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UNIVERSITY OF SAN DIEGO

Hahn School of Nursing and Health Science

DOCTOR OF PHILOSOPHY IN NURSING

DETERMINANTS OF HEALTH-RELATED QUALITY OF LIFE IN ARAB

AMERICAN PATIENTS WITH TYPE 2 DIABETES

by

Yousef Zakarni

A dissertation presented to the

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requirements for the degree

DOCTOR OF PHILOSOPHY IN NURSING

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Dissertation Committee

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Abstract

HRQL is an important aspect of chronic illnesses such as diabetes and needs to be considered by healthcare providers. It is one of the most important outcomes of healthcare interventions, representing an integral public health goal in Healthy People 2000, 2010, and 2020. Arab Americans (AAs), one of the most rapidly growing minorities in United States, tend to have a high prevalence of type 2 diabetes.

The purpose of this study was to describe determinants of HRQL, including social support attitude, religiosity, and select demographics for AA patients with type 2 diabetes. A descriptive correlational study using a cross sectional design was conducted. Self-administered questionnaires were completed by participants (N=185) recruited from mosques, churches, and two endocrinology outpatient clinics located in Southern California. Descriptive and inferential statistics were used to analyze the data. Multiple linear regression was performed to examine the variance in the physical component summary (PCS) and mental component summary (MCS) scores.

The majority of the participants were male (60%). The sample mean age was 58.9 (SD = 12.21) years. Mean MCS (43.78, SD = 6.30) and PCS (47.00, SD = 8.15) scores were below the 2009 US diabetes population norms. In the MCS model the data explained 15.2% of the variance ($F(6,178) = 5.302, p < .000$). Participants with greater intrinsic religiosity are expected to have higher MCS scores ($\beta = .043, p = .036$). Participants with stroke are expected to have lower MCS scores ($\beta = -10.208, p = .000$). In the PCS model the data explained 47.3% of the variance ($F(18,147) = 7.333, p <$

.000). Participants with neuropathy ($\beta = -3.397$, $p = .039$) who are unemployed or retired ($\beta = -1.656$, $p = .046$), or who have higher BMI ($\beta = -.306$, $p = .005$) are expected to have lower PCS scores. Married participants ($\beta = 3.168$, $p = .037$) and participants with greater social support attitudes ($\beta = .824$, $p = .007$) are expected to have higher PCS scores.

AA patients with type 2 diabetes and with a history of stroke or neuropathy, or who are unemployed, retired, unmarried, or who have a high BMI may need close monitoring of their HRQL. Future interventions to improve HRQL should be designed that include considerations of religiosity and promote social support.

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Dedication

I dedicate this dissertation to my wonderful family, particularly to my precious wife, Weam Alkhatib, who has been standing next to me for the last seven years. I would not have achieved my personal and professional goals without your love, wisdom, and words of encouragement. To my heartbeats, my son Yanal and my daughter Retal, today I dedicate my doctoral dissertation to both of you because without the love in your eyes and the touch of your hands, I would not have reached this achievement.

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I love you all.

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"He who does not thank people, does not thank Allah"

--Prophet Mohammad, Peace Be Upon Him

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CHAPTER I

INTRODUCTION

Diabetes mellitus is a complex, chronic disease associated with several short-term and long-term complications that affect the eyes, kidneys, nerves, heart, skin, and feet. The total number of individuals with diabetes worldwide is projected to rise from 170 million in 2000 to about 370 million in 2030 (Wild, Roglic, Green, Sicree, & King, 2004). According to the American Diabetes Association (ADA, 2007), diabetes was the seventh leading cause of death in United States in 2006; 23.6 million Americans (7.8% of the population) have diabetes, and 1.6 million new cases of diabetes are diagnosed in those aged 20 years and older each year. More than 35% of people aged 20 years and older with diabetes have a chronic kidney disease (Centers for Disease Control and Prevention [CDC], 2010). In comparison, according to the ADA's National Diabetes Fact Sheet (2011a), a total of 25.8 million children and adults in the US (8.3% of the population) have diabetes, and 1.9 million new cases of diabetes are diagnosed in people aged 20 years and older.

In 2010, diabetes was the leading cause of kidney failure, non-traumatic lower limb amputations, new cases of blindness among US adults, and a major cause of heart

disease and stroke. Twelve percent of patients with diabetes take insulin, while 58% take oral medication only. These findings suggest that the prevalence of diabetes is increasing, and the majority of patients with diabetes are diagnosed with type 2 diabetes. Therefore, type 2 diabetes is an important study area and was the focus of this dissertation study.

The term *Arab* is applied to people who live in the region that extends from North Africa to the Middle East and spans 22 countries. This term is not a racial classification, as it includes people with widely varied physical features. There are 359 million persons who reside in the Arab region (United Nations Development Program, 2010). Arab Americans (AAs) are citizens or residents of the US who originally emigrated from the Arab countries and/or trace their ancestry, culture, linguistic heritage, or identity to the Arab origin population.

Arab immigration to the US goes back to 1890s. Due to political instability in the Middle East, the immigration rate increased in the early 1970s. It is estimated that the AA population grew by 65% between 1990 and 2000, and the most recent estimate of the AA population in the US is approximately 3.5 million (Arab Americans Institute Foundation [AAIF], 2008). California is the state with the largest population of AAs in the US (de la Cruz & Brittingham, 2003). Sixty percent of the Arab population of California lives in Southern California (de la Cruz & Brittingham, 2005).

Statement of Problem and Rationale

Studying AAs' health-related quality of life (HRQL) is important, as AAs are one of the most rapidly growing minorities in the US and have unique needs from the general population. AAs have their own language, culture, historical identity, traditional norms, family structure, gender roles, beliefs about health, and religious affiliations

distinguishing them from other ethnicities (Berlie, Herman, Brown, Hammad, & Jaber, 2008). The large majority of AAs are followers of Islam, while others are members of such Christian groups as the Chaldean Catholic Church. Religious beliefs may affect AAs perception of health and illnesses and play a major role in regulating their spheres of life (Berlie et al., 2008).

According to the ADA's national survey (2011a), the prevalence of diabetes varies according to race/ethnicity, with 7.1% of non-Hispanic Whites, 8.4% of Asian Americans, 12.6% of non-Hispanic Blacks, and 11.8% of Hispanics having diabetes. "White" is defined as a racial category and refers to those persons having origins in any of the original peoples of Europe, the Middle East, or North Africa (Office of Management and Budget, 2011). Therefore, AAs are considered in US governmental statistics as a part of the White race; however, little attention in terms of race and health status has been given to AAs as a subcategory of the White race (Berlie et al., 2008).

The prevalence of diabetes among AAs is high. Surveys conducted by the Arab Community Center for Economic and Social Services (ACCESS) suggest a high prevalence of chronic diseases including diabetes, underuse of health services, and limited preventative health practices among AAs (Kulwicki, 1990; Hammad & Kysia, 1996). The prevalence of diabetes among AAs in California has been documented at between 9.5% and 15% (Laffrey, Meleis, Lipson, Solomon, & Omidian, 1989; Qahoush, 2006).

The overall prevalence of diabetes among AAs in the community of Dearborn, Michigan, was 31.9% (Hammad, Kysia, Maleh, Ghafoor, & Rabah-Hammad, 1997), with 15.5% in women and 20.1% in men (Jaber et al., 2003). Another study conducted in

Southeast Michigan by Jamil et al. (2007) found that the prevalence of self-reported diabetes in AAs was 7.0%. According to another study conducted in Michigan, the prevalence of diabetes was 9.8% (Berlie et al., 2008). This suggests that in comparison to data from the ADA (2011a), the prevalence of diabetes among AAs is greater than among non-Hispanic Whites (7.1%), Asian Americans (8.4%), non-Hispanic Blacks (12.6%), and Hispanics (11.8%). In another comparative study of Black women and AA women in Michigan, there was no significant difference between the prevalence of diabetes among AA women (28%) and Black women (22%; Jamil et al., 2007). The proportional mortality ratio among AAs in California for diabetes was significantly elevated compared to non-Hispanic Whites (Nasseri, 2008).

Study Purpose

The overall purpose of this study was to describe determinants of HRQL among AA patients with type 2 diabetes. This study was guided by the integrative HRQL theory and Ferrans' conceptual model of Quality of Life (QoL) (Ferrans, 1990).

Specific Aims

The specific aims of this study were to:

1. Describe the socio-demographic factors (age, gender, birthplace, income, education, marital status, employment status, health insurance status and type, length of stay in the US, and religious affiliations and denominations), diabetes-related characteristics (family history, length of diabetes diagnosis, micro- and macro-vascular complications, comorbidities, obesity), spirituality/religiosity, diabetes acceptance, social

support, self-management behaviors, glycemic control, and HRQL among AA patients with type 2 diabetes;

2. Examine the strength and direction of the relationships between socio-demographic factors, diabetes-related characteristics, spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, glycemic control, and HRQL among AA patients with type 2 diabetes; and
3. Generate two statistical significant models (mental component summary – [MCS] and physical component summary [PCS]) that are fitted to the data explaining the variance in HRQL among AA patients with type 2 diabetes.

The additional exploratory aim of this study was to describe the reliability of the instruments utilized in the current study of AA patients with type 2 diabetes.

Significance of the Problem

Quality of life (QoL) is a complex and multifaceted construct that refers to individuals' perceived status in all life domains (Peterson & Bredow, 2009). The newer concept of health-related quality of life (HRQL) is more clearly defined. While many definitions of HRQL exist in the health care literature, for the purposes of this study the term is defined as self-perceived health and the general well-being domains of physical functioning, somatic sensations, physiological status, social interactions, functional capacity, and sense of well-being as influenced by health status (Diener & Suh, 1997).

Health care professionals should focus not only on objective vital signs, physical examination findings, and laboratory test values associated with diabetes treatment, but also on understanding the subjective impact of diabetes and its management for patients

with diabetes – in other words, their HRQL (Thommasen & Zhang, 2006). Therefore, patients' needs include both enhanced glycemic control and improved HRQL (Weinberger et al., 1994). HRQL became a national health standard for improving quality of care that bridges boundaries between disciplines and between social, mental, and medical services (CDC, 2011). Healthy People 2000, 2010, and 2020 identified HRQL as an integral public health goal; therefore, HRQL can serve as an indicator to monitor progress in achieving the nation's health goals (CDC, 2011).

The measurement of HRQL in population health can be helpful in estimating the burdens of various diseases, monitoring outcomes in clinical practice, and evaluating the effects of medical treatments. Further, interpreting HRQL surveillance data can help identify needs for health policies and legislation, allocate resources based on unmet needs, guide the development of strategic plans, and monitor the effectiveness of broad community interventions (CDC, 2011). Improving HRQL may lead to fewer office visits and hospitalizations and hence reduce health care costs (Stewart et al, 1989; CDC, 2000).

Relevant studies published in the literature demonstrate a high prevalence of diabetes among AAs. Additionally, a small number of research publications regarding this rapidly growing subpopulation of the White population exist compared with other subpopulations. The author found no currently published study assessing HRQL among AA patients with diabetes. Examining the socio-demographic factors, diabetes-related characteristics, spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, glycemic control, and HRQL of AA patients with type 2 diabetes may help health care practitioners to provide diabetes management in a more culturally sensitive way for this population.

Summary

This study built on the paucity of knowledge that is presently available for this culturally and ethnically diverse population and provides culturally sensitive scientific data that may affect diabetes management and HRQL for this population. Specifically, data from this study may assist in developing future preventative, management, and educational programs specifically appropriate for this cultural subpopulation. In addition, the findings of this study may guide future interventions, specifically for improving HRQL in this population, thus decreasing health care disparities. With the growing importance of nurse practitioners as primary care providers in the US health care environment, data from this study may inform mid-range theory development in this population for nurse theorists and serve as a basis for future nursing research.

In the following chapter, the researcher reviews the published literature relevant to this study, including variables of diabetes-related characteristics, religion-related factors, disease acceptance, social support, self-management behaviors, AAs, QoL, and HRQL in the overall US diabetic population. This literature review serves as a basis for the description of the method and findings of this study.

CHAPTER 2

LITERATURE REVIEW

Conceptual Framework

This researcher's interest in studying QoL occurs in the context of a philosophical phenomenon studied for hundreds of years. Florence Nightingale's involvement with the British military provided several examples of how nurses can promote QoL in individuals. This interest has intensified and become a focus of health care research in the past 15-20 years. Because of this growing research interest in QoL, mid-range theories about QoL have been developed (Meleis, 1997; Peterson & Bredow, 2009). Even though theories of QoL are not identified with a single theorist and are difficult to define and describe, this lack of clarity did not diminish its popularity as an outcome measure for patients tested in hundreds of published studies (Peterson & Bredow, 2009).

This study was guided by Ferrans' conceptual model of QoL (1990) and the integrative HRQL theory (Figure 1). HRQL measurement provides an understanding of the patient-perceived outcome experiences of chronic diseases, evaluation of procedures, medications, or other interventions between groups or populations (Peterson & Bredow, 2009). Utilizing Ferrans' (1990) conceptual model of QoL and the integrative HRQL

theory in this study provided valuable subjective and objective indicators of HRQL and the life domains that influence the HRQL among AA patients with type 2 diabetes.

Figure 1. Conceptual framework for HRQL

Ferrans' Conceptual Model of QoL

There are several conceptual models of QoL or HRQL. The theoretical framework that primarily guided this study is derived from Ferrans' conceptual model of QoL (Ferrans, 1990). Ferrans (1990, p. 15) provided a seminal definition of QoL as a person's "sense of well being that stems from satisfaction or dissatisfaction with the areas of life those are important to him or her". This model encompasses all major life domains, including health and functioning, socioeconomic, psychological and spiritual, and family.

