were created as themes began to be identified. Meaningful segments of the verbatim data that expressed a common concept were assigned to an appropriate node. Faculty advisors reviewed

the initial coding scheme and new nodes were created as needed. The transcripts were read multiple times and new nodes created in an iterative process until data saturation was reached, i.e., no new data could be added to the nodes. During this process subcategories were created within the nodes and some nodes were clustered under overarching headings or themes. The process culminated in a narrative interpretation of the data that summarized the essence of the group's experiences with the diabetes self-management approach offered in the four weekly focus group sessions (Creswall, 2013; Polit & Beck, 2008).

Protection of Human Subjects

The protocol for this project was approved by the University of Virginia Institutional Review Board for Health Sciences Research. Participants signed a consent form that was read in Spanish to each participant. One participant witnessed his wife writing his name for him on the consent form because he was unable to do so.

All content from the session recordings was deleted from the recording devices after being downloaded to the candidate's computer and the files were password protected. No personal identifiers such as name or birth dates were included on the demographic data collection sheets or the transcribed focus group sessions. Each participant was provided a pedometer and glucometer and given a $10 cash compensation for each session attended. In addition, low glycemic load refreshments were served at each of the focus group and discussion sessions.

Section IV

Results

This project focused on answering the question "Is it feasible to adapt a current University of Virginia Health System research study intervention (IRB-HSR #16293) for use in an individualized lifestyle modification program for persons with type 2 diabetes (T2D) that includes self-monitoring of blood glucose to motivate and prompt behaviors, instruction on low glycemic load foods, and the importance of reduction of sedentary behaviors and increasing moderate and vigorous exercise for a population of Hispanics with T2D and low health literacy skills?" Nine participants over the course of four focus group sessions shared feedback that clustered around four themes: information and knowledge about T2D, motivation and barriers to changing behavior, experiences with new self-management behaviors, and personal responsibility in disease management.

Information and Knowledge

Although five of the nine participants had been living with the diagnosis of T2D for 5 years or more, all of the participants expressed a lack of information and knowledge regarding basic principles of glycemic control. This was expressed by several of the participants as exemplified in the following statements:

> One associates diabetes with sugar, that's all. But we really don't know what is diabetes or how to prevent it. Now I have more understanding.
>
> We all know about diabetes, but parts we do not know. Today I learned a lot of things. And that sheet [handout] with the [picture of the] woman and complications [of diabetes]; sometimes we have those problems but we don't know that it comes from diabetes.
>
> Some of the foods that have a very low glycemic load and strategies that can aid in

blocking an acute rise in blood sugar are, in fact, familiar and common to the Hispanic diet; however, the group participants perceived some of these foods as being "bad" for them. Examples of such foods included avocados, pork meat, and dairy products such as yogurt and whole milk. For some participants, learning that strawberries and certain other fruits were very low glycemic load foods came as a pleasant surprise. Cinnamon, reported to be a commonly used spice in the Hispanic community, is an example of a natural product that has been shown to reduce postprandial blood glucose when consumed as a 6-gm dose (approximately 2.5 teaspoons) with a high glycemic load meal.

On the other hand, some foods that are high on the glycemic load scale, such as oatmeal, corn, corn flakes, bananas, rice, and refried beans, were thought by the participants to be "good" foods to consume and they reportedly included these regularly in their meals. One participant was surprised to learn that bottled sodas such as Coke or Pepsi would raise one's blood glucose rapidly. Another knowledge gap revealed in the discussion of high glycemic load foods related to food preparation with the misconception that toasting the bread or tortilla would decrease its effect on raising blood sugar.

A new awareness of each individual's ability to take control of his or her disease emerged over the course of the 4 weeks, as evidenced by several statements about feeling empowered and motivated to use the new knowledge to make lifestyle changes. One of the young mothers made a statement during the last group session that captured the general position of those participating when she stated, "If it is in my power to lower my sugar and not take medicine, I will. With this information about food and exercise and everything [that we have been given], one has to do one's own part."

It became evident that, as participants were able to engage in blood glucose self-monitoring at home and use the knowledge they were gaining through the group discussions to interpret the results of their blood glucose testing, they began to feel empowered to make changes in the management of their T2D. Some of the participants found a new awareness of how high their blood glucose levels were and others had not realized the fluctuation in the patterns of their glucose levels or the effects of particular foods and activities on their blood glucose levels.

Motivation and Barriers to Behavior Change

Participants' lived experiences with other family members who had diabetes and the profound impact of these experiences on them came up repeatedly in the group discussions. The following quote from one participant is representative of the experiences shared by other participants as well:

> I think that . . . because I have seen diabetes very close—my Mother had diabetes [and I saw her] suffer a lot [and have] amputations. . . . I watched a neighbor be slowly consumed by the disease until he died. So when I was told I had diabetes, for me [learning my diagnosis] was worse [than it may have been without seeing my Mother and neighbor suffer]. First, [learning my diagnosis was worse for me] because I did not have information about how to manage the illness and, second, because I had seen it [diabetes] firsthand.

Witnessing the devastating effects of diabetes on friends and family emerged as a strong motivator for change. Setting a good example in an effort to prevent diabetes in one's children also was a powerful motivator for the young mothers in the group, as were the potential effects

of diabetes on fertility and their desire to have more children. One participant shared the following statement after the group had discussed reasons to focus on their own health:

> The group leader told us [to] do it [monitor blood glucose levels, exercise, and eat low glycemic foods) for your [own] health and do it for your son. I don't want my child to have this [diabetes]. I feel bad about having diabetes, having to take medications, worrying about what [to] eat . . . and sometimes get[ting] upset [because you don't want [your] child to have diabetes]. I want to do whatever I can do to . . . need less medication. We have to do our part.

The willingness to share experiences and offer support to each other was evident in the interactions among the participants. On one occasion an older participant responded to the discouragement of another participant by pointing out how much the discouraged participant had improved. The following conversation then occurred:

> **Participant 3**
>
> I stopped worrying [about my weight], I gave up. I have been very frustrated. I used to be thin. After a surgery and having diabetes I gained [weight]. It's been frustrating for me to not be able to lose [the] weight but I am resigned now [to being overweight]. How is it possible that I was . . . [thin] and now overweight?
>
> **Participant 6**
>
> You should not give up.
>
> **Participant 1**
>
> Maybe now with this information you will start losing [weight].

Participant 8

Look, you said this week your sugar was at 120. Last week you said it was in the 200s, so already [the lifestyle changes we learned] are working. That is a good example for the rest of us.

Participant 9

And you can start dancing with your sister. [Participant 3 had shared with the group about her sister's daily practice with a dance video.]

Participant 1

You can also do what the [group leader] said [about] combining the foods [carbohydrates with fat and protein] and [eating] fiber [before meals] so you are not hungry.

The value of the group setting was verbalized several times by one participant, who acknowledged that the group setting was an important source of motivation, knowledge, and support to improve his diabetes self-management behaviors.

One of the main challenges to adopting a low glycemic load diet was the unfamiliarity with or dislike for including a variety of vegetables in the participants' regular diet. Four participants shared their dislike for vegetables in general and for raw ones in particular. When participants were invited to give feedback about what they thought would be the most difficult change to implement, one participant offered:

I think the hardest thing is to get used to the change in tastes. . . . There are foods that we are not used to [eating] and may seem bland or sour, but if we start eating these daily we will get used to the taste. I think that can be the hardest thing [to change] at the beginning.

Several of the women in the group who were caring for young children at home or older housewives living in the migrant farm worker's camps shared feelings of isolation and anxiety, which they felt led them to frequent snacking. The participants who were farm workers were challenged to find the time or convenience to monitor their blood glucose levels during the workday or the energy to exercise in the evenings. The breakfast meal was problematic for some given that it is not customary in the Hispanic culture to have anything other than coffee with sweet bread, with many consuming nothing at all in the morning. One of the farm workers was used to having oatmeal with a banana for breakfast believing that was a good choice on a diabetic diet. He learned that with a little adjusting (strawberries instead of banana and smaller portion of oatmeal) he could eat a good breakfast with a lower glycemic load. In spite of the identified barriers, participants were open to finding ways to incorporate the principles of diabetes self-management that had been presented in the group discussions.

Experiences with New Self-management Behaviors

The GEM program that served as the foundation for the current study asks participants to experiment with their glucose monitoring before and after eating and before and after activities throughout the day as a way to receive immediate feedback about the effects of these on blood glucose levels and thus be able to make more informed future decisions regarding food choices and activities. The participants embraced these concepts and shared their experiences. Some had not been using blood glucose self-monitoring and gained through the education sessions a new awareness of their glycemic status and the need to monitor their blood glucose levels. During the second group session, one female participant, who had been diagnosed with T2D 5 years ago, said:

> It had been a long time since I checked it [blood glucose level]. To be honest, I didn't have a meter for more than 2 years. [Now] I [see] that [my blood glucose level] went up. In the morning [it is] lower, after eating it [goes] up and at bedtime it [blood glucose level] is even higher.

Another participant followed with the comment that, "[My readings are] . . . always high. Even in the mornings, it's always high. I [have] tried to eat better, but they [blood glucose levels] are still high."

Others were able to see the effects of certain foods on their blood glucose levels. During the last group session, participants shared how they were trying some of the strategies learned over the course of the four focus groups and discussion sessions:

> I tried eating fiber before the meal and, yes, it worked for me. I checked it [blood glucose level] before and after [eating] and it did not go up as much as it did when I ate the same thing before but without the added fiber. I had a little rice with pork chop and beans. The same [amount] that I had the other time, but I had the fiber and . . . it helped.

> I don't think I can do it [consume vinegar] but I tried eating the right foods . . . we talked about . . . and it worked. Your blood sugar [can be] normal when you eat right. I have seen it [happen].

Several participants reported seeing improvements in how they felt when they followed a low glycemic load diet. Specifically, three participants shared that they had experienced a decline in evening headaches, which had been a daily occurrence before attending the discussion sessions. Participants shared about changes in behaviors and trying new foods. Comments that reflected changes made by two participants—one a farm worker and another a stay-at-home mother—follow:

> For me, it's the Coke that I quit. I haven't had a Coke for a week now. Sometimes it's a temptation when I drive [my coworkers] on our break and I see them drinking their Cokes. [Instead] I have a glass of water and go to the truck for lunch. I also used to eat sandwiches every day; now I don't. I take a salad or some eggs or nothing.
>
> I tried having plain yogurt with some fresh strawberries for breakfast instead of bread with my coffee. I did not think I would like it, but I liked it!

After the sessions on physical activity and strategies to blunt the blood sugar spike after meals the participants shared more success stories:

> One day I checked my sugar and it was high at 150s. So after dinner I said [to myself], "You know what? I am going out for a walk." I walked and drank lots of water and it [blood glucose level] went down to 125, so that [walking] did help.
>
> I used to come home and lay down after eating [dinner]. Not anymore. When I finish having dinner, I talk [on the phone] to my wife in Mexico, but now I walk as I talk instead of lying down.
>
> I have learned to eat better—what I should eat and what I should not eat. I have set goals. In addition to walking at work . . . I see that I do walk a lot on my job [wore pedometer provided in the study]. . . . in the evening when I get home I shower, I eat something, and then instead of laying down to watch TV I go to the gym at least a little while. Not [every day] but at least 3 to 4 times a week I try to do that [go to the gym].

Personal Responsibility for Disease Management

The information delivered in the group sessions emphasized the importance of empowerment and self-determination, reinforcing the idea that T2D is a disease that has symptoms that can best be managed by individuals themselves, and not primarily by medical

providers. This message seemed to resonate with the participants, and the idea of "doing your part" came up repeatedly in the group sessions. Stories were shared about friends or family members who either refused to take care of themselves or perhaps did not have access to the information needed to take control of their diabetes, thus leading to poor outcomes. The following interaction summarizes several participants' feelings about the importance of taking responsibility for one's own health:

Particpant 7

[For] some people you can explain it all but they still say, "No" [to making the lifestyle changes needed to manage diabetes].

Participant 6

The thing about these talks and the way one responds is that each person will [make changes] depending on whether they want to do it . . . or . . . whether they are interested or not.

Participant 5

It is the willpower of each person [that will determine whether she/he makes changes or not].

The foregoing section includes solid descriptions of feedback from the sample members and offers an abundance of strong descriptive excerpts to portray the contextualized information in support of the thematic analysis. The study findings show that many factors influenced the self-management of disease in this sample of Hispanic adults with T2D living in rural central Virginia. An in-depth understanding of the targeted population's perspective is necessary in preparing a culturally appropriate educational program for future use.

Section V

Discussion

The information covered in the five chapters of the GEM manual used in the University of Virginia Health System study, which provided the content delivered orally in Spanish in the four group sessions, addressed all the areas identified in the patient-centered model of diabetes self-management assessment and intervention that was used as a framework for this project. The concepts of choosing lower glycemic index foods, dietary strategies to blunt postprandial glucose spikes, monitoring blood glucose levels, and using physical activity to help achieve glycemic goals were successfully presented to a group of Hispanic individuals with T2D. The content was understood and well received, as evidenced by the willingness of the participants to try new behaviors and report their experiences and successes during the focus group sessions. The candidate found that feedback from participants could be organized easily into the categories of cognitive, attitudinal, behavioral, instrumental, and social levels of assessment and intervention as identified in the framework used for this study.

The GEM manual provided content that reinforced aspects of the Hispanic diet and guided the adaptation of the diet where needed. For example, fresh fruits are familiar to the Hispanic population, and participants were able to substitute lower glycemic load fruits for those fruits with a higher glycemic load. By encouraging the more liberal use of proteins such as meats and dairy and adding good fats such as avocado and olive oil, which are a significant part of the Hispanic diet, it appeared easier for the participants to accept the need for decreased use of commonly used starches and carbohydrates (tortillas, rice, and potatoes).

The findings in this study confirm those of Jimenez–Cruz et al. (2003), that is, the Mexican-style diet can be modified to a lower glycemic load diet that is acceptable to this

population. Several of the strategies, such as using fiber, fats, vinegar, and cinnamon as sugar blockers, which were presented in the GEM manual for mitigating the postprandial rise in blood glucose, were well received as a way to consume small amounts of the familiar and common high glycemic load foods (rice and tortillas) prevalent in this culture. The participants' new awareness of their blood glucose levels and the changing patterns over the course of a day was effective in motivating reported behavioral change during the 4-week project period.

