

AMIREHSANI, KAREN A., Ph.D. Self-Care Expressions, Patterns, and Practices of Latinos/Hispanics for the Management of Type 2 Diabetes. (2011)  
Directed by Dr. Debra C.Wallace. 219 pp.

The purpose of this cross-sectional, correlational study was to explore the use of traditional, complementary, and alternative (TCA) self-care expressions, patterns, and practices of Latinos/Hispanics for the management of type 2 diabetes. The target population was adult men and women living in a nonborder, emerging Latino/Hispanic area. Specifically, this study explored the use of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription practices and assessed their association to glycemic control. Leininger's culture care diversity and universality theory and sunrise enabler were used as the conceptual framework.

A total of 75 Latino/Hispanic immigrants living in central and western North Carolina were enrolled. Approximately 67% of participants were female and the mean age was 47 years. High levels of hypertension, overweight/obesity, and diabetes-related comorbidities were reported. Glycemic control was poor, as measured by A1C. Limited financial resources and low acculturation levels were reported by the men and women. Sixty-nine percent of the sample reported using herbal/plant products on a daily, weekly, or monthly basis for diabetes self-care. Forty-nine different products were used. The most frequently used herbal remedies were prickly pear cactus (*nopale*), aloe vera (*salvia* or *sábila*), celery (*apio*), vegetable pear (*chayote*), cinnamon (*canela*), cat's claw (*uña de gato*), Herbalife, beets (*betabel*), bitter melon (*cundeamor* or *yerba mora*), *nin*, horsetail (*la cola de caballo*), and oats (*aveno*). Forty-one percent of the sample reported

using faith-based interventions, such as personal prayer or going to mass/church. Eight percent of the sample consulted with traditional healers, and approximately 15% used self-medication/self-prescription to manage diabetes. Participants reported not communicating the use of TCA modalities with their health care provider. Persons identified reasons for not disclosing this information as: beliefs that American healthcare providers do not believe in or lack knowledge of Latino/Hispanic natural medicine; “it’s not relevant”; a translator was required to explain TCA practices; and prior experiences with healthcare providers “being in a hurry” and “not asking questions” of patients.

Multiple linear regression analyses were used to examine the association of individual characteristics, cultural and social structure dimensions, and environmental context factors with the use of TCA modalities and with glycemic control (A1C level). The effect of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription on A1C level was examined. Predictors of TCA usage and glycemic control were not found.

New knowledge of the emic practices of Latinos/Hispanics for the management of type 2 diabetes was developed. Understanding self-care practices of Latinos/Hispanics and improving provider cultural competency are critical for alleviating diabetes-related health disparities of this population. Study findings inform implications in the areas of practice, education, healthcare systems and policy, and future research to alleviate disparities in access, care, and health outcomes for Latinos/Hispanics with diabetes.

SELF-CARE EXPRESSIONS, PATTERNS, AND PRACTICES OF  
LATINOS/HISPANICS FOR THE MANAGEMENT  
OF TYPE 2 DIABETES

by

Karen A. Amirehsani

A Dissertation Submitted to  
the Faculty of the Graduate School at  
The University of North Carolina at Greensboro  
in partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy

Greensboro  
2011

Approved by

Debra C. Wallace  
Committee Chair

© 2011 Karen A. Amirehsani

To Shawn and Mandonna,

Thank you so much for all of your love, support, and encouragement during this journey of completing my Ph.D. It has been quite an adventure for all of us. Without your unending love, I would never have accomplished this goal. Just know that you are the “lights” of my life and mean more to me than I can ever express. I am truly blessed to have you both in my life.

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair \_\_\_\_\_  
Debra C. Wallace

Committee Members \_\_\_\_\_  
Jie Hu

\_\_\_\_\_  
Carolyn L. Blue

\_\_\_\_\_  
José A. Villalba, Jr.

June 9, 2011  
Date of Acceptance by Committee

June 1, 2011  
Date of Final Oral Examination

## ACKNOWLEDGEMENTS

This study was partially funded by the Ruth P. Council Research Grant Award from Sigma Theta Tau International Honor Society of Nursing, Gamma Zeta Chapter.

Appreciation is extended to the Nursing Research Office of the School of Nursing at the University of North Carolina at Greensboro for providing support by loaning equipment to measure some of the biophysical indicators.

Gratitude and appreciation is extended to my dissertation committee as each of you has provided valuable insight and guidance on my dissertation and promoted my development as a nurse scientist.

To my advisor and dissertation chair, Dr. Debra C. Wallace, thank you for your invaluable advice, encouragement, and for pushing me when at times, I lost momentum during this process.

To my research assistants, Zulema Silva and Grisel Trejo, thank you both for your compassion and care for the Latino/Hispanic community and for recruiting participants with me in this study.

## TABLE OF CONTENTS

	Page
LIST OF TABLES .....	vii
LIST OF FIGURES .....	ix
CHAPTER	
I. INTRODUCTION .....	1
Purpose.....	4
Significance of the Issue .....	5
Justification of the Need for the Study .....	6
Synopsis of Current Knowledge .....	8
Conceptual Framework.....	17
Definitions.....	22
Contribution of the Study.....	27
Summary .....	28
II. REVIEW OF THE LITERATURE .....	30
Introduction.....	30
Culture Care Expressions, Patterns, and Practices.....	32
Cultural and Social Structure Dimensions .....	48
Environmental Context of Latinos/Hispanics in the United States .....	74
Summary of Current Knowledge .....	81
Gaps and Omissions in Current Knowledge.....	83
III. METHODOLOGY .....	88
Design .....	88
Research Questions .....	89
Setting .....	91
Sample.....	93
Recruitment.....	95
Measurement and Instrumentation.....	96
Data Collection Procedures.....	103
Data Analyses .....	106
Summary .....	114



IV. RESULTS .....	115
Individual Characteristics, Environmental Context Factors, and Cultural and Social Structure Dimensions of Participants.....	115
Health.....	119
Research Question 1 .....	123
Research Question 2 .....	142
Research Question 3 .....	145
Research Question 4 .....	147
Research Question 5 .....	150
Research Question 6 .....	153
Research Question 7 .....	155
Research Question 8 .....	157
Summary.....	161
V. DISCUSSION .....	163
Diabetes Knowledge, Self-Care, and Glycemic Control .....	165
Usage of TCA Self-Care Expressions, Patterns, and Practices .....	166
Communication with Healthcare Provider Regarding TCA Modalities .....	172
Individual Characteristics .....	172
Environmental Context Factors .....	173
Cultural and Social Structure Dimensions .....	174
Self-Care Expressions, Patterns, and Practices .....	175
Conclusions.....	175
Implications.....	177
Limitations .....	183
Summary.....	183
REFERENCES .....	185
APPENDIX A. PERMISSION TO USE THE SUNRISE ENABLER .....	219

## LIST OF TABLES

	Page
Table 1. Internal Reliability of Instruments .....	107
Table 2. The Effect of Data Transformation on Skewness and Kurtosis.....	110
Table 3. Individual Characteristics and Environmental Context Factors of Participants (N = 75).....	117
Table 4. Economic Characteristics of Participants (N = 75) .....	118
Table 5. Age When Diabetes Diagnosed (N = 75) .....	120
Table 6. Diabetes-Related Comorbidities (N = 75) .....	121
Table 7. Biophysical Indicators (N = 75) .....	123
Table 8. Alphabetical List of Herbal Remedies and Characteristics of Use.....	125
Table 9. Faith-Based Interventions (n = 31) .....	135
Table 10. Self-Perceived Effectiveness of Faith-Based Interventions for Diabetes.....	136
Table 11. Traditional Healers and Types of Treatments (n = 6) .....	138
Table 12. Self-Perceived Effectiveness of Self-Medication/ Self-Prescription Practices .....	141
Table 13. Purposes for Using Herbal Remedies for Diabetes.....	143
Table 14. Purposes for Using Faith-Based Interventions for Diabetes.....	144
Table 15. Alterations in Dosing of Prescribed Diabetes Medications When Using TCA Modalities .....	147
Table 16. Reasons Why Latino/Hispanic Persons Don't Discuss TCA Modalities .....	149
Table 17. Pearson's r Correlation Coefficients Between Independent Variables and Sum of TCAs .....	151

Table 18. Multiple Regression Summary for Summed Total of TCA Modalities (N = 75).....	153
Table 19. Pearson's r Correlations Between Independent Variables and Natural Log A1C.....	154
Table 20. Multiple Regression Summary for Natural Log A1C and 7 Independent Variables (N = 75).....	155
Table 21. Multiple Regression Summary for Natural Log A1C and 4 Independent Variables (N = 75).....	156
Table 22. Multiple Regression Summary for Natural Log A1C and 11 Independent Variables (N = 75).....	158
Table 23. Alternative Analyses for Relationships Between Independent and Dependent Variables (N = 75) .....	160

## LIST OF FIGURES

	Page
Figure 1. Leininger's Sunrise Enabler to Discover Culture Care.....	18
Figure 2. Culture Care of the Self-Care Expressions, Patterns, and Practices of Latinos/Hispanics for the Management of Type 2 Diabetes .....	23

## CHAPTER I

### INTRODUCTION

Diabetes mellitus is the seventh leading cause of death in the general population and the fifth leading cause of death among Latinos/Hispanics living in the United States (U.S.; Centers for Disease Control and Prevention [CDC], 2011b; National Center for Health Statistics [NCHS], 2010). This debilitating and chronic disease affects approximately 25.8 million people or 8.3% of the total U.S. population (CDC, 2011b). The prevalence of diabetes has more than doubled in the last 15 years (CDC, 2008b). In fact, the CDC estimates that if current trends continue, the lifetime risk for developing diabetes will be one in three Americans and two in five African Americans and Latinos/Hispanics (CDC, 2008b, 2010). It is estimated that on average, those who develop diabetes will lose 10 to 15 years of life (CDC, 2010). Approximately 90-95% of all diagnosed cases are attributed to type 2 diabetes, regardless of race or ethnicity (CDC, 2008c).

Latinos/Hispanics are the fastest growing minority group in the U.S. (U.S. Census Bureau, 2008b) and have nearly twice the risk of developing type 2 diabetes compared to non-Hispanic Whites, 11.8% and 7.1% respectively (CDC, 2011b). Disparities in diabetes prevalence rates exist between Latino/Hispanic subgroups, with Puerto Ricans having the highest rate (13.8%), followed by Mexican Americans (13.3%), and 7.6% for

Cubans and Central and South Americans (CDC, 2011b). Compared to non-Hispanic Whites, Latinos/Hispanics have disproportionately higher rates of diabetes-related complications and mortality (CDC, 2006; NCHS, 2010) and are more likely to be hospitalized for uncontrolled diabetes (Agency for Healthcare Research and Quality [AHRQ], 2009b).

Self-care behaviors and skills have been identified as the cornerstone for achieving glycemic control, improving health outcomes, and decreasing diabetes-related complications (American Diabetes Association [ADA], 2011c; Funnell et al., 2010). Persons with diabetes must learn to correctly interpret symptoms and make day-to-day self-care decisions in order to control the disease process. However, Latinos/Hispanics are less likely than non-Hispanic Whites to follow the medically recommended diabetes self-care practices of exercise, proper diet, and foot care, and Latinos/Hispanics are 36% less likely to conduct self-monitoring of blood glucose (SMBG) compared to non-Hispanic Whites (AHRQ, 2009b). Nearly 75% of Mexican women and more than 77% of Mexican men are either overweight or obese (NCHS, 2010). Moreover, empirical data from a 7 year longitudinal study with 908 elderly Mexican Americans with type 2 diabetes reported that more than one third of persons did not consistently take their insulin (38%) or oral hypoglycemic agents (34%; Kuo et al., 2003).

There is limited knowledge indicating Latinos/Hispanics engage in a variety of traditional, complementary, and alternative (TCA) self-care expressions, patterns, and practices to manage type 2 diabetes (Bergland, Heuer, & Lausch, 2007; Brown, Upchurch, Garcia, Barton, & Hanis, 1998; Coffman, Shobe, & O'Connell, 2008;

Coronado, Thompson, Tejeda, & Godina, 2004; Hunt, Arrar, & Akana, 2000; Johnson et al., 2006; Mikhail, Wali, & Ziment, 2004; Poss, Jezewski, & Stuart, 2003; Sleath et al., 2009). These culturally-based self-care practices include the use of herbal remedies, faith-based interventions, consulting traditional healers, and the practice of self-medication/self-prescription without seeking medical advice. Empirical data concerning the use of TCA self-care expressions, patterns, and practices for the management of type 2 diabetes is limited. Prior research indicates that most Latinos/Hispanics do not tell their healthcare providers about the use of cultural self-care modalities (Howell et al., 2006; Najm, Reinsch, Hoehler, & Tobis, 2003; Poss, Pierce, & Prieto, 2005; Shelley et al., 2009), even when used concurrently with standard medical treatments (Coronado et al., 2004; Howell et al., 2006; Johnson et al., 2006; Mikhail et al., 2004; Poss et al., 2003). This raises concerns for patient safety, as there is the potential for drug-herb and drug-drug interactions, toxicities, exposure to harmful contaminants, incorrect medication use, overmedication, exacerbation of underlying health conditions, allergic reactions, and receiving counterfeit or substandard medications (Blalock et al., 2009; Coffman et al., 2008; Kroeger et al, 2001; Mainous, Diaz, & Carnemolla, 2009; Nolen, Ball, Piñón, & Shepherd, 2002; Phua, Zosel, & Heard, 2009; Sleath et al., 2009). In addition, when nurses and other healthcare providers are not aware or knowledgeable of cultural self-care practices, difficulties may arise in promoting effective diabetes disease management and treatment.

Further research is needed to explicate and obtain a clearer understanding of the TCA self-care expressions, patterns, and practices used by Latinos/Hispanics for the

management of type 2 diabetes. To date, much of what is known regarding these alternative modalities has been obtained from diabetes-related, qualitative research studies with predominantly Mexican American samples living along the U.S.-Mexico border region (Brown et al., 1998; Hunt et al., 2000; Johnson et al., 2006; Poss et al., 2003), in geographic areas with a well established Latino/Hispanic community (Bergland et al., 2007; Coronado et al., 2004), or studies pertaining to the use of TCA modalities by Latinos/Hispanics for general health purposes (Coffman et al., 2008; Howell et al., 2006; Mikhail et al., 2004; Najm et al., 2003; Poss et al., 2005; Shelley et al., 2009). Limited research has uncovered the presence, manner, and reasons of TCA self-care expressions, patterns, and practices of type 2 diabetes among Latino/Hispanic subgroups living in nonborder, emerging Latino/Hispanic communities.

### **Purpose**

The purpose of this study was to explore the use of TCA self-care expressions, patterns, and practices for the management of type 2 diabetes among a group of Latinos/Hispanics living in a nonborder, emerging Latino/Hispanic community. Specifically, this study explored the use of herbal remedies, faith-based interventions, consulting traditional healers, and the practices of self-medication/self-prescription. In addition, the association of TCA self-care expressions, patterns, and practices to glycemic control and factors associated with the use of TCA self-care expressions, patterns, and practices were explored. Critical new knowledge about the TCA self-care expressions, patterns, and practices of Latinos/Hispanics with type 2 diabetes was developed to fill a current knowledge gap. The knowledge obtained from this study can enhance nurses'



and other healthcare professionals' awareness and knowledge of the TCA self-care expressions, patterns, and practices utilized by Latinos/Hispanics for the management of type 2 diabetes. This knowledge assists in promoting culturally congruent, safe, and efficacious care of Latinos/Hispanics with type 2 diabetes.

### **Significance of the Issue**

In the U.S., diabetes is the leading cause of non-traumatic lower extremity amputations, renal failure, and new cases of adult blindness (CDC, 2010, 2011b). Diabetes has been associated with a two to four fold increased risk for stroke and death related to cardiovascular disease (American Heart Association, 2008; Goldstein et al., 2006). Serious sequelae include: hypertension, obesity, dyslipidemia, dental disease, neuropathy, and gestational diabetes-related complications such as birth defects, spontaneous abortion, and excessively large infants (ADA, 2011c; CDC, 2008c). Persons with diabetes report a lower quality of life, which may be related to depression, loss of employment, increased absenteeism, permanent disability, and the daily complex treatment demands associated with trying to achieve glycemic control (CDC, 2008c; McEwen, Baird, Pasvogel, & Gallegos, 2007; Misra & Lager, 2009).

According to the ADA (2008), one out of every five healthcare dollars is spent on someone diagnosed with diabetes. In 2007, the total estimated economic cost of diabetes was \$174 billion; \$116 billion was direct medical expenditures, and \$58 billion was due to disability, work loss, and premature mortality (CDC, 2010). Considering the additional costs of undiagnosed diabetes, prediabetes, and gestational diabetes, the total estimated cost of diabetes in the U.S. in 2007 was \$218 billion (ADA, 2011a). If the

current trends continue, the economic cost of diabetes is projected to triple by the year 2034 (Huang, Basu, O'Grady, & Capretta, 2009).

The Latino/Hispanic population has disproportionate rates of diabetes and related complications compared to non-Hispanic Whites (CDC, 2008c; NCHS, 2010) and is projected to comprise 30% of the total U.S. population by 2050 (U.S. Census Bureau, 2008a). The rate of prediabetes among Mexican American adults, age 20 years and older, is now at 36% (CDC, 2011b), significantly higher than the rate of 25.1% noted in 2008 (NCHS, 2009). Latino/Hispanic women have an increased risk for developing gestational diabetes (ADA, 2011b). Diabetes accounts for 33-62% of years of potential life lost for Latino/Hispanic men and women compared to non-Hispanic Whites with type 2 diabetes (AHRQ, 2009b). A recent analysis of Mexican American seniors age 75 years and older indicates that the prevalence of diabetes in this population nearly doubled from 1993-1994 to 2004-2005, and the rates of diabetes-related complications have not improved (Beard, Ghatrif, Samper-Ternent, Gerst, & Markides, 2009). Given these facts, research that uncovers factors associated with glycemic control among Latinos/Hispanics is an essential aspect of addressing this important public health threat.

### **Justification of the Need for the Study**

Findings reported in the *2010 National Healthcare Disparities Report* and the *CDC Health Disparities and Inequalities Report—United States, 2011* indicated significant diabetes-related health disparities exist between Latino/Hispanic populations and non-Hispanic Whites (AHRQ, 2011a; CDC, 2011a). In the *Healthy People 2020* objectives, diabetes has been identified as a core health priority for the nation, with emphasis on

increasing the proportion of persons with an A1C value less than 7% and decreasing the rate of diabetes-related morbidity and all-cause mortality (U.S. Department of Health and Human Services, 2010, n.d.).

A limited number of studies have been conducted examining the use of alternative self-care modalities of Latinos/Hispanics, specifically for the management of type 2 diabetes (Bergland et al., 2007; Brown et al., 1998; Coronado et al., 2004; Hunt et al., 2000; Johnson et al., 2006; Poss et al., 2003). Most studies have consisted of predominately Mexican American samples living along the U.S.-Mexico border region or areas with an established Latino/Hispanic community. Little is currently known about the TCA self-care expressions, patterns, and practices of Latinos/Hispanics living in nonborder, emerging Latino/Hispanic communities. Further, no studies were found that examined the association of TCA self-care modalities to glycemic control when searching the English-based databases of Cumulative Index to Nursing and Allied Health Literature, PubMed, and Academic Search Premier EBSCO. Given the continued diabetes-related health disparities between Latino/Hispanic populations and non-Hispanic Whites, and that self-care behaviors and skills are crucial for achieving glycemic control and preventing complications, empirical data are needed to fill this current knowledge gap.

This study was innovative in several ways. First, this study explored a more comprehensive view of the TCA self-care expressions, patterns, and practices used by Latinos/Hispanics for the management of type 2 diabetes than prior studies, by exploring the use of herbal remedies, faith-based interventions, consulting traditional healers, and

self-medication/self-prescription practices. Second, this study provided more specific information regarding the use of TCA self-care expressions, patterns, and practices for the management of type 2 diabetes than prior studies. Third, this study explored the association of TCA self-care expressions, patterns, and practices to glycemic control. Fourth, factors associated with the use of TCA self-care expressions, patterns, and practices were examined. Lastly, the setting was the nonborder, emerging Latino/Hispanic community in North Carolina which consists of Latinos/Hispanics with ties to Mexico, Central and South America, and the Caribbean (Kochhar, Suro, & Tafoya, 2005; Pew Hispanic Center, 2009b; State Center of Health Statistics & North Carolina Department of Health and Human Services, 2009; State Center for Health Statistics & Office of Minority Health and Health Disparities, 2006). Many Latino/Hispanic persons in this geographic area are more recent immigrants to the U.S. with limited English proficiency skills, lower educational levels, and significant barriers to healthcare access (Pew Hispanic Center, 2009b; State Center for Health Statistics & Office of Minority Health and Health Disparities, 2010). The findings from this research study fill critical knowledge gaps to promote culturally congruent care and treatment, thus, may positively impact long-term health outcomes of Latinos/Hispanics with type 2 diabetes.

### **Synopsis of Current Knowledge**

#### **Background**

Diabetes care is a complex collaborative process usually involving a team of healthcare providers, the patient, and the family (ADA, 2011b). Extensive research has resulted in evidence-based treatment guidelines and recommendations to achieve

glycemic control and minimize diabetes-related complications through a combination of standard medical interventions and practices (ADA, 2011c). The standard medical interventions and practices include: (a) pharmaceutical treatments which may include any combination of oral hypoglycemic agents, insulin, antihypertensive agents, cholesterol lowering medications, and antiplatelet agents; (b) regularly scheduled laboratory analyses of glucose levels, hemoglobin A1C (A1C) levels, lipid profile assessments, chemistry panels, and renal function; (c) regularly scheduled assessment of blood pressure; (d) referrals to specialists for an annual dilated eye exam, dental assessment, as well as podiatry and mental health experts as needed; and (e) diabetes self-management education to increase knowledge of the diabetes disease process, follow dietary and physical activity recommendations, SMBG, safe medication use, monitor for acute and chronic diabetes-related complications, and set personal goals to promote health (ADA, 2011c; Funnell et al., 2010).

To date, diabetes educational programs have been culturally tailored for Latinos/Hispanics by: (a) teaching classes in English or Spanish (Brown, Garcia, Kouzekanani, & Hanis, 2002; Lorig, Ritter, & González, 2003; Lorig, Ritter, Villa, & Piette, 2008; Lujan Ostwald, & Ortiz, 2007; Mauldon, Melkus, & Cagganello, 2006; Sixta & Ostwald, 2008; Vincent, Pasvogel, & Barrera, 2007); (b) incorporating family members or other support persons in the management (Brown et al., 2002; Vincent et al., 2007); (c) educating persons on how to prepare traditional ethnic foods in a healthier manner (Brown et al., 2002; Lorig et al., 2003; Lujan et al., 2007; Mauldon et al., 2006; Sixta & Ostwald, 2008); (d) using *promotores/as* (lay health advisors), who are bicultural

and bilingual community members with an emic perspective of the Latino/Hispanic community, as program leaders (Lorig et al., 2003; Lujan et al., 2007; Sixta & Ostwald, 2008; Vincent et al., 2007); (e) clarifying misconceptions about insulin (Brown et al., 2002; Lorig et al., 2003; Lujan et al., 2007; Mauldon et al., 2006; Vincent et al., 2007); (f) using community settings (Brown et al., 2002; Lorig et al., 2003; Lujan et al., 2007; Mauldon et al., 2006); (g) using Latin music to encourage physical activity (Lorig et al., 2003); (h) using low-literacy Spanish language teaching materials (Vincent et al., 2007); and (i) using the concepts of divine fatalism and familialism as motivational methods to increase SMBG and other health promoting behaviors (Lujan et al., 2007). Despite those efforts, disparities in glycemic control persisted between Latinos/Hispanics and non-Hispanic Whites with type 2 diabetes. A key component missing from culturally tailored research interventions is information pertaining to the use of culturally-based TCA self-care expressions, patterns, and practices of Latinos/Hispanics for diabetes care. One study reported discussing the use of traditional Mexican home remedies (*remedios caseros*) with participants; however, specific home remedies were not explicated and no relationship to health outcomes or effective diabetes self-care was provided (Vincent, 2009).

A meta-analysis of research studies published between 1993 and 2007 revealed that Latinos/Hispanics have higher A1C levels than non-Hispanic Whites, indicating uncontrolled diabetes (Kirk et al. 2008). Findings from other research studies indicate that Latinos/Hispanics with type 2 diabetes have low levels of diabetes knowledge (Chilton, Hu, & Wallace, 2006; Lorig et al., 2003, Lujan, 2008; Lujan et al., 2007; Sixta

& Ostwald, 2008; Vincent et al., 2007; Whittemore, 2007), lack awareness of diabetes-related symptoms, or misinterpret the meaning of symptoms resulting in delayed medical treatment or incorrect self-management (Brown et al., 1998; García, 2005).

Persons from every background and culture engage in self-care behaviors and practices to promote health and treat illnesses (Chang, Wallis, & Tiralongo, 2007; Leininger, 2006). Self-care is defined as those behaviors and practices that an individual will use to support or improve his/her health (Sánchez, 2007). Behaviors and practices are multifaceted and are often based upon cultural values, family traditions, health beliefs, past experiences of success or failure, individual personalities, level of concern regarding clinical manifestations, knowledge of the disease process, and accessibility to resources (Chang et al., 2007; Lopez, 2006; Najm et al., 2003; Sánchez, 2007). Prior empirical data indicates that the use of TCA self-care expressions, patterns, and practices among Latinos/Hispanics for health purposes is associated with living in the U.S. less than 10 years (Clark, Bunik, & Johnson, 2010; Howell et al., 2006; Najm et al., 2003), lacking health insurance (Coffman et al., 2008), having a lower education level (Caban & Walker, 2006; Mikhail et al., 2004; Najm et al., 2003), limited English proficiency (Howell et al., 2006; Mikhail et al., 2004), lower income (Coffman et al., 2008; Mikhail et al., 2004), distrust of physicians (Howell et al., 2006), or the perception of poor communication with healthcare providers (Reyes-Ortiz, Rodriguez, & Markides, 2009). Further, Latinos/Hispanics report using TCA modalities because these modalities are familiar, natural, culturally congruent, and correlate with holistic perspectives of health (Najm et al., 2003; Poss et al., 2003; Poss et al., 2005; Schoenberg, Stoller, Kart,

Perzynski, & Chapleski, 2004). Some Latinos/Hispanics believe that these self-care treatments can control or cure diabetes (Coronado et al., 2004; Lopez, 2006; Poss et al., 2003). A more clear understanding of the TCA self-care expressions, patterns, and practices used by Latinos/Hispanics for the management of type 2 diabetes is needed.

### **Herbal Remedies**

The use of herbal remedies as a first-line modality to support health or treat illnesses or diseases is ubiquitous among Latin American countries (Andrate-Cetto & Heinrich, 2005; Roberts, 2007; Sánchez, 2007; Schumacher, 2010). Knowledge about these home remedies (*remedios caseros*) is often transmitted through the women in the family to successive generations (Eggenberger, Grassley, & Restrepo, 2006). Prior research findings indicate that herbs and plants are commonly used in the management of type 2 diabetes among Latinos/Hispanics living in Latin America (Andrade-Cetto & Heinrich, 2005; Argáez-López et al., 2003; Johnson et al., 2006; Poss et al., 2003; Shapiro & Gong, 2002; Yeh, Eisenberg, Kaptchuk, & Phillips, 2003) and there is evidence that Latinos/Hispanics living in the U.S. use herbal remedies as part of their TCA self-care expressions, patterns, and practices for the management of type 2 diabetes (Brown et al., 1998; Coffman et al., 2008; Coronado et al., 2004; Johnson et al., 2006; Mikhail et al., 2004; Poss et al., 2003).

The scientific literature concerning herbal remedies among Latinos/Hispanics, indicates a complex and varied formulation involving tablets, capsules, teas, *licuados* (mixture of herbs, juices, foods that are processed in a blender), *agua frescas* (cold mixture of primarily one herb drunk as a refreshing beverage), and eating herbs/plants



raw or cooked as food (Johnson et al. 2006; Poss et al., 2003). Little is known about dosing frequency of herbal remedies or if Latinos/Hispanics alter their dose of prescribed diabetes medications to accommodate herbal treatments or symptoms. Some Mexican Americans with type 2 diabetes reported relying on their own judgment to titrate doses of herbs as part of their diabetes self-care, even when they did not understand the mechanism of action of the herbs ingested (Poss et al., 2003). Healthcare providers and pharmacists do not regularly ask Latino/Hispanic clients about their use of TCA modalities (Chang et al., 2007; Howell et al., 2006; Mikhail et al., 2004; Najm et al., 2003; Poss et al., 2003; Shelley et al., 2009). Concerns have been raised that nurses and other healthcare providers may lack sufficient knowledge or training of herbal practices to provide safe medical advice regarding self-care expressions, patterns, and practices for TCA substances (Burman, 2003; Howell et al., 2006; Kemper et al., 2003; Ortiz, Shields, Clauson, & Clay, 2007). A clear understanding of how Latinos/Hispanics utilize herbal remedies for the management of type 2 diabetes is needed.

### **Faith-Based Interventions**

Faith in God has been identified as a source of hope and strength for Latinos/Hispanics with type 2 diabetes. Prior research indicates that the faith-based interventions of prayer, seeking counsel from a priest, or wearing religious icons or having them in their home are important self-care measures used by Mexican and Puerto Rican subgroups to cope with the burdens of diabetes (Bergland et al., 2007; Caban & Walker, 2006; Hunt et al., 2000; Lopez, 2006; Mikhail et al., 2004). However, it is not known if Latinos/Hispanics use other faith-based interventions as part of their TCA self-

care expressions, patterns, and practices for diabetes management or if they would like nurses and other healthcare providers to incorporate faith-based interventions into diabetes self-care management plans.

### **Consulting Traditional Healers**

A variety of traditional healers are consulted by Latinos/Hispanics for the management of traditional illnesses and health conditions, including diabetes (Coffman et al., 2008; Coronado et al., 2004; Lopez, 2005; Sánchez, 2007; Tafur, Crowe, & Torres, 2009). Empirical data pertaining to the specific type of consultation with traditional healers as part of diabetes self-care is limited. A sample ( $N = 42$ ) of Mexican American persons with type 2 diabetes reported consulting with *yerberos/as* (herbalists; Coronado et al., 2004). Puerto Ricans with type 2 diabetes were found to seek the services of *espiritualistas* (faith healers, a type of traditional healer), but not *curanderos/as* (traditional healers; Caban & Walker, 2006). Other Mexican Americans living in Texas and the Midwest denied consulting with *curanderos/as* (traditional healers) as part of diabetes care (Hunt et al., 2000; Clark, Vincent, Zimmer, & Sanchez, 2009). In fact, these participants reported being skeptical of *curanderos/as*. However, Hunt et al. (2000) and Clark et al. (2009) did not report if participants consulted with other types of traditional healers. More information is needed to understand the role of traditional healers in the management of diabetes among Latinos/Hispanics.

### **Self-Medication/Self-Prescription**

In many Latin American countries, prescription medications are widely available in pharmacies without a prescription or without first seeking medical advice (Drug

Utilization Research Group, 1997; Kroeger et al., 2001; Sleath et al., 2009). This practice is known as self-medication/self-prescription (Drug Utilization Research Group, 1997; Kroeger et al., 2001). Recent research indicates that Latinos/Hispanics continue this self-care practice while living in the U.S. for a variety of health conditions, including diabetes (Coffman et al., 2008; Larson, Dilone, Garcia, & Smolowitz, 2006; Mainous et al., 2009; Nolen et al., 2002; Sleath et al., 2009). Multiple safety issues are associated with this behavior which include: taking harmful medications, using medications incorrectly, potential allergic reactions, drug-drug or drug-herb interactions, overmedication, exacerbation of underlying health conditions, receiving counterfeit or substandard medications, and increasing microbial resistance (Coffman et al., 2008; Larson et al., 2006; Mainous et al., 2009; Nolen et al., 2002; Sleath et al., 2009).

Common reasons cited by research participants for the practices of self-medication/self-prescription include tradition, greater trust in medications from their home country, feelings that medications from their home country are stronger and more effective, self-reinforcing (having experienced the same symptoms in the past and had successful treatment with the same medication), lack of health insurance, lower cost, frustration navigating the U.S. healthcare system, limited English proficiency, time off from work to consult with a medical provider, negative past experiences with U.S. healthcare providers, limited appointment availability in free clinics, and fears of deportation (Coffman et al., 2008; Larson et al., 2006; Mainous et al., 2009; Sleath et al., 2009). To date, all of the research studies pertaining to self-medication/self-prescription

have been focused primarily on the use of antibiotics or for general health. Research to understand this practice in relationship to diabetes self-care is needed.

### **Trust and Communication with Healthcare Providers**

Latinos/Hispanics use a variety of TCA self-care expressions, patterns, and practices to assist them with diabetes care. Consistently, Latinos/Hispanics report not telling their healthcare providers about culturally-based TCA practices. Persons feel it is not necessary or appropriate for healthcare providers to know about cultural self-care modalities (Najm et al., 2003). Persons cite concerns of being embarrassed or ridiculed by healthcare providers in the past for such practices (Najm et al., 2003; Poss et al., 2003; Shelley et al., 2009). The lack of time or opportunity to tell healthcare providers during office visits has been reported (Najm et al., 2003; Shelley et al., 2009).

Latinos/Hispanics reported concerns that U.S. healthcare providers are not knowledgeable about culturally-based TCA self-care expressions, patterns, and practices, and therefore, unable to give adequate advice regarding these modalities (Howell et al., 2006; Poss et al., 2003; Shelley et al., 2009). However, the most frequent reason Latinos/Hispanics reported for not telling their healthcare provider about alternative modalities was because healthcare providers do not ask and do not seem interested in TCA self-care expressions, patterns, and practices (Howell et al., 2006; Shelley et al., 2009). A sample of Latino participants living in New Mexico reported that in order to feel comfortable discussing TCA self-care expressions, patterns, and practices, persons need to perceive openness, respect, and interest on the part of healthcare providers

(Shelley et al., 2009). That sample of participants reported believing that healthcare providers should be the initiators of discussions regarding these practices.

### **Conceptual Framework**

Madeleine Leininger's culture care diversity and universality theory and the sunrise enabler were used to guide this study (see Figure 1). This transcultural theory provides a holistic conceptual framework from which to examine the multiple determinants that shape peoples' perceptions and experiences of health, well-being, healing, illness, disabilities, and death (Leininger, 2006). The ultimate goal of this theory is to discover and reveal emic and etic culture care knowledge that is meaningful and can be incorporated into nursing care and interventions in order to optimize the health of people from diverse cultures, by providing care that is culturally congruent, safe, and beneficial. According to this theory, culturally congruent care can enhance trust and promote positive relationships between persons and healthcare providers, and contribute to quality of life (Leininger, 2007). Therefore, research exploring the use of TCA self-care expressions, patterns, and practices that are culturally derived may enhance nurses' and other healthcare providers' abilities to provide culturally congruent care, leading to improved diabetes care and health outcomes among Latinos/Hispanics.

The central construct of this theory is the synthesis of culture and care. Care, according to Leininger (2006), is a dynamic and powerful force that is culturally-based to promote human dignity and instill hope of recovery and assist others. Care, both a concrete and abstract phenomenon, is defined as "those assistive, supportive, and enabling experiences or ideas towards others with evident or anticipated needs to

# Sunrise Enabler

## Leininger's Sunrise Enabler to Discover Culture Care

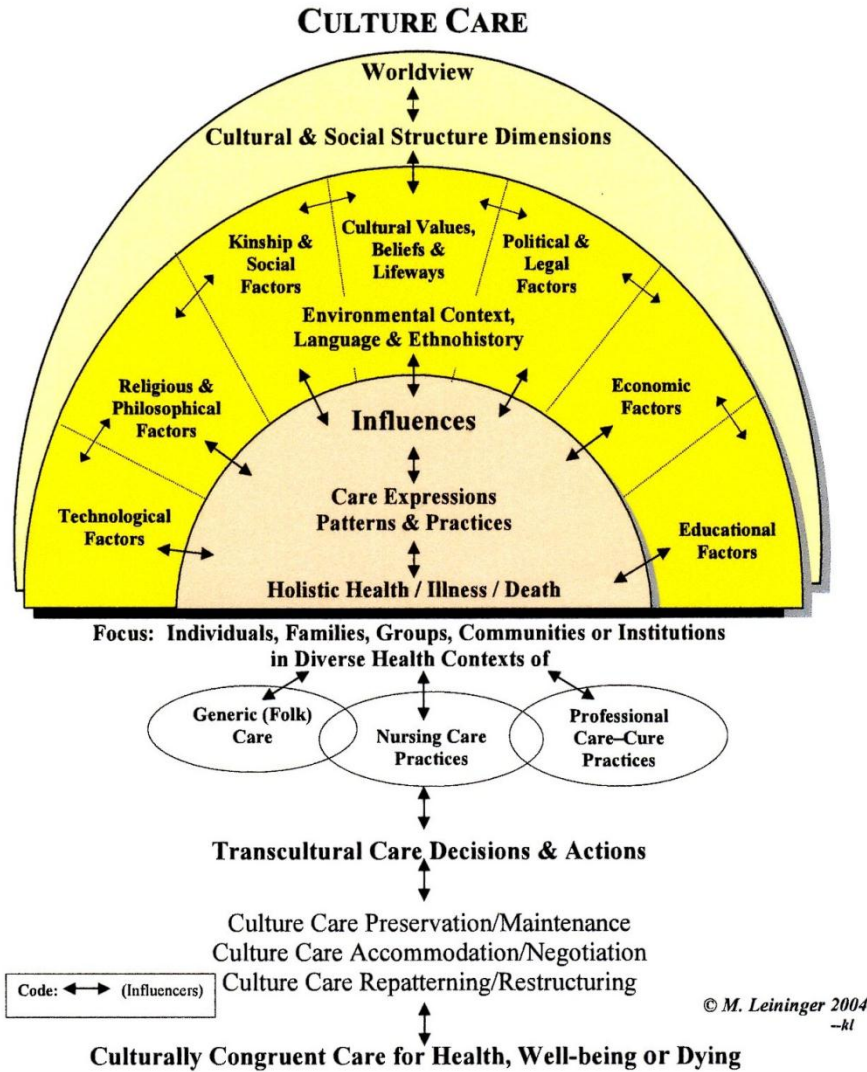


Figure 1. Leininger's Sunrise Enabler to Discover Culture Care

Used with permission from Dr. Madeleine M. Leininger (See Appendix A).

ameliorate or improve a human condition or lifeway” (Leininger, 2006, p. 12). Care is comprised of emic (generic or folk) and etic (professional nursing and medical) care. Emic care refers to the “learned and transmitted lay, indigenous, traditional, or local knowledge and practices....to improve well-being, or to help with dying or other human conditions” (Leininger, 2006, p. 14). Etic care is the

formal and explicit cognitively learned professional care knowledge and practices obtained generally through educational institutions....to improve their health, prevent illnesses, or to help with dying or other human conditions (Leininger, 2006, p. 14).

In this theory, emic and etic care behaviors and practices inform care expressions, patterns, and practices which may be expressed differently between cultural groups and influence health and illness outcomes. This study focused on exploring the emic care expressions, patterns, and practices, which were defined as TCA self-care expressions, patterns, and practices, utilized by Latinos/Hispanics for the management of type 2 diabetes.

Culture, the other aspect of this theory’s central construct, is intrinsic to all human beings and may vary based upon geographic location, ethnicity, social networks, and natural resources (Leininger, 2006). Culture is defined as “the learned, shared, and transmitted values, beliefs, norms, and lifeways of a particular culture that guides thinking, decisions, and actions in patterned ways and often intergenerationally” (Leininger, 2006, p. 13). The culture construct informs peoples’ worldview—how people look at the world around them—which in turn guides actions and decisions surrounding health, well-being, and care actions (Leininger, 2006). Culture informs how a particular

group of people define health and the meaning of diseases, like diabetes. When culture is integrated with the care construct, it provides a powerful modality to understand how a particular group of persons define health, wellness, illness and associated beliefs, practices, and values. This construct is dynamic and can be transformed with experiences like immigration, which may alter individuals' values, beliefs, and practices due to influences from their new environment (Schumacher, 2010). Unlike standard medical health practices, which have traditionally focused on symptoms and disease entities, culture care is a blend of a client's cultural values, beliefs, and practices with those of professional healthcare providers to promote a holistic perspective that is both acceptable and therapeutic (Leininger, 2006).