The Ferrans and Powers QoL index (Ferrans & Powers, 1992) is the operational measure designed to represent their comprehensive construct of QoL. This model was tested among different ethnicities, including African Americans and Mexican Americans, and provided evidence that the elements of the model appropriately reflect QoL for segments of a population (Ferrans, 1996). To date, this model has not been tested in the AA population, but it constitutes an appropriate organizing framework for this study.

Health and functioning domain. Diabetes is associated with several disabilities and complications that greatly reduce QoL (Livneh & Antonak, 2005). The health and functioning domain is operationalized by diabetes-related characteristics consisting of family history of diabetes, length of diabetes diagnosis, micro- and macro-complications, comorbidities, and obesity. These variables demonstrated an influence on diabetic patients' health and physical functioning. Several studies demonstrated an association between the length of diabetes diagnosis (Redekop et al., 2002; Brown et al., 2004), presence of microvascular and macrovascular diabetes complications (Polonsky, 2000; Huang, Brown, Ewigman, Foley, & Meltzer, 2007; Al-Shehri, Taha, Bahnassy, & Salah, 2008; Lloyd, Sawyer, & Hopkinson, 2001; Glasgow, Ruggiero, Eakin, Dryfoos, &

Chobanian, 1997; Akinci et al., 2008; Kirk et al., 2001; Wexler et al., 2006), and obesity (Hill-Briggs, Gary, Hill, Bone, & Brancati, 2002; Rejeski et al., 2006), and the QoL of patients with diabetes. Patients with diabetes tend to have low physical activity, and level of physical activity was found to be a significant predictor for obesity and lower QoL (Glasgow et al., 1997; Maddigan, Feeny, & Johnson, 2005; Kalda, Rätsep, & Lember, 2008).

Socioeconomic domain. QoL has been documented to vary in relation to race or ethnicity (Rubin & Peyrot, 1999). However, Smith (2004) indicates ethnic/racial differences exist in QoL for socio-demographic reasons, not reasons of ethnicity or race. The socioeconomic domain is described by age, gender, birthplace, height, weight, income, educational level, marital status, employment status, health insurance status, length of stay in the US, and religious affiliation. These variables have been mainly investigated in research and in national surveys in relation to QoL.

Psychological/spiritual domain. The psychological domain is represented by the level of acceptance of the condition of diabetes by the patient. Knowledge of the condition can lead to development of anxiety about the disease's implications on daily life activities and future complications, resulting in denial of disease (Garay-Sevilla, Malacara, Gutierrez-Roa, & Gonzalez, 1999). Disease denial leads to improper self-management behaviors (Garay-Sevilla et al., 1999); however, individuals who accept diabetes are more likely to actively participate in proper self-management behaviors (Brownlee-Duffeck et al., 1987; Hayes et al., 1999). Additionally, greater acceptance of the diagnosis of diabetes has been associated with better QoL (Lager, 2006).

For this study, the spiritual domain is represented by an individual's spirituality/religiosity. While some researchers consider spirituality and religiosity

separate constructs, others use them interchangeably (O'Neill & Kenny, 1998; Rowe & Allen, 2004; Tanyi, 2002). This study used the mixed construct of "spirituality/religiosity," comprised of three dimensions: 1) search for support or access to spirituality/religiosity, 2) trust in higher guidance or source, and 3) reflection or positive interpretation of disease (Büssing, 2010). The broader conceptualization of spirituality/religiosity was appropriate for this study population, which consisted of persons from a wide spectrum of faith traditions, including variants of Islamic and Christian beliefs. Spirituality/religiosity was shown to be associated with an individual's QoL through practicing their religious beliefs in coping with their diseases (Sears, Rodrigue, Greene, Fauerbach, & Mills, 1997; Pargament, Koenig, Tarakeshwar, & Hahn, 2004).

Family domain. The family domain is represented by the attitudes of and social support received by an individual's children, spouse, and friends. Social support shows a strong influence on enhanced self-management behaviors and enhanced QoL in patients with diabetes (Glasgow & Toobert, 1988; DiMatteo, 2004; Sherman et al., 2000; Lager, 2006; McCracken, 2005; Tang, Brown, Funnell, & Anderson, 2008; Göz, Karaoz, Goz, Ekiz, & Cetin, 2007; Franks, Campbell, & Shields, 1992; Trief, Grant, Elbert, & Weinstock, 1998). Interestingly, some researchers found that patients with diabetes tend to have poor self-management behaviors due to social influences (Goodall & Halford, 1997). Sherman et al. (2000) also emphasize the significance of the individual's culture on self-management behaviors.

The Integrative HRQL Theory

QoL could be labeled as a meta theory because the construct refers to individuals' perceived status in all life domains, whereas HRQL is more fitted as a middle range theory because it is more limited in focus on life domains most directly influenced by health (Peterson & Bredow, 2009). Therefore, HRQL is a subcategory of global QoL. Nurses wishing to understand the effect of a condition on their patients or to judge the effectiveness of an illness treatment can make use of this middle range theory and the instruments designed to measure it (Peterson & Bredow, 2009).

The integrative HRQL theory is appropriate for nursing science because it involves the measurement of variables that have traditionally been important to nursing, constituting a holistic approach of the individual's responses to real or potential illness. A search of the literature returned no currently published studies that examine the HRQL of AA patients with type 2 diabetes.

Theorists and researchers have increasingly described HRQL as having three characteristics: multidimensionality, temporality, and subjectivity (Peterson & Bredow, 2009). Multidimensionality is reflected by major life domains identified as physiological, psychological, and sociological (Padilla & Grant, 1985). Other investigators emphasize the importance of the spiritual domains (Ferrans & Powers, 1985; Cella & Tulsky, 1990). Recent publications have featured physical, psychological, spiritual, emotional, and cognitive dimensions (Peterson & Bredow, 2009). Since HRQL is a subcategory of QoL, it is important to emphasize that some of its multiple dimensions – specifically its spiritual, psychological, and social life domains – overlap with the same life domains in Ferrans' conceptual model of QoL (Ferrans, 1990).

The temporal aspect of HRQL can be seen as a result of patients changing their self perceptions as they experience daily life events and process what they feel are QoL priorities (Sprangers & Schwartz, 1999; Peplau, 1994). Thus, a challenge to reliability in HRQL research findings includes potential concurrent life changes (Peterson & Bredow, 2009). Future longitudinal studies could be conducted to examine these changes over time.

Some scholars (Oleson, 1990; Zhan, 1991) assert that HRQL is primarily subjective in nature but may include objective assessment including income, education, and type of occupation. However, the majority of researchers consider HRQL as entirely subjective in nature, including the individual's satisfaction in various aspects of their lives (Cella, 1992; Cooley, 1998; Harrison, Juniper, & Mitchell-DiCenso, 1996; Murdaugh, 1997). Therefore, this study measured both the subjective and objective assessment of HRQL among AA patients with type 2 diabetes.

In this study, a total of seven health-related life domains were assessed that may affect the HRQL of AA patients with diabetes (Figure 1). Five of those life domains were assessed based on Ferrans' (1990) conceptual model of QoL, consisting of the health and functioning domain, socioeconomic domain, psychological/spiritual domain, and family domain. Use of the integrative HRQL added two more domains: cognitive and physiological. Adding these two domains was appropriate for this study, as this addition captured a more complete characterization of this phenomenon. Thus, this study framework is a hybridization of Ferrans' (1990) conceptual model of QoL with two additional domains added to more completely describe the factors that may affect HRQL for AA patients with type 2 diabetes.

Cognitive domain. An individual's self-management behaviors of diabetes consist of a complex regimen. These behaviors require a complex cognitive process including problem detection, sense making, decision making, and planning or re-planning (Klein & Lippa, 2008). Therefore, in this study the cognitive domain is operationalized as the degree of self-management behaviors performed by the patient.

Physiological domain. The physiological domain is represented by degree of glycemic control. Several variables influence patients with diabetes in their self-management behaviors and HRQL as discussed in this conceptual framework. Proper self-management behaviors improve QoL by achieving glycemic control (McCaul, Glasgow, & Schafer, 1987; Walsh, Katz, & Sechrest, 2002). Therefore, glycemic control has been a target to reflect diabetes control (Lau, Qureshi, & Scott, 2004). Barr, Nathan, Meigs, and Singer (2002) found that good diabetic control was determined by glycosylated hemoglobin A1c (HbA1c). Because HbA1c is the standardized test for the glycemic control (ADA, 2011b), glycemic control is considered to be in the physiologic domain in this study framework.

Researchers have found the relationship between glycemic control and QoL to be inconsistent. Improved glycemic control was associated with improved QoL in several studies (Testa & Simonson, 1998; Rubin & Peyrot, 1999; Glasgow, Toobert, & Gillette, 2001). On the other hand, other studies show no association between glycemic control and QoL (Bagne, Luscombe, & Damiano, 1995; Aalto, Uutela, & Aro, 1997; Kalda et al., 2008).

Diabetes

Diabetes is one of the chronic diseases widely discussed in the literature because of their high prevalence and complications in people all over the world. In 2004, 70% of Americans died from chronic diseases and more than 90 million suffered from a chronic condition (CDC, 2004). Diabetes is a multidimensional disease that has a major effect on an individual's QoL due to its complex self-care regimen and associated complications (Ahroni & Boyko, 2000; Maddigan et al., 2005). In addition to physiological, psychological, and long-term complications, diabetes can result in significant economic costs. The direct and indirect costs of diabetes in the US in 2007 totaled \$174 billion (ADA, 2007); \$116 billion in direct costs were for treatment and hospitalization, while \$58 billion in indirect costs were attributed to disability, work loss, and premature mortality.

The World Health Organization (WHO) gives two main objectives in caring for diabetic patients: 1) to maintain health and QoL through effective patient care and education, and 2) to treat and prevent diabetes complications that could decrease morbidity, mortality, and treatment costs (WHO, 2004). Diabetes patients tend to have a worse QoL than those with no chronic illness but a better QoL than patients with most other serious chronic diseases (Maddigan et al., 2005). Nonetheless, prolonged illness, pain, and disability contribute to a greatly diminished QoL for millions of Americans (Livneh & Antonake, 2005).

Recently, HRQL became a national health standard that can be used in direct patient care, clinical trials, program evaluation, and in monitoring the health status of a population (CDC, 2000). Because improving HRQL may lead to fewer office visits and

hospitalizations and reduced healthcare costs (Stewart et al., 1989; CDC, 2000), it is crucial to understand factors affecting HRQL. This review of literature identifies gaps in knowledge in the current healthcare literature and focuses on the main variables affecting the diabetic patient's HRQL.

Prevalence of Diabetes in AA Populations

Surveys conducted by the Arab Community Center for Economic and Social Services (ACCESS) suggest a high prevalence of chronic diseases including diabetes, underuse of health services, and limited preventative health practices in AAs (Kulwicki, 1990; Hammad & Kysia, 1996). The prevalence of diabetes in AAs in California has been documented at 15% (Laffrey et al., 1989) and 9.5% (Qahoush, 2006). The overall prevalence of diabetes in AAs in the community of Dearborn, MI, was 31.9% (Hammad et al., 1997), with 15.5% in women and 20.1% in men (Jaber et al., 2003). Findings from another study of Michigan's AA population included a diabetes prevalence rate of 9.8% (Berlie et al., 2008).

In comparison to data from the ADA (2011a), the prevalence of diabetes in AAs is greater than in non-Hispanic Whites (7.1%), Asian Americans (8.4%), non-Hispanic Blacks (12.6%), and Hispanics (11.8%). In a comparative study of African American and AA women in Michigan, there was no significant difference between the prevalence of diabetes in AA women (28%) and African American women (22%; Jamil et al., 2007). Furthermore, the proportional mortality ratio for AAs with diabetes in California was significantly higher than for non-Hispanic Whites (Nasseri, 2008). Also, in a study of AAs in Michigan, researchers found that 66% of the population did not receive diabetes education (Berlie et al., 2008). These findings support the need to examine factors that

might affect HRQL for this growing minority to enable health care providers, including nurse practitioners, to establish culturally sensitive treatment plans.

Factors Influencing Health-Related Quality of Life

Spirituality/Religiosity

This study used the mixed construct of “spirituality/religiosity” comprised of three dimensions: 1) search for support or access to spirituality/religiosity, 2) trust in higher guidance or source, and 3) reflection or positive interpretation of disease (Büssing, 2010). This conceptualization of spirituality/religiosity was appropriate for the study population, which was persons from a wide spectrum of faith traditions, including variants of Islamic and Christian beliefs.

Spirituality/religiosity can generally be viewed as a more or less stable disposition that may constitute a resource in the process of coping with various life stressors (Zwingmann, Klein, & Büssing, 2011). Religion is often described as an institutional and culturally determined approach that organizes the collective experiences of people into a closed system of beliefs and practices (Mueller, Plevak, & Rummans, 2001). Thoresen and Harris (2002) defined religion as an organized system of beliefs and practices related to God or a higher being.

In contrast, spiritual experiences are often highly individual and not easily communicated or shared by group of people (Zwingmann et al., 2011). Spirituality is multidimensional and encompasses a number of descriptors ranging from the religious to the existential and mystical. Büssing, Ostermann, and Matthiessen (2005a) defined spirituality as an individual and open approach in the search for meaning and purpose in life, whereas religiosity is an attitude of reference, trust, and hold. According to Wright

(1999), spirituality is a summation of our values that determines the process of how we interact with world, whereas religion is a pathway to follow the practices and thoughts that are appropriate to the god or gods of a particular faith.