The devastating effects of T2D on the health of friends and family members of the majority of participants served as a motivator for change. The empowering message that individuals have a great deal of control over the outcomes of diabetes, even more than that of their health care providers, resonated with the group. The participants were eager to take on the challenge of lifestyle modification with the hope of not only normalizing their own blood glucose levels but also preventing diabetes in their children.

Using illustrations of low glycemic load foods and sugar blocking strategies, participants of varying literacy levels were able to learn the skills needed for adopting the GEM manual recommendations. Demonstrations of use of the glucometer and the low glycemic load foods provided for refreshments reinforced the discussions. It was apparent that some of the GEM manual tools, such as logs, journals, written descriptions of exercises, and complex data tables, would not be useful to many of the participants with low to no health literacy skills.

The literature describes the importance of the social context of a Hispanic person's life. In the current project, the family emerged in two ways as a strong influence for change. One influence was the participants' experiences in witnessing the complications of unmanaged diabetes in family members. The second, particularly for the females in the group, was the more positive aspect of wanting a better life and health for their children and improving their own

fertility and future pregnancy outcomes.

Quality Enhancement Strategies Used to Ensure Methodology Rigor

The candidate brought to this qualitative project not only her experiences growing up in a Spanish-speaking country (Argentina) but also a 29-year history of working with diverse Hispanic populations in Chicago, including many patients over the years diagnosed with T2D. In the 12 years prior to beginning this project, the candidate worked as a family nurse practitioner providing primary care in a variety of settings, which afforded her multiple opportunities to learn patient teaching strategies that could potentially work with a broad spectrum of patients seen in both urban and rural primary care settings. These earlier experiences gave her a 'real world view' or perspective on the importance of persistent observation within the project's group setting and waiting for responses from group members before moving the topic of discussion forward. Prior relevant experiences also provided the candidate with opportunities to draw upon her flexibility, can-do attitude, and her creativity skills early in the class sessions when she began to realize that word charts and graphs, despite simplicity, were not educational tools she could use with her project sample, thus leading her to use color pictures of foods and drinks and to rank order glycemic load foods from those that are high to those that are low.

Given the candidate's background and knowledge of the Spanish culture, she was particularly sensitive to ways she could gather the information needed to answer the project questions without disrupting the natural setting of the class sessions and/or the focus group discussions. In other words, she kept her cultural sensitivity in the forefront and was knowledgeable of 'herself' and any biases that could potentially influence her world view. Member checking was accomplished, in part, by reviewing with the group members the previous week's focus group feedback to ensure that what she had understood from their discussion was

indeed what information the group members had intended to convey. Credibility was also enhanced through working closely with her capstone committee chair, meeting with her every week to review progress, the transcripts, and key themes that were emerging. A second capstone committee member also met with the candidate on one occasion to support the credibility of the information being gathered. The candidate took all of this into consideration when working with the study sample and interpreting the findings keeping these as close to the real world situation as possible.

Other Strengths and Weaknesses

A major strength of this project is that it provided direct feedback from the targeted population regarding the feasibility and appropriateness of the educational program, which had the goal of providing culturally relevant information to Hispanic persons with T2D and low health literacy skills. The data gleaned through the 4-week project have high credibility given that the participants were reporting their own impressions and experiences (Shi, 2008) and that this strategy allowed for information to be obtained from those who may not be able to respond to a written survey because of their low literacy skills (Wood & Ross-Kerr, 2006). Also, a design strength of the project is that it was anchored in a comprehensive framework that guided the data collection and data explication.

Although quality enhancement strategies were in place throughout the project, some readers may identify as limitations the potential for biases related to participant self-selection into the project and the fact that the Spanish-speaking presenter of the educational component also served as facilitator of the focus group discussions. The latter point may have posed a challenge for the participants to be completely honest in their feedback because of their desire to be polite and please the presenter. In addition, the participants had a lower level of literacy skills

than anticipated, which provided several challenges. First, challenges were experienced in presenting the GEM manual content in its original format with the many charts, graphs, logs, and journals and, second, in the use of the focus group method of data collection. These two factors may have limited the amount and quality of the data available for analysis. However, given that the intent of the project was to assess the feasibility of the educational program within the context of the Hispanic population, the findings lay the groundwork for further development and testing of the GEM program in other groups of Hispanic adults with T2D and low health literacy.

Conclusions and Nursing Practice Implications

Advanced practice nurses have a major role in health promotion and disease prevention and are well prepared to take a leading role in the primary and secondary prevention of chronic diseases such as T2D. With the implementation of the Affordable Care Act will come an increased number of underserved patients accessing care (Rosenbaum, 2011), many of whom will require management of T2D. Agencies and organizations must find evidence-based and cost-effective strategies to meet this demand. The Affordable Care Act includes provisions for funding research and initiatives to promote evidence-based preventative interventions and establishes incentives for Medicare and Medicaid beneficiaries to participate in behavior modification programs. Funding opportunities, including those focused toward pragmatic research studies to address prevention, decrease chronic disease rates, and decrease health disparities in rural and frontier areas, make 2014 a propitious time for nurses to become more involved in bringing evidence- based strategies to the clinical sites where they practice (The Henry J. Kaiser Family Foundation, 2013).

The patient-centered principles of culturally competent care should guide practitioners in caring for Hispanic patients with T2D and those practitioners involved in program planning

regarding diabetes management in the Hispanic community. This involves addressing the language, access, and literacy barriers to diabetes self-management education within the Hispanic population. This project offers a T2D self-management tool that is sustainable, patient-centered, and congruent with the culture, customs, and language of the Hispanic population. In settings with limited resources that provide care for vulnerable populations, it is often the nurse practitioner or other primary care provider who has the responsibility to provide the patient education and to foster motivation for patients to make lifestyle modification changes. It is known that diet and physical activity are the cornerstones to reversing hyperglycemia and avoiding microvascular complications. Yet, the statistics on diabetes morbidity and mortality suggest that dietary and physical activity lifestyle changes are difficult to adopt and that conventional diabetes education has largely failed. In 2010, diabetes was the seventh leading cause of death in the United States and led to 73,000 limb amputations in persons over the age of 20 (Centers for Disease Control, 2014). The information obtained in this current project may help in the development of tools and strategies that are simple, easily applied in the daily lives of Hispanic adults with T2D, and sustainable over time. This work lays the foundation for further research and for creating tools that can be made available to community health workers, primary care providers, nurses, and diabetes educators, with the goal of empowering Hispanic adults with T2D to improve their health outcomes. The project also confirms the need for creating materials such as picture-based handouts and video resources that effectively communicate the principles of low glycemic load diet, physical activity, and purposeful blood glucose monitoring for use with a low literacy Spanish-speaking population. In addition, lessons learned from this project can be transferred easily to other chronic disease populations identified as having low health-related literacy skills.

Implementation of culturally tailored educational programs in the patient care setting is also a step towards improving the quality of care for a population that can feel discriminated against because of their language, color, or socio-economic status. By attending to the cultural differences in our patients and creating an environment of equality and respect, we are contributing to the slow work of breaking down the prejudices that still affect minorities throughout the health care system; not only among patients but also health care providers, non-professional staff, and students in all fields of health care who are receiving training in our institutions.

References

Aakre, K. M., Watine, J. P., Bunting, S., Sandberg, S., & Oosterhuis, W. P. (2012). Self-monitoring of blood glucose in patients with diabetes who do not use insulin—are guidelines evidence-based? *Diabetic Medicine, 29*, 1226–1236.

American Diabetes Association. (2013). Economic costs of diabetes in the U.S. in 2012. *Diabetes Care, 36,*1033-1046.

American Diabetes Association. (2013). Standards of medical care in diabetes—2013. *Diabetes Care, 36*(Suppl 1), S11-S66.

Anderson, R. M., & Funnell, M. M. (2000). Compliance and adherence are dysfunctional concepts in diabetes care. *The Diabetes Educator, 26*(4), 597-604.

Anderson, R. M., & Funnell, M. M. (2005). Patient empowerment: Reflections on the challenge of fostering the adoption of a new paradigm. *Patient Education and Counseling, 57,*153-157.

Babamoto, K. S., Sey, K. A., Camilleri, A. J., Karlan, V. J., Catalasan, J., & Morisky, D. E. (2009). Improving diabetes care and health measures among Hispanics using community health workers: Results from a randomized controlled trial. *Health Education & Behavior, 36*(1), 113-126. doi:10.1177/1090198108325911

Bell, S. J., & Sears, B. (2003). A proposal for a new national diet: A low-glycemic load diet with a unique macronutrient composition. *Metabolic Syndrome & Related Disorders, 1*(3), 199-208.

Benhalima, K., & Chantal, M. (2012). The role of blood glucose monitoring in non-insulin treated type 2 diabetes: What is the evidence? *Primary Care Diabetes* (6), 179-185.

Berkman, N. D., Sheridan, S. J., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine, 155*(2), 97-107.

Carbone, E. T., Rosal, M. C., Torres, M. I., Goins, K. V., & Bermudez, O. I. (2007). Diabetes self-management: Perspectives of Latino patients and their health care providers. *Patient Education & Counseling, 66*(2), 202-210.

Centers for Disease Control and Prevention. (2011). *National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the United States, 2011*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention. (2012). Characteristics associated with poor glycemic control among adults with self-reported diagnosed diabetes—National Health and Nutrition Examination Survey, United States, 2007-2010. *Morbidity and Mortality Weekly Report,* 61, 32-37. Retrieved from http://www.cdc.gov/mmWr/pdf/other/su6102.pdf#page=34

Centers for Disease Control and Prevention. (2012). *Minority health*. Retrieved from www.cdc.gov/minorityhealth/populations/REMP/definitions.html#HL

Centers for Disease Control and Prevention. (2014). *National diabetes statistics report, 2014.* Retrieved from http://www.cdc.gov

Centers for Disease Control and Prevention. (2014). *National diabetes statistics report: Estimates of diabetes and its burden in the United States, 2014.* Atlanta, GA: U.S. Department of Health and Human Services.

Coffman, M. J., Ferguson, B. L., Steinman, L., Talbot, L. A., & Dunbar-Jacob, J. (2013). A health education pilot for Latina women with diabetes. *Clinical Nursing Research, 22*(1), 70-81. doi:10.1177/1054773812451746

Cox, D. J., Singh, H., McCall, A., Taylor, A. G., & Yancy, W. S. (2012). *Glycemic load, exercise & monitoring blood glucose* (*GEM): Healthy lifestyle management of T2DM* (Manual used for study). University of Virginia, Charlottesville, VA.

Cox, D. J., Taylor, A. G., Dunning, E. S., Winston, M. C., Luk Van, I .L., McCall, A., … Yancy, W. S., Jr. (2013). Impact of behavioral interventions in the management of adults with type 2 diabetes mellitus. *Current Diabetes Report, 13*(6), 860-868. doi:10.1007/s11892-013-0423-7

Creswell, J. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage.

Culica, D., Walton, J. W., Harker, K., & Prezio, E. A. (2008). Effectiveness of a community health worker as sole diabetes educator: Comparison of CoDE with similar culturally appropriate interventions. *Journal of Health Care for the Poor & Underserved, 19*(4), 1076-1095.

Davis, R. E., Peterson, K. E., Rothschild, S. K., & Resnicow, K. (2011). Pushing the envelope for cultural appropriateness: Does evidence support cultural tailoring in type 2 diabetes interventions for Mexican American adults? *Diabetes Educator, 37*(2), 227-238.

Deitrick, L. M., Paxton, H. D., Rivera, A., Gertner, E. J., Biery, N., Letcher, A. S., . . . Salas-Lopez, D. (2010). Understanding the role of the promotora in a Latino diabetes education program. *Qualitative Health Research, 20*(3), 386-399.

Delahante, L. M., & McCulloch, D. K. (2014). Nutritional considerations in type 2 diabetes mellitus. *UpToDate.* Retrieved from http://www.uptodate.com

Devlin, H., Roberts, M., Okaya, A., & Xiong, Y. M. (2006). Our lives were healthier before: Focus groups with African American, American Indian, Hispanic/Latino, and Hmong people with diabetes. *Health Promotion Practice, 7*(1), 47-55.

Early, K. B., Shultz, J. A., & Corbett, C. (2009). Assessing diabetes dietary goals and self-management based on in-depth interviews with Latino and Caucasian clients with type 2 diabetes. *Journal of Transcultural Nursing, 20*(4), 371-381. doi:10.1177/1043659609334928

Esden, J. L., & Nichols, M. R. (2013). Patient-centered group diabetes care: A practice innovation. *Nurse Practitioner, 38*(4), 42-48.

Garcia, A. A., & Benavides-Vaello, S. (2006). Vulnerable populations with diabetes mellitus. *Nursing Clinics of North America, 41,* 605-623.

Georgetown Health Policy Institute. (2004*). Cultural competence in health care: Is it important for people with chronic conditions?* Retrieved from http://hpi.georgetown.edu/agingsociety/pubhtml/cultural/cultural.html

Gold, R., Yu, K., Liang, L. J., Adler, F., Balingit, P., Luc, P., . . . Modilevsky, T. (2008). Synchronous provider visit and self-management education improves glycemic control in Hispanic patients with long-standing type 2 diabetes. *Diabetes Educator, 34*(6), 990-995. doi:10.1177/0145721708323744

Grueninger, U. J., Goldstein, M. G., & Duffy, D. (1990). A conceptual framework for interactive patient education in practice and clinic settings. *Journal of Human Hypertension, 4*(Suppl. 1), 21-31.

Hatcher, E., & Whittemore, R. (2007). Hispanic adults' beliefs about type 2 diabetes: Clinical implications. *Journal of the American Academy of Nurse Practitioners, 19*(10), 536-545.

Hawthorne, K., Robles, Y., Cannings-John, R., & Edwards, A. G. K. (2008). Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups. *Cochrane Database of Systematic Reviews Issue 3*, Art. No.: CD006424. doi:10.1002/14651858.CD006424.pub2

Heuer, L., & Lausch, C. (2006). Living with diabetes: Perceptions of Hispanic migrant farmworkers. *Journal of Community Health Nursing, 23*(1), 49-64.