Health, as defined by this theory, is

...a state of well-being that is culturally defined and constituted. Health is a state of being to maintain and the ability to help individuals or groups to perform their daily role activities in culturally expressed beneficial care and patterned lifeways. (Leininger, 2006, p. 10)

According to this theory, health is more than just biophysical outcomes. Health is holistic, incorporates well-being, and often includes one's ability to fulfill societal role expectations. The concept of health can vary between cultural groups. Therefore, understanding how a particular group of persons defines health, aids in promoting cultural competency and more meaningful care, especially when perspectives differ from those of the dominant culture.

The cultural and social structure dimensions of the individual can directly and indirectly impact health and well-being (Leininger, 2006). These dimensions affect



everyday lives and impact the manner in which persons care for their own health and treat disease and illnesses. Elucidating these dimensions is essential when considering a holistic and culturally congruent approach. The cultural and social structure dimensions of this theory include: educational factors; economic factors; political and legal factors; cultural values, beliefs, and lifeways; kinship and social factors; religious and philosophical factors; and technological factors (Leininger, 2006). Explicating these factors as they relate to TCA self-care expressions, patterns, and practices and health outcomes may highlight barriers and facilitators to health, care behaviors, and outcomes for Latinos/Hispanics.

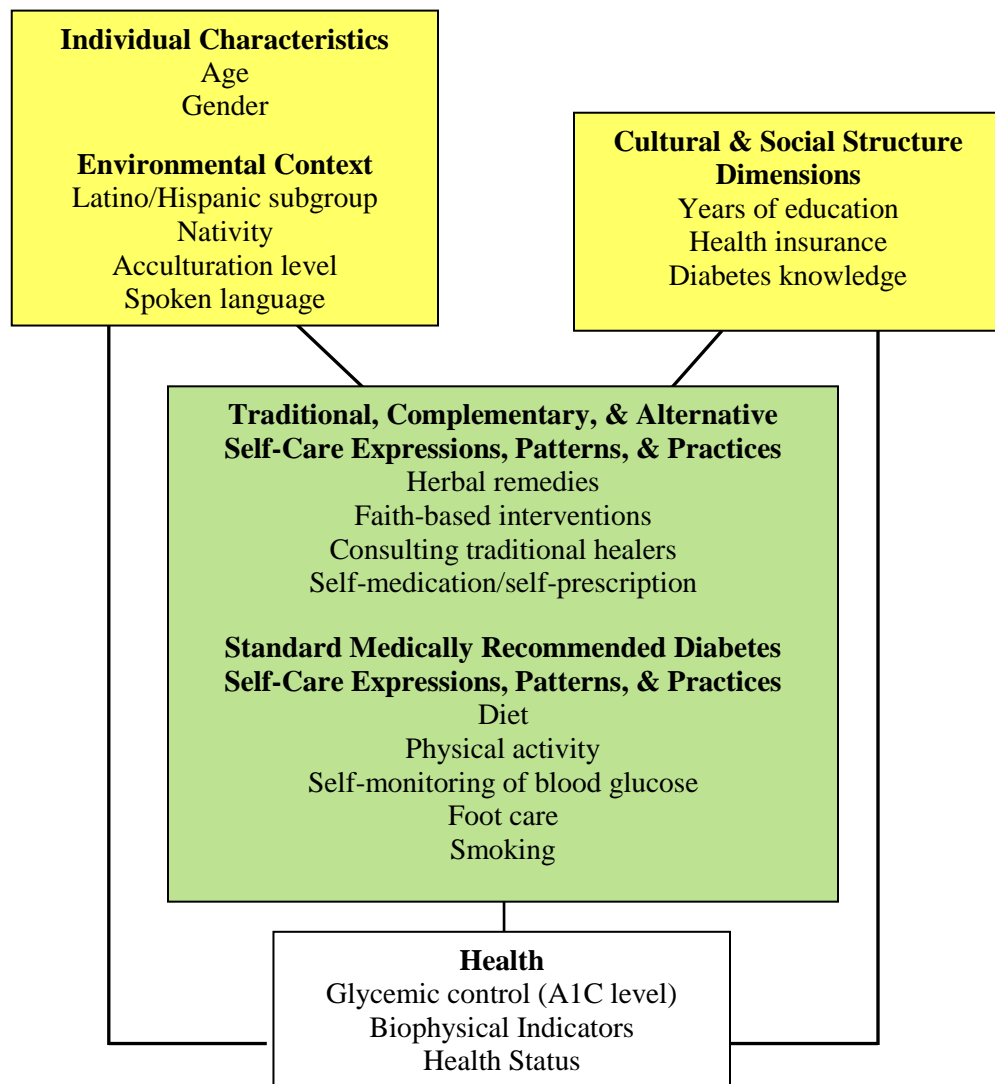
The culture care diversity and universality theory predicts three transcultural care decisions and actions which will assist in promoting culturally congruent nursing care (Leininger, 2006). As explicated by Leininger (2006), the three modes of transcultural care decisions and actions are: (1) culture care preservation and/or maintenance which refers to nursing acts or decisions that help people continue cultural beneficial care beliefs and practices; (2) culture care accommodation and/or negotiation which refers to nursing acts or decisions that help people adapt or negotiate for culturally competent and safe care; and (3) culture care repatterning and/or restructuring which refers to those actions and mutual decisions that help people adapt or change traditional care practices so that they are more beneficial for health and outcomes (Leininger, 2006). TCA self-care expressions, patterns, and practices may be harmful to people. In order to sensitively promote positive change in the health of Latinos/Hispanics with type 2 diabetes, healthcare providers must be knowledgeable about the TCA self-care expressions,

patterns, and practices used by Latinos/Hispanics. This knowledge provides a basis from which to negotiate practices that promote safe, effective, and culturally sensitive diabetes management (Leininger, 2006; Schumacher, 2010). This study did not measure the three transcultural care decisions and actions. However, the findings from this study regarding the use of TCA self-care expressions, patterns, and practices of Latinos/Hispanics for the management of type 2 diabetes have implications pertaining to the three modes of transcultural care decisions and actions.

The culture care diversity and universality theory was implemented through the use of the sunrise enabler. The sunrise enabler is a diagrammatic tool providing a comprehensive and holistic guide for nurse researchers and other healthcare providers to discover and assess culture care phenomena (Leininger, 2006). In this study, the focus was to gain new knowledge about the TCA self-care expressions, patterns, and practices utilized by Latinos/Hispanics for the management of type 2 diabetes. A diagram depicting the concepts and variables of this study is shown in Figure 2.

### **Definitions**

Concepts and variables used in this study included: Latino/Hispanic; environmental context; cultural and social structure dimensions; care expressions, patterns, and practices; and health.



*Figure 2.* Culture Care of the Self-Care Expressions, Patterns, and Practices of Latinos/Hispanics for the Management of Type 2 Diabetes

### **Latino/Hispanic**

The terms Latino and Hispanic are used to describe someone who self-identifies as being of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish culture or origin, regardless of race (U.S. Census Bureau, 2007). These terms

are often used interchangeably and may be based upon birthplace or family heritage.

This term was operationalized based upon responses to Demographic Questionnaire items and was limited to persons from Spanish speaking Latin American countries.

### **Environmental Context**

Environmental context refers to the totality of person's lives which informs and influences how persons interpret, express, and interact in cultural settings (Leininger, 2006). This includes an individual's ethnohistory and spoken language (Leininger, 2006). Ethnohistory is an anthropological term referring to

...past facts, events, instances, and experiences of human beings, groups, cultures, and institutions that occur over time in particular contexts that help explain past and current lifeways about culture care influences of health and wellbeing or the death of people. (Leininger, 2006, p. 15)

Ethnohistory includes a person's self-identification with country or culture of origin (subgroup status), nativity, generational status, acculturation level, and spoken language.

Nativity refers to being either foreign-born or native-born (born in the U.S.; Pew Hispanic Center, 2009a). Generational status is defined as being (a) first-generation which is equivalent to being foreign-born; (b) second-generation which is a person who was born in the U.S. but has at least one parent who is foreign-born; and (c) third-generation is a person who was born in the U.S. as well as both parents (Pew Hispanic Center, 2009a). Acculturation is defined as a multidimensional process whereby a person adapts cultural values and practices from his/her culture of origin with those adopted from a new dominant culture (Marín & Gamba, 1996; Page, 2006).

Environmental context was operationalized based upon responses to Demographic Questionnaire items for Latino/Hispanic subgroup status, nativity, generational status, and spoken language. Acculturation level was operationalized by using the average scores for the cultural domains of Hispanic and non-Hispanic from the Linguistic Proficiency subscale from the Bidimensional Acculturation Scale for Hispanics (Marín & Gamba, 1996). Spoken language was identified based upon responses to the Linguistic Proficiency subscale from the Bidimensional Acculturation Scale for Hispanics and a question regarding spoken language at home on the Demographic Questionnaire.

### **Cultural and Social Structure Dimensions**

Cultural and social structure dimensions are factors that influence health and illness, both directly and indirectly (Leininger, 2006). These dimensions impact care expressions, patterns, and practices. In this study, the cultural and social structure dimensions of educational factors, economic factors, kinship and social factors, religious and philosophical factors were assessed based upon responses to Demographic Questionnaire items. Diabetes knowledge, part of the cultural values, beliefs, and lifeways dimension, was operationalized by the summed total score on the Spoken Knowledge in Low Literacy in Diabetes Scale (Rothman et al., 2005).

### **Care Expressions, Patterns, and Practices**

Care expressions, patterns, and practices are the ways in which persons care for health, illness, and disease, and are comprised of both TCA self-care expressions, patterns, and practices (emic care) and the standard medically recommended diabetes self-care behaviors and practices (etic care) enacted to manage type 2 diabetes

(Leininger, 2006). One's environmental context and cultural and social structure dimensions directly impact care expressions, patterns, and practices. In this study, the TCA self-care behaviors and practices assessed were herbal remedies, faith-based interventions, consulting traditional healers, and self-prescription/self-medication practices pertaining to type 2 diabetes care. TCA self-care expressions, patterns, and practices were operationalized based upon responses to the Traditional, Complementary, and Alternative Self-Care Expressions, Patterns, and Practices Questionnaire. The standard medically recommended diabetes self-care expressions, patterns, and practices assessed were the use of oral hypoglycemic medications and insulin based upon responses to Demographic Questionnaire items, and scores from the domains of diet, physical activity, SMBG, foot care, and smoking from the Summary of Diabetes Self-Care Activities measure (Toobert, Hampson, & Glasgow, 2000).

## **Health**

In this study, health was assessed based upon determination of glycemic control, evaluation of biophysical indicators, and self-reported health status.

**Glycemic control.** Glycemic control refers to maintaining blood glucose levels within the target levels and is an essential goal in diabetes care. Maintaining glycemic control has been shown to reduce the risk for the development of microvascular and neuropathic complications in those with type 2 diabetes (ADA, 2011c). The A1C blood test is the primary target indicating glycemic control in most persons with diabetes. The A1C represents the level of blood glucose bound to hemoglobin A and is a reflection of glycemic control for the previous 90 to 120 days (Chernecky & Berger, 1997). Glycemic

control, as defined by the ADA (2011c), is an A1C level less than 7% for nonpregnant adults with type 2 diabetes. Poor glycemic control is an A1C level greater than or equal to 7.0%, indicating hyperglycemia. Glycemic control was operationalized by the result obtained from a finger stick A1C level.

**Biophysical indicators.** Biophysical indicators consist of noninvasive anthropometric measurements such as height, weight, and abdominal circumference for the purpose of assessing adipose tissue distribution, as well as blood pressure (Spraycar, 1995). Persons with type 2 diabetes who have uncontrolled hypertension and elevated body mass index, particularly visceral adiposity, are at an increased risk for the development of cardiovascular events (AACE Diabetes Mellitus Clinical Practice Guidelines Task Force, 2007; ADA, 2011c). In this study, the biophysical indicators that were measured included: blood pressure, height, weight, and waist circumference. Each participant's body mass index was calculated.

**Health status.** Self-rated health is an individual's perception of their health which may be comprised of both physical and mental health and is considered to be an important aspect of quality of life (CDC, 2000). In this study, self-rated health status consisted of one question from the CDC Healthy Days Core Module (CDC, 2000) that was included on the Demographic Questionnaire.

### **Contribution of the Study**

This study filled a gap in knowledge regarding the TCA self-care expressions, patterns, and practices of Latinos/Hispanics for the management of type 2 diabetes. In contrast to prior studies which have primarily involved Latinos/Hispanics of Mexican

heritage living along the U.S.-Mexico border or geographic areas with a well established Latino/Hispanic community, this study recruited Latino/Hispanic participants from multiple Latino/Hispanic subgroups living in nonborder, emerging Latino/Hispanic communities. Latinos/Hispanics in this setting live in emerging communities and encounter barriers to healthcare access, and often are recent immigrants to the U.S. This study explored a more comprehensive view of the TCA self-care expressions, patterns, and practices than studies previously undertaken by including herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription practices used for the management of type 2 diabetes. This study explored the association of TCA self-care expressions, patterns, and practices to glycemic control and examined factors associated with the use of these traditional modalities. Findings have implications for more effective culturally competent care strategies.

### **Summary**

Latinos/Hispanics have disproportionately higher rates of type 2 diabetes and associated complications and mortality compared to non-Hispanic Whites. There is a limited body of knowledge that indicates if, how, or why Latinos/Hispanics use TCA self-care expressions, patterns, and practices to help manage their diabetes condition. These practices include the use of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription. Some of these TCA modalities may pose safety risks. Empirical data of these practices are lacking. Therefore, the purpose of this study was to explore the use of TCA self-care expressions, patterns, and practices among a group of Latinos/Hispanics living in a nonborder, emerging



Latino/Hispanic community for the management of type 2 diabetes. In addition, the association of these TCA self-care expressions, patterns, and practices to glycemic control and the factors associated with the use of these modalities was explored. Leininger's culture care diversity and universality nursing theory and sunrise enabler guided this study. Findings from this study explicate a clearer understanding of the TCA self-care expressions, patterns, and practices used by Latinos/Hispanics for type 2 diabetes care. This knowledge informs healthcare professionals to provide culturally congruent, safe, and efficacious care and treatment and improve the health outcomes of Latinos/Hispanics with type 2 diabetes.

## CHAPTER II

### REVIEW OF THE LITERATURE

#### **Introduction**

The act of engaging in self-care expressions, patterns, and practices to promote health and treat illness is universal to all persons (Chang, Wallis, & Tiralongo, 2007; Leininger, 2006). The characteristics and purposes of self-care behaviors vary widely, depending upon the cultural background and social and/or environmental factors influencing the individual, family, or community (Caballero, 2007; Oomen, Owen, & Suggs, 1999; Schumacher, 2010). Often, cultural self-care behaviors are unfamiliar to “outsiders” of the culture. Uncovering the specifics of cultural self-care expressions, patterns, and practices has been identified as an essential element for providing culturally congruent care and improving health and disease outcomes (Chang et al., 2007; Leininger, 2006; Poss, Jezewski, & Stuart, 2003; Schumacher, 2010).

Knowledge and understanding of the cultural health beliefs, values, and care practices of diverse populations is vital to provide effective diabetes education, as culture permeates every aspect of the diabetes disease management process (American Association of Diabetes Educators [AADE], 2007). Cultural perspectives influence what diabetes means to an individual, family, or group of people; decisions regarding food choices and levels of physical activity; perceptions of body image and weight; when and how to seek healthcare advice; the use of standard medical interventions and treatments;

attitudes towards medications; and the use of culturally-based traditional, complementary, and alternative (TCA) self-care expressions, patterns, and practices (AADE, 2007; Caballero, 2007; Leininger, 2006; Oomen et al., 1999). The AADE advocates for health research that explores the “relationship between culture, health, and medicine in diabetes education to develop new therapeutic approaches to improve diabetes care” (AADE, 2007, p. 43).

A review of the literature was undertaken to explicate what is currently known about the health beliefs, values, and TCA self-care expressions, patterns, and practices of Latinos/Hispanics for the management of type 2 diabetes. This review consisted of English language articles in the databases of PubMed, Cumulative Index to Nursing and Allied Health Literature, and Academic Search Premier EBSCO. The TCA self-care modalities being explored include: herbal remedies, faith-based interventions, consulting traditional healers, and the practices of self-medication/self-prescription. Leininger’s culture care diversity and universality theory was implemented through the sunrise enabler to guide this literature review. First, what is currently known about the TCA self-care expressions, patterns, and practices of Latinos/Hispanics for type 2 diabetes management is reviewed. Then, the cultural and social structure dimensions are presented as factors influencing health, illness, and care expressions, patterns, and practices (Leininger, 2006). The cultural and social structure dimensions include: cultural values, beliefs, and lifeways; educational factors; economic factors; political and legal factors; kinship and social factors; and religious and philosophical factors. To understand the environmental context of the lives of Latinos/Hispanics, their ethnohistory

is explored, consisting of Latino/Hispanic subgroup, nativity, generational status, acculturation, and spoken language.

### **Culture Care Expressions, Patterns, and Practices**

Culture care expressions, patterns, and practices refer to the manner in which persons express caring for illness, disease, and promoting health (Leininger, 2006). This includes traditional and cultural self-care practices and behaviors, and practices and behaviors derived from the standard medical community. Diabetes self-care, as defined by Brown, Upchurch, Garcia, Barton, and Hanis (1998), is the “decision making process of persons with diabetes regarding whether to treat symptoms with prescribed therapies and /or employ alternative therapies such as herbal teas or other types of home remedies” (p. 332). For persons with type 2 diabetes, multiple decisions are made each day to manage their disease. Explicating what is currently known about the TCA self-care expressions, patterns, and practices of Latinos/Hispanics for type 2 diabetes is essential.

### **TCA Self-Care Expressions, Patterns, and Practices**

The TCA self-care expressions, patterns, and practices of Latino/Hispanic populations have been influenced by the integration of the health beliefs and practices of indigenous peoples, Catholic church, Spanish conquistadors, weaknesses of the national health systems of home countries, and accessibility of natural and/or ethnic products, medications, and healthcare services (Lopez, 2006; Lujan & Campbell, 2006; Ortiz, Shields, Clauson, & Clay, 2007; Schneider, 2009; Tafur, Crowe, & Torres, 2009). Findings from prior research indicate that Latinos/Hispanics commonly seek diabetes care from traditional and standard medical systems simultaneously and concurrently use

treatments from both systems (Caban & Walker, 2006; Coronado, Thompson, Tejada, & Godina 2004; Najm, Reinsch, Hoehler, & Tobis, 2003; Poss et al., 2003).

Latino/Hispanic persons do not view these modalities as “folk” or “alternative” remedies; rather, the modalities are considered to be normal and meaningful self-care behaviors associated with health promotion, restoring harmony and balance, and treating such illness as diabetes (Caban & Walker, 2006; Lopez, 2006; Lopez, 2005; Poss et al., 2003; Poss, Pierce, & Prieto, 2005; Shelley et al., 2009). Latinos/Hispanics with type 2 diabetes have voiced a desire for U.S. healthcare providers to be knowledgeable about their TCA practices and to integrate TCA practices into medical care (Poss et al., 2003).

**Herbal remedies.** The use of herbal remedies has a long tradition in Latin America for the treatment of diabetes (Andrade-Cetto & Heinrich, 2005; Argáez-López et al., 2003; Johnson et al, 2006; Yeh, Eisenberg, Kaptchuk, & Phillips, 2003). For example, in Mexico herbal extracts may be used during the early stages of the disease; herbal abstracts are widely available in community settings (Andrade-Cetto & Heinrich, 2005). There are 800 plants with suspected hypoglycemic properties in Mexico (Shapiro & Gong, 2002) and 306 plants which are popularly used in diabetes treatment (Andrade-Cetto & Heinrich, 2005).

There is evidence that Latinos/Hispanics living in the United States (U.S.) use herbal remedies for diabetes care. In a qualitative study with Mexican Americans in Texas, participants reported using 21 herbal products for treating type 2 diabetes (Poss et al., 2003). Three products were commercial herbal tea products comprised of multiple herbs. Herbal remedies were usually ingested as either a tea, *licuado* (liquid beverage processed

in a blender), eaten raw or cooked. The study participants reported using topical herbal remedies to treat diabetic ulcer wounds. Persons believed that herbal treatments controlled diabetes. Participants were unaware of possible synergistic hypoglycemic affects when combining herbs with hypoglycemic medications. Two participants reported becoming ill after taking herbs recommended by a friend.

Johnson et al. (2006) reported the use of 77 herbs or commercial herbal products for diabetes self-care among southwestern Latino/Hispanic study participants ( $N = 23$ ) in an established Latino/Hispanic community. Ninety-one percent of participants reported using herbal remedies without informing healthcare providers of the use. No herbs were documented in the patients' pharmaceutical records. Study findings indicated that health center pharmacists did not screen, monitor, or discuss herbal remedy use with patients when dispensing medications (Johnson et al., 2006). Latino/Hispanic subgroups in this study were not identified.

In a study in Texas with 63 Mexican Americans who lacked glycemic control, 25% of the sample reported using herbal remedies in the prior month to manage diabetes-related symptoms (Brown et al., 1998). Herbs were commonly ingested daily, with the most frequently utilized herbs being *chaya* (tree spinach), *ajo* (garlic), and *salvia* or *sábila* (aloe vera). Participants reported growing these plants in their yards for easy access, or obtaining them from family members who lived across the border in Mexico. Herbs were ingested simultaneously with prescribed diabetic medications. Authors did not report if prescription medication dosages were altered with the ingestion of herbal remedies or if participants suffered adverse events.

In a qualitative study with 19 Latino/Hispanics immigrants from Mexico and Peru living in North Carolina, participants reported using herbal products, vitamins, homemade syrups, and teas as measures of TCA self-care for general health concerns (Coffman, Shobe, & O'Connell, 2008). One participant with diabetes stated,

I have 'sugar,' but I have never controlled it with medication. I have never gone to the doctor here [in the United States]. I am controlling it with teas. When I see that my sugar levels are going up, I begin to drink teas and immediately the sugar level goes down. (Coffman et al., 2008, p. 208)

It was not explicated how this participant knew her sugar levels were elevated or what criteria she used to indicate that her diabetes was controlled.

Findings from these studies indicated that Latinos/Hispanics used herbal remedies concurrently with prescribed diabetes medications (Brown et al., 1998; Johnson et al., 2006; Poss et al., 2003). No studies reported the frequency or dosage of herb use, nor the diabetes-related symptoms being treated. The development of adverse events was reported in one study (Poss et al., 2003). These studies did not report or discuss if participants altered or skipped doses of prescribed diabetes medications when using herbal treatments. Most studies did not include data on diabetes-related health outcomes or A1C results. Further, most studies were qualitative in design with samples along the U.S.-Mexico border region and limited to the Mexican American subgroup.

The most common herbal remedies used by Latinos/Hispanics for treating diabetes have been reported as: prickly pear cactus (*nopale* in Spanish), aloe vera (*salvia* or *sábila* in Spanish), cottonwood tree (*espina de pochote* in Spanish), tree spinach (*chaya* in Spanish), garlic (*ajo* in Spanish), bitter melon (*cundeamor* in Spanish), cat's claw (*uña de*

*gato* in Spanish), corn silk (*pelo de elote* or *barbas de elote* in Spanish), yellow bells (*tronadora* in Spanish), and loquat or Chinese plum (*nispero* in Spanish; Brown et al., 1998; Coronado et al., 2004; Johnson et al., 2006; Lopez, 2006; Ortiz et al., 2007; Poss et al., 2003; Schoenberg, Stoller, Kart, Perzynski, & Chapleski, 2004). Several premixed commercial teas intended for the treatment of diabetes were reported and include: Te Diabetil, Diabe Cure, Diabetina, Te Malabar, and Starbien (Coronado et al., 2004; Howell et al., 2006; Lopez, 2006). Studies did not consistently report herbal frequency, dosage information, symptoms being treated, development of adverse events, how the herbs were ingested, or if prescribed diabetes medications dosages were altered.

The pharmacokinetic and toxicology knowledge of many herbs is lacking, leaving a vital gap of knowledge regarding efficacy and safety of these products (Andrade-Cetto & Heinrich, 2005; DerMarderosian & Beutler, 2010; Shapiro & Gong, 2002; Yeh et al., 2003). Concerns have been raised of the lack of regulation, product quality control, and inadequate consumer knowledge regarding herbal remedies. In addition, contaminants or adulterants have been identified as a problem. Phua, Zosel, and Heard (2009) reported that 7% of 243 proprietary herbal products sold in California contained undeclared pharmaceuticals. The most common adulterants were non-steroidal anti-inflammatory drugs, antihistamines, Sildenafil citrate (Viagra), and the sulfonylurea, glyburide, a frequently prescribed hypoglycemic agent used to treat type 2 diabetes (Phua, Zosel, & Heard, 2009). Other important safety factors of herbal products include inappropriate indications, prolonged duration of use, excessive dose, and inadequate or improper



ingestion methods (Phua et al., 2009). Contamination of herbs with heavy metals has been reported, particularly in Mexican folk remedies (Phua et al., 2009; Yeh et al., 2003).

Of the herbs reportedly used by Latinos/Hispanics in the aforementioned studies, prickly pear cactus (*nopale*), bitter melon (*cundeamor*), aloe vera (*salvia* or *sábila*), and garlic (*ajo*) have the most reported safety evaluations. Prickly pear cactus (*nopale*) is a member of the *Opuntia* genus and is one of the most widely used herbs/plants among Latinos of Mexican heritage for diabetes management (Andrade-Cetto & Heinrich, 2005; Shapiro & Gong, 2002). *Nopale* is usually consumed raw, cooked, or as a dried powder and has known hypoglycemic properties. It is also high in fiber, vitamin C, calcium, potassium, and iron (Shapiro & Gong, 2002). *Nopale* is widely available in U.S. grocery stores, Latin markets (*tiendas* or *bodegas*), and grows naturally in the southwestern U.S. (Lopez, 2006; Shapiro & Gong, 2002). Physicians in Mexico have prescribed *nopale* as treatment for diabetes (Shapiro & Gong, 2002). American physicians, accustomed to working with the Latino population, have reportedly recommended *nopale* as well for diabetes (Reimann, Talavera, Salmon, Nuñez, & Velasquez, 2004). Patients using both *nopale* and hypoglycemic agents may not be aware of synergistic effects and the possibility of hypoglycemic events, especially with inconsistent dosing of either *nopale* and/or their medications (Shapiro & Gong, 2002; Yeh et al., 2003).

Bitter melon, known as *cundeamor* in Puerto Rico, Cuba, and the Dominican Republic, is the most popular plant used worldwide for diabetes treatment (Shapiro & Gong, 2002). The plant name is *Momordica charantia* and is known by other names such as wild cucumber, bitter melon, and balsam apple (Shapiro & Gong, 2002). Both

human and animal studies have been conducted on this herb, with findings indicating a plant insulin that exhibits hypoglycemic activity. Patients must be cautious and monitor for hypoglycemic events, especially when combined with hypoglycemic medications. Pregnant females taking this herb must be aware that if used as a juice, it can act as an abortifacient and could result in an unintended miscarriage (Shapiro & Gong, 2002).

Aloe vera (*salvia* or *sábila*) belongs to the genus *Liliaceae* and is a desert plant traditionally used to treat diabetes (Yeh et al., 2003). It contains a hydrosoluble fiber that may be responsible for its hypoglycemic effects. Studies are needed as the exact mechanism of action is unknown and the limited studies that have been conducted, consisted of nonrandomized clinical trials with small sample sizes (Yeh et al., 2003).

Garlic (*ajo*) is a frequently used ingredient in cooking and belongs to the lily family, known as *Allium sativum* (Yeh et al., 2003). It appears that garlic can increase the secretion of insulin or slow its degradation as well as improve liver glycogen storage (Yeh et al., 2003). There are limited randomized control trials in humans regarding the insulin effect of garlic (Shapiro & Gong, 2002; Yeh et al., 2003).

According to the existing body of knowledge, Latinos/Hispanics use herbs to treat type 2 diabetes and most persons do not tell their healthcare provider about such use (Brown et al., 1998; Caban & Walker, 2006; Coronado et al., 2004; Howell et al., 2006; Johnson et al., 2006; Najm et al., 2003; Poss et al., 2003; Shelley et al., 2009). Concurrently, many persons do not understand the mechanism of action of herbs or how herbs may interact with medications, other herbs, or health conditions (Argáez-Lopez et al., 2003; Coronado et al., 2004; Poss et al., 2003; Poss et al., 2005). This lack of

knowledge places individuals at risk for allergic reactions, toxicities, drug-drug or drug-herb interactions, overmedication, exposure to contaminants, and exacerbation of underlying health conditions (Phua et al., 2009; Shapiro & Gong, 2002; Yeh et al., 2003).

Latinos/Hispanics report using herbal remedies because they are familiar, accessible, affordable, natural, culturally congruent, and correlate with their holistic perspectives of health (Argáez-Lopez et al., 2003; Lopez, 2006; Poss et al., 2003; Poss et al., 2005; Schoenberg et al., 2004; Shelley et al., 2009). In addition, Latinos/Hispanics believe herbal remedies are an effective diabetes treatment and can possibly cure diabetes (Coronado et al., 2004; Lopez, 2006; Poss et al., 2003). The use of herbal remedies is often based upon recommendations of family members, friends, or personnel working in Latino/Hispanic grocery stores (Caban & Walker, 2006; Howell et al., 2006; Poss et al., 2003; Poss et al., 2005). Latinos/Hispanics who use herbs were more likely to be older (Najm et al., 2003), more comfortable speaking Spanish (Howell et al., 2006; Mikhail, Wali, & Ziment, 2004), have lower levels of education (Caban & Walker, 2006; Mikhail et al., 2004; Najm et al., 2003), have lower incomes (Mikhail et al., 2004), and have lived in the U.S. less than 10 years (Howell et al., 2006; Najm et al., 2003).

**Faith-based interventions.** Prayer has been identified as an important diabetes self-care measure used by Latinos/Hispanics to cope with the challenges of daily life of living with this disease (Bergland, Heuer, & Lausch, 2007; Caban & Walker, 2006; Coronado et al., 2004; Lopez, 2006; Mikhail et al., 2004). Consulting with a priest has been identified as a helpful intervention for controlling diabetes by 55% of Puerto Ricans in a study in New York City (Caban & Walker, 2006). Wearing a necklace of the Virgin of

Guadalupe or having religious icons in the home were reportedly used by Latinos/Hispanics with type 2 diabetes as a source of strength and protection (Bergland et al., 2007). Latinos/Hispanics believe that faith-based interventions do not replace medical treatment; rather, God works through the medical treatment to control their diabetes (Caban & Walker, 2006; Lopez, 2006). A sample of Mexican Americans ( $N = 43$ ) with type 2 diabetes living in Texas reported a belief that prayer indirectly helped diabetes by decreasing stress and anxiety (Hunt, Arrar, & Akana, 2000). In a study involving multiple Latino/Hispanic subgroups ( $N = 3,725$ ), Reyes-Ortiz, Rodriquez, and Markides (2009) found that if Latino/Hispanic persons felt confused by the information provided in the last medical visit, then the odds increased that persons would ask others to pray for their health and persons would pray for themselves. Among this sample, 69.2% reported that spiritual healing was very important. This study did not relate the practice of prayer to any specific disease entity. Beyond prayer, consulting with a priest, and using religious icons it is not known if Latinos/Hispanics use other TCA faith-based interventions as part of their diabetes self-care or if persons would like these interventions to be incorporated into diabetes self-care management plans by nurses and other healthcare providers. Research is needed to fill this knowledge gap.

**Consulting traditional healers.** Latinos/Hispanics from Latin America and the Caribbean consult with traditional healers to assist with the management of traditional illnesses and other health conditions, including diabetes (Caban & Walker, 2006; Coronado, 2005; Pachter, 1994; Tafur et al., 2009). There is limited evidence that indicates Latinos/Hispanics living in the U.S. consult with traditional healers as part of

diabetes self-care practices (Caban & Walker, 2006; Coronado et al., 2004). Traditional healers are unlicensed healers lacking formal education; however, some healers have received apprenticeships or have been identified as receiving *el don*, the gift of healing from a higher power (Clark, Bunik, & Johnson, 2010; Lopez, 2005; Tafur et al., 2009). *Curanderos/as* (a type of traditional healer) are healers who have the ability to both diagnosis and treat illnesses that may be biological, psychological, spiritual, or supernatural in origin (Lopez, 2005, Sánchez, 2007; Tafur et al., 2009). *Yerberos/as* are herbalists who may dispense herbal remedies, homeopathic medicines, religious amulets, and offer medical advice (Lopez, 2005; Sánchez, 2007; Tafur et al., 2009). *Sobadores/as* are traditional massage therapists who treat physical ailments by performing therapeutic touch, massage, or manipulations (Coffman et al., 2008; Sánchez, 2007). *Espiritualistas* or *senoras* are faith healers or psychic mediums, generally women, who are consulted to heal the soul (Lopez, 2005; Tafur et al., 2009).

Coronado et al. (2004) reported that among 42 Mexican Americans with type 2 diabetes living in Washington state, study participants consulted with *yerberos/as* (herbalists) as part of diabetes self-care. Puerto Ricans with type 2 diabetes living in New York reported consulting with *espiritualistas* for help to control diabetes and only consulted with *curanderos/as* for traditional illnesses (Caban & Walker, 2006). In contrast, Hunt, Arrar, and Akana (2000) and Clark, Vincent, Zimmer, and Sanchez (2009) found skepticism about *curanderos/as* among their samples of Mexican Americans with diabetes living in Texas ( $N = 43$ ) and a large metropolitan area in the Midwest ( $N = 40$ ), respectively. In both latter two studies, participants denied consulting

with *curanderos/as*. Authors did not report if participants consulted with other types of traditional healers or if information regarding other types of traditional healers was assessed in these studies (Clark et al., 2009; Hunt et al., 2000).

Sánchez (2007) found in her qualitative study with Mexican American women ( $N = 15$ ) living in the Rio Grande Valley of Texas, that this sample of women consulted with *curanderos/as*, *yerberos/as*, *partaras* (midwives), and *sobadores/as* as part of their self-care behaviors for assistance with traditional illnesses, physical pain, and childbirth. However, Sánchez (2007) did not report whether traditional healers were consulted for treating diabetes. In a qualitative study conducted by Eggenberger, Grassley, and Restrepo (2006) with six Mexican American women living in Texas, women consulted with traditional healers, but were reluctant to discuss this practice. Empirical data from a research study with a sample of 70 Latina Mexican women in California, university students of whom 77% were native-born, indicated that the majority of women were familiar with multiple types of traditional healers. Twenty-five percent of the women had personally sought the services of a *curandero/a*, 38.6% sought the services of a *sobador/a*, and 20% sought services of a *yerbero/a* (Lopez, 2005). The purpose and frequency of consulting with traditional healers and the types of treatments utilized by traditional healers were not provided. Lopez (2005) found that greater religiosity suggested an increased use of traditional healers ( $F = 7.266$ ;  $p = 0.001$ ). Reyes-Ortiz et al. (2009) conducted a study with 3,728 Latinos/Hispanics of Mexican, Puerto Rican, Cuban, Central or South American, or other origin. Six percent of the sample reported consulting with a *curandero/a*. Consulting with a *curandero/a* was correlated with being

foreign-born, female, Cuban, and self-reported poor or fair health. Reyes-Ortiz et al. (2009) noted that the odds of consulting a *curandero* increased if the person reported feeling confused by their last patient-medical encounter ( $OR = 1.58$ ; 95% CI [1.02, 2.45]). In this sample, 16% had diabetes and 17.6% depression. Correlations between health conditions and the purpose of consulting with a *curandero/a* were not reported. Information was not provided as to the purpose of the last patient-medical encounter. Lastly, in a study ( $N = 525$ ) with 167 Hispanics living in California which assessed the use of complementary and alternative modalities among ethnic elderly, 8% of Hispanics reported seeking the help of a *curandero/a* (Najm et al., 2003). The reasons for the consultation or the types of treatments utilized were not reported.

Current knowledge of the types of treatments that traditional healers use primarily is from expert opinion (Oomen et al., 1999; Tafur et al., 2009) or from research regarding the consultation of traditional healers for non-diabetes related conditions (Coffman et al., 2008; Eggenberger et al., 2006; Lopez, 2005; Reyes-Ortiz, Rodriguez, & Markides, 2009; Sánchez, 2007). Treatments include: herbal remedies, medications, imagery, massage, prayer, holy objects such as rosary beads or amulets, penance for sin, laying of hands, oil, eggs, lighting candles, and performing spiritual cleansings called *una limpia* (cleansing), *una barrida* (sweeping), or *un baño* (bathing; Coffman et al., 2008; Eggenberger et al., 2006; Lopez, 2005; Ooem et al., 1999; Tafur et al., 2009). Research pertaining to the types of treatments that traditional healers use for the management of type 2 diabetes is lacking. No empirical data was found evaluating the effectiveness of treatments provided by traditional healers.

Data from non-diabetes specific studies indicate that Latinos/Hispanics who consult with traditional healers tend to be older, more closely connected to Latino/Hispanic traditions, prefer speaking Spanish, and have lived in the U.S. less than 5 years (Clark et al., 2010; Najm et al., 2003). In contrast, R. A. Lopez (2005) reported that among a sample of Latina university students traditional healers were consulted even though the majority (70%) of the participants were between 20 to 30 years of age, 77% were native-born, and 81% were bilingual in Spanish and English. Knowledge of the factors associated with consulting traditional healers as part of diabetes care is lacking. There is a lack of clarity if when Latinos/Hispanics seek treatment for *susto*, a traditional illness believed by some Latinos/Hispanics to cause diabetes, persons are actually seeking treatment for diabetes (Arcury, Skelly, Gesler, & Dougherty, 2004; Caban & Walker, 2006; Poss & Jezewski, 2002; Weller et al., 1999). The role traditional healers play in the TCA self-care expressions, patterns, and practices of Latinos/Hispanics for diabetes is unclear. Currently, there are no studies explicating this TCA modality as part of diabetes management in nonborder, emerging Latino/Hispanic communities. In addition, details about this type of care are lacking and the outcomes of this care are unknown. Further research would assist to fill this knowledge gap.

**Self-medication/self-prescription practices.** Self-medication/self-prescription are considered to be common practices throughout Latin America (Drug Utilization Research Group, 1997; Kroeger et al., 2001). The Drug Utilization Research Group (1997) defines self-medication as “the use of a medicinal product by consumers on their own responsibility, to treat self-recognized disorders or symptoms, when they consider such



use appropriate” (p. 492). In contrast, self-prescription is the practice of refilling a prescribed medication or use of a prescribed medication without advice (Drug Utilization Research Group, 1997). In many Latin American countries, restricted medications can be easily bought without a prescription in pharmacies (Drug Utilization Research Group, 1997; Kroeger et al., 2001). Latinos/Hispanics are accustomed to asking pharmacy workers for advice of restricted medications and herbs, even though most pharmacy workers in Guatemala and Mexico lack education in pharmacology (Kroeger et al., 2001). In a multinational study involving six Latin American countries, clients were able to obtain oral hypoglycemic agents without first consulting with a medical provider (Drug Utilization Research Group, 1997).