A person can be spiritual without being religious (Rowe & Allen, 2004; Tanyi, 2002). Büssing, Ostermann, and Matthiessen (2005b) asked self-identified Christian patients whether they would describe themselves as religious or spiritual. They found that 32% described themselves as religious and spiritual (R+S+), 35% as religious but not spiritual (R+S-), 19% as neither religious nor spiritual (R-S-), 9% as spiritual but not religious (R-S+), and 4% were not sure. In the Islamic context, there is no spirituality without religious thoughts and practices, and the religion provides the spiritual path for salvation and a way of life (Rassool, 2000; Büssing, Abu-Hassan, Matthiessen, & Ostermann, 2007). However, of a group of Arabic Muslims patients with chronic illnesses in Palestine, 78% reported themselves as (R+S+), 6% as (R+S-), 1% as (S+R-), and 15% as (R-S-).

The interest in religiosity within the field of health care has increased in the last decade (Koenig, McCullough, & Larson, 2001). Several studies have found positive relationships between religious involvement, health, and QoL (Baetz, Griffin, Bomen, Koenig, & Marcoux, 2004; Koenig et al., 2001; Harrison et al., 2005; Idler & Kasl, 1997; Lutgendorf, Russell, Ulrich, Harris, & Wallace, 2004; McCullough, Hoyt, Larson, Koenig, & Thoresen, 2000; Strawbridge, Cohen, Shema, & Kaplan, 1997). Religion has been identified as an important factor affecting health outcomes and ability to cope with chronic illness (Anno & Vasconcelles, 2005; Folkman & Moskowitz, 2004; de Ridder & Schreurs, 2001; Pargament, 1997; Siegel, Anderman, & Schrimshaw, 2001). In a nationwide survey of 1,204 Americans, researchers found that prayer was used by half of

the respondents to deal with pain, and nearly half reported significant pain relief from praying (Qiuling, Langer, Cohen, & Cleeland, 2007). Baetz and Bowen (2008) examined data from a 2002 Canadian Community Health Survey of 30,859 individuals 15 years or older; after controlling for baseline health, they found worship attendance was associated with a lower level of chronic pain and fatigue and with better psychological wellbeing. Another study found that more frequent worship attendees had fewer depressive symptoms (Baetz et al., 2004).

Larson et al. (1992) reviewed studies appearing in the *American Journal of Psychiatry* between 1978 and 1989 and found that 72% found a positive relationship between religious commitment and mental health, 16% found a negative relationship, and 12% reported a neutral relationship. Another systematic review of 850 studies found that 80% demonstrated a positive relationship between religious beliefs, practices, and greater life satisfaction (Koenig & Larson, 2001). Approximately two-thirds of these studies found lower rates of depression or anxiety in more religious participants. Mental health of heart transplant patients has been documented as being enhanced by practicing religious beliefs (Sears et al., 1997). Green-Bush et al. (1999) documented that religious beliefs improved mood for patients with chronic pain. Koenig, Meador, and Parkerson (1997) suggested that the lower levels of inflammatory cells and proteins found in persons who attend religious services regularly may be the result of stress reduction where lower inflammation translates into lower pain levels.

In studies of cancer patients, religious beliefs improved acceptance of disease and increased hope (Holland et al., 1999; Mickley & Soeken, 1993). Brady, Peterman, Fitchett, Mo, and Cella (1999) examined the QoL and spiritual wellbeing of 1,610 cancer

patients and found that spiritual wellbeing was a unique predictor of the physical, social/family, and emotional domains of their QoL. In the medically ill elderly, religious beliefs were shown to enhance mental and physical health (Pargament, Koeing, Tarakeshwar, & Hahn, 2004). Tix and Frazier (1998) found that religious beliefs promoted psychosocial adjustment in kidney transplant patients. In a study of patients with HIV, religious beliefs lowered anxiety, emotional distress, and depression (Pargament et al., 2004). However, none of these studies focused on the AA population or examined AAs' ethnicity or religion as potential contributing factors.

Little research has been conducted to investigate religiosity among patients with diabetes. Landis (1996) reported spiritual wellbeing lowered feelings of uncertainty for diabetes patients and enhanced their ability to adjust to living with diabetes. Another study found that reading the Bible and praying decreased African American women's daily hassles and stresses (Samuel-Hodge et al., 2000). Zaldivar and Smolowitz (1994) found a belief in God and an perceptions of God's role in diabetes influenced perceptions of diabetes and treatment choices for non-Mexican American Hispanic persons. Other research has suggested that individuals may attribute the diabetes diagnosis as part of God's plan, punishment from God, or unintended by God (Gordon et al., 2002; Jenkins & Pargament, 1988; Pargament & Hanh, 1986, Seigel et al., 2001), and that these attributions can in turn influence disease management behaviors (Nooney & Woodrum, 2002).

In Lager's (2006) study, religiosity was not a significant predictor of QoL in diabetes patients; however, a study limitation identified by the researcher was the high level of religiosity among this sample of non-Hispanic Whites, African Americans, and

Hispanics, which may have biased information regarding religiosity. Lager (2006) did not specifically examine AAs or individuals with Islamic affiliation.

Among the general population of AAs, greater family dysfunction and less religiosity were associated with depression (Amer & Hovey, 2007). Another study conducted by Ajrouch (2007) found that religious affiliation with Islam or Christianity among the AA elderly is not significantly associated with wellbeing; however, there was no assessment of the construct of religiosity in this study sample.

Abudabbeh and Hamid (2001) suggested that affiliation with the Islamic religion that prohibits alcohol consumption was the main factor in preventing substance abuse and related psychological problems among Arab clients. They also reported that substance abuse organizations that serve Christian and Muslim Arabs found substance abuse problems to be rare among this population. Therefore, religion may serve as a source of prevention and coping for both Christian and Muslim AAs (Amer, 2005).

No published reports exist regarding spirituality/religiosity among AA patients with diabetes in relation to self-management behaviors and HRQL. Because AAs come from a variety of faith traditions, studying the broader construct of spirituality/religiosity for this population was deemed appropriate to capture the multiple spiritual and religious contexts of the population. While acknowledging the limitations of using such a broad, multi-dimensional construct as spirituality/religiosity, the researcher used it purposively as a starting point for study of an unknown area. Data regarding spirituality/religiosity from this study can provide a basis for future research in which the discrete concepts of spirituality and religiosity in specific faith traditions can be explored in more detail, particularly in relation to HRQL in the AA population with type 2 diabetes.

Diabetes Acceptance

Chronic diseases affect patients' physical and mental health, and those with multiple chronic diseases are at higher risk for disabilities (Anderson & Horvath, 2004) that can cause loss of functional ability and difficulty in performing daily activities (Chesla, 2005; Hummel, 2008; Larsen, 2008). Loss of function can contribute to varied psychological and physiological reactions (Hummel, 2008; Yang & George, 2005).

The importance of acceptance has been recognized as a way to diminish the aversive meaning of chronic disease (Evers et al., 2001). Kintner (1997) has defined acceptance of chronic disease as coming to terms with or identifying with the illness as a natural circumstance and taking control of illness-imposed limitations. Therefore, it can be of value to assist patients in accepting their chronic diseases and disabilities (McDonald et al., 2010). Acceptance of chronic conditions may lead to better health outcomes and QoL (Phillips, 2005; Stuifbergen, Seraphine, & Roberts, 2000). Van Damme, Crombez, Van Houdenhove, Mariman, and Michielsens (2006) found a positive relationship between chronic pain acceptance and HRQL, including greater emotional stability and less psychological distress for patients diagnosed with chronic pain. McDonald, Zauszniewski, and Bekhet (2010) found older adults with greater acceptance of chronic conditions had better functional status.

Diabetes is a chronic condition that can be stressful for those living with a diagnosis and managing the impact of their disease on a daily basis. As a result, some patients with diabetes can develop anxiety that leads to denial of the disease (Garay-Sevilla et al., 1999). If they accept their disease emotionally, they will be able to see it as a medical condition and not as a personal failure; this will allow them to accept the

necessary treatment and learn how to appropriately deal with difficulties caused by the disease (Büssing, Matthiessen, & Mundle, 2008). Detaile, Haafkens, Hoekstra, and van Dijk (2006) found that diabetes patients emphasized the importance of emotional acceptance of diabetes in coping at work. Individuals accepting diabetes actively participated in healthful behaviors despite the physical symptoms and emotions (Hayes et al., 1999; McCracken, Carson, Eccleston, & Keefe, 2004).

Richardson, Adner, and Nordstrom (2001) found that diabetes patients who reported greater disease acceptance also had better glycemic control. They also reported a significant negative relationship between disease acceptance and the presence of two or more diabetes complications. Similarly, Lewko et al. found that diabetic patients with peripheral neuropathy demonstrated greater difficulties in accepting their illness than diabetic patients without additional complications (2007). Researchers also found that disease denial led to poor glycemic control, increased diabetes late complications, and reduced adherence to the disease regimen (Garay-Sevilla et al., 1999; Spiess, Sachs, Pietschmann, & Prager, 1995).

Other studies found that social support and positive cognitions can also influence disease acceptance (Dion, 1990; Zauszniewski et al., 2002). Lager (2006) found that Hispanics had a higher diabetes acceptance than African Americans and that acceptance was associated with a higher QoL. Misra and Lager (2008) found that diabetic patients with greater acceptance of their disease had a lower perceived difficulty of adherence behaviors and that higher social support led to greater disease acceptance. Misra and Lager (2009) reported ethnic differences in acceptance of diabetes illness; Hispanics had the poorest outlook and Asian Indians had the most positive outlook on the disease.

Barriers to diabetes management among AAs include myths about the disease itself (Berlie et al., 2008). Additionally, those of the Islamic faith believe in the five pillars of Islam, one of which is to believe in destiny that is determined for every individual by God, including life and death, health and disease. Islam requires individuals to care for their health and wellbeing, and not to harm themselves; thus, Muslims might misinterpret their religious beliefs by being negligent in self-management behaviors for diabetes, since life, death, health, and disease are predetermined by God. No current published reports exist examining acceptance in AA patients with diabetes or the relationship between diabetes acceptance, self-management behaviors, and HRQL for this population.

Social Support

Theorists have proposed that social support is an antecedent to and direct influence on health, while the absence of social support is a risk factor for poor health (House, 1981; House, Landis, & Umberson, 1988). Research has supported a positive relationship between social support and perceived health status (White, Philogene, Fine, & Sarbajit, 2009). Although there are multiple classifications of social support, perceived social support exerts the strongest and most consistent effects on health and wellbeing in late life (Krause, 2001). This is consistent with the stress-buffering model of social support developed by Cohen and Wills (1985), which maintains that social support has the potential to buffer or protect individuals from the potentially negative influence of stressful events.

The effects of social support have been investigated for patients with diabetes, and researchers found that social support perceived through patient networking, family

members, and healthcare providers brings encouragement, information, emotional support, and reduces the stress associated with diabetes (Rubin & Peyrot, 1999; Tillotson & Smith, 1996; Toljamo & Hentinen, 2001; Williams & Bond, 2002; Misra & Lager, 2008). Often, diabetes management requires support from family and friends in such self-management activities as glucose monitoring, meal planning, foot care, and medication administration. Because this support is often essential in effective diabetic management, improving social support is an important goal in meeting the diabetic patient's needs (Kreig et al., 2009).

Social support has been studied extensively in relation to QoL and HRQL in the diabetic population. Social support showed a significant influence in promoting QoL with diabetic patients and enhancing their ability to manage the disease (Franks et al., 1992; Gleeson-Krieg, Bernal, & Woolley, 2002; Gallant, 2003; Trief et al., 1998; Lager, 2006). On the other hand, a lack of social support has been related to decreased motivation to remain actively involved in diabetes self-management behaviors (Nouwen, Gingras, Talbot, & Bouchard, 1997).

Social support has a positive relationship with the physical functioning and emotional wellbeing of diabetic patients (Wang & Fenske, 1996; MacLean & Lo, 1998; Garay-Sevilla et al., 1999; van Dam et al., 2005; Wysocki & Greco, 2006). Social support utilization is significantly related to good glycemic control (Toljamo & Hentinen, 2001; Tang et al., 2008; Misra & Lager, 2009; Sukkarieh, 2011), greater disease acceptance, and improved QoL (Karlsen, Idsoe, Hanestad, Murberg, & Bru, 2004; McCracken, 2005; Trief et al., 1998; Lager, 2006; Misra & Lager, 2008; Misra & Lager, 2009). Social support influences patients' disease acceptance and decisions to avoid or engage in

health-promoting activities (Misra & Lager, 2008). Conversely, McCracken (2005) found that having a significant other interfering with self-management or demonstrating an angry, irritated, or frustrated response decreases diabetic patients' acceptance of disease and engagement in health-promoting activities.

Misra & Lager (2008) found that social support improves self-management behaviors such as diet and physical activity, influences metabolic control, and contributes to weight loss, thus preventing hyperglycemic and hypoglycemic events that lead to complications. Tang et al. (2008) found that satisfaction with social support was associated with better diabetes QoL and glycemic monitoring. The researchers reported that better social support predicted adherence to a healthy diet and routine of physical activity, while poor social support predicted poor adherence to medication administration. Therefore, healthcare providers need to have information about social factors affecting patients' self-management behaviors and HRQL (Göz et al., 2007).

Research also illustrates the central importance of family in the Arab culture. One study of social support among AA adolescents indicated that not only can social support improve behavioral problems, emotional distress, and coping assistance (Ramaswamy, Aroian, & Templin, 2009), but that male and female AA adolescents received more social support from their families than friends. Sengstock (1996) reported a higher level of satisfaction among elderly AA Muslims in relationships with their children but a lower level of satisfaction with spousal relationships. Ajrouch (2007) reported that children are a source of comfort for the AA elderly, but their perception of their children's nervousness was associated with lower life satisfaction. There were no studies found in

the literature that examined the relationship of social support to HRQL for AA patients with diabetes.