Hlebowicz, J., Darwiche, G., Björgell, O., & Almér, L.-O. (2007). Effect of cinnamon on postprandial blood glucose, gastric emptying, and satiety in healthy subjects. *American Journal of Clinical Nutrition.* 85, 1552– 1556.

Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century.* Washington, DC: The National Academies Press.

Jimenez-Cruz, A., Bacardi-Gascon, M., Turnbull, W., Rosales-Garay, P., & Severino-Lugo, I. (2003). A flexible, low-glycemic index, Mexican-style diet in overweight and obese subjects with type 2 diabetes improves metabolic parameters during a 6-week treatment period. *Diabetes Care, 26,* 1967-1970. doi:10.2337/diacare.26.7.1967

Jones, D. S., Hofmann, L., & Quinn, S. (2010). *21st century medicine: A new model for medical education and practice*. Gig Harbor, WA: The Institute for Functional Medicine.

Kirk, J. K., Passmore, L. V., Bell, R. A., Narayan, K. M., D'Agostino, R., Arcury, T. A., & Quandt, S. A. (2008). Disparities in A1C levels between Hispanic and non-Hispanic white adults with diabetes: A meta-analysis. *Diabetes Care, 31*(2), 240-246.

Kochhar, R., Fry, R., & Taylor, P. (2011). *Wealth gaps rise to record highs between Whites, Blacks and Hispanics.* Pew Research Center. Retrieved from http://www.pewsocialtrends.org

Kutner, M., Greenberg, E., Jin, Y., & Paulsen, C. (2006). *The Health Literacy of America's Adults: Results From the 2003 National Assessment of Adult Literacy* (NCES 2006–483). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Livesey, G., Taylor, R., Hulshof, T., & Howlett, J. (2008). Glycemic response and health—a systematic review and meta-analysis: Relations between dietary glycemic properties and health outcomes. *American Journal of Clinical Nutrition, 87*(suppl), 258S-268S.

Lujan, J., Ostwalk, S. K., & Ortiz, M. (2007). Promotora diabetes intervention for Mexican Americans. *The Diabetes Educator, 33*(4), 660-670.

Lynch, E. B., Fernandez, A., Lighthouse, N., Mendenhall, E., & Jacobs, E. (2012). Concepts of diabetes self-management in Mexican American and African American low-income patients with diabetes. *Health Education Research, 27*(5), 814-824.

Mauldon, M., Melkus, G. D., & Cagganello, M. (2006). Tomando control: A culturally appropriate diabetes education program for Spanish-speaking individuals with type 2 diabetes mellitus—evaluation of a pilot project. *Diabetes Educator, 32*(5), 751-760.

McCloskey, J. (2009). Promotores as partners in a community-based diabetes intervention program targeting Hispanics. *Family & Community Health, 32*(1), 48-57.

McEwen, M. M., Baird, M., Pasvogel, A., & Gallegos, G. (2007). Health-illness transition experiences among Mexican immigrant women with diabetes. *Family & Community Health, 30*(3), 201-212.

Metghalchi, S., Rivera, M., Beeson, L., Firek, A., De Leon, M., Balcazar, H., & Cordero-MacIntyre, Z. R. (2008). Improved clinical outcomes using a culturally sensitive diabetes education program in a Hispanic population. *Diabetes Educator, 34*(4), 698-706.

Ockene, I. S., Tellez, T. L., Rosal, M. C., Reed, G. W., Mordes, J., Merriam, P. A., . . . Ma, Y. (2012). Outcomes of a Latino community-based intervention for the prevention of diabetes: The Lawrence Latino Diabetes Prevention Project. *American Journal of Public Health, 102*(2), 336-342. doi:10.2105/AJPH.2011.300357

O'Keefe, L. H., Gheewala, N. M., & O'Keefe, J. O. (2008). Dietary strategies for improving post-prandial glucose, lipids, inflammation, and cardiovascular health. *Journal of the American College of Cardiology, 51*(3), 249-255.

Passel, J., & Cohn, D. (2008). *U.S. population projections, 2005-2050*. Pew Research Center. Retrieved from http://www.pewhispanic.org/2008/02/11/us-population-projections-2005-2050/

Patten, M. (2012). *Understanding research methods: An overview of the essentials*. Glendale, CA: Pyrczak.

Philis-Tsimikas, A., Fortmann, A., Lleva-Ocana, L., Walker, C., & Gallo, L. C. (2011). Peer-led diabetes education programs in high-risk Mexican Americans improve glycemic control compared with standard approaches: A Project Dulce promotora randomized trial. *Diabetes Care, 34*(9), 1926-1931. doi:10.2337/dc10-2081

Polit, D., & Beck, C. (2008). *Nursing research: Generating and assessing evidence for nursing practice.* Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins.

Ramal, E., Petersen, A. B., Ingram, K. M., & Champlin, A. M. (2012). Factors that influence diabetes self-management in Hispanics living in low socioeconomic neighborhoods in

San Bernardino, California. *Journal of Immigrant and Minority Health, 14*(6), 1090-1096. doi:10.1007/s10903-012-9601-y

Rosal, M. C., Ockene, I. S., Restrepo, A., White, M. J., Borg, A., Olendzki, B., . . . Reed, G. (2011). Randomized trial of a literacy-sensitive, culturally tailored diabetes self-management intervention for low-income Latinos: Latinos en control. *Diabetes Care, 34*(4), 838-844.

Rosenbaum, S. (2011). The Patient Protection and Affordable Care Act: Implications for Public Health Policy and Practice. *Public Health Report, 126*(1), 130–135.

Ryabov, I. (2011). The impact of community health workers on behavioral outcomes and glycemic control of diabetes patients on the U.S.-Mexico border. *International Quarterly of Community Health Education, 31*(4), 387-399. doi:10.2190/IQ.31.4.f

Sadowski, D., Devlin, M., & Hussain, A. (2012). Diabetes self-management activities for Latinos living in non-metropolitan rural communities: A snapshot of an underserved rural state. *Journal of Immigrant and Minority Health, 14*(6), 990-998. doi:10.1007/s10903-012-9602-x

Salto, L. M., Cordero-MacIntyre, Z., Beeson, L., Schulz, E., Firek, A., & De Leon, M. (2011). En Balance participants decrease dietary fat and cholesterol intake as part of a culturally sensitive Hispanic diabetes education program. *Diabetes Educator, 37*(2), 239-253.

Schiller, J. S., Lucas J. W., Ward, B. W., & Peregoy, J. A. (2012). Summary health statistics for U.S. adults: National Health Interview Survey, 2010. National Center for Health Statistics. *Vital and Health Statistics, 10*(252), 1-207.

Shaw, S. J., Huebner, C., Armin, J., Orzech, K., & Vivian, J. (2009). The role of culture in health literacy and chronic disease screening and management. *Journal of Immigrant and Minority Health, 11*, 460-467.

Shi, L. (2008). *Health services research methods* (2nd ed.). Clifton Park, NY: Delmar Cengage Learning.

Sixta, C. S., & Ostwald, S. (2008). Texas-Mexico border intervention by promotores for patients with type 2 diabetes. *Diabetes Educator, 34*(2), 299-309.

Spencer, M. S., Rosland, A. M., Kieffer, E. C., Sinco, B. R., Valerio, M., Palmisano, G., . . . Heisler, M. (2011). Effectiveness of a community health worker intervention among African American and Latino adults with type 2 diabetes: A randomized controlled trial. *American Journal of Public Health, 101*(12), 2253-2260.

Sullivan, L. V., Hicks, P., Salazar, G., & Robinson, C. K. (2010). Patient beliefs and sense of control among Spanish-speaking patients with diabetes in northeast Colorado. *Journal of Immigrant and Minority Health, 12*(3), 384-389.

The Henry J. Kaiser Family Foundation. (2013). *Summary of the Affordable Care Act*. Retrieved from http://www.kff.org

U.S. Census Bureau. (2010). *Profile of General Population and Housing Characteristics: 2010.* Retrieved from http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

U.S. Census Bureau. (2011). *The Hispanic population: 2010*. Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-04.pdf

U.S. Department of Health and Human Services. (2001*). National standards for culturally and linguistically appropriate services in health care.* Office of Minority Health, U.S.

Department of Health and Human Services. Retrieved from http://www.minorityhealth.hhs.gov/assets/pdf/checked/finalreport.pdf

Varela, N., Vega, C., & Valenzuela, K. (2012). Relación del consumo de alimentos de alto índice glicémico en la dieta y los niveles de HbA1c en individuos Diabéticos Tipo 2 en tratamiento con dieta y/o Metformina [Relationship of consumption of high glycemic index food in the diet and levels of HbA1c in type 2 diabetic patients treated with diet and/or Metformin]. *Archivos Latinoamericanos de Nutrición ,62*(1), 23-29.

Ventura, E., Davis, J., Byrd-Williams, C., Alexander, K., McClain, A., Lane, C. J., . . . Goran, M. (2009). Reduction in risk factors for type 2 diabetes mellitus in response to a low-sugar, high-fiber dietary intervention in overweight Latino adolescents. *Archives of Pediatrics & Adolescent Medicine, 163*(4), 320-327. doi:10.1001/archpediatrics.2009.11

Whittemore, R. (2006). Behavioral interventions for diabetes self-management. *Nursing Clinics of North America 41*, 641–654.

Whittemore, R. (2007). Culturally competent interventions for Hispanic adults with type 2 diabetes: A systematic review. *Journal of Transcultural Nursing, 18*(2), 157-166.

Wood, M. J., & Ross-Ker, J. C. (2006). *Basic steps in planning nursing research: From question to proposal* (6th ed.). Sudbury, MA: Jones and Bartlett.U.S.

Table 1. Lifestyle modification education targeting Hispanic populations

Author & Year	Journal	Purpose	Outcome Variables	Design Framework	Sample	Methods	Limitations	Findings
CHW interventions								
Babamoto et al., 2009	*Health Education and Behavior*	Evaluate the effectiveness of a CHW-delivered intervention for Hispanics with diabetes	HbA1c BMI	RCT Transtheoretical Model	*N* = 189 Hispanic or Latino by self-report from family health centers in inner city Los Angeles	Randomized to CHW (10-week education sessions, follow-up calls); case management (seen monthly in clinic, calls as needed) or standard of care; Duration: 6 months	Physicians not blinded in standard care group; self-reported data on health status and ED visits	Mean HbA1c decreased in both intervention groups; significant difference between groups for health status, ED visits, fruit, and vegetable intake, and diabetes knowledge
Culica et al., 2008	*Journal of Health Care for the Poor and Underserved*	Evaluate the feasibility of a Community Diabetes Education Program (CoDE) with CHW as sole educator	HBA1c	Quasi-experimental design	*N* = 55 Predominantly Mexican clinic patients with diabetes in Dallas	Pre and post design; intervention: 60-min sessions x3 and quarterly assessment and case management by trained CHWs Duration: 1 year	Small, non-randomized or controlled study	Full participators had significant decrease in HbA1c at 6months and 12 months; partial participators had decrease only at 12 months ($p < .05$); doseresponse noted; low cost, low intensity program
Lujan et al., 2007	*The Diabetes Educator*	Evaluate the effect of a CHW-led intervention for Hispanic patients with T2D	HbA1c Diabetes know-ledge and beliefs	RCT Community empowerment theory	*N* = 150 Hispanic diabetes patients from faith-based clinic on Texas-Mexico border	CHWs led 8 weekly 2-hour education sessions with phone follow-up; faith-based health behavior cards were developed by patients and staff and sent to participants Duration: 6 months	Limited generalizability because of specific border population	Significant decreases in HbA1c and increased knowledge at 6 months
McEwen et al., 2007	*Family and Community Health*	Explore the effect of a culturally tailored CHW education intervention on the health-illness transition of Mexican immigrant women with T2D	Diabetic know-ledge Social support Self-efficacy Health-related behaviors	Mixed-method, observational Transition theory	*N* = 15 adult Mexican immigrant women	Monthly group presentations/discussions and 4 home visits by CHW Duration: 6 months	Small sample All female subjects	Significant improvement in diabetic knowledge, self-efficacy, and psychosocial and health-related behavior (p = <0.001)
Ockene et al., 2012	*American Journal of Public Health*	Test a culturally tailored lifestyle modification intervention for diabetes prevention in a high risk Latino population (LLDPP)	HbA1c Weight loss	RCT Social Cognitive Theory	*N* = 312 Latinos at risk for diabetes recruited primarily from Greater Lawrence Family Health Center and other community practices	Group and individual education sessions, goal setting, physical activity, diabetes prevention delivered by Spanish-speaking trained community members Duration: 1 year	Prevention intervention too short to measure diabetes incidence as outcome	Improved insulin resistance and HbA1c (p = .009), modest weight loss (p = .004)