There is a growing body of evidence self-medication/self-prescription occurs in Latino/Hispanic communities within the U.S. However, knowledge regarding self-medication/self-prescription in relation to diabetes self-management is limited (Coffman et al., 2008; Larson, Dilone, Garcia, & Smolowitz, 2006; Mainous, Diaz, & Carnemolla, 2009; Nolen, Ball, Piñón, & Shepherd, 2002; Sleath et al., 2009). Among a sample of 93 Latinos/Hispanics comprised of Mexicans and Puerto Ricans living in central North Carolina, 42% bought medications in local Latino markets (*tiendas*) without seeking medical advice and 31% obtained medications bought in another country (Sleath et al., 2009). The most common medications purchased were antibiotics, pain medications, vitamins, and herbal medicines. A few persons reported obtaining medications to treat hypertension and diabetes (Sleath et al., 2009). In this sample, 29% reported having

depression, 22.6% had hypertension, 10.6% had diabetes, and 10.8% had hypercholesterolemia.

Coffman et al. (2008) reported similar findings in a qualitative study with Latino/Hispanic immigrants ( $N = 19$ ). This group of Mexicans and Peruvians described self-diagnosis resulting in self-prescription, as a normal aspect of traditional self-care for themselves and for their children. Participants perceived the medications from Mexico to be stronger and more effective than medications from the U.S. This sample reported buying prescription medications from local *tiendas* as well as by mail, courier, or proxy. Some participants reported receiving medications sent by family members living in their home countries. The types of medications obtained included antibiotics, contraceptives, injectable vitamins, and syringes. The authors did not specify the medications obtained or used by participants. Participants reported seeking medication advice from those working in the local *tiendas*. It is unknown if this sample of Latinos/Hispanics used the practices of self-medication/self-prescription to treat diabetes.

In a study in New York City with a sample of 25 Latinas from the Dominican Republic and El Salvador, persons reported purchasing antibiotics without a prescription from *bodegas* (Latino markets), pharmacies, and other countries (Larson et al., 2006). Also, persons obtained antibiotics from friends or leftover from previous use. This study pertained to self-prescription of antibiotics only. It is not known if self-prescription was used for diabetes self-care.

Latinos/Hispanics have reported using self-medication/self-prescriptions practices while living in the U.S. because the practice is customary and familiar (Coffman et al.,

2008; Larson et al., 2006; Mainous et al., 2009), and due to higher levels of trust in medications from their home countries (Coffman et al., 2008; Sleath et al., 2009). Prior success with the same medication is another reason reported for utilizing self-medication/self-prescription practices (Coffman et al., 2008; Larson et al., 2006). Latinos/Hispanics reported that medications obtain via this TCA modality were cheaper (Coffman et al., 2008; Mainous et al., 2009) and did not require time off from work to see a healthcare provider (Coffman et al., 2008; Mainous et al., 2009). Healthcare access barriers, such as a lack of health insurance (Coffman et al., 2008; Sleath et al., 2009), language barriers in healthcare settings (Coffman et al., 2008; Mainous et al., 2009), and the lack of authorized immigration status (Coffman et al., 2008; Larson et al., 2006; Sleath et al., 2009) have been cited as reasons for using self-medication/self-prescription. Additionally, Latinos/Hispanics who have had prior negative experiences with the U.S. healthcare system, such as receiving incomplete or inappropriate education/information and dissatisfaction with the doctor, reported using self-medication/self-prescription (Coffman et al., 2008).

To date, all of the studies regarding self-medication/self-prescription practices of Latinos/Hispanics pertain either to general health or the use of antibiotics. No studies were found regarding the use of this modality by Latinos/Hispanics specifically for the management of diabetes. Research is needed to fill this gap in knowledge and better inform nurses and other healthcare providers. Understanding these practices is important due to the potential serious health consequences of using medications inappropriately, drug-drug and drug-herb interactions, overmedication, exacerbation of underlying health

conditions, receiving counterfeit or substandard medications, and potentiating hypoglycemic events when combining diabetes medications from multiple sources (Coffman et al., 2008; Larson et al., 2006; Mainous et al., 2009; Nolen et al., 2002; Sleath et al., 2009). Elucidating the specific details of the self-medication/self-prescription practices of Latinos/Hispanics as part of their TCA self-care expressions, patterns, and practices for diabetes is critical to promote safe diabetes care.

### **Cultural and Social Structure Dimensions**

Cultural and social structure dimensions are factors that influence the lives of Latino/Hispanics and directly or indirectly impact care expressions, patterns, and practices, health, and illness (Leininger, 2006). These dimensions can vary between cultural groups and subgroups. The following section presents current knowledge of these dimensions.

#### **Cultural Values, Beliefs and Lifeways**

Cultural values, beliefs, and lifeways are distinctive to populations and influenced by the totality of people's lives (Leininger, 2006). For this study, cultural perspectives pertaining to health and illness, traditional illnesses, women as the keepers of family health, and the meanings of diabetes are explored.

**Health and illness.** In contrast to the Western biomedical model, which often describes health as the physical manifestations of disease (Leininger, 2006; Lopez, 2006), health for many Latinos/Hispanics, is a holistic interdependent state of the mind, body, and soul in harmony with the environment (Lopez, 2005; MacNaughton, 2008; Mendelson, 2002). This concept of health transcends the physical body and is inclusive

of meeting societal role expectations, emotional balance, mental well-being, social interactions and relationships, and spiritual life (Eggenberger et al., 2006; MacNaughton, 2008; Mendelson, 2002). According to this perspective, physical and nonphysical problems cannot be dichotomized. Health issues must be evaluated and treated based upon the whole context of the person. Being healthy is associated with being of value to one's family and/or other social groups as well as being productive (Mendelson, 2002; Sobralske, 2006). For Mexican Americans, a person with a chronic illness is considered healthy, as long as he/she fulfills his/her functional role within the family (Mendelson, 2002; Sobralske, 2006). Illness is described as changes in physical body functioning, inability to work or fulfill role expectations, lack energy, or be emotionally sad (MacNaughton, 2008; Mendelson, 2002). For Latinos/Hispanics with ties to the Dominican Republic, health and illness consists of physical and spiritual/mystical dimensions (Schumacher, 2010). For example, illness may result from bacteria and/or viruses, but also may be caused by God or evil spirits (Schumacher, 2010).

**Traditional illnesses.** *Curanderismo* (based upon the Spanish word *curar* which means to recover or cure) is the health system of traditional illnesses and healers that exists throughout Latin America and the Caribbean (Coronado, 2005; Pachter, 1994; Tafur et al., 2009). This indigenous, traditional health system defines health as the equilibrium between the body, mind, soul, society, and nature/cosmic forces. In contrast, illness results when equilibrium is no longer present between these elements (Coronado, 2005; Tafur et al., 2009). Spirituality is at the center of *curanderismo* and is more than organized religion; it is being in balance with all of nature and the cosmos (Coronado,

2005; Tafur et al., 2009). The goal of *curanderismo* is to restore harmony and equilibrium between the elements to benefit the sick person and the community.

Traditional illnesses of *curanderismo* defy understanding from a Western biomedical perspective (Coronado, 2005; Lee & Balick, 2003; Tafur et al., 2009). Traditional illnesses may be due to alterations in pathophysiological, psychological, or spiritual processes and then interpreted from a social, personal, and/or cultural perspective that is unfamiliar to those outside of the culture (Pachter, 1994; Poss & Jeweski, 2002). TCA treatments are usually initiated by family members and traditional healers are consulted if the family believes their assistance is warranted. If symptoms persist or worsen despite TCA treatments, then care is sought from the formal medical system, resulting in the utilization of traditional and formal medical systems simultaneously (Lee & Balick, 2003; Pachter, 1994; Poss & Jeweski, 2002). The traditional illness of *susto* (strong emotions) has been identified by Mexicans, Guatemalans, and Salvadorans as an etiology of diabetes (Arcury et al., 2004; Caban & Walker, 2006; Poss & Jezewski, 2002; Weller et al., 1999).

**Women the keepers of family health.** Women are the principle force responsible for maintaining the health of the Latino/Hispanic family, particularly wives, mothers, and grandmothers (Lopez, 2006; Oomen et al., 1999; Poss et al., 2003; Sánchez, 2007; Sobralske, 2006). Their assistance is usually sought first for any health concerns. In the literature, Latino/Hispanic women have been described as “cultural health care brokers” (MacNaughton, 2008, p. 87) and “household health managers” (Schneider, 2009, p. 236).

Health knowledge, advice, and the use of traditional practices and traditional healers are transmitted from one generation of women to the next (Eggenberger et al., 2006). This includes information of *remedios caseros* (home remedies), herbal treatments and teas, prayers, prescription and non-prescription medications, religious objects and amulets, *barridas* (traditional spiritual sweepings/cleansings), and traditional healers (Berry, 1999; Eggenberger et al., 2006; Garcés, Scarinci, Harrison, 2006; Sánchez, 2007; Schneider, 2009).

Mexican women ( $N = 15$ ) living in Texas reported feeling confident in their abilities to provide self-care for themselves and their family (Sánchez, 2007). The women described using multiple types of cultural TCA modalities and adjusted medication dosages based on their own judgment. The Mexican women in this study reported seeing a formal medical provider only if the women were in a lot of distress, family members were worried, a physician was not willing to renew a prescription without seeing them, and if self-care practices were not perceived to be sufficient (Sánchez, 2007). The specific health conditions reported in this study were traditional illnesses, childbirth, and physical pain. MacNaughton (2008) reported similar findings pertaining to how women care for their families. Female family members treated multiple illnesses using prayer, home remedies, herbal remedies, and over-the-counter medications. Professional medical help was sought if a person's health condition had not improved. In the study by Garcés, Scarinci, and Harrison (2006) with Mexican Latina immigrants ( $N = 54$ ) living in Alabama, the women described being in charge of the family's health. All women reported using herbal remedies and teas as a first-line of treatment, followed by that of

self-medication/self-prescription, and consulted professional healthcare providers as a last resort.

**The meaning of diabetes.** Diabetes has been identified by Latinos/Hispanics as a serious life-threatening illness, comparable to cancer (Arcury et al., 2004; Coronado et al., 2004). This disease represents a shortened lifespan and a future full of complications, such as amputations, kidney failure, and blindness (Heuer & Lausch, 2006; Lopez, 2006). Some persons are fearful of dialysis. Mexican Americans have called it a “confusing and silent illness” because they don’t feel ill until it is too late (Lopez, 2006, p. 195). Other Mexican Americans have stated, “It kills you little by little” (Coronado et al., 2004, p. 579). Mexican migrant farmworkers have labeled it the big “D” or the “horrible monster,” since for them it leads to worthlessness, shame, and the loss of manhood and livelihood (Weiler, 2007, p. 78).

Latinos/Hispanics describe diabetes as being more than just a physical disease, as diabetes pervades one’s emotions and interpersonal relationships. Diabetes means being always tired and unable to carry out responsibilities, maintain daily roles, or go to work (Arcury et al., 2004; Lopez, 2006). Diabetes makes some Latinos/Hispanics “feel old, wasted” (Heuer & Lausch, 2006, p. 57); it also negatively affects the abilities of Latinos/Hispanics to be good mothers and can lead to sadness, depression, anger, and moodiness (Arcury et al., 2004; Heuer & Lausch, 2006; Lopez, 2006). Persons reported living with diabetes to be a burden, resulting in feelings of powerless and fear (Chang et al., 2007). Worrying about the economic burden of diabetes negatively impacts the lives of Latinos/Hispanics (Clark et al., 2009).



Due to the high diabetes prevalence rates within their communities, Mexican migrant farmworkers in the Midwest and Texas perceived diabetes to be inevitable (Brown & Hanis, 1999; Heuer & Lausch, 2006). Among a group of Puerto Ricans living in Boston, diabetes-related complications were perceived to be unavoidable and beyond their control (Caban & Walker, 2006). Similar fatalistic beliefs about diabetes-related complications were reported by a group of Mexican migrant farmworkers (Weiler & Crist, 2009).

**Beliefs regarding the etiology of diabetes.** Latinos/Hispanics report a variety of beliefs regarding the etiology of diabetes. Beliefs are from the biomedical model, traditional illness system, or religious/faith-based belief system. Beliefs may differ between Latino/Hispanic subgroups and individuals may hold several beliefs from different systems simultaneously.

Personal lifestyle behaviors and heredity are the most common biomedical causes of diabetes reported by Latinos/Hispanics (Arcury et al., 2004; Buscemi, 2000; Caban & Walker, 2006; Coronado et al., 2004; Heuer & Lausch, 2006; Lopez, 2006; Weller et al., 1999). Eating a diet high in sugar or fat and too many sweets were reported frequently by Mexicans, Central Americans, Cubans, and Puerto Ricans (Arcury et al., 2004; Buscemi, 2000; Caban & Walker, 2006; Coronado et al., 2004; Weller et al., 1999). Limited physical activity and being overweight were identified by some Mexican Americans as possible causes (Coronado et al., 2004). However, a group of Latinos/Hispanics who recently immigrated from Mexico and Central America were uncertain as to what role being overweight might play in causing diabetes, as they associated diabetes with weight loss and being skinny (Arcury et al., 2004).

Heredity was identified as a possible cause of diabetes; however, some of the beliefs regarding heredity are not consistent with those of the biomedical model. For example, Latinos/Hispanics of Mexican, Guatemalan, or Puerto Rican descent believe that you are born with the disease (Weller et al., 1999). Other Mexican and Central American immigrants believe that everyone has diabetes; however, for some it is latent and has not yet manifested itself (Arcury et al., 2004). Persons reported believing that diabetes could not be passed on to their children as long as they controlled the disease process; “If I controlled the diabetes, then I wouldn’t give it to my children. But if I don’t control it, then it’s probably that my children will inherit it because I might have it in my blood already.” (Arcury et al., 2004, p. 2187). What is meant by having “it in my blood” and transmission to one’s children is unclear.

Problems with inadequate insulin production by the pancreas, genetics, and a prior history of gestational diabetes were identified as possible causes of diabetes by Cuban women living in Florida ( $N = 3$ ; Buscemi, 2000). Latinos/Hispanics believe that diabetes can be caused by medications and being under long-term stress (Caban & Walker, 2006). Being older is perceived as more susceptible to developing the disease, though aging was not identified as a specific cause of diabetes (Weller et al., 1999).

*Susto* (strong emotions) has been described as an etiology of diabetes from the traditional belief system of Mexican, Guatemalan, and Salvadoran subgroups, but not for Puerto Ricans (Arcury et al., 2004; Caban & Walker, 2006; Coronado et al., 2004; Poss & Jezewski, 2002; Weller et al., 1999). *Susto* refers to very strong emotions, which can either be emotions of great joy or those such as depression, fear, anger, or a sudden

traumatic event (Acrury et al., 2004; Coronado et al., 2004; Lopez, 2005; Tafur et al., 2009). Strong emotions associated with *susto* make the body more susceptible to diabetes (Poss & Jezewski, 2002). Symptoms of diabetes may occur immediately after a *susto* event or years later.

Beliefs about diabetes causation may differ between genders. For example, Mexican women associate psychosocial or household factors with causing diabetes, while Mexican men identify employment stress, anger, and rage as causing diabetes (Lopez, 2006). Latinos/Hispanics believe that diabetes is a result of fate or an act of God (Caban & Walker, 2006; Eggenberger et al., 2006). In the multinational study ( $N = 161$ ) by Weller et al. (1999) with Latinos/Hispanics living in Guatemala, Mexico, Texas, and Connecticut, all participants denied believing that witchcraft was a cause of diabetes.

**Diabetes knowledge.** Findings from multiple research studies indicate that Latinos/Hispanics with type 2 diabetes have low levels of accurate diabetes knowledge (Brown, Garcia, Kouzekanani, & Hanis, 2002; Chilton, Hu, & Wallace, 2006; Lorig, Ritter, & González, 2003; Lujan, 2008; Lujan, Ostwald, & Ortiz, 2007; Sixta & Ostwald, 2008; Vincent, Pasvogel, & Barrera, 2007). Among Latinos/Hispanics with diabetes, increased levels of diabetes knowledge are associated with higher levels of education (Chilton et al., 2006; Firestone et al., 2004; Mainous, Diaz, Saxena, & Geesey, 2007) and with having been diagnosed with diabetes for a longer duration of time (Firestone et al., 2004). However, the effect of age on the level of diabetes knowledge is conflicting. Chilton et al. (2006) noted that older study participants from Mexico and Central America scored higher on the Diabetes Knowledge Questionnaire-24; whereas, Firestone

et al. (2004) found that younger age participants who were Costa Rican scored higher than those who were older.

Many Latinos/Hispanics believe that diabetes can be cured. Qualitative interviews with 22 Mexican Americans with type 2 diabetes from Texas revealed that most participants believed diabetes could be cured (Poss et al., 2003). This belief corresponds with findings from a study with Mexican migrant farmworkers who reported thinking diabetes would “go away” after taking medications prescribed by healthcare providers (Heuer & Lausch, 2006). This group of migrant farmworkers considered diabetes to be an acute illness, not a chronic disease. Arcury et al. (2004) reported that younger Mexicans and Central Americans believed that diabetes can be cured; older study participants perceived diabetes could be controlled. In a recent study in New York City ( $N = 151$ ) with a predominately Latino population (58%), 29% reported believing that their diabetes could be cured by a doctor, 36% believed that diabetes was not permanent, 12% believed they had diabetes only when their glucose levels were elevated, and 25% thought there was no need to take diabetes medications if blood sugar levels were normal (Mann, Ponieman, Leventhal, & Halm, 2009). In this study, 56% described a normal blood sugar level as  $\leq 200$  mg/dL and 42% believed a glucose level  $< 100$  mg/dL was too low (Mann et al., 2009).

Latinos/Hispanics describe diabetes as “sugar in the blood” (Arcury et al., 2004; Lopez, 2006). However, there appears to be confusion about terminology. Mexican American participants reported not understanding the concept of blood sugar or the purpose of blood glucose monitoring, as glucose levels had no meaning (Brown & Hanis,

1999). O. Lopez (2006) reported that Mexican Americans believed borderline diabetes, glucose intolerance, or having sugar in the urine were not harmful, like sugar in the blood. Caban & Walker (2006) reported similar findings with Latinos/Hispanics believing that sugar in the urine was not as serious as sugar in the blood. Mexican Americans reported treating sugar in the blood by drinking sour juices or increasing their intake of salt to counteract the sweetness, and by eating “diet” foods like fruits and vegetables (Lopez, 2006). In another study, persons discussed that sugar in the blood could be removed by purifying the blood with injections of vitamins and herbs obtained from Mexico (Arcury et al., 2004).

Confusion exists among Mexican Americans regarding how foods such as tortillas, potatoes, and bread elevate blood glucose levels (Lopez, 2006). Mexican migrant farmworkers acknowledged not understanding the diabetes disease process and requested guidance and specific information about nutrition, food portions, measuring, and healthy cooking (Weiler & Crist, 2009). Persons voiced frustration over the lack of specific and practical information provided during doctor visits. Coronado, Thompson, Tejeda, Godina, and Chen (2007) reported that Mexican Americans, compared to non-Hispanic Whites, were less likely to be referred to diabetes education programs. However, when persons were referred, they were sent to programs offered by public clinics rather than a hospital.

The concept of tight glycemic control may be poorly understood among Latinos/Hispanics with type 2 diabetes (Caballero, 2007). Data from the Hispanic Established Population for the Epidemiologic Study of the Elderly that assessed the

consistency of diabetes medication use among 908 Mexican Americans with type 2 diabetes over 7 years, found that 36% did not consistently take their medications (Kuo et al., 2003). The inconsistent use of medications was similar for those taking insulin (38%) and for those taking oral hypoglycemic agents (34%; Kuo et al., 2003). In this study, inconsistent use of diabetic medications was associated with being older and not having health insurance. Those persons not regularly taking their medications were found to have a higher risk for renal failure and mortality over the 7-year period. The authors did not report on the use of TCA self-care expressions, patterns, and practices.

The A1C test may be unfamiliar to some Latinos/Hispanics even though the test is the gold standard of care (ADA, 2011c). In an evaluation of the 2003 National Health Survey ( $N = 2,136$ ; Latinos,  $n = 373$ ), Mainous, Diaz, Saxena, and Geesey (2007) found that Puerto Ricans were more likely to be familiar with the A1C test than Mexicans or other Latinos/Hispanics. The authors reported that Puerto Ricans were more likely than Mexicans to have only one doctor to manage their diabetes. Among this sample, higher levels of education were associated with higher levels of A1C knowledge (Mainous et al., 2007). In the study by Mann et al. (2009) with low-income minorities in New York City ( $N = 151$ ), of which 58% were Latinos, only 37% had ever heard of an A1C test and only 18% of this group could identify the A1C target level. Ninety-one percent of Latino patients with type 2 diabetes, who had been referred to the Joslin Diabetes Center in Boston as part of the Latino Diabetes Initiative, were not familiar with an A1C test, despite the fact that 90% were covered by health insurance (Caballero, 2007). The lack of familiarity and knowledge that Latinos/Hispanics have of A1C testing may be partially

related to practices of healthcare providers. For example, Neumiller et al. (2010) reported on evaluation of the 2005 U.S. National Ambulatory Medical Care Survey, among clients evaluated for International Classification of Disease codes 250.00 to 250.93 (those pertaining to type 2 diabetes), significant disparities existed between racial/ethnic groups regarding physician-ordered A1C levels. The odds of having an A1C test ordered was significantly lower for Blacks ( $OR = 0.4$ ; 95% CI [0.2, 0.8]) and Hispanics ( $OR = 0.3$ ; 95% CI [0.2, 0.7]) compared to Whites after adjusting for age, sex, and primary insurance coverage. Costa Rican immigrants lack awareness of A1C testing, as it is not part of the formulary for diabetes management under their national socialized healthcare system (Firestone et al., 2004).

**Recognition of diabetes-related symptoms.** Latinos/Hispanics describe diabetes-related symptoms experientially from the domains of the biophysical, emotional, and relational. Mexican Americans ( $N = 42$ ) living in Washington State reported diabetes-related symptoms that are similar to those from the biomedical model (Coronado et al., 2004). Symptoms reported were: thirst, hunger, tiredness, sleepiness, irritability, dizziness, headaches, frequent urination, and dry mouth. Guatemalan, Mexican, and Puerto Rican participants ( $N = 161$ ) in the study conducted by Weller et al. (1999) reported similar symptoms; however, this group described symptoms of circulatory and kidney problems and vision loss, late signs indicative of diabetes-related microvascular damage (ADA, 2011b). Mexican and Central American immigrants ( $N = 40$ ) living in North Carolina identified symptoms such as thirst, urinary frequency, vision changes, headaches, fatigue, and dizziness (Arcury et al., 2004). This group of Latino/Hispanics

described the late diabetes-related signs and symptoms of difficulty with wound healing, blindness, weight loss, and becoming very thin. Similar late signs and symptoms indicating advanced complications were reported by Mexican migrant farmworkers ( $N = 12$ ) in the Midwest (Heuer & Lausch, 2006). Tender feet and paresthesia of the hands and feet, a late sign indicative of neuropathic damage, were reported by Mexican Americans and Puerto Ricans in other studies (Lopez, 2006; Weller et al., 1999).

Unlike the biomedical model, Latinos/Hispanics may characterize diabetes symptoms based upon emotional and relational domains, which is consistent with cultural values that promote family (*familismo*), sense of community (*collectivismo*), and smooth social interactions (*simpatía*; Caballero & Tenzer, 2007; Campos, 2007). Additionally, this perspective is congruent with cultural beliefs of being a value to one's family, fulfilling role expectations, and being productive (MacNaughton, 2008; Mendelson, 2002; Sobralske, 2006). For example, Mexican Americans reported perceiving that diabetes was controlled as long as persons were able to maintain daily roles (Lopez, 2006). Other persons described diabetes symptoms as family discord due to intense feelings of irritability and anger leading to conflicts (Heuer & Lausch, 2006; Lopez, 2006). Diabetes was characterized as negatively impacting marriages related to alterations in sexual functioning (Heuer & Lausch, 2006). Lacking energy was discussed in relationship with not being able to play with one's children, attend social events, or be able to work (Heuer & Lausch, 2006; Lopez, 2006).

Empirical findings indicate that Latinos/Hispanics do not commonly use blood glucose monitoring to manage their diabetes and are not able to interpret blood glucose



results (Brown et al., 1998; García, 2005; Lopez, 2006). Rather, Latinos/Hispanics are more likely to treat how they “feel” (Lopez, 2006; Mann et al., 2009). Concerns have been raised regarding the accuracy of interpretations of diabetes-related symptoms among Latinos/Hispanics. For example, García (2005) reported that in a sample of 87 Mexican Americans with a mean A1C level of 8.29%, participants averaged 4.9 diabetes-related symptoms in the prior 30 days. Only blurred vision and excessive fatigue were interpreted as being serious, all other symptoms were not perceived as important. In fact, persons treated increased urinary frequency by limiting their fluid intake and other persons who reported feeling dizzy, nervous, or shaky treated those symptoms by waiting for the feelings to pass. In this study, only 6% checked blood glucose levels despite that most persons owned a glucometer.

Brown et al. (1998) reported similar findings in a sample of 63 Mexican Americans with a mean A1C level of 12.5%. Forty percent of persons reported symptoms of excessive thirst in the past month and half did not believe this to be serious. Nearly 50% of persons described symptoms of hypoglycemia and did not interpret this to be a significant concern. Brown et al. (1998) reported that some study participants experienced classic hypoglycemic symptoms with glucose levels in the low 200s mg/dL. This phenomenon is known as physiological adaptation to hyperglycemia (Brown et al., 1998; García, 2005). Suffering this phenomenon leads to inaccurate interpretation and treatment of symptoms, without first assessing blood glucose levels. The phenomenon of physiologic adaptation to hyperglycemia has been identified as a barrier to effective diabetes management among Latinos/Hispanics (Brown et al., 1998; García, 2005).

Low levels of diabetes knowledge and inaccurate interpretation of diabetes-related symptoms may negatively influence self-care choices with TCA modalities or prescription medications. Treatment decisions based upon how someone “feels” without knowing actual blood glucose levels may contribute to the poor glycemic control and diabetes health outcomes experienced by Latinos/Hispanics. Further research about this process may provide insight for the development of efficacious diabetes self-care management.

**Fears and concerns regarding insulin and other medications.** The fear of insulin is prevalent among Latinos/Hispanics as some believe insulin causes blindness, renal failure, and amputations (Caballero, 2007; Caban & Walker, 2006; Campos, 2007; Lopez, 2006; Poss et al., 2003). Fear may be based on the past practice of initiating insulin late in the treatment plan, often coinciding with the development of diabetes-related complications (Caballero, 2007; Campos, 2007). The late initiation of insulin treatment has contributed to the misconception that Latinos/Hispanics have of associating insulin with causing blindness, renal failure, amputations, and even death, rather than attributing these complications to damage from prolonged hyperglycemia (Caban & Walker, 2006; Campos, 2007; Lopez, 2006; Poss et al., 2003). Latino/Hispanic immigrants from rural areas may be unfamiliar with insulin. For example, Weller et al. (1999) reported that Guatemalans living in rural Guatemala never have known of insulin.

Latinos/Hispanics are resistant to considering insulin due to the anticipation of pain with injections, fears of becoming dependent on insulin, and the cost of the medication and associated supplies (Campos, 2007; Huang, Brown et al., 2009; Larkin et al., 2008;

Mann et al., 2009). Non-Hispanic Whites reported being resistant to initiating insulin due to fears of hypoglycemic symptoms (Larkin et al., 2008). However, this concern has not been reported among Latinos/Hispanics.

Latinos/Hispanics report reluctance to using diabetes medications, including oral medications, due to worries about possible side effects, addiction to the medication, cost, and the logistical difficulties of managing multiple medications (Huang, Brown et al., 2009; Mann et al., 2009). Mexican Americans in a large metropolitan area in the Rocky Mountain region associated diabetes medications with the “hassles” of the healthcare environment, such as trying to get an appointment, filling out paperwork for eligibility, and the timeliness of receiving mail order medications and supplies (Clark et al., 2009, p. 390). Dissatisfaction with the educational information has affected the willingness to comply with medication management (Aikens & Piette, 2009). Latinos/Hispanics in California perceived prescribed medications as able to cure some ailments and at the same time “damage other things” (Mikhail et al., 2004, p. 855). It is unknown if the fears and concerns Latinos/Hispanics have regarding insulin and oral hypoglycemic medications contribute to the use of TCA self-care expressions, patterns, and practices.

### **Educational Factors**

Sixty-one percent of Latinos/Hispanics earned a high school diploma compared to 89% of non-Hispanic Whites (Office of Minority Health, 2009). Variations in educational attainment have been reported among Latino/Hispanic subgroups. According to the U.S. Census Bureau (2007), 52.4% of Latinos/Hispanics from Mexico, 48.3% from

Guatemala, 52.7% from Honduras, and 41.3% from El Salvador have earned a high school diploma.

Findings from several studies indicate that diabetes knowledge is associated with educational attainment (Brown et al., 2002; Chilton et al., 2006; Firestone et al., 2004; Mainous et al., 2007). In a sample of Mexican Americans with type 2 diabetes and a mean educational level of 6 years, participants reported not understanding how herbs worked, except that they “lowered blood sugar,” (Poss et al., 2003). These persons relied on their own judgment to titrate doses of herbs. Argáez-López et al. (2003) reported that Mexican women ( $N = 573$ ) with diabetes and low educational levels used traditional herbs for diabetes management simultaneously with prescribed diabetes medications and ignored the potential sum or toxic effects of such practices. In this study, 94.2% of the women reported preferring herbal remedies; though all received healthcare from the public insurance system. Najm et al. (2003) reported that among a group of elderly ( $\geq 65$  years of age;  $N = 525$ ) Hispanic participants in California, the use of herbal home remedies was associated with having a lower educational level, living in the U.S. less than 10 years, and lacking health insurance ( $p < .001$ ). These authors reported that the majority (58%) of elderly Hispanics used TCA self-care expressions, patterns, and practices simultaneously with medically prescribed treatments for the same health problem. These persons did not disclose the use of TCA modalities to their healthcare provider. In a study by Howell et al. (2006) with 620 Hispanics living in Indianapolis, 35.1% believed that herbs interacted with prescribed medications. In that sample, the majority (53%) of participants had less than a high school education and most (69.7%)

had lived in the U.S. less than 5 years. Using the National Health and Nutrition Examination Survey (NHANES) data, Miech, Kim, McConnell, and Hamman (2009) noted a trend of widening disparities in diabetes-related mortality for those with lower education levels as compared to those with higher educational levels in the U.S. across gender, racial, and ethnic subgroups.

### **Economic Factors**

The median income of Latino/Hispanic households is lower than that of the general U.S. population, \$37,913 and \$50,303 respectively (DeNavas-Walt, Proctor, Smith, & U.S. Census Bureau, 2009) and usually supports a larger household (Pew Hispanic Center, 2009c). Higher percentages of Latinos/Hispanics (23.2%) live in poverty compared to non-Hispanic Whites (8.6%) and the general population (13.2%; DeNavas-Walt et al., 2009). Income disparities exist between English-speaking and Spanish-speaking Latinos/Hispanics, with English speakers having higher household incomes and better employment opportunities (Alsalam & Smith, 2005; Elder, Ayala, Parra-Median, & Talavera, 2009). Latinos/Hispanics constitute the largest portion of the population lacking health insurance (30.7%), compared to non-Hispanic Whites (10.8%) and the general population (15.4%; DeNavas-Walt et al., 2009; U.S. Department of Commerce, 2009). Among Latino/Hispanic subgroups, Mexicans have the lowest health insurance rate compared to Puerto Ricans, Cubans, and Dominicans. Mexicans are more likely to be employed in positions lacking employer-sponsored insurance (National Center for Health Statistics [NCHS], 2010; Shah & Carrasquillo, 2006).

Low income, living in poverty, and lacking health insurance serve as serious barriers to healthcare access and can negatively impact health and the quality of care received (Agency for Healthcare Research and Quality [AHRQ], 2011a). The high cost of health insurance premiums and health insurance policy co-payments may be cost prohibitive for lower income Latinos/Hispanics, even with the option of employer-sponsored health insurance (Cristancho, Garces, Peters, & Mueller, 2008). Uninsured Latinos/Hispanics may not access standard medical treatment or delay seeking care until health concerns are at a crisis level, leading to more frequent utilization of hospital emergency departments or safety net healthcare providers (Coffman, Shobe, Smochowski, & Fox, 2007; Paez, Zhao, & Hwang, 2009). The most recent report of *Health, United States, 2009, In Brief* (NCHS, 2010) reported that 9% of Hispanics did not purchase prescription drugs due to cost, compared to 6.8% of non-Hispanic Whites. In addition, 6.5% of Hispanics did not utilize medical care due to cost, compared to 5.7% of non-Hispanic Whites (NHCS, 2010). Safety net providers may not have adequate resources to address the health needs of the poor and uninsured (North Carolina Institute of Medicine, 2009). Chronic health conditions, like type 2 diabetes, are costly in both time and financial resources. Inability to pay for office visits, laboratory and diagnostic tests, glucose testing equipment, medications, and diabetes educational classes are significant barriers for low-income and/or uninsured Latinos/Hispanics with type 2 diabetes (Caban & Walker, 2006; Coronado, Thompson, Tejada, Godina, & Chen, 2007; Najm et al., 2003). The high cost of healthcare services has been identified as a common reason for delaying medical treatment in this population (MacNaughton, 2008). More importantly, lacking health

insurance, affordability, low income, and negative economic consequences from taking time off work to visit a healthcare provider have been cited as reasons for utilizing the TCA self-care expressions, patterns, and practices of herbal remedies and self-medication/self-prescription among Latino/Hispanic populations (Coffman et al., 2008; Larson et al., 2006; Mainous et al., 2009; Najm et al., 2003; Sleath et al., 2009).

### **Political and Legal Factors**

The Pew Hispanic Center estimates that in 2010 there were 11.2 million unauthorized immigrants in the U.S. from many different countries (Passel & Cohn, 2011). The majority (61%) arrived before 2004 and more than half (58%) were from Mexico (Passel & Cohn, 2011). Being an unauthorized immigrant is defined as someone who entered the country without valid documents, entered the country with a valid visa and stayed after his/her visa expired, or violated the terms of admission into the country (Passel & Cohn, 2011). Being unauthorized can directly affect the health status of Latinos/Hispanics, by serving as a barrier to public health programs and standard medical care, which may contribute to crisis-oriented care and foregoing follow-up treatment and monitoring for chronic health conditions, like diabetes (Coffman et al., 2007; Heyman Núñez, & Talavera, 2009). Being unauthorized and the fear of deportation have been reported as reasons for utilizing the TCA self-care expressions, patterns, and practices of herbal remedies, consulting with traditional healers, and self-medication/self-prescription for general health conditions among Latino/Hispanic persons (Coffman et al., 2008; Larson et al., 2006). Fears of being reported or denied treatment led some Latinos/Hispanics to delay seeking services from formal healthcare providers (Heyman et al., 2009).

Unauthorized Latino/Hispanic immigrants have reported obtaining formal healthcare services only after receiving assurance from healthcare providers that they would not require their “papers” (McGuire, 2006). Latinos/Hispanics without authorization have the perception of being treated inhumanly in medical practices, contributing to mistrust with healthcare providers/professionals (Nápoles-Springer, Santoyo, Houston, Pérez-Stable, & Stewart, 2005). Unauthorized immigration status presents a significant dilemma for Latinos/Hispanics with diabetes as daily medications, regular office visits, and annual consultations with specialists are required to manage the disease.

### **Kinship and Social Factors**

Latino/Hispanic cultures highly value strong fidelity to the family and *collectivismo*, a sense of community (Bathum & Baumann, 2007; Elder et al., 2009). The concept of *familismo*, family first, is a significant cultural value shared across Latino/Hispanic subgroups and is considered to be the foundation of society (Caballero & Tenzer, 2007; Caban & Walker, 2006). The Latino/Hispanic family network is frequently multigenerational and comprised of both immediate and extended family members, as well as close family friends (Eggenberger et al., 2006). This critical support network is used for advice, assistance, financial aid, and managing daily events and crises. In multiple studies with Latinos/Hispanics, family members have been identified as the first point of care for health issues, including the TCA practices of herbal remedies for diabetes management, decisions to consult with traditional healers versus formal healthcare providers, and self-medication/self-prescription (Caban & Walker, 2006; Lopez, 2006; Najm et al., 2003; Poss et al., 2003; Poss et al., 2005; Sánchez, 2007).



For those with diabetes, *familismo* provides support and assistance. Family members or friends often accompany Latino/Hispanic patients to medical visits or assist with transportation (Caballero, 2007). Daily encouragement and surveillance from family members aids with medication management, dietary changes, and physical activity (Weiler & Crist, 2009). Input from family members is essential when considering a new recommendation or change in one's diabetes treatment plan (Caballero, 2007; Campos, 2007). Improvements in A1C levels and diabetes knowledge have been reported when family members are included in diabetes educational programs tailored for Mexican Americans (Brown et al., 2002; Vincent et al., 2007). For some Latinos/Hispanics, *familismo* is an effective motivator to follow diabetes treatment plans to remain healthy and to fulfill responsibilities and roles within the family (Weiler & Crist, 2009). King et al. (2010) found that for those persons with type 2 diabetes, social support of family and friends was significantly associated with adherence to dietary and physical activity regimens. In this study ( $N = 463$ ), 21% were Latinos (King et al., 2010). In a qualitative study with Dominicans, Schumacher (2010) reported that the lack of family involvement in care inhibited healing and negatively affected well-being. The inclusion of family in diabetes care is culturally congruent and makes Latino/Hispanic clients feel cared for and respected, leading to a more collaborative and trusting client-provider relationship (Caballero, 2007; Campos, 2007).

**Collectivismo.** The Latino/Hispanic community is comprised of a network of culturally familiar resources that Latinos/Hispanics utilize to obtain TCA self-care expressions, patterns, and practices. For example, Latino/Hispanic markets, called

*tiendas* or *bodegas*, are a source of herbal remedies, health advice, and self-medication/self-prescription (Coffman et al., 2008; Howell et al., 2006; Larson et al., 2006; Lopez, 2006; Sleath et al., 2009). Spanish communication media outlets such as radio, television, and newspapers have been identified as sources of health information regarding TCA modalities (Elder et al., 2009; Mainous et al., 2009; Najm et al., 2003). Latinos/Hispanics visit Latino botanical shops for herbal remedies and to consult with *yerberos/as* (traditional healers that are herbalists; Lopez, 2006; Sánchez, 2007). Churches, priests, and other faith-based institutions and personnel provide spiritual support and strength for coping with diabetes (Bergland et al., 2007; Caban & Walker, 2006; Lujan & Campbell, 2006). Lastly, Latinos/Hispanics living in various geographic locations within the U.S. have sought the services of traditional healers (Coffman et al., 2007; Lopez, 2005; Sánchez, 2007; Schumacher, 2010; Tafur et al., 2009).

**Social interactions.** Prominent cultural values governing social interactions for Latinos/Hispanics include *personalismo* (warm, personal relationships), *respeto* (respect), and *simpatía* (kindness; Caballero, 2007; Campos, 2007; Oomen et al., 1999). Empirical data indicates that when Latinos/Hispanics do not perceive *personalismo* from healthcare providers, then Latinos/Hispanics are more likely to believe that the healthcare provider is not interested in them, more likely to be dissatisfied with care, and less likely to comply with treatment plans (Reyes-Ortiz et al., 2009; Shelley, et al., 2009). The lack of *personalismo* in client-healthcare provider interactions has been identified as a deterrent for seeking care by Mexican American men (Sobralke, 2006) and as being *frio*, or cold, contributing to dissatisfaction with care among South Americans (Roberts, 2007).

*Respeto* (respect) consists of deferential behaviors towards others based upon age, gender, social position, and economic status (Campos, 2007). In a study with 28 Hispanic women living in Brooklyn, Julliard et al. (2008) found that a lack of perceived respect from healthcare providers affected the willingness of this sample of women to disclose health information and trust the healthcare provider. Shelley et al. (2009) reported similar findings in a study with Latinos living in New Mexico. This sample reported that in order to discuss TCA modalities, Latinos/Hispanics needed to perceive openness, respect, and interest from healthcare providers; otherwise, disclosure of cultural self-care practices would not occur.