Self-Management Behaviors

Self-management refers to the engagement in activities that protect and promote health, monitor and manage symptoms and signs of illness, manage the impacts of illness on functioning, emotions, and interpersonal relationships, and adhere to treatment regimens (Gruman & Von Kroff, 1996). The Diabetes Control and Complications Trial (DCCT, 1993) reported that diabetic patients following a complex regimen such as diet restrictions, medication administration, exercise, blood sugar monitoring, and foot care had better glycemic control and slower disease progression. Despite the benefit of effective self-management, it is estimated that 50% to 55% of patients diagnosed with chronic illnesses do not follow their prescribed management (Rapoff, 1999; Rapoff & Bernard, 1991). McNabb (1997) reported the estimates of diabetes patients not following their management regimen ranging from 20% to 93%; Manos (2004) reported that 66% failed to meet the recommended treatment guidelines. Inappropriate self-management behaviors can lead to developing short- and long-term complications such as retinopathy, nephropathy, and diabetic ketoacidosis (DKA; ADA, 2011b; Funnell, Tang & Anderson, 2007).

A prescribed diabetes regimen requires routinely following diet restrictions, administering medication and foot care, exercising, and monitoring blood sugar. Adherence to this regimen has a major impact on QoL for diabetes patients. Several factors may influence self-management behaviors including demographic factors, psychosocial factors, and social support. Low socioeconomic status, status as an ethnic

minority, and low level of education have been associated with greater diabetes-related morbidity and lower regimen adherence (Delamater et al., 2001). Jacobson, de Groot, and Samson (1994) noted that diabetes complications and lack of adherence to treatment regimen reduced QoL. Also, comorbidities associated with diabetes and other psychological conditions can create considerable barriers to successful self-management behaviors (McKellar, Humphreys & Peitte; 2004; Miller & Elsay, 2008; Peyrot et al., 2005). Better adherence can be predicted by appropriate health beliefs about the seriousness of the disease, patients' vulnerability to complications, and the efficacy of treatments (Brownlee-Duffeck et al., 1987).

Patient-family relationship has a major impact on patient self-management behaviors. Delamater et al. (2001) found that low levels of conflict, high levels of organization, and good family communication patterns are associated with better regimen adherence. Similarly, Glasgow and Toobert (1988) found that greater levels of social support especially from spouses and other family members are predictors of better regimen adherence.

Improved self-management behaviors that are critical in achieving the glycemic control and reducing diabetes complications lead to better QoL (Rubin & Peyrot, 1999; Toljamo & Hentinen, 2001). Bonds et al. (2004) indicated that perceived difficulty with self-management behaviors is associated with poor glycemic control and QoL. Subjects who reported higher social support and acceptance of the seriousness and consequences of the disease perceived less difficulty with their diabetes self-management that led to higher QoL (Misra & Lager, 2008).

Berlie et al. (2008) noted that pharmacotherapy was less aggressive than that recommended by the ADA for AA patients with diabetes. The researchers reported that 89% of patients followed the diabetic diet regimen, 74% reported monitoring blood glucose level, 15% engaged in strenuous exercise, and glycemic control was greater than or equal to 7% in seventy percent of subjects. This study did not explain the nature of the diabetic diet regimen and did not assess factors affecting self-management behaviors such as religiosity, social support, diabetes acceptance, and HRQL. In fact, given that 66% of the AA population did not receive diabetic education (Berlie et al., 2008), this finding supports the need to examine more factors that might affect self-management and its relation to HRQL for this growing minority to enable healthcare providers to establish culturally-sensitive treatment plans. There were no studies found in the literature that assessed self-management and its relationship to HRQL among AA patients with diabetes.

Glycemic Control

The DCCT (1993) and the United Kingdom Prospective Diabetes Study (UKPDS, 1998) demonstrated the importance of glycemic control in reducing the risks of diabetes complications and monitoring patients' self-management behaviors. The gold standard of measuring the glycemic control is the HbA1c (DCCT, 1993; UKPDS, 1998; ADA, 2011b). The value of HbA1c represents the metabolic rate over the preceding 3 months and the ADA recommends it is maintained at < 7% to reduce complications of diabetes (2011b). The DCCT (1993) found that intensive therapy reduced retinopathy by 34-76%, microalbuminuria by 35%, clinical albuminuria by 56%, and clinical neuropathy by 60%.

Reduction in HbA1c levels by 1% has shown to reduce diabetes complications by 25% (UKPDS, 1998).

Glycemic control and HRQL were investigated in multiple research studies. Diabetic patients coping poorly with the disease experienced higher glycemic levels, anxiety, depression, and poor psychological adjustment (Karlsen et al., 2004; Lloyd et al., 1999; Peyrot & McMurray, 1992; Smari & Valtysdottire, 1997; Turan, Osar, Turan, Damci, & Ilkova, 2002; White, Richter, & Fry, 1992) while those who coped well had greater adherence to a self-care regimen, higher QoL, better glycemic control, and less utilization of emergency medical services (Macrodimitis & Endler, 2001; Sanden-Eriksson, 2000, Walsh et al., 2002). Poor glycemic control was reported among AA patients with diabetes (Jaber et al., 2003a; Berlie et al., 2008), but none of these studies examined the factors that could lead to poor glycemic control and its relationship to HRQL in AA patients with type 2 diabetes.

Diabetes-Related Characteristics

The literature identifies specific characteristics that are associated with the diagnosis of diabetes and influence the patients' HRQL, including family history of diabetes, length of diabetes diagnosis, micro- and macro-complications, comorbidities, and obesity.

Family history of diabetes. A person with a family history of diabetes is two to four times more likely to develop diabetes than someone without a family history (Michigan Department of Community Health, 2007). A survey conducted among AAs in Michigan found that 43% reported an immediate family member had been diagnosed

with diabetes (Corteville, 2010); however, this study did not include data regarding family history, length of stay in the US, or degree of glycemic control.

Length of diabetes diagnosis. Increased length of diabetes diagnosis has been associated with poor QoL among diabetic patients (Redekop et al., 2002; Brown et al., 2004; Akinci et al., 2008; Al-Shehri et al., 2008; Lloyd et al., 2001). Increased length of diabetes diagnosis for AA patients with type 2 diabetes was associated with poor glycemic control (Berlie et al., 2008). No studies found in the literature assessed the relationship between the length of diabetes diagnosis and HRQL among AA patients with diabetes.

Micro- and macro-complications. Diabetes can lead to multiple micro- and macro-complications; the most common micro-complication, diabetic retinopathy, is the leading cause of blindness in the US (ADA, 2011a; Fowler, 2008). According to the ADA (2011a), diabetic nephropathy is the leading cause of end-stage renal failure that leads to chronic hemodialysis. In addition, 70% of people diagnosed with diabetes will exhibit diabetic neuropathy such as pain, numbness, impaired sensation, erectile dysfunction, and other nervous disorders, and more than 60% of non-traumatic lower limb amputations occur in people with diabetes (ADA, 2011a). These complications can negatively affect the patient's HRQL (ADA, 2011a), and several researchers have shown that they are associated with a poor QoL (Polonsky, 2000; Huang et al., 2007; Al-Shehri et al., 2008; Lloyd et al., 2001; Glasgow et al., 1997; Akinci et al., 2008; Kirk et al., 2001; Wexler et al., 2006). Rubin and Peyrot (1999) concluded that diabetes complications are one of the most important determinants of QoL.

A study conducted among AA diabetic patients in Michigan showed that self-reported diabetes complications were retinopathy (26.9%), neuropathy (33.3%), and nephropathy (4%; Berlie et al., 2008). The clinical evaluation of patients in that study showed that 26% of the study population could have nephropathy. No published studies were found regarding diabetes complications among AA patients with diabetes residing in California, nor the relationship of complications to HRQL.

Comorbidities. Diabetic patients tend to have more comorbidities than those without diabetes. According to the ADA (2011a), diabetes was associated with heart disease, hypertension, blindness and eye problems, renal diseases, nervous system diseases, and amputations. As a result of these comorbidities, diabetic patients are two times more at risk for death than people at a similar age without diabetes (ADA, 2011a).

Comorbidities also increase disease management costs (O'Brien, Shomphe, Kavanagh, Raggio, & Caro, 1998). It is estimated that preventing diabetes hospitalization in the US could save \$2.5 billion per year (Agency for Healthcare Research and Quality [AHRQ], 2005). Therefore, HRQL was established as a national standard to monitor the burden of diabetes, with the goal of improving HRQL in these patients to decrease hospitalization (CDC, 2000). Studying diabetes comorbidities would give better understanding of HRQL among AA patients with type 2 diabetes.

A health assessment survey conducted by the Arab American Chaldean Council (ACC, 2005) in Michigan found that AAs were more likely to have three or more chronic conditions, including hypertension, high cholesterol, and heart diseases (Corteville, 2010). Surveys of AAs' health conditions corroborate these findings. A study assessing the health status of 353 AAs in Southern California found the following health

conditions: hypertension (21%), hyperlipidemia (24.9%), diabetes (9.3%), overweight (40.3%), and obesity (27.5%; Qahoush, 2006). Another study of 321 AAs in Washington found health conditions were as follows: hypertension (16.3%), high cholesterol (37.6%), overweight (39.9%), and obesity (22.3%; Shara et al., 2010). Hammad et al.'s (1997) study of 261 AAs in Michigan reported the following: hypertension (23%), diabetes (31.9%), and high cholesterol (48%). As of this literature review, no published studies have attempted to assess diabetes comorbidities in relation to HRQL in AA patients with type 2 diabetes.

Obesity. It is generally accepted that obesity is a risk factor for developing type 2 diabetes. Obesity has been investigated in several studies in which it showed a negative relationship with QoL in diabetic patients (Al-Shehri et al., 2008; Hill-Briggs et al., 2002; Akinci et al., 2008; Glasgow et al., 1997; Rejeski et al., 2006). A CDC (2007) survey of US adults diagnosed with diabetes found that 82.7% were overweight or obese and 53% were obese. A survey of 2,025 individuals conducted in Michigan showed 59.4% were overweight and 17.1% were obese (Corteville, 2010). A study of 353 AAs in Southern California showed that 40.3% were overweight and 27.5% were obese (Qahoush, 2006). Thus, documentation exists that obesity among AAs is high; however, it has not been studied in relation to HRQL for this population to date.

Socio-Demographic Factors

Several socio-demographic factors are associated with diabetic patients' HRQL, including age, gender, birthplace, height, weight, income, educational level, marital status, employment status, health insurance status, length of stay in the US, and religious affiliation.

Age. Age was investigated in relation to HRQL in several studies. Redekop et al.'s (2002) assessment of diabetic patients' HRQL found that the social function of older adults was better than their role functioning due to physical problems. Another study found that patients older than 65 years reported greater satisfaction in their life domains related to diabetes, less emotional distress, and better coping with diabetes than younger adults (Trief, Wade, Pine, & Weinstock, 2003). Among the US general population with chronic disease, researchers found that increased age was associated with a lower HRQL (Lubetkin, Jia, Franks, & Gold, 2005), while in Turkey, Muslim patients under age 40 diagnosed with type 2 diabetes reported better HRQL (Akinci et al., 2008). Jamil et al. (2007) found that increased age among AAs is associated with an increased risk of developing diabetes. To date, no published studies have been identified that report the relationship between age and HRQL for AA patients with type 2 diabetes.

Gender. Gender differences exist in relation to HRQL between individuals with chronic conditions. Lubetkin et al. (2005) found that females had lower HRQL than males with chronic conditions in the US general population. Akinci et al. (2008) found that male Muslims diagnosed with type 2 diabetes reported higher HRQL than females. Jaber et al. (2003b) reported that AA males are at higher risk than females for developing diabetes and that gender differences exist in relation to HRQL between AA patients with type 2 diabetes.

Income and educational level. Economic status, including low income and education level, was significantly related to diabetic patients' QoL in several studies (Rubin & Peyrot, 1999; Larson, Lager, & Nilsson, 1999; Al-Shehri et al., 2008; Glasgow et al., 1997; Akinci et al., 2008; Maddigan, Feeny, Majumdar, Farris, & Johnson, 2006).

There were no studies that assessed AAs' income and education levels in relation to HRQL.

Marital status. The CDC (2005) analyzed surveys conducted by the Behavioral Risk Factor Surveillance System (BRFSS) and the National Health and the Nutrition Examination Survey (NHANES) to assess HRQL in the general US population in relation to marital status. The analysis shows that higher percentages of widowed, separated, and divorced persons reported fair or poor health compared to married persons. Unfortunately, both the BRFSS and the NHANES databases failed to separate AAs as a specific category, rendering them invisible. To begin to fill this important knowledge gap, the relationship of marital status relationship to HRQL was investigated in this study.

Employment status. The CDC (2005) also analyzed BRFSS and NHANES surveys to assess the HRQL of the general US population in relation to employment status. The analysis shows that people who were retired or unemployed often reported poorer HRQL than those who were self- or otherwise employed. Because AAs were invisible in these surveys, the relationship of employment status to HRQL was investigated in this study.

Length of stay in the US. First-generation AAs are those who originally emigrated from the Arab region to the US. They have their own inherited culture and tradition that can influence their HRQL. Researchers have posited that lack of acculturation contributes to poorer health outcomes (Abdulrahim & Baker, 2009). Read, Amick, and Donato (2005) found that more acculturated Arab immigrants, as determined by citizenship status and length of residency, reported worse health status. On the other

hand, a study conducted in Michigan found that less acculturation was a significant risk for diabetes for AAs (Jaber, Brown, Hammad, Zhu, & Herman, 2003b). This finding is in contrast to other research on people of other ethnicities (Japanese Americans, Pima Indians, and Australian Aborigines) concluding that greater acculturation was associated with increased risk for diabetes (Fujimoto et al., 1987; Knowler, Pettitt, Lillioja, & Nelson, 1988; O'Dea, 1991). Hazuda, Haffner, Stern, and Eifler (1988) found that less acculturation among Mexican Americans was associated with greater risk of diabetes. While the current study did not measure acculturation, it assessed AAs' length of stay in the US as a factor influencing HRQL.

