INTEGRATING STRATEGIES FOR IMPROVED GLYCEMIC CONTROL
IN MEXICAN AMERICANS WITH DIABETES

by

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ABSTRACT

The purpose of this report is to describe a plan for an evidence-based intervention program to help Mexican Americans with type 2 diabetes to achieve improved glycemic control, resulting in better health and fewer complications. The proposed intervention would combine education, counseling, and social support to aid in improving the glycemic control of Mexican Americans with type 2 diabetes. It would be appropriate for use in an outpatient primary care clinic. The intervention consists of culturally specific education, behavioral counseling, and social support through a Mexican American bilingual lay health advisor (LHA) and family members of patients with non-insulin-dependent type 2 diabetes. This report is a review of the evidence for the individual components of the intervention, a detailed plan for the implementation of the intervention, and a description of a feasibility study.
CHAPTER ONE: INTRODUCTION

One of the health problems that has impacted Mexican American health status in a major way is type 2 diabetes. This report is a description of an intervention program to promote glycemic control in Mexican Americans with type 2 diabetes. Chapter One of this report gives the background of the prevalence of type 2 diabetes in the world, the United States, and Mexican Americans. This chapter includes the complications that add to the pain and suffering of persons with diabetes. It contains a discussion of the cultural and economic factors that contribute to the problem of type 2 diabetes in the Mexican American population. The chapter provides the background and statement of the problem, the planned intervention program, the significance of the program to nursing, and program evaluation questions. Following the questions are definitions of terms used in the questions.

Background

Type 2 diabetes mellitus is a chronic disease that has affected 7.8% of the people in the United States (Centers For Disease Control and Prevention [CDC], 2007). According to the World Health Organization [WHO] (2008), there are approximately 180 million people in the world with diabetes. In the United States, 23.5 million people over age twenty have diabetes, which is about 10.7% of the population (CDC, 2007). People with type 1 or 2 diabetes are two to four times more likely to have heart disease, hypertension and strokes (WHO, 2008). Other serious complications of diabetes include blindness, kidney disease, and amputations (CDC, 2007). This disease has a major impact on the lives of those affected by it. The number of Mexican Americans who suffer from diabetes is almost double that of non-Latino white adults
Not only are Mexican Americans more likely than non-Latino Whites to have type 2 diabetes, they are more likely to have complications from it. Latinos have a higher incidence of renal disease in general (Carter, Pugh, & Monterrosa, 1996), about 275 of every 100,000 Latinos with diabetes, as compared with 165 per 100,000 people with diabetes who are non-Latino Whites (CDC, 2009). Franklin and colleagues estimated in 1990 that 60 to 70% of all people with diabetes have peripheral neuropathy, which is a major risk factor for amputation. That study found no difference in the prevalence of diabetic neuropathy in Latinos with that of non-Latino whites (Franklin, Kahn, Marshall, & Hamman, 1990). Diabetic retinopathy is more common in Latinos with diabetes (Emanuele et al., 2005). Of all those who have had diabetes for 15 years, blindness and severe visual impairment are suffered by 12%, but in the Latino adults with diabetes, 16.5% have visual impairment (CDC, 2009). The studies cited above illustrate that complications of diabetes can produce significant pain and suffering in the Mexican American population.

Latinos are more likely than non-Latino Whites to die as a result of diabetes complications. According to the OMH (2008), the mortality rate among Latinos with diabetes in the United States in 2005 was 60% higher than in non-Latino Whites. Diabetes (type 1 and 2) accounts for over one million deaths worldwide per year (WHO, 2008), and it is the seventh most frequent cause of death listed on United States death certificates (CDC, 2007). End-stage renal disease is more prevalent in Latinos with diabetes (CDC, 2007), contributing to the mortality rate. Fifty percent of all people with diabetes die of heart disease or stroke (WHO,
In the San Antonio Heart Study, Mitchell et al. (1999) found there is a higher occurrence of cardiovascular risk factors in Mexican Americans with diabetes, including hypertension and hyperlipidemia, compared with non-Latino Whites. Latinos with diabetes also have a disproportionately higher mortality rate due to cardiovascular causes, according to one study by Hunt et al. (2003). Deaths attributed to diabetes in 1999 were over five percent among Latinos, compared with three percent among the U. S. population as a whole (National Center For Health Statistics [NCHS], 2008). The risk of mortality from cardiovascular causes in Mexican Americans is double that of non-Latino Whites, while the mortality risk from coronary artery disease is tripled (Peek, Cargill, & Huang, 2007).

Cultural Factors

Many factors influence the ability of Mexican Americans to manage diabetes and avoid its complications. Some of these factors are cultural, while others are economic. Cultural factors include the traditional diet, the importance of family needs over the needs of the individual, the value women in particular place on self-sacrifice for the sake of others, and the belief in divine fatalism (Oomen, Owen, & Suggs, 1999). This has an effect on self-efficacy, which is defined as “a judgment of one’s ability to carry out a particular course of action” (Pender, Murdaugh, & Parsons, 2006, p. 42). Poor self-efficacy for diabetes self-management is rooted in fatalism; the language barrier and poor literacy are also contributing factors (Oomen et al., 1999).

Traditional Diet

In Mexican American culture, family and social gatherings often revolve around food, making it difficult for Latinos to adhere to diet recommendations in this setting (Adams, 2003; Weiler & Crist, 2009). The traditional diet of Mexican Americans is greatly affected by the
family customs and interactions. The typical Mexican American diet is high in fat and carbohydrates. Beans fried in oil or lard, rice, and tortillas are staples in the diet of many Mexican Americans (Jimenez-Cruz, Turnbull, Bacardi-Gascon, & Rosales-Garay, 2004). The tradition of the women in the family preparing meals for the men and children (Anderson, Goddard, Garcia, Guzman, & Vasquez, 1998; Wen, Parchman, & Shepherd, 2004) affects adherence to a diabetic diet. When the woman preparing the food has diabetes herself, she is likely to defer to the preferences of the rest of the family, so she is reluctant to prepare meals that are healthy for her (Wen et al., 2004).

**Familismo**

Mexican American culture is known for *familismo*, the deeply ingrained belief that family comes first, and therefore it would be selfish to put one’s own needs ahead of the family (Elder, Ayala, Parra-Medina, & Talavera, 2009; Oomen et al., 1999; Ruiz, 2007; Weiler & Crist, 2007). This belief extends to spending the family’s money on special food, medications, and medical visits. A woman with diabetes may also be hesitant to spend time on herself to test her blood glucose, check her feet, or exercise, as this may be seen as self-indulgent (Oomen et al., 1999). There is also a sense of “machismo” (similar to that found in non-Latino white men), which causes Mexican American men to feel that admitting they have a health problem is a sign of weakness which they do not want others to see (Larkey, Hecht, Miller, & Alatorre, 2001; Weiler & Crist, 2009). Often the burden of providing for the family leaves little time for thinking about ways to improve one’s own health and becomes a barrier to health-management behaviors (Brown et al., 2000; Larkey et al., 2001).
Fatalism

Many people in Mexican American culture are influenced by a deep-rooted belief in fatalism (Caban & Walker, 2006; Elder et al., 2009), which often impedes diabetes self-management and undermines self-efficacy. Many Latinos believe that diabetes is “God’s will” and that the individual is helpless to change it (Oomen et al., 1999). Some believe that getting diabetes is inevitable and one has little control over one’s diabetes (Brown et al., 2000), or that diabetes was God’s punishment for wrongs committed (Caban & Walker, 2006). Latinos also frequently believe that God decides whether one has complications of diabetes or not (Lujan, Ostwald, & Ortiz, 2007), and thus believe that individual behavior has no impact. Often the person with diabetes is stigmatized as a result of the belief that diabetes is punishment (Weiler & Crist, 2007). Stigma is defined as an adverse social judgment about a person (Weiss, Ramakrishna, & Somma, 2006). According to Scambler (2006) “People to whom a stigma is attributed are ‘imperfect beings,’ possessed of putative defects that it is beyond their capacity to correct” (p. 293). This can be applied to Latinos with diabetes, and may explain why Latino men in the study by Larkey et al. (2001) expressed a certain amount of shame and fear of what others might think about their need to seek healthcare. This attitude, along with the social stigma attached to diabetes (Weiler & Crist, 2009), tends to produce denial of the reality of diabetes (Caban & Walker, 2006) and the seriousness of its complications (Garcia, 2005). The resulting feelings of helplessness (Caban & Walker, 2006) undermine the motivation for diabetes self-management behaviors.

As stated above, self-efficacy is the individual’s perceived ability to perform a behavior (Pender et al., 2006). The lack of self-efficacy that results in part from the cultural concept of...
fatalism is common in Mexican Americans in regard to managing diabetes. The belief that diabetes and its complications are inevitable, and one is helpless to change them, is rooted in fatalism. It produces the conviction of an inability to perform the necessary behaviors to avoid worsening diabetes complications. Lack of self-efficacy is a major barrier in preventing older patients from making diet and exercise changes to improve health (Newsom, Kaplan, Huguet, & MacFarland, 2004). According to Lee, Arthur, and Avis (2008) “the stronger the individual's belief in his or her ability to perform a set of actions, the more likely they will be to initiate and persist in the given activity” (p. 1696). The reported low level of education is an important issue among Mexican Americans, especially the elderly. Lack of education has a negative effect on self-efficacy and the practice of healthy behaviors (Norris, Engelgau, & Narayan, 2001).

Difficulties with reading and understanding diabetes educational materials contribute to poor self-management, especially among older individuals (Oomen et al., 1999; Rosal, Olendzki, Reed, Gumienak, & Scavron, 2005). For many Mexican American adults, low literacy and the language barrier impede self-management of diabetes. Even with health care providers who are fluent in Spanish, the Mexican American may not understand the vocabulary used to explain and teach about diabetes; however, because of the high regard they feel for the provider, many Mexican Americans have a tendency to smile and nod as if they do understand. This leads them to be reluctant to ask questions (Lipton, Losey, Mendez, & Girotti, 1998), interfering with their understanding of the disease and its management. The low level of education and literacy is almost always a result of economic difficulties, especially the need to quit school and work to help support the family.
Economic Factors

In the 2000 census, 23.3% of Mexican American families were below the poverty level (U. S. Census Bureau, 2000). They are often employed in low-wage jobs where medical insurance is not offered. “Approximately one-third of full-time employed Hispanics do not have health care benefits,” resulting in poor access to medical care (Fox, Chavez, Gaston, Stinson, & Delgado, 2001, p. 99). Kington and Smith (1997) found that the occurrence of chronic diseases including diabetes increased disproportionately for persons at poverty level, or even slightly above. Carranza and Lebaron (2004) attributed poor adherence to diabetic diet and medications primarily to poverty and lack of resources. Many Mexican Americans are afraid to seek medical care because of being undocumented and fearing deportation (Weiler & Crist, 2007), resulting in failure to access available resources. The foods recommended for people with diabetes including fresh fish, fresh vegetables, brown rice, and whole grain tortillas or breads may be unaffordable (Brown, Garcia, Kouzekanani, & Hanis, 2002; Oomen et al., 1999). Many Latinos with diabetes, especially migrant workers, continue to work even when they are suffering from serious complications of diabetes such as diabetic ulcers, delaying treatment until amputation becomes necessary (Weiler & Crist, 2007). Poor literacy, poor access to health care, and limited money for food are a few of many economic difficulties for Mexican Americans.