Author & Year	Journal	Purpose	Outcome Variables	Design Framework	Sample	Methods	Limitations	Findings
Rosal et al., 2011	*Diabetes Care*	Study the effect of a theory-based culturally tailored self-management intervention for T2D on glycemic control in a Latino population	HbA1c, diet, physical acativity, self-monitoring of blood glucose, knowledge, and self-efficacy, lipids, weight as secondary	RCT Social Cognitive Theory	*N* = 252 Puerto Ricans recruited from 5 medical centers	12 weekly and 8 monthly sessions Lay trained workers with either a nutritionist or investigator supervising; culturally tailored program, bingo games, soap opera-type audiovisuals, other experiential and non-didactic methods; unannounced 24-hour diet recalls by phone; taught participants to respond appropriately to blood glucose measures	Self-reported data Specific to Puerto Rican population	Significant intervention effect on HbA1c at 4 months but not at 12 Decrease in glucose variability; increase in self-monitoring of blood glucose and diet quality
Ryabov, 2011	*Applied Research and Evaluation*	Study impact of CHW on self-management practices of Hispanics on border	HbA1c and BMI Diabetes knowledge, self-efficacy, diabetes self-manage-ment score	RCT Community-based participatory research Self-efficacy models	*N* = 30 Hispanic diabetics recruited form community health centers on the Mexico border	Monthly visits by trained CHWs Duration: 2 years	Small and generalizable only to border area communities	Significant effect on HbA1c, self- management, and knowledge scores
Sixta & Ostwald, 2008	*The Diabetic Educator*	Evaluate the impact of a CHW-led diabetes self-management program compared to wait list controls	HbA1c, diabetes knowledge, and health beliefs	RCT	*N* = 131 Recruited from Texas-Mexico border community clinic	10 weekly classes led by trained and supervised CHWs Duration: 6 months	Small study Only 50% completed intervention	Significant increase in knowledge No change in HbA1c (baseline low at 7.33) No change in health beliefs
Spencer et al., 2010	*American Journal of Public Health*	Test the effectiveness of a CHW intervention that is culturally tailored on the glycemic control of Hispanic and African American groups of patients	HbA1c	RCT Empowerment framework (self-determination and autonomy) with community participatory research principles	*N* = 164 Latinos and African Americans in Detroit with diabetes	CHW conducted 11 classes and 2 home visits and visited provider with patient once CHW received 80 hours training Duration: 6 months	Small sample size Self-reported behavioral data	Significant improvement in HbA1c levels in intervention group Self-reported improvement in diabetes understanding
Philis-Tsimikas et al., 2011	*Diabetes Care*	Evaluate effects of peer-led education on glycemic control of Mexican American patients with T2D (Projecto Dulce)	HbA1c	RCT	*N* = 207 Mexican Americans form San Diego community clinics	CHW delivered 8 weekly 2-hour classes and monthly support groups; measures taken at baseline and at 4 and 10 months	25% attrition	Significant improvement in HbA1c, serum lipids More classes attended correlated with greater HbA1c reduction

Author & Year	Journal	Purpose	Outcome Variables	Design Framework	Sample	Methods	Limitations	Findings
Other culturally tailored interventions								
Coffman et al., 2013	*Clinical Nursing Research*	Pilot study of diet and physical activity education tools for Latina women with T2D and low literacy skills	Qualitative data	Observational study Situated Learning Theory	*N* = 27 Low literacy Latinas with T2D	Group class regarding diet using Idaho Plate Method; exercise instruction and pedometer use; returned in 1 week with logs and for focus group	Short intervention time (1 week); unable to measure outcomes; no baseline information on diet or exercise levels	Educational tools (Idaho Plate and pedometer with log) were well received and easily used by women with low literacy
Esden, 2013	*The Nurse Practitioner*	Implement and evaluate group visit/education program for patients with T2D in a free clinic setting	Knowledge, self-efficacy	Observational study Centering Model	*N* = 8	Group visit included short one-on-one with NP, group interactive activities, and educational presentations monthly x 3	Small sample	Intervention had significant effect on knowledge; moderate but significant effect of measure of self-efficacy
Metgalchi et al., 2008	*Diabetes Education* (NIH funded)	Evaluate the effects of a culturally sensitive diabetes education program for Hispanics with T2D	FBS, HbA1c, lipids, body composition	Prospective cohort study	*N* = 34 Spanish-speaking T2D	Assessments at baseline and 3 months; educationalintervention weekly by native Spanish speakers	Non-experimental design; poor generalizability	Significant decreases in fasting blood sugar, HbA1c, weight, total fat, hip-waist ratio, cholesterol/HDL ratio
Gold et al., 2008	*The Diabetes Educator*	Establish if synchronizing diabetes self-management education with provider visits improves glycemic control in Hispanic patients with longstanding poorly controlled T2D	HbA1c	Improved HbA1c correlates with decreased complications	*N* = 35	Culturally tailored, Spanish language education offered concurrently with provider visits every 3 months Duration: 6 months	Small size, non-randomized, short duration	Significant (< .001) decrease in HbA1c in intervention group
Mauldon et al., 2006	*The Diabetes Educator*	Test feasibility, acceptability, and efficacy of culturally appropriate Spanish self-care education intervention for T2D	HbA1c, BMI, lipids, knowledge, acculturation measures, psychosocial measure	Pilot study, mixed-methods, pre- and post-test	*N* = 16	6 weekly 3-hour classes; culturally appropriate: language, foods, beliefs, social emphasis Duration : 6 months	Convenience sample; small, non-controlled pilot study	Good outcomes as far as feasibility and acceptance Improved knowledge scores, lipid profiles, and HbA1c (p = .001)
Salto et al., 2011	*The Diabetes Educator*	Study effects of En Balance program on dietary intake habits on Mexican Americans with T2D	Food intake, glycemic control, serum lipidspids		*N* = 39 Hispanic adults with T2D	Baseline and 3-month data: labs, anthropomorphic measures; culturally tailored education, transportation, evenings and Sundays, free glucometers, adapting traditional foods	Self-reported data, small size, convenience sample	Significant improvements in HbA1c (p = .008), insulin(p = .05), and all serum lipids No change in weight or BMI Improved diet: decrease in total fat, protein, and cholesterol

Author & Year	Journal	Purpose	Outcome Variables	Design Framework	Sample	Methods	Limitations	Findings
Glycemic load diet								
Jimenez-Cruz et al., 2003	*Diabetes Care*	Study the effects of a flexible, lower glycemic index Mexican-style diet	HbA1c, BMI, serum lipids	RCT Crossover design	*N* = 14	Two 6-week intervention periods consisting of high vs low GI foods Mexican-style diets with 6-week washout in between	High attrition rate: 36 participants; 12 dropped out and 10 did not complete dietary records	Significant improvements (p = < 0.05) in HbA1c, BMI, and fasting glucose
Ventura et al., 2009	*Archives of Pediatric Adolescent Medicine*	To examine if reductions in added sugar intake or increases in fiber intake in response to a 16-week intervention were related to improvements in metabolic outcomes related to T2D risk	Metabolic risk factors: body composition, visceral fat, insulin sensitivity, and response; dietary intake by 3-day records	Secondary data analysis of RCT	*N* = 54 overweight Latino adolescents	Participants randomized to control, nutrition (decrease sugar and increase fiber), or nutrition plus strength training intervention for 16 weeks with pre- and post-testing of labs and anthropomorphic measures	Generalizable to adolescent population only	Modest decreases in sugar intake (equal to 1 can of soda) improved insulin response Modest increased fiber intake (equal to ½ cup of beans) decreased visceral fat
Varela et al., 2012	*Archivos Latinoamericanos de Nutrición*	Examine the relationship between consumption of high GI food and glycemic control in T2D patients	HbA1c, BMI, and number of servings per day of high GI foods	Descriptive, cross-sectional study	*N* = 40 Convenience sample of adults with T2D identified by medical records search at a health center in Chile	Subjects interviewed by nutritionist to collect food intake data for previous month Foods analyzed for total carbohydrates and number of servings of high and low GI foods Anthropomorphic measurements taken at time of interview HbA1c levels taken from medical records		Positive correlation found between number of portions of high GI foods eaten daily and HbA1c levels

Note: CHW = community health worker, HbA1c = glycosylated hemoglobin, BMI = body mass index, RCT = randomized controlled trial, ED = emergency department, T2D = type 2 diabetes, GI – glycemic index

Appendix A

GEM Intervention Chapter Content

Chapter 1

My Diabetes and How I Can Manage It

Goals of this chapter are to learn about:

1. Your diabetes
2. Co-Pilots: Family and friends
3. How to get the most out of the manual
4. Important terms
5. Diabetes the disease
6. Treatment options (medication and non-medication)
7. Non-medication management of your diabetes
8. Deciding how you want to manage your diabetes
9. How well you learned the information (self-test)
10. What you can do to reinforce learning (home activities)
11. About GEM
12. Additional resources
13. Feedback

Chapter 1: GEM intervention for newly diagnosed T2DM
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Chapter 2

Blood Glucose (BG) Monitoring:

How Will Your Everyday Choices Affect Your BG and What to Do Next?

Goals of this chapter are to learn about:

1. Making the most from last week's home activities
2. Important terms
3. Understanding your Tool Kit
4. How managing diabetes is all about making choices about food and physical activity based on BG levels
5. How glucose travels through your body
6. BG monitoring – When and why?
7. How do I use my BG numbers?
8. Setting BG goals
9. Using BG goals
10. Making BG measurements easier
11. Measuring your BG
12. Identifying personal cues of high and low BG
13. How well you learned the information (self-test)
14. Making the most of your BG meter (home activity)
15. Additional resources
16. Feedback

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Chapter 3
Making Food Choices to Avoid High BG – Fueling Up!

Goals of this chapter are to learn about:

1. Making the most from last week's home activities
2. Important terms
3. Choosing foods that are best for your current situation
4. Basic information about food and its nutrients
5. Choosing foods based on their glycemic load
6. Sample food choices
7. Alternatives to high GL foods
8. Weight management and its indirect benefits
9. How well you learned the information (self-test)
10. Making the most of your BG meter (home activity)
11. Resources
12. Feedback

Chapter 3: GEM intervention for newly diagnosed T2DM
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Chapter 4

Burning More Fuel and Burning It More Efficiently- Revving Up the Engine

Goals of this chapter are to learn about:

1. Making the most from last week's home activity
2. Important terms
3. How physical activity/inactivity affects your BG
4. Being seduced by modern technology
5. Personal reasons to increase physical activity
6. How much physical activity do you do?
7. Setting personal goals
8. How to reduce sedentary activity
9. Defeating sedentary behavior with the pedometer
10. How to increase moderate physical activity
11. Being successful at being physically active
12. Choosing intensive physical activities
13. Checking your MPG- the impact of physical activity on your BG
14. How to magnify the effects of physical activity
15. Getting started
16. Putting it all together (home activity)
17. How well you learned the information (self-test)
18. Resources
19. Feedback

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Chapter 5

You Are on Your Way: A Trip of a Lifetime!

Goals of this chapter are:

1. Making the most of your home activities
2. Reviewing your successes
3. Reviewing your concerns and optimism
4. Protecting your investments
5. Life is all about change and adaptation
6. Becoming your own scientist
7. Road trip
8. How well you learned the information (self-test)
9. Resources
10. Feedback

Chapter 5: GEM intervention for newly diagnosed T2DM
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Appendix B

Content of Sessions and Discussion Questions

Session I

Introduction and Blood Glucose Self–monitoring

1. How do you feel about having diabetes? How does it affect your life and family? Have you noticed changes in your body as a result of having diabetes?
2. What complications of diabetes worry you the most? (Activity)
3. What benefits of glucose control are most important to you? (Activity)
4. Introduction to the three-pronged approach to diabetes management:
    a. Low glycemic load diet
    b. Physical activity and decreasing sedentary habits
    c. Monitoring blood glucose to guide and inform choices about food and physical activity
5. Lifestyle changes pros and cons (Activity)
6. Blood glucose monitoring

Questions for Feedback Following the Session

What was helpful about today's session?

What was not helpful about today's session?

Which parts of this program do you think you may want to try?

Which parts of this program do you think you cannot or do not want to try? Why?

Session II

Low Glycemic Load Diet

1. Share last week's experiences
2. Glycemic load of foods
3. Meal examples and substitutes
4. Foods that can help decrease blood sugar
5. Strategies to avoid blood sugar spikes and sugar blockers

Questions for Feedback Following the Session

What was most helpful about today's session?

What was not helpful about today's session?

What part of this diet information do you think you can use?

What part of this diet information do you think you can't or don't want to try? Why?

Session III

Physical Activity

1. Effects of activity on muscles and blood sugar
2. What are the most important reasons to increase physical activity for you?
3. What is your current level of activity?
4. Strategies to decrease sedentary habits
5. Pedometer use

Questions for Feedback Following the Session

What was most helpful about today's session?

What was not helpful about today's session?

Which suggestions for being less sedentary do you think you can incorporate into your daily life?

Which suggestions for being less sedentary do you think will not work for you? Why?

Session IV

Putting It All Together

1. Sharing past week's experiences
2. Problem solving
3. Effects of stress and illness
4. Review and summary of all sessions

Questions for Feedback Following the Session

What part of this session was most helpful?

What part of this session was least helpful?

How has what you learned these past 3 weeks affected your day-to-day choices?

How has your outlook on your diabetes changed since the beginning of this program?

Appendix C

Participant Demographic Form

Participant #_____

Date
Fecha _____

What is your age?
Cual es su edad? _____

What is your gender? Male Female
Cual es su sexo? Hombre Mujer

How long have you had diabetes?
Cuanto tiempo tiene con diabetes? _____

Have you experienced any complications of diabetes? _____
Ha sufrido complicaciones de su diabetes?_____

How many years of education do you have?
Cuantos anos de educacion tiene? _____

What country are you from?
Cual es su pais de origen? _____

How long have you lived in the U.S.?
Cuanto tiempo tiene viviendo en los Estados Unidos?

What is your predominant language?
Cual es su idioma principal? _____

Appendix D

Institutional Review Board Approval

University of Virginia
Institutional Review Board for Health Sciences Research
Protection of Human Subjects Approval
Assurance Identification/Certification/Declaration
(Common Federal Rule)

HSR # 17360		
Event: Approval New Protocol - Expedited	Type: Protocol	Sponsor(s): UVA Center for the Study of Complementary and Alternative Therapies Rodriguez Nursing Student Research & Leadership Fund Sponsor Protocol #: Principal Investigator: Ann Taylor, RN, MS, EdD

Title: A Culturally Appropriate Self-Management Program for Hispanic Adults with Type 2 Diabetes and Low Health Literacy Skills

Assurance: Federal Wide Assurance (FWA)#: 00006183

Certification of IRB Review: The IRB-HSR abides by 21CFR50, 21CFR56, 45CFR46, 45CFR160, 45CFR164, 32CFR219 and ICH guidelines. This activity has been reviewed and approved by the IRB in accordance with these regulations.

Approval Date: 04/28/14

Protocol Expiration Date: 04/27/15

Approved to Enroll 12 subjects.

HSR Protocol Version Date: 04/24/14

Current Status: Open to enrollment

Consent Version Dates:

adult consent -- 04/24/2014
english short form -- 04/01/2014
non english short form -- 04/01/2014

Committee Members (did not vote):

Comments: The purpose of this study is to explore the feasibility of adapting a patient centered education intervention for the effective management of diabetes for Hispanic adults.