A social interaction typifying *simpatía* is kind, polite, and without anger or hostility (Campos, 2007). When Latinos/Hispanics perceive *simpatía* to be part of the client-provider interaction, they are more apt to disclose health information, report higher satisfaction with care, and comply with treatment (Julliard et al., 2008; Shelley et al., 2009). The lack of perceived *personalismo*, *respeto*, or *simpatía* negatively impacts the relationship between Latinos/Hispanics and formal healthcare providers and limits the disclosure of TCA self-care expressions, patterns, and practices of Latinos/Hispanics to healthcare providers. Negative past experiences with U.S. healthcare providers and settings have been identified as one reason why Latinos/Hispanics seek out TCA self-care expressions, patterns, and practices from within the Latino/Hispanic community (Coffman et al., 2008; Larson et al., 2006; Shelley et al., 2009).

## **Religious and Philosophical Factors**

Faith in God plays a significant role in the everyday lives of many Latinos/Hispanics and provides hope and strength to overcome the difficulties of life, including diabetes (Bergland et al., 2007; Lujan & Campbell, 2006; Schumacher, 2010). Based upon 4,600 interviews examining the religious beliefs and behaviors of Latinos/Hispanics living in the U.S., 68% of persons self-identified as Roman Catholic, 15% of persons self-identified as evangelical Protestant or born-again, and 8% of persons did not identify with any religion (Pew Forum on Religion & Public Life, 2007). The majority of Latinos/Hispanics reported that they prayed daily, had religious objects in their homes, attended religious services at least monthly, and believed in divine healing and miracles. For many Latinos/Hispanics, religion, God, and the supernatural are intimately intertwined with their concepts of health, illness, and traditional healers (Lopez, 2006; Musgrave et al., 2002; Schumacher, 2010). Latinos/Hispanics hold to a holistic perspective of life whereby the mind, body, and spirit exists in harmony with the environment (Lopez, 2005; Musgrave et al., 2002; Tafur et al., 2009). The boundaries between these elements are fluid, without distinct lines; therefore, a clear cut differentiation may not exist between spiritual care and healthcare (Schumacher, 2010).

The concept of *fatalismo*, fatalism, is closely associated with the religious perspectives of Latinos/Hispanics. According to *fatalismo* everything is under God's control, including health, and little can be done to either prevent or redirect the course of life (Caban & Walker, 2006; Eggenberger et al., 2006). Variances in the strength of fatalistic beliefs are reported among Latino/Hispanic populations with type 2 diabetes

(Caban & Walker, 2006). Mexican Americans Latinas ( $N = 6$ ) described good health as resulting from fate or a reward from God; whereas, illness or disease was a punishment from God (Eggenberger et al., 2006). Also, Mexican Americans believe that God has the power to cure illness, including diabetes, if that is part of His will (Lopez, 2006). God can work through prayers, physicians, and prescribed medications (Eggenberger et al., 2006). Berry (1999) reported in her qualitative study, that Mexican Americans felt they must place their trust in God for they had little control over their own lives. Similar fatalistic beliefs were reported among a sample of Puerto Ricans living in Boston with diabetes (Caban & Walker, 2006). Persons reported feeling that it was impossible to avoid diabetes-related complications; therefore, prevention strategies were outside of their control (Caban & Walker, 2006). Nearly a quarter of Puerto Ricans from a study in New York felt that diabetes was a punishment from God and 78% believed diabetes was part of God's will (Caban & Walker, 2006). Being more fatalistic has been associated with not engaging in diabetes self-management behaviors (Caban & Walker, 2006), not seeking professional healthcare advice early in a disease process (Eggenberger et al., 2006), and not adhering to treatment (Aikens & Piette, 2009). In contrast, Mexican American Latinas who had higher levels of internal locus of control were more apt to engage in healthy lifestyle behaviors, participate in health education, and seek out medical advice for general health issues (Eggenberger et al., 2006).

## **Environmental Context of Latinos/Hispanics in the United States**

### **Ethnohistory**

Despite being reported as a homogeneous group in federal and state data systems and research studies (Herman et al., 2007; Kirk et al., 2008; Miech et al., 2009; State Center for Health Statistics & North Carolina Department of Health and Human Services, 2009), Latinos/Hispanics are a heterogeneous group of people from any racial background and subgroups have ties to Mexico, Cuba, Puerto Rico, Dominican Republic, Central and South America, or any other Spanish culture or origin (U.S. Department of Commerce, 2009). The historical patterns of Spanish colonization in Latin American countries, influx of European immigrants and African slaves to the Western hemisphere, existing indigenous peoples and cultures, and the types of available natural resources in their respective countries contribute to the cultural diversity between Latino/Hispanic subgroups (Elder et al., 2009; Lujan & Campbell, 2006; Oomen et al., 1999). The blending of these multifaceted, influential factors has resulted in a variety of ethnic foods, variations in health beliefs and practices, spoken languages, expressions of faith and spirituality, and societal class position found among Latino/Hispanic subgroups (Elder et al., 2009; Lopez, 2005; Lujan & Campbell, 2006; Mainous et al., 2007; Schumacher, 2010). Indigenous peoples in Latin American countries and states of Mexico occupy marginalized societal class positions and are subject to racism and inadequate access to national health programs in comparison to the majority population (Hercé, Chapman, Castro, García-Salyano, & Khoshnood, 2010; McGuire, 2006). When Latinos/Hispanics immigrate to the U.S., cultural beliefs and practices may be transmitted to successive

generations. This includes the TCA self-care expressions, patterns, and practices utilized by Latinos/Hispanics for the management of type 2 diabetes (Bergland et al., 2007; Coronado et al., 2004; Howell et al., 2006; Najm et al., 2003; Tafur et al., 2009).

**Nativity.** The majority (60.8%) of Latinos/Hispanics have been born in the U.S. (U.S. Census Bureau, 2007). Sixty-one percent of Mexicans are U.S. born citizens compared to approximately 27% to 33% of Central and South Americans (U.S. Census Bureau, 2007). Latinos/Hispanics living in the Southern region of the U.S. are more likely to be foreign-born and to have immigrated to the U.S. since 1990 (U.S. Census Bureau, 2007). The states predominately affected by this recent wave of Latino/Hispanic immigration have been Alabama, Arkansas, Florida, Georgia, Maryland, North Carolina, South Carolina, Tennessee, and Virginia (Kochhar, Suro, & Tafoya, 2005; U.S. Census Bureau, 2007). Prior research indicates that foreign-born Latinos/Hispanics are more likely to use TCA self-care expressions, patterns, and practices to manage their diabetes than native born Latinos/Hispanics, as these modalities are familiar, easily accessible, affordable, recommended by family members and/or friends, and available within the Latino/Hispanic community (Caban & Walker, 2006; Coffman et al., 2008; Lopez, 2006; Najm et al., 2003).

**Generational status.** Latinos/Hispanics may differ based upon generational status. Being first-generation is equivalent to being foreign-born (Pew Hispanic Center, 2009a). Typically, first-generation Latinos/Hispanics are more closely connected to their traditional beliefs and practices than successive generation Latinos/Hispanics, as evidenced by predominantly speaking their primary language, strong cultural identity to

their home country, and utilizing TCA modalities to promote health and treat illness (Elder et al., 2009; Howell et al., 2006; Pew Hispanic Center, 2009a). Second-generation Latinos/Hispanics are those persons born in the U.S. and have at least one first-generation parent. Third-generation Latinos/Hispanics are those persons born in the U.S., as are both of their parents (Pew Hispanic Center, 2009a). Second- and third-generation Latinos/Hispanics are likely to have been educated in the U.S. and typically speak English fluently (Pew Hispanic Center, 2009a). These latter persons have adopted more mainstream U.S. cultural values and may have less identification with their family's country of origin (Pew Hispanic Center, 2009a). A new generational status has been termed, 1.5 generation, which refers to those foreign-born immigrant children who arrived in the U.S. by age 10 and have more similar characteristics to second-generation Latinos/Hispanics, since many formative experiences occurred while living in the U.S. (Elder et al., 2009). To date, minimal research reports the association of generational status and the use of TCA self-care expressions, patterns, and practices of Latinos/Hispanics for diabetes management.

**Acculturation.** Acculturation levels between Latinos/Hispanic individuals, families, and communities may vary widely. Acculturation is a multidimensional process that involves adapting cultural values and practices from one's culture of origin by integrating new cultural values and practices adopted from the new dominant culture (Marín & Gamba, 1996; Page, 2006). Changes can impact behavioral, affective, and cognitive levels of functioning (Cuéllar, Arnold, & Maldonado, 1995). For example, behavioral changes may include speaking a new language, not participating in traditional customs, or



no longer eating ethnic foods or listening to music from one's culture of origin. Affective level of change refers to the emotional dimensions of cultural identity or having a connection to cultural symbols. Cognitive changes reflect alterations in fundamental cultural values such as gender roles, beliefs about health and illness, and attitudes towards exercise and weight. The rates of acculturation vary from person to person. Empirical data indicates that Latinos/Hispanics with lower acculturation levels are more likely to use TCA self-care expressions, patterns, and practices (Caban & Walker, 2006; Lopez, 2006; Mikhail et al., 2004).

In research studies, attempts have measured levels of acculturation via responses on acculturation instruments or by using such proxy variables as spoken language, nativity, generational status, and length of stay in the U.S. (Abraído-Lanza, Armbrister, Flórez, & Aguirre, 2006; Cuéllar et al., 1995; Deyo, Diehl, Hazuda, & Stern, 1985; Marín & Gamba, 1996; Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987).

Acculturation tools have been developed and tested for Latino/Hispanic populations. Two widely used acculturation tools designed for Mexican Americans are the Acculturation Rating Scale for Mexican Americans II (Cuéllar et al., 1995) and the Simple Language-based Acculturation Scale for Mexican Americans (Deyo et al., 1985). The Short Acculturation Scale for Hispanics (Marin et al., 1987) and Bidimensional Acculturation Scale for Hispanics (Marín & Gamba, 1996) have been created and tested for use with both Mexicans and Central Americans. Due to the lack of standardization between acculturation measures and proxy variables, it is difficult to compare acculturation levels between studies.

The implications of acculturation level on diabetes health are not clear. Research findings are contradictory in determining if acculturation is a risk factor for health problems or a protective health factor. For example, in the Multi-Ethnic Study of Atherosclerosis (Kandula et al., 2008) involving 708 Mexican-origin Hispanics, 547 non-Mexican-origin Hispanics, and 737 Chinese participants, findings indicated that more acculturated non-Mexican-origin Hispanics had higher levels of diabetes than more acculturated Mexican-origin Hispanics and Chinese, after controlling for sociodemographic variables. A possible explanation given by the authors for this discrepancy was the higher caloric diet consumed by the non-Mexican-origin Hispanic group compared to that of the Mexican-origin Hispanic group and Chinese group (Kandula et al., 2008). In contrast, an analysis of acculturation and diabetes among 2,696 Latinos/Hispanics from the 1999-2002 NHANES determined that Latinos/Hispanics with low acculturation levels had higher rates of diabetes and peripheral neuropathy and were more likely to lack a usual place of health care, be without health insurance, and have lower levels of education (Mainous et al., 2006). In this analysis of NHANES, data was not evaluated by Latino/Hispanic subgroups. In a different study evaluating 1999-2004 NHANES Latino/Hispanic data, findings indicated that less acculturated Latinos/Hispanics with diabetes were more likely to be female, have an annual income less than \$20,000, and not be a high school graduate (Mainous, Diaz, & Geesey, 2008). In addition, persons less acculturated were more likely to consume a diet low in saturated fat and higher in fiber, but less likely to exercise during leisure time or have a usual place of healthcare or have health insurance (Mainous et al., 2008). Other authors report that

less acculturated, first-generation Latino/Hispanic females have healthier diets, lower body mass index, and better birth outcomes than successive-generation Latino/Hispanic women who consume higher fat diets, less fruits and vegetables, and have higher rates of obesity (Yeh, Viladrich, Bruning, & Roye, 2009). Thus, it is not clear if or how acculturation is associated with the health of Latinos/Hispanics with diabetes. The question remains if acculturation alone or in combination with other variables, such as socioeconomic status, is the mediating factor for health outcomes.

### **Spoken Language**

In the U.S., approximately 12% of the total population speaks Spanish at home (Office of Minority Health, 2009). This includes 14.5 million Mexicans, 2.3 million Puerto Ricans, 1 million Cubans, and 6.7 million other Latinos/Hispanics (Office of Minority Health, 2009). The majority (53.9%) of Latinos/Hispanics age 18 years and older can speak English “very well” (Pew Hispanic Center, 2009c). However, 46% of Latino/Hispanic adults do not speak English “very well” and most (76%) are foreign-born (Pew Hispanic Center, 2009c). It is important to note that not all Latinos/Hispanics speak Spanish as there are multiple indigenous spoken languages among people from Mexico, Guatemala, Bolivia, Ecuador, and Peru (Carter-Pokras & Zambrana, 2001; Central Intelligence Agency, 2010a, 2010b).

Limited English proficiency (LEP) is one reason that Latinos/Hispanics use TCA self-care expressions, patterns, and practices (Coffman et al., 2008; Howell et al., 2006; Mainous et al., 2009; Mikhail et al., 2004). LEP has been identified as a significant barrier for accessing formal healthcare services and receiving quality healthcare services

(AHRQ, 2011a; Cristancho et al., 2008; Wallace, Gutiérrez & Castañeda, 2008). LEP has been found to lead to “misunderstanding, dissatisfaction, omission of vital information, misdiagnosis, inappropriate treatment, and lack of compliance” (Office of Minority Health, 2001, p. 10). The language discordance between clients and healthcare providers negatively impacts the quality of healthcare services and the development of a trusting client-healthcare provider relationship (Andrulis & Brach, 2007; Julliard et al., 2008). In healthcare settings, monolingual Spanish speaking Latinos/Hispanics have reported not receiving adequate education regarding new treatments, having to wait extended periods of time for an available interpreter before being seen, and feeling discriminated against due to their LEP abilities (Cristancho et al., 2008; Wallace et al., 2008). For persons with diabetes, experiences of perceived discrimination have been linked with higher A1C levels and lower physical functioning (Piette, Bibbins-Domingo, & Schillinger, 2006). Further, data analysis of the U.S. 2000 National Health Interview Survey indicated that among Hispanics with diabetes or cardiovascular disease, those with LEP as compared to English-proficient Hispanics, were less likely to receive advice about physical activity or a healthy diet from healthcare providers, after controlling for health insurance coverage and the number of visits to a physician in the last year (Lopez-Quintero, Berry, & Neumark, 2009). LEP negatively impacts complex diseases like diabetes, which require multifaceted treatment plans and unfamiliar products that may not be perceived to be culturally congruent (McCabe, Gohdes, Morgan, Eakin, & Schmitt, 2006).

### **Summary of Current Knowledge**

This review of the literature illustrates that Latinos/Hispanics utilize a variety of TCA self-care expressions, patterns, and practices to manage health concerns. Evidence reveals that herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription may be part of diabetes self-care. These cultural modalities may be unfamiliar to U.S. healthcare providers. To date, findings from several studies, primarily qualitative in design and comprised of Mexican Americans living along the U.S.-Mexico border region, indicate that Latinos/Hispanics use herbal remedies as part of their TCA self-care expressions, patterns, and practices for diabetes management. In fact, Latino/Hispanic persons believe that herbal remedies can cure or at least control the diabetes disease process. Many persons do not understand the mechanism of action of the herbs they ingest and have low levels of diabetes knowledge. Current knowledge indicates a complex and varied formulation of herbal ingestion with concurrent use of prescribed diabetes medications. Little is known about how these herbs are dosed, what symptoms they are used to treat, if side effects are experienced, if prescribed diabetes medications dosages are altered, or how herbal remedies impact diabetes health outcomes. It is not known if the use of this traditional modality is associated with the fears Latinos/Hispanics have of insulin or oral hypoglycemic agents.

Faith in God is central to the lives of many Latino/Hispanic persons. Mexican Americans and Puerto Ricans have reported using prayer, seeking counsel from religious personnel, and using religious icons as faith-based interventions to cope with the burden

of living with diabetes. These practices are meaningful and consistent with their holistic paradigm of health and religious perspectives.

Current knowledge indicates a limited understanding of the role of consulting traditional healers as part of the TCA self-care expressions, patterns, and practices of Latinos/Hispanics for diabetes management. Empirical findings indicate that some Mexican Americans consult with *yerberos/as*, while Puerto Ricans may consult with *espiritualistas* to assist with controlling diabetes. Other Mexican Americans report skepticism about *curanderos/as* and deny consulting with traditional healers for any reason. Embarrassment and reluctance to discuss consulting with traditional healers was found in a qualitative study with Mexican American women. Current information pertaining to consulting with traditional healers for diabetes management lacks details and is conflicting.

Findings from recent research studies indicate that Latinos/Hispanics engage in self-medication/self-prescription practices for a variety of health conditions, including diabetes. Limited information is available, however, regarding this practice in relationship to diabetes self-care and health outcomes. In fact, no diabetes-specific research studies were found pertaining to the self-medication/self-prescription practices of Latinos/Hispanics as part of diabetes self-management.

Several cultural and social structure dimensions and environmental context factors are associated with the use of TCA self-care expressions, patterns, and practices among Latinos/Hispanics for diabetes care. The Latino/Hispanic family and community networks have been identified as essential resources for TCA self-care expressions,

patterns, and practices for the management of type 2 diabetes among several Latino/Hispanic subgroups. The perceived lack of *personalismo*, *respeto*, and *simpatía*, cultural values governing social interactions, on the part of healthcare providers are cited as reasons Latinos/Hispanics fail to disclose TCA modalities to healthcare providers. Economic factors, such as low income, living in poverty, and the lack of health insurance, as well as the political and legal factor of not having authorized immigration status, have been associated with the use of TCA self-care expressions, patterns, and practices among Latinos/Hispanics for general health purposes. Research findings indicate that foreign-born Latinos/Hispanics with LEP abilities and low acculturation are more likely to use TCA modalities as part of diabetes management than persons with English proficiency and high acculturation levels.

### **Gaps and Omissions in Current Knowledge**

Currently, gaps and omissions in knowledge exist pertaining to the TCA self-care expressions, patterns, and practices used by Latinos/Hispanics for the management of type 2 diabetes. In regards to herbal remedies, little is known about herbal dosing and frequency. Empirical evidence is lacking regarding what diabetes-related symptoms Latinos/Hispanics are attempting to treat with herbal remedies or the perceived effectiveness of these herbs. It is not known whether Latinos/Hispanics utilize herbal remedies in lieu of prescribed diabetes medications or alter the dosages of prescribed diabetes medications on the days when herbal remedies are used. Finally, it is not known whether the use of herbal remedies among Latinos/Hispanics for type 2 diabetes is

associated with fears or concerns regarding insulin or other prescribed diabetes medications.

Gaps in knowledge exist whether Latinos/Hispanics use faith-based interventions in lieu of prescribed treatments or if persons prefer nurses and other healthcare providers to incorporate faith-based interventions into personalized diabetes self-care management plans. The role of traditional healers as part of type 2 diabetes self-care is poorly understood. Limited information is available pertaining to the types of traditional healers that Latinos/Hispanics consult with as part of diabetes self-care or what treatments or interventions traditional healers utilize for diabetes management. It is also unknown whether Latinos/Hispanics are seeking treatment for diabetes when they consult with traditional healers for the treatment of *susto*.

No research studies pertaining to the practice of self-medication/self-prescription specifically for the management of type 2 diabetes among Latinos/Hispanics were found. A deficit of knowledge exists regarding the types of medications Latinos/Hispanics obtain for diabetes management via self-medication/self-prescription and how medications are dosed. A lack of clarity exists as to whom Latinos/Hispanics consult for advice about diabetes medications obtained in this manner. Information regarding the perceived efficacy of these medications and the association of self-medication/self-prescription practices to glycemic control and diabetes-related complications is lacking. Gaps in knowledge exist pertaining to the development of adverse events from medications obtained via self-medication/self-prescription practices. Finally, it is not known if medications obtained from self-medication/self-prescription practices for



diabetes management are used simultaneously with prescribed medications obtained from formal healthcare providers.

Knowledge regarding the association of cultural and social structure dimensions and the environmental context of Latinos/Hispanics to the use of TCA self-care expressions, patterns, and practices for diabetes care among Latinos/Hispanics is limited. Empirical data is lacking regarding the association of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription to glycemic control (A1C levels). Little is known about the TCA modalities of Latinos/Hispanics living in regions with emerging Latino/Hispanic communities and those living in nonborder states.

This study adds to and expands the existing knowledge of the TCA self-care expressions, patterns, and practices of Latinos/Hispanics for the management of type 2 diabetes by:

- Exploring a comprehensive view of the TCA self-care expressions, patterns, and practices used for the management of type 2 diabetes by including the use of herbal remedies, faith-based interventions, consulting traditional healers, and the practices of self-medication/self-prescription.
- Exploring specific details of TCA self-care expressions, patterns, and practices of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescriptions for diabetes management.
  - For herbal remedies this included: names of herbal remedies, identification of purpose or symptoms being treated, preparation/formulation, dosing

frequency, perceived effectiveness, development of adverse events, and alterations of prescribed diabetes medications.

- For faith-based interventions this included: types of faith-based interventions Latinos/Hispanics used, perceived effectiveness, alterations of prescribed diabetes medications, and assessing if Latinos/Hispanics would prefer for faith-based interventions to be included in diabetes self-care management plans.
- For consulting traditional healers this included: types of traditional healers, types of treatments traditional healers used for diabetes, perceived effectiveness, and alterations of prescribed diabetes medications.
- For self-medication and self-prescription this included: names of medications used for diabetes management, types of community settings from which medications were obtained, simultaneous use of diabetes medications obtained from self-medication/self-prescription and formal healthcare providers, identified from whom Latinos/Hispanics seek medication advice, perceived effectiveness, development of adverse events, and reasons why they buy medications in this manner.
- Exploring the association of TCA self-care expressions, patterns, and practices to glycemic control.
- Examining cultural and social structure dimensions and environmental context factors associated with the use of TCA self-care expressions, patterns, and practices.

- Gaining the perspectives of Latinos/Hispanics living in North Carolina which is a nonborder, emerging Latino/Hispanic community consisting of Latinos/Hispanics from multiple subgroups.

Further research is needed to develop a more comprehensive and clear understanding of the TCA self-care expressions, patterns, and practices used by Latinos/Hispanic for type 2 diabetes management, especially for Latinos/Hispanics living in nonborder, emerging Latino/Hispanic communities. The knowledge obtained from this study provides a foundation to improve the cultural competence of nurses and other healthcare providers, better inform how to best culturally tailor diabetes education programs, and provide a basis from which to maintain, promote, and negotiate the use of holistic, safe, and efficacious TCA self-care expressions, patterns, and practices to promote optimal health outcomes for Latinos/Hispanics with type 2 diabetes.

CHAPTER III  
METHODOLOGY

**Design**

This cross-sectional, correlational study explored the use of traditional, complementary, and alternative (TCA) self-care expressions, patterns, and practices of Latinos/Hispanics for the management of type 2 diabetes. A cross-sectional, correlational research design measures data at a single collection point in time and is an effective method for describing the current status of phenomena and for examining associations or interrelationships among phenomena (Newman, Browner, Cummings, & Hulley, 2007). For this study, data were collected one time from participants to: (a) describe the use and characteristics of the TCA self-care expressions, patterns, and practices of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription; (b) examine cultural and social structure dimensions and environmental context factors associated with the use of TCA self-care expressions, patterns, and practices; (c) assess the level of glycemic control; and (d) explore the association of TCA self-care expressions, patterns, and practices, as well as cultural and social structure dimensions, and environmental context factors to glycemic control.

## **Research Questions**

### **Research Question 1**

What are the TCA self-care expressions, patterns, and practices used by Latinos/Hispanics for the management of type 2 diabetes?

- A. What herbal remedies do Latinos/Hispanics use for the management of type 2 diabetes?
- B. What faith-based interventions do Latinos/Hispanics use for the management of type 2 diabetes?
- C. What traditional healers do Latinos/Hispanics consult with for the management of type 2 diabetes?
- D. What self-medication/self-prescription practices do Latinos/Hispanics use for the management of type 2 diabetes?

### **Research Question 2**

What symptoms/purposes do Latinos/Hispanics use TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription) to treat in the management of type 2 diabetes?

### **Research Question 3**

Do Latinos/Hispanics use TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription) in lieu of or in combination with prescribed conventional diabetes medications?

**Research Question 4**

Do Latinos/Hispanics tell their healthcare provider about the use of TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription) for the management of type 2 diabetes?

**Research Question 5**

What is the association of the cultural and social structure dimensions (years of education, diabetes knowledge, health insurance), the environmental context factor of acculturation level, and individual characteristics (age, gender) to the use of TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription)?

**Research Question 6**

What is the association of the cultural and social structure dimensions (years of education, diabetes knowledge, health insurance), environmental context factor of acculturation level, individual characteristics (age, gender), and the self-care expressions, patterns, and practices (diet) to health (glycemic control/A1C level)?

**Research Question 7**

What is the association of TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription) to health (glycemic control/A1C level)?

### **Research Question 8**

What is the association of TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription), cultural and social structure dimensions (years of education, diabetes knowledge, health insurance), environmental context factor of acculturation level, individual characteristics (age, gender), and self-care expressions, patterns, and practices (diet) to health (glycemic control/A1C level)?

#### **Setting**

Conducting Latino/Hispanic health research in North Carolina is salient as this state has a rapidly emerging Latino/Hispanic community and has been identified as a hypergrowth region. A hypergrowth region is defined as an area that has experienced a growth of more than 300% in the Latino/Hispanic population after 1980 (Suro & Singer, 2002). From 1990 to 2009 the population of Latinos/Hispanics in North Carolina increased more than 804%, from 76,726 to 694,185 respectively (Guzmán, 2001; United States [U.S.] Census Bureau, 2010e). Currently, Latinos/Hispanics comprise 7.4% of the total estimated North Carolina population and reside in all 100 counties of the state (U.S. Census Bureau, 2010e).

The majority (53%) of Latinos/Hispanics living in North Carolina is foreign-born and most (65%) persons are of Mexican origin (Pew Hispanic Center, 2010). In 2009, according to the U.S. Department of Homeland Security (2010), Mexican immigrants comprised the largest portion of persons who obtained permanent legal resident status in the state. Other Latinos/Hispanics immigrants living in North Carolina who received

legal permanent residency in 2009 are from Brazil, Colombia, Dominican Republic, Ecuador, El Salvador, and Peru (U.S. Department of Homeland Security, 2010).

The median age of Latinos/Hispanics in North Carolina is younger than that of the state's general population, 25 years as compared to 36 years, respectively (Pew Hispanic Center, 2009b). Only 51% of Latinos/Hispanics have a high school diploma compared to 85% of Whites and approximately half do not speak English well (State Center for Health Statistics & Office of Minority Health and Health Disparities, 2006, 2010). In 2008, a higher proportion of Latino/Hispanic families (24.8%) lived in poverty compared to White families (6.7%; State Center for Health Statistics & Office of Minority Health and Health Disparities, 2010). In 2009, the Latino/Hispanic population had the highest rate of not having any type of health insurance (61.1%), as compared to Whites (13%) and African Americans (21.4%; North Carolina Center for Health Statistics, 2010). Additionally, a higher proportion of Latinos/Hispanics (32.3%) reported being unable to see a doctor in the last 12 months due to cost, as compared to Whites (13.8%) and African Americans (23.7%; North Carolina Center for Health Statistics, 2010). Of Latinos/Hispanics with diabetes and limited English proficiency skills, 14.8% reported not having diabetes medications in the last 12 months and 18.3% of persons reported not having glucose testing supplies, both due to the lack of money (North Carolina Center for Health Statistics, 2010). The diabetes prevalence rate for adults in North Carolina (9.3%) is higher than that of the general U.S. population (6.6%; Centers for Disease Control and Prevention [CDC], 2008c; North Carolina Division of Public Health & Diabetes Prevention and Control, 2009). In 2006, the estimated cost of diabetes in North Carolina



was \$5.3 billion (North Carolina Division of Public Health & Diabetes Prevention and Control, 2009).

Data was collected in five counties located in central and western North Carolina. The counties were Davidson, Davie, Forsyth, Guilford, and Yadkin counties. According to results from the 2008 North Carolina Behavioral Risk Factor Surveillance System (North Carolina Center for Health Statistics, 2009), the diabetes prevalence rates among these counties ranged from 7.9% to 9.8%. The estimated current Latino/Hispanic population among these counties is 85,539 (U.S. Census Bureau, 2010a, 2010b, 2010c, 2010d, 2010f). This setting has been identified as an emerging Latino/Hispanic community, an area in which the base population of Latinos/Hispanics was very small and then rapidly grew over the last 20 years (Kochhar, Suro, & Tafoya, 2005; Suro & Singer, 2002).

### **Sample**

A convenience sampling design was used to recruit participants from a variety of community-based settings. Inclusion criteria consisted of: (1) self-identification as either Latino or Hispanic, (2) self-reported history of type 2 diabetes for at least 12 months, (3) men or women, age 18 years of age or older, (4) able to speak either Spanish or English, and (5) oriented to time, place, and person. Exclusion criteria consisted of: (1) living in noncommunity dwelling institutions and (2) having a condition which may impair the ability to answer questions.

A total of 76 participants were recruited. Fifty-three persons were recruited from three community clinics, each located in a different county. Eight individuals were

recruited from Latino/Hispanic churches of various denominations. Fifteen persons were recruited from community environments that included an English as a Second Language class, a migrant farmworker neighborhood, Latino/Hispanic *tiendas* (markets), and a Hispanic health fair. Participants lived in both rural and urban areas. A total of 75 persons completed the study. One person from a community clinic did not complete the study due to a transportation issue. Data collection time ranged from 40 to 60 minutes per person. All interviews were conducted in the Spanish language.

A priori power analysis was conducted using nQuery Advisor version 7.0 software to determine the required sample size to answer the research questions (RQ). RQ 1-4 were analyzed with descriptive statistics only. The a priori power analysis indicated that RQ 5 would require a sample of 62 participants when using a multiple linear regression model with a significance level of .05, 80% power, estimated effect size of  $R^2 = 0.20$ , and six independent variables. RQ 6 would require a sample of 69 participants when using a multiple linear regression model with a significance level of .05, 80% power, estimated effect size of  $R^2 = 0.20$ , and eight independent variables. RQ 7 would require a sample of 53 participants when using a multiple linear regression model with a significance level of .05, 80% power, estimated effect size of  $R^2 = 0.20$ , and four independent variables. RQ 8 would require a sample of 81 participants when using a multiple linear regression model with a significance level of .05, 80% power, estimated effect size of  $R^2 = 0.20$ , and 12 independent variables.

## Recruitment

Recruitment occurred in community-based settings from December 2010 through April 2011. These community-based settings consisted of faith-based institutions, Latino/Hispanic markets (*tiendas* or *bodegas*), community centers, Latino/Hispanic community events, and healthcare environments that provide services to Latino/Hispanics clients. Multiple methods of recruitment were used. Selected personnel in settings were oriented to the study and eligibility criteria. Culturally and linguistically appropriate flyers explaining the study were posted and distributed to potential participants by site personnel. Site personnel did not obtain consent; however, personnel assisted in determining if persons were interested in participating in the study. Bilingual flyers were posted in community settings and bilingual announcements were made in faith-based institutions. A table was set up at Latino/Hispanic community events. Lastly, social nomination was used. Interested participants were encouraged to speak to family members, friends, co-workers, or neighbors who have type 2 diabetes to identify interest in participating in this study. The primary investigator (PI) provided bilingual flyers containing research study information and contact information for participants to share with others. Then, interested persons contacted the PI or bilingual research assistant(s) for information about the study. All flyers were bilingual and evaluated by a bicultural, bilingual interpreter for appropriate use of the Spanish language and conveyance of meaning.

## **Measurement and Instrumentation**

Biophysical indicators were assessed. Five instruments were used for data collection: (a) the Demographic Questionnaire, (b) the Bidimensional Acculturation Scale for Hispanics Linguistic Proficiency subscale, (c) the Spoken Knowledge in Low Literacy in Diabetes Scale, (d) the Summary of Diabetes Self-Care Activities Measure, and (e) the Traditional, Complementary, and Alternative Self-Care Expressions, Patterns, and Practices Questionnaire.

### **Biophysical Indicators**

The biophysical indicators measured were: blood pressure, height, weight, waist circumference, and A1C. To measure blood pressure, a sphygmomanometer cuff was placed on the upper arm and a stethoscope bell placed over the antecubital fossa of the same arm while auscultating for Phase 1 (systolic) and Phase 5 (diastolic) Korotkoff sounds (The National High Blood Pressure Education Program, 2003). Blood pressure was measured after the participant had been sitting for at least five minutes; two measurements were taken at a minimum of 3 minute intervals. Participants were considered hypertensive if the average of the two blood pressure readings indicated a systolic blood pressure greater than or equal to 130 mmHg or a diastolic blood pressure greater than or equal to 80 mmHg, taking antihypertensive medications, or participants were told they have high blood pressure by a healthcare provider (AAACE Diabetes Mellitus Clinical Practice Guidelines Task Force, 2007; American Diabetes Association [ADA], 2011c). Height was measured in centimeters using a portable stadiometer. Weight was measured in kilograms using a Tanita BWB-800A Class III Digital

Professional Body Weight Scale which has an internal mechanism to recalibrate at each use and a maximum capacity up to 200 kilograms (kg; 440 pounds). Height and weight were measured without shoes or hats and wearing only light weight clothing. Waist circumference was measured in centimeters using a Gantt tape wrapped around the waist area and over the umbilicus with participants standing and arms positioned slightly away from their sides. Participants were asked to remove any belts or bulky clothing. Abdominal obesity was defined as a waist circumference greater than 102 centimeters (> 40 inches) in men and greater than 88 centimeters (> 35 inches) in women (National Cholesterol Education Program, 2001).

A finger stick blood sample was performed using aseptic technique and the Bayer A1CNow+<sup>®</sup> point of care machine was used to determine the A1C level. The Bayer A1CNow+<sup>®</sup> point of care machine measured as a portable analyzer with accuracy and precision comparable to that of clinical diagnostic laboratories (Bayer HealthCare LLC, 2009). It has received National Glycohemoglobin Standardization Program certification and has been found on average to have an accuracy rate of 99% with fingerstick samples and has been found to have precision (Bayer HealthCare LLC, 2011). The maximum A1C result available with the Bayer A1CNow+<sup>®</sup> point of care machine is 13.0%. In the event that a result was greater than 13.0%, that result was entered into the database as 13.10%. ADA (2011c) guidelines were used to interpret A1C levels. Glycemic control consisted of an A1C less than 7.0% in adults and poor glycemic control was an A1C level greater than or equal to 7.0%. BMI was calculated using the statistical software program based upon the standard calculation formula of weight in kilograms divided by the height

in meters squared (weight in kg divided by [height (m)]<sup>2</sup> (CDC, 2009). The CDC's BMI guidelines were used to characterize weight based upon the established categories of normal weight (BMI 18.5 to 24.9 kg/m<sup>2</sup>), overweight (25 to 29.9 kg/m<sup>2</sup>), and obese ( $\geq$  30 kg/m<sup>2</sup>; CDC, 2009).

### **The Demographic Questionnaire**

The Demographic Questionnaire, an investigator-designed form consisting of 32 questions, was used to capture information describing characteristics of the individual (age, gender), medical history pertaining to type 2 diabetes (length of time since being told had diabetes, type of provider/healer who told person they had diabetes, history of attending diabetes education classes, medications taken for diabetes, frequency of seeing a healthcare provider for diabetes, diabetes-related hospitalizations and complications), environmental context factors (Latino/Hispanic subgroup status, nativity, generational status, length of residence in North Carolina and the U.S., spoken language), the cultural and social structure dimensions of educational factors (years of school), economic factors (income, health insurance), kinship and social factors (marital status), religious and philosophical factor (self-identified faith affiliation), and health (self-rated health status). The response options were either short answer or multiple options. Self-rated health status consisted of one question taken from the CDC (2000) Healthy Days Core Module. The question was "Would you say in general your health is..." and has a 5-point Likert-type response ranging of "Poor" (1) to "Excellent" (5). This item has been used in national and state-based Behavioral Risk Factor Surveillance System surveys since 1993.

The Demographic Questionnaire was translated into Spanish and back translated into English by two bicultural, bilingual persons.

**The Bidimensional Acculturation Scale for Hispanics Linguistic Proficiency subscale (BAS/LP)**

The BAS/LP is a subscale of the BAS, which is a bidirectional language-based (Spanish and English) acculturation tool used to measure an acculturation score for each participant in the cultural domains of Hispanic and non-Hispanic (Marín & Gamba, 1996). The BAS/LP consists of 12 items. Six items measure Spanish-language based behaviors for the cultural domain of Hispanic and a corresponding six items measure English-language based behaviors for the non-Hispanic domain. A four-point Likert-type response option is used for the BAS/LP, ranging from “very poorly” (1) to “very well” (4). Item responses are summed and then averaged to yield a final score for each cultural domain, with a total possible score range of 1 to 4 per cultural domain. Higher scores indicated higher acculturation in each domain, with a cutoff score of 2.5 to indicate low or high acculturation. Scores above 2.5 in both Hispanic and non-Hispanic indicate biculturalism. The Flesch-Kincaid grade level of the BAS/LP is 4.3.

The BAS/LP subscale has adequate internal consistency scores (alpha coefficient = 0.82) and high validity coefficients when compared to generation status, length of residence in the U.S., amount of formal education, age at arrival in the U.S., proportion of respondent’s life lived in the U.S., ethnic self-identification, and correlation with the acculturation score obtained through the Short Acculturation Scale for Hispanics (Marín & Gamba, 1996). This acculturation instrument has been used in other health research

studies with Latinos/Hispanics (Fernández et al., 2009; Tucker et al., 2010; Zambrana & Carter-Pokras, 2010). For this study, acculturation level was operationalized by using the averaged scores for the cultural domains of Hispanic and non-Hispanic on the linguistic proficiency subscale. The averaged scores from the non-Hispanic acculturation domain were used in regression models.

### **The Spoken Knowledge in Low Literacy in Diabetes Scale (SKILLD)**

The SKILLD was used to assess diabetes knowledge pertaining to the signs and symptoms of hyperglycemia and hypoglycemia, diabetes-related blood tests, self-care behaviors, and diabetes-related complications (Rothman et al., 2005). This verbally administered instrument consists of 10 primary questions and 10 secondary questions. Results have been associated with glycemic control (Rothman et al., 2005). Higher scores indicate a greater level of diabetes knowledge, with the cutoff score of 5.0 indicating high versus low knowledge. This instrument was designed for low literacy populations with type 2 diabetes and was written at below the fifth grade level on Flesch-Kincaid scale. The Kuder-Richardson coefficient of internal reliability (KR-20) for all items was 0.72 among a sample ( $N = 217$ ) of English speaking adults with a mean age of 55 years, average duration of diabetes of 8.4 years, and 38% reported less than a sixth-grade literacy level (Rothman et al., 2005). The race and ethnicity of the sample was not reported. This diabetes knowledge tool has been used in other studies with low literacy populations (DeWalt, Boone, & Pigone, 2007; Guler, & Oguz, 2011; Huizinga et al., 2008). A Spanish version of the SKILLD and associated psychometric properties were not found in the literature.



After receiving permission from the tool developers (R. L. Rothman, personal communication, August 2, 2010), the SKILLD was translated into Spanish by a bicultural native Spanish speaker and back translated into English by a second bicultural native Spanish speaker, assessing for consensus in conveyance of meaning. The Spanish version of the SKILLD was piloted by the investigator with a small sample ( $N = 7$ ) of Latinos/Hispanics to assess for ease of use and comprehension of the questions. No difficulties were noted with administration in the pilot sample. Each person was read the primary question first and if they were not able to respond, then the secondary question was asked. One point was awarded for complete and correct responses to each question set (primary and secondary question). No points were awarded for responses that were incomplete, wrong, or no response. Scores were summed with a maximum possible score of 10 points and range of 0 to 10. Diabetes knowledge was operationalized as the total summed and range scores of the SKILLD. The total summed score was used in the regression analyses.