Statement of the Problem

All of these cultural and economic factors: traditional diet, *familismo*, fatalism, poor literacy, the language barrier, poverty, and lack of medical care, contribute to the impact of type 2 diabetes in Mexican Americans, which is a major cause of pain and suffering in the Mexican American people (Rosal et al., 2005). More than one in 10 Mexican Americans suffer from
diabetes (OMH, 2008). Complications including retinopathy, peripheral neuropathy, and nephropathy are more prevalent in Mexican Americans (CDC, 2009; Peek et al., 2007). The mortality rate from all causes in Mexican Americans with diabetes is significantly higher than in non-Latino Whites (NCHS, 2008). The cultural and economic factors make it difficult for Mexican Americans with type 2 diabetes to change behaviors such as diet, exercise and taking medications in ways that will improve their health. Health care providers see communication as a greater barrier than economic issues to improved outcomes for Mexican Americans with diabetes (Lipton et al., 1998). Minor frustration with communication on the part of the provider translates into major, life-threatening health issues in the lives of Mexican Americans with diabetes. To improve glycemic control, avoid complications, and enhance the quality of life for Mexican Americans with diabetes, an intervention program is needed that addresses these difficulties. Such a program is compatible with the role of advanced practice nurses and easily adapted to settings in which they practice, and is described in this report.

Significance of the Intervention Program to Nursing

The goal of nursing is to promote wellness and alleviate pain and suffering (University of Tennessee College of Nursing, 2005). One way that nurses do that is through patient education and empowerment. Many complications and much suffering could be prevented if Mexican Americans with diabetes were able to achieve better glycemic control, defined as a glycosylated hemoglobin (HbA1c) value of less than 7.5 over a 12 month period. A culturally tailored intervention program that effectively enables and empowers Mexican Americans with diabetes to manage their disease would help reach that goal. Nurses, especially those in advanced practice, are in an ideal role to promote and participate in such a program.
Purpose

The purpose of this report is to describe the development of an evidence-based behavior modification program for Mexican American adults with type 2 diabetes, to help improve glycemic control as measured by HbA1c. The report also describes the proposed assessment of the feasibility and acceptability of the program. This author intends to evaluate the process on a small scale in a clinical setting to determine its feasibility and any modifications needed to improve its implementation.

Process Evaluation Questions

1. To what extent do the Lay Health Advisors (LHAs) feel prepared to implement the program in each content area provided by the training?
2. In their weekly reports of patient contacts, how often do the LHAs report incorporating Cognitive Behavioral Therapy (CBT) and Motivational Interviewing (MI) into their interactions with program participants?
3. What percentage of program participants comply with requested office visits and labs?
4. How closely do the LHAs follow the recommended follow up schedule including phone calls and home visits?

Impact Evaluation Questions

1. What is the level of knowledge of diabetes the LHAs have after the training program compared with before training?
2. How satisfied are LHAs with the intervention program after three months of working with the participants?
3. How satisfied are the providers with the intervention program after three months of implementation?

4. How satisfied are the participants with the intervention program after three months of participation?

5. How do the participants rate their attitude toward managing their diabetes after participating in the program?

6. How much change in knowledge about diabetes self-management occurs in participants after three months in the intervention program?

7. During each contact with the LHAs, how many days per week do participants report following dietary guidelines taught in the program?

8. During each contact with the LHAs, how many times per week do participants report exercising according to guidelines taught in the program?

Outcome Evaluation Question

1. What is participants’ HbA1c level after three months of participation in the intervention program compared with their HbA1c level before beginning the program?

Definitions

Following are definitions of the terms used in the preceding evaluation questions:

- **Provider**: A physician, physician’s assistant, or nurse practitioner who is licensed to prescribe and qualified to manage patients with type 2 diabetes

- **LHA**: A member of the community from the specified culture who is trained to serve as a mediator to assist in patient education and give social support that is culturally appropriate and relevant. Promotora is another word for LHA.
• **CBT**: The use of cognitive interventions and behavioral modification techniques including “self-monitoring, stimulus control, contingency management, cognitive restructuring, stress management, and social support” (Carlos Poston et al., 2003, p. 1487) designed to reinforce positive behavior changes, having the effect of increasing the patient’s self-efficacy.

• **MI**: A technique in which a counselor or health care provider utilizes a person’s sense of ambivalence about making a behavior change to “tip the scales” toward the commitment to change. “The four guiding principles of MI are: express empathy, develop discrepancies, roll with resistance, and support self-efficacy” (McWelschen et al. 2007, p. 2).

Summary

Chapter One contains a review of the demographics and scope of type 2 diabetes and its complications in Mexican Americans. The chapter is a discussion of the background of the problem of type 2 diabetes in Mexican Americans, including the cultural and economic factors that exacerbate the problem. Cultural factors including the traditional diet, the concept of *familismo*, and the fatalistic mindset were presented. *Familismo* provides some social support for people with diabetes, but also produces feelings of guilt and selfishness in putting the individual’s needs ahead of those of the family. Fatalism results in an external locus of control, the belief that diabetes is inevitable and its complications cannot be avoided. Economic constraints make it difficult to access health care; this is compounded by poor communication with providers regarding self-management behaviors. The result is poorer glycemic control and increased morbidity and mortality in Mexican Americans with diabetes. Nurses can have a
significant role in patient education and support to address this problem. An intervention program is needed that will be effective among Mexican Americans who have diabetes. The purpose of this report is to describe a plan for an evidence-based intervention to help Mexican Americans with type 2 diabetes achieve improved glycemic control, resulting in better health and fewer complications.
CHAPTER TWO: CONCEPTUAL MODEL AND REVIEW OF LITERATURE

Improving glycemic control usually requires making behavior changes in the areas of diet and exercise, which is difficult for many people. Chapter Two consists of a description of Pender’s Health Promotion Model and the factors that the model describes that influence behavior change. The chapter also details a review of the literature regarding ways to facilitate these changes for Mexican Americans with diabetes, including culturally relevant interventions, social support and cognitive behavioral therapy techniques. In addition, the chapter contains a discussion of a study of the feasibility of combining culturally relevant interventions, social support and cognitive behavioral techniques into one intervention program. Pender’s Health Promotion Model provides a conceptual framework for understanding the interaction of these elements.

Conceptual Model

In the literature, Pender’s Health Promotion Model (HPM) is the framework for many studies regarding behavior change. Many researchers have tested it and shown it to be relevant for interventions aimed at changing behavior (Colwell, Prather, Phillips, & Zinsmeister, 1998; Lannon, 1997; Martinelli, 1999; Srof & Velsor-Friedrich, 2006). In her model, Pender describes the interactions between individual characteristics and experiences, cognitions and affect regarding a behavior, and competing demands and preferences. Prior experiences related to a behavior affect the way the person perceives a change in behavior and the ability to make the change, or self-efficacy, for the behavior. Perceived benefits of a behavior along with perceived self-efficacy affect the behavior positively. Activity-related affect, or the way the person feels about a behavior, has a powerful impact, as do the interpersonal influences that come from
family, peers, and healthcare providers. Perceived barriers to change have a negative impact on making a change. Situational influences can have either a positive or a negative role in promoting a behavior. Competing demands for either time or resources may interfere with the realization of a behavior change. The individual’s personal preferences may become a barrier to change. All of these factors influence the person’s motivation to change and follow-through (Pender, Murdaugh & Parsons, 2006).

Pender’s Model represents “Individual Characteristics and Experiences” as consisting of “Prior related behavior” and “Personal factors” (Pender et al., 2006, p. 50). “Prior related behavior” can be defined as the experience that a person has with behaviors similar to those needed or desired. In this report, “Prior related behavior” (p. 50) would consist of behavior that promotes better glycemic control, such as attempts to eat a healthier diet or to exercise regularly. Personal factors, which consist of individual characteristics such as age, race, gender (Srof & Velsor-Friedrich, 2006), “health locus of control and perceived health status” (Martinelli, 1999, p. 264), also influence behavior according to Pender et al. (2006). These personal factors and experiences with prior related behavior directly affect the next level of influences on behavior, “Behavior-specific Cognitions and Affect” (Pender et al., p. 50).

The thoughts and feelings the person has regarding a behavior, or “Behavior-specific Cognitions and Affect” (Pender et al., 2006, p. 50) strongly affect the performance of a health-promoting behavior. Past experience has a strong correlation with “activity-related affect,” (p. 54). The person’s positive experiences with the behavior increase perceived self-efficacy for the behavior (p. 53). Feelings of fear and doubt of one’s own ability undermine self-efficacy for a specific behavior. The behavior-specific cognitions include the person’s perception of the benefits of and the barriers to the behavior. “Perceived benefits of action” (p. 52) are the advantages or positive results the person believes will come from a specific behavior change. “Perceived barriers” consist of difficulties the person views as “the unavailability, inconvenience, expense, difficulty or time-consuming nature of a particular action” (p. 53). At this level, interpersonal and situational influences can affect a behavior. Interpersonal influences from the person’s family, peers, or health care providers can help or hinder the person in carrying
out a behavior. Situational influences are circumstances and environmental factors that play a role in shaping the cognitions and affect of the person at this point.

Behavior Outcome in Pender’s Model consists of three parts, “Commitment to a plan of action,” “Immediate competing demands and preferences,” and the resulting “Health-promoting behavior” (Pender et al., 2006, p. 50). Once the person is committed to a plan of action, the only hindrances to performing the behavior according to Pender are immediate competing demands and preferences. Competing demands are alternative behaviors the person thinks of when preparing to do a planned behavior. They are “behaviors over which individuals have a relatively low level of control” (p. 56), such as demands of job and family. Competing preferences are behaviors that the individual enjoys, over which the individual has “a relatively high level of control” (p. 57), which preclude the desired behavior. If the person overcomes these competing demands and preferences, the result is success that feeds self-efficacy and positive affect, which in turn makes repetition of the behavior more likely (Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004).

Application of Conceptual Model

“The Health Promotion Model allows for a rapid assessment of behavioral factors which influence compliance” with health-promoting behaviors (Lannon, 1997, p. 179). The HPM can be applied to helping Mexican Americans with diabetes achieve better glycemic control. By determining the factors that affect the person’s tendency to choose dietary or physical activity behaviors beneficial to controlling diabetes, the health-care provider can choose interventional strategies that target those factors. Two of the factors, perceived self-efficacy and interpersonal
influences, form the framework for the intervention program, and are discussed in the following paragraphs.

Perceived Self-Efficacy

Perceived self-efficacy has a crucial role in advancing the likelihood of a particular behavior change, according to the HPM. Perceived self-efficacy can be defined as the person’s perception of capability to successfully perform a behavior. When a person feels confident in his or her ability to complete a behavioral task, such as exercise, the person is also more motivated to carry out that particular behavior (Pender et al., 2006). According to Rosal et al. (2001) a person’s perceived level of self-efficacy regarding a particular behavior correlates with both the willingness to perform the behavior and the persistence of the behavior despite any difficulties the individual may face. Poor self-efficacy may occur when the person has the perception of insufficient knowledge, skills, or resources for a particular behavior change; lack of social support can also lower perceived self-efficacy (Rosal et al., 2001). Building the individual’s sense of self-efficacy in the ability to self-manage diabetes and avoid complications is an important component of any intervention program to improve glycemic control and is incorporated in the intervention program proposed in this report.

Interpersonal Influences

According to the HPM, the influence of other people is a key factor for changing behavior. This influence can come from a health care provider, a trusted friend, a significant other, or a family member. A warm, caring, and friendly provider can have more influence with the person with diabetes, compared with a provider who is distant or seems uncaring (Warda, 2000). In addition, the provider can employ an LHA from the specified culture to assist in patient
education that is culturally appropriate, and to give social support. Social support from family is also important in interpersonal influences promoting healthy behaviors for Latinos with diabetes. Multiple studies (Benavides-Vaello, Garcia, Brown, & Winchell, 2004; Fisher et al., 2000; Gleeson-Krieg, Bernal, & Woolley, 2002; Vincent, Clark, Marquez Zimmer, & Sanchez, 2006; Wen, Parchman, & Shepherd, 2004) verify the importance of interpersonal influences from family for promoting healthy behaviors in Latinos with diabetes as seen in Pender’s Model. Any intervention designed to promote behavior change in Mexican Americans must include the family. In the HPM, Pender and colleagues (2006) affirm the value of interpersonal influences for behavior change. Interventional strategies that fit into the HPM may help Mexican Americans with type 2 diabetes achieve improved glycemic control.