Health-Related Quality of Life

Conceptual clarity about QoL is important for all healthcare providers; in fact, Rubin and Peyrot (1999) describe QoL as the ultimate goal of all health interventions. While researchers and clinicians often endorse the importance of QoL, a precise definition of the term is rarely given (Kleinpell, 1991). There is no consistent conceptualization of QoL in the healthcare literature; it is used interchangeably with other conceptually similar concepts, such as life satisfaction, wellbeing, functional status, and happiness (Haas, 1999). Furthermore, the literature shows ambiguity about the concept of QoL compared to the concept of HRQL and a lack of standard definitions for both concepts (Anderson & Burckhardt, 1999; Farquhar, 1995; Dugger, 2010).

QoL is a broader, more abstract concept than HRQL, inclusive of all life domains that are important to a person (Peterson & Bredow, 2009). Several researchers consider HRQL as a more narrowly and clearly defined concept than QoL with a focus on the health- and disease-specific issues that impact perceived QoL (Dugger, 2010). The more

recently developed concept of HRQL is considered by contemporary researchers (Bradley & Gamsu, 1994; Kotsanos et al., 1996) as a key outcome of and a fundamental concept in diabetes management. Patients with diabetes are required to modify their lifestyles to minimize their risk of developing diabetes complications. Patients with diabetes tend to have a worse HRQL than those in the same age group with no chronic illness but a better HRQL than others with most other serious chronic diseases (Maddigan et al., 2005). Given the centrality of HRQL as an outcome in current research on the diabetic population, it was deemed appropriate to measure in this study.

The World Health Organization's (WHO) definition of health includes physical, psychological, and social wellbeing, not just the absence of illness or infirmity (1948). This definition provides early impetus to consider QoL as an important aspect for healthcare professionals. The Healthy People 2000 and 2010 reports are consistent with WHO goals in not only including disease-related issues, but also reporting on QoL (Baker, 2000). Furthermore, the Healthy People 2020 framework attempts to emphasize the impact and influence of HRQL on health outcomes and conditions and underscores a continued focus on population disparities, including those categorized by ethnicity. This framework illustrates the fundamental overlap between the social determinants of health. In exploring HRQL levels of AA patients with type 2 diabetes, the current study's aims are not only congruent with Healthy People 2020 goals, but they also address a gap in the literature about HRQL in AA patients with type 2 diabetes.

In several research studies, HRQL has been shown to vary with ethnicity. The CDC (2009) conducted a nationwide to assess HRQL differences between ethnicities and reported the following percentages of "fair" or "poor" self-rated health: non-Hispanic Whites 13.5%, non-Hispanic Blacks 20.9%, Hispanics 24.7%, Asian and Pacific

Islanders 10%, Native Americans and Alaska Natives 26.4%, and other non Hispanics 17.7%. A survey of immigrant AAs in the US found that Arabic-speaking immigrants reported poorer self-rated health than US-born AAs or English speaking AA immigrants (Abdulrahim & Baker, 2009). Read, Amick, and Donato (2005) compared AA immigrant data to that of US-born Whites from the 2000 and 2001 National Health Interview Surveys (NHIS) and found that AAs were more likely to report their health status as “fair” or “poor”.

Rubin and Peyrot (1999) note that the predictive ability of race/ethnicity for QoL is inconsistent and emphasized the need to clarify the relationship between ethnicity and QoL. Smith (2004) indicated that ethnic/racial differences exist in QoL for socio-demographic reasons. The studies summarized above demonstrate the major determinants of diabetes in AAs are age, BMI, diastolic and systolic blood pressure, and total cholesterol and triglyceride counts (Jaber, Slaughter, & Grunberger, 1995; Jaber et al., 2003a). While lower physical activity levels were reported among AAs (Jaber et al., 2003b; Qahoush, 2006; Berlie et al., 2008), to date, no published studies correlated any of these determinants with HRQL in AA patients with type 2 diabetes.

Conceptual Definitions

Spirituality/Religiosity

For this study, spirituality was defined as an individual and open approach in the search for life meaning and purpose, whereas religiosity is an attitude of reference, trust, and hold (Büssing et al. 2005a). Spirituality/religiosity is comprised of three dimensions: 1) search for support or access to spirituality/religiosity, 2) trust in a higher guidance or source, and 3) reflection or positive interpretation of disease (Büssing, 2010). The first

dimension, search for support or access to spirituality/religiosity, is defined as the patient's interest in spiritual/religious issues and intent to find or have access to a spiritual/religious resource that may be beneficial to cope with illness (Büssing, 2010). Accessing spiritual/religious resources may provide the individual with enhanced reflection on or positive interpretation of the disease. Such cognitive reappraisal includes reflecting on what is essential in life, viewing the illness as a chance for development, and constructing meaning from the illness (Büssing, 2010).

Because AAs come from a variety of faith traditions, studying the broader construct of spirituality/religiosity for this group was deemed appropriate to capture the multiple spiritual and religious contexts of the population. While acknowledging the limitations of using such a broad, multi-dimensional construct as spirituality/religiosity, the researcher used it purposively as a starting point for study of an unknown area.

Diabetes Acceptance

For the purposes of this study, diabetes acceptance is a psychological construct of acknowledgment of the implications of having diabetes (Dion, 1990).

Social Support

Social support is defined as patients' interactions with their families and friends that provide information and emotional support to help them carry out their diabetes regimen (Fitzgerald et al., 1996).

Self-Management Behaviors

Self-management behaviors are those activities that protect and promote health by monitoring signs and symptoms of illness, managing the impacts of illness on patients'

functioning, emotions, and interpersonal relationships, and adhering to treatment regimens (Gruman & Von Korff, 1996).

Glycemic Control

For the purposes of this study, glycemic control is defined as the maintenance of HbA1c at a value of less than 7% (ADA, 2011b).

Health-Related Quality of Life (HRQL)

In this study, health related quality of life (HRQL) is the individual's or group's perceived physical and mental health over time (CDC, 2000).

Type 2 Diabetes

Type 2 diabetes is a progressive insulin secretory defect (ADA, 2011b).

Diabetes-Related Characteristics

Diabetes-related characteristics are: family history of diabetes, length of diabetes diagnosis, micro- and macro-complications, comorbidities, and obesity.

Family History of Diabetes

In this study, family history of diabetes indicates the presence or absence of diabetes in family members (father, mother, brothers, and sisters).

Length of Diabetes Diagnosis

Length of diabetes diagnosis is the length of time from initial diabetes diagnosis by a healthcare professional to the present.

Micro- and Macro-Complications

Micro-complications are diseases of the finer blood vessels in the body, including the capillaries. Macro-complications are diseases of the large blood vessels, including the coronary arteries, brain, and limb arteries (Waltz, 2008).

Comorbidities

For the purposes of this study, comorbidities are the occurrence of one or more chronic conditions in the same person with an index disease (Beckman, Creager, & Libby, 2002).

Obesity

Obesity is defined as the state of being above one's recommended normal weight (Waltz, 2008).

Summary

There is a paucity of research in the literature describing current knowledge of factors related to HRQL for diabetic AA patients. In particular, no published data currently exist about the relationships between socio-demographic factors, diabetes-related characteristics, spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, glycemic control, and HRQL in this culturally and ethnically diverse population. Therefore, this study fills an important gap in current scientific knowledge. Data from this study may provide healthcare professionals with an enhanced, culturally-sensitive knowledge base to impact diabetes management and HRQL in this population.

CHAPTER 3

METHODS

The overall purpose of this study was to describe determinants of HRQL among AA patients with type 2 diabetes. The specific aims of this study were to:

1. Describe the socio-demographic factors (age, gender, birthplace, income, education, marital status, employment status, health insurance status and type, length of stay in the US, and religious affiliations and denominations), diabetes-related characteristics (family history, length of diabetes diagnosis, micro- and macro-vascular complications, comorbidities, obesity), spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, glycemic control, and HRQL among AA patients with type 2 diabetes;
2. Examine the strength and direction of the relationships between socio-demographic factors, diabetes-related characteristics, spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, glycemic control, and HRQL among AA patients with type 2 diabetes; and

3. Generate two statistical significant models (mental component summary [MCS] and physical component summary [PCS]) that are fitted to the data explaining the variance in HRQL among AA patients with type 2 diabetes.

The additional exploratory aim of this study was to describe the reliability of the instruments utilized in the current study of AA patients with type 2 diabetes.

Research Design

A descriptive correlational study using a cross sectional design was conducted to collect data from the subjects using standardized questionnaires in an outpatient clinic population and public Arab community gathering places such as mosques and churches.

Setting

This study was conducted in AA communities of different districts in Southern California. The primary investigator (PI) contacted two AA endocrinologists practicing medicine in clinics located in Orange County's Anaheim and Fountain Valley. These endocrinologists agreed to assist in recruitment because they provide health care to thousands of AA patients in their clinics. A letter of support for conducting the study in these clinics was obtained from clinic physicians and administrators. Potential participants were then recruited in public gathering places such as mosques and churches of Arab community districts in Orange County, Riverside County, San Diego County, Los Angeles County, and San Bernardino County.

Research Sample

A convenience sampling method was used to recruit the potential subjects. The inclusion criteria were: self identified Arab ancestry, diagnosed with type 2 diabetes by a health care provider, ≥ 18 years old, non-pregnant adults, no history of psychiatric disorders, able to communicate verbally or in writing in English or Arabic, and willing to

sign consent to participate in this study. Persons with type I diabetes and gestational diabetes were excluded from the study.

Sample Size

One of the most popular behavioral science approaches to calculating the required sampling size is Cohen's (1992) statistical power analysis (Cappelleri, Darlington, & Trochim 1994). In order to determine an adequate sample size using Cohen's statistical power analysis, the values of significance level, effect size, and power have to be predetermined for the ANOVA and multiple regression analysis independent T-tests. The statistical level of significance for most studies in the teaching field is often fixed at $\alpha=.05$ (Chuan & Penyelidikan, 2006). Cohen (1992) proposed fixing the power at .80 ($\beta=.20$), which is also a convention proposed for general use (Chuan & Penyelidikan, 2006).

Cohen standardized the effect sizes into small, medium, and large values based on the type of statistical test conducted. The effect size index, d for small, medium, and large effect sizes for two independent T-tests are $d=.20$, $.50$, and $.8$, respectively. The effect size index, r for small, medium, and large effect sizes for Pearson's correlations are $r=.10$, $.30$, and $.5$, respectively. The effect size index f for small, medium, and large effect sizes for ANOVA are $f=.10$, $.25$, and $.4$, and the effect size index f^2 for small, medium, and large effect sizes for regression analysis are $f^2=.02$, $.15$, and $.35$, respectively.

Cohen (1992) proposed that a medium effect size is desirable because it can approximate the average size of observed effects in various fields. Cohen's power analysis takes into consideration the number of K independent variables used in regression analysis. In order to estimate this study's sample size using Cohen's (1992)

statistical power analysis, considering the level of significance $\alpha = .05$, the medium effect size, and power at .80, and 18 K independent variables, the G POWER program (Erdfelder, Faul, & Buchner, 1996) was utilized to calculate the required sample size.

Two independent t-tests. The input into the G POWER program based on Cohen's power analysis (1992) were effect size $d = .5$, α err probability $= 0.05$, power (1- α err probability) $= 0.8$, and allocation ratio $N2/N1 = 1$. The output of these of these inputs were non-centrality parameter $\lambda = 2.8284271$, critical $t = 1.9789706$, $DF = 126$, sample size group 1 $= 64$, sample size group 2 $= 64$, total sample size $= 128$. To detect a medium effect size at 0.5 considering the above assumptions, the study required a minimum of 128 participants to be divided into two groups.

Pearson's correlation analysis. For Pearson's correlation bivariate analyses, the input into the G POWER program based on Cohen's power analysis (1992) were correlation $\rho_{H1} = 0.3$, α err probability $= 0.05$, power (1- α err probability) $= 0.8$, and correlation $\rho_{H0} = 0$. The output of these inputs were lower critical $r = -0.2145669$, upper critical $r = 0.2145669$, total sample size $= 84$. To detect a correlation as medium effect size at 0.3 considering the above assumptions, the study required a minimum of 84 participants.

ANOVA analysis. For the ANOVA, the input into the G POWER program based on Cohen's power analysis (1992) were effect size $f = 0.25$, α err probability $= 0.05$, power (1- α err probability) $= 0.8$, and number of groups $= 3$. The output were non-centrality parameter $\epsilon = 9.9375000$, critical $F = 3.0540042$, numerator $DF = 2$, denominator $DF = 156$, total sample size $= 159$. To detect a medium effect size at 0.25 considering the above assumptions, the study required a minimum of 159 participants to be divided into three groups.

Multiple linear regression analysis. For multiple linear regression, input into the G POWER program based on Cohen's power analysis (1992) were effect size $f^2 = 0.15$, α err probability = 0.05, power (1 - α err probability) = 0.8, and total number of tested predictors = 18. The output were non-centrality parameter $\epsilon = 22.5000000$, critical F = 1.6831122, numerator DF = 18, denominator DF = 131, total sample size = 150. To detect a medium effect size at 0.15 considering the above assumptions and a model that includes 18 variables, the study required a minimum of 150 participants.

According to these calculations, the maximum sample size required was 159 participants. The PI obtained 15% above this sample size to accommodate for incomplete questionnaires or missing data, for a total of 183 participants for this study.