The study will involve 4-2 hour facilitated audio taped focus group sessions which address various aspects (diet, physical activity, self glucose monitoring), and a survey.

There is no outside sponsor for this study.

N=12. Ages: 18 years old and older.

The following items were reviewed with this approval: participant demographic form (2.19.14), letter of support from Blue Ridge Medical Center (1.23.14).

Compensation $10 per session $40 total. No tax information will be recorded.

REGULATORY INFORMATION:

The IRB determined this protocol met the criteria of minimal risk.

Enrollment of pregnant women approved under 45CFR46.204.

Protocol Expedited by Category #5: Research involving materials (data, documents, records or specimens) that have been collected solely for non-research purposes (such as medical treatment and/or diagnosis).

Protocol Expedited by Category #6: Collection of data from voice, video, digital, or image recordings made

for research purposes.

Protocol Expedited by Category #7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

This protocol has been granted a Waiver of Consent to identify potential subjects via 45CFR46.116.

This protocol has been granted a Waiver of Consent via 45CFR46.116 and a Waiver of HIPAA Authorization via 45CFR 164.512(i)(2) to contact subjects by direct contact by a person who is not their health care provider.

Direct contact may include phone, letter, direct email or approaching potential subjects while at UVa.

Phone, letter or emails will be approved by the IRB-HSR prior to use.

The following HIPAA identifiers may be collected: Name, medical record number, date of birth and contact information appropriate to the recruitment plan. The minimum necessary PHI to be collected includes only those items related to the inclusion/ exclusion criteria.

This protocol has been granted a Waiver of Consent via 45CFR46.116 to contact potential subjects by direct contact by a person who is their health care provider. Direct contact may include phone, letter, direct email or potential subject approached at UVa by a person is their health care provider. Phone, letter or emails will be approved by the IRB-HSR prior to use.

Written consent will be obtained for this study. The consent form signed will have a non-expired IRB-HSR approval stamp.

PLEASE REMEMBER:
* If an outside sponsor is providing funding or supplies, you must contact the SOM Grants and Contracts Office/ OSP regarding the need for a contract and letter of indemnification. If it is determined that either of these documents is required, participants cannot be enrolled until these documents are complete.
* You must notify the IRB of any new personnel working on the protocol PRIOR to them beginning work.
* You must obtain IRB approval prior to implementing any changes to the approved protocol or consent form except in an emergency, if necessary to safeguard the well-being of currently enrolled subjects.
* If you are obtaining consent from subjects, prisoners are not allowed to be enrolled in this study unless the IRB-HSR previously approved the enrollment of prisoners. If one of your subjects becomes a prisoner after they are enrolled in the protocol you must notify the IRB immediately.
* You must notify the IRB-HSR office within 30 days of the closure of this study.
* Continuation of this study pass the expiration date requires re-approval by the IRB-HSR.

The official signing below certifies that the information provided above is correct and that, as required, future reviews will be performed and certification will be provided.

Name: Lynn R. Noland , RN PhD Title: Vice Chair, Institutional Review Board for Health Sciences Research Phone: 434-924-9634 Fax: 434-924-2932	Name and Address of Institution: Institutional Review Board for Health Sciences Research PO Box 800483 University of Virginia Charlottesville, VA 22908
Signature: Lynn R. Noland	Date: 4/29/14

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Appendix E

Letter of Support from Blue Ridge Medical Center

January 23, 2014

To Whom It May Concern:

This letter is to confirm the strong support of Blue Ridge Medical Center (BRMC) Board and staff for the Capstone project proposed by Debra Brunk and to offer our site and patient community as a resource and location for her project associated work.

The need for more educational support for our Hispanic diabetics is quite evident to our providers and other support staff, and the opportunity to offer targeted services to this group through Ms. Brunk's project is most welcome. It will help staff to meet important goals associated with our recognition by NCQA in 2013 as a Patient Centered Medical Home and to insure culturally competent services, particularly for the targeted population served through her project. We anticipate continuing all successful aspects of her project for the benefit of our Hispanic patients with diabetes and their family members.

We foresee excellent outcomes as a result of Ms. Brunk's work to adapt a "patient centered education intervention" for our Hispanic/Latino patients who are low literacy. We also have resources that will support the successful implementation of her project. These include a solid interpretation and case management program for Hispanic patients, a strong outreach program that takes health care to work and residential sites for migrant and seasonal farm workers, and an active community health promoter program (training and services) that reaches this population through interactions with family, co-workers, and neighbors.

We also know Ms. Brunk to be an organized, empathetic, and talented clinician with the skills to carry out her project effectively. We are very much looking forward to working with her on her Capstone project.

Sincerely,

Margaret J. Whitehead,
Executive Director

www.brmedical.com 4038 Thomas Nelson Highway, Arrington, VA 22922 | T: 434-263-4000 | F: 434-263-4160

Appendix F

Journal Submission Guidelines for the *Journal of Transcultural Nursing*

Manuscript Submission Information for Authors

The *Journal of Transcultural Nursing* is the official journal of the Transcultural Nursing Society. It is a peer-reviewed, multidisciplinary journal that aims to advance the field of cross cultural nursing and healthcare. Its mission is to contribute new knowledge about the relationship between social and cultural factors related to healthcare, with a focus on improving care for persons of all cultures. Research reports, analysis and discussion articles, systematic reviews of the literature, theoretical articles, clinical applications, and analytical case studies are desired. The journal is a member of the Committee on Publication Ethics (COPE).

Departments

Manuscripts must be original, unpublished works submitted for the exclusive use of the JTN in accordance with these guidelines. Manuscripts must be submitted via SageTrack, an online submission system. Guidelines must be followed exactly. JTN encourages submission of original research reports that contribute to expanding the body of knowledge of transcultural nursing and health care. Systematic and analytic reviews of the literature, theoretical articles, clinical applications, and analytical case studies are also desired. International submissions are highly encouraged. Submission of manuscripts to one of the following departments are encouraged:

· **Theory**

Manuscripts concerning theory design, construction, development, utilization, application and critique will be presented in this department. Of interest are theories related to transcultural nursing, relationships between culture and health care, including ethnopharmacology or ethnonutrition, anthropological or cross-cultural patterning of health care beliefs and practices, inter- and intra- cultural communication, or transcultural ethics. In addition, manuscripts discussing organizational, technological, political or economic theories that influence health care delivery to specific cultural groups are encouraged. Articles discussing the application of nursing theories to transcultural nursing are also suitable for submission.

· **Research**

Research studies that expand the body of knowledge of transcultural nursing and health care as a human science will be included in this department. Studies will be considered that utilize such qualitative methodologies as: ethnography, ethnonursing, grounded theory, phenomenology, oral/life histories, critical theory, focus group methods, hermeneutics, participant observation, case study analysis, pattern recognition, or other innovative methods that relate the dynamics of culture to health care. Additionally, studies that utilize a variety of quantitative methodologies to investigate transcultural nursing and health care phenomena are also welcomed. Discussion and/or analytical articles on such topics as instrument development or themes related to the conduction of research on these phenomena are likewise encouraged. Publication of research

studies requires aletter of approval from a Human Subjects Committee (IRB) at the time of manuscript submission. Processing of the manuscript will not begin until the IRB approval letter is received.

It is highly recommended to follow publishing guidelines recommended by the National Institute of Health, National Library of Medicine (http://www.nlm.nih.gov/services/research_report_guide.html) to "specify a minimum set of items required for a clear and transparent account of what was done and what was found in a research study, reflecting, in particular, issues that might introduce bias into the research" (adapted from the EQUATOR Network Resource Centre). This may include (but not limited to) the following:

1. CONSORT: Consolidated Standards of Reporting Trials

2. STROBE: STrengthening the Reporting of OBservational studies in Epidemiology

3. PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

4. MOOSE: Meta-analysis of Observational Studies in Epidemiology

5. QUOROM: QUality Of Reporting Of Meta-analyses

· **Education**

Manuscripts included in this department aim to promote the understanding of the sociocultural context of the nursing educational structure, processes and outcomes. Topics may focus on the organizational culture of schools, teacher/student /client relationships, teaching methods, learning and cognitive styles, curricular designs, evaluation strategies and academic outcomes. Additionally, content focusing on extra-curricular strategies such as recruitment, advisement, peer support, financial aid and mentoring are invited. Topics relevant to teacher training and development are also solicited. Subject content may pertain to any aspect of the educational experience in the undergraduate or graduate levels, or in any setting, including clinical practice, which emphasizes the linkage between culture and education.

· **Clinical Practice**

The focus of this department is to explicate the sociocultural context and universal and variant patterns influencing the delivery of nursing and health care. Examples of topics suitable for this department include culturally defined health beliefs and values, folk and professional models of health care delivery, practitioner/client interactions, family and community roles, or health care outcomes. Specific content areas may include cultural variations in symptom management, birth or death rituals, use of home remedies, dietary considerations, cultural assessment tools, cultural conflict resolution, use of interpreters in the clinical setting, organizational culture of health care settings, ethical-legal conflicts, or other practice-related subjects. Case studies must include the following: statement and significance of the problem, a brief review of the literature, presentation of the case study, discussion and analysis of the case study within the cultural context, conclusions, recommendations for practice and references.

· **International**

This department will highlight themes and examples of international collaborative practice, education, research and consultation. This department will serve as an international forum for nurses and other health care disciplines to share expertise, knowledge, opinions and experience with nurses and health care professionals throughout the world.

· **Informational Resources**

Methods of accessing information concerning transcultural nursing or health care will be the major emphasis of this department. Articles regarding library searches, web page listings, internet resources, computer software packages and topics on informatics related to the journal's subject matter are encouraged. In addition, book reviews, critiques of videotapes or educational materials, annotated bibliographies and similar brief reports are welcomed.

Style

· Manuscripts should be prepared in accordance with the guidelines set forth in the Publication Manual of the American Psychological Association, 6th edition.

· Manuscripts, including abstracts and references, should be double-spaced, using 12-pt font type, left justified margins, one-inch margins on all sides.

· No identifying information about the author(s) should be on the body of the paper, abstract, or figures.

· A short heading and page number should be typed on each page.

· Manuscripts should not exceed 15 pages, excluding references, tables and figures.

· Each table, figure, graph etc. should have its relative placement noted within the text.

· Tables should be typed one to a page with any notes/legends typed on the same page.

· Tables should be numbered, titled, typed double-spaced, tab delineated, and without use of lines.

· Figures should be submitted digitally. Label each figure with its number and legend.

· Graphs or figures should NOT use gray-scaling or shading, but rather use hatch markings to demonstrate differences.

· Each figure, graph or drawing should be on a single page with its number, title and legend or caption typed on the same page.

· All tables, figures, graphs and drawings should follow the reference list, not placed within the text.

· If English is a second language, it is highly recommended to have article reviewed by an editor before submission.

Format

· **Cover letter**

A cover letter must accompany all manuscripts and should follow APA format and should state that the material has not been published elsewhere and that it is not under consideration at any other journal.

· **Title page**

A title page must accompany all manuscripts. Include the following for all authors: title, names of authors in the order to be listed, complete credentials, position titles, affiliations, and contact information (address, phone, fax, email). Indicate the corresponding author with an asterisk (*). Author names should appear only on title page, **not on any other page headings**. A secondary title page listing only the title must also be included. The title page must be submitted as a separate electronic file, not on the same file as the manuscript.

· **Permissions**

Written permission from the copyright holder must be submitted for any of the following: all figures, tables, or graphics taken from another author's work; quotations of 300 words or more from any academic journal or book, or for use of quotations of ANY length from newspapers, magazines, poems, songs or movies or any other previously copyrighted information. If a payment for permission to reprint is required, it will be the author's responsibility to pay all fees prior to publication and submit evidence of such payment to the editor.

Permissions must be included at the time of submission and must give permission to Sage Publications, Inc. to reproduce the material. Permissions should be scanned or copied into a file and uploaded as a "Supplementary file not for review". Permissions must include both print and electronic publication.

After a paper is accepted, the corresponding author will be prompted to complete an online copyright agreement.

NOTE: Do not pay fees until the manuscript has been accepted and scheduled for publication.

· **Acknowledgements**

Acknowledgements should be uploaded as a separate file. Acknowledgements include recognition of grant funding and appreciation to reviewers or colleagues and mentors. Please add this as a "supplemental file not for review" and upload it as directed in Manuscript Central.

· **Abstracts**

All manuscripts, except Letters to the Editor or Commentaries, should be accompanied by an

abstract of no more than 150 words. Abstract headings for research articles are: purpose (include background and significance); design (include population, sample, setting; methods, including measures, and intervention if applicable), findings/results, discussion and conclusions, and implications for practice.

· **Review and Action**

Authors are notified when the manuscripts are received. Manuscripts are examined by the editorial staff and peer reviewed by at least two reviewers drawn from our editorial board and panel of peer reviewers. Authors are sent the comments from the reviewers but the manuscripts are not returned to the authors. The journal reserves the right to edit all manuscripts to its style and space requirements.

On-line Submission Information

To make a submission you must login to your SageTrack account: http://mc.manuscriptcentral.com/tcn. If you do not have an account you must create one. If you do have an account please login, check it over and update it if necessary. **For any difficulty with on-line submission, please contact Elizabeth Marshall, Assistant Editorial Manager at elizabeth.marshall @comcast.net.**

The following will be requested during on-line submission:

o Names, credentials, positions and complete contact information on all authors, and acknowledgements, if appropriate;

o Cover letter;

o Abstract of ≤ 150 words;

o Key Words; and

o Complete text of article with the following components attached on one file in the following order: a) Main body of article; b) References, and c) Tables and/or Figures attached after the references.

Before uploading manuscript, please remember to remove the title page and any headings with author identifying information.

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========== PRIOR TO LOGIN ==========

Have an email address for yourself.

Have an email address for all co-authors.

Determine whether each of your co-authors meets the criteria for authorship: see Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication, 2013 http://www.icmje.org/ethical_1author.html

Have the complete contact information and credentials for all your co-authors. Credentials will be limited to five, consisting of only the highest degree within each discipline plus any honorary credentials, e.g. FAAN or FRCN. If your manuscript is accepted for publication you will be able to update your credentials, address, affiliation, etc. at time of proof reading. Determine the approximate number of words in your submission files. Select keywords for your submission. Limit your Abstract to 150 words and ensure it is formatted correctly. Limit the body of the text to 15 pages, excluding references, tables and figures. Determine the appropriate department for your manuscript: · Research · Theory · Education · Clinical practice · International (non-research) · Informational Resources. You may enter it directly or copy and paste your cover letter text into a MC "Cover Letter" box, OR you can attach a file containing your cover letter following the onscreen instructions.