**Review of the Literature**

The HPM includes concepts that are relevant to behavior changes, such as those necessary for improving glycemic control in Mexican Americans with diabetes. The following section is a survey of the literature relevant to the subject of Mexican Americans with diabetes. Five interventional strategies were found in reviewing the literature regarding behavior change among persons with chronic illnesses, encouraging healthy behaviors in Latinos, improving glycemic control in persons of all races with diabetes, and specifically in Mexican Americans with type 2 diabetes. Each of these strategies is consistent with the HPM in promoting behavior change. Perceived self-efficacy as used in the HPM is an essential component of two of the strategies discovered, MI and CBT. Evidence supports the importance of interpersonal influences such as family support and use of LHAs in encouraging behavior changes, as shown in the HPM.
The review of literature focuses on the two HPM concepts most relevant to the intervention program: perceived self-efficacy and interpersonal influences.

**Perceived Self-Efficacy**

According to the HPM, perceived self-efficacy is one of six major factors that influence behavior change. A number of studies indicate that improving a person’s perceived self-efficacy increases the performance of specified behaviors (Cid, Marino, & Stiepovich, 2006; Lannon, 1997; Martinelli, 1999; Piazza, Conrad, & Wilbur, 2001; Wu & Pender, 2002). There has been some controversy regarding the appropriateness of promoting self-efficacy for a community-based culture such as that of Mexican Americans (Elder et al., 2009; Oomen et al., 1999). However, studies by Alcalay, Alvarado, Balcazar, Newman, and Huerta (1999), Bernal, Woolley, Schensul, and Dickenson (2000), Cid et al. (2006), and Wen, Shepherd, and Parchman (2004) all found that improving self-efficacy in Latino adults resulted in improved adherence to various health-promoting behaviors. According to Lee et al. (2008), there are four ways to increase perceived self-efficacy: “performance accomplishments, vicarious learning, verbal encouragement, and physiological and affective states” (p. 1694). Carlos Poston et al. (2003) found that three of these strategies known to enhance self-efficacy improved the diet and exercise behaviors of Mexican American women. In this study the researchers used behavioral modification techniques including (a) self-monitoring, allowing for performance accomplishment, which increases self-efficacy; (b) cognitive restructuring and stress management, which improve behavior-related affect; and (c) social support, allowing for verbal encouragement through interpersonal influences (Lee et al., 2008). According to the HPM, these three areas are important in promoting behavior change. Lorig, Ritter, and Gonzalez (2003) and
Vincent, Pasvogel, and Barrera (2007) found that small increases in self-efficacy in Mexican Americans with diabetes accompanied statistically significant improvements in HbA1c, Body Mass Index (BMI) and weight. These and other studies lead to the conclusion that self-efficacy is necessary in any culture for promoting a healthy lifestyle (Cid et al., 2006; Lannon, 1997; Martinelli, 1999; Piazza et al., 2001; Williams, Wold, Dunkin, Idleman, & Jackson, 2004; Wu & Pender, 2002; Aljasem, Peyrot, Wissow, & Rubin, 2001; Foreyt & Goodrick, 1994; Gatt & Sammut, 2008; Karlsen, Idsoe, Dirdal, Hanestad, & Bru, 2004; Von Ah et al., 2004).

Incorporating methods that increase perceived self-efficacy into an intervention promotes success in making a behavior change. In order for individuals to have a feeling of accomplishment regarding performance of a healthy behavior, it is important to help them set small, attainable goals (McWelschen et al., 2007; Peyrot & Rubin, 2007), and then give verbal praise for reaching them, which constitutes verbal encouragement, resulting in an increase in self-efficacy. Vicarious learning takes place when individuals see or read about someone they relate to engaged in the desired healthy behaviors, encouraging them to believe they can as well (Lee et al., 2008). In several studies this took place during a group counseling session, with positive results (Carlos Poston et al., 2003; Karlson et al. 2004; Van Der Ven et al., 2005).

Aljasem and colleagues (2001) state that “self-efficacy is crucial to taking on a challenging task and overcoming obstacles to successful implementation of the treatment regimen” (p. 402). Therefore, treatment regimens need to include interventions designed to enhance patients’ self-efficacy (Foreyt & Goodrick, 1994). Research shows that two interventional strategies that have self-efficacy as a major component, MI and CBT, are effective in bringing about behavior change (Hettema, Steel & Miller, 2005; Burke, Arkowitz, & Menchola, 2003; Kenardy, Mensch,
Motivational Interviewing

“The four guiding principles of MI are: express empathy, develop discrepancies, roll with resistance and support self-efficacy” (McWelschen et al. 2007, p. 2). This approach recognizes the person’s autonomy and assists in the exploration of feelings regarding the change. Multiple studies analyzed by Hettema et al. (2005) have shown that MI helps patients develop the motivation to change. Often a person will realize there is a discrepancy between personal values and beliefs and personal behavior (Pender et al., 2006). MI is a technique in which a counselor or health care provider utilizes a person’s sense of ambivalence about making a behavior change to “tip the scales” toward the commitment to change. Because people often want to change their behavior (e.g., diet or exercise), but also enjoy their current behaviors, they become “stuck” in indecision and are not committed to change. The common healthcare method of telling the person what to do often results in resistance. MI works by asking individuals for their own personal reasons to change or not to change. The provider seeks to help the person verbalize the beliefs and values that are in opposition to current behavior, to see the inconsistency, and to move toward a commitment to change by realizing how the desired behavior change fits with expressed values (Levensky, Forcehimes, O'Donahue, & Beitz, 2007).

MI techniques have been shown in the research to be effective in a variety of types of behavior change. Researchers have applied MI to health promoting behaviors such as diet, exercise, smoking, HIV risk reduction, and water purification (Hettema et al., 2005). According to one meta-analysis of studies utilizing MI, three out of four studies obtained positive results
(Rubak et al., 2005). Meta-analyses by Burke et al. (2003), Knight et al. (2006), and Van Wormer and Boucher (2004) showed that MI was effective in increasing adherence to diet and exercise recommendations. Studies regarding diabetes self-care by Kenardy et al. (2002), and McWelschen et al. (2007) showed that MI incorporated into a cognitive-behavioral approach was effective for improving self-care. Peyrot and Rubin (2007) recommended MI as a component of a behavioral intervention for improving diabetes self-management based on a review of the literature. Two other studies (Hoy et al., 2009; West, Dilillo, Bursac, Gore, & Greene, 2007) showed MI to be effective as part of interventions to improve health promoting behaviors including diet and exercise. West et al. (2007) also showed that an intervention using MI resulted in improvements in HbA1c values in the intervention group. One study (Arroyo, Miller, & Tonigan, 2003) showed that MI was just as effective for Hispanics as for non-Latino Whites in reducing alcohol abuse. The study by Rosal et al. (2005) found using MI was effective specifically with Mexican Americans with diabetes, when used in conjunction with behavioral therapy techniques.

**Cognitive Behavioral Therapy Techniques**

Sometimes just having the motivation and desire to change is not sufficient to bring about a behavior change. The best results in several studies were obtained when MI was combined with cognitive behavioral therapy (Kenardy et al., 2002; McWelschen et al., 2007). CBT targets the person’s beliefs and attitudes toward the behaviors, along with belief in the ability to perform the behaviors. Interventions using CBT have been successful in bringing about behavior change: in reviews of the literature, Lee et al. (2008) and Peyrot and Rubins (2007) found that interventions including cognitive behavioral strategies were more successful than interventions based only on
patient education. Kahn et al. (2002), Carlos Poston et al. (2003), and Simons-Morton et al. (2001) found that CBT is more effective than education alone in changing behavior. In the previous section, the effectiveness of CBT combined with MI for changing behavior was explored. CBT includes cognitive interventions and behavior modification techniques. For example, a cognitive restructuring intervention might be to help the patient replace the thought, “I’m never going to lose weight” with the affirmation, “I can lose weight by following this diet and exercising; it just takes time.” A behavior modification technique is to praise the person for even small successes such as reciting this affirmation, foregoing a piece of pie, or exercising for ten minutes. Both have the effect of increasing the patient’s self-efficacy (Carlos Poston et al., 2003).

Strategies for behavior modification, according to Carlos Poston et al. (2003), included “self-monitoring, stimulus control, contingency management, cognitive restructuring, stress management, and social support” (p. 1487). Self-monitoring appears in other studies in the form of keeping a diary (Enright, 1997) or log (Carlos Poston & Foreyt, 2000). Stimulus control is recognizing any external cues that the person associates with particular behaviors, such as the association of eating a snack with a specific television program (Carlos Poston & Foreyt, 2000). Contingency management is planning specific strategies for coping with everyday events such as this, that might impede the healthy behavior (McWelschen et al. 2007). Cognitive restructuring consists of helping patients to identify negative, dysfunctional thoughts and assumptions, and to replace them with affirmations of positive truth (Enright, 1997). Cognitive restructuring is one of the ways to increase self-efficacy by replacing thoughts of hopelessness and defeat with realistic appraisals of the ability to change behavior to improve health (Carlos Poston & Foreyt, 2000).
Stress-reducing techniques include teaching slow, deep breathing, meditation and progressive muscle relaxation. Stress management, according to Carlos Poston and Foreyt (2000), reduces the tendency to overeat, improving the person’s ability to persist in healthy eating and to cope with chronic disease.

Attitudes and beliefs about disease or health that have an impact on the ability to cope with the disease and manage it successfully (Karlsen et al., 2004; Van Der Ven et al., 2005) comprise the person’s “behavior-specific cognitions” (Pender et al., 2006, p. 50) in the HPM. One aspect of CBT, cognitive restructuring focuses on challenging assumptions and beliefs which are distorted or dysfunctional (Karlson et al, 2004, Peyrot & Rubin, 2007). According to Peyrot and Rubin (2007), “helping patients recognize the power of “self-talk” (what they say to themselves) can enhance emotion-focused coping and is the foundation of the preferred approach for dealing with emotional distress” (p. 2436). The person is taught to listen to his or her inner dialogue and write down what thoughts accompany or produce particular emotions, as well as any resulting behaviors. In this way the person can begin to see how specific thoughts are associated with particular emotions and behavior (Enright, 1997). The health care provider, counselor, or LHA can act as a coach to help the person question the thoughts that produce negative emotions, examine them in a rational way, and replace them with affirmations of positive truth (Enright, 1997; Peyrot & Rubin, 2007). For example, the thought, “I’ll never be able to exercise 30 minutes five times a week” can be challenged and replaced with “I may not be able to exercise five times a week right now, but I can start with twice a week and find ways to fit more exercise into every day.” Karlson, Horton and Flores (2004) found that using this method can help the person begin to see the possibility of behavior change, producing hopeful
feelings that encourage the actual behavior. The result was improved glycemic control and increased perceived self-efficacy (Karlson et al., 2004), which has a direct impact on the likelihood of performing the desired behavior (Von Ah et al., 2004). Carlos Poston and colleagues (2003) used cognitive restructuring in a weight loss program with Mexican Americans that produced significant weight loss when used along with pharmacotherapy. Thompson et al. (2007) studied an intervention that included CBT facilitated by LHAs, that was shown to be effective in decreasing HbA1c values in Mexican Americans with diabetes.

Another aspect of CBT that improves self-efficacy and adds to positive affect regarding behaviors is contingency management, or advance planning to overcome foreseen barriers to the behavior. This is consistent with the HPM in its inclusion of “perceived barriers to action” under “behavior-specific cognitions and affect” (Pender, 2006, p.50). Aljasem et al. (2001) found that when people with diabetes perceived barriers to diet and exercise compliance, the result was poor diet choices and less exercise. Newsom et al. (2004) found that 36% of elderly Canadians in their study reported that they were dissuaded from physical activity because of perceived barriers. A study by Boehm, Schlenk, Funnell, Powers, and Ronis (1997) showed that contingency planning resulted in improved diet adherence. Kenardy and colleagues (2001) found that including planning for situations with a high risk for binge eating in a CBT intervention resulted in a longer lasting improvement than nonprescriptive therapy. Knowing what to do when barriers are encountered increases perceived behavioral control, which is correlated with self-care behaviors (Gatt & Sammut, 2008). A literature review by Krichbaum, Aarestad, and Buethe (2003) found coping with barriers to diabetes self-care to be one of the most important factors in improving diabetes self-efficacy, resulting in better health outcomes. Problem solving was a key
component of a CBT intervention pilot study on diabetes self-care by McWelschen and colleagues (2007). Rosal et al. (2001) advocated including barrier management as an important part of patient counseling for improved diet. Thus, barrier management should be included in any intervention for improving diabetes outcomes in Mexican Americans.