Data Collection

Instruments

Several instruments were used to collect study data variables. The socio-demographic factors survey (Appendix A) was developed by the PI to collect participant age, gender, birthplace, height, weight, income, educational level, marital status, employment status, health insurance type and status, length of stay in the US, and religious affiliation. The diabetes-related characteristics survey (Appendix B) was developed by the PI to collect family history of diabetes, length of diabetes diagnosis, micro-complications (including retinopathy, nephropathy, and neuropathy), macro-complications (including coronary artery disease [CAD], peripheral vascular disease [PVD], and stroke), and comorbidities (including hypertension [HTN], hyperlipidemia, arthritis, and obesity). HbA1c value was measured by SIEMENS point of care DCA

Vantage® Analyzer. HbA1c results were documented on a special study form (Appendix C).

The spirituality/religiosity variable was assessed using the translated Arabic version of the Spiritual and Religious Attitude in Dealing with Illness (SpREUK) 15-item questionnaire (Appendix D; Büssing et al., 2005a; Büssing et al., 2007; Büssing, 2010). Diabetes acceptance was measured with the Ideas About Diabetes-Revised (IAD-R) scale (Appendix E; Dion, 1990). Social support was measured by the translated Arabic version of the social support received and attitudes scales derived from the Diabetes Care Profile (DCP; Appendix F; Fitzgerald, et al., 1996; Al-Akour, 2003, Sukkarieh, 2011). Self-management behaviors were measured by the translated Arabic version of Summary of Diabetes Self Care Activities Measure Revised (SDSCA; Appendix G; Toobert, Hampson, & Glasgow, 2000; Aljohani & Snider, 2010). A license agreement was signed with the QualityMetric to use the SF-36v2® Health Survey © 1992, 2000, 2009 by Medical Outcomes Trust and QualityMetric Incorporated. The SF-36v2® Health Survey Standard, Saudi Arabia (English and Arabic versions) was used to measure HRQL (Appendix H, P). The study variables are presented in Table 1.

Table 1

Study Variables and Instrument Psychometrics Properties

Variable	Instrument	Description	Reliability	Validity
Spirituality/Religiosity	SpREUK Spiritual and Religious Attitudes in Dealing with Illness/Arabic version (Büssing, Abu- Hassan, Matthiessen, & Ostermann, 2007).	15 items 3 subscales Search: 3 items Trust: 7 items Reflection: 5 items 5 point Likert scale. Score > 50 higher agreement	15 items $\alpha =$ 0.923 Search $\alpha =$ 0.779 Trust $\alpha =$ 0.894 Reflection α = 0.872	Construct validity (Büssing, Abu- Hassan, Matthiessen, & Ostermann, 2007)
Diabetes Acceptance	IAD-R Ideas About Diabetes Revised (Dion, 1990)	20 items 3 subscales Outlook: 7 items Confidence: 7 items Inhibitors: 6 items 5 point Likert scale. Higher score- higher acceptance	20 items $\alpha =$ 0.91 Outlook $\alpha =$ 0.86 Confidence α = 0.70 Inhibitors $\alpha =$ 0.85	Content & Construct Validity, Factors correlations .30 to .70 (Dion, 1990)
Social Support	DCP: Social Support Received and Attitudes Scales Arabic version (Fitzgerald et al., 1996; Al- Akour, 2003; Sukkarieh, 2011).	12 items. Social Support Received: 6 items Attitudes: 6 items 5 point Likert scale Higher score- higher social support	$\alpha = 0.69$ & 0.73	Predictive, Content, & Construct Validity

Glycemic Control	HbA1c	< 7% good ≥ 7% poor	ADA 2011	ADA 2011
Self Management Behaviors	SDSCA Summary of Diabetes Self Care Activities Measure Revised Arabic version (Toobert, Hampson, & Glasgow, 2000; Aljohani & Snider, 2010).	11 items 6 subscales General diet: 2 items Specific diet: 2 items Exercise: 2 items Blood sugar testing: 2 items Foot care: 2 items Medication adherence: 1 item -Scores 0 to 7 days -higher score: better management	α 0.85 Test-retest reliability .92 Split half reliability .95	Content Validity Representativeness score 95.3 Clarity 94.79
HRQL	SF-36v2 [®] Health Survey Standard, Saudi Arabia (English and Arabic) versions (Ware, et al., 2007).	36 items 8 dimensions - Computer- norm based scoring - Higher score- better health	α 0.7 to 0.9	Construct, Predictive, Content, Criterion, & Concurrent Validity (Ware et al., 2007)
Obesity	BMI (CDC, 2009)	25 - 29.9 kg/m2 overweight ≥ 30 kg/m2 Obese	CDC 2009	CDC 2009

SpREUK 15-item questionnaire. The PI contacted the original author of the SpREUK questionnaire and obtained permission to use the SpREUK 15-item Arabic version to measure the spirituality/religiosity construct (A. Büssing, personal communication, April 4, 2012). The questionnaire, a five-point Likert scale ranging from

disagreement (0= “does not apply at all”) to agreement (4= “applies very much”). was developed to measure the impact of spiritual/religious attitudes on health for patients with chronic diseases (Büssing et al., 2005a; Büssing et al., 2007; Büssing, 2010). The SpREUK questionnaire avoids exclusive religious terminology such as *church*, *mosque*, *Bible*, and *Quran*, and is not biased for or against a particular religious commitment and is suited for persons in both secular and religious societies (Büssing, 2010). The SpREUK 15-item version measures whether patients are in search for a transcendent source of support or whether they still rely on an external divine source of help, and how dealing with illness results in a reflection on life and subsequent change of life and behaviors (Büssing et al., 2005a).

The SpREUK 15-item version measures three dimensions: 1) search for support or access to spirituality/religiosity (three items), 2) trust in higher guidance or source (intrinsic religiosity; seven items), and 3) reflection or positive interpretation of disease (five items; Büssing, 2010). Scores on the SpREUK 15-item can be referred to a 100% level that is the transformed scale score (Büssing et al., 2005a); scores $\geq 50\%$ indicate higher agreement or positive attitudes of spirituality/religiosity on individual's health, while scores $< 50\%$ indicate disagreement or negative attitudes of spirituality/religiosity on individual's health (Büssing et al., 2005a; Büssing et al., 2007; Büssing, 2010).

The SpREUK was found to be a valid and reliable instrument for different religious traditions including Christian denomination and secular communities (atheist/agnostics; Büssing et al., 2005a), Arab Muslims (Büssing et al., 2007), and Orthodox Jews (Zini, Büssing, & Sgan-Cohen, 2010). The questionnaire was qualitatively upgraded in several steps; the 18-item version 1.2 was tested among German

patients (Büssing et al., 2005a), and the 16-item version 1.2b was tested among Arabic Muslims and German patients, resulting in Cronbach's $\alpha = 0.929$ (Büssing et al., 2007).

The SpREUK 15-item has good internal consistency measured by Cronbach's α of 0.94 (Büssing, 2010). Its three factorial structure has maintained acceptable internal consistency including search for support/access to spirituality/religiosity (Cronbach's $\alpha = 0.91$), trust in higher guidance/source (intrinsic religiosity; Cronbach's $\alpha = 0.91$), and reflection or positive interpretation of disease (Cronbach's $\alpha = 0.86$; Büssing, 2010). Two items address a self-perception of spirituality and religiosity ("to my mind I am a religious individual," and "to my mind I am a spiritual individual"; Büssing et al., 2007; Büssing, 2010). These items correlate with specific spiritual/religious activities and attitudes, particularly for participants with a spiritual and religious (R+S+) perception, who had significantly higher SpREUK scores (Büssing et al., 2007; Büssing, 2010). Construct and factorial validity were obtained for the SpREUK 15-item and its three subscales (Büssing et al., 2005a; Büssing et al., 2007; Büssing, 2010).

The original author conducted factor analysis on the existing data gathered from Arab Palestinian Muslims (Büssing et al., 2007), and the results were a Cronbach's α of 0.894 for the trust dimension, Cronbach's $\alpha = 0.779$ for the search dimension, and Cronbach's $\alpha = 0.872$ for the reflection dimension, for an overall Cronbach's $\alpha = 0.923$.

Ideas about Diabetes-Revised (IAD-R) questionnaire. The diabetes acceptance construct was measured by the IAD-R (Dion, 1990), a 20-item, five-point Likert scale ranging from agreement (1= "strongly agree") to disagreement (5= "strongly disagree")

that measures three subscales of diabetes acceptance: 1) outlook (seven items), which measures perceptions about future health and wellbeing; 2) confidence (seven items), which measures comfort in interacting with others; and 3) inhibitors (six items), which measures how limited patients feel by their diabetes. These subscales include questions that indicate the patients' degree of agreement about accepting the implications of having diabetes.

The items were scored by adding the response point values and dividing this sum by the total number of responses (Dion, 1990). The sum of the higher outlook and confidence subscale scores and the lower scores for inhibitors subscale indicates higher levels of diabetes acceptance. Eight items of the IAD-R's 20 items are negatively worded, which requires reverse scoring.

The psychometric properties of IAD-R have been demonstrated by Dion (1990). The tool's overall internal consistency reliability measured by Cronbach's alpha coefficient = .91. Reliability of the outlook subscale is Cronbach's alpha coefficient = 0.86, of the confidence subscale 0.70, and the inhibitors subscale 0.85. Ten experts in diabetes were utilized to establish the content validity of the instrument. Factor analysis demonstrated construct validity, and factor correlations of .30 and .70 were reported.

The IAD-R has been used in studies of different ethnicities, including non-Hispanic Whites, African Americans, Asian Americans, Hispanics, Jamaicans, and West Indians (Misra & Lager, 2008/2009; Zauszniewski et al., 2002; McDonald, Zauszniewski, & Bekhet, 2010); however, this questionnaire has never been used with the Arab population. As part of a subsequent study, the researcher is planning to establish the psychometric properties of this instrument for the Arab population.

For this study, the IAD-R was forward translated by the primary investigator (PI) and a bilingual English-Arabic translator. After the PI and translator discussed their individual translations to achieve a reconciled version, the reconciled version was backward translated into English by an experienced translator who was unaware of and had no access to the original English-language questionnaire. Finally, the backward-translated version of the IAD-R was then compared with the original English version and necessary modifications were made.

Content validity can be established through review of the instrument by at least three experts to determine whether specific items are relevant, sufficient, and clear in representing the concepts to be measured (Waltz, Strickland, & Lenz, 2010). The Arabic translation of the IAD-R was validated by a committee of three associate professors in nursing, health education, and diabetes who were proficient in both English and Arabic and who had different Arabic dialects. After content validity and clarity were assessed, the instrument was revised based on the committee's suggestions.

The translated IAD-R was piloted in a convenience sample of N=10 AA patients with type 2 diabetes who were not involved in the study. A cognitive interviewing methodology with respondent debriefing technique was used for this step. Reliability for the Arab population was determined based on the internal consistency of the instrument (Cronbach's alpha coefficient), or the consistency of the participants' responses to the items. The alpha coefficient determines whether the performance of any item accurately indicates the performance of other items in the same instrument (Waltz et al., 2010).

Diabetes care profile (DCP). The social support construct was measured by the translated Arabic version of the social support received and social support attitude scales from the Diabetes Care Profile (DCP; Fitzgerald et al., 1996; Al-Akour, 2003, Sukkarieh,

2011). The DCP was developed to assess social and psychological factors related to diabetes and its treatment (Fitzgerald et al., 1996). The self-administered 234-item questionnaire is divided into 16 profile scales (4 to 19 questions per scale) that assess control problems, social and personal factors, positive attitude, negative attitude, self-care ability, importance of care, self-care adherence, diet adherence, medical barriers, exercise barriers, monitoring barriers, understanding management practice, long-term care benefits, support needs, support received, and support attitudes (Fitzgerald et al., 1996). Only the social support received and social support attitudes scales from the DCP were used in this study.

The social support received scale reflects the support received from family and friends to carry out diabetes self-care tasks. The scale's 6 items are measured on a 6-point Likert scale (1 = strongly disagree, 2 = somewhat disagree, 3 = neutral, 4 = somewhat agree, 5 = strongly agree, NA = does not apply). The social support attitudes scale reflects the support attitudes of family and friends in carrying out diabetes self-care tasks. The scale's 6 items are measured on 5-point Likert scale (1 = strongly disagree, 2 = somewhat disagree, 3 = neutral, 4 = somewhat agree, 5 = strongly agree). Three items (b, d, and f) are negatively worded, requiring reverse scoring. Each scale score ranges between 6 (least supported) and 30 (best supported) in terms of support from family and friends about diabetes and its management (Fitzgerald et al., 1996).

The reliability of the DCP's 16 scales were calculated for Caucasian populations ($n=440$ and $n=352$, respectively) receiving care for diabetes in two different settings by using Cronbach's coefficient alpha ranging between 0.60 to 0.95 and 0.66 to 0.94, respectively (Fitzgerald et al., 1996). Fitzgerald et al. (1998) tested the psychometric

characteristics of the DCP by comparing African American (n=511) and Caucasian (n=235) populations with type 2 diabetes and found the scale's reliability measured by Cronbach's alpha ranged from 0.70 to 0.97 for African Americans and 0.68 to 0.96 for Caucasians. The reliability of the scale in a study conducted of a Hispanic population resulted in Cronbach's alpha ranging from 0.54 to 0.97 (Cunningham et al., 2005). The reliability of the social support received and social support attitudes scales were 0.69 and 0.73, respectively (Fitzgerald et al., 1996).