### **The Summary of Diabetes Self-Care Activities measure (SDSCA)**

The SDSCA, which is available in both Spanish and English, was used to assess the frequency of performing the standard medically recommended diabetes self-care expressions, patterns, and practices in the preceding seven days (Toobert, Hampson, & Glasgow, 2000). This self-report instrument consists of 11 core items with five subscales asking individuals to report the number of days in the last week they carried out self-care behaviors related to diet, physical activity, blood sugar testing, foot care, and smoking. For example, “On how many of the last SEVEN DAYS did you eat five or more servings

of fruits and vegetables?” and “On how many of the last SEVEN DAYS did you test your blood sugar?” Responses for the subscales of general diet, specific diet, physical activity, blood sugar testing, and foot care range from zero days to seven days. To obtain the final score for the subscales of general diet, specific diet, physical activity, blood sugar testing, and foot care, the item responses for each subscale question are summed and then averaged by the number of questions per subscale. The final score for each subscale indicates the mean number of days per week that these self-care behaviors were reported. The smoking subscale consists of one question with a dichotomous response of “No” or “Yes,” qualified by the number of cigarettes smoked on an average day. In prior research, internal consistency of the subscales have been assessed by using inter-item correlations which ranged from  $r = 0.47$  to  $r = 0.80$  for general diet, exercise, and blood sugar testing (Toobert et al., 2000). However, specific diet items have been consistently unreliable in prior testing ( $r = 0.07-0.23$ ; Toobert et al., 2000). Moderate test-retest correlations of this tool over 3-4 months were reported. Concurrent validity was assessed by the instrument developers for the diet and exercise subscales by comparing the results to food records and self-monitoring. Evaluation of the English and Spanish versions of the SDSCA revealed item correlations ranging from .78 to 1.00 and test-retest correlations ranging from .51 to 1.00 (Vincent, McEwen, & Pasvogel, 2008). Cronbach’s alpha of .68, indicating acceptable internal consistency, was reported for the Spanish version (Vincent et al., 2008). This instrument has a Flesch-Kincaid grade level score of 7.6. In this study, diet was operationalized by using the general diet subscale score in the regression models. The specific diet and physical activity subscales had poor reliability

and were not used in the regression models. Responses from questions were used to describe the sample.

### **The Traditional, Complementary, and Alternative (TCA) Self-Care Expressions, Patterns, and Practices Questionnaire**

The TCA Self-Care Expressions, Patterns, and Practices Questionnaire, an investigator-designed form, was developed based upon clinical knowledge, scientific literature, and the 2007 National Health Interview Survey Adult Alternative Health/Complementary and Alternative Medicine questionnaire (CDC, 2008a). This tool consists of 31 questions and was used to determine the use and characteristics of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription practices for the management of type 2 diabetes. Response options ranged from answering open-ended questions to choosing from multiple response sets. This questionnaire was translated into Spanish and back translated into English by two bicultural native Spanish speakers for this study.

### **Data Collection Procedures**

The people involved with data collection were the PI and two bicultural, bilingual native Spanish speaking research assistants. The PI speaks Spanish as a second language. However, to ensure comprehension and accuracy of the data, native Spanish speaking bilingual research assistants were utilized. Prior to interaction with participants, the PI held a training session with each research assistant regarding informed consent, culturally competent data collection procedures, and participant confidentiality.

Permission and letters of support were obtained from appropriate administrators in institutional type settings prior to recruitment and data collection. Once potential participants declared interest to participate in the study, the PI and/or bilingual research assistant(s) determined eligibility, obtained written informed consent prior to data collection, and then collected data at that time or scheduled an appointment for a time convenient for the participant. Data collection occurred in private rooms or areas of healthcare settings, faith-based institutions, community centers, community events, and in homes.

Data were collected in face-to-face interviews by the PI and/or bilingual research assistants. All data collection forms, instruments, and consent forms were available in Spanish or English, based upon the preference of participants. All forms, except for those available in both Spanish and English, were translated into Spanish and back translated into English as previously described.

The consent form was read to each prospective participant and each person was given an opportunity to ask questions and to sign, indicating their consent to participate. The signed consent form was placed in an envelope and kept separate from all data collection instruments. All written instruments were read to participants to increase data validity, since many Latino/Hispanic immigrants in North Carolina have a low educational level, and to prevent participant embarrassment for low literacy abilities (Pew Hispanic Center, 2009b). Cards with numeric response sets were available to assist with responding to instrument questions for the BAS/LP. A list of hypoglycemic agent and insulin names was available to promote accuracy of medication recall.

Using standardized protocols, biophysical indicators were collected by the PI, which consisted of: blood pressure, height, weight, waist circumference, and a finger stick blood sample for obtaining an A1C level. Each participant received a copy of his/her biophysical indicator results. In the event that blood pressure or A1C results were outside the normal limits established by the National High Blood Pressure Education Program (2003) and ADA (2011c), participants were encouraged to follow up with their primary care provider, local health department, community clinic, free clinic, urgent care, or emergency department.

All interviews were completed within one hour. At the end of the interview, each participant was provided written diabetes educational material in either Spanish or English from the National Diabetes Education Program (2004, 2006) entitled: *4 Steps to Control Your Diabetes for Life* or *4 Pasos para Controlar la Diabetes de por Vida*. Each participant received a \$20.00 gift card to a local store in appreciation of their time.

### **Human Subjects Protection**

Approval for this study was obtained from the Institutional Review Board of the University of North Carolina at Greensboro prior to the recruitment of participants. All participants were fully informed regarding the purpose of the study, risks, benefits, and expectations of participating prior to agreeing to participate. Potential participants were informed that their participation was voluntary and that they could withdraw from the study at any time. Participants were assured that choosing to participate or not to participate in this study would not affect the services they received from the site from

which they were recruited. Participants were assured that their responses would not be shared with personnel at community settings.

A written consent form was provided in the language of preference, either Spanish or English, and read to each prospective participant by the PI or bilingual research assistant(s). The consent form was written at a 5.4 Flesch-Kincaid reading level and clearly stated the purpose of the study, the potential risks and benefits, and expectations of participants. Each participant was provided an unsigned copy of the written consent form for their personal records.

To maintain confidentiality, coded numbers instead of names were used on all data collection forms. Names appear on consent forms and gift card receipts, which were placed in an envelope and in a locked file separate from other study data. A master list linking consent forms to other study documents does not exist. All electronic data are stored on a password protected computer. Data were entered into the statistical software system identifying the participant only by his/her coded number. The data collection forms and consents are stored in separate locked filing cabinets.

### **Data Analyses**

All data were entered into SPSS version 18.0 (SPSS Inc., an IBM<sup>®</sup> Company, Chicago, IL). To assess for missing and extreme values, frequencies were run on all variables. No extreme values were found. Missing values pertaining to the types of herbal remedies used for diabetes were noted for two participants. Both participants reported using herbal remedies but could not recall the names of the herbs/plants that they

used, thus information of specific herbs/plants were entered as missing for these two participants.

Three instruments required calculation of scores. Only Spanish versions of the tools were used in this study. Cronbach's alpha was determined for the BAS/LP and for the SDSCA. The Kuder-Richardson 20 was used to evaluate the internal consistency reliability of the SKILLD. Scores for the total BAS/LP and non-Hispanic and Hispanic domains were high (see Table 1). Reliability for the SKILLD and total SDSCA were marginally acceptable (Gliner & Morgan, 2000). Results of subscale reliability analysis for the SDSCA were mixed. The general diet subscale indicated high reliability and was used in regression analyses. However, the specific diet subscale and physical activity subscales were unreliable and therefore not used in regression analyses.

Table 1

*Internal Reliability of Instruments*

Instrument	Cronbach's alpha	Kuder-Richardson 20
Bidimensional Acculturation Scale for Hispanics Linguistic Proficiency subscale-Total (Spanish version)	0.876	
Non-Hispanic domain	0.938	
Hispanic domain	0.818	
Summary of Diabetes Self-Care Activities measure (Spanish version)	0.628	
General diet subscale	0.859	
Specific diet subscale	0.229	
Physical activity subscale	0.586	
Spoken Knowledge in Low Literacy in Diabetes Scale (Spanish version)		0.665

Frequencies and proportions were determined for categorical variables. Measures of central tendency, mean, standard deviation, and range were calculated for each continuous variable. Normality was assessed by utilizing histograms, Q-Q plots, skewness, kurtosis, and Kolmogorov-Smirnov (K-S) test statistics. Variables were considered normally distributed if skewness and kurtosis values ranged between 1 and -1 and the K-S test statistic was nonsignificant (Tabachnick & Fidell, 2007). Upon evaluation of skewness, kurtosis, and K-S test statistics, only age and general diet score were normally distributed. Normality of the independent variables of acculturation non-Hispanic domain, diabetes knowledge (total score of SKILLD), education, and the dependent variables of A1C and summed total of traditional, complementary, and alternative (TCA) modalities (Sum TCAs) could not be assumed (see Table 2). The variable acculturation non-Hispanic domain was positively skewed. Natural log transformation yielded the most significant improvement and was used in regression analyses. The diabetes knowledge variable (SKILLD) had satisfactory skewness and kurtosis values with a significant K-S test statistic and slight negative skewness on examination of the histogram. Both a square root and natural log transformations were applied to the SKILLD variable with evidence of increased skewness for both. Therefore, the untransformed SKILLD was retained for regression analyses. The education variable had satisfactory skewness and kurtosis values with a significant K-S test statistic and slight positive skewness on histogram examination. Since some values equaled zero, a natural log transformation was not applied. A constant of 1 was added to each value and then a base 10 logarithm was applied with significantly increased



skewness (Tabachnick & Fidell, 2007). Therefore, the untransformed education variable was retained for regression analyses. The skewness and kurtosis values of the variable A1C were within range; however, the K-S test statistic was significant, indicating that normality could not be assumed. Upon examination, the histogram of the A1C variable indicated positive skewness. Natural log transformation of A1C was applied with significant improvement and was used in regression models. The Sum TCAs variable had significant positive skewness upon evaluation of the K-S test statistic, though skewness and kurtosis values were within range. As some values equaled zero, a constant of 1 was added and a base 10 logarithm was applied with evidence of increased skewness. Thus, the untransformed Sum TCAs variable was retained and used in regression analyses.

Table 2

*The Effect of Data Transformation on Skewness and Kurtosis*

Variable	Pre-transformation			Post-transformation		
	Skewness	Kurtosis	K-S <i>p</i> value	Skewness	Kurtosis	K-S <i>p</i> value
Acculturation <sup>a</sup>	2.088	4.499	.000	1.223	.829	.000
A1C <sup>a</sup>	.792	-.286	.024	.390	-.742	.200
SKILLD <sup>b</sup>	-.164	-.663	.007	-.676	-.119	.000
Education <sup>c</sup>	.390	.431	.000	-1.165	.797	.000
Sum TCAs <sup>c</sup>	.348	-.628	.000	-.058	-.681	.000

*Note.* K-S = Kolmogorov-Smirnov test statistic.

<sup>a</sup>natural log transformation

<sup>b</sup>square root transformation

<sup>c</sup>Base 10 logarithm applied after adding a constant of 1 to each score

The resulting continuous independent variables used in multiple linear regression models were: age, natural log acculturation non-Hispanic domain, education, diabetes knowledge (SKILLD), and general diet score. The final dependent variables were natural log A1C level and Sum TCAs. Scatterplots were used to assess for linearity of each continuous dependent variable, natural log A1C level and Sum TCAs, with each continuous independent variable. No evidence of linearity was found.

In the regression models, data were assessed for multicollinearity, linearity, homoscedasticity, and outliers. Pearson product moment correlation coefficient, *r*, was used to assess for correlation between variables (Tabachnick & Fidell, 2007); coefficients

of .85 or greater were not found. In addition variance inflation factors for each independent variable were evaluated to assess for multicollinearity; variance inflation factors greater than 10 were not found (Tabachnick & Fidell, 2007). Confidence intervals of 95% were calculated for each regression coefficient. A two-sided  $p$ -value of .05 was considered statistically significant for the regression models.

### **Data Analyses for Research Questions**

**RQ 1.** Descriptive statistics were used to describe the TCA self-care expressions, patterns, and practices of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription. Categorical variables were analyzed using frequencies and proportions. Responses to open-ended questions were evaluated by using basic content analysis and counts (Richards & Morse, 2007). Responses were transcribed verbatim and evaluated for frequently mentioned ideas. Codes were then developed by the researcher. Exemplars of participants' responses for each code were identified. Two doctorally prepared nurse researchers, experienced in qualitative analysis, reviewed the data. The analyses of the two reviewers and that of the researcher were compared. Any area of disagreement was reanalyzed until consensus was reached.

**RQ 2.** Descriptive statistics (frequencies and proportions) were used to describe the symptoms and reasons why Latinos/Hispanics use TCA modalities. Counts and basic content analysis for open-ended questions were conducted as described for RQ 1.

**RQ 3.** Descriptive statistics (frequencies and proportions) were used to describe responses to alterations in dose of prescribed diabetes medications when using TCA modalities.

**RQ 4.** Frequencies and proportions were used to describe if Latinos/Hispanics have told their healthcare providers about the use of TCA modalities. As described for RQ 1, basic content analysis and counts were used to evaluate participants' responses to the open-ended question regarding disclosure of TCA modalities.

**RQ 5.** Multiple linear regression was used to assess the association of the independent variables: age, gender, natural log acculturation non-Hispanic domain, years of education, diabetes knowledge, health insurance, with the dependent variable, Sum TCAs (summed total count of all TCA categories used which included herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription). Age was entered as a continuous variable based upon years of age. Gender was entered as an indicator variable (male or female). Natural log acculturation non-Hispanic domain was entered as a continuous variable based upon the score from the BAS/LP non-Hispanic domain. Years of education were entered into the model as a continuous variable. Diabetes knowledge was entered as a continuous variable consisting of the total summed score from the SKILLD. Health insurance was entered as an indicator variable (no insurance or has insurance). The dependent variable, Sum TCAs consisted of an interval outcome of 0 to 4 representing a summed total count of all TCA categories used. All independent variables were entered simultaneously into the model to

determine how well the model explained the variance in Sum TCAs. Assumptions of multiple linear regression models were assessed.

**RQ 6.** Multiple linear regression was used to assess the association of the independent variables of age, gender, natural log acculturation non-Hispanic domain, years of education, diabetes knowledge, health insurance, and general diet with the dependent variable health (glycemic control). The variables of age, gender, natural log acculturation non-Hispanic domain, years of education, diabetes knowledge, and health insurance, were entered into the model as described in RQ 5. The dependent variable, glycemic control, was the continuous variable of A1C level.

**RQ 7.** Multiple linear regression was used to assess the association of the independent variables of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription to the dependent variable of health (glycemic control). Herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription, and health insurance were entered into the model as indicator variables (don't use or use). As in RQ 6, glycemic control was the continuous variable of A1C level.

**RQ 8.** Multiple linear regression was used to assess the association of herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription, age, gender, natural log acculturation non-Hispanic domain, years of education, diabetes knowledge, health insurance, and general diet to the dependent variable of health (glycemic control). Herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription were entered into the

model as described in RQ 7. The dependent variable of health (glycemic control) was the continuous variable of A1C level.

**Alternative analyses.** Due to the nonsignificant findings for RQ 5-8, alternative analyses using the nonparametric Chi-Square test of independence and Fisher's exact test were used to assess associations between independent and dependent categorical variables. Independent *t*-tests were used to assess for differences in the mean of natural log A1C and Sum TCAs based upon categorical variables.

### **Summary**

This descriptive correlational study was conducted in 5 counties and multiple community settings. Seventy-five persons were recruited, enrolled and completed data collection. Four established tools and a demographic form were used. Eight research questions were answered using descriptive statistics, basic content analysis, and multiple linear regression. Biophysical indicator data was collected. Assumptions for normality and multicollinearity were assessed. Reliability of instruments was calculated.

## CHAPTER IV

### RESULTS

In this chapter, descriptions of the participants are provided, and the research questions findings are reported. A description of the individual characteristics, environmental context factors, and cultural and social structure dimensions of the sample is presented. Participants' health characteristics, consisting of self-reported history of diabetes and diabetes-related comorbidities, glycemic control (A1C level), biophysical indicators, and self-reported health status are provided. Then, findings from each research question related to use of TCA and glycemic control are delineated.

#### **Individual Characteristics, Environmental Context Factors, and Cultural and Social Structure Dimensions of Participants**

The sample consisted of 75 Latino/Hispanic persons with type 2 diabetes, with the majority of participants being female (66.7%; see Table 3). Ages ranged from 25 to 73 years old, with a mean age of 47 years ( $SD = 11.34$ ). The majority (69.3%) of participants were either married or living with a committed partner and identified themselves as Catholic (64%) or Christian (28%). Eight percent identified as Jehovah Witness, Seventh Day Adventist, or not religious.

All participants were immigrants; the majority originated from Mexico (85.3%). The average length of time living in the United States was approximately 16 years ( $SD = 7.22$ ); the time living in North Carolina was approximately 12 years ( $SD = 4.35$ ). The

majority of persons (72%) spoke Spanish at home and (64.0%) rated their ability to speak English as “very poorly.” The average educational attainment was 6.08 years ( $SD = 3.82$ ). Seven individuals reported never attending any formal education. Approximately one-third (30%) of persons self-rated their ability to write in Spanish as either “poorly” or “very poorly”; 17.3% of persons rated their ability to read in Spanish as “poorly” or “very poorly.” Scores indicated that all participants were highly acculturated in the Hispanic domain and seven persons (9.3%) were considered to be bicultural.

In terms of economic characteristics, the majority of persons (86.7%) did not have health insurance and many persons reported low household income. A significant proportion of persons reported not being able to pay for their diabetes medications or blood sugar testing supplies, and not being able to see a doctor for diabetes (see Table 4).



Table 3

*Individual Characteristics and Environmental Context Factors of Participants (N = 75)*

Variable	n (%)	Mean (SD)
<b>Gender</b>		
Female	50 (66.7%)	
Male	25 (33.3%)	
<b>Countries of Origin</b>		
Mexico	64 (85.3%)	
El Salvador	7 ( 9.3%)	
Honduras	1 ( 1.3%)	
Nicaragua	1 ( 1.3%)	
Colombia	1 ( 1.3%)	
Dominican Republic	1 ( 1.3%)	
<b>Languages Spoken at Home</b>		
Spanish	54 (72.0%)	
Spanish and English	16 (21.3%)	
Spanish and Tarasco (Purépecha <sup>a</sup> )	3 ( 4.0%)	
Spanish and Mixtec	2 ( 2.7%)	
<b>Acculturation scores (range 1 – 4)</b>		
Non-Hispanic domain		1.47 (0.68)
Hispanic domain		3.64 (0.51)
<b>Self-reported ability to read in Spanish</b>		
Very well	44 (58.7%)	
Well	18 (24.0%)	
Poorly	9 (12.0%)	
Very poorly	4 ( 5.3%)	
<b>Self-reported ability to write in Spanish</b>		
Very well	45 (60.0%)	
Well	8 (10.7%)	
Poorly	11 (14.7%)	
Very poorly	11 (14.7%)	

*Note.* Percentages may not equal 100% due to rounding and missing values.

<sup>a</sup> Purépecha is the proper name for Tarasco (Lewis, 2009).

Table 4

*Economic Characteristics of Participants (N = 75)*

Variable	n (%)
Family household income in past year	
Less than \$10,000	22 (29.3%)
\$10,000 to \$19,999	5 (18.7%)
\$20,000 to \$29,999	5 (6.7%)
\$30,000 to \$39,999	2 (2.7%)
\$40,000 to \$49,999	1 (1.3%)
Not employed	14 (18.7%)
Don't know	14 (18.7%)
Declined to respond	3 (4.0%)
In the last 12 months was there any time that you did not have diabetes medications due to a lack of money?	
Yes	27 (36.0%)
No	46 (61.3%)
Does not take diabetes medications	2 (2.7%)
In the last 12 months was there any time that you did not have blood sugar testing supplies due to a lack of money?	
Yes	44 (58.7%)
No	29 (38.7%)
Does not own a glucometer	2 (2.7%)
In the last 12 months was there any time that you did not see a doctor for diabetes due to the lack of money?	
Yes	32 (42.7%)
No	43 (57.3%)

*Note.* Percentages may not equal 100% due to rounding and missing values.

The average scores on the diabetes knowledge tool, the SKILLD, was 5.57 ( $SD = 2.28$ ; range 1-10), indicating that the sample was very knowledgeable about diabetes. The majority of persons (76%) articulated signs and symptoms of hyperglycemia, and the majority (66%) correctly stated the signs and symptoms of hypoglycemia. Only 26.7%

of persons were able to explain correct treatment for hypoglycemia. Nearly two thirds of persons demonstrated knowledge of the correct frequency for foot exams, the importance of foot exams, and the recommended guidelines for physical activity. However, the majority (80%) was not knowledgeable concerning the recommended frequency for seeing an eye doctor and the importance of that examination. More than half (57.3%) of persons stated the correct goal for fasting blood sugar level, and more than one third (34.7%) of persons stated the correct goal for an A1C level. The majority of persons (80%) explained long term complications of diabetes. Consistently with most interviews, participants responded to the questions seeking knowledge of hyper/hypoglycemia from the realm of their personal experience, not from specific biomedical knowledge.

This sample of Latinos/Hispanics reported following a healthy diet an average of 3.23 ( $SD = 2.24$ ) days in the past week. On average, they ate five or more servings of fruits and vegetables 4.14 ( $SD = 2.54$ ) days in the past week and reported engaging in at least 30 minutes of physical activity 2.47 ( $SD = 2.69$ ) days in the past week. Mean days in the past week for testing blood sugar was 1.88 ( $SD = 2.85$ ) and 4.52 (3.09) days in the past week for assessing feet. Less than 14 % reported smoking in the past week.

### **Health**

The majority of persons (97.3%) was told by a doctor that they had type 2 diabetes. One person reported being diagnosed by a pharmacist and another person was diagnosed at a health fair. The average age at diagnosis was 39.72 years ( $SD = 11.10$ , range 19 to 66). More than half of the sample had been diagnosed before age 40 (see Table 5). The

duration of diabetes among persons in this study ranged from 1 year to 26 years ( $M = 7.59$ ,  $SD = 5.40$ ).

Table 5

*Age When Diabetes Diagnosed (N = 75)*

Variable	n (%)
Between 18 and 29 years of age	16 (21.3%)
Between 30 and 39 years of age	23 (30.7%)
Between 40 and 49 years of age	17 (22.7%)
Age 50 years or older	19 (25.3%)

More than half of the persons (57.3%) have attended a diabetes education class. As treatment for diabetes, 85% of persons reported using an oral hypoglycemic agent(s) and 26.7% of persons reported using insulin. One-fifth (20%) of the sample used a combination of oral hypoglycemic agents and insulin. The majority of persons (68%) have seen a doctor more than twice in the past year for diabetes. However, 60% reported not having a regular doctor that they trusted to visit when feeling sick. Ten individuals (13.3%) reported being hospitalized for diabetes within the past six years. Participants reported significant diabetes-related comorbidities (see Table 6). All persons denied having any lower extremity amputations.

Table 6

*Diabetes-Related Comorbidities (N = 75)*

Variable	n (%)
Hypercholesterolemia or hypertriglyceridemia	57 (76.0%)
History of hypertension	40 (53.3%)
Diabetic eye changes	31 (41.3%)
Neuropathy of feet or legs	25 (33.3%)
History of renal damage	16 (21.3%)
History of myocardial infarction or heart disease	4 (5.3%)
History of a stroke	3 (4.0%)

*Note.* Percentages may not equal 100% due to rounding and missing values.

Related to comorbidities, approximately 40% of persons were taking an angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker. A majority (52%) was using a statin drug. One fifth (22.7%) of the participants reported using antihypertensive medications. Persons reported taking an aspirin (17.3%), Tricor (fenofibrate; 4%), Omega-3 (8%), and/or antidepressant (5.3%).

### **Glycemic Control (A1C) and Biophysical Indicators**

The biophysical indicators of systolic blood pressure (mean blood pressure for each participant was calculated based on two separate blood pressure readings), diastolic blood pressure, A1C, waist circumference, and calculated body mass index (BMI) are presented in Table 7. The majority of persons (84%) was considered to be hypertensive, based on

systolic and/or diastolic blood pressure, history of high blood pressure, or taking antihypertensive medications. The overwhelming majority (90%) of the sample was either overweight or obese, and the measures indicated that significant abdominal obesity existed among both men and women. The average A1C reading was 8.37% ( $SD = 2.18$ ). The A1C result of four individuals was  $> 13.0\%$ , as it exceeded the maximum range of the Bayer A1CNow+<sup>®</sup> machine. Therefore, the result  $> 13.0\%$  was entered into the data base as 13.10% and the overall mean reported in Table 7 may be an underestimation of the sample's actual mean A1C.

### **Self-Rated Health Status**

One percent of persons rated their health as “excellent.” Eight percent of persons rated their health as “very good.” Twenty-seven percent of persons rated their health as “good.” Fifty-three percent of persons rate their health as “fair.” Eleven percent of persons rate their health as “poor.”

Table 7

*Biophysical Indicators (N = 75)*

Variable	Mean (SD)	Range	n (%)
Mean systolic blood pressure	133.24 (15.62)	106-182	
Mean diastolic blood pressure	78.03 (8.38)	60-99	
A1C level (%)	8.37 (2.18)	5.40-13.10 <sup>a</sup>	
Glycemic control			
Controlled (A1C < 7.0%)			21 (28%)
Not controlled (A1C ≥ 7.0%)			54 (72%)
Waist circumference (inches)			
Men	40.75 (4.16)	33.25-49.80	
Women	40.31 (4.63)	29.92-52.95	
Body mass index	32.21 (5.91)	20.94-54.58	
Body mass index categories			
Normal weight (18.5 – 24.9 kg/m <sup>2</sup> )			7 ( 9.3%)
Overweight (25.0 – 29.9 kg/m <sup>2</sup> )			20 (26.7%)
Obese (≥ 30.0 kg/m <sup>2</sup> )			48 (62.0%)

*Note.* Percentages may not equal 100% due to rounding and missing values.

<sup>a</sup>4 participants had results > 13.0, the maximum range of the Bayer A1CNow+<sup>®</sup> machine. These results were entered as 13.10 in the data base and sample mean is an underestimation of A1C.

### Research Question 1

What are the traditional, complementary, and alternative (TCA) self-care expressions, patterns, and practices used by Latinos/Hispanics for the management of type 2 diabetes?

## Herbal Remedies

Fifty-two participants (69.3%) in this study reported currently using 1 to 9 different herbal/plant remedies specifically for the management of diabetes. A total of 49 different herbs and plants were reported by the study participants. These herbal/plant remedies consisted of a variety of vegetable food products, herbs, teas, and commercially package products, some not available in the United States. The most frequently reported used herbs/plants were: prickly pear cactus (*nopale*), aloe vera (*salvia* or *sábila*), celery (*apio*), vegetable pear (*chayote*), cinnamon (*canela*), cat's claw (*uña de gato*), Herbalife, beets (*betabel* or *la remolacha*), bitter melon (*cundeamor* or *yerba mora*), *Nin* (English translation and ingredients not known; participants stated it is a blend of Mexican herbs), horsetail (*la cola de caballo*), oats (*aveno*), chamomile tea (*te manzanilla*), and lemon (*limón*). A complete list of the herbal/plant products and available name translations with characteristics of use is available in Table 8.

Participants described various methods of preparation, with some herbs/plants being consumed in more than one manner. The most common method of preparation reported was a *licuado*. A *licuado* is a blenderized beverage made from herbs or plants. Sometimes the *licuado* is comprised only of the herb/plant and at other times the herb/plant is mixed with juice, milk, other type of vegetables, or fruit. Twenty different herbal/plant products (40.8%) were reportedly made into a *licuado*. A tea was the second most common form of preparation used for 19 products (38.78%). Another method was cooking the plant products as food, used for 13 items. The cooked items consisted of vegetables, oats, chia seeds, flax seeds, and horchata, which is a traditional beverage



Table 8

*Alphabetical List of Herbal Remedies and Characteristics of Use*

Common English Name	Common Spanish Name	Number of People Who Used Herb/Plant	Frequency of Use	Preparation	Self-Perceived Effectiveness	Where/How Obtained	Reported Side Effects
Aloe vera	Salvia or sábila	8	Daily (62.5%) Weekly (37.5%)	Licuada (50%) Agua frescas (25%) Tea (12.5%) Premixed beverage (12.5%)	A lot (50%) A little (37.5%) No change (12.5%)	Tienda (50%) Health food store (12.5%) Internet (12.5%) Consultant (12.5%) Grow it (12.5%)	None (100%)
Arnica	Arnica	1	PRN* (100%)	Topical (100%)	A lot (100%)	Home country (100%)	None (100%)
Artichoke extract	Extracto de alcachofa	2	Daily (100%)	Tablet/capsule (50%) Other (50%)	A lot (100%)	Grocery store (50%) Home country (50%)	None (100%)
Asparagus	Esparrago	1	Daily (100%)	Cooked (100%)	A lot (100%)	Grocery store (100%)	None (100%)
Beets	Betabel or la remolacha	4	Daily (50%) Weekly (50%)	Licuada (75%) Cooked (25%)	A lot (75%) No change (25%)	Tienda (50%) Grocery store (50%)	None (100%)

Bitter gourd/melon	Cundeamor or yerba mora	3	Daily (33.33%) Weekly (66.66%)	Licuadao (33.33%) Cooked (66.66%)	A lot (100%)	Grocery store (33.33%) Home country (33.33%) Grow it (33.33%)	Bitterness (100%)
Blood Sugar Formula capsules (mixture of 21 different herbs & vitamins)	Blood Sugar Formula capsules	1	Weekly (100%)	Tablet/capsule (100%)	A lot (100%)	Health food store (100%)	Stomach ache (100%)
Brickellia grandiflora	La Prodigiosa	2	Weekly (100%)	Tea (100%)	A little (100%)	Tienda (50%) Home country (50%)	None (100%)
Canary seeds	Alpiste	2	Daily (100%)	Licuadao (100%)	A little (50%) No change (50%)	Tienda (50%) Mailed from CA (50%)	Diarrhea (50%) None (50%)
Cat's claw	Uña de gato	4	Daily (50%) Monthly (50%)	Licuadao (25%) Tea (75%)	A little (25%) No change (25%) Worse (25%) Don't know (25%)	Tienda (100%)	None (100%)
Celery	Apio	7	Daily (42.86%) Weekly (57.14%)	Licuadao (85.71%) Cooked (14.29%)	A lot (28.57%) A little (71.43%)	Tienda (28.57%) Grocery store (71.43%)	None (100%)
Chamomile tea	Te manzanilla	3	Weekly (33%) Monthly (66%)	Tea (100%)	A little (100%)	Tienda (100%)	None (100%)

Chia seeds	Salvia Hispania	1	Weekly (100%)	Cooked (100%)	A lot (100%)	Health food store	Low sugar verified with glucometer (100%)
Cinchona bark	La quina	1	Daily (100%)	Tea (100%)	A little (100%)	Tienda (100%)	None (100%)
Cinnamon	Canela	5	Daily (80%) Weekly (20%)	Tablet/capsule (40%) Licuado (20%) Tea (40%)	A lot (60%) A little (20%) No change (20%)	Tienda (40%) Grocery store (60%)	None (100%)
Coconoxtle cactus	Coconoxtle or Joconoxtle	2	Daily (100%)	Licuado (100%)	A lot (100%)	Tienda (100%)	None (100%)
Corn silk tea	Barba de elote	1	Weekly (100%)	Tea (100%)	A lot (100%)	Tienda (100%)	None (100%)
Cranberry	Arándano	1	Daily (100%)	Licuado (100%)	A lot (100%)	Grocery store (100%)	None (100%)
Diabetisan (Blend of extracts of Pasuchasca and Cat's claw)	Diabetisan	1	Weekly (100%)	Tea (100%)	A lot (100%)	Tienda (100%)	None (100%)
Eggplant	Berenjena	1	Daily (100%)	Licuado (100%)	No change (100%)	Grocery store (100%)	None (100%)
Fenugreek	Fenugreco	1	Daily (100%)	Tablet/capsule (100%)	A lot (100%)	Health food store (100%)	None (100%)

Flax seed	Semillas de lino	1	Weekly (100%)	Cooked (100%)	A lot (100%)	Grocery store (100%)	None (100%)
Grapefruit	Toronja	1	Daily (100%)	Raw (100%)	A lot (100%)	Grocery store (100%)	None (100%)
Green bell pepper	Pimiento verde	1	Weekly (100%)	Cooked (100%)	A little (100%)	Grocery store (100%)	None (100%)
Green tea	Te verde	1	Monthly (100%)	Tea (100%)	A little (100%)	Tienda (100%)	None (100%)
Herbalife	Herbalife	4	Daily (75%) PRN* (25%)	Licuada (25%) Tea (75%)	A lot (25%) A little (50%) No change (25%)	Consultant (100%)	Diarrhea (25%) Back/kidney pain (25%) None (50%)
Hibiscus tea	Agua de Jamaica	1	Monthly (100%)	Agua frescas (100%)	A little (100%)	Tienda (100%)	None (100%)
Horchata beverage (mixture of milk, rice, cinnamon)	Horchata	1	Weekly (100%)	Cooked (100%)	A little (100%)	Grocery store (100%)	None (100%)
Horsetail	La cola de caballo	3	Daily (66.66%) PRN* (33.33%)	Tea (100%)	A lot (100%)	Tienda (33.33%) Home country (66.66%)	None (100%)

Husk tomato	Tomatillo verde	2	Daily (50%) Weekly (50%)	Licuada (50%) Tea (50%)	A little (100%)	Tienda (100%)	Bitterness (50%) None (50%)
Jungle Miracle (blend of herbs from Guatemala)	El Milagro de la Selva	1	§	Tea (100%)	A lot (100%)	Home country (100%)	None (100%)
Lemon	Limón	3	Daily (66.66%) Weekly (33.33%)	Licuada (33.33%) Agua frescas (66.66%)	A little (100%)	Tienda (66.66%) Grocery store (33.33%)	Bitterness (33.33%) None (66.66%)
Lemon root (roots of the lemon tree)	Raíz de limón	2	Daily (50%) Weekly (50%)	Tea (50%) Cooked (50%)	A little (50%) No change (50%)	Home country (50%) Grow it (50%)	None (100%)
Mint	Yerba buena	1	Daily (100%)	Tea (100%)	A lot (100%)	Home country (100%)	None (100%)
Noni	Noni	2	Daily (50%) PRN* (50%)	Agua frescas (50%) Premixed beverage (50%)	A lot (50%) Don't know (50%)	Tienda (50%) Grocery store (50%)	Cramps (50%) None (50%)
Oats (oatmeal)	Aveno	3	Daily (66.66%) Weekly (33.33%)	Licuada (66.66%) Cooked (33.33%)	A lot (33.33%) A little (66.66%)	Grocery store (100%)	None (100%)

Onion mixed with honey and lemon	Cebolla con la miel y limón	1	Daily (100%)	Licuada (100%)	No change (100%)	Grocery store (100%)	None (100%)
Oregano	Orégano	1	PRN* (100%)	Tea (100%)	A lot (100%)	Home country (100%)	None (100%)
Parsley	Perejil	1	Daily (100%)	Licuada (100%)	A little (100%)	Grocery store (100%)	None (100%)
Prickly pear cactus Pads	Nopale, Nopales, Noplina, Nopalito	28	Daily (32.14%) Weekly (53.57%) Monthly (3.57%) PRN* (10.71%)	Licuada (57.14%) Cooked (39.29%) Raw (3.57%)	A lot (35.71%) A little (35.71%) No change (3.57%) Worse (3.57%) don't know (7.14%)	Tienda (86.84%) Grocery store (10.71%)	None (100%)
Fruit	Tuna	2	Daily (50%) Monthly (50%)	Raw (100%)	A lot (50%) No change (50%)	Tienda (100%)	None (100%)
Stevia rebaudina	Stevia	1	Weekly (100%)	Other** (100%)	A lot (100%)	Grocery store (100%)	None (100%)
Tamarind	Tamarindo	1	Daily (100%)	Licuada (100%)	No change (100%)	Tienda (100%)	None (100%)
Vegetable pear	Chayote or patastillo	6	Daily (33%) Weekly (33%) PRN* (33%)	Licuada (16.67%) Cooked (83.33%)	A lot (33.33%) A little (50%) No change (16.66%)	Tienda (83.33%) Home country (16.67%)	Diarrhea (16.67%) None (83.33%)

?	Cuacia	1	Daily (100%)	Cooked (100%)	A little (100%)	Home country (100%)	Bitterness (100%)
?	El mulato or palo mulato	1	Daily (100%)	Tea (100%)	No change (100%)	Home country (100%)	None (100%)
?	Fruta de zopilote (seeds from a grass that grows during the dry season in Mexico)	1	Daily (100%)	Tea (100%)	A little (100%)	Home country (100%)	None (100%)
?	Nin	3	Daily (33.33%) PRN* (66.66%)	Licuardo (33.33%) Tea (66.66%)	A lot (66.66%) Don't know (33.33%)	Tienda (33.33%) Home country (66.66%)	None (100%)

\*PRN = 2-4 times per year as needed  
 ?Exact English translation not available  
 \*\*Sweetener from a plant source  
 §information is missing

often made with cooked rice, milk, and cinnamon. Herbs/plants were consumed fresh (raw;  $n = 3$ ) or put into an *agua fresca* (type of beverage;  $n = 4$ ). Four products were consumed in a pill or capsule formula; two products were purchased as a premixed beverage. One product, arnica, was used as a topical agent for ulcers or cuts.

The majority ( $n = 33$ ) of herbal/plant products was used on a daily basis. The most frequent were prickly pear cactus (*nopale*), aloe vera (*salvia* or *sábila*), celery (*apio*), vegetable pear (*chayote*), cinnamon (*canela*), Herbalife, horsetail (*la cola de caballo*), coconoxtle cactus, and canary seeds (*alpiste*). Another set of 20 herbs/plants were consumed weekly, with examples consisting of bitter gourd/melon (*cundeamor* or *yerba mora*), brickellia grandiflora (*la prodigiosa*), chamomile tea (*te manzanilla*), lemon/lemon root (*limón* and *raíz de limón*), and Blood Sugar Formula. A set of six herbs/plants were used monthly and examples included cat's claw (*uña de gato*), green tea (*te verde*), hibiscus tea, (*agua de Jamaica*), and the fruit of the prickly pear cactus (*tuna*). Eight products were used on an as needed basis, such as arnica, Noni, and *nin*, two to four times per year. Each person reported their own dosing and frequency schedule with no standardization noted across specific herbs/plants or the sets.

Many herbal/plant remedies ( $n = 23$ ) were purchased in a local Latino/Hispanic market (*tienda*) and 19 remedies were purchased in the local grocery store. Some examples were prickly pear cactus (*nopale*), aloe vera (*salvia* or *sábila*), celery (*apio*), vegetable pear (*chayote*), cat's claw (*uña de gato*), Noni, and husk tomatoes (*tomatillo verde*). Sixteen people obtained the herbal/plant products ( $n = 13$ ) from their home country. Examples of these products were arnica, brickellia grandiflora (*la prodigiosa*),



*nin*, *fruta de zopilote*, *el mulato* or *palo mulato*, and, *cuacia*. A few products ( $n = 4$ ) were bought in health food stores, grown in peoples' gardens ( $n = 3$ ), or purchased over the internet ( $n = 1$ ) or from a consultant ( $n = 2$ ). One person had herbal remedies mailed to them by a friend living in California.