Interpersonal Influences

Although an individual’s culture can facilitate healthy behaviors, it can also be a source of barriers to healthy behaviors. It comprises both a personal factor and an interpersonal influence in the HPM (Pender et al., 2006). Culture is the source of norms for behavior as well as language and customs (Miriam-Webster, n.d.). People are influenced both by their culture and by their family and peers regarding health behaviors. Health care professionals can also serve as interpersonal influences. The most effective interpersonal influences are those from the same culture with the same native language or those with cultural competence (Warda, 2000). Three important interpersonal influences are culturally relevant interventions, LHAs, and family support.

Culturally Relevant Interventions

One barrier to diabetes self-management is the cultural difference between Mexican Americans with diabetes and educators or educational materials written by and for non-Latino Whites. Brown and colleagues (2002) did the landmark study on the effectiveness of culturally competent diabetes education for Mexican Americans as part of the Starr County Border Health Initiative. A large group of Mexican Americans with diabetes was divided into a control group that received standard educational materials and teaching about diabetes management, and an intervention group that received culturally tailored education. HbA1c values in the experimental
group decreased by a full percentage point over a twelve month period, showing a statistically significant improvement. A study by Lorig and Gonzalez (2000) showed improvements in self-reported health behaviors including diet, exercise, and glucose monitoring when patients received culturally relevant education. Ayala et al. (2001) used focus groups to develop a culturally tailored nutritional intervention for Latino women, which they subsequently tested and showed to be effective in improving nutrition. Brown et al. (2007) found that culturally specific diabetes education resulted in improved HbA1c levels. Gilmer, Philis-Tsimikas, and Walker (2005), Joshu, Rangel, Brownson, and O'Toole, (2007) and Lujan et al. (2007) used culturally tailored materials combined with the use of LHAs. This strategy successfully improved the dietary intake and resulted in lowering A1c levels and increasing the diabetes-related knowledge.

_Lay Health Advisors (LHAs)_

The use of Lay Health Advisors (LHAs) has been effective in improving health outcomes. In a review of the literature, Swider (2002) found that using community health workers, another title for LHAs, was effective in improving knowledge, health outcomes, and healthy behaviors in varied populations. Subsequent studies indicate the effectiveness of LHAs specifically in the Latino and Mexican American populations (Ayala et al., 2001; Elder et al., 2005; Gilmer et al., 2005; Ingram et al. 2007; Lujan et al., 2007; Sixta & Ostwald, 2008; Thompson et al., 2007; Weiler & Tirrell, 2007).

_Promotoras_, with their unique first-hand knowledge of the Mexican American culture and command of the language, delivered diabetes self-management education in a culturally sensitive manner by speaking Spanish at the appropriate level, using relevant food items, recommending feasible physical activities, and
acknowledging and integrating the Mexican American beliefs of divine fatalism and familialism (sic.) into relevant interactions to improve health (Lujan et al., 2007, p. 666).

A three-armed study by Elder et al. (2005) compared the use of standard “off-the-shelf, Latino-targeted materials” (p. 50) to the use of culturally-tailored materials alone, and the use of the same materials plus an LHA, to improve nutritional intake in Latinas. They found that those in the LHA plus culturally-tailored materials group had statistically better outcomes in terms of reduced calorie, fat, and carbohydrate intake. An important reason that LHAs are more successful at patient education than culturally relevant materials alone is that LHAs can tailor the education in a way that is relevant to a specific individual. Lujan et al. (2007) found in a randomized, controlled trial that using LHAs to reinforce printed diabetic educational materials over a six month period resulted in improved outcomes in Mexican Americans with diabetes. A study by Gilmer et al. (2005) showed a significant decrease in HbA1c levels, blood pressure, and total cholesterol levels in a culturally-tailored self-management program delivered by LHAs. The Diabetes Control and Complications Trial showed that improved glycemic control reflected by lower HbA1c values is linked to fewer diabetes complications (National Diabetes Information Clearinghouse, 2008). Thus LHAs can effectively deliver diabetes teaching in a way that is superior to that of the health care provider using printed materials.

A number of primary care clinics have successfully implemented LHA-led diabetes education (47 studies cited by Elder et al., 2009). Some specific examples are the *Campesinos sin Fronteras* program in Somerton, Arizona, the *Gateway Community Health Center* in Laredo, Texas, the *Holyoke Health Center Incorporated* (Holyoke, Massachusetts), and *La Clínica de la*
Clinics throughout Galveston County, Texas use LHAs for diabetes education and support (Robert Wood Johnson Foundation, 2006). At La Clínica del Cariño Family Health Care Center in Hood River, Oregon, promotores are used for general healthy lifestyle education and support, including for those who have diabetes (La Clínica Del Cariño, 2009). Regarding financial feasibility, Project Dulce found the expenditures for LHAs and diabetes management education to be higher for the clinic, but the resulting decrease in hospital admissions was a significant cost savings for the state healthcare program (Gilmer et al., 2005). A study of a diabetes self-management education program in a community clinic in Austin Texas found a significant decrease in HbA1c values for a very modest cost of $279 total per participant for 12 months, including diabetes testing supplies (Banister, Jastrow, Hodges, Loop, & Gillham, 2004). While this program did not use LHAs, it can be conjectured that a clinic would save money by using LHAs for some of the hours of instruction instead of a physician, Certified Diabetes Educator, or registered dietician.

In addition to patient education, an important role of LHAs is to provide social support and to reinforce positive behaviors (Pender et al., 2006). Thompson et al. (2007) found that using LHAs resulted in lowered HbA1c levels, with a correlation between the number of contacts with the LHA and the reduction in HbA1c, reflecting the importance of LHAs’ social support. A study by Weiler and Tirrell (2007) used currently employed bilingual Hispanic office nurses as LHAs for a rural clinic. These RNs and LPNs were trained by Certified Diabetes Educators, and were required to update their training every two years. Weiler and Tirrell (2007) noted a reduction in HbA1c levels of more than two percentage points as a result of diabetic teaching by
these nurses in the clinic setting. In a study of migrant workers with diabetes along the US-Mexico border, Ingram et al. (2007) found that using LHAs from the migrant community also resulted in significantly decreased HbA1c readings as well as decreased LDL levels and blood pressure after a year. They also sought to increase the perceived social support from all sources, including the LHA and the family. The participants indicated through questionnaires that they felt more emotional support from their families and friends after the intervention, as well as more willingness to discuss their diabetes with their peers and their health care providers. The evidence points to the conclusion that in the Mexican American population, the use of LHAs can improve the health outcomes of persons with diabetes.

Family Support

Just as LHAs provide social support for diabetes management, the person’s family can also play a vital role in improving disease management. According to Fisher et al. (2000), “the family embodies the patient’s most powerful and influential web of intimate personal relationships and has an enormous supportive or deleterious effect on patient behavior, health, and well-being” (p. 267). The family in Mexican American culture makes many of the decisions regarding health care (Anderson et al., 1998; Wen et al., 2004). The family is also the source of many of the attitudes and beliefs its members hold (Weiler & Crist, 2007), including those about diabetes. Families are particularly important as interpersonal influences cited in Pender’s model. According to Weiler and Crist (2009), the family of the Mexican American with diabetes is a source of advice and encouragement in self-care behaviors. Studies show that when families are supportive of the individual with diabetes, self-care improves in the areas of diet and exercise,
compared with individuals who do not feel supported by their families (Anderson et al., 1998; Wen et al., 2004).

The family can also present barriers to diabetes management. Anderson et al. (1998), Wen et al. (2004), and Fisher et al. (2000) found that many Mexican American women with diabetes were reluctant to follow diabetes diet recommendations when they conflicted with the family’s preferred foods. Women with diabetes thought the expense of special foods was a barrier because of their belief that the family’s needs should come first (Martinelli, 1999; Weiler & Crist, 2007). This “family-oriented worldview” (Weiler & Crist, 2007, p. 31) can also result in barriers to exercise for women with diabetes, who put household tasks and caring for other family members ahead of spending time caring for themselves by exercising. The final barrier families often presented relates to stress caused by family problems or lack of cohesion, producing poor self-care and poorer glycemic control (Anderson et al., 1998, Chesla et al., 2003; Fisher et al., 2000). The body of evidence points to the importance of including family members in diabetes education and including the family in the care plan of the person with diabetes.

Summary

This chapter was a discussion of Pender’s HPM and its application to diabetes self-care along with five strategies for promoting healthy behaviors in Mexican Americans, including MI, CBT, culturally relevant education, LHAs, and family support. Pender’s Model suggests that interventions that support self-efficacy are essential for behavior change. Some research literature supports the effectiveness of both MI and CBT in promoting self-efficacy. Pender’s Model states that sociocultural characteristics affect behavior change. For Mexican Americans with diabetes, research shows the effectiveness of presenting self-care information in a
culturally-sensitive way to increase the likelihood of compliance; LHAs are ideally suited to this function. The HPM also cites interpersonal influences as important to behavior change; the use of LHAs and the nurturing of family support serve as strong positive interpersonal influences, according to the research literature. The evidence presented supports MI and CBT as strategies that facilitate behavior change in general, and changes in diet and exercise in particular. There is little published research about the effectiveness of MI and CBT specifically for Mexican Americans with diabetes; however, research results suggest there is promise that these would be effective. The research reviewed indicates that use of culturally tailored educational materials, LHAs, inclusion of family support, MI, and CBT, individually or in combination, enhance the likelihood for behavior change. The feasibility of an intervention program incorporating these interventions, including CBT and MI, culturally tailored education, LHAs, and family support, is unknown. No research has been reported to test an intervention program using these five interventions in combination.
CHAPTER THREE: INTERVENTION PROGRAM

This chapter is a description of a 12 month intervention program that uses the combined effects of education, counseling and social support to improve the glycemic control of Mexican American adults with type 2 diabetes. The educational component of the intervention has been tailored for Mexican Americans and will be delivered by LHAs. Other strategies are enlistment of family support, and the use of MI and CBT to improve self-efficacy. The chapter describes the setting, recruitment process, training of the LHAs, and protection of human subjects for the study. The chapter details the roles of the health care provider, the counselor, the LHA, and the participant. Chapter Three reports details of the intervention itself, an outline of the educational materials and class for the participants, and the timeline for office visits and contact with the LHAs over a twelve month period. There is a description of a feasibility study for the intervention program. The study encompasses the LHA recruitment, training, and implementation of the first three months of the intervention program itself. The feasibility study differs from the intervention program only in the abbreviated length of time and the data collection.

Setting

The setting of the intervention will be a family or adult outpatient clinic in which many of the patients are Mexican American adults. Most of the intervention program will take place in the clinic, including recruitment, LHA training, the initial and subsequent physical assessments of the participants, the labs, the diabetic self-management class, and the one-on-one counseling appointment with a professional counselor. The LHAs will make telephone contacts from the
office or the LHAs’ homes. The remainder of the intervention program will take place in the participants’ homes, including home visits by the LHAs in Week 2, Week 6, and Week 40.

Recruitment Procedures and Roles

The author will recruit participants for the intervention program primarily from the clinic where she will be employed. Potential participants will be interested Mexican American adults with type 2 diabetes who are currently enrolled at the clinic, health care providers employed by the clinic, LHAs, and one or more professional counselors. In subsequent paragraphs, “participants” will refer only to Mexican Americans with diabetes enrolled in the program. Providers and LHAs will be referred to by those respective terms.