Be prepared to:

o Confirm that the manuscript has been submitted solely to this journal and is not published, in press, or submitted elsewhere.

o Confirm that all the research (and your use of citations) meets the ethical guidelines, including adherence to the legal requirements of the study country.

o Upload the IRB/Human Subjects approval letter if this is a report of research findings.

o Upload any relevant Permission letters.

o Confirm that you have prepared a complete text minus the title page, acknowledgments, and any running headers with author names, to allow blinded review.

o State if you have any conflicts of interest.

==========AFTER YOU HAVE LOGGED IN ==========

The SageTrack system will demand that you designate your files as one of the following types: · Main Document includes the body of the text and references with all author identifying information removed, and no embedded tables or figures.· Tables and Figures should be separated into individual files and uploaded with appropriate labels applied as requested during the submission process. · “Supplementary Files Not for Review” may be uploaded to provide specific information such as:

o Permission to reprint material

o A copy of the letter of approval to conduct research from the appropriate review board.

o A conflict of interest disclosure

During the upload process your files will be converted into both HTML and PDF format for use by the reviewers. (Sometimes the conversion process takes a while or fails.) If it seems to be taking too long - close the conversion-in-progress window and check to see if a file conversion actually occurred. If the file conversion appears stalled or failed, follow any instructions that may become visible on the screen. Otherwise delete any corrupted files and start the process over. Once your submission is complete you will receive an automatic email from SageTrack verifying your submission and providing you with your Manuscript ID Number. You will be able to track the progress of your submission using that number in the system.

PLEASE NOTE: For any correspondence with the editorial office, please provide your manuscript number so that we may better assist you.

Appendix G

Manuscript for Submission to the *Journal of Transcultural Nursing*

A Culturally Appropriate Self-Management Program for Hispanic Adults with Type 2 Diabetes and Low Health Literacy Skills

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Acknowledgments

The authors are grateful for the support and input from the University of Virginia Health System GEM research team and for the financial award from the University of Virginia School of Nursing Rodriguez Nursing Student Research and Leadership Fund. A special thank you is given to the patients and staff at the health center in central Virginia from which the project participants were recruited.

Abstract

Purpose: This study assessed the feasibility of adapting a patient-centered educational intervention for type 2 diabetes (T2D) self-management for a Hispanic population with low health literacy skills. **Design:** A descriptive qualitative study design and phenomenological analyses were used. Nine Hispanic adults with T2D recruited from a rural community health center participated in an educational program that instructed on low glycemic food choices, meaningful glucose self-monitoring, and physical activity to decrease blood glucose spikes. Participants' feedback was recorded during four 2-hour focus group sessions. **Findings/results:** Participants' feedback clustered around four themes: information and knowledge, motivation and barriers to change, experiences with new behaviors, and personal responsibility. **Discussion/conclusions:** Data support the feasibility of adapting an established health-enhancing approach for promoting self-management of T2D to a low health literacy Spanish-speaking population. **Implications for practice:** The findings may help in further development of tools and strategies for improved T2D self-management in the study population.

Key words: type 2 diabetes, Hispanic adults, diabetes self-management education, health literacy, glycemic load, blood glucose self-monitoring

Changing demographics, an obesity epidemic, and the ongoing health care crisis in the United States have created a perfect storm for diabetes to continue to increase among all populations, particularly among Hispanic Americans. According to the U.S. Census Bureau, the Hispanic population grew from 36 million in 2001 to almost 50 million in 2011 (U.S. Census Bureau, 2011). The Pew Research Center predicts that Latinos will account for 60% of the population growth in the United States between 2005 and 2050 (Passel & Cohn, 2008).

The cost of diabetes in 2012 was estimated to be $245 billion—a 41% increase from the estimated $174 billion in 2007 (American Diabetes Association, 2013). From 2010 to 2012, diabetes affected 29.1 million Americans, or 9.3% of the total population (Centers for Disease Control, 2014). The prevalence of diabetes among the Hispanic population of all ages in the United States is 13.3% for all Hispanics and 14.3% among those of Mexican origin (Schiller, Lucas, Ward, & Peregoy, 2012).

The ethnicity-related disparities in diabetes morbidity, mortality, and quality of care have been documented extensively (Centers for Disease Control, 2012). In a study of disparities in glycosylated hemoglobin (HbA1c) levels (among the gold standards in the assessment and management of diabetes) between Hispanic and non-Hispanic White adults with diabetes, Kirk et al. (2008) found that Hispanic adults have approximately 0.5% higher HbA1c levels than non-Hispanic White adults. Mexican Americans with diabetes are six times more likely to develop end–stage kidney disease and 2.7 times more likely to have limb amputations than the diabetic non-Hispanic population (Garcia & Benavides-Vaello, 2006). In addition, U.S. Census data (2011) estimate the poverty rate among Hispanics to be 25%, and approximately 30% of the Hispanic population under the age of 65, regardless of socioeconomic status, are without health insurance. Financial constraints reportedly affect access to care, access to exercise facilities, and

the Hispanic head-of-household's ability to purchase quality foods (Ramal, Petersen, Ingram, & Champlin, 2012).

In the report *Crossing the Quality Chasm*, the Institute of Medicine calls for a focus on patient-centered care defined as "providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient values guide all clinical decisions" (Institute of Medicine, 2001, p. 6). In the context of diverse patient care environments where there may be great cultural discord between the health care providers and the patients, patient-centered care means attending to the language, culture, and literacy barriers to diabetic self-management. Thus, the purpose of this project was to determine the feasibility of adapting a patient-centered lifestyle modification program for the self-management of type 2 diabetes (T2D) currently being conducted at an academic medical center to a Hispanic population with low health literacy skills (Cox, Taylor, McCall, Singh, & Yancy, personal communication, September 1, 2013). The two aims of this project were to (1) provide a lifestyle modification educational program to Hispanic patients with T2D who were being seen in a rural health center in central Virginia and (2) gather data through focus group sessions regarding the cultural applicability of the lifestyle modification program referred to as GEM (**G**lycemic load diet, **E**xercise, and self-blood glucose **M**onitoring).

Theoretical Framework

Adapted from work to address disease self-management assessment and education for patients with hypertension (Grueninger, Goldstein, & Duffy, 1989), Whittemore (2006) described a patient-centered model for diabetes education that incorporates the theories of behavioral change that are commonly used in discussing diabetes self-management education within a patient-centered approach. This model identifies five levels for assessment and

intervention to address diabetes self-management: cognitive, attitudinal, instrumental, behavioral, and social levels. These concepts anchored the lifestyle modification educational program and guided the data collection and explication. *(Figure 1 about here)*

Background

Culturally Tailored Diabetes Education

Clear evidence exists that culturally tailored educational interventions are effective in improving knowledge and glycemic control in Hispanic diabetic populations (Garcia & Benavidez-Vaello, 2006; Hawthorn, Robles, Cannings-John, & Edwards, 2008). Ability to adapt the traditional Hispanic diet while considering concerns related to social structures and recognizing the spiritual beliefs of the Latino community are important components of successful diabetes self-management educational interventions in this population (Mauldon, Melkus, & Cagganello, 2006; Metghalchi et al., 2008; Salto et al., 2011). Literacy barriers have been successfully overcome by using novel, non-didactic methods such as soap opera-type audiovisuals, bingo games, and other experiential methods (Rosal et al., 2011) and simple and easy-to-use tools that are adapted to the targeted population's health literacy level (Coffman et al., 2013).

Lifestyle Modification Approaches to the Treatment of Diabetes

Researchers who developed the GEM program that served as the underpinning for this study reviewed the literature published from 2010 to 2013 to identify recent trials of lifestyle modification interventions for the management of adults with T2D (Cox et al., 2013). These researchers found that effective interventions for lowering HbA1c levels included the use of low carbohydrate or low glycemic load diets, physical activity that combined resistance training with aerobic exercise, and the use of glucose self-monitoring, yet did not identify any studies that

combined all three elements in a diabetes self-management program. Although the low glycemic load diet has shown to be an effective strategy to improve glycemia in people with T2D (Livesey, Taylor, Hulshof, & Howlett, 2008), only three studies were identified that addressed the use of this strategy in the Hispanic population. One, a 6-week intervention study using a flexible Mexican-style diet, emphasized the use of low glycemic load foods that resulted in lower HbA1c levels and a reduction of body mass index in the participants (Jimenez-Cruz et al., 2003). The second study focused on adolescent Hispanics and concluded that even a moderate change in diet that reduced carbohydrate intake equivalent to one can of soda and increased dietary fiber equivalent to one cup of beans had a significant impact on diabetes risk in this population (Ventura et al., 2009). The third study, conducted in Chile, correlated glycemic load composition of the study participants' diets with their HbA1c levels. A significant positive correlation was found between the number of daily portions of high glycemic load foods consumed and HbA1c levels, with the HbA1c increasing by 0.9% with each extra serving of high glycemic load food consumed (Varela, Vega, & Valenzuela, 2012). Similarly, the effectiveness of using blood glucose self-monitoring for improved glycemic control in non-insulin dependent diabetics has been debated extensively (Aakre, Watine, Bunting, Sandberg, & Oosterhuis, 2013; Benhalima & Chantal, 2013) but not in the context of the Hispanic population with T2D and low health literacy skills. The third component of the GEM program, physical activity, although addressed in many of the culturally tailored interventions reviewed, has not been studied in the context of purposeful blood glucose self-monitoring in the Hispanic population with T2D.

Methods

The GEM protocol on which this lifestyle modification program for Hispanic adults with T2D was based, presents an individualized lifestyle modification program that is structured as a

simple, positive, and sustainable health-enhancing approach based on the principles of active learning. The program consists of (a) blood glucose self-monitoring to motivate and prompt behaviors, (b) instruction on low glycemic load foods, and (c) instruction on the importance of reducing sedentary behaviors and increasing daily moderate and vigorous exercise. The GEM manual also offers dietary strategies, referred to as "sugar blockers," which have been found to blunt postprandial blood glucose spikes and thereby improve HbA1c levels. The use of protein, fiber, healthful fats, vinegar, and cinnamon has been found to have a mitigating effect on blood glucose when consumed either before or with a high glycemic load meal (Hlebowicz, Darwiche, Björgell, & Almér, 2007; O'Keefe, Gheewala, & O'Keefe, 2008).

Design

This descriptive qualitative study was conducted using feedback from participants representing the targeted population to guide the adaptation of the GEM intervention by presenting the information orally in Spanish and facilitating focus group discussions to elicit feedback after each of four sessions. A phenomenological approach was used to explore how a group of Hispanic adults with T2D and low health literacy skills experienced and interpreted the lifestyle self-management program presented (Creswell, 1998).

Sample

Nine participants, ranging in age from 30 to 66 years, who either had been diagnosed with T2D (n = 8) or accompanying a family member (n = 1) who had T2D were recruited from a rural community health center in central Virginia. Length of time from diagnosis ranged from 1 to 7 years, four were male, and all reported being married or partnered. Most participants originated from Mexico, with the exception of two women who were from El Salvador. The length of time residing in the United States was between 1 to 30 years. Spanish was the primary

language for all group members. Four participants reported no formal education, four reported 2 to 12 years of formal schooling, and one did not respond to the question.

Setting

The rural community health center from which the participants were recruited provides primary health care to an underserved and underinsured population, including a small number of Hispanics and seasonal migrant farm workers. The lifestyle modification program was conducted at the health center during evening hours to accommodate working participants' schedules.

Procedures

Recruitment. Potential participants were identified through the health center providers and staff, who informed Hispanic patients and those who identified Spanish as their first language about the lifestyle modification educational program. The investigator contacted potential participants by telephone and invited them to participate. Inclusion criteria included (a) a diagnosis of T2D, (b) Spanish as primary language, (c) 18 years of age or older, and (d) for females, not pregnant. The goal was to recruit 6 to10 participants, the optimal number for data collection within a focus group setting (Patten, 2012).

Educational program. The GEM manual (Cox, Singh, McCall, Taylor, & Yancy, 2012) on which this project was based consists of chapters that provide information on T2D and its management, blood glucose self-monitoring and how to use self-monitoring to guide T2D self-management, low glycemic load foods, and physical activity. The researchers who authored the GEM manual authorized its use in the present educational program; two of the researchers (Taylor and Cox) served as faculty advisors for this project.

The first author, a native Spanish speaker, conducted four weekly, 2-hour evening education sessions at the rural health center, during which time the contents of the GEM manual

were presented in Spanish in an interactive format. Given the participants' literacy challenges, use of written materials was minimized and those that were used were prepared at a low literacy level. These materials were adapted further after the first week of the project, with words being replaced with pictures and diagrams wherever possible. Blood glucose monitoring was demonstrated at the first session, and low glycemic load foods and sugar blockers were discussed during the time refreshments were served at each session. Leading questions to elicit feedback after each session were directed towards gleaning information on the cultural fit of the GEM self-management educational program for the Hispanic population.

(Insert *Table 1. Content Presented in Sessions 1-4* about here)

Data collection. Data were collected through four 2-hour class and focus group sessions described above, each of which was recorded using digital audio recording equipment. Session 1 began with participants sharing how they were currently managing their T2D, and each session thereafter started with a discussion about the prior week's experiences trying out the self-management ideas from the previous week's session. Next, the current week's topic was presented in an interactive format, which allowed for more input and comments from the participants. Following a short break during which refreshments were served, the investigator facilitated the focus group discussion using leading questions such as "What was most helpful about today's session from your perspective?" "What do you consider to be least helpful to you about the session today?" "Which suggestions for incorporating additional moderate level activity do you think you can include in your daily life?"