Concurrent validity of the DCP was determined by correlating its scales with the validated Social Provision Scale, Center for Epidemiologic Studies Depression Scale (CES-D), and Happiness and Satisfaction Scale. These three instruments were positively correlated with the DCP scales with the same construct and negatively correlated with opposite constructs. Construct validity was determined by the ability of the DCP to differentiate between patients with type 1 diabetes and type 2 diabetes. Six of the DCP's 16 scales (Control Problems, Social and Personal Factors, Medical Barriers, Monitoring Barriers, Understanding Management Practice, and Positive Attitudes) were significantly different for different patient groups in community settings (Fitzgerald et al., 1996). Four scales (Control Problems, Social and Personal Factors, Medical Barriers, and Understanding Management Practice) were significantly different for different patient groups in the medical center setting (Fitzgerald et al., 1996). Construct validity was also measured in comparison to the SF-36 and glycemic control (Fitzgerald et al., 1996). Correlations between DCP scales and SF-36 subscales were more often significant in the non-insulin-using population than in the insulin-using population. Significant correlations

were found between selected DCP profile scales and glycemic control (Fitzgerald et al., 1996).

The DCP social support received scale and social support attitudes scale were translated and used with Jordanian adolescents diagnosed with type 1 diabetes, and a Cronbach's alpha of 0.65 was reported for both scales (Al-Akour, 2003). The Arabic translations of these scales were used with Lebanese patients diagnosed with type 2 diabetes, resulting in Cronbach's alpha of 0.88 and predictive validity for both scales (Sukkarieh, 2011).

Summary of diabetes self care activities (SDSCA). The self-management behaviors construct was measured by the translated Summary of Diabetes Self Care Activities Measure Revised (SDSCA; Toobert, Hampson, & Glasgow, 2000; Aljohani & Snider, 2010). The instrument assesses five aspects of a diabetic self-care regimen (diet, exercise, blood glucose testing, foot care, and medication) over a consecutive seven-day period. The SDSCA has five subscales and a total of 11 items; each item's possible scores range from 0 to 7 days, and each aspects yields a subscale score. Subscale scores are divided by the number of items in each subscale to obtain the average number of days an individual adhered to that specific aspect of the diabetes self-care regimen. Higher scores on this instrument indicate better self-management behaviors.

Toobert et al. (2000) reviewed seven studies using the SDSCA and reported acceptable reliability including inter-item correlations within scales (mean =0.47) and moderate test-retest correlations (mean =0.40). The SCDSA normative data have been established in Spanish, French, Chinese, Thai, and Korean languages (Vincent, McEwen, & Pasvogel, 2008; Turcotte, 2008; Chiou, 2002; Keeratiyutawong, Hanucharunkul, Melkus, Panpakdee, & Vorapongsathorn, 2006; Choi et al., 2011). Aljohani and Snider

(2010) translated and validated the SCDSA and found that the test-retest reliability was .921, split-half reliability was .95, and coefficient alpha was .85. Content validity showed a representativeness score of 95.3 and clarity 94.79, which indicates good agreement.

DCA vantage analyzer. Glycemic control (HbA1c) was measured by SIEMENS' point of care DCA Vantage® Analyzer, a clinically proven system that delivers HbA1c lab quality results in the office lab. The DCA Vantage® Analyzer is certified by the National Glycohemoglobin Standardization Program (NGSP) and aligned with DCCT results (Lenters-Westra & Slingerland, 2010). In an independent study evaluating all available HbA1c point of care instruments according to CLSI protocols, the DCA Vantage® Analyzer was one of just two that met the newly tightened criteria set by the NGSP (Lenters-Westra & Slingerland, 2010). HbA1c value < 7% was considered good glycemic control, and HbA1c value $\geq$ 7% was considered poor glycemic control (ADA, 2011b).

SF-36v2 health survey standard. The HRQL construct was measured using the translated Saudi Arabia Arabic and English versions of the SF-36v2® Health Survey Standard (four-week recall period) obtained from QualityMetric Incorporated (Ware et al., 2007). The items measured on the SF-36v2 have their roots in instruments that have been in use since the 1970s' Health Insurance Experiment (HIE; Brook et al., 1979; Stewart & Ware, 1992), such as the Health Perceptions Questionnaire (HPQ; Ware, 1976), the General Psychological Well-Being Inventory (GPWBI; Dupuy, 1984), which tests various physical and role functioning measures (Patrick, Bush, & Chen, 1973; Hulka & Cassel, 1973; Reynolds, Rushing, & Miles, 1974; Stewart, Ware, & Brook, 1981). Researchers selected and adapted questionnaire items from these and other sources to

develop new measures for a 149-item Functioning and Well-Being Profile (FWBP) (Stewart & Ware, 1992) that was the source for items and instructions adapted for use in the SF-36.

The SF-36 was first made available in a developmental form in 1988 (Ware, 1988; Ware & Sherbourne, 1992); in 1990, a standard form incorporated improvements in item wording, format and scoring (Ware, Snow, Kosinski, & Gandek, 1993). McDowell and Newell (1996) attributed to the development of the SF-36v2 by correcting deficiencies identified in the original version after careful study using both qualitative and quantitative methods. Despite revisions in wording and the number of response choices, the validity, assumptions and the method of scoring scales have not changed and correlations between the subscales on the two versions are high (Ware, Kosinski, & Dewey, 2000).

The SF-36 is a generic measure, as opposed to one that targets a specific age, disease, or treatment group; thus, it is useful in assessing the health of general and specific populations, comparing the relative burden of diseases and results across studies and populations, differentiating the health benefits produced by a wide range of treatments, screening individual patients, and accelerating the accumulation of interpretation guidelines that are essential to determining the clinical, economic, and social relevance of differences in health status and outcomes (Ware et al., 2007). On the other hand, diabetes-specific instruments attempt to capture the specific impact of diabetes on patients' functioning and wellbeing and could be more sensitive to small, clinically important differences.

Reviews have shown that the dimensions covered by diabetes-specific instruments vary, but generally include physical functioning, psychological functioning, social-role fulfillment, diabetes control, and treatment satisfaction (Garratt, Schmidt, & Fitzpatrick, 2002; Hirsch, Bartholomae, & Volmer, 2000; Watkins K, Connell, 2004). Although several instruments are available to measure HRQL in diabetes, psychometric evidence does not indicate whether it is preferable to use generic or diabetes-specific instruments individually or in combination (Parkerson et al., 1993; Jacobson, de Groot, & Samson, 1994; Anderson et al., 1997). Among instruments, the SF-36 is considered to be the most relevant generic instrument to the diabetes population (Bradley, 1996; Garratt et al., 2002; McColl et al., 1995, Ware et al., 1996). The SF-36 has been used in various populations, including type-2 diabetics (De Berardis et al., 2005; Paschalides et al., 2004; Trief et al., 2003; Woodcock et al., 2001).

The SF-36v2 consists of eight scales to measure relevant dimensions of HRQL: physical function (PF; 10 items), role physical (RP; 4 items), bodily pain (BP; 2 items), general health (GH; 5 items), vitality (VT; 4 items), social function (SF; 2 items), role emotional (RE; 3 items), mental health (MH; 5 items), and health transition status (1 item). The eight scales are combined into two summary scores for physical function (physical component summary; PCS) and psychological function (mental component summary; MCS). Subjects' responses are presented as a profile of scores calculated for each scale. To facilitate interpretation and comparison to population data, the scales scores are transformed to norm-based scores (NBS) with a mean of 50 and standard deviations of 10 based on the general US population (Ware et al., 2000). Using NBS as linkages, researchers can easily compare results across studies relying on the eight-scales

profile or two summary measures (Ware et al., 2007). For this study, the QualityMetric Health Outcomes™ Scoring Software 4.5 Version was utilized to analyze the current study SF-36 data.

Extensive psychometric testing was conducted on the SF-36 in the US initially and later in many other countries (McHorney, Ware, & Raczek, 1993; McHorney, Ware, Rogers, Raczek, & Lu, 1992; McHorney, Ware, Lu, & Sherbourne, 1994). It has been deemed psychometrically valid and reliable in English, German, Dutch, French, Danish, Kiswahili, and Swedish (Bullinger, 1995; Aaronson et al., 1998; Razavi & Gandek, 1998; Leplège, Ecosse, Verdier, & Pernneger, 1998; Bjorner, Damsgaard, Watt, & Groenvold, 1998; Wagner et al., 1999; Taft, Karlsson, & Sullivan, 2004).

The reliability of the eight scales and two summary measures has been estimated using both internal consistency and test-retest methods. Published reliability statistics measured by Cronbach's alpha have exceeded the minimum standard of 0.70 recommended for measures used in group comparisons in more than 25 studies (Tsai, Bayliss, & Ware, 1997; Ware, Snow, Kosinski, & Gandek, 1993), and reliability estimates for physical and mental summary scores exceed Cronbach's alpha of 0.90 (Ware, Kosinski, & Keller, 1994). The SF-36v2 User's Manual reports internal consistency reliability estimates of .95 for the PCS measure and .93 for the MCS measure. Internal consistency estimates for the eight domain scales range from .83 to .95 (Ware et al., 2007). The test-retest reliability estimates (intervals 17-21 days) are .94 and .81 for the PCS and MCS measures, respectively, with estimates of the eight health domains scales ranging from .61-.91 (Ware, Kosinski, DeBrot, Andrejasich, & Bradt, 1995). Previous studies of patients with diabetes have reported internal consistency

scores for the eight scales ranging from 0.62-0.96, and two-week test-retest reliability ranging from 0.60-0.81 with a median of 0.76 (McHorney, Ware, Lu, & Sherbourne, 1994).

Also included in the user's manual is evidence of construct validity as demonstrated in findings from factor analyses, tests of convergent and discriminant validity, and known-groups comparisons. Criterion and concurrent validity was revealed in correlations with similar measures such as the Quality of Well-Being Scale, Sickness Impact Profile, Katz Activities of Daily Living scale, Duke Health Profile, Nottingham Health Profile, Functional Status Questionnaire, Modified Health Assessment Questionnaire, and the Shortened Arthritis Impact Measurement Scales (McHorney et al., 1993). Predictive validity was demonstrated in relation to future events such as hospitalization and inclusion in randomized controlled trials. Content validity was supported by the inclusion of content representing the health domains most frequently measured in widely-used health surveys and those believed to be most affected by disease and health conditions.

The Arabic translation of SF-36 (Coons et al., 1998; Sabbah, I. et al., 2003) has been adapted for many different Arabic speaking countries and cultures and modified for consistency with societal and socio-cultural norms, (Daher, A., Ibrahim, Daher, T., & Anbori, 2011). Coons et al. (1998) conducted translated and adapted the SF-36 for Saudi Arabia patients diagnosed with diabetes. The median internal consistency reliability coefficient measured by Cronbach's alphas for the Arabic SF-36 in multiple subgroups exceeded 0.70 for every scale except for the general health perceptions scale (median alpha =0.59). Two of the English SF-36 scales had median Cronbach's alphas that

exceeded 0.70, while the remainder exceeded 0.50. Two-week test-retest correlations were all statistically significant for both versions. Product moment correlations ranged from 0.73-0.92 between corresponding scales. These results provide strong support for the reliability and equivalence of the Arabic and English versions of the SF-36.

Sabbah et al. (2003) conducted further psychometric evaluation of the SF-36 in Lebanon by following the International Quality of Life Assessment (IQOLA) project methodology (Gandek & Ware, 1998). The instrument's reliability was accepted for internal consistency with a Cronbach's alpha greater than 0.7, and factor analysis showed patterns of correlation comparable to that found in the US and France. Internal item consistency, item discriminant and acceptability validity were all good for the instrument.

The psychometric properties of the SF-36 were assessed in Jordan and showed satisfactory reliability measured by Cronbach's alpha greater than 0.70 and adequate internal consistency and item discriminant validity (Khader, Hourani, & Al-Akour, 2011). Furthermore, the SF-36 has been used in different Arab countries and different Arab populations (Coons et al., 1998; Abdel-Monhem, Amin, & Al-Omair, 2011), including Iraqi immigrants settled in Malaysia (Daher et al., 2011). For this study, the PI obtained permission to use the translated Arabic version of SF-36v2 Health Survey and the QualityMetric Health Outcomes™ Scoring Software 4.5 Version

Type 2 diabetes. Study participants self-reported a current diagnosis of type 2 diabetes by a healthcare professional and specified whether they were taking oral diabetes medications.

Diabetes-related characteristics. Study participants self-reported their family history of diabetes, length of diabetes diagnosis, micro-complications, macro-complications, comorbidities, and obesity.

Family history of diabetes. Study participants self-reported any family history of diabetes (Appendix B).

Length of diabetes diagnosis. Study participants self-reported their age (in years) when diagnosed with by a healthcare professional (Appendix B).

Micro-complications. Study participants self-reported any diagnosis by a healthcare professional of retinopathy, nephropathy, and/or neuropathy (Appendix B).

Macro-complications. Study participants self-reported any diagnosis by a healthcare professional of CAD, PVD, and/or stroke (Appendix B).

Comorbidities. Study participants self-reported any diagnosis by a healthcare professional of HTN, hyperlipidemia, arthritis, and/or obesity (Appendix B).

Obesity. BMI was calculated by dividing participants' weight, measured in kilograms, by the square of their height, measured in meters (CDC, 2009). Participants were categorized as *underweight* if BMI was below 18.5, *healthy weight* if BMI was 18.5-24.9, *overweight* if BMI was 25-29.9 kg/m², and *obese* if BMI was 30 kg/m² or more (CDC, 2009).

Recruitment Plan

English and Arabic fliers advertising the study were posted in visibly prominent places by research assistants and distributed by front office clerks in both clinics.

Potential subjects visiting these clinics for routine assessment, follow up, or management were approached for the research study and given the study flier by the front office

clerks. The front office clerks gave potential subjects the eligibility criteria and told them how to contact the PI or research assistant (RA) for further questions and instructions about participation.