Recruitment, Roles and Protection of Program Participants

The participants will consist of Mexican American patients in the clinic with previously diagnosed type 2 diabetes who are age 18 and older, and speak Spanish or are bilingual in Spanish and English. For the feasibility study, approximately 20 people will be recruited. Exclusion criteria are pregnancy, unstable angina, advanced cancer, end-stage renal disease, and severe unstable congestive heart failure. Individuals with no family members or friends to act as support persons or with plans to leave the area for more than two consecutive weeks during the twelve months of the intervention program will be excluded.

Recruitment of Program Participants and Their Role

The author will create posters with colorful illustrations to be displayed in the clinic to give a very brief description of the program in Spanish and English. Poster content will also be printed on postcards to mail to possible participants identified by office staff. The author will develop a brochure to give to interested Mexican Americans that would give a more detailed
description of the program with the criteria for eligibility and the approximate timeframe. The brochure will also include graphics and be printed in both English and Spanish. The author will work with the clinic director to institute a procedure by which providers can refer their Mexican American patients with diabetes to the intervention program. The author will post pre-approved recruiting posters in the clinic waiting areas and each of the exam rooms. Front office staff will receive a blank form on which to record a list of the names of anyone who mentions being interested in the program. Interested persons will be asked to sign HIPAA waivers to permit their charts to be reviewed for eligibility and for the author to contact them about the project. The author will call interested patients with more information or mail them a brochure after reviewing their charts for eligibility. The role of participants will be to attend the prescribed clinic visits for assessments and labs, the diabetes self-management class, and the counseling session. They will be expected to provide information regarding any changes of address or phone number, and to be willing to share with the LHAs regarding their self-management behaviors.

**Protection of Human Subjects (Program Participants)**

The author will apply for approval to the Institutional Review Board for the setting in which the study will take place. All participants will be asked to sign a consent form detailing their role in the intervention program, what they can expect, and their freedom to withdraw from the program at any time (see Appendix A).

**Recruitment of Health Care Providers and Their Role**

The author will prepare a PowerPoint presentation for the providers and staff, including a summary of the evidence base, a detailed proposal of the intervention program, and a proposed budget. The author will request that all the health care providers at the clinic where the
intervention will be proposed attend a brief presentation of the intervention program. She will invite providers to review the curriculum for training the LHAs and the curriculum for the participants’ diabetes self-management class and make suggestions. The purpose of this presentation is to persuade providers to agree to implement the intervention and to refer participants for the program. The providers who take part in the intervention program may or may not choose to participate in the feasibility study. The author will request that those who agree to participate in the feasibility study sign an Informed Consent Form similar to that in Appendix A with the program’s expectations of their role, an agreement to maintain the participant’s privacy, and a statement of their freedom to withdraw at any time. The role of the health care providers is to refer eligible Mexican Americans with diabetes to the intervention program. For the feasibility study, the author will request that they fill out a short questionnaire regarding their perceptions of the intervention program at the end of the 12 weeks.

Recruitment of Counselors and Their Role

The author will recruit counselors through recommendations from clinic providers or office staff. Inclusion criteria for the professional counselors are training as a psychologist, Psychiatric NP, or certified counselor with a Master’s in Social Work, an interest in the program, fluency in Spanish, and willingness to accept a discounted rate of payment for those participants whose insurance will not pay for the appointment. Additional criteria are knowledge of and willingness to use the CBT and MI techniques incorporated in the program. The author will contact each candidate by phone and then conduct a personal interview.

The author will give counselors who agree to participate a detailed written explanation of the program and their role. They will be expected to maintain the participant’s privacy. The role
of the professional counselor is to meet with each participant for one session to ascertain the participant’s readiness for change, encourage a commitment to change, and help the participant choose one or more positive affirmations regarding the change to help begin cognitive restructuring.

Recruitment of Lay Health Advisors (LHAs) and Their Role

For this intervention, the author will recruit LHAs from the community through recommendations from community leaders such as pastors and priests, local school staff, and nominations from clinic patients. Qualified people are bilingual (Spanish and English), and available for 24 hours of training, plus follow-up testing and periodic meetings with the author in the clinic to review skills and concepts (Thompson et al., 2007), as well as to discuss any problems encountered. In addition they will need to be literate, based on a passing score on the Test of Functional Health Literacy (Parker, Baker, Williams, & Nurss, 1995). They should express a desire to serve the community (Thompson et al., 2007). The author will base the evaluation of these characteristics on the references from the community and an in depth interview with prospective candidates. The author will give those who agree to participate in the intervention program and the feasibility study an Informed Consent Form similar to that in Appendix A with the program’s expectations of their role, an agreement to maintain the participant’s privacy, and a statement of their freedom to withdraw at any time. The role of the LHA is to provide tailored diabetes education to the participants, to contact them on a prescribed schedule by phone and through visits in the home, and to serve as a source of support and encouragement for healthy behaviors to help participants improve their glycemic control. The author will conduct the LHA training.
**LHA Training**

The LHA training will take place in the clinic for a total of approximately 24 hours over the course of several weeks. The scheduling of the LHA training will depend upon the availability of the LHAs; it can be done in eight weekly sessions of three hours each or in three longer eight hour sessions. The author will prepare teaching materials for the LHAs, including a printed handbook and a curriculum to teach basic physiology of diabetes, effects on body systems, complications, self-management including diet and exercise, and MI and CBT techniques. An outline is contained in Appendix B. The author will submit the curriculum to the other providers in the office for approval in terms of content, understandability, and completeness. LHA training by the author will take place during the recruitment period for program participants. Any office staff members who are interested are welcome to attend also.

**Training Content**

Training of the LHAs consists of the following topics: basic information regarding the pathophysiology of diabetes, recommended dietary guidelines for diabetes with special emphasis on culturally relevant foods, exercise recommendations and possible venues for exercise (Midwest Latino Health Research, Training & Policy Center, 2006; Nettles & Belton, 2009), and cognitive behavioral techniques including MI to improve adherence of participants to behavioral changes (Reinschmidt, 2005). See Appendix B for more details. The author may request a nutritionist, diabetes educator or counselor, if available, to present specific topics within their expertise. The training will take place in Spanish in an informal classroom format with discussion questions and brainstorming to improve the curriculum for the diabetes self-management class to be taught to participants. The LHAs will receive a printed handbook for
reference. Training will include role-playing to practice MI and CBT techniques. Upon completion of the training, the author will test the LHAs using the “Diabetes Educator Knowledge Test” (Weiler & Tirrell, 2007, p. 24-26) (See Appendix C). She will also test them on MI and CBT techniques through an observed role-play session to affirm their competency in these areas.

**Basic Physiology of Diabetes**

LHA training will begin with a basic presentation of type 1 and type 2 diabetes. Through the training sessions LHAs will learn the function of insulin in the body and the results of insulin resistance. Basic physiology will include the effect of diabetes on each body system. They will learn the basic functions and side effects of the most common oral hypoglycemics. The class will cover self-management of diabetes, especially diet and exercise, in detail. The class will teach symptoms and treatment of hyper- and hypoglycemia. The LHAs will also receive information about the complications of diabetes, their causes, and ways to prevent them. Complications the author will cover are diabetic retinopathy, nephropathy, neuropathy, and cardiovascular conditions associated with diabetes (Midwest Latino Health Research, Training, & Policy Center, 2006).

**MI Techniques**

The NP will train LHAs in cognitive behavioral techniques to help their assigned participants develop motivation to change in their assigned participants. They will learn the basic techniques of MI to guide persons with whom they work to find motivation to change within themselves. The NP will train them in specific ways to express empathy, develop discrepancies, roll with resistance and support self-efficacy (Rollnick, Miller, & Butler, 2008). The LHAs will
learn and practice asking open-ended questions, reflective listening, affirming, and summarizing responses (Levensky et al., 2007). The LHAs can apply MI to each stage of lifestyle change for the person with whom they are working. Examples of scripting using MI principles are found in Table 1.

**TABLE 1. Examples of Scripting Using MI Principles**

<table>
<thead>
<tr>
<th>Principle</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Express Empathy</td>
<td>I know it is often difficult to change our diet and give up some foods we really like.</td>
</tr>
<tr>
<td>Develop Discrepancies</td>
<td>So on one hand, you are not following a diabetes diet because you don’t have time to prepare a special meal just for yourself, but on the other hand, you want to control your diabetes better so you will be healthier and avoid complications. I’m hearing you say you want to manage your diabetes; it’s important to you. How does the diabetes diet fit into that?</td>
</tr>
<tr>
<td>Support Self-Efficacy</td>
<td>I see by your log that you are walking three times a week now. That’s great. What helped you make regular exercise a practice? What are some healthy changes you could make to your diet that wouldn’t require making a special meal?</td>
</tr>
<tr>
<td>Roll with Resistance</td>
<td>It can feel frustrating to have to eat differently than the way you’ve been eating all your life. It’s normal to feel that way. May I tell you about some small ways to change your diet that have worked well for others with diabetes? If you like, we can talk about a few areas where you’d be willing to change your diet.</td>
</tr>
</tbody>
</table>

Adapted from Van Wormer and Boucher (2004, p. 408)

**CBT Techniques**

LHAs’ training in CBT techniques encompasses how to teach the participant goal-setting, reinforcement, stress reduction, and self-monitoring. LHAs will learn how to guide the
participant to goals which are “specific, measurable, achievable, relevant, and timed” (McWelschen et al., p. 76). LHAs will learn ways to reinforce the desired behaviors, as well as how to teach self-reinforcement. Self-monitoring teaching for LHAs includes strategies such as journaling, logging or keeping a diary regarding diabetes self-management behaviors, thoughts and feelings (Boehm, Schlenk, Raleigh, & Ronis, 1993; Enright, 1997; McWelschen et al., 2007; Woo et al., 2007). The self-monitoring skills the participants learn are to prepare them for the self-awareness needed for cognitive restructuring.

Cognitive Restructuring

The NP will teach the LHAs to recognize the “connections between thoughts, affect, and behavior” (Enright, 1997, p. 1812). As they begin to be aware of their own thoughts and the emotions they evoke, the LHAs will learn to challenge the truth of negative thoughts, identify false assumptions and distorted perceptions, and replace false cognitions with more positive true ones (Enright, 1997). They will then be able to coach their clients in the same techniques. Some examples of cognitive distortions (Palmer & Gyllensten, 2008) include “I should do it perfectly”, “It’s awful to have to be on a diet all the time,” “I can’t stand this exercise program,” and “I just can’t do it; I should just give up.” Replacement affirmations are such as “It’s ok to mess up once in a while,” “It’s unpleasant to diet and exercise, but it’s not that bad,” and “I may not be able to do it all the time, but I can do it today or right now.” As the LHAs see the impact of thoughts on emotions, they will be able to coach participants through this process. Cognitive distortions often form barriers impeding behavior change.
**Barrier Management**

Barrier management consists of problem-solving to overcome difficulties in implementing behavior change. LHAs will learn to anticipate possible barriers and challenges the participants may face, and coach them in ways to overcome them (Rosal et al., 2001). Mexican Americans with diabetes commonly face pitfalls such as holidays and family gatherings; the author will discuss these and other practical situations during the LHA training, along with possible solutions for the LHAs to share with participants. According to McWelschen et al. (2007), barrier management involves defining the problem, “generating multiple possible solutions, evaluating and choosing the solution, implementing the preferred solution, [and] evaluating the outcome” (p. 76). LHAs will also learn to coach participants to see lapses as short deviations from their internal standards, as opposed to evidence of personal failure, a complete inability to change, and hopelessness, which cause decreased motivation to change (Rosal et al., 2001). By preventing a lapse from becoming a relapse, the person with diabetes can get back on track to meet personal goals for diabetes management, which is the ultimate purpose of the proposed intervention.