To assess self-perceived effectiveness of the herbs/plants, the question "How much does this product help you?" was asked. Thirty products were rated by 52 (100%) persons as helping "a lot" and 21 products were rated by 45 (86.54%) persons as helping "a little." Some products ( $n = 14$ ) were rated as "no change/did not help" by 19 (36.54%) persons. Two (3.85%) persons reported feeling worse, one with prickly pear cactus (*nopale*) and one after using cat's claw (*uña de gato*). Herbs/plants were perceived to help differently by individuals. Examples of herbs/plants most frequently rated as helping "a lot" were prickly pear cactus (*nopale*), aloe vera (*salvia* or *sábila*), celery (*apio*), vegetable pear (*chayote*), cinnamon (*canela*) and beets (*betabel* or *la remolacha*). In contrast, examples of herbs/plants rated by some participants as "no change/did not help" included eggplant (*berenjena*), prickly pear cactus (*nopale*), Herbalife, aloe vera (*salvia* or *sábila*), and canary seeds (*alpiste*). The most common side effects reported were bitterness ( $n = 6$  [11.54%] from using lemon, husk tomatoes, bitter gourd/melon, and *cuacia*), diarrhea ( $n = 2$  [3.85%] from using canary seeds and Herbalife), one (1.92%) person developed muscle cramps from Noni, one (1.92%) person developed hypoglycemia from chia seeds (verified with a glucometer), and one (1.92%) person reported a stomach ache from using Blood Sugar Formula.

Two questions were asked to obtain participant's perceptions ( $N = 75$ ) about which they trusted more for the treatment of diabetes and which they thought was safer. The questions were: "Which do you trust more for the treatment of diabetes?" and "Which do you think is safer to use?" Response options were herbs/plants, prescription medicines, or a combination of herbs/plants and prescription medicines. Forty-five percent of persons trusted a combination of prescription medications and herbal remedies more for the treatment of diabetes, followed by 44% of persons who trusted prescription medications more and 5.3% of persons who trusted herbal remedies. In regards to safety, the majority (57.33%) of persons perceived that prescriptions medicines were safer than either a combination of herbal remedies and prescriptions medicines or herbal remedies alone. Several participants (29.3%) perceived that a combination of prescription medicines and herbal remedies were safer than either prescriptions medicines or herbal remedies. Nearly 11% of persons perceived herbal remedies alone were the safest compared to prescription medicines or a combination of prescriptions medicines and herbal remedies.

### **Faith-Based Interventions**

Thirty-one participants (41.3%) reported specifically using a type of faith-based intervention as part of their diabetes self-care management (see Table 9). Personal prayer was the primary intervention. Self-perceived effectiveness of faith based interventions was identified from the responses to the open-ended question, "How do faith-based remedies help your diabetes?" Eight codes of self-perceived effectiveness for using faith-

based interventions are presented in Table 10. The most frequently reported outcomes were calmness, less worry and stress, and tranquility.

Table 9

*Faith-Based Interventions (n = 31)*

Type of Faith-Based Remedy	n (%)
Personal prayer	30 (96.77%)
Go to mass or church	5 (16.13%)
Light candles	2 (6.45%)
Maintain an alter at home with the Virgin of Guadalupe	2 (6.45%)
Consult your priest, pastor, or religious leader	1 (3.23%)
Bible study	1 (3.23%)
Meditation	1 (3.23%)
Prayers to the Virgin Mary	1 (3.23%)
Prayers to Saint Jude	1 (3.23%)
Say a rosary	1 (3.23%)

*Note.* Percentages may not equal 100% due to rounding and missing values.

Table 10

*Self-Perceived Effectiveness of Faith-Based Interventions for Diabetes*

Code	Examples of Supporting Documentation	n
Calm and tranquility	“I’m calmer, less worried and stressed.” “I have increased tranquility and calmness.”	6
God helps	“God helped me physiologically.” “God helps get food.”	6
A lot	“Helps me a lot.”	5
None	“None”	5
God listens and guides	“I feel better because God listens.” “God guides me.”	3
God works through doctors, medicines, and natural remedies	“God helps direct doctors with my treatment.” “God works through the prescribed medicines and natural things like plants and food.”	3
Faith is important	“Faith is most important.” “Faith gives me the strength to survive this disease.”	3
Heal my disease	“Faith-based remedies will heal my disease.”	2

Every participant ( $N = 75$ ) was asked the question, “In your opinion, what helps you the most to control your diabetes?”, to gain insight into what this population of Latinos/Hispanics perceived helped the most to control diabetes. Response options were faith-based remedies, prescription medicines, combination of faith-based remedies and

prescription medicines, or other. The majority of persons (56%) perceived prescriptions medicines as the most helpful. Nearly one third (30.66%) of persons reported a combination of faith-based remedies and prescription medicines as most helpful. Slightly over 9% of persons reported faith-based remedies alone were the most helpful. One person reported physical activity as being the most helpful, and another person stated, “God gives doctors the knowledge to treat my diabetes.” Approximately 71% of all participants reported wanting their healthcare provider to use or prescribe prayer or other faith-based remedy to help control diabetes. However, one person stated, “I don’t want the doctors to use faith-based remedies. That is not what they went to school for.”

### **Consulting Traditional Healers**

Six (8%) participants, five women and one man, reported consulting traditional healers specifically for diabetes. One person was from Nicaragua and all others were from Mexico. The mean age of these participants was 53 years ( $SD = 11.98$ ) and the average education was 8.67 ( $SD = 2.66$ ) years. On average, those who had consulted with traditional healers have lived in North Carolina for 11.67 years ( $SD = 2.07$ ) and had been diagnosed with diabetes for 10 years ( $SD = 5.73$ ). All but one person sought treatment from a healer within the last 12 months. The remainder of the sample reported they consulted traditional healers for other health concerns like muscle pains, but not for diabetes. Data pertaining to consulting traditional healers for other purposes were not collected in this study. Three people made firm comments when asked if they consulted traditional healers for diabetes. One stated, “I don’t believe in *curanderas*.” Another, “They are from the devil!” Lastly, one person said, “No *curanderas* for any problem!”

Table 11 presents the types of traditional healers and the treatments persons reported using for diabetes.

Table 11

*Traditional Healers and Types of Treatments (n=6)*

Traditional Healers and Treatments	n (%)
<i>Sobador/a</i> (traditional massage therapist)	2 (33.33%)
<i>Yerbero/a</i> (herbalist)	1 (16.67%)
<i>Espiritualista</i> (faith healers or psychic mediums)	1 (16.67%)
<i>Acupunturista</i> (acupuncturist)	1 (16.67%)
<i>Naturista</i> (homeopathic specialist)	1 (16.67%)
Treatments	
Herbs/plants	3 (50.00%)
Massage	2 (33.33%)
Prayer	1 (16.67%)
Oil	1 (16.67%)
Eggs	1 (16.67%)
<i>Una limpia</i> (cleansing)	1 (16.67%)
Acupuncture	1 (16.67%)
Diet recommendations: no soda and less sugar	1 (16.67%)

*Note.* Percentages may not equal 100% due to rounding and missing values.

Half ( $n = 3$ ) of the persons who consulted with traditional healers as part of diabetes self-care reported an improvement in their health. One person reported that her headaches stopped. Another person stated feeling calmer and being relieved from muscle and neck pain. A third person reported lower levels of blood sugar after consulting with a healer. In contrast, two individuals reported healers and their

treatments as being ineffective. One person described feeling worse after using the herbal remedies from the traditional healer. Another person reported that her blood sugar levels could not be controlled and that she was required to start insulin injections after consulting with the traditional healer.

### **Self-Medication/Self-Prescription Practices**

A total of 11 participants (14.7%) reported currently buying medicines without seeing a doctor as part of their diabetes self-care. Eight persons had used the practice of self-medication/self-prescription while in their home countries and seven persons used this practice in North Carolina. One person stated, “I used this way to buy medicine (self-medication/self-prescription) only when living in Mexico because it was a traditional and normal way to get treatment for diabetes.” This individual discontinued this method of self-care for diabetes after moving to North Carolina because the medication used was no longer available. Other participants reported they used self-medication/self-prescription for health issues, but not for diabetes.

The medications Latinos/Hispanics reported purchasing as part of self-medication/self-prescription were: cinnamon pills and sticks (*canela*), artichoke extract (*extracto de alcachofa*), Seven Blossom Tea (*7 Azahares*; commercially prepared blend of Valeriane, Tilia, Orange blossom, Blossom of Manita de Leon, Cedronella blossom, Pasionaria, Magnolia blossom from Mexico), vegetable pear (*chayote*), beets (*betabel*), cat’s claw (*uña de gato*), chamomile tea (*te manzanilla*), horsetail (*la cola de caballo*), *cuacia* (English translation not known), Diabetina (commercially prepared blend of blueberry, horehound, horsetail, eucalyptus, barberry, dandelion root and prickly pear

cactus from Mexico), *nin* (English translation and ingredients not known; participants stated a blend of Mexican herbs), *brickellia grandiflora* (*La Prodigiosa* herbal tea), and prickly pear cactus (*nopale*). All products were specifically identified by the 11 participants as being medications they use to treat diabetes. Participants described obtaining self-medication/self-prescription products by various means. Products were purchased locally from Latino/Hispanic markets (*tiendas*), grocery stores, and pharmacies. Products were ordered through the internet or obtained from family members or friends. Two participants reported someone from their home countries sending them the medications.

The open-ended question, “How do you know these self-medication/self-prescription medicines help your diabetes?” was asked to assess self-perceived effectiveness of self-medication/self-prescription as part of diabetes self-care. The descriptions of responses are presented in Table 12. The responses are related to cultural norms and specific diabetes symptoms. Two people reported experiencing side effects from using self-medication/self-prescription medicines; the side effects were bitterness and trembling.



Table 12

*Self-Perceived Effectiveness of Self-Medication/Self-Prescription Practices*

Code	Examples of Supporting Documentation	n
Testimonies of others	“I use Nin because of testimonies of people in Mexico.”	3
Improved sugar levels	“This helped because I felt my sugar level was not high and had no side effects.”  “I checked my blood sugar level with my machine and saw my level was lower.”	2
Improved diabetes-related symptoms	“I know the medicine works because I don’t go to the bathroom a lot anymore.”	1
Hope	“There is a high possibility for improving my health.”	1
It is natural	“I know this medicine works because it is natural.”	1
Don’t know	“I don’t know.”	1

**Seek Advice**

To develop an understanding of whom Latino/Hispanic persons with diabetes consult with or seek advice from regarding herbal remedies and self-medication/self-prescription practices, an open-ended question was asked, “Who do you ask for advice about which medicine or herbal remedy to use or how to take it?” Family members were the most frequently asked persons, particularly mothers. One person stated, “My Mom told me about all of them—herbs/plants. Basically make a tea and drink it.” Advice from friends was regularly reported. For example, “My friend told me about its preparation. I know it

helps because it helped other people and friends.” Participants reported consulting a book of herbs and natural medicine or reading about herbs on the internet. One person described consulting with a *naturista* (homeopathic doctors) for advice. A few persons based their decisions on the advice from the Herbalife consultant or the successful testimonies of other persons, and a few reported reading the product label for instructions. Only one person reported asking the worker at the store (*tienda*) for information. Two participants made a point to state that they do not consult doctors about these TCA modalities, as they only talk with doctors about prescription medications.

### **Research Question 2**

What symptoms/purposes do Latinos/Hispanics use TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription) to treat in the management of type 2 diabetes?

#### **Herbal Remedies**

The purposes described by study participants for using herbal remedies are presented in Table 13. Despite attempts to probe for more specific reasons, such as biomedical diabetes-related signs and symptoms by both the research assistants and primary investigator, most purposes were general in nature.

Table 13

*Purposes for Using Herbal Remedies for Diabetes*

Purpose	Number of Products	Number of People
Lower sugar	31	51
For diabetes	16	41
For triglycerides or cholesterol	5	7
To feel better	5	6
For my kidneys	5	6
Normal and traditional treatment in our country	2	2
For blood pressure	1	1
For relaxing	1	1
Source of omega-3	1	1
When feel sick from diabetes	1	1
Sweetener from a plant source	1	1
Lose weight	1	1
For my stomach	1	1
For ulcers or cuts	1	1

**Faith-Based Interventions**

Every person who described using a faith-based intervention for diabetes was asked the question, “What symptoms or purposes do you use faith-based remedies for

diabetes?” In Table 14, the seven codes describing these purposes are presented with supporting documentation and frequency counts.

Table 14

*Purposes for Using Faith-Based Interventions for Diabetes*

Code	Examples of Supporting Documentation	n
Improve health	“I pray to not have any symptoms.”	8
Cure diabetes	“I have had problems with my thyroid, gastritis, nerves, and diabetes. God has healed all but diabetes. He still may heal my diabetes.”	8
	“I pray for healing. I have two little children.”	
Peace and relaxed	“I pray to feel relaxed because sugar increases with stress.”	8
	“Get peace and receive comfort.”	
Give God or Virgin Mary control	“Give God control of my health and disease.”	7
	“Give the Virgin Mary control of my health.”	
General help	“Help with total life.”	5
Lower sugar	“To lower my sugar.”	1
Financial concerns	“I pray for work so I can pay for my medicines.”	1

### **Consulting Traditional Healers**

In order to explore the reason why Latino/Hispanic persons consult with traditional healers as part of diabetes care, each person was asked the open-ended question, “What symptoms or purposes do you consult with healers for diabetes?” A variety of reasons were described by the six individuals who have consulted with traditional healers.

Reasons were: to lower sugar, control diabetes, advised by others to see a healer, stress and anxiety, pain in my back, and terrible headaches, insomnia and not feeling hungry.

### **Self-Medication/Self-Prescription Practices**

Each of the 11 people who reported using self-medication/self-prescription as part of diabetes self-care was asked, “Why do you buy/obtain medicines for diabetes in this way?” The two most common reasons were the recommendations of either family members or friends and that these medicines were less expensive than those obtained from a doctor. One person stated, “A family member sends it from my home country for free.” Other reasons reported were: to be healed, to be healthier, to try it, prefer herbs, does not like to take prescribed medicines, and this medicine is not available from the doctor here in the United States.

### **Research Question 3**

Do Latinos/Hispanics use TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription) in lieu of or in combination with prescribed conventional diabetes medications?

Each person using a TCA modality for diabetes was asked if they continued to take their prescribed medications for diabetes as directed or altered the dose of their prescribed medications on the days that they used an alternative remedy. Findings describing these practices are presented in Table 15. The majority of persons concurrently utilized TCA modalities with prescribed diabetes medications. However, for every TCA modality, few persons altered the dose of prescribed medications on the days that they used an alternative modality.

Table 15

*Alterations in Dosing of Prescribed Diabetes Medications When Using TCA Modalities*

TCA Modalities and Alterations in Prescribed Medications	n (%)
<b>Herbal Remedies (n=52)</b>	
Take prescribed medications as directed that day	40 (76.92%)
Skip the dose of prescribed medications that day	7 (13.46%)
Decrease the dose of prescribed medications that day	4 (7.69%)
Increase the dose of prescribed medications that day	0
<b>Faith-Based Interventions (n=31)</b>	
Take prescribed medications as directed that day	27 (87.09%)
Skip the dose of prescribed medications that day	1 (3.23%)
Decrease the dose of prescribed medications that day	2 (6.45%)
Increase the dose of prescribed medications that day	0
<b>Consulting Traditional Healers (n=6)</b>	
Take prescribed medications as directed that day	3 (50%)
Skip the dose of prescribed medications that day	0
Decrease the dose of prescribed medications that day	2 (33%)
Increase the dose of prescribed medications that day	0
<b>Self-Medication/Self-Prescription Practices (n=11)</b>	
Take prescribed medications as directed that day	8 (72.72%)
Skip the dose of prescribed medications that day	0
Decrease the dose of prescribed medications that day	1 (9.1%)
Increase the dose of prescribed medications that day	1 (9.1%)

*Note.* TCA = traditional, complementary, and alternative.  
Percentages may not equal 100% due to rounding and missing values.

#### **Research Question 4**

Do Latinos/Hispanics tell their healthcare provider about the use of TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription) for the management of type 2 diabetes?

The majority of Latino/Hispanic persons in this sample did not tell their healthcare provider about the use of herbal remedies, faith-based interventions, or self-medication/self-prescription for the management of diabetes. Specifically, 77% of persons using herbal remedies, 80.65% of persons using faith-based interventions, and 72.73% of persons using self-medication/self-prescription reported not discussing their alternative diabetes-related self-care practices with their health care provider. Participants who reported consulting with traditional healers were not asked if they discussed this cultural modality with their healthcare provider.

Participants who reported not telling their healthcare provider about the use of TCA modalities were asked one open-ended question asking them to explain their reason for not discussing TCA modalities with their healthcare provider. Nine codes emerged when evaluating participants' explanations (see Table 16). The most frequently reported reasons participants described for not discussing TCA modalities with their healthcare provider were: American healthcare providers don't believe in Latino/Hispanic natural medicine or want to talk about it; American healthcare providers lack knowledge of natural medicine; and it was not relevant to discuss these practices with the healthcare provider.



Table 16

*Reasons Why Latino/Hispanic Persons Don't Discuss TCA Modalities*

Code	Examples of Supporting Documentation	n
American healthcare providers don't believe in our natural medicine or want to talk about it	"American doctors don't trust or believe in our herbs or natural medicine."	5
	"Doctors don't listen or want to talk about herbal or natural remedies."	
American healthcare providers lack knowledge of natural medicine	"I haven't told about herbs and plants because they didn't study for this. They went to school to learn about prescription medicines."	5
	"I don't tell about herbs and faith because American doctors don't know about these home remedies."	
It's not relevant	"I didn't tell the doctor about the tea because it wasn't relevant. I did tell about the <i>licaudos</i> with vegetables and fruits."	4
	"I didn't tell them because I didn't think it important to tell them."	
Healthcare providers don't ask	"I haven't told because they haven't asked me about it."	3
Doctors always in a hurry	"I don't tell the doctor because he doesn't stop to ask questions and he never explains anything."	2
	"They are always in a hurry."	
Healthcare providers will be disappointed	"Because they are going to be disappointed."	2
Lack of trust	"I don't trust the Latino coordinator (at the clinic). She discriminates against us and there is a lack of respect."	2

Treat diabetes myself	“I’m trying by myself.” “I haven’t visited the doctor.”	2
Language barriers	“I don’t tell because I would need a translator to explain about it.”	1
Recent remedy	“I haven’t told because I just started with cinnamon.”	1

---

*Note.* TCA = traditional, complementary, and alternative.

### **Research Question 5**

What is the association of the cultural and social structure dimensions (years of education, diabetes knowledge, health insurance), the environmental context factor of acculturation level, and individual characteristics (age, gender) to the use of TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription)?

The first level of analysis for examining the relationships was bivariate correlations. Pearson’s *r* correlation coefficients were computed to determine relationships between the independent variables and the dependent variable (see Table 17). The only independent variable significantly correlated with the summed total of TCA modalities was age. Being older in age was significantly correlated with using TCA modalities. Bivariate correlations between the independent variables indicated that older age was correlated with lower levels of education and having health insurance. Higher levels of natural log acculturation non-Hispanic domain were correlated with higher levels of education. Higher levels of education were correlated with greater diabetes knowledge.

Using multiple linear regression, the effect of age, gender, natural log of acculturation non-Hispanic domain, years of education, diabetes knowledge (total score from the SKILLD), and health insurance on the summed total use of TCA modalities (summed total count of all categories used [herbal remedies, faith-based interventions, traditional healers, self-medication/self-prescription] with a possible range of 0-4) was examined.

Table 17

*Pearson's r Correlation Coefficients Between Independent Variables and Sum of TCAs*

Variables	1	2	3	4	5	6	7
1. Age	-	-.134	-.152	-.317 **	-.199	.362 **	.235 *
2. Gender		-	-.220	.015	.154	-.055	.165
3. LnAccul			-	.492 **	.041	.090	.076
4. Education				-	.369 **	.033	.027
5. SKILLD					-	-.134	.165
6. Insurance						-	.072
7. Sum TCAs							-

*Note.* Variables: Age = years of age; Gender = Male (0) or Female (1); LnAccul = natural log of acculturation non-Hispanic domain; Education = years of education; SKILLD = sum total score of diabetes knowledge from Spoken Knowledge in Low Literacy in Diabetes Scale; Insurance = No (0) or yes (1); Sum TCAs = summed total count of all categories of traditional, complementary, and alternative modalities used (herbal remedies, faith-based interventions, traditional healers, self-medication/self-prescription) with a possible range of 0-4.

\* Correlation significant at 0.05 level

\*\* Correlation significant at 0.01 level

Independent variables were entered simultaneously into the regression model. Prior to examining the regression statistics, the output data were examined for assumptions

related to multiple linear regression. There was no evidence of multicollinearity as all tolerance values were greater than 0.10 and all variance inflation factors were less than 10.00 (Polit, 1996). Studentized deleted residuals were examined for multivariate outliers and independence. All residual values were between -3.0 and 3.0, indicating no outliers. The Durbin-Watson statistic was 2.046, indicating independence of residuals. A scatterplot of predicted values and studentized deleted residuals was examined and points were distributed around the midpoint, without evidence of heteroscedasticity or linearity.

Upon examination of the regression statistics, this model did not significantly explain the variance in the summed total of TCA modalities ( $F = 2.123$ ,  $df = 6$ ,  $p = .062$ ) when considering all variables (see Table 18). A post-hoc power analysis (nQuery Advisor version 7.0) indicated that there was insufficient power to model this small variance.

Table 18

*Multiple Regression Summary for Summed Total of TCA Modalities (N = 75)*

	Standardized Regression Coefficient	95% CI	p-value
Age	0.329	[0.006, 0.048]	0.013*
Gender	0.219	[-0.029, 0.878]	0.066
Education	-0.037	[-0.079, 0.061]	0.801
Health insurance	-0.024	[-0.723, 0.592]	0.843
SKILLD	0.199	[-0.019, 0.180]	0.112
Ln acculturation	0.187	[-0.203, 1.139]	0.169

*Note.* CI = confidence interval;  $R^2 = 0.158$ ;  $R^2_{adj} = 0.083$ ;  $F = 2.123$ ;  $p = 0.062$ ; \* $p < 0.05$

### Research Question 6

What is the association of the cultural and social structure dimensions (years of education, diabetes knowledge, health insurance), environmental context factor of acculturation level, individual characteristics (age, gender), and the self-care expressions, patterns, and practices (diet) to health (glycemic control/A1C level)?

To answer this research question, two levels of association were used. Pearson's  $r$  coefficients were calculated to assess bivariate correlations. No independent variables were significantly associated with the dependent variable natural log of A1C (see Table 19). Being older in age was significantly correlated with eating a healthy diet more days per week (general diet score). Multiple linear regression was used to model the effect of age, gender, natural log of acculturation non-Hispanic domain, years of education,

diabetes knowledge (total score from the SKILLD), health insurance, and general diet score on the dependent variable natural log of A1C. All independent variables were entered into the model simultaneously.

Table 19

*Pearson's r Correlations Between Independent Variables and Natural Log A1C*

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	-	-.134	-.152	-.317 **	-.199	.362 **	.434 **	-.068	.154	.117	.149	.129
2. Gender		-	-.220	.015	.154	-.055	-.179	-.024	-.041	.306 **	.104	-.027
3. LnAccul			-	.492 **	.041	.090	.084	.002	-.002	.096	-.006	.070
4. Education				-	.369 **	.033	.151	-.065	-.055	-.089	.201	.110
5. SKILLD					-	-.134	.062	.121	.092	.027	.120	.178
6. Insurance						-	.412 **	-.037	.006	-.011	.318 **	-.052
7. Diet							-	-.013	.017	-.013	.067	.105
8. LnA1C								-	.114	.052	-.070	-.059
9. Herbs									-	.088	.090	.194
10. Faith										-	.052	.035
11. Healers											-	.156
12. SMSP												-

*Note.* Variables: Age = years of age; Gender = Male (0) or Female (1); LnAccul = natural log of acculturation non-Hispanic domain; Education = years of education; SKILLD = sum total score of diabetes knowledge from Spoken Knowledge in Low Literacy in Diabetes Scale; Insurance = No (0) or yes (1); Diet = general diet score from Summary of Diabetes Self-Care Activities; LnA1C = natural log of A1C; Herbs = uses herbs/plants (1) or doesn't use (0); Faith = uses faith-based interventions (1) or doesn't use (0); Healers = consults with traditional healers (1) or doesn't (0); SMSP = uses self-medication/self-prescription (1) or doesn't (0).

\* Correlation significant at 0.05 level

\*\* Correlation significant at 0.01 level

Output data were examined for the assumptions of multicollinearity, multivariate outliers and independence of residuals, and scatterplots were assessed to examine the studentized deleted residuals versus the predicted values for any evidence of

heteroscedasticity or linearity. Assumptions were met and the Durbin-Watson statistic was 1.956. The independent variables in this model were not significantly associated with the natural log of A1C (see Table 20).

Table 20

*Multiple Regression Summary for Natural Log A1C and 7 Independent Variables (N = 75)*

	Standardized Regression Coefficient	95% CI	p-value
Age	-0.104	[-0.009, 0.005]	0.506
Gender	-0.031	[-0.153, 0.121]	0.814
Education	-0.190	[-0.035, 0.009]	0.249
Health insurance	-0.001	[-0.205, 0.204]	0.997
SKILLD	0.151	[-0.014, 0.048]	0.280
Ln acculturation	0.060	[-0.157, 0.239]	0.680
General diet	0.041	[-0.031, 0.041]	0.786

*Note.* CI = confidence interval;  $R^2 = 0.033$ ,  $R^2_{adj} = -0.071$ ,  $F = 0.314$ ,  $df = 7$ ,  $p = 0.945$

### Research Question 7

What is the association of TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription) to health (glycemic control/A1C level)?

Bivariate correlations were assessed prior to conducting the regression analysis. No significant correlations were found between independent variables and the dependent

variable natural log A1C (see Table 19). The independent variables, the use of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription, were entered into the model as indicator variables (don't use = 0 or use = 1) to predict the natural log of A1C.

All four independent variables were entered simultaneously into the linear regression model. Assumptions of regression models were examined and no abnormalities were noted. The Durbin-Watson statistic was 2.060. Assessment of the regression statistics revealed that these independent variables were not significantly associated with natural log of A1C in this model. A minimal proportion of variance was accounted for by the model variables. The regression statistics are presented in Table 21.

Table 21

*Multiple Regression Summary for Natural Log A1C and 4 Independent Variables (N = 75)*

	Standardized Regression Coefficient	95% CI	p-value
Herbal remedies	0.131	[-0.059, 0.199]	0.282
Faith-based interventions	0.047	[-0.095, 0.142]	0.695
Traditional healers	-0.072	[-0.283, 0.152]	0.547
SMSP	-0.075	[-0.221, 0.117]	0.541

*Note.* CI = confidence interval; SMSP = self-medication/self-prescription;  $R^2 = 0.027$ ,  $R^2_{adj} = -0.029$ ,  $F = 0.482$ ,  $df = 4$ ,  $p = 0.749$



### **Research Question 8**

What is the association of TCA self-care expressions, patterns, and practices (herbal remedies, faith-based interventions, consulting traditional healers, self-medication/self-prescription), cultural and social structure dimensions (years of education, diabetes knowledge, health insurance), environmental context factor of acculturation level, individual characteristics (age, gender), and self-care expressions, patterns, and practices (diet) to health (glycemic control/A1C level)?

Bivariate correlations using Pearson's  $r$  were calculated (see Table 19). In addition to the significant bivariate correlations previously identified between variables, being female was significantly correlated with using faith-based interventions and having health insurance was significantly correlated with consulting traditional healers. All correlations were low or moderate in strength. The eleven independent variables were entered simultaneously into the multiple linear regression model. Output data were examined for assumptions. Violations of assumptions were not found and the Durbin-Watson statistic was 1.994. The addition of the use of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescriptions with the environmental context factor of acculturation, and cultural and social structure dimensions independent variables did not improve the model's ability to explain the natural log A1C and no variance in the outcome was explained (see Table 22 for regression statistics).

Table 22

*Multiple Regression Summary for Natural Log A1C and 11 Independent Variables (N = 75)*

	Standardized Regression Coefficient	95% CI	<i>p</i> -value
Age	-0.112	[-0.010, 0.005]	0.503
Gender	-0.048	[-0.175, 0.125]	0.740
Education	-0.143	[-0.034, 0.015]	0.429
Health insurance	0.009	[-0.215, 0.228]	0.952
SKILLD	0.137	[-0.017, 0.048]	0.353
Ln acculturation	0.028	[-0.195, 0.233]	0.858
General diet	0.044	[-0.032, 0.043]	0.782
Herbs	0.131	[-0.069, 0.209]	0.317
Faith-based interventions	0.070	[-0.105, 0.177]	0.615
Traditional healers	-0.048	[-0.304, 0.216]	0.738
SMSP	-0.078	[-0.249, 0.136]	0.559

*Note.* CI = confidence interval; SMSP = self-medication/self-prescription;  $R^2 = 0.058$ ,  $R^2_{adj} = -0.111$ ,  $F = 0.344$ ,  $df = 11$ ,  $p = 0.972$

### Alternative Analyses

Due to the nonsignificant findings of the regression models, alternative methods were used to examine the association between independent and dependent variables. The nonparametric Chi-Square test of independence was used to assess categorical variables if cell counts were sufficient. The Fisher's exact test was used to assess independence if cell counts were less than five. Independent *t*-tests were used to assess the continuous dependent variables of natural log A1C and Sum TCAs with categorical variables (see Table 23). Upon examination of Chi-square and Fisher's exact tests, being female was significantly associated with using faith-based interventions and having health insurance was significantly associated with consulting traditional healers. These findings were

consistent with the prior bivariate analyses using Pearson's  $r$  coefficients and did not reveal additional information. Results from the independent  $t$ -tests indicated that there were no significant differences in the mean natural log A1C based on gender, having insurance, or using herbal remedies, faith-based interventions, consulting traditional healers, or self-medication/self-prescription. Additionally, there were no significant differences in the mean Sum TCAs based on gender or having health insurance. The alternative analyses did not provide additional information.

Table 23

*Alternative Analyses for Relationships Between Independent and Dependent Variables (N = 75)*

Variables	Chi- Square Test			Fisher's Exact Test																																																																								
	Value	df	<i>p</i> -value	<i>p</i> -value																																																																								
Gender vs.																																																																												
Insurance	**	-	-	0.723																																																																								
Herbal remedies	0.125	1	0.723	-																																																																								
Faith-based interventions	7.038	1	0.008*	-																																																																								
Traditional healers	**	-	-	0.657																																																																								
SMSP	**	-	-	1.000																																																																								
Health insurance vs.																																																																												
Herbal remedies	**	-	-	1.000																																																																								
Faith-based interventions	**	-	-	1.000																																																																								
Traditional healers	**	-	-	0.028*																																																																								
SMSP	**	-	-	1.000																																																																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th colspan="3">Independent <i>t</i>-test</th> <th colspan="2">Levene's Test for Equality of Variances</th> </tr> <tr> <th><i>t</i></th> <th>df</th> <th><i>p</i>-value</th> <th>F</th> <th><i>p</i>-value</th> </tr> </thead> <tbody> <tr> <td colspan="6">Ln A1C vs.</td> </tr> <tr> <td>Gender</td> <td>0.208</td> <td>73</td> <td>0.836</td> <td>0.601</td> <td>0.441</td> </tr> <tr> <td>Insurance</td> <td>0.318</td> <td>73</td> <td>0.752</td> <td>0.206</td> <td>0.651</td> </tr> <tr> <td>Herbal remedies</td> <td>-0.981</td> <td>73</td> <td>0.330</td> <td>0.001</td> <td>0.974</td> </tr> <tr> <td>Faith-based interventions</td> <td>-0.444</td> <td>73</td> <td>0.658</td> <td>0.554</td> <td>0.459</td> </tr> <tr> <td>Traditional healers</td> <td>0.598</td> <td>73</td> <td>0.551</td> <td>1.820</td> <td>0.181</td> </tr> <tr> <td>SMSP</td> <td>0.504</td> <td>73</td> <td>0.616</td> <td>0.316</td> <td>0.576</td> </tr> <tr> <td colspan="6">Sum TCAs vs.</td> </tr> <tr> <td>Gender</td> <td>-1.430</td> <td>73</td> <td>0.157</td> <td>0.133</td> <td>0.717</td> </tr> <tr> <td>Insurance</td> <td>-0.613</td> <td>73</td> <td>0.542</td> <td>0.062</td> <td>0.805</td> </tr> </tbody> </table>							Independent <i>t</i> -test			Levene's Test for Equality of Variances		<i>t</i>	df	<i>p</i> -value	F	<i>p</i> -value	Ln A1C vs.						Gender	0.208	73	0.836	0.601	0.441	Insurance	0.318	73	0.752	0.206	0.651	Herbal remedies	-0.981	73	0.330	0.001	0.974	Faith-based interventions	-0.444	73	0.658	0.554	0.459	Traditional healers	0.598	73	0.551	1.820	0.181	SMSP	0.504	73	0.616	0.316	0.576	Sum TCAs vs.						Gender	-1.430	73	0.157	0.133	0.717	Insurance	-0.613	73	0.542	0.062	0.805
	Independent <i>t</i> -test			Levene's Test for Equality of Variances																																																																								
	<i>t</i>	df	<i>p</i> -value	F	<i>p</i> -value																																																																							
Ln A1C vs.																																																																												
Gender	0.208	73	0.836	0.601	0.441																																																																							
Insurance	0.318	73	0.752	0.206	0.651																																																																							
Herbal remedies	-0.981	73	0.330	0.001	0.974																																																																							
Faith-based interventions	-0.444	73	0.658	0.554	0.459																																																																							
Traditional healers	0.598	73	0.551	1.820	0.181																																																																							
SMSP	0.504	73	0.616	0.316	0.576																																																																							
Sum TCAs vs.																																																																												
Gender	-1.430	73	0.157	0.133	0.717																																																																							
Insurance	-0.613	73	0.542	0.062	0.805																																																																							

*Note.* SMSP = self-medication/self-prescription; TCAs = traditional, complementary, and alternative

\* *p* < .05

\*\*Cells with expected count < 5

## Summary

Seventy-five Latino/Hispanic persons with type 2 diabetes were interviewed to explore their use of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription as part of their TCA self-care expressions, patterns, and practices for the management of type 2 diabetes. The majority of persons were from Mexico and all participants were immigrants. The average age of participants was 47 years old and they had been diagnosed with diabetes for an average of 7.59 years. Many persons had limited financial resources, lacked health insurance, spoke English poorly, and had literacy concerns reading and writing in Spanish. A significant proportion of participants had poor glycemic control, hypertension, obesity, and diabetes-related comorbidities. Participants described using a variety of herbal remedies and faith-based interventions to control diabetes. The most frequently reported herbal remedies were prickly pear cactus (*nopale*) and aloe vera (*salvia* or *sábila*), while personal prayer was the predominant faith-based intervention utilized. Participants consulted with traditional healers and reported being treated with massage, herbs, and other cultural modalities. Persons engaged in self-medication/self-care practices of using herbal medicines, such as Seven Blossom Tea (*7 Azahares*) and horsetail (*la cola de caballo*), as part of diabetes self-management. Several persons described altering the dose of their prescribed medications for diabetes on the days that they used alternative modalities. The participants did not discuss the use of TCA self care practices for diabetes with their healthcare provider on a regular basis. Several multiple regression models were computed to examine the impact of personal characteristics, cultural and social structure

dimensions and environmental factors on the use of TCA modalities and with glycemic control (A1C). Further, multiple regression analysis was used to model the use of TCA modalities with glycemic control (A1C). The variables did not adequately explain either the use of TCA modalities or glycemic control. Alternative analyses, primarily nonparametric, did not provide additional insight or explanation of the outcomes.

## CHAPTER V

### DISCUSSION

The purpose of this study was to explore the use of traditional, complementary, and alternative (TCA) self-care expressions, patterns, and practices for the management of type 2 diabetes among Latinos/Hispanics living in a nonborder, emerging Latino/Hispanic community. Interpretation of these findings, conclusions, implications for practice, education, healthcare systems and policy, and recommendations for future research are provided. Limitations for generalizability of findings are discussed.

This sample of Latino/Hispanic persons was similar to Latino/Hispanic participants described in prior research studies on diabetes or the use of TCA self-care practices for female gender, mean age, low acculturation levels, limited English proficiency, limited financial resources, and low rates of health insurance (Brown, Garcia, Kouzekanani, & Hanis, 2002; Chilton, Hu, & Wallace, 2006; Coffman, Shobe, & O'Connell, 2008; Howell et al., 2006; Hu, Wallace, & Tesh, 2010; Mikhail, Wali, & Ziment, 2004; Poss, Jezewski, & Stuart, 2003; Poss, Pierce, & Prieto, 2005; Sixta & Ostwald, 2008; Vincent, Pasvogel, & Barrera, 2007). Low levels of educational attainment were similar to those reported in other studies with Latinos/Hispanics living in North Carolina and Texas (Howell et al., 2006; Hu et al., 2010; Poss et al., 2003; Poss et al., 2005). However, the rate of high school completion among this sample was significantly lower compared to that of the general Latino/Hispanic population in the United States (U.S.; Office of

Minority Health, 2009) or the foreign-born Latino/Hispanic population (Pew Hispanic Center, 2011).

The lower levels of educational attainment found among this sample of Latinos/Hispanics may directly impact health literacy (CAHPS Consortium, 2009; Nielsen-Bohlman, Panzer, & Kindig, 2004). Those with limited health literacy have a lower capacity to process health information and less understanding of complex chronic disease self-management skills, such as interpreting blood glucose levels (CAHPS Consortium, 2009; Nielsen-Bohlman et al., 2004; Schillinger et al., 2002). Further, prior research with Latinos/Hispanics with diabetes indicated that persons with low health literacy had poor glycemic control and a higher incidence of retinopathy and cerebrovascular disease (Mainous et al., 2006; Schillinger et al., 2002).

Low levels of physical activity and healthy nutrition adherence among study participants were similar to those reported in other studies with Latinos/Hispanics with diabetes (Coronado, Thompson, Tejada, Godina, & Chen, 2007; Hu et al., 2010; Neighbors, Marquez, & Marcus, 2008). Prior research indicates Latinos/Hispanics with limited English proficiency are less likely to intake appropriate servings of fruits and vegetables compared to English proficient Latinos/Hispanics and non-Hispanic Whites (August & Sorkin, 2010).

Measured rates of hypertension found among the sample were higher than those reported by participants, indicating that some may have undiagnosed hypertension. This is consistent with new data reported in the *CDC Health Disparities and Inequalities Report—United States, 2011*, indicating that Mexican American persons who lacked



health insurance, and had diabetes were less likely to have controlled hypertension (Centers for Disease Control and Prevention, 2011a). High rates of overweight/obesity and significant abdominal obesity were found in both men and women. This finding is similar to rates of overweight and obesity reported among Latinos/Hispanics at a national level (National Center for Health Statistics, 2010).

More than half of the participants rated their health status as either “fair” or “poor.” Reasons for this self-report were not asked. Findings from prior research with Latino/Hispanic populations with diabetes suggest that perceptions of poor health may be related to impaired health from diabetes-related comorbidities and complications, decreased physical functioning, lower levels of mental health, financial barriers to treatment, and dietary restrictions (Hu et al., 2010; Misra & Lager, 2009).

### **Diabetes Knowledge, Self-Care, and Glycemic Control**

High levels of diabetes knowledge were found among participants in this study. The high levels of diabetes knowledge found in this study are in contrast with low levels of diabetes knowledge reported in previous studies with Latinos/Hispanics with similar sociodemographic characteristics (Brown et al., 2002; Chilton et al., 2006; Sixta & Ostwald, 2008; Vincent et al., 2007). One possible explanation for this difference may be attributed to the use of a different diabetes knowledge measure, as other studies reported findings from the Spanish version of the Diabetes Knowledge Questionnaire-24, rather than the Spoken Knowledge in Low Literacy in Diabetes scale used in the current study. Another potential explanation for this difference is that 57.3% of participants reported attending a prior diabetes education class.