Data explication and analyses. The data were analyzed using a hermeneutical phenomenology approach to learn how a group of Hispanic adults with T2D experienced a lifestyle modification educational program (Creswall, 2013). After an initial review of the digital

recording from each session, the participants' feedback and any germane interactions and comments from the group were translated and transcribed. Sections of the recordings that were unintelligible because multiple participants were speaking at the same time as well as unnecessary conversational elements such as "you know," "like," and "uh" were omitted from the transcriptions (Polit & Beck, 2008). NVivo 10 software was used to organize and analyze the data. The transcribed text from the four sessions was loaded into the software program. Then data were read multiple times and codes (referred to as nodes in NVivo) were created as themes began to be identified. Meaningful segments of the verbatim data that expressed a common concept were assigned to an appropriate node. Project team faculty members reviewed the initial coding scheme and new nodes were created as needed. The transcripts were read multiple times and new nodes created in an iterative process until data saturation was reached, i.e., no new data could be added to the nodes. During this process, subcategories were created within the nodes and some nodes were clustered under overarching headings or themes. The process culminated in a narrative summary of the group's experiences with the diabetes self-management approach that was offered over the course of four weekly sessions (Creswall, 2013; Polit & Beck, 2008).

Results

Each of the four weekly discussion sessions and focus groups was attended by seven to nine participants, with five of the participants attending all four sessions. Over the course of the group sessions, participants shared feedback clustered around four themes: information and knowledge about T2D, motivation and barriers to changing behaviors, experiences with new self-management behaviors, and personal responsibility for disease management.

Information and Knowledge

Although five of the nine participants had been living with the diagnosis of T2D for 5

years or more, all of the participants expressed a lack of information and knowledge regarding basic principles of glycemic control. This was expressed by several participants as exemplified in the following statements:

> One associates diabetes with sugar, that's all. But we really don't know what is diabetes or how to prevent it. Now, I have more understanding.
>
> We all know about diabetes, but parts we do not know. Today I learned a lot of things. And that sheet [handout] with the [picture of the] woman and complications [of diabetes] helped me understand a lot; sometimes we have those problems [complications of diabetes] but we don't know that it comes from diabetes.

Some very low glycemic load foods and strategies that aid in blocking an acute rise in blood sugar are, in fact, familiar and common to the Hispanic diet; however, the participants perceived some of these foods as being "bad" for them. These foods include avocados, pork meat, and dairy products such as yogurt and whole milk. For some participants, learning that strawberries and certain other fruits such as blueberries are low glycemic load foods came as a pleasant surprise.

The participants believed that some high glycemic load foods such as oatmeal, corn, corn flakes, bananas, rice, and refried beans were "good" foods to consume and foods they reportedly included regularly in their meals. One participant was surprised to learn that bottled sodas such as Coke and Pepsi would raise one's blood glucose rapidly. Another knowledge gap revealed in the discussion of high glycemic load foods was related to food preparation—the misconception that toasting bread or a tortilla would decrease its effect on raising blood sugar.

Each individual's new awareness of the ability to take control of his or her disease emerged over the course of the 4 weeks, as evidenced by several statements about feeling

empowered and motivated to use the new knowledge to make lifestyle changes. One young mother made a statement during the last group session that captured the general position of those participating when she said, "If it is in my power to lower my sugar and not take medicine, I will. With this information about food and exercise and everything [that we have been given], one has to do one's own part."

As participants engaged in blood glucose self-monitoring at home and used the knowledge gained through the group discussions to interpret the results of their blood glucose testing, it became evident that they felt empowered to make changes in the management of their T2D. Some of the participants found a new awareness of how high their blood glucose levels were and others had not realized the fluctuation in the patterns of their glucose levels or the effects of particular foods and activities on their blood glucose levels.

Motivation and Barriers to Behavior Change

Participants' lived experiences with other family members who had diabetes and the profound impact of these experiences on them came up repeatedly in the group discussions. The following quote from one participant is representative of the experiences shared by other participants as well:

> I think that . . . because I have seen diabetes very close—my Mother had diabetes [and I saw her] suffer a lot [and have] amputations. . . . I also watched a neighbor be slowly consumed by the disease until he died. So when I was told I had diabetes, for me [learning my diagnosis] was worse [than it may have been without seeing my mother and my neighbor suffer]. First, [learning my diagnosis was worse for me] because I did not have information about how to manage the illness and, second, because I had seen it [diabetes] firsthand.

Thus, witnessing the devastating effects of diabetes on friends and family emerged as a strong motivator for lifestyle change. Also, setting a good example in an effort to prevent diabetes in one's children was a powerful motivator for the young mothers in the group, as were the potential effects of diabetes on fertility given that these women expressed the desire to have more children. One participant shared the following statement after the group had discussed reasons why they needed to focus on their own health as well as that of those around them:

> The group leader told us do it [monitor blood glucose levels, exercise, and eat low glycemic foods] for your [own] health and do it for your son. I don't want my child to have this [diabetes]. I feel bad about having diabetes, having to take medications, worrying about what [to] eat . . . and sometimes get[ting] upset [because you don't want [your] child to have diabetes]. I want to do whatever I can do to need less medication. We have to do our part.

The willingness to share experiences and offer support to each other was evident in the interactions among the participants. On one occasion an older participant responded to the discouragement of another participant by pointing out how much the participant, who was discouraged because of her weight gain, had improved her blood glucose levels, thus making her an example for the other group participants. Other participants added their encouragement as well, pointing out that with the lifestyle changes learned in the sessions she would surely start losing weight. The value of the group setting was verbalized several times by one participant, who acknowledged that the group was an important source of motivation, knowledge, and support to improve his diabetes self-management behaviors.

Among the challenges to adopting a low glycemic load diet was the participants' unfamiliarity with or dislike for a variety of vegetables in their regular diet. Four participants

openly shared their dislike for vegetables in general and for raw ones in particular. When participants were invited to give feedback about what they thought would be the most difficult change to implement, one participant offered:

> I think the hardest thing is to get used to the change in tastes. . . . There are foods that we are not used to [eating] and may seem bland or sour but if we start eating these [foods] daily we will get used to the taste. I think that can be the hardest thing [to change] at the beginning.

Several of the women in the group who were mothers or older housewives shared feelings of isolation and anxiety, which led them to frequent snacking. Those participants who were farm workers were challenged with the difficulties of finding the time or convenience to monitor their blood glucose levels during the workday in the fields or the energy to exercise in the evenings given the demands of their work. The breakfast meal was problematic for some given that it is not customary in the Hispanic culture to have anything other than coffee with sweet bread, with many consuming nothing at all in the morning. One of the farm workers reported having oatmeal with a banana for breakfast, believing it was a good choice on a diabetic diet. He learned that with a little adjusting (strawberries instead of banana and a smaller portion of oatmeal) he could eat a good breakfast that had a lower glycemic load.

In spite of the identified barriers to changing behaviors, the group discussions revealed that participants were open to finding ways to incorporate the principles of diabetes self-management that had been presented in the group discussions.

Experiences with New Self-management Behaviors

The GEM program intervention that served as the foundation for the current project asks participants to experiment with their glucose monitoring before and after eating and before and

after activities throughout the day as a way to receive immediate feedback about the effects of these activities on blood glucose levels and thus to be able to make more informed future decision choices regarding foods and activities. The Hispanic participants embraced these concepts and shared their experiences. Some had not been using blood glucose self-monitoring and thus gained through the education sessions a new awareness of their glycemic status and the need to monitor their blood glucose levels. During the second group session, one female participant who had been diagnosed with T2D 5 years ago said:

> It had been a long time since I have checked it [blood glucose level]. To be honest, I didn't have a meter for more than 2 years. [Now] I [see] that it [blood glucose level] went up. In the morning [it is] lower, after eating it [goes] up, and at bedtime it [blood glucose level] is even higher.

Another participant followed with the comment "[My readings are] . . . always high. Even in the mornings, it's always high. I [have] tried to eat better, but they [blood glucose levels] are still high."

Others were able to see patterns and the effects of certain foods on their blood glucose levels. During the last group session, participants shared how they were trying some of the strategies learned over the course of the four discussion sessions. Two participants made the following statements:

> I tried eating fiber before the meal, and, yes, it worked for me. I checked it [blood glucose level] before and after [eating] and it did not go up as much as it did when I ate the same thing before but without the added fiber. I had a little rice with pork chop and beans. The same [amount] that I had the other time, but I had the fiber and . . . it helped.

> I don't think I can do it [consume vinegar] but I tried eating the right foods that . . . we talked about . . . and it worked. Your blood sugar [can be] normal when you eat right. I have seen it [happen].

Several participants reported seeing improvements in how they felt when they followed a low glycemic load diet. Specifically, three participants shared that they had experienced a decline in evening headaches that had been a daily occurrence before attending the sessions. Participants shared about changes in behaviors and also trying new foods. Comments that reflect changes made by two participants—one a farm worker and the second a stay-at-home mother—follow:

> For me it's the Coke that I quit. I haven't had a Coke for a week now. Sometimes it's a temptation when I drive [my coworkers] on our break and I see them drinking their Cokes. [Instead] I have a glass of water and go to the truck for lunch. I also used to eat sandwiches every day; now I don't. I take a salad or some eggs or nothing.

> I tried having plain yogurt with some fresh strawberries for breakfast instead of bread with my coffee. I did not think I would like it, but I liked it!

After the discussions and focus group sessions on physical activity and strategies to blunt the blood sugar spike after meals, the participants shared more success stories:

> One day I checked my sugar and it was high at 150s. So after dinner I said [to myself], "You know what? I am going out for a walk." I walked and drank lots of water and it [blood glucose level] went down to 125, so that [walking] did help.

> I used to come home and lay [sic] down after eating [dinner]. Not anymore. When I finish having dinner I talk [on the phone] to my wife in Mexico, but now I walk as I talk instead of laying [sic] down.

> I have learned to eat better . . . what I should eat and what I should not eat. I have set goals. In addition to walking at work, now I see that I do walk a lot on my job [wore pedometer provided in the study]. . . . In the evening when I get home I shower, I eat something, and then instead of laying [sic] down to watch TV I go to the gym at least a little while. Not [every day] but at least 3 to 4 times a week, I try to do that [go to the gym].

Personal Responsibility for Disease Management

The information delivered in the group sessions provided a strong message of empowerment and self-determination, reinforcing the idea that T2D is a disease that has selected symptoms that can be managed best by patients themselves. This message seemed to resonate with the participants, and the idea of "doing your part" came up repeatedly in the group sessions. Stories were shared about friends or family members who either refused to take care of themselves or perhaps did not have access to the information needed to take control of their T2D, thus leading to poor outcomes. Statements made by the participants such as "Each person will [make changes] depending on whether they want to do it or not" and "It is the willpower of each person [that will determine whether they make changes or not]" exemplified this sentiment within the group.

The findings from this study show that many factors influence the self-management of disease in this sample of Hispanic patients with T2D living in rural central Virginia. An in-depth understanding of the targeted population's perspective is needed in preparing a culturally appropriate educational program.

Discussion

The concepts of choosing lower glycemic index foods, monitoring blood glucose levels, and using activity to help achieve glycemic goals as presented in the GEM manual were

successfully presented to a group of Spanish-speaking individuals in a way that was understood and well received, as evidenced by their willingness to try the new behaviors that were discussed in the discussion groups and report their experiences and successes.

The GEM manual provided content that reinforced the useful aspects of the Hispanic diet and guided the adaptation of the diet where needed. For example, fresh fruits are familiar to the Hispanic population, and the group members were easily able to substitute lower glycemic load fruits for those with a higher glycemic load. By encouraging the more liberal use of proteins such as meats and dairy and adding good fats such as avocado and olive oil, which are a significant part of the Hispanic diet, it appeared easier for the group participants to accept the need for decreased use of the commonly used starches and carbohydrates (tortillas, rice, and potatoes). The findings from this project confirm those of Jimenez-Cruz et al. (2003); that is, the Mexican-style diet can be modified to a lower glycemic load diet that is acceptable to this population. Several of the strategies, such as using fiber, fats, vinegar, and cinnamon as sugar blockers, presented in the GEM manual for mitigating the postprandial rise in blood glucose also were well received as a way to consume small amounts of the familiar and common foods (rice and tortillas) prevalent in the Hispanic culture. The participants' new awareness of their blood glucose levels and patterns was effective in motivating behavioral changes over the course of the 4-week educational project.

The devastating effects of T2D on the health of friends and family members of the majority of the participants served as a motivator for behavioral changes. The empowering message that individuals have a great deal of control over many of the outcomes of T2D, much more so than that of their health care providers, seemed to resonate with the group. They were eager to take on the challenges of lifestyle modification with the hope of not only normalizing

their own blood glucose levels but also preventing T2D in their children by role modeling healthful lifestyles. In addition, particularly for the females in the group, improving their own fertility and future pregnancy outcomes was a strong motivator for lifestyle change.

Using illustrations of low glycemic load foods and sugar blocking strategies, participants with low literacy were able to learn the skills needed for adapting the GEM recommendations. Demonstrations of how to use the glucometer and providing low glycemic load foods for refreshments at the sessions reinforced the group discussions. It was apparent that some of the GEM manual tools, such as logs, journals, written exercises, and complex data tables, were not useful to many of the Hispanic participants with low to no literacy skills and even were challenging to the more literate participants in the group.

Quality Enhancement Strategies Used to Ensure Methodology Rigor

The first author brought to this qualitative project not only her experiences growing up in a Spanish-speaking country (Argentina) but also a 29-year history of working with diverse Hispanic populations in Chicago, including many patients diagnosed with T2D. During the 12 years prior to beginning this project, she worked as a family nurse practitioner providing primary care in a variety of settings, which afforded her multiple opportunities to learn patient teaching strategies that potentially could work with a broad spectrum of patients seen in both urban and rural primary care settings. These earlier experiences gave her a ‘real world view’ or perspective on the importance of persistent observation within the project’s group setting and waiting for responses from group members before moving the topic of discussion forward.

Given this investigator’s background and knowledge of the Spanish culture, she was particularly sensitive to ways she could gather the information needed to answer the project questions without disrupting the natural setting of the class sessions and/or the focus group

discussions. In other words, she kept her cultural sensitivity in the forefront, was knowledgeable of 'herself' and any biases that potentially could influence her perspective. Member checking was accomplished, in part, by reviewing with the group members the previous week's focus group feedback to ensure that what she had understood from their discussion was indeed what information the group members had intended to convey. Credibility was also enhanced through working closely with the second author, meeting with her every week to review progress, the transcripts, and key themes that were emerging. The first author investigator took the foregoing into consideration when working with the project sample and interpreting the findings, keeping these as close to the real world situation as possible.