**Description of the Intervention Program**

The intervention program is a year-long program consisting of culturally relevant diabetes education, the use of LHAs as educators and coaches, use of MI and CBT techniques, and the inclusion of family support. To prevent relapse, the intervention will take place over a 12 month period, as shorter interventions are found to be less effective (Elder et al., 2006). The steps of the intervention program will be as follows:
• Step One – Recruitment
• Step Two – Physical Exam by PCP and Labs
• Step Three – Selection of Support Person
• Step Four – Diabetes Education Class
• Step Five – Appointment with Counselor
• Step Six – Appointment with LHA

The rest of the steps are described in Table 2. LHA contacts will take place weekly for six weeks, then every two weeks for 18 weeks, then every four weeks for the remainder of the year. The time frame between recruitment, physical exam, labs, and the Diabetes Education Class may vary with the individual participant, but should take place within one to three months. The PCP will instruct the participant in choosing a support person during the physical exam appointment, including the role that person will play.

Diabetes Self-Management Class

The author will prepare teaching materials for the diabetic education class including PowerPoints containing the main concepts taught to the LHAs, but in simple Spanish with many illustrations. See Appendix D for an outline of the class content. The participants in the program, along with the support persons of their choosing, will attend an initial class taught by an RN and an LHA. The curriculum includes education on the recommended diabetes diet using culturally specific foods. The RN and LHA will give information on stress management, the benefits of exercise, and the type and intensity of exercise which is most effective. The class will briefly cover diabetes complications including retinopathy, nephropathy, and diabetic neuropathy. It will include signs and symptoms of hypo- and hyperglycemia as well as the treatments for these.
During the class, participants will be given a printed guidebook in English and Spanish with pictures and diagrams as well as written text in easy vocabulary (Alcalay et al., 1999). The guidebook will contain summaries of the material taught, as well as some suggested modifications of common dishes, and a place to record exercise, diet, and the participant’s feelings (emotional and physical) each day. The RN and LHA instructing the class will also encourage them to note any problems they encountered in following the recommendations for diet and exercise.

Counseling Appointment

Following the class, each participant will schedule an individual meeting with one of the professional counselors involved in the program to help begin the process of cognitive restructuring. The appointment marks Week One of 52 weeks in the timeframe of the intervention program. The counselor will use MI techniques to ascertain the participant’s readiness for change, and to elicit the participant’s thoughts and feelings about the recommended changes. The counselor will help the participant see how the recommended behaviors fit into the personal value system of the participant (Levensky et al., 2007). The counselor will also encourage the participant to problem-solve any foreseen barriers to the behavior change. Finally, the counselor will help the participant choose one or two initial positive affirmations to be used to overcome negative, discouraging thoughts regarding diabetes self-care (Foreyt, 2005).

Initial LHA Appointment

For the next step in the intervention, each person will have an appointment with the LHA to make individualized plans and goals for how to implement the necessary behavior changes. The participant’s chosen support person will be invited to attend as well. They will discuss diet,
go through the person’s typical day’s diet, and plan some small changes that the person could easily make to have a healthier diet. Together they will choose a physical activity such as walking, swimming, or an exercise video, in which they will participate, with the ultimate goal of thirty minutes of physical activity for a minimum of four times a week. With the help of the LHA they will plan small successive steps to achieve these goals and others, and then to sustain this behavior for the next year.

LHA Follow-up

The LHA will then follow up by telephone weekly for six weeks, then every two weeks until six months have passed, and then once a month until the end of the year. Each phone call would consist of discussing how the person felt that week, as well as checking progress toward the week’s goals. If the person reached goals, the LHA will affirm and praise the person’s progress. If the person had problems implementing the behaviors, the LHA will assist in thinking of ways to overcome those problems for the next week (Elder et al. 2005, Lujan et al., 2007). The LHA will also meet with the person face to face, either in the home or at the clinic, at the six week point, then at three months, six months, and nine months (see Table 2). The LHA will interact with family members at these visits to encourage their support for the person in managing the diabetes (Vincent et al., 2006). After a year in the program, the participant will come to the office to repeat labs and in order for the NP to evaluate and affirm any progress.
### TABLE 2. LHA Contact Timeframe

<table>
<thead>
<tr>
<th>Time</th>
<th>Contact</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 2</td>
<td>Clinic or home visit</td>
<td>Set goals for diet and exercise</td>
</tr>
<tr>
<td>Week 3</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 4</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 5</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 6</td>
<td>Home visit</td>
<td>Review goals and progress, encourage family support</td>
</tr>
<tr>
<td>Week 7</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 9</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 11</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 12</td>
<td>Clinic visit</td>
<td>Labs</td>
</tr>
<tr>
<td>Week 13</td>
<td>Home visit</td>
<td>Review goals and progress, Encourage family support</td>
</tr>
<tr>
<td>Week 15</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 17</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 19</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 21</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 23</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 25</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 26</td>
<td>Home visit</td>
<td>Review goals and progress, encourage family support</td>
</tr>
<tr>
<td>Week 28</td>
<td>Clinic visit</td>
<td>NP appointment and Labs</td>
</tr>
<tr>
<td>Week 30</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 34</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 38</td>
<td>Clinic visit</td>
<td>Labs</td>
</tr>
<tr>
<td>Week 40</td>
<td>Home visit</td>
<td>Review goals and progress, Encourage family support</td>
</tr>
<tr>
<td>Week 42</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 46</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 50</td>
<td>Phone call</td>
<td>Review goals and progress</td>
</tr>
<tr>
<td>Week 52</td>
<td>Clinic visit</td>
<td>NP appt and Labs</td>
</tr>
</tbody>
</table>

**Feasibility Study**

Before implementing the intervention with all eligible clinic clients, the author will evaluate the feasibility of the intervention. For the feasibility study, the intervention will be tested with a small sample of approximately 20 Mexican Americans with type 2 diabetes, using
two LHAs, for a period of three months. The LHA training will take place as previously described prior to the three month intervention period. Recruitment for the study will be through the same procedures as described above for program participants. The author will obtain informed consent from each participant and a HIPAA waiver to use data collected from patients’ charts, assessments and labs as part of the feasibility study. The study proposal will be submitted to the Institutional Review Board for the setting of the study for its approval.

Data Collection Procedures

The author and clinic staff will collect demographic information on each participant before the start of the intervention program through interviews conducted in Spanish or English as well as from the participant’s clinic chart. Age, gender, marital status, occupation, formal education, years since diagnosis of diabetes, and comorbidities will be recorded. The author will test participants’ knowledge about diabetes before and after the Diabetes Self-Management Class using the Spanish version of the Diabetes Knowledge Questionnaire (Appendix E; Garcia et al., 2001). The author will read the questions aloud to the participants individually, and will record their responses. Initial weight, height, BMI, and HbA1c will be included in data collected for analysis. The HbA1c value for each participant will be either from an in-house Bayer DCA 2000+. Clinic staff will draw labs including HbA1c before the start of the intervention program and repeat the HbA1c after three months of the program. Clinic staff will also repeat weight and BMI at that time. The Diabetes Knowledge Questionnaire will be repeated at the end of the three months. A clinic staff member other than the author or the LHAs will give a program satisfaction questionnaire (Appendix H) to each participant in a verbal format to determine whether the participants feel satisfied with the program.
The LHAs will take the Diabetic Educator Knowledge test before and after the LHA training. The weekly reports from the LHAs will consist of a pre-printed form for each patient contact that contains check boxes for use of MI and CBT, as well as a blank for the number of days the participant reports following dietary guidelines, and a blank for reported number of days of compliance with exercise guidelines. The author will also review these patient contact forms to determine if the LHAs are following the recommended contact schedule. These data will be logged by the author for later analysis. The LHAs and the clinic’s providers will also complete questionnaires (Appendix F and G) regarding their satisfaction with the program, in addition to informal interviews with the author regarding suggestions for improvement.

Plan for Data Analysis

The author will use data from the feasibility study to determine whether the intervention program is realistically feasible for implementation on a larger scale. The author will compare the LHAs’ mean scores on the Diabetic Educator Knowledge Test (Appendix C) before and after the LHA training. The author will compare the number and timing of patient contacts made by the LHAs with the number anticipated, and calculate a percentage. The author will analyze mean scores on the Likert scale satisfaction surveys given to the LHAs. On the LHA Satisfaction Survey, mean scores on items one through six will used to evaluate LHAs’ satisfaction with their training; mean scores on items seven through 12 can be used to evaluate satisfaction with the intervention program as a whole. On the Providers Satisfaction Survey, the mean scores will be used to measure the providers’ perceptions of the effectiveness of the program and their satisfaction with it.
The author will also compare the mean scores of the participants on the Diabetes Knowledge Questionnaire before and after the program. The changes in values for HbA1c, BMI, and scores on the Diabetes Knowledge Questionnaire will be analyzed for statistical significance. Further analysis could compare the amount of change between patients by gender, education, and years since diagnosis. The author will analyze mean scores on the Likert scale satisfaction surveys for the participants. On the Participants’ Satisfaction Survey, items seven and eleven will be analyzed separately to measure the participants’ attitudes toward managing their diabetes after the program. The remainder of the responses on the Satisfaction Survey will show overall satisfaction of the participants with the program. The primary criterion for the outcome evaluation of the program’s effectiveness is the participants’ change in HbA1c. While this will be observed in the feasibility study, the author plans to use results of this study primarily to determine program feasibility, rather than effectiveness. The author plans to consult a statistician for further analysis of collected data.

Summary

Chapter Three describes the intervention program in detail. It combines culturally specific education, CBT techniques, and social support, strategies that have been shown effective in producing behavior change. The setting for the program is an outpatient family clinic with a large Mexican American population; the sample is adult Mexican Americans with type 2 diabetes. The recruitment of providers for referrals will take place through a PowerPoint presentation of the intervention. Recruitment of participants in the program is by means of posters in the clinic, brochures mailed to eligible patients, and referrals from the providers. The author will train the LHAs through classes and practice sessions. The author will apply for
approval to the Institutional Review Board for the clinic where the study takes place. Data collection procedures consist of observation, pre- and post-testing, questionnaires and interviews. Data on HbA1c and BMI measurements in the projected feasibility study will be analyzed for statistical significance. Questionnaires and interviews will guide the author in making any necessary adjustments in the intervention to improve its efficacy.
CHAPTER FOUR: EVALUATION AND FUTURE RESEARCH

Chapter Four is a discussion of the potential results of this intervention program. This chapter contains an outline of the potential results of the feasibility study discussed in Chapter Three. There is a review of process outcomes including feasibility, satisfaction of the LHAs with their training, and compliance with the planned schedule. There is also a review of the impact outcomes expected from the intervention including measurement plans. The chapter includes a discussion of limitations of the feasibility study and the significance of the study to nursing.

Potential Feasibility Study Results

Process Evaluation

1. How well prepared to implement the program do the Lay Health Advisors (LHAs) feel in each content area provided by the training?

   The author will use items one through six of the LHA Satisfaction Survey (Appendix F) and informal interviews to determine if there are areas in which the LHAs do not feel adequately prepared. Although the author has attempted to include enough material on each subject in the LHA training, there will probably be some areas revealed in the questionnaire and interviews that need to be covered in more depth or in simpler terms.

2. In their weekly reports of patient contacts, how often do the LHAs report incorporating Cognitive Behavioral Therapy (CBT) and Motivational Interviewing (MI) into their interactions with program participants?

   The author will request a report of LHAs’ use of MI and CBT in the weekly report of contacts.

3. What percentage of program participants comply with requested office visits and labs?
Because of the reminders and encouragement of the LHAs, the author expects 100% of participants in the feasibility study will comply with office visits and labs. This will be measured by comparing the list of participants with the clinic record of those who come in for an office visit and/or lab work at each point in the timeframe as listed in Table 2, within a two-week window.

4. *How closely do the LHAs follow the recommended follow up schedule, including phone calls and home visits?*

The author will request a weekly written report of the contacts with participants, including phone calls and home visits. This will allow her to see whether the schedule is realistic and if it is being followed.

**Impact Evaluation**

1. *What is the level of knowledge of diabetes the LHAs have after the training program compared with before training, as measured by the Diabetic Educator Knowledge Test (Appendix C)?*

A score of 80% is the goal for learning by the LHAs following the training program.