Knowledge deficits were noted pertaining to the treatment of hypoglycemia, recommendations for ophthalmological exams, and target goals for fasting blood sugar and A1C levels. The A1C knowledge deficits among this sample are similar to findings from prior studies, which reported a lack of awareness of A1C testing and target goal among Latino/Hispanic participants (Mainous, Diaz, Saxena, & Geesey, 2007; Mann, Ponieman, Leventhal, & Halm, 2009). In this study, participants responded to diabetes knowledge questions from their personal realm of experience, and not from the realm of biomedical knowledge. It is not known if the knowledge deficits are attributed to participants' lack of health insurance or inadequate financial resources for glucose testing supplies, laboratory exams, or consultation with specialists.

The low levels of reported self-monitoring of blood glucose among participants were similar to national data regarding glucose monitoring among Latinos/Hispanics with diabetes (AHRQ, 2009b). The majority of study participants had poor glycemic control. This finding is similar to other studies with Latinos/Hispanics with type 2 diabetes (Brown et al., 2002; Chilton et al., 2006; García, 2005; Hu et al., 2010; Kirk et al., 2008; Sixta & Ostwald, 2008).

### **Usage of TCA Self-Care Expressions, Patterns, and Practices**

#### **Herbal Remedies**

The majority of participants described using 49 different types of herbal remedies to treat diabetes. Some herbal remedies have been identified in prior research as *remedios caseros* (home remedies) for diabetes among Latinos/Hispanics living in Mexico, Texas, and the southwestern U.S. (Andrade-Cetto & Heinrich, 2005; Johnson et al., 2006; Poss

et al., 2003; Shapiro & Gong, 2002). Other herbal remedies described in this study were not reported in prior studies among Latinos/Hispanics for diabetes. They include: arnica, asparagus, Blood Sugar Formula, canary seeds, celery, chia seeds, cinchona bark, coconoxtle cactus, cranberry, *cuacia*, eggplant, *El Milagro de la Selva*, flax seeds, *fruta de zopilote*, green bell peppers, hibiscus tea, horchata, husk tomatoes, lemon root tea, *nin*, stevia rebaudina, and tamarind. Direct translations in English of several products are unknown. The herbal preparations reported by participants, such as teas, *licuados*, *agua frescas*, fresh or cooked food, and pills/capsules, were similar to those reported in studies with Latinos/Hispanics from the U.S.-Mexico border region (Johnson et al., 2006; Poss et al., 2003).

New information regarding the use of herbal remedies was learned. For example, participants described 13 reasons for using herbal remedies for diabetes. The two predominant purposes were “to lower sugar” and “for diabetes.” Persons reported that the majority of herbal remedies were used daily, weekly, or monthly. The majority of participants perceived the effectiveness of herbal remedies as either helping their diabetes “a lot” or “a little.” However, several persons described developing side effects or adverse reactions. Prior studies pertaining to use of herbal remedies among Latinos/Hispanics, both for diabetes and general use, have lacked information pertaining to the purpose, frequency of use, self-perceived effectiveness, and the development of side effects or adverse reactions (Coronado, Thompson, Tejeda, & Godina, 2004; Howell et al., 2006; Johnson et al., 2006; Najm et al., 2003; Poss et al., 2003).

Most persons reported using herbal remedies concurrently with prescribed diabetes medications. A few participants described skipping or decreasing the dose of prescribed diabetes medications on the days that they ingested herbal remedies. This finding is different from that reported in a prior study with Mexicans in Texas, which indicated that herbal remedies were used to complement diabetes medications, not replace prescribed medications (Poss et al., 2003). An important finding from the current study was that participants reported trusting the combination of herbal remedies and prescription medications more than prescribed medications alone or herbal remedies alone. Persons described believing that prescriptions medications were safer than a combination of herbal remedies and medicines, or just herbal remedies. Neither finding was reported in prior studies.

### **Faith-Based Interventions**

A significant proportion of Latinos/Hispanics in this study reported using faith-based interventions as part of diabetes self-care, which is consistent with prior studies among Latinos/Hispanics with diabetes (Bergland, Heuer, & Lausch, 2007; Caban & Walker, 2006; Coronado et al., 2004). Similar to previous reports, personal prayer, consulting a priest/religious leader, and using religious icons were identified by study participants as important faith-based interventions for diabetes (Bergland et al., 2007; Caban & Walker, 2006; Coronado et al., 2004). Additional meaningful faith-based interventions were described by persons for diabetes that had not been previously reported. The new findings included: going to mass/church, lighting candles, Bible study, meditation, praying to the Virgin Mary and Saint Jude, and saying a rosary.

Participants reported several reasons for using faith-based interventions to manage diabetes. These reasons were: to improve their health, to be cured of diabetes, peace and comfort, to give God/Virgin Mary control of their lives, general help, lower sugar, and to pray for work to buy medicines. These findings are both similar and different from prior reports. Authors have reported reasons for using faith-based interventions as: strength to cope with the challenges of living with diabetes, controlling diabetes, protection, and miscommunication or feeling confused from an encounter with their healthcare provider (Bergland et al., 2007; Caban & Walker, 2006; Coronado et al., 2004; Lopez, 2006; Mikhail et al., 2004; Reyes-Ortiz, Rodriquez, & Markides, 2009). However, the reasons of: to be cured of diabetes, peace and comfort, and to pray for work to buy medicines are new findings describing why Latinos/Hispanics use faith-based interventions as part of diabetes self-care.

The perceptions of feeling calmer, less stressed, and more tranquil were identified by study participants as an effect of using faith-based interventions. Findings are consistent with the perceived effectiveness of prayer among a sample of Mexicans with diabetes living in Texas (Hunt, Arrar, & Akana, 2000). However, two persons reported believing that their faith-based remedies would heal (cure) their disease, which is in contrast to the findings of Hunt, Arrar, and Akana (2000). In this study, the majority of participants continued taking their prescribed diabetes medications while using faith-based interventions. A few persons skipped and decreased the dose of prescribed medications on the days they used faith-based remedies. This finding is in contrast to prior study

findings that reported faith-based interventions were not used as a replacement for medical treatment (Caban & Walker, 2006; Lopez, 2006).

The majority of the sample reported wanting their doctor/healthcare provider to incorporate faith-based remedies into the diabetes plan of care. This finding is not clearly understood. For example, do Latinos/Hispanics with diabetes want their healthcare provider to truly use faith-based interventions, such as prayer, with their patients? Or, does this reflect a desire for their healthcare provider to be a moral, caring, good hearted person? Or, could this perspective be related to the cultural health belief that places tranquility as a desired state of being for those with diabetes (Clark, Vincent, Zimmer, Sanchez, 2009)? Lastly, does the desire of having healthcare providers incorporate faith-based remedies into the diabetes plan of care represent the holistic paradigm of health and illness of Latinos/Hispanics?

### **Consulting Traditional Healers**

Persons consulted with a *sobador/a* (traditional massage therapist), *acupunturista* (acupuncturist), and *naturista* (homeopathic specialist) for diabetes which has not been previously reported. Similar to prior studies, participants described consulting with a *yerbero/a* (herbalist) and an *espiritualista* (faith healer or psychic medium) for diabetes (Caban & Walker, 2006; Coronado et al., 2004). No person reported consulting with a *curandero/a* for diabetes. In fact, several participants had strong reactions when asked about *curanderos/as* (traditional healers), consistent with the skepticism voiced about *curanderos/as* in prior studies (Hunt et al., 2000; Clark et al., 2009). In this study, a point was made by the primary investigator and research assistants to not ask participants if

they consulted traditional healers using the term *curanderos/as*, a term that can be used in Spanish to refer to all types of traditional healers. Instead, participants were asked if they consulted with each type of traditional healer, inquiring of *curanderos/as* last.

The treatments used by traditional healers for diabetes and participants' perceptions of treatment effectiveness have not been previously reported. Additionally, the reasons why Latinos/Hispanics consult with traditional healers for diabetes is new information that adds to the scientific body of knowledge. Further, participants reported decreasing the dose of diabetes medications when consulting with traditional healers; several persons continued medications as prescribed.

### **Self-Medication/Self-Prescription Practices**

Participants identified purchasing 13 medicines for diabetes by method of self-medication/self-prescription. All medicines except, Seven Blossom Tea (*7 Azahares*), had been identified by other participants as herbal remedies. During the interview process, questions of TCA modality use were asked in the order of herbal/plant remedies, faith-based interventions, consulting traditional healers, and lastly, self-medication/self-prescription. No prescribed pharmaceutical medications were reported by participants. The names of herbal medicines for diabetes obtained by self-medication/self-prescription have not been previously reported. Reasons identified by participants for using self-medication/self-prescription consistent with findings reported in prior literature were recommendations of family members and friends and less expensive than prescribed medications (Coffman et al., 2008; Mainous, Diaz, & Carnemolla, 2009). Reasons described for using self-medication/self-prescription for diabetes that have not been

previously documented included: to be healed; cultural medicines are not available from U.S. doctors; and a preference for herbal medicines rather than prescription medicines. Also, new knowledge found in this study was participants' perceptions of herbal medicine effectiveness and dosing behaviors with prescribed diabetes medications.

### **Communication with Healthcare Provider Regarding TCA Modalities**

The majority of participants reported not disclosing the use of TCA modalities for diabetes with healthcare providers. "I treat diabetes myself" and "It is a recent remedy" were the only reported reasons for not communicating TCA modalities with healthcare providers that have not been previously identified in prior studies with Latinos/Hispanics for general health purposes and diabetes (Howell et al., 2006; Najm, Reinsch, Hoehler, & Tobis, 2003; Poss et al., 2003; Shelley et al., 2009). Reasons not previously reported consisted of: American healthcare providers "don't believe in our natural medicine or want to talk about it"; American healthcare providers lack knowledge of natural medicine; healthcare providers are always in a hurry; healthcare providers "don't ask"; and healthcare providers will be disappointed.

### **Individual Characteristics**

The individual characteristics of gender and age were examined for association with the outcomes of TCA modality use and glycemic control. Female gender was associated with using faith-based interventions for the management of type 2 diabetes, but not with use of other TCA modalities or the total number of TCAs used. Prior studies among Latinos/Hispanics have not reported an association of gender with the use of these cultural practices for managing diabetes or general health (Caban & Walker, 2006;



Howell et al., 2006; Mikhail et al., 2004; Najm et al., 2003; Ortiz, Shields, Clauson, & Clay, 2007; Poss et al., 2003). Gender was not found to be a significant predictor of glycemic control.

Older in age was significantly associated with the total number of TCAs used, but not the specific types of TCAs. This is similar to the findings reported with Latinos/Hispanics for general health; whereby, older Latino/Hispanic persons were more likely to use herbal remedies (Najm et al., 2003) or consult with traditional healers (Clark, Bunik, & Johnson, 2010; Najm et al., 2003). Age was not significantly associated with glycemic control.

### **Environmental Context Factors**

The environmental context factor of acculturation non-Hispanic domain was examined for association with specific TCA modalities and the outcomes of total number of TCAs used and glycemic control. Acculturation was not significantly associated with any specific TCA modality, or the outcomes of the total number of TCAs used or with glycemic control. In prior research studies, acculturation has been reported as a descriptive statistic and not as a predictor variable for the use of TCA modalities or A1C level (Brown et al., 2002; Howell et al., 2006; Lujan, Ostwald, & Ortiz, 2007; Mauldon, Melkus, Cagganello, 2006; Najm et al., 2003; Poss et al., 2003; Sixta & Ostwald, 2008; Vincent et al., 2007). In this study, the acculturation measure, the Bidimensional Acculturation Scale for Hispanics Linguistic Proficiency subscale, uses language literacy in English and Spanish as proxy measures for acculturation in each cultural domain. This sample was highly acculturated only in Spanish and many participants reported using

TCA modalities. This finding is similar to previous studies that reported higher use of herbal remedies (Howell et al., 2006; Mikhail et al., 2004) and higher rates of consulting traditional healers (Clark et al., 2010; Najm et al., 2003) among Latinos/Hispanics who felt more comfortable speaking Spanish.

### **Cultural and Social Structure Dimensions**

The cultural and social structure dimensions of years of education, diabetes knowledge, and health insurance were examined for association with the use of specific TCA modalities, total number of TCAs used, and glycemic control. Neither education nor diabetes knowledge was associated with specific TCA modalities or the outcomes of total number of TCAs used and glycemic control. The lack of association between education and glycemic control in this study is in contrast to that reported by Schillinger et al. (2002), which identified lower levels of education associated with poor glycemic control among diabetics (Schillinger et al., 2002). Prior research utilizing the Spoken Knowledge in Low Literacy in Diabetes scale has reported significant correlations between scores on this diabetes knowledge measure and A1C level among low literacy populations (Guler & Oguz, 2011; Rothman et al., 2005). However, neither study was comprised of Latino/Hispanic participants.

Having health insurance coverage was significantly associated with consulting traditional healers for the management of diabetes, but not with other specific TCA modalities or total number of TCAs used. Also, health insurance coverage was not associated with the outcome variable of glycemic control. In prior research studies exploring the use of TCA modalities for general health concerns, Latinos/Hispanics have

identified the lack of health insurance as a reason for using self-medication/self-prescription practices (Coffman et al., 2008; Sleath et al., 2009).

### **Self-Care Expressions, Patterns, and Practices**

The diabetes self-care behavior of general diet was examined for association with each specific TCA modality, total number of TCAs used, and glycemic control. No associations were identified between diet and any of these variables. The use of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription were examined for association with other specific TCA modalities and the outcome of glycemic control. However, no associations were identified. Prior research studies have not reported the association of the use of TCA modalities with glycemic control.

### **Conclusions**

This sample of Latino/Hispanic men and women from an emerging cultural community reflect the national Latino/Hispanic population with diabetes. In addition to medically prescribed diabetes treatments, Latinos/Hispanics utilized a variety of TCA self-care expressions, patterns, and practices as measures to treat diabetes that are meaningful, holistic, and consistent with their conceptual view of life.

Important new knowledge and insights of TCA self-care expressions, patterns and practices used for the management of type 2 diabetes by Latino/Hispanic immigrants were found. Participants described using a variety of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription practices as part of their culturally-based diabetes self-care. The most frequently reported

TCA modalities used were commonly available from within the Latino/Hispanic community setting and from family members or friends living in persons' home countries. TCA modalities were similar to those reported in the literature, and several modalities were different than those used among Latino/Hispanic populations living in established border regions. Knowledge was learned pertaining to the purposes of TCA modalities for diabetes self-care, perceived effectiveness, and the development of side effects. The majority of participants described using TCA modalities concurrently with prescribed diabetes medications; fewer altered the dose of prescribed diabetes medications on the days alternative modalities were used.

Minimal new knowledge was obtained regarding factors related to glycemic control among Latino/Hispanic adults with type 2 diabetes. In fact, predictors of TCA usage and glycemic control were not found. One possible explanation for a lack of statistical findings in these areas was the homogeneity of environmental context factors, cultural and social structure dimensions, and biophysical indicators within the participant sample. The lack of differences between participants' individual characteristics, environmental context, cultural and social structure dimensions occurred despite recruiting Latinos/Hispanics from five counties, rural and urban areas, and multiple community-based settings. A more heterogeneous or larger sample size may detect the small differences of TCA modality usage and glycemic control such as those found in this study. A more important explanation may be that the findings of this study represent a greater consistency in Latino/Hispanic culturally-based diabetes self-management than previously known.

Leininger's culture care diversity and universality theory and sunrise enabler provided a meaningful conceptual framework from which to seek emic knowledge of the diabetes-related self-care measures of Latinos/Hispanics. This paradigm aided the researcher to utilize a holistic and cultural lens to reveal new emic culture care knowledge previously unknown to those outside of the Latino/Hispanic culture. Though significant predictors of the use of TCA modalities and glycemic control were not found in this study, Leininger's cross-cultural theory and sunrise enabler provides a foundation from which to continue to explore critical factors that may affect these outcomes. Further, the new knowledge learned of TCA modalities from this study, provides a basis from which nurses and other healthcare providers can promote safe and meaningful traditional practices for diabetes self-care and adapt and negotiate traditional practices that may not be safe. Utilization of this conceptual framework promotes cultural awareness and increased cultural competency of healthcare providers and assists with disclosure of TCA modalities on the part of Latinos/Hispanics for diabetes self-care.

The knowledge from this study adds to the existing scientific and clinical foundation and has the capacity to assist nurses and other healthcare providers to provide culturally congruent and safe care for Latinos/Hispanics with diabetes. Findings provide a scientific basis from which to develop, negotiate, implement, integrate and evaluate clinical and cultural practices for Latinos/Hispanics and diabetes self-management.

### **Implications**

The findings of this study have important implications in the areas of clinical practice, nursing education, healthcare systems and policy, and recommendations for future

research. One of the most important implications from this study is that nurses and other healthcare providers who provide care, educate new generations of professionals, assist in providing and evaluating care, and conduct research with and for Latino/Hispanic populations and individuals should be familiar with and knowledgeable about TCA practices of Latinos/Hispanics for the management of type 2 diabetes. Thus, cultural competency and communications skills are essential for clinical healthcare providers to improve the discussion, disclosure, and integration of TCA modalities in diabetes care. Interactions between providers and clients that sensitively inquire about the use and importance of TCA modalities for diabetes care should become standard practice. Client and provider awareness of potential herb-herb and herb-drug interactions and toxicities may assist in evaluating client complaints and symptoms, prescribing treatment and medications, and achieving optimal glycemic control. Collaboration is necessary among nurses, nurse practitioners, other healthcare providers and Latino/Hispanic clients to discuss and negotiate the use of TCA practices to ensure safety, limit side effects, and improve effective diabetes self-care. This collaboration should not be limited to the use of translators or interpreters, or Spanish language provider training. Providers must be attentive to access and educational barriers for many Latino/Hispanic patients when prescribing medications. Diabetes education programs require tailoring with consideration of the language, literacy, health literacy, and cultural capacity and context of clients. Lastly, culturally acceptable healthy nutritional choices should be incorporated into diabetes education programs and include more than mainstream foods to achieve optimal glycemic control.

Specific to nursing education, cultural competency, TCA modalities, health literacy, and health disparity content, skills and experiences are imperative to adequately prepare nurses for working with the increasing number of Latino/Hispanic persons and families experiencing and dealing with diabetes. Curricula content must include information on herbal remedies and other TCA modalities, the cultural importance and reasoning, and the actions and side effects for persons with diabetes. Experiences in classrooms, laboratories, and clinical settings may include role playing, vignettes, guest lecturers, and immersion experiences, to provide students exposure and knowledge of Latino/Hispanic diabetes self-management. Given the low literacy levels found among this study sample and reported nationwide for the Latino/Hispanic population, nursing students across all levels of preparation and types of roles require focused information and training. Specifically, nursing students require skills in use of literacy assessment tools, determining suitability of educational materials, and effective low literacy teaching strategies to provide care with low literacy/numeracy populations, especially those with manageable chronic illnesses such as diabetes. Promoting health literacy among Latino/Hispanic persons with diabetes is essential as prior research indicates limited health literacy results in miscommunication between clients and healthcare providers, difficulty understanding health education materials, and incorrectly following prescription labels, even in one's primary language (Andrulis & Brach, 2007; Hill-Briggs & Smith, 2008).

Study findings inform healthcare systems and policy in several ways. Significant diabetes disease burden and healthcare access barriers were found among this relatively

young population of Latino/Hispanic immigrants. Previous research with Latinos/Hispanics in North Carolina indicate that the findings are not unique to this study's population or to the geographic area (Arcury, Skelly, Gesler, & Dougherty, 2004; Coffman et al., 2008; Hu et al., 2010). North Carolina has been identified as a 'diabetes hot spot' and one of the top five states in Latino/Hispanic growth; the nation is experiencing similar diabetes prevalence and Latino/Hispanic population growth. Therefore, healthcare systems and policy considerations must be implemented.

As this Latino/Hispanic population ages and if the same level of comorbidities, diabetes, and uncontrolled hyperglycemia continues, the care burden and financial burden on healthcare systems, the state, nation, communities, and families will exceed the social, economic, and system capacity to provide care for the population. The exponential increase in human, material and financial requirements must be attenuated by immediate efforts. Healthcare institutions and providers must address internal structure, language, and cultural barriers that prevent Latinos/Hispanics from seeking and receiving quality diabetes care (Collins, Villagran, & Sparks, 2008).

Increased English proficiency among Latinos/Hispanics has the capacity to improve client-provider relationships, increase the accuracy of diagnosis, and understanding of treatment options and plans (AHRQ, 2009a, Cristancho, Garces, Peters, & Mueller, 2008). Improved English proficiency may enable some individuals to obtain improved employment opportunities that offer health insurance and higher compensation. Employment of Latinos/Hispanics within healthcare agencies and systems provides a direct avenue for enhancing the understanding, linkages, and potential improvement of



culturally based care for Latinos/Hispanics. Developing collaborative partnerships with Latino/Hispanic community leaders are critical to establishing effective community engaged primary diabetes prevention programs and increasing health literacy to alleviate diabetes disparities (National Center for Health Statistics, 2010). Lastly, new efforts are required to provide consistent and usual care providers for diabetic Latinos/Hispanics. One strategy is patient-centered medical homes, which are characterized by having a regular healthcare provider who is involved in the total care for the patient; patient engagement in care; and care accessibility. This delivery model has been identified as one strategy for eliminating healthcare disparities and increasing the ability of Latinos/Hispanics to negate the barriers of healthcare access (Beal, Hernandez, & Doty, 2009).

Healthcare systems, the state of North Carolina, and the nation have a vested interest in encouraging and facilitating English as a Second Language programs, community engagement and outreach to the Latino/Hispanic community, and support of physicians and nurse practitioners that provide direct primary and chronic diabetes care for Latinos/Hispanics. This support from hospitals, insurance companies, the Veterans Health Administration, Medicare and Medicaid, federally defined community clinics, and free and philanthropic supported clinics necessitate development and implementation of additional efforts to provide translators, educational materials, personnel, and adequate provider reimbursement. Another critical effort is to engage private, philanthropic, grant, and public in financially supporting safety net Latino/Hispanic healthcare providers and practices.

Further research would strengthen the knowledge, evidence base, and educational practices to improve diabetes self-care among Latino/Hispanic persons. Studies that identify the chemical structure of herbal remedies, the pharmacokinetics, dosing, efficacy, and toxicity characteristics for the use in diabetes care are necessary especially in the areas of nutritional biochemistry, ethnobotany, and endocrinology. Investigations may develop knowledge of how Latinos/Hispanics prepare, ingest, and dose herbal remedies for the treatment of diabetes, which can be used in educational programs and clinical practice. Research determining what Latinos/Hispanics mean by wanting healthcare providers to incorporate faith-based interventions into diabetes care is needed. Definitive identification of factors associated with the use of TCA modalities and adequate glycemic control (A1C level) among Latinos/Hispanics is necessary. This may require larger sample sizes, longitudinal studies, and testing interventions. Finally, development, testing, evaluation and utilization of measures that are appropriate for use with Latino/Hispanic questions, culture, language and context may enhance researchers ability to generate new knowledge regarding diabetes self-care and the use of TCA modalities.

The practice, education, delivery system, policy and research implications and types of foci, activities, and preparations recommended are consistent with the *Sullivan Report* (Sullivan Commission, 2004), the Institute of Medicine's *Unequal Treatment* (Smedley, Stith, & Nelson, 2003), the Agency for Healthcare Research and Quality patient centered care and health literacy efforts (Peikes, Genevro, Scholle, & Torda, 2011), the *2010 National Healthcare Quality Report* (AHRQ, 2011b), the *2010 National Health*

*Disparities Report* (2011a), and the *CDC Health Disparities and Inequalities Report—United States, 2011* (CDC, 2011a).

### **Limitations**

There are limitations to generalizing findings from this study. The sample was one of convenience and the location was North Carolina, which may not represent Latinos/Hispanics living in other geographic locations or areas of the United States. The participants may have been more interested in discussing TCA modalities than those who declined to participate. Even though assurance was provided to participants that their information would remain confidential and would not be shared with personnel from community-based settings, persons may have been hesitant to respond honestly or completely to questions they perceived to be “sensitive.”

### **Summary**

The purpose of this cross-sectional, correlational study was to explore the use of TCA self-care expressions, patterns, and practices of Latinos/Hispanics for the management of type 2 diabetes living in a nonborder, emerging Latino/Hispanic community. Leininger’s culture care diversity and universality theory and sunrise enabler provided a holistic structure from which to provide emic knowledge of Latino/Hispanic diabetes health and TCA self-care modalities. New knowledge was developed of the cultural self-care practices of herbal remedies, faith-based interventions, consulting traditional healers, and self-medication/self-prescription practices of Latinos/Hispanics used in diabetes self-care. The knowledge provides a clearer understanding of if, how and why TCA modalities are used. Study findings inform important implications in the areas of practice, education,

healthcare systems and policy and future research to alleviate disparities in access, care and health outcomes for Latinos/Hispanics with diabetes.

## REFERENCES

- AACE Diabetes Mellitus Clinical Practice Guidelines Task Force. (2007). American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for the Management of Diabetes Mellitus. Retrieved from <http://www.aace.comp/pub/guidelines/>
- Abraído-Lanza, A. F., Armbrister, A. N., Flórez, K. A., & Aguirre, A. N. (2006). Toward a theory-driven model of acculturation in public health research. *American Journal of Public Health, 96*(8), 1342-1346. doi: 10.2105/AJPH.2005.064980
- Agency for Healthcare Research and Quality. (2009a). *National healthcare disparities report, 2008* (AHRQ Pub. No. 09-0002). Rockville, MD: U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality. Retrieved from <http://www.ahrq.gov/qual/qrd08.htm>
- Agency for Healthcare Research and Quality. (2009b). *Program brief: Minority health: Recent findings* (AHRQ Pub. No. 09-P002). Retrieved from <http://www.ahrq.gov/research/minorfind.pdf>
- Agency for Healthcare Research and Quality. (2011a). *2010 National healthcare disparities report* (AHRQ Pub. No. 11-0005). Rockville, MD: U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality. Retrieved from <http://www.ahr.gov/qual/qrd10.htm>

- Agency for Healthcare Research and Quality. (2011b). *2010 National healthcare quality report* (AHRQ Pub. No. 11-0004). Rockville, MD: U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality. Retrieved from <http://www.ahrq.gov/qual/nhqr10/nhqr10.pdf>
- Aikens, J. E. & Piette, J. D. (2009). Diabetic patients' medication underuse, illness outcomes, and beliefs about antihyperglycemic and antihypertensive treatments. *Diabetes Care*, *32*(1), 19-24. doi: 10.2337/dc08-1533.
- Alsalam, N. A., & Smith, R. E. (2005). *The role of immigrants in the U.S. labor market*. Washington, DC: Congressional Budget Office. Retrieved from <http://www.cbo.gov>
- American Association of Diabetes Educators. (2007). AADE position statement: Cultural sensitivity and diabetes education: Recommendations for diabetes educators. *The Diabetes Educator*, *33*(1), 41-44. doi: 10.1177/0145721706298202
- American Diabetes Association. (2008). Economic costs of diabetes in the U.S. in 2007. *Diabetes Care*, *31*(3), 1-20. doi: 10.2337/dc08-9017
- American Diabetes Association. (2011a, January 26). *Diabetes statistics: Data from the 2011 national diabetes fact sheet*. Retrieved from American Diabetes Association website: <http://diabetes.org/diabetes-basics/diabetes-statistics/>
- American Diabetes Association. (2011b). Diagnosis and classification of diabetes mellitus. *Diabetes Care*, *34*(Suppl 1), S62-S69. doi: 10.2337/dc11-S062
- American Diabetes Association. (2011c). Standards of medical care in diabetes—2011. *Diabetes Care*, *34*(Suppl 1), S11-S61. doi: 10.2337/dc11-S011

- American Heart Association. (2008). *Heart disease and stroke statistics—2008 update*. Retrieved from [http://www.americanheart.org/downloadable/heart/1200078608862HS\\_Stats%202008.final.pdf](http://www.americanheart.org/downloadable/heart/1200078608862HS_Stats%202008.final.pdf)
- Andrade-Cetto, A., & Heinrich, M. (2005). Mexican plants with hypoglycaemic effect used in the treatment of diabetes. *Journal of Ethnopharmacology*, 99(3), 325-348. doi: 10.1016/j.jep.2005.04.019
- Andrulis, D. P., & Brach, C. (2007). Integrating literacy, culture, and language to improve health care quality for diverse populations. *American Journal of Health Behavior*, 31(Suppl. 1), S122-S133.
- Arcury, T. A., Skelly, A. H., Gesler, W. M., & Dougherty, M. C. (2004). Diabetes meanings among those without diabetes: Explanatory models of immigrant Latinos in rural North Carolina. *Social Science & Medicine*, 59(11), 2183-2193. doi: 10.1016/j.socscimed.2004.03.024
- Argáez-López, N., Wachter, N. H., Kumate-Rodríguez, J., Cruz, M., Talavera, J., Rivera-Arce, K., & Lozoya, X. for the DIMSS Study Group. (2003). The use of complementary and alternative medicine therapies in type 2 diabetic patients in Mexico. *Diabetes Care*, 26(8), 2470. doi: 10.2337/diacare.26.8.2470
- August, K. J., & Sorkin, D. H. (2010). Racial/ethnic disparities in exercise and dietary behaviors of middle-aged and older adults. *Journal of General Internal Medicine*, 26(3), 245-250. doi: 10.1007/s11606-010-1514-7

- Bathum, M. E., & Baumann, L. C. (2007). A sense of community among immigrant Latinas. *Family & Community Health, 30*(3), 167-177. doi: 10.1097/01.FCH.0000277760.24290.de
- Bayer HealthCare LLC. (2009). Professionals-A1CNow+<sup>®</sup> product information. Retrieved from <http://www.a1cnow.com/Professionals/A1CNow-Overview/Product-Information.aspx>
- Bayer HealthCare LLC. (2011). Professionals-A1CNow+<sup>®</sup> overview clinical performance FAQs. Retrieved from [http://www.a1cnow.com/Professionals/A1CNow-Overview/Clinical-Performance\\_FAQs.aspx](http://www.a1cnow.com/Professionals/A1CNow-Overview/Clinical-Performance_FAQs.aspx)
- Beal, A., Hernandez, S., & Doty, M. (2009). Latino Access to the patient-centered medical home. *Journal of General Internal Medicine, 24*(Suppl 3), 514-520. doi: 10.1007/s11606-009-119-1
- Beard, H. A., Ghatrif, M. A., Samper-Ternent, R., Gerst, K., & Markides, K. S. (2009). Trends in diabetes prevalence and diabetes-related complications in older Mexican Americans from 1993-1994 to 2004-2005. *Diabetes Care, 32*(12), 2212-2217. doi: 10.2337/dc09-0938
- Bergland, J. E., Heuer, L., & Lausch, C. (2007). The use of prayer by Hispanic migrant farmworkers with type 2 diabetes. *Journal of Cultural Diversity, 14*(4), 164-168.
- Berry, A. B. (1999). Mexican Americans women's expressions of the meaning of culturally congruent prenatal care. *Journal of Transcultural Nursing, 10*(3), 203-212. doi: 10.1177/104365969901000311



- Blalock, S. J., Gregory, P. J., Patel, R. A., Norton, L. L., Callahan, L. F., & Jordan, J. M. (2009). Factors associated with potential medication-herb/natural product interactions in a rural community. *Alternative Therapies in Health and Medicine, 15*(5), 26-34.
- Brown, S. A., Garcia, A. A., Kouzekanani, K., & Hanis, C. L. (2002). Culturally competent diabetes self-management education for Mexican Americans: The Starr County Border Health Initiative. *Diabetes Care, 25*(2), 259-268. doi: 10.2337/diacare.25.2.259
- Brown, S. A., & Hanis, C. L. (1999). Culturally competent diabetes education for Mexican Americans: The Starr County Study. *The Diabetes Educator, 25*(2), 226-236. doi: 10.1177/014572179902500208
- Brown, S. A., Upchurch, S. L., Garcia, A. A., Barton, S. A. & Hanis, C. L. (1998). Symptom-related self-care of Mexican Americans with type 2 diabetes: Preliminary findings of the Starr County Diabetes Education Study. *The Diabetes Educator, 24*(3), 331-339. doi: 10.1177/014572179802400308
- Burman, M. E. (2003). Complementary and alternative medicine: Core competencies for family nurse practitioners. *Journal of Nursing Education, 42*(1), 28-34.
- Buscemi, C. (2000). Diabetes: A Cuban-American perspective. *Home Healthcare Nurse, 18*(10), 635-638.
- Caballero, A. E. (2007). Cultural competence in diabetes mellitus care: An urgent need. *Insulin, 2*(2), 80-91.

- Caballero, A. E. & Tenzer, P. (2007). Building cultural competency for improved diabetes care: Latino Americans and diabetes. *The Journal of Family Practice*, 56(9 Suppl), S21-S30.
- Caban, A., & Walker, E. A. (2006). A systematic review of research on culturally relevant issues for Hispanics with diabetes. *The Diabetes Educator*, 32(4), 584-595. doi: 10.1177/0145721706290435
- CAHPS Consortium. (2009). *CAHPS<sup>®</sup> clinician & group survey and reporting kit 2008: About the CAHPS<sup>®</sup> item set for addressing health literacy* (Document No. 1311). Retrieved from [http://www.cahps.ahrq.gov/CAHPSkit/files/1311\\_About\\_Health\\_Lit.pdf](http://www.cahps.ahrq.gov/CAHPSkit/files/1311_About_Health_Lit.pdf)
- Campos, C. (2007). Addressing cultural barriers to the successful use of insulin in Hispanics with type 2 diabetes. *Southern Medical Association*, 100(8), 812-820. doi: 10.1097/SMJ.0b013e3180f609c4
- Carter-Pokras, O., & Zambrana, R. E. (2001). Latino health status. In M. Aguirre-Molina, C. W. Molina, & R. E. Zambrana (Eds.), *Health issues in the Latino community* (pp. 23-54). San Francisco: Jossey-Bass, A Wiley Company.
- Centers for Disease Control and Prevention. (2000). Measuring healthy days. Atlanta, Georgia: Centers for Disease Control and Prevention. Retrieved from <http://www.cdc.gov/hrqol/pdfs/mhd.pdf>
- Centers for Disease Control and Prevention. (2006). Geographic disparities in diabetes-related amputations—Texas-Mexico border, 2003. *Morbidity and Mortality Weekly Report*, 55(46), 1251-1253.

Centers for Disease Control and Prevention. (2008a). *2007NHIS questionnaire-Adult*

*CAM: Adult alternative health/complementary and alternative medicine.*

Retrieved from

[ftp://ftp.cdc.gov/pub/Health\\_Statistics/NCHS/Survey\\_Questionnaires/NHIS/2007/English/qalthealt.pdf](ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Survey_Questionnaires/NHIS/2007/English/qalthealt.pdf)

Centers for Disease Control and Prevention. (2008b). *Diabetes: Disabling disease to*

*double by 2050: At a glance 2008.* Retrieved from

<http://www.cdc.gov/nccdphp/publications/aag/ddt.htm>

Centers for Disease Control and Prevention. (2008c). *National diabetes fact sheet:*

*General information and national estimates on diabetes in the United States,*

*2007.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention. (2009, July27, last updated). *About bmi for*

*adults.* Retrieved from

[http://www.cdc.gov/healthyweight/assessing/bmi/adult\\_bmi/index.html](http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html)

Centers for Disease Control and Prevention. (2010). *Diabetes successes and*

*opportunities for population-based prevention and control: At a glance 2010.*

Retrieved from

[http://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2010/diabetes\\_aag.pdf](http://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2010/diabetes_aag.pdf)

- Centers for Disease Control and Prevention. (2011a). *CDC health disparities and inequalities report—United States, 2011*. *MMWR 2011*, 60(Suppl). Retrieved from <http://www.cdc.gov/mmwr/pdf/other/su6001.pdf>
- Centers for Disease Control and Prevention. (2011b). *National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the United States, 2011*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.
- Central Intelligence Agency. (2010a). *The world factbook: Central America and Caribbean: Guatemala*. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/gt.html>
- Central Intelligence Agency. (2010b). *The world factbook: North America: Mexico*. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/mx.html>
- Chang, H., Wallis, M., & Tiralongo, E. (2007). Use of complementary and alternative medicine among people living with diabetes: Literature review. *Journal of Advanced Nursing*, 58(4), 307-319. doi: 10.1111/j.1365-2648.2997.04291.x
- Chernecky, C. C., & Berger, B. J. (1997). *Laboratory tests and diagnostic procedures* (2<sup>nd</sup> ed.). Philadelphia: W. B. Saunders Company.
- Chilton, L., Hu, J., & Wallace, D. C. (2006). Health-promoting lifestyle and diabetes knowledge in Hispanic American adults. *Home Health Care Management & Practice*, 18(5), 378-385. doi: 10.1177/1084822306288059

- Clark, L., Bunik, M., & Johnson, S. L. (2010). Research opportunities with curanderos to address childhood overweight in Latino families. *Qualitative Health Research*, 20(1), 4-14. doi: 10.1177/1049732309355285
- Clark, L., Vincent, D., Zimmer, L., & Sanchez, J. (2009). Cultural values and political economic contexts of diabetes among low-income Mexican Americans. *Journal of Transcultural Nursing*, 20(4), 382-394. doi: 10.1177/1043659609334851
- Coffman, M. J., Shobe, M. A., Dmochowski, J., & Fox, S. D. (2007). Health care access and utilization among Latino immigrants. *Hispanic Health Care International*, 5(2), 73-80. doi: 10.1891/154041507780978923
- Coffman, M. J., Shobe, M. A., & O'Connell, B. (2008). Self-prescription practices in recent Latino immigrants. *Public Health Nursing*, 25(3), 203-211. doi: 10.1111/j.1525-1446.2008.00697.x
- Collins, D., Villagran, M. M., & Sparks, L. (2008). Crossing borders, crossing cultures: Barriers to communication about cancer prevention and treatment along the U.S./Mexico border. *Patient Education and Counseling*, 71(3), 333-339. doi: 10.1016/j.pec.2008.03.013.
- Coronado, G. (2005). Competing health models in Mexico: An ideological dialogue between Indian and hegemonic views. *Anthropology & Medicine*, 12(2), 165-177. doi: 10.1080/13648470500140047
- Coronado, G. D., Thompson, B., Tejada, S., & Godina, R. (2004). Attitudes and beliefs among Mexican Americans about type 2 diabetes. *Journal of Health Care for the Poor and Underserved*, 15(4), 576-588. doi: 10.1353/hpu.2004.0057

- Coronado, G. D., Thompson, B., Tejada, S., Godina, R. & Chen, L. (2007). Sociodemographic factors and self-management practices related to type 2 diabetes among Hispanics and non-Hispanic Whites in a rural setting. *National Rural Health Association, 23*(1), 49-54.
- Cristancho, S., Garces, D. M., Peters, K. E., & Mueller, B. C. (2008). Listening to rural Hispanic immigrants in the Midwest: A community-based participatory assessment of major barriers to health care access and use. *Qualitative Health Research, 18*(5), 633-646. doi: 10.1177/104973230831669
- Cuéllar, I., Arnold, B., & Maldonado, R. (1995). Acculturation Rating Scale for Mexican Americans-II: A revision of the original ARMSA Scale. *Hispanic Journal of Behavioral Sciences, 17*(3), 275-304. doi: 10.1177/07399863950173001
- DerMarderosian, A., & Beutler, J. A. (Eds.). (2010). *The review of natural products: The most complete source of natural product information* (6<sup>th</sup> ed.). St. Louis, MO: Wolters Kluwer Health.
- DeNavas-Walt, C., Proctor, B. D., Smith, J. C., & U.S. Census Bureau. (2009). *Income, poverty, and health insurance coverage in the United States: 2008*. (Current population reports, P60-23). Washington, DC: U.S. Government Printing Office.
- DeWalt, D. A., Boone, R. S., & Pignone, M. P. (2007). Literacy and its relationship with self-efficacy, trust, and participation in medical decision making. *American Journal of Health Behavior, 31*(Suppl 1), S27-S35.