Limitations

Limitations of this educational project regarding self-management of T2D include the potential for biases related to participant self-selection and the fact that the Spanish-speaking group facilitator also presented the content, which may have made it challenging for the participants to be honest in their responses given the desire among many Hispanics to present themselves as polite and pleasing. In addition, a lower than anticipated level of health literacy skills among the participants provided several challenges, with the first becoming evident when the group facilitator attempted to present orally the GEM manual content using charts, graphs, logs, and journals and, second, the use of the focus group method of data collection. However, given that the intent of the project was to determine the feasibility of the educational program within the context of the Hispanic population, the findings lay the groundwork for further development and testing of the GEM program in other groups of Hispanic adults with T2D and low health literacy.

Conclusions and Nursing Practice Implications

With the implementation of the Affordable Care Act (ACA) will come an increased number of underserved patients accessing care (Rosenbaum, 2011), many of whom will require management of T2D. Agencies and organizations must find evidence-based and cost-effective strategies to meet this demand. The patient-centered principles of culturally competent care should guide both practitioners in caring for Hispanic patients with T2D and those involved in program planning regarding diabetes in the Hispanic community. These principles include addressing the language, access, and literacy barriers to T2D self-management education within the Hispanic population. Findings from this project provide the foundation for further research and for creating tools that can be made available to community health workers, primary care providers, nurses, and diabetes educators with the goal of empowering Hispanic adults with T2D to improve their health outcomes. It confirms the need for creating materials such as picture-based handouts and video resources that effectively communicate the principles of low glycemic load diet, physical activity, and purposeful blood glucose monitoring for use with a low literacy Spanish-speaking population.

Implementation of culturally tailored educational programs in the patient care setting is also a step towards improving the quality of care for a population that can feel discriminated against because of their language, color, or socioeconomic status. By attending to the cultural differences in our patients and creating an environment of equality and respect, we are contributing to the slow work of breaking down the prejudices that still affect minorities throughout the health care system—among not only patients but also health care providers, non-professional staff, and students in all fields of health care who are receiving training at our institutions.

References

Aakre, K. M., Watine, J. P., Bunting, S., Sandberg, S., & Oosterhuis, W. P. (2012). Self - monitoring of blood glucose in patients with diabetes who do not use insulin—are guidelines evidence-based? *Diabetic Medicine, 29*, 1226–1236.

American Diabetes Association. (2013). Economic costs of diabetes in the U.S. in 2012. *Diabetes Care, 36,* 1033–1046.

American Diabetes Association. (2013). Standards of medical care in diabetes—2013. *Diabetes Care, 36*(Suppl 1), S11-S66.

Benhalima, K., & Chantal, M. (2012). The role of blood glucose monitoring in non-insulin treated type 2 diabetes: What is the evidence? *Primary Care Diabetes, (6)*, 179-185.

Centers for Disease Control and Prevention. (2011). *National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the United States, 2011*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention. (2014). *National diabetes statistics report: Estimates of diabetes and its burden in the United States, 2014.* Atlanta, GA: US Department of Health and Human Services.

Centers for Disease Control and Prevention. (2014). *National diabetes statistics report, 2014.* Retrieved from http://www.cdc.gov

Coffman, M. J., Ferguson, B. L., Steinman, L., Talbot, L. A., & Dunbar-Jacob, J. (2013). A health education pilot for Latina women with diabetes. *Clinical Nursing Research, 22*(1), 70-81. doi:10.1177/1054773812451746

Cox, D. J., Singh, H., McCall, A., Taylor, A. G., & Yancy, W. S. (2012). *Glycemic load, exercise & monitoring blood glucose* (*GEM): Healthy lifestyle management of T2DM* (Manual used for study). University of Virginia, Charlottesville, VA.

Cox, D. J., Taylor, A. G., Dunning, E .S., Winston, M. C., Luk Van, I. L., McCall, A., … Yancy, W.S., Jr. (2013). Impact of behavioral interventions in the management of adults with type 2 diabetes mellitus. *Current Diabetes Report.* doi:10.1007/s11892-013-0423-7

Creswell, J. (2013). *Qualitative inquiry and research design. Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage.

Garcia, A. A., & Benavides-Vaello, S. (2006). Vulnerable populations with diabetes mellitus. *Nursing Clinics of North America, 41,* 605-623.

Grueninger, U. J., Goldstein, M. G., & Duffy, D. (1990). A conceptual framework for interactive patient education in practice and clinic settings. *Journal of Human Hypertension, 4*(Suppl. 1), 21-31.

Hawthorne K., Robles Y., Cannings-John R., & Edwards, A. G. K. (2008). Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups. *Cochrane Database of Systematic Reviews Issue 3*, Art. No.: CD006424. doi:10.1002/14651858.CD006424.pub2.

Hlebowicz, J., Darwiche, G., Björgell, O., & Almér, L.-O. (2007). Effect of cinnamon on postprandial blood glucose, gastric emptying, and satiety in healthy subjects. *American Journal of Clinical Nutrition, 85*(6), 1552-1556.

Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century.* Washington, DC: The National Academies Press.

Jimenez-Cruz, A., Bacardi-Gascon, M., Turnbull, W. H., Rosales-Garay, P., & Severino-Lugo, I. (2003). A flexible, low-glycemic index, Mexican-style diet in overweight and obese subjects with type 2 diabetes improves metabolic parameters during a 6-week treatment period. *Diabetes Care, 26,* 1967-1970. doi:10.2337/diacare.26.7.1967

Kirk, J. K., Passmore, L. V., Bell, R. A., Narayan, K. M., D'Agostino, R., Arcury, T. A., & Quandt, S. A. (2008). Disparities in A1C levels between Hispanic and non-Hispanic white adults with diabetes: A meta-analysis. *Diabetes Care, 31*(2), 240-246.

Kochlar, R., Fry, R., & Taylor, P. (2011). *Wealth gaps rise to record highs between Whites, Blacks and Hispanics.* Pew Research Center. Retrieved from http://www.pewsocialtrends.org/files/2011/07/SDT-Wealth-Report_7-26-11_FINAL.pdf

Livesey, G., Taylor, R., Hulshof, T., & Howlett, J. (2008). Glycemic response and health—a systematic review and meta-analysis: Relations between dietary glycemic properties and health outcomes. *American Journal of Clinical Nutrition, 87*(Suppl), 258S-268S.

Mauldon, M., Melkus, G. D., & Cagganello, M. (2006). Tomando control: A culturally appropriate diabetes education program for Spanish-speaking individuals with type 2 diabetes mellitus--evaluation of a pilot project. *Diabetes Educator, 32*(5), 751-760.

Metghalchi, S., Rivera, M., Beeson, L., Firek, A., De Leon, M., Balcazar, H., & Cordero-MacIntyre, Z. R. (2008). Improved clinical outcomes using a culturally sensitive diabetes education program in a Hispanic population. *Diabetes Educator, 34*(4), 698-706.

O'Keefe, L. H., Gheewala, N. M., & O'Keefe, J. O. (2008). Dietary strategies for improving post-prandial glucose, lipids, inflammation, and cardiovascular health. *Journal of the American College of Cardiology, 51*(3), 249-255.

Passel, J., & Cohn, D. (2008). *U.S. population projections, 2005-2050*. Pew Research Center. Retrieved from http://www.pewhispanic.org/2008/02/11/us-population-projections-2005-2050/

Patten, M. (2012). *Understanding research methods: An overview of the essentials*. Glendale, CA: Pyrczak.

Polit, D., & Beck, C. (2008). *Nursing research: Generating and assessing evidence for nursing practice.* Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins.

Ramal, E., Petersen, A. B., Ingram, K. M., & Champlin, A. M. (2012). Factors that influence diabetes self-management in Hispanics living in low socioeconomic neighborhoods in San Bernardino, California. *Journal of Immigrant and Minority Health, 14*(6), 1090-1096. doi:10.1007/s10903-012-9601-y

Rosal, M. C., Ockene, I. S., Restrepo, A., White, M. J., Borg, A., Olendzki, B., . . . Reed, G. (2011). Randomized trial of a literacy-sensitive, culturally tailored diabetes self-management intervention for low-income Latinos: Latinos en control. *Diabetes Care, 34*(4), 838-844.

Rosenbaum, S. (2011). The Patient Protection and Affordable Care Act: Implications for public health policy and practice. *Public Health Report, 126*(1), 130–135.

Salto, L. M., Cordero-MacIntyre, Z., Beeson, L., Schulz, E., Firek, A., & De Leon, M. (2011). En Balance participants decrease dietary fat and cholesterol intake as part of a culturally sensitive Hispanic diabetes education program. *Diabetes Educator, 37*(2), 239-253.

Schiller, J. S., Lucas, J. W., Ward, B. W., & Peregoy, J. A. (2012). Summary health statistics for U.S. adults: National Health Interview Survey, 2010. National Center for Health Statistics. *Vital and Health Statistics, 10*(252), 1-207.

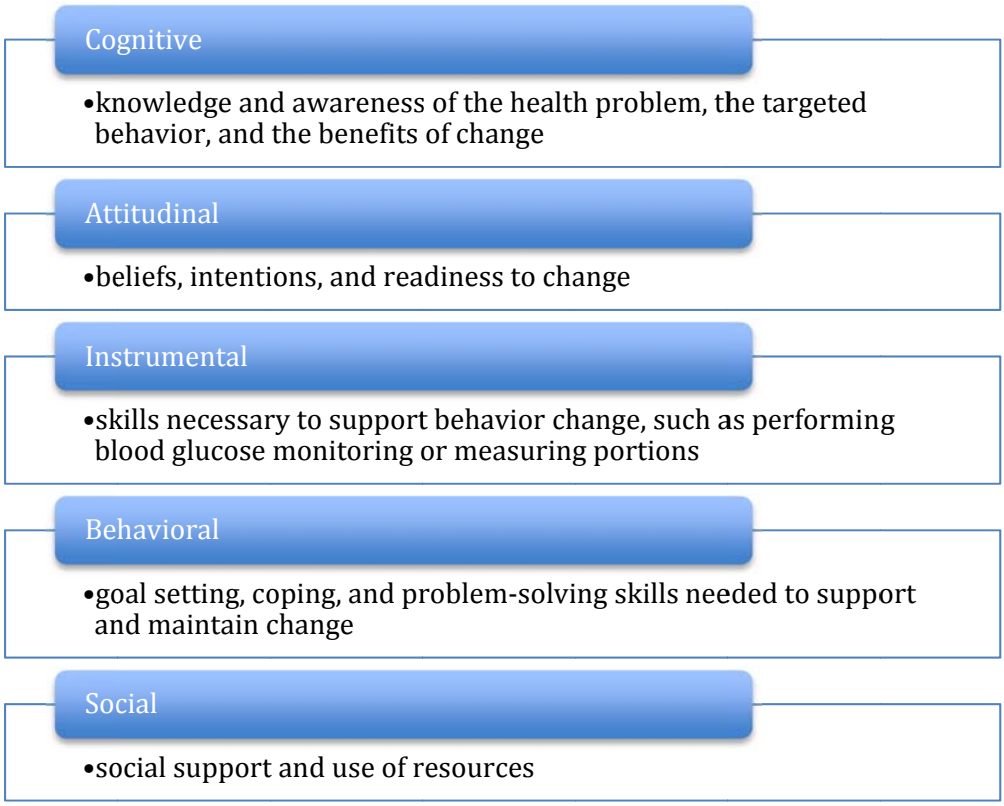
U.S. Census Bureau. (2011). *The Hispanic population: 2010*. Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-04.pdf

Varela, N., Vega, C., & Valenzuela, K. (2012). Relación del consumo de alimentos de alto índice glicémico en la dieta y los niveles de HbA1c en individuos Diabéticos Tipo 2 en tratamiento con dieta y/o Metformina [Relationship of consumption of high glycemic index food in the diet and levels of HbA1c in type 2 diabetic patients treated with diet and/or Metformin]. *Archivos Latinoamericanos de Nutricion ,62*(1), 23-29.

Ventura, E., Davis, J., Byrd-Williams, C., Alexander, K., McClain, A., Lane, C. J., . . . Goran, M. (2009). Reduction in risk factors for type 2 diabetes mellitus in response to a low-sugar, high-fiber dietary intervention in overweight Latino adolescents. *Archives of Pediatrics & Adolescent Medicine, 163*(4), 320-327. doi:10.1001/archpediatrics.2009.11

Whittemore, R. (2006). Behavioral interventions for diabetes self-management. *Nursing Clinics of North America 41*, 641–654.

Figure 1. Patient-centered Model of Diabetes Self-management Assessment and Intervention*



*Adapted from "Behavioral Interventions for Diabetes Self-Management" by R. Whittemore, 2006, *Nursing Clinics of North America, 41*, p. 646.

Table 1. Content Presented in Sessions 1-4

Session 1 Introduction and blood glucose self–monitoring

- How do you feel about having diabetes? How does it affect your life and family? Have you noticed changes in your body as a result of having diabetes?
- What complications of diabetes worry you the most? (Activity)
- What benefits of glucose control are most important to you? (Activity)
- Introduction to three-pronged approach to diabetes management:
    - Low glycemic load diet
    - Physical activity and decreasing sedentary habits
    - Monitoring blood glucose to guide and inform choices about food and physical activity
- Lifestyle changes pros and cons (Activity)
- Blood glucose monitoring

Session 2 Low glycemic load diet

- Sharing last week's experiences
- Glycemic load of foods
- Meal examples and substitutes
- Foods that can help avoid blood sugars spikes
- Strategies to avoid blood sugar spikes and" sugar blockers"

Session 3 Physical activity

- Sharing last week's experiences
- Effects of activity on muscles and blood sugar
- What are the most important reasons to increase physical activity for you?
- What is your current level of activity?
- Strategies to decrease sedentary habits
- Pedometer use

Session 4 Review and putting it all together

- Sharing past week's experiences
- Problem solving
- Effects of stress and illness.
- Review and summary of all sessions