2. *How satisfied are LHAs with the intervention program after three months of working with the participants?*

At the end of the first three months, the author will meet with the LHAs to discuss their view of the effectiveness of the intervention and their satisfaction with taking part. She will also have them fill out the survey (Appendix F) at the end of three months. The author can make adjustments in the intervention suggested by the LHAs at the three month point, or changes that they find are needed to improve the LHAs’ perception of the program’s effectiveness.
3. **How satisfied are the providers with the intervention program after three months of implementation?**

The researcher will evaluate provider satisfaction with the program through the Satisfaction Survey in Appendix G, through informal interviews with the providers, and through the number of referrals they make. If the program is effective, the providers will hear positive feedback from the individuals they refer, as well as note the objective evidence of improved glycemic control. This should help to assure the provider’s satisfaction with the program and its effectiveness.

4. **How satisfied are the participants with the intervention program after three months of participation?**

5. **How do the participants rate their attitude toward managing their diabetes after participating in the program?**

To evaluate the reactions of the participants to the program, they will be asked to complete a short survey (Appendix H) after three months and 12 months, regarding whether they are satisfied with the program and whether they feel the program is effective. The survey includes questions regarding possible areas in which the participants feel they have been helped, whether they were helped by the class and/or the LHA, and whether they feel more confident in their ability to manage their diabetes.

6. **How much change in knowledge about diabetes self-management occurs in participants after three months in the intervention program?**

The Diabetes Knowledge Questionnaire will be administered to the participants before the class, after the class, and after three months of program participation.
7. During each contact with the LHAs, how many days per week do participants report following dietary guidelines taught in the program?

8. During each contact with the LHAs, how many times per week do participants report following exercise guidelines taught in the program?

To evaluate reported participation in planned exercise and dietary goals, the author will also review the weekly reports from the LHAs, which will include notations of how many days participants state they met dietary and/or exercise goals.

**Outcome Evaluation**

What are participants’ HbA1c levels after three months of participation in the intervention program compared with their HbA1c level before beginning the program?

The desire to change behaviors that are not consistent with personal values is present in most people with diabetes, but they become frustrated when they have difficulty making those changes. The intervention program is designed to increase their motivation for change and their confidence in the ability to change, to provide tools for dealing with barriers to change, and to celebrate every small success. The positive support and encouragement may result in both subjective and objective indications of the intervention’s effectiveness. Participants will report subjective indications of success in the questionnaires (Appendix H). The physical exams and labs drawn at three months after starting the intervention program will provide objective measures of success in the form HbA1c values. The author expects participants’ HbA1c values to decrease by one percentage point by the three month point in the intervention, or the end of the feasibility study. It is hoped that the intervention program will continue after the end of the
study, and the HbA1c value will continue to decrease slightly or stay the same rather than increase over the rest of the year.

Limitations of the Feasibility Study

The feasibility study would be limited by the small sample size (20 participants) and the short timeframe. The sample may not be representative of the population of Mexican Americans with diabetes as a whole, thus limiting generalizability. If this particular group of participants has better or poorer glycemic control than the general population at the outset of the study, that could produce results that do not truly reflect the effectiveness of the intervention program. The selection of participants could be controlled for a range of HbA1c values, such as nine to eleven, to improve the accuracy of the results. There may be other factors that affect the participants’ glycemic control, such as changes in medication during the study, resulting in changes in outcome not attributable to the intervention program. These would be unavoidable, since prohibiting medication changes during the study period would potentially put participants at risk. The two LHAs who are the program’s “pioneers” may not gain enough experience to be most effective in their role in only three months, unavoidably resulting in smaller changes in the participants than would be reflected if the LHAs were experienced. The health care providers in the clinic where the feasibility study takes place may not represent the variety of providers found in different clinics; they may be more or less receptive to the intervention program and making referrals to it than other providers in other clinics. Finally, because the intervention combines five components (LHAs, culturally relevant education, family support, CBT, and MI), the study will not reflect which of the five actually produce the desired results. The study will not test each component individually.
Significance to Nursing Practice

If successful, this intervention program will give nurses who are involved in diabetic education, including advanced practice nurses, a new alternative for helping Mexican American patient with diabetes to achieve better glycemic control. Even if the entire program cannot be implemented in a particular practice setting, diabetic educators can choose any combination of the five components (the use of LHAs, enlistment of family support, educational materials tailored specifically to Mexican American culture, MI, and CBT) to implement with the possibility of benefiting their patients. There is also the possibility of adapting the intervention program to people of other cultures who have diabetes. Finally, even if the entire intervention program is not shown to be effective, it will pave the way for research to test different combinations of the five components for evidence of effectiveness in nursing practice.

Implications for Future Research

After the feasibility study is completed and the data analyzed, the intervention program can be adjusted according to the findings as well as the suggestions by providers, LHAs, and participants. Plans for future research include a pilot study, followed by a randomized controlled trial to test the efficacy of the described intervention program. A pilot study will be done with a slightly larger sample over a full year. Again the results at one year, HbA1c, BMI, and diabetes knowledge, will be compared with the baseline values at the beginning of the program. Then ultimately the intervention program will be tested in a randomized controlled trial with a sample of a size determined by power analysis from several different clinics, divided randomly into a control group and an experimental group. The control group will receive standard diabetes education and care, while the experimental group participates in the intervention program. This
will show whether the intervention program as a whole is effective in improving the glycemic control of Mexican Americans with diabetes.

**Summary**

Chapter Four contains a discussion of the evaluation of the potential and expected outcomes of a program for improving glycemic control in Mexican Americans with diabetes. Evaluation will correspond to the Program Evaluation Questions introduced in Chapter One. Chapter Four also reports the expected outcome of the program in terms of HbA1c improvement. Limitations of the feasibility study are described, along with future research to evaluate the intervention. It is hoped that the intervention program will be effective, and can be used to help Mexican Americans with type 2 diabetes achieve better glycemic control, resulting in a significant impact in terms of avoidance of complications and improved overall health.
APPENDIX A: INFORMED CONSENT
Strategies for Glycemic Control

Introduction

You are being invited to take part in an intervention program. The information in this form is provided to help you decide whether or not to take part. Clinic staff will be available to answer your questions and provide additional information. If you decide to take part in the intervention program, you will be asked to sign this consent form. A copy of this form will be given to you.

What is the purpose of this intervention program?
To improve the control of blood sugar levels for Mexican Americans with diabetes who participate.

Why are you being asked to participate?
You are being invited because you are a Mexican American adult who has type 2 diabetes and does not require insulin.

How many people will be asked to participate in this intervention program?
Approximately 20 persons will be asked to participate in this program.

What will happen during this intervention program?
You will be given a complete physical exam, and have some blood drawn to check for any new health problems and to see how well your diabetes is controlled. Then you will be given some information about how to manage your diabetes. You’ll be contacted periodically by telephone for follow up. You’ll be asked to come back to the clinic between two and four times to have more blood drawn. We will then analyze the information from your blood tests.

How long will I be in this intervention program?
About three months will be needed to complete this program.

Are there any risks to me?
The things that you will be doing have no more risk than you have now from complications of your diabetes. Although we have tried to avoid risks, you may feel that some questions or procedures we ask you to do may be stressful or upsetting. If this occurs, you can stop participating immediately. We can give you information about individuals who may be able to help you with these problems.

Are there any benefits to me?
The program will benefit Mexican Americans with diabetes by helping to control symptoms and complications of diabetes.

What are the alternatives for participating in this program?
The alternative is not to participate in this intervention program.

Will there be any costs to me?
Aside from your time, there are no costs to you for the study.

Will I be paid to participate in the intervention program? No.
Will video or audio recordings be made of me during the study? No.

Will the information that is obtained from me be kept confidential? The only persons who will have access to the information about your participation are your healthcare provider and her assistants. Your records will be confidential. You will not be identified in any reports or publications resulting from the study.

What if I am harmed by the study procedures? There are no physical risks to the study; any psychological harm would be treated by a professional counselor at no cost to you.

May I change my mind about participating? Your participation in this program is voluntary. You may decide to not begin or to stop the intervention program at any time. Your refusing to participate will have no effect on your health care. You can discontinue your participation with no effect on your care.

Whom can I contact for additional information? You can call Paula Scoggins FNP, MSN at (602)296-5492 to tell her about a concern or complaint about this intervention program.

Your Signature
By signing this form, I affirm that I have read the information contained in the form, that the intervention program has been explained to me, that my questions have been answered and that I agree to take part in this program. I do not give up any of my legal rights by signing this form.

Name (Printed)

Participant’s Signature ___________________________ Date signed ______________

Statement by person obtaining consent
I certify that I have explained the intervention program to the person who has agreed to participate, and that he or she has been informed of the purpose, the procedures, the possible risks and potential benefits associated with participation. Any questions raised have been answered to the participant’s satisfaction.

Name of clinic staff member ___________________________

Clinic staff member signature ___________________________ Date signed ______________
1. Basic pathophysiology of diabetes
   A. Function of insulin in the body
   B. Function of the liver in metabolism
   C. Types of diabetes and causes
      1) Type 1
      2) Type 2
      3) Gestational

2. Effect of diabetes on organ systems
   A. The Nervous System
      1) The Brain
      2) The Autonomic Nervous System
      3) The Peripheral Nervous System
         a. Peripheral Neuropathy
      4) The Sensory Organs
         a. Retinopathy
   B. The Circulatory System
      1) The Heart
      2) The Veins and Arteries
         a. Peripheral Vascular Disease
   C. The Urinary Tract
      1) The Kidneys
         a. Nephropathy
      2) The Urinary System
         a. UTIs
   D. The Musculoskeletal System
      1) The Muscles and Glucose

3. Hyper- and Hypoglycemia
   A. Hyperglycemia
      1) Causes
      2) Symptoms
      3) Treatment
   B. Hypoglycemia
      1) Causes
      2) Symptoms
      3) Treatment

4. Nutrition and Diet
   A. The Food Pyramid
   B. Effects of Foods on Diabetes
   C. Modification of Diet to Manage Diabetes
5. Exercise
   A. Rationale for Exercise
   B. Types of Exercise
      1) Aerobic
      2) Weight-bearing
   C. Exercise Recommendations
      1) Frequency
      2) Intensity
      3) Time

6. Health care for Diabetes
   A. Lab tests for diabetes
      1) FBG
      2) A1c
      3) Urine Tests
         a) Urinalysis
         b) Microalbuminuria
   B. Office Appointments
      1) PCP
      2) Optometrist/Ophthalmologist
      3) Podiatrist
         a) Foot Care

7. Mobilizing Social Support
   A. Asking for Help
   B. Joining with Family and Friends for Healthy Habits

8. Motivating and Mobilizing for Change
   A. Motivational Interviewing
      1) Four General Principles
      2) Four Interactional Skills
   B. CBT Techniques
      1) Goal-setting and Reinforcement
      2) Self-Monitoring
      3) Cognitive Restructuring and Stress Reduction
      4) Barrier Management
      5) Relapse Prevention
APPENDIX C: DIABETES EDUCATOR KNOWLEDGE TEST
1. When recommending infant feeding options to women with previous history of gestational diabetes, which of the following are true?

A. If the woman required insulin therapy, breast-feed her baby.
B. If the woman continues to have elevated BG levels and is diagnosed with type 2 diabetes, breast feeding her baby is recommended.
C. Breast-feeding mobilizes fat stores and can help in weight reduction.
D. If the infant is macrosomic, breast-feeding may increase the risk of obesity later in life.