- Deyo, R. A., Diehl, A. K., Hazuda, H., & Stern, M. P. (1985). A simple language-based acculturation scale for Mexican Americans: Validation and application to health care research. *American Journal of Public Health, 75*(1), 51-55).
- Drug Utilization Research Group. (1997). Multicenter study on self-medication and self-prescription in six Latin American countries. *Clinical Pharmacology & Therapeutics, 61*(4), 488-493.
- Eggenberger, S. K., Grassley, J., & Restrepo, E. (2006). Culturally competent nursing care for families: Listening to the voices of Mexican-American women. *Online Journal of Issues in Nursing, 11*(3). Retrieved from <http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume112006/Number3/ArticlePreviousTopics/CulturallyCompetentNursingCare.aspx>
- Elder, J. P., Ayala, G. X., Parra-Medina, D., & Talavera, G. A. (2009). Health communication in the Latino community: Issues and approaches. *Annual Review of Public Health, 30*, 227-251. doi: 10.1146/annurev.publhealth.031308.100300
- Fernández, M. E., Gonzales, A., Tortolero-Luna, G., Williams, J., Saavedra-Embese, M., Chan, W., & Vernon, S. W. (2009). Effectiveness of *Cultivando la Salud*: A breast and cervical cancer screening promotion program for low-income Hispanic women. *American Journal of Public Health, 99*(5), 936-943. doi: 10.2105/AJPH.2008.136713
- Firestone, D. N., Jiménez-Briceño, L., Reimann, J. O., Talavera, G. A., Polonsky, W. H., & Edelman, S. V. (2004). Predictors of diabetes-specific knowledge and treatment

satisfaction among Costa Ricans. *The Diabetes Educator*, 30(2), 281-292. doi: 10.1177/014572170403000221

Funnell, M. M., Brown, T. L., Childs, B. P., Hass, L. B., Hosey, G. M., Jensen, B., ... Weiss, M. A. (2010). National standards for diabetes self-management education. *Diabetes Care*, 33(Suppl 1), S89-S96. doi: 10.2337/dc10-S089

Garcés, I. C., Scarinci, I. C., & Harrison, L. (2006). An examination of sociocultural factors associated with health and health care seeking among Latina immigrants. *Journal of Immigrant Health*, 8, 377-385. doi: 10.1007/s10903-006-9008-8

García, A. A. (2005). Symptom prevalence and treatments among Mexican Americans with type 2 diabetes. *The Diabetes Educator*, 31(4), 543-554. doi: 10.1177/0145721705278801

Gliner, J. A., & Morgan, G. A. (2000). *Research methods in applied settings: An integrated approach to design and analysis*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Goldstein, L. B., Adams, R., Alberts, M.J., Appel, L. J., Brass, L. M., Bushnell, C.D., ... Sacco, R. L. (2006). Primary prevention of ischemic stroke: A Guideline from the American Heart Association/American Stroke Association Stroke Council: Cosponsored by the Atherosclerotic Peripheral Vascular Disease Interdisciplinary Working Group; Cardiovascular Nursing Council; Clinical Cardiology Council; Nutrition, Physical Activity, and Metabolism Council; and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Stroke*, 37(6), 1583-1633. doi: 10.1161/01.STR.0000223048.70103.F1



- Guler, N., & Oguz, S. (2011). The spoken knowledge of low literacy in patients with diabetes. *Diabetes Research and Clinical Practice*. Epublished ahead of print March 2, 2011. doi: 10.1016/j.diabres.2011.02.008
- Guzmán, B. (2001). *The Hispanic population: Census 2000 brief*. Retrieved from U.S. Census Bureau website: <http://www.census.gov/prod/2001pubs/c2kbr01-3.pdf>
- Herce, M. E., Chapman, J. A., Castro, A., García-Salyano, G., & Khoshnood, K. (2010). A role for community health promoters in tuberculosis control in the state of Chiapas, Mexico. *Journal of Community Health, 35*, 182-189. doi: 10.1007/s10900-009-9206-0
- Herman, W. H., Ma, Y., Uwaifo, G., Haffner, S., Kahn, S. E., Horton, E. S., ... Barrett-Connor, E. (2007). Differences in A1C by race and ethnicity among patients with impaired glucose tolerance in the Diabetes Prevention Program. *Diabetes Care, 30*(10), 2453-2457. doi: 10.2337/dc06-2003
- Heuer, L., & Lausch, C. (2006). Living with diabetes: Perceptions of Hispanic migrant farmworkers. *Journal of Community Health Nursing, 23*(1), 49-64. doi: 10.1207/s15327655jchn2301\_5
- Heyman, J. M., Núñez, G. G., & Talavera, V. (2009). Healthcare access and barriers for unauthorized immigrants in El Paso County, Texas. *Family & Community Health, 32*(1), 4-21. doi: 10.1097/01.FCH.0000342813.42025.a3
- Hill-Briggs, F. & Smith, A. S. (2008). Evaluation of diabetes and cardiovascular disease print patient education materials for use with low-health literate populations. *Diabetes Care, 31*(4), 667-671. doi: 10.2337/dc07-1365

- Howell, L., Kochhar, K., Saywell, Jr., R., Zollinger, T., Koehler, J., Mandzuk, C., Allen, D. (2006). Use of herbal remedies by Hispanic patients: Do they inform their physician? *Journal of the American Board of Family Medicine*, 19(6), 566-578.
- Hu, J., Wallace, D. C., & Tesh, A. S. (2010). Physical activity, obesity, nutritional health and quality of life in low-income Hispanic adults with diabetes. *Journal of Community Health Nursing*, 27, 70-83. doi: 10.1080/07370011003704933
- Huang, E. S., Basu, A., O'Grady, M., & Capretta, J.C. (2009). Projecting the future diabetes population size and related costs for the U.S. *Diabetes Care*, 32(12), 2225-2229. doi: 10.2337/dc09-0459
- Huang, E. S., Brown, S. E. S., Thakur, N., Carlisle, L., Foley, E., Ewigman, B., & Meltzer, D. O. (2009). Racial/ethnic differences in concerns about current and future medications among patients with type 2 diabetes. *Diabetes Care*, 32(2), 311-316. doi: 10.2337/dc08-1307
- Huizinga, M. M., Elasy, T. A., Wallston, K. A., Cavanaugh, K., Davis, D., Gregory, R. P., ...Rothman, R. L. (2008). Development and validation of the Diabetes Numeracy Test (DNT). *BMC Health Services Research*, 8(96). doi: 10.1186/1472-6963-8-96. Retrieved from <http://www.biomedcentral.com/1472-6963/8/96>
- Hunt, L. M., Arrar, N. H., & Akana, L. L. (2000). Herbs, prayer, and insulin: Use of medical and alternative treatments by a group of Mexican American diabetes patients. *The Journal of Family Practice*, 49(3), 216-223.

- Johnson, L., Strich, H., Taylor, A., Timmermann, B., Malone, D., Teufel-Shone, N.,  
...Martinez, A. (2006). Use of herbal remedies by diabetic Hispanic women in the  
southwestern United States. *Phytotherapy Research*, 20, 240-255. doi:  
10.1002/ptr.1820
- Julliard, K., Vivar, J., Delgado, C., Cruz, E., Kabak, J., Sabers, H. (2008). What Latina  
patients don't tell their doctors: A qualitative study. *Annals of Family Medicine*,  
6(6), 543-549. doi: 10.1370/afm.912
- Kandula, N. R., Diez-Roux, A. V., Chan, C., Daviglius, M. L., Jackson, S. A., Ni, H., &  
Schreiner, P. J., (2008). Association of acculturation levels and prevalence of  
diabetes in the Multi-Ethnic Study of Atherosclerosis (MESA). *Diabetes Care*,  
31(8), 1621-1628. doi: 10.2337/dc07-2182
- Kemper, K. J., Amata-Kynvi, A., Dvorkin, L., Whelan, J., Woolf, A., Samuels, R. C., &  
Hibberd, P. (2003). Herbs and other dietary supplements: Healthcare  
professionals' knowledge, attitudes, and practices. *Alternative Therapies in  
Health and Medicine*, 9(3), 42-49.
- Kirk, J. K., Passmore, L. V., Bell, R. A., Venkat Narayan, K. M., D'Agostino, Jr., R. B.,  
Arcury, T. A., & Quandt, S. A. (2008). Disparities in A1C levels between  
Hispanic and non-Hispanic White adults with diabetes: A meta-analysis. *Diabetes  
Care*, 31(2), 240-246. doi: 10.2337/dc07-0382.
- King, D. K., Glasgow, R. E., Toobert, D. J., Strycker, L. A., Estabrooks, P.A., Osuna, D.,  
& Faber, A. J. (2010). Self-efficacy, problem solving, and social-environmental

- support are associated with diabetes self-management behaviors. *Diabetes Care*, 33(4), 751-743. doi: 10.2337/dc09-1746
- Kochhar, R., Suro, R., & Tafoya, S. (2005). *The new Latino south: The contest and consequences of rapid population growth*. Washington, DC: Pew Hispanic Center. Retrieved from <http://pewhispanic.org/files/reports/50.pdf>
- Kroeger, A., Ochoa, H., Arana, B., Diaz, A., Rizzo, N., & Flores, W. (2001). Inadequate drug advice in the pharmacies of Guatemala and Mexico: The scale of the problem and explanatory factors. *Annals of Tropical Medicine and Parasitology*, 95(6), 605-616. doi: 10.1080/00034980120092543
- Kuo, Y. F., Raji, M. A., Markides, K. S., Ray, L. A., Espino, D. V., & Goodwin, J. S. (2003). Inconsistent use of diabetes medications, diabetes complications, and mortality in older Mexican Americans over a 7-year period. *Diabetes Care*, 26(11), 3054-3060. doi: 10.2337/diacare.26.11.3054
- Larkin, M. E., Capasso, V. A., Chen, C.L., Mahoney, E. K., Hazard, B., Cagliero, E., & Nathan, D. M. (2008). Measuring psychological insulin resistance: Barriers to insulin use. *The Diabetes Educator*, 34(3), 511-517. doi: 10.1177/0145708317869
- Larson, E. L., Dilone, J., Garcia, M., & Smolowitz, J. (2006). Factors which influence Latino community members to self-prescribe antibiotics. *Nursing Research*, 55(2), 94-102.
- Lee, R., & Balick, M. J. (2003). Stealing the soul, *soumwahu en naniak*, and *susto*: Understanding culturally-specific illness, their origins and treatment. *Alternative Therapies in Health and Medicine*, 9(3), 106-108.

- Leininger, M. M. (2006). Culture care diversity and universality theory and evolution of the ethnonursing method. In M. M. Leininger & M. R. McFarland (Eds.), *Culture care diversity and universality: A worldwide nursing theory* (2<sup>nd</sup> ed.) (1-41). Sudbury, MA: Jones and Barlett.
- Leininger, M. M. (2007). Theoretical questions and concerns: Response from the theory of culture care diversity and universality perspective. *Nursing Science Quarterly*, 20(1) 9-15. doi: 10.1177/0894318406296784
- Lewis, M. P. (ed.). (2009). *Ethnologue: Languages of the world* (16<sup>th</sup> ed. ). Dallas, TX: SIL International. Online version retrieved from <http://www.ethnologue.com>
- Lopez, O. (2006). Chapter 9: Self-care practices and Hispanic women with diabetes. In R. R. Greene (Ed.), *Contemporary Issues of Care* (pp. 183-200). Binghamton, NY: The Haworth Press, Inc.
- Lopez, R. A. (2005). Use of alternative folk medicine by Mexican American women. *Journal of Immigrant Health*, 7(1), 23-31. doi: 10.1007/s10903-005-1387-8
- Lopez-Quintero, C., Berry, E. M., & Neumark, Y. (2009). Limited English proficiency is a barrier to receipt of advice about physical activity and diet among Hispanics with chronic diseases in the United States. *Journal of the American Dietetic Association*, 109(10), 1769-1774. doi: 10.1016/j.jada.2009.07.003
- Lorig, K. R., Ritter, P. L., & González, V. M. (2003). Hispanic chronic disease self-management. *Nursing Research*, 52(6), 361-368.

- Lorig, K., Ritter, P. L., Villa, F., & Piette, J. D. (2008). Spanish diabetes self-management with and without automated telephone reinforcement: Two randomized trials. *Diabetes Care*, *31*(3), 408-14. doi: 10.2337/dc07-1313
- Lujan, J. (2008). Testing the diabetes knowledge and health beliefs of Mexican Americans on the Texas-Mexico border. *Hispanic Health Care International*, *6*(1), 9-20. doi: 10.1891/1540-4153.6.1.9
- Lujan, J., & Campbell, H. B. (2006). The role of religion on the health practices of Mexican Americans. *Journal of Religion and Health*, *45*(2), 183-195. doi: 10.1007/s10943-006-9019-8
- Lujan, J., Ostwald, S. K., & Ortiz, M. (2007). *Promotora* diabetes intervention for Mexican Americans. *The Diabetes Educator*, *33*(4), 660-670. doi: 10.1177/0145721707304080
- MacNaughton, N. S. (2008). Health disparities and health-seeking behavior among Latino men: A review of the literature. *Journal of Transcultural Nursing*, *19*(1), 83-91. doi: 10.1177/1043659607309144
- Mainous, A. G., III, Diaz, V. A., & Carnemolla, M. (2009). A community intervention to decrease antibiotics used for self-medication among Latino adults. *Annals of Family Medicine*, *7*(6), 520-526. doi: 10.1370/afm.1061
- Mainous, A. G., III, Diaz, V. A., & Geesey, M. E. (2008). Acculturation and healthy lifestyle among Latinos with diabetes. *Annals of Family Medicine*, *6*(2), 131-137. doi: 10.1370/afm.814

- Mainous, A. G., III, Diaz, V. A., Saxena, S., & Geesey, M. E. (2007). Heterogeneity in management of diabetes mellitus among Latino ethnic subgroups in the United States. *Journal of the American Board of Family Practice*, 20(6), 598-605. doi: 10.3122/jabfm.2007.06.070115
- Mainous, A. G., III, Majeed, A., Koopman, R. J., Baker, R., Everett, C. J., Tilley, B. C., & Diaz, V. A. (2006). Acculturation and diabetes among Hispanics: Evidence from the 1999-2002 National Health and Nutrition Examination Survey. *Public Health Reports*, 121(1), 60-66.
- Mann, D. M., Ponieman, D., Leventhal, H., & Halm, E. A. (2009). Misconceptions about diabetes and its management among low-income minorities with diabetes. *Diabetes Care*, 32(4), 591-593. doi: 10.2337/dc08-1837
- Marín, G. & Gamba, R. J. (1996). A new measurement of acculturation for Hispanics: The Bidimensional Acculturation Scale for Hispanics (BAS). *Hispanic Journal of Behavioral Sciences*, 18(3), 297-316. doi: 10.1177/07399863960183002
- Marin, G., Sabogal, F., Marin, B. V, Otero-Sabogal, Y Perez-Stable, E. (1987). Development of a Short Acculturation Scale for Hispanics. *Hispanic Journal of Behavioral Sciences*, 9(2), 183-205. doi: 10.1177/07399863870092005
- Mauldon, M., Melkus, G. D., & Cagganello, M. (2006). *Tomando* control: A culturally appropriate diabetes education program for Spanish-speaking individuals with type 2 diabetes mellitus—evaluation of a pilot project. *The Diabetes Educator*, 32(5), 751-760. doi: 10.1177/0145721706291999

- McCabe, M., Gohdes, D., Morgan, F., Eakin, J., & Schmitt, C. (2006). Training effective interpreters for diabetes care and education: A new challenge. *The Diabetes Educator, 32*(5), 714-720. doi: 10.1177/0145721706292101
- McEwen, M. M., Baird, M., Pasvogel, A., & Gallegos, G. (2007). Health–illness transition experiences among Mexican immigrant women with diabetes. *Family & Community Health, 30*(3), 201-212. doi: 10.1097/01.FCH.0000277763.70031.0d
- McGuire, S. (2006). Agency, initiative, and obstacles to health among indigenous immigrant women from Oaxaca, Mexico. *Home Health Care Management & Practice, 18*(5), 370-377. doi: 10.1177/1084822306288057
- Mendelson, C. (2002). Health perceptions of Mexican American women. *Journal of Transcultural Nursing, 13*(3), 210-217. doi: 10.1177/10459602013003010
- Miech, R. A., Kim, J., McConnell, C., & Hamman, R. F. (2009). A growing disparity in diabetes-related mortality: U.S. trends, 1989-2005. *American Journal of Preventive Medicine, 36*(2), 126-132. doi: 10.1016/j.amepre.2008.09.041
- Mikhail, N., Wali, S., & Ziment, I. (2004). Use of alternative medicine among Hispanics. *The Journal of Alternative and Complementary Medicine, 10*(5), 851-859.
- Misra, R., & Lager, J. (2009). Ethnic and gender differences in psychosocial factors, glycemic control, and quality of life among adult type 2 diabetic patients. *Journal of Diabetes and Its Complications, 23*, 54-64. doi: 10.1016/j.jdiacomp.2007.11.003
- Musgrave, C. F., Allen, C. E., & Allen, G. J. (2002). Spirituality and health for women of color. *American Journal of Public Health, 92*(4), 557-560.



- Najm, W., Reinsch, S., Hoehler, F., & Tobis, J. (2003). Use of complementary and alternative medicine among the ethnic elderly. *Alternative Therapies in Health and Medicine, 9*(3), 50-57.
- Nápoles-Springer, A. M., Santoyo, J., Houston, K., Pérez-Stable, E. J., & Stewart, A. L. (2005). Patients' perceptions of cultural factors affecting the quality of their medical encounters. *Health Expectations, 8*(1), 4-17. doi: 10.1111/j.1369-7625.2004.00298.x
- National Center for Health Statistics. (2009). *Health, United States, 2008 with chartbook*. Hyattsville, MD: U.S. Government Printing Office.
- National Center for Health Statistics. (2010). *Health, United States, 2009: In brief*. Hyattsville, MD: U.S. Government Printing Office.
- National Cholesterol Education Program. (2001). *Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Executive Summary* (NIH Publication No. 01-3670). Retrieved from <http://www.nhlbi.nih.gov/guidelines/cholesterol/atp3sum.pdf>
- National Diabetes Education Program. (2004). *4 pasos para controlar la diabetes de por vida* (NIH Publication No. 08-5492S). Bethesda, MD: National Diabetes Education Program, National Institutes of Health, Centers for Disease Control and Prevention.
- National Diabetes Education Program. (2006). *4 steps to control your diabetes for life* (NIH Publication No. 08-5492). Bethesda, MD: National Diabetes Education

Program, National Institutes of Health, Centers for Disease Control and Prevention.

National High Blood Pressure Education Program. (2003). *JNC 7 Express: The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (NIH Publication No. 03-5233). Retrieved from <http://www.nhlbi.nih.gov/guidelines/hypertension/express.pdf>

Neighbor, C. J., Marquez, D. X., & Marcus, B. H. (2008). Leisure-time physical activity disparities among Hispanic subgroups in the United States. *American Journal of Public Health, 98*(1), 12-16. doi: 10.2105/AJPH.2006.096982

Neumiller J. J., Sclar, D. A., Robison, L. M., Maldonado, A. L., Setter, S. M., & Skaer, T. L. (2010). Ethnicity/race and the extent of physician-ordered hemoglobin A1C during US office-based visits by patients with diabetes mellitus. *The Diabetes Educator, 36*, 65-66. doi: 10.1177/0145721709358463

Newman, T. B., Browner, W. S., Cummings, S.R., & Hulley, S. B. (2007). Designing cross-sectional and case-control studies. In S. B. Hulley, S. R. Cummings, W. S. Browner, D. G. Grady, & T. B. Newman (Eds.), *Designing clinical research* (3<sup>rd</sup> ed., pp. 108-126). Philadelphia: Lippincott Williams & Wilkins, a Wolters Kluwer business.

Nielsen-Bohlman, L., Panzer, A. M., & Kindig, D. A. (Eds.). (2004). *Health literacy: A prescription to end confusion*. Washington, DC: The National Academies Press.

- Nolen, A. L., Ball, R., Piñón, M., & Shepherd, M. (2002). Using medications purchased in Mexico: Position statement of the Texas Society of Health-System Pharmacists. *American Journal of Health-System Pharmacy*, 59, 1289-1290.
- North Carolina Center for Health Statistics. (2009). *2008 Behavioral Risk Factor Surveillance System results: North Carolina*. Retrieved from <http://www.schs.state.nc.us/SCHS/brfss/2008/>
- North Carolina Center for Health Statistics. (2010). *2009 Behavioral Risk Factor Surveillance System results: North Carolina*. Retrieved from <http://www.schs.state.nc.us/SCHS/brfss/2009/nc/all/topics.html>
- North Carolina Division of Public Health, & Diabetes Prevention and Control. (2009). *North Carolina Diabetes Prevention & Control fact sheet September 2009: Diabetes in North Carolina*. Retrieved from [http://www.ncdiabetes.org/\\_pdf/DIABETES%20IN%20NC%20WEB.pdf](http://www.ncdiabetes.org/_pdf/DIABETES%20IN%20NC%20WEB.pdf)
- North Carolina Institute of Medicine. (2009). *Health care access: Expanding access to health care in North Carolina*. Morrisville, NC: Author. Retrieved from <http://www.nciom.org>
- Office of Minority Health. (2001). *National standards for culturally and linguistically appropriate series in health care: Executive summary*. Retrieved from <http://www.omhrc.gov/assets/pdf/checked/executive.pdf>
- Office of Minority Health. (2009, November 21). *Hispanic/Latino profile*. Retrieved from <http://minorityhealth.hhs.gov/templates/browse.aspx?lvl=2&lvlid=54>

- Oomen, J. S., Owen, L. J., & Suggs, L. S. (1999). Culture counts: Why current treatment models fail Hispanic women with type 2 diabetes. *The Diabetes Educator*, 25(2), 220-225. doi: 10.1177/014572179902500207
- Ortiz, B. I., Shields, K. M., Clauson, K. A., & Clay, P. G. (2007). Complementary and alternative medicine use among Hispanics in the United States. *The Annals of Pharmacotherapy*, 41, 994-1004. doi: 10.1345/aph.1H600
- Pachter, L. M. (1994). Culture and clinical care: Folk illness beliefs and behaviors and their implications for health care delivery. *Journal of the American Medical Association*, 271(9), 690-694.
- Paez, K. A., Zhao, L., & Hwang, W. (2009). Rising out-of-pocket spending for chronic conditions: A ten-year trend. *Health Affairs*, 28(1), 15-25. doi: 10.1377/hlthaff.28.1.15
- Page, R. L. (2006). Acculturation in Mexican immigrants: A concept analysis. *Journal of Holistic Nursing*, 24(4), 270-278. doi: 10.1177/0898010106289839
- Passel, J. S., & Cohn, D. V. (2011). *Unauthorized immigrant population: National and state trends, 2010*. Washington, DC: Pew Hispanic Center. Retrieved from <http://www.pewhispanic.org>
- Peikes, D., Genevro, J., Scholle, S. H., & Torda, P. (2011). *The patient-centered medical home: Strategies to put patients at the center of primary care* (AHRQ Pub. No. 11-0029). Rockville, MD: Agency for Healthcare Research and Quality.
- Pew Forum on Religion & Public Life. (2007). *Changing faiths: Latinos and the transformation of American religion*. Washington, DC: Pew Hispanic Center.

Retrieved from <http://pewforum.org/newassets/surveys/hispanic/hispanics-religion-07-final-mar08.pdf>

Pew Hispanic Center. (2009a). *Between two worlds: How young Latinos come of age in America*. Washington, DC: Author. Retrieved from

<http://pewhispanic.org/reports/Report.php?ReportID=117>

Pew Hispanic Center. (2009b). *Demographic profile of Hispanics living in North Carolina, 2007*. Washington, DC: Author. Retrieved from

[http://pewhispanic.org/states/pdf/NC\\_07.pdf](http://pewhispanic.org/states/pdf/NC_07.pdf)

Pew Hispanic Center. (2009c). *Statistical portrait of Hispanics in the United States, 2007*. Washington, DC: Author. Retrieved from

<http://pewhispanic.org/factsheets/factsheet.php?FfactsheetID=46>

Pew Hispanic Center. (2010). *Demographic profile of Hispanics in North Carolina, 2008*. Washington, DC: Author. Retrieved from

<http://pewhispanic.org/states/?stateid=NC>

Pew Hispanic Center. (2011). *Statistical portrait of Hispanics in the United States, 2009*. Washington, DC: Author. Retrieved from

<http://pewhispanic.org/factsheets/factsheet.php?FactsheetID=70>

Phua, D. H., Zosel, A., & Heard, K. (2009). Dietary supplements and herbal medicine toxicities—when to anticipate them and how to manage them. *International Journal of Emergency Medicine*, 2(2), 69-76. doi: 10.1007/s12245-009-0105-z

- Piette, J. D., Bibbins-Domingo, K., & Schillinger, D. (2006). Health care discrimination, processes of care, and diabetes patients' health status. *Patient Education and Counseling, 60*, 41-48. doi: 10.1016/j.pec.2004.12.001
- Polit, D. F. (1996). *Data analysis & statistics for nursing research*. Upper Saddles River, NJ: Prentice Hall.
- Poss, J., & Jezewski, M. A. (2002). The role and meaning of *susto* in Mexican Americans' explanatory model of type 2 diabetes. *Medical Anthropology Quarterly, 16*(3), 360-377.
- Poss, J., Pierce, R., & Prieto, V. (2005). Herbal remedies used by selected migrant farmworkers in El Paso, Texas. *The Journal of Rural Health, 21*(2), 187-191. doi: 10.1111/j.1748-0361.2005.tb00081.x
- Poss, J. E., Jezewski, M. A., & Stuart, A. G. (2003). Home remedies for type 2 diabetes used by Mexican Americans in El Paso, Texas. *Clinical Nursing Research, 12*(4), 304-323. doi: 10.1177/1054773803256872
- Reyes-Ortiz, C. A., Rodriguez, M., & Markides, K. S. (2009). The role of spirituality healing with perceptions of the medical encounter among Latinos. *Journal of General Internal Medicine, 24*(Suppl 3), S542-S547. doi: 10.1007/s11606-009-1067-9
- Reimann, J. O. F., Talavera, G. A., Salmon, M., Nuñez, J. A., & Velasquez, R. J. (2004). Cultural competence among physicians treating Mexican Americans who have diabetes: A structural model. *Social Science & Medicine, 59*, 2195-2205. doi: 10.1016/j.socscimed.2004.03.025

- Richards, L., & Morse, J. M. (2007). *Readme first for a user's guide to qualitative methods* (2<sup>nd</sup> ed.). Thousand Oaks, CA: SAGE Publications.
- Roberts, T. E. (2007). Health practices and expectations of Brazilians in the United States. *Journal of Cultural Diversity*, 14(4), 192-197.
- Rothman, R. L., Malone, R., Bryant, B., Wolfe, C., Padgett, P., DeWalt, D. A.,...Pignone, M. (2005). The Spoken Knowledge in Low Literacy in Diabetes Scale: A diabetes knowledge scale for vulnerable patients. *The Diabetes Educator*, 31(2), 215-224. doi: 10.1177/0145721705275002
- Sánchez, M. S. (2007). Mexican American women's pathways to health. *Family & Community Health*, 30(Suppl 1 to January-March), S43-S52.
- Schillinger, D., Grumbach, K., Piette, J., Wang, F., Osmond, D., Daher, C., ...Bindman, A. B. (2002). Association of health literacy with diabetes outcomes. *Journal of the American Medical Association*, 288(4), 475-482. doi: 10.1001/jama.288.4.475
- Schneider, S. D. (2009). Radical remedies: Women, health, and the micropolitics of grassroots organizing in Mexico. *Medical Anthropology Quarterly*, 23(3), 235-256. doi: 10.1111/j.1548-1387.2009.01058.x
- Schoenberg, N. E., Stoller, E. P., Kart, C. S., Perzynski, A., & Chapleski, E. E. (2004). Complementary and alternative medicine use among a multiethnic sample of older adults with diabetes. *The Journal of Alternative and Complementary Medicine*, 10(6), 1061-1066. doi: 10.1089/acm.2004.10.1061

- Schumacher, G. (2010). Culture care meanings, beliefs, and practices in rural Dominican Republic. *Journal of Transcultural Nursing, 21*(2), 93-103. doi: 10.1177/1043659609357635
- Shah, N. S. & Carrasquillo, O. (2006). Twelve-year trends in health insurance coverage among Latinos, by subgroup and immigration status. *Health Affairs, 25*(6), 1612-1619. doi: 10.1377/hlthaff.25.6.1612
- Shapiro, K., & Gong, W. C. (2002). Natural products used for diabetes. *Journal of the American Pharmaceutical Association, 42*(2), 217-216.
- Shelley, B. M., Sussman, A. L., Williams, R. L., Segal, A. R., Crabtree, B. F., & the RIOS Net Clinicians. (2009). 'They don't ask me so I don't tell them': Patient-clinician communication about traditional, complementary, and alternative medicine. *Annals of Family Medicine, 7*(2), 139-147. doi: 10.137/afm.947
- Sixta, C. S., & Ostwald, S. (2008). Texas-Mexico border intervention by promotores for patients with type 2 diabetes. *The Diabetes Educator, 34*(2), 299-309. doi: 10.1177/0145721708314490
- Sleath, B., Blalock, S. J., Bender, D., Murray, M., Cerna, A., & Cohen, M. G. (2009). Latinos' sources of medication and medication information in the United States and their home countries. *Patient Education and Counseling, 75*(2), 279-282. doi: 10.1016/j.pec.2008.10.002
- Smedley, B. D., Stith, A. Y., & Nelson, A. R. (Eds.). (2003). *Unequal treatment: Confronting racial and ethnic disparities in health care*. Washington, D.C.: The National Academies Press.



- Sobralse, M. C., (2006). Community-based strategies to improve the health of Mexican American men. *International Journal of Men's Health*, 5(2), 153-171. doi: 10.3149/jmh.0502.153
- Spraycar, M. (Ed.). (1995). *Stedman's medical dictionary* (26<sup>th</sup> ed.). Baltimore, MD: Williams & Wilkins.
- State Center for Health Statistics, & North Carolina Department of Health and Human Services. (2009). Health profile of North Carolinians: 2009 update. Retrieved from <http://www.schs.state.nc.us/SCHS/pdf/HealthProfile2009.pdf>
- State Center for Health Statistics, & Office of Minority Health and Health Disparities. (2006). North Carolina minority health facts: Hispanics/Latinos. Retrieved from <http://schs.state.nc.us/SCHS/pdf/FactsHL.pdf>
- State Center for Health Statistics, & Office of Minority Health and Health Disparities. (2010). North Carolina minority health facts: Hispanics/Latinos. Retrieved from: [http://www.schs.state.nc.us/SCHS/pdf/Hispanic\\_FS\\_WEB/\\_080210.pdf](http://www.schs.state.nc.us/SCHS/pdf/Hispanic_FS_WEB/_080210.pdf)
- Suro, R., & Singer, A. (2002). *Latino growth in metropolitan America: Changing patterns, new locations*. Washington, DC: The Brookings Institution.
- Sullivan Commission. (2004). *Missing persons: Minorities in the health professions: A report of The Sullivan Commission on Diversity in the Healthcare Workforce*. Retrieved from <http://www.aacn.nche.edu/media/pdf/sullivanreport.pdf>
- Tabachnick, B.G., & Fidell, L. S. (2007). *Using multivariate statistics* (5<sup>th</sup> ed.) Boston, MA: Pearson Education.

- Tafur, M. M., Crowe, T., K., Torres, E. (2009). The review of *curanderismo* and healing practices among Mexicans and Mexican Americans. *Occupational Therapy International*, 16(1), 82-88. doi: 10.1002/oti.265
- Toobert, D. J., Hampson, S. E., & Glasgow, R. E. (2000). The Summary of Diabetes Self-Care Activities measure: Results from 7 studies and a revised scale. *Diabetes Care*, 23(7), 943-950.
- Tucker, K. L., Mattei, J., Noel, S. E., Collado, B. M., Mendez, J., Nelson, J. ... Falcon, L. M. (2010). The Boston Puerto Rican Health Study, a longitudinal cohort study on health disparities in Puerto Rican adults: Challenges and opportunities. *BMC Public Health*, 10(107). Retrieved from <http://www.biomedcentral.com/1471-2458/10/107>
- U.S. Census Bureau. (2007). *The American community—Hispanics: 2004; American Community Survey Reports (ACS-03)*. Retrieved from <http://www.census.gov/prod/2007pubs/acs-03.pdf>
- U.S. Census Bureau. (2008a). *Table 4. Projections of the population by sex, race, and Hispanic origin for the United States: 2010 to 2050*. Retrieved from <http://www.census.gov/population/www/projections/files/nation/summary/np2008-t4.xls>
- U.S. Census Bureau. (2008b). U.S. Hispanic population surpasses 45 million: Now 15 percent of total, (CB08-67). Retrieved from <http://www.census.gov/Press-Release/www/releases/archives/population/011910.html>

- U.S. Census Bureau. (2010a, April 22, last revised). State & county quickfacts: Davidson County, North Carolina. Retrieved from <http://quickfacts.census.gov/qfd/states/37/37057.html>
- U.S. Census Bureau. (2010b, April 22, last revised). State & county quickfacts: Davie County, North Carolina. Retrieved from <http://quickfacts.census.gov/qfd/states/37/37059.html>
- U.S. Census Bureau. (2010c, April 22, last revised). State & county quickfacts: Forsyth County, North Carolina. Retrieved from <http://quickfacts.census.gov/qfd/states/37/37067.html>
- U.S. Census Bureau. (2010d, April 22, last revised). State & county quickfacts: Guilford County, North Carolina. Retrieved from <http://quickfacts.census.gov/qfd/states/37/37081.html>
- U.S. Census Bureau. (2010e, April 22, last revised). State & county quickfacts: North Carolina. Retrieved from <http://quickfacts.census.gov/qfd/states/37000.html>
- U.S. Census Bureau. (2010f, April 22, last revised). State & county quickfacts: Yadkin County, North Carolina. Retrieved from <http://quickfacts.census.gov/qfd/states/37/37197.html>
- U.S. Department of Commerce. (2009). Hispanic heritage month 2009: Sept. 15 - Oct. 15. *U.S. Census Bureau News: Facts for features*, CB09-FF, 17. Retrieved from [http://www.census.gov/Press-Release/www/releases/pdf/cb09ff-17\\_hispmonth09eng.pdf](http://www.census.gov/Press-Release/www/releases/pdf/cb09ff-17_hispmonth09eng.pdf)

- U.S. Department of Health and Human Services. (2010, December 2). *HHS announces the nation's new health promotion and disease prevention agenda*. Retrieved from <http://www.hhs.gov/news/press/2010pres/12/20101202a.html>
- U.S. Department of Health and Human Services. (n.d.). *Healthy people 2020 topics & objectives: Diabetes*. Retrieved from <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=8>
- U.S. Department of Homeland Security. (2010). Persons obtaining legal permanent resident status during fiscal year 2009 by state of residence and selected characteristics: State: North Carolina. Retrieved from <http://www.dhs.gov/files/statistics/data/DSLPR09s.shtm>
- Vincent, D. (2009). Culturally tailored education to promote lifestyle change in Mexican Americans with type 2 diabetes. *Journal of the American Academy of Nurse Practitioners, 21*(2), 520-527. doi: 10.1111/j.1745-7599.2009.00439x
- Vincent, D., McEwen, M. M., & Pasvogel, A. (2008). The validity and reliability of a Spanish version of the Summary of Diabetes Self-Care Activities questionnaire. *Nursing Research, 57*(2), 101-106. doi: 10.1097/01.NNR.0000313484.18670.ab
- Vincent, D., Pasvogel, A., & Barrera, L. (2007). A feasibility study of a culturally tailored diabetes intervention for Mexican Americans. *Biological Research in Nursing, 9*(2), 130-141. doi: 10.1177/1099800407304980

- Wallace, S. P., Gutiérrez, V. F., & Castañeda, X. (2008). Access to preventive services for adults of Mexican origin. *Journal of Immigrant Minority Health, 10*, 363-371. doi: 10.1007/s10903-007-9093-3
- Weller, S. C., Baer, R. D., Pachter, L. M., Trotter, R. T., Glazer, M., Garcia de Alba Garcia, J. E., & Klein R. E. (1999). Latino beliefs about diabetes. *Diabetes Care, 22*(5), 722-728. doi: 10.2337/diacare.22.5.722
- Weiler, D. M. (2007). The socio-cultural influences and process of living with diabetes for the migrant Latino adult. (Doctoral dissertation, University of Arizona, 2007). *Dissertation Abstracts International, 68*(10B), 6592-6726.
- Weiler, D. M., & Crist, J. D. (2009). Diabetes self-management in a Latino social environment. *The Diabetes Educator, 35*(2), 285-292. doi: 10.1177/0145721708329545
- Whittemore, R. (2007). Culturally competent interventions for Hispanic adults with type 2 diabetes: A systematic review. *Journal of Transcultural Nursing, 18*(2), 157-166. doi: 10.1177/1043659606298615
- Yeh, G. Y., Eisenberg, D. M., Kaptchuk, T. J., & Phillips, R. S. (2003). Systematic review of herbs and dietary supplements for glycemic control in diabetes. *Diabetes Care, 26*(4), 1277-1294. doi: 10.2337/diacare.26.4.1277
- Yeh, M. Viladrich, A., Bruning, N., & Roye, C. (2009). Determinants of Latina obesity in the United States: The role of selective acculturation. *Journal of Transcultural Nursing, 20*(1), 105-115. doi: 10.1177/1043659608325846

Zambrana, R. E., & Carter-Pokras, O. (2010). Role of acculturation research in advancing science and practice in reducing health care disparities among Latinos. *American Journal of Public Health, 100*(1), 18-23. doi: 10.2105/AJPH.2008.138826

APPENDIX A

PERMISSION TO USE THE SUNRISE ENABLER

*Copy retained for my files*

March 25, 2010

*March 31, 2010  
From Professor Dr. Leininger*

Dear Dr. Leininger,

I am writing to request permission to use the Sunrise Enabler in my dissertation study. I will be exploring the traditional, complementary, and alternative self-care behaviors and practices of Latinos/Hispanics with type 2 diabetes and will be informing the study with your Culture Care Diversity and Universality theory.

I am requesting permission to obtain and print the Sunrise Enabler in my dissertation chapters, on any poster or powerpoint presentation, or journal article that I may do/write in order to disseminate the findings of my dissertation. In regards to journal articles, please advise me if you would prefer that I request permission for each article as this is an unknown entity to me at this time. The theory as well as the Sunrise Enabler would be appropriately accredited.

Dr. Leininger, thank you so much for all of your hard work and forging the way for all of us to become transcultural nurses who can work with diverse populations in a more knowledgeable, collaborative, and sensitive manner to better assist cultural groups in achieving better health and health outcomes. The hours and thought you have put into developing this theory and the guiding enablers is "mind boggling" to consider.

Sincerely,

*Karen Amirehsani*  
Karen A. Amirehsani, MSN, FNP-BC  
PhD Nursing Student  
The University of North Carolina at Greensboro  
111 Wolf Hill Drive  
Mooresville, NC, 28117  
email: kaamireh@uncg.edu

*3/31/10  
Dear Karen Amirehsani  
I hereby grant you permission to use and print my Sunrise Enabler and major theoretical ideas from my Culture Care Diversity and Universality theory contained in it, all of the author (and the pages of the book) and your page 1 of the book. I am pleased you are using my theory and work in your dissertation on Patient, Hispanic & this permission will suffice. Because I do not feel general permission is not to be granted by using my permission. Thank you for your appreciation of my work. It is a joy to know many are using my work, publications & ideas. Best wishes to complete the study.*

*Kindly send me any abstracts and your findings and a brief on the study for my files. I wish you success in all of your endeavors.  
Dr. Leininger*