2. Diabetes is caused by which of the following?

A. Consuming a lot of sugar.
B. A decrease in the body’s secretion of insulin.
C. A decrease in the activity of insulin.
D. Skipping meals
E. Both A and B
F. Both B and C

3. When a person has type 2 diabetes, the body . . .

A. Is not using insulin well.
B. Is not making any insulin.
C. Is rejecting insulin.
D. Is destroying insulin.

4. Blood glucose before meals should be in which range?

A. 50-70 mg/dl
B. 70 – 120 mg/dl
C. 125-170 mg/dl
D. 170-210 mg/dl

5. Choose the answer that can have an effect on glucose control.

A. Daily stress
B. Eating habits
C. Exercise
D. All of the above

6. Which of the following is not a source of carbohydrates?

A. Milk products
B. Meats
C. Breads and grains
D. Fruits

7. Choose the answer that is highest in saturated fat.

A. Butter, marbled meats, cheese and cream.
B. Olive oil, avocados, butter
C. Canola oil, skim milk, cheese
D. Lard, peanut butter and safflower oil

8. How does exercise normally affect blood sugar levels?

A. It increases the blood sugar levels.
B. It decreases the blood sugar levels.
C. It does not affect blood sugar levels.
D. You shouldn’t exercise if you have diabetes.

9. The best method for testing sugar or glucose levels in the body is . . .

A. Testing the urine.
B. Testing the blood.
C. Both A and B
D. Basing blood sugar levels on how you feel.
10. Drinking unsweetened fruit juice will affect blood sugar levels by . . .
   A. Raising blood sugar levels.
   B. Lowering blood sugar levels.
   C. Having no effect on blood sugar levels.
   D. None of the above.

11. A diabetes patient does blood glucose self-monitoring because it is:
   A. Essential for intensive therapy.
   B. Needed to determine the right amount of medication.
   C. Useful even if diabetes is controlled with diet and exercise.
   D. All of the above.

12. How does infection affect blood sugar levels?
   A. It raises blood sugar levels.
   B. It lowers blood sugar levels.
   C. It does not have any effect on blood sugar levels.

13. A glycosylated hemoglobin test (HbA1c) is used to measure the blood sugar levels during which time frame?
   A. 1 week
   B. 2 – 4 months
   C. 24 hours
   D. 1 year

14. The typical goal for a diabetes patient’s glycosylated hemoglobin test is:
   A. 8% - 10%
   B. 3%
   C. 6% - 7%
   D. 112% - 15%

15. True or False: When you have an illness, you should stop taking your diabetes medication.
   A. True
   B. False
   C. It doesn’t matter

16. The purpose of insulin in the body is to:
   A. Stimulate cells to take up sugar from the bloodstream.
   B. Store the body’s sugar in the bloodstream.
   C. Make red blood cells.
   D. None of the above.

17. Diabetes medication is used to . . .
   A. Lower the blood glucose level.
   B. Increase the release of insulin.
   C. Fight insulin resistance.
   D. All of the above.
   E. None of the above.

18. When you are traveling, you should keep your diabetes medications and supplies . . .
   A. Checked in your luggage.
   B. Carried with you.
   C. At home because of airport security.
   D. A and B are appropriate answers.

19. Diabetes can increase your risk of developing which of the following?
   A. Kidney, eye and heart disease
   B. Cancer and liver disease
   C. Lung and skin disease
   D. None of the above.
20. The best way for a person with diabetes to care for his/her feet is to . . .
   A. Soak them for an hour once a day.
   B. Buy shoes that are one size larger than needed.
   C. Inspect them daily for cuts and abrasions.
   D. All of the above.

21. If you get sick with the flu, you should . . .
   A. Stop taking insulin and all of your diabetes pills.
   B. Stop drinking fluids.
   C. Test your blood sugar levels more often.
   D. Do nothing; the flu does not affect blood sugar levels.

22. Which of the following is a common symptom of hypoglycemia?
   A. Increased weakness
   B. Sweating
   C. Shakiness
   D. Irritability
   E. All of the above

23. A good food to treat low blood sugar.
   A. One medium hotdog.
   B. One regular chocolate candy bar.
   C. One cup of skim milk.
   D. Two ounces of cheese.

24. Working on small behavioral changes can . . .
   A. Reduce stress and help you control diabetes.
   B. Make you crazy.
   C. Adversely affect diabetes control.
   D. None of the above.

25. True or False: Individuals diagnosed with diabetes have no control over the development of complications.
   A. True
   B. False

26. The most important person on the health care team of a diabetes patient is . . .
   A. The physician
   B. The diabetes educator
   C. The dietician
   D. The patient

27. The best time for a diabetes patient to exercise is . . .
   A. Before meals
   B. After meals
   C. Exercise does not affect diabetes management.
   D. Never

28. A diabetes patient who is pregnant will require . . .
   A. Close monitoring of blood glucose and adjustments in insulin use.
   B. Double her normal amount of insulin.
   C. No changes in insulin therapy.
   D. None of the above.
APPENDIX D: DIABETES SELF-MANAGEMENT CLASS OUTLINE
1. Basic Description of Diabetes

2. How to Manage Your Diabetes
   A. Diet
   B. Exercise
   C. Medications

3. Complications of diabetes and their prevention
   A. Eyes
   B. Legs
   C. Kidneys
   D. Circulation

4. Diabetic Emergencies
   A. Hyperglycemia
      1) Symptoms
      2) Treatment
   B. Hypoglycemia
      1) Symptoms
      2) Treatment

5. Coping with Diabetes
   A. Stress Management
   B. Preventing and Treating Depression
APPENDIX E: DIABETES KNOWLEDGE QUESTIONNAIRE

(SPANISH AND ENGLISH)
1. Eating too much sugar and other sweet foods is a cause of diabetes.

2. The usual cause of diabetes is lack of effective insulin in the body.

3. Diabetes is caused by failure of the kidneys to keep sugar out of the urine.

4. Kidneys produce insulin.

5. In untreated diabetes, the amount of sugar in the blood usually increases.

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

7. Diabetes can be cured.

8. A fasting blood sugar level of 210 is too high.

9. The best way to check my diabetes is by testing my urine.

10. Regular exercise will increase the need for insulin or other diabetic medication.
11. Hay dos tipos principales de diabetes: Tipo 1 (dependiente de insulina) y Tipo 2 (no-dependiente de insulina).

11. There are two main types of diabetes: Type 1 (insulin-dependent) and Type 2 (non-insulin-dependent).

12. Una reacción de insulina es causada por mucha comida.

12. An insulin reaction is caused by too much food.

13. La medicina es más importante que la dieta y el ejercicio para controlar mi diabetes.

13. Medicine is more important than diet and exercise to control my diabetes.

14. La diabetes frecuentemente causa mala circulación.


15. Cortaduras y rasguños cicatrizan más despacio en diabéticos.

15. Cuts and abrasions in diabetics heal more slowly.

16. Los diabéticos deberían poner cuidado extra al cortarse las uñas de los dedos de los pies.

16. Diabetics should take extra care when cutting their toenails.

17. Una persona con diabetes debería limpiar una cortadura primero yodo y alcohol.

17. A person with diabetes should cleanse a cut with iodine and alcohol.

18. La manera en que preparo mi comida es igual de importancia que las comidas que como.

18. The way I prepare my food is as important as the food I eat.

19. La diabetes puede dañar mis riñones.

19. Diabetes can damage my kidneys.

20. La diabetes puede causar que no sienta en mis manos, dedos y pies.

20. Diabetes can cause loss of feeling in my hands, fingers, and feet.
21. El temblar y sudar son señales de azúcar alta en la sangre.
Shaking and sweating are signs of high blood sugar.

22. El orinar seguido y la sed son señales de azúcar baja en la sangre.
Frequent urination and thirst are signs of low blood sugar.

23. Los calcetines y las medias elásticas apretadas no son malos para los diabéticos.
Tight elastic hose or socks are not bad for diabetics.

24. Una dieta diabética consiste principalmente de comidas especiales.
A diabetic diet consists mostly of special foods.

APPENDIX F: DIABETES INTERVENTION PROGRAM SATISFACTION SURVEY -

LHAS
Please answer the following questions regarding the Diabetes Intervention Program for Mexican Americans. Please use the following numbers: 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree

1. The training I received was helpful in working with my patients to manage their diabetes.__________.

2. The training was presented in a way that was easy to understand. ______________

3. The training taught me what I needed to know to help my patients. _____________

4. The handbook I received in the training was helpful to me in remembering what I was taught in the class. ______________

5. The training taught me how to use CBT and MI to motivate my patients to better manage their diabetes. ______________

6. I used the CBT and MI techniques I learned in training to interact with my clients. ______________

7. My patients who participated in the program were happy with it. ______________

8. My patients who participated in the program reported learning new strategies for managing their diabetes. ______________

9. Most of my patients who participated in the program reported positive changes in behavior (healthier eating and more physical activity). ______________

10. Most of my patients who participated in the program improved their blood sugar levels. ______________

11. I feel the program was effective in helping my patients manage their diabetes better. ______________

12. I am satisfied with the program. ______________
APPENDIX G: DIABETES INTERVENTION PROGRAM SATISFACTION SURVEY - PROVIDERS
Please answer the following questions regarding the Diabetes Intervention Program for Mexican Americans. Please use the following numbers: 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree

1. It was easy to refer my patients to the program. ______________
2. The program did not increase the amount of time I spent with my patients. ______________
3. The program decreased the amount of time I spent counseling my Mexican American patients with diabetes. ______________
4. Most of my patients who were eligible for the program were interested in participating. ______________
5. My patients who participated in the program were happy with it. ______________
6. My patients who participated in the program reported learning new strategies for managing their diabetes. ______________
7. Most of my patients who participated in the program reported positive changes in behavior (healthier eating or more physical activity). ______________
8. Most of my patients who participated in the program improved their glycemic control. ______________
9. I feel the program was effective in helping my patients improve their glycemic control. ______________
10. I am satisfied with the program. ______________
APPENDIX H: DIABETES INTERVENTION PROGRAM SATISFACTION SURVEY - PARTICIPANTS
Please answer the following questions regarding the Diabetes Intervention Program for Mexican Americans. Please circle one of the following: 1-Not at all, 2-No, 3-Maybe yes, maybe no, 4-Yes, 5-Certainly yes

1. The diabetes class I went to helped me know how to manage my diabetes.
   1-Not at all   2-No   3-Maybe yes, maybe no   4-Yes   5-Certainly yes

2. The class was presented in a way that was easy to understand.
   1-Not at all   2-No   3-Maybe yes, maybe no   4-Yes   5-Certainly yes

3. The class taught me some things I needed to know to manage my diabetes.
   1-Not at all   2-No   3-Maybe yes, maybe no   4-Yes   5-Certainly yes

4. The papers I received in the class were helpful to me in remembering what I was taught in the class.
   1-Not at all   2-No   3-Maybe yes, maybe no   4-Yes   5-Certainly yes

5. I used what I learned in the class to change the way I ate.
   1-Not at all   2-No   3-Maybe yes, maybe no   4-Yes   5-Certainly yes

6. I used what I learned in the class to change the way I exercised.
   1-Not at all   2-No   3-Maybe yes, maybe no   4-Yes   5-Certainly yes

7. The counselor helped me change the way I think about managing my diabetes.
   1-Not at all   2-No   3-Maybe yes, maybe no   4-Yes   5-Certainly yes

8. The promotora helped me change the way I manage my diabetes.
   1-Not at all   2-No   3-Maybe yes, maybe no   4-Yes   5-Certainly yes
9. The promotora helped me change the way I eat.
   1-Not at all  2-No  3-Maybe yes, maybe no  4 –Yes  5-Certainly yes

10. The promotora helped me change the way I exercise.
    1-Not at all  2-No  3-Maybe yes, maybe no  4 –Yes  5-Certainly yes

11. The diabetes program helped me feel more confident that I can manage my diabetes.
    1-Not at all  2-No  3-Maybe yes, maybe no  4 –Yes  5-Certainly yes

12. I feel the program helped my family/friends understand more how to help me with my diabetes.
    1-Not at all  2-No  3-Maybe yes, maybe no  4 –Yes  5-Certainly yes

13. I am satisfied with the program.
    1-Not at all  2-No  3-Maybe yes, maybe no  4 –Yes  5-Certainly yes
REFERENCES