Potential subjects were then invited to meet with the PI or RA (wearing University of San Diego [USD] t-shirts and identification badges for recognition) in a private room for more information about the study's aims. The PI and RA approached the subjects in a culturally appropriate manner. The male PI recruited males for the study while the RA, a female, bilingual (Arabic and English), bicultural nurse and doctoral student in nursing, recruited females. The PI and RA were available in each clinic two to three days a week.

Other potential subjects were recruited from mosques and churches in Arabs communities after these facilities' administrators granted permission to do so. The PI and RA attended weekly Friday Prayers to recruit Muslim participants and weekly Sunday Prayers to recruit Christian participants. Following the prayer services, mosque and church administrators announced the study to those in attendance, introduced the PI and RA, and provided study fliers to interested persons. Potential subjects were invited by the study PI and RA to private rooms for further explanation of the study's aims.

Following explanation of the study's aims at all locations, those who expressed interest in participation after were asked to sign USD's Institutional Research Board (IRB) consent to participate in the research study, made available in Arabic and English translations.

Data Collection Procedure

Prior to data collection, the PI trained the RA in a one-hour workshop that included orientation and introduction to the study, an explanation of how the questionnaire should be presented to subjects, and a demonstration of all recruitment and data collection activities. The RA demonstrated recruitment and data collection procedures until the PI became confident that the RA was consistently following study protocols.

Participants were asked to complete self-administered paper and pencil questionnaires, available in Arabic and English translations. Immediately after data collection, the PI or RA reviewed the completed questionnaires for missing data. If a participant did not answer a question, the PI or RA respectfully asked him or her for clarification. Next, the PI or RA performed the HbA1c test using the DCA Vantage® Analyzer and recorded results on a special study form (Appendix C). Each participant was given a printed HbA1c result, and those with high results were instructed to follow up with their primary physicians. After questionnaire completion, each participant was given a \$20 gift card for taking part in the study.

Data Management

Data was collected daily from participants at the clinic, mosque, and church locations. Each questionnaire was assigned a code number that served to identify the participants and protect their anonymity. All data was manually entered by the PI into a spreadsheet using the Statistical Package for the Social Sciences (SPSS) version 20.0. The questionnaires and all other study forms were stored in a locked file cabinet in the PI's office, which is also regularly locked, to preserve confidentiality.

Statistical Analysis

Descriptive statistics were performed to achieve the first aim of this study, which was to describe the socio-demographic factors, diabetes-related characteristics, spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, glycemic control, and HRQL of AA patients with type 2 diabetes. Measures of central tendency for continuous data (mean, mode, median), variability (range, standard deviation), and frequencies were calculated. Descriptive statistics are given as mean and standard deviation for quantitative variables (continuous level data) and number with percent for qualitative variables (categorical level data). The QualityMetric Health Outcomes™ Scoring Software 4.5 version was used to analyze the eight HRQL domains and the two health summary measures (MCS and PCS). The HRQL domain, MCS and PCS means were then calculated based on the 2009 US norms for diabetes patients.

Two independent t-tests, an ANOVA, and Pearson's correlation coefficient were performed to examine the second aim of the study, which was to determine the strength and direction of the relationships between the independent variables (socio-demographic factors, diabetes-related characteristics, spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, glycemic control), and HRQL in AA patients with type 2 diabetes. The t-tests compared the participants' mean MCS and PCS with means of different independent variables having two categorical groups. A one-way ANOVA was utilized to compare participants' mean MCS and PCS with means of different independent variables having three or more categorical groups. Post-hoc tests were done using Bonferonni adjustment for multiple comparisons. Pearson's correlation coefficients

were calculated to examine the relationship between continuous independent variables with participants' mean MCS and PCS.

Alpha was set at 0.05 significance level for all statistical tests. A correlation matrix was used to identify possible issues with multicollinearity among these variables, looking for moderate to high intercorrelations. Multicollinearity is a problem that arises when moderate to high intercorrelations exist among IVs to be used in a regression analysis. Multicollinearity diagnostics were conducted during aim #3 as part of the regression analysis.

Multiple linear regression analysis was utilized to achieve the third aim of the study, which was to generate two significant statistical models (MCS and PCS) fitted to the data to explain the variance in HRQL in AA patients with diabetes. Multiple linear regression analysis is used to predict the value of a single dependent variable (DV) from a weighted, linear combination of independent variables (IVs). The linear combination of IVs that maximally correlate with the DV is called the multiple correlations and is symbolized by R . The F test, a of significance, was run to determine whether the relationship between the set of IVs and the DV was large enough to be meaningful. The coefficient of determination, symbolized as R^2 , was used to determine the proportion of DV variance that can be explained by the combination of the IVs. Finally, a regression equation was developed in order to predict DV value for individuals in this population.

Prior to running the regression analysis data were screened for outliers and missing data and then examined for test assumptions. Because multiple regressions are very sensitive to extreme values, outliers were identified by calculating Mahalanobis distance. To assess issues of multicollinearity, tolerance statistics were obtained for each

IV (Tabachnick & Fidell, 2007). Tolerance values range from 0 to 1, and a measure close to 0 indicates multicollinearity. Typically, a value of 0.1 serves as the cutoff point; where a tolerance value for a given IV is less than 0.1, multicollinearity is a distinct problem. Variance inflation factor (VIF) was also utilized to examine linear associations between each IV and all remaining variables. VIF values greater than 10 are generally cause for concern. In order to combat multicollinearity, the problematic variable was deleted from the analysis in the regression equation and regression model.

The additional exploratory aim of the study was to describe the reliability of the instruments' used in this study of AA patients with diabetes. Reliability was assessed calculating Cronbach's alpha coefficient on each instrument's subscales and total score; a Cronbach's alpha 0.70 or higher indicates acceptable internal consistency (Cronbach, 1951). Confirmatory factor analysis (CFA), a special form of factor analysis most commonly used in social research, was also used to verify the original factor structure of the IAD-R (Dion, 1990) and test whether measures of factors used were consistent with the researcher's understanding of the nature of those factors. The objective of CFA is to test whether the data fit a hypothesized measurement model; thus, it was used to assess the fit of the uni-dimensional measurement model of diabetes acceptance with the current data.

The SPSS AMOS version 20 was utilized to perform the CFA of diabetes acceptance measurement model. The chi-square fit index (CMIN or χ^2) and relative chi-square (CMIN/DF or χ^2/df) along with the comparative fit index (CFI; Bentler, 1990), the root mean square error of approximation (RMSEA; Brown & Cudeck, 1993), PCLOSE, goodness of fit index (GFI), and adjusted goodness of fit index (AGFI) were used to

evaluate the goodness-of-fit of the model.

The CMIN or χ^2 statistic is heavily used in assessing CFA results, it tends to reject otherwise tenable models when large sample sizes are involved. A significant chi-square indicates lack of satisfactory of model fit. A criterion of model χ^2 at $p < .05$ is generally used to reject the model. The CMIN uses the maximum likelihood estimation chi-square test to assess the fit of a model in CFA and modeling.

The CMIN/DF or relative chi-square is a test used to assess the fit of model in CFA in which the minimum discrepancy is divided by its degrees of freedom. By using the CMIN/DF, the chi-square test becomes less dependent on sample size. Some researchers recommended the CMIN/DF ratio of 2:1 or 3:1 for an acceptable model (Carmines & McIver, 1981). Kline (1998; 2005) suggests that 3 or less is acceptable. Marsh and Hocevar (1985) recommend using ratios as low as 2 or as high as 5 to indicate an acceptable model. The actual value of the CMIN/DF should be close to 1; the values of 3 or less indicate an adequate fit (Byrne, 1989).

The CFI indicates the percent to which the data covariance can be reproduced by the hypothesized model by contrasting the covariance matrix of the hypothesized model against an independence model where latent variables are assumed to be uncorrelated. The CFI has a value ranging from 0 to 1, with a value of 1 indicating a perfectly fit model. Bentler (1990) suggests that a CFI value of $>.90$ indicates an acceptable model.

The RMSEA can be interpreted as a root mean square standardized measure of badness of fit of a particular model (Steiger, 1990). A value of 0.06 or less indicates a good-fitting model relative to the model degrees of freedom (Hu & Bentler, 1999), and a value greater than 0.10 represents a poor-fitting model (Browne & Cudeck, 1993). In

addition, the PCLOSE is an approach transforming the RMSEA into a test of statistical significance.

The GFI is a measure of fit between the hypothesized model and the observed covariance matrix. The AGFI corrects the GFI, which is affected by the number of indicators of each latent variable. The GFI and AGFI range between 0 and 1, with a cutoff value of .9 generally indicating acceptable model fit (Baumgartner & Hombur, 1996).

Human Subjects Considerations

USD IRB approval was obtained before beginning data collection. The investigator notified all participants that their acceptance or refusal to participate would not influence the care they received at the clinic. Participants were informed of the aims, risks, and benefits of the study, and of their rights to decline to answer any question or withdraw from the study at any time. Participants were allowed sufficient time to read the study consent form and ask questions before signing their consent, and each participant was provided with a copy of the consent form.

Confidentiality was protected through coding questionnaires so that none provided identifying information. All questionnaires were saved in a locked file cabinet in the investigator's office. All participants received a \$20 gift card for their involvement in the study.

Summary

This descriptive correlational study was designed to describe and examine determinants of HRQL in AA patients with type 2 diabetes. A convenience sampling method was used to recruit subjects from health clinics, mosques, and churches in Arabic

communities in several districts of Southern California. The research utilized used several instruments to measure the study variables, and performed multiple statistical tests to analyze the data.

CHAPTER 4

RESULTS

Specific Aim # 1

The first specific aim of this study was to describe the levels of the socio-demographic factors (age, gender, birthplace, income, education level, marital status, employment status, health insurance type and status, length of stay in the US, religious affiliations, and religious affiliations denominations), diabetes-related characteristics (family history of diabetes, length of diabetes diagnosis, diabetes micro-complications, diabetes macro-complications, comorbidities, and BMI), spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, glycemic control, and HRQL among AA patients with type 2 diabetes.

The descriptive statistics for the categorical variables are shown in Table 2, and statistics for the continuous variables are shown in Table 3. The descriptive statistics are presented for the overall sample (N=185). The study variables are briefly described in the section following the tables.

Table 2

Descriptive Statistics for Categorical Variables

Variable	Category	N = 185	%
Gender	Male	111	60
	Female	74	40
Birthplace	Jordan	37	20
	Palestine	43	23.2
	Syria	15	8.1
	Lebanon	14	7.6
	Iraq	16	8.6
	Saudi Arabia	1	.5
	Kuwait	2	1.1
	Egypt	42	22.7
	Libya	2	1.1
	Tunisia	1	.5
	Algeria	2	1.1
	Somali	4	2.2
	Yemen	4	2.2
	Qatar	1	.5
	Sudan	1	.5
Income	< 25,000	117	63.2
	25,000 to 90,000	62	33.5
	> 90,000	6	3.2
Education	< 12 years	75	40.5
	College/University	93	50.3
	Graduate degree	17	9.2
Marital Status	Single	8	4.3
	Married	158	85.4
	Separated	3	1.6
	Divorced	3	1.6
	Widow	13	7.0
Employment Status	Employed	73	39.5
	Unemployed	52	28.1
	Retired	60	32.4
Health Insurance Status	Yes	137	74.1
	No	48	25.9
Health Insurance Type	Private	59	31.9
	Medicaid/Medicare	78	42.2

Length of Stay in US	< 5 years	44	23.8
	5 to 10 years	15	8.1
	> 10 years	126	68.1
Religious Affiliation	Muslims	121	65.4
	Christians	64	34.6
Religious Denominations	Sunni	121	65.4
	Catholic	35	18.9
	Orthodox	17	9.2
	Protestant	3	1.6
	Evangelical	9	4.9
Family History of DM	Yes	123	66.5
	No	62	33.5
Length of Diabetes Diagnosis	< 5 years	68	36.8
	5 to 10 years	56	30.3
	> 10 years	61	33.0
Presence of Micro-complications (self reported)	Yes	89	48.1
	No	96	51.9
Incidence of Micro-complications (self reported)	Retinopathy	73	39.5
	Nephropathy	16	8.6
	Neuropathy	38	20.5
Presence of Macro-complications (self reported)	Yes	47	25.4
	No	138	74.6
Incidence of Macro-complications (self reported)	CAD	40	21.6
	PVD	14	7.6
	Stroke	6	3.2
Presence of Comorbidities (self reported)	Yes	148	80
	No	37	20
Incidence of Comorbidities	HTN	98	53
	Hyperlipidemia	106	57.3
	Arthritis	82	44.3
	Obesity	58	31.4
Body Mass Index (BMI)	Healthy	28	15.1
	Overweight	68	36.8
	Obese	89	48.1
Hemoglobin A1c (HbA1c)	< 7 % (Good)	102	55.1
	≥ 7 % (Poor)	83	44.9

Spirituality/Religiosity (Sp/Rg)	< 50 (Negative Attitude)	7	3.8
	≥ 50 (Positive Attitude)	178	96.2
Muslims Sp/Rg	< 50 (Negative Attitude)	3	2.5
	≥ 50 (Positive Attitude)	118	97.5
Christians Sp/Rg	< 50 (Negative Attitude)	4	6.3
	≥ 50 (Positive Attitude)	60	93.8

Table 3

Descriptive Statistics for Continuous Variables

Variable	Possible Range	Mean ± SD	Minimum	Maximum
Age	≥ 18	58.91 ± 12.213	19	86
Spirituality/Religiosity	0 to 100	80.76 ± 15.83	36.67	100
Search	0 to 100	76.04 ± 26.69	.00	100
Trust	0 to 100	72.37 ± 22.17	14	100
Reflection	0 to 100	95.32 ± 7.23	65	100
Disease Acceptance	1 to 5	4.39 ± .50	2.65	5.00
Outlook	1 to 5	4.26 ± .64	1.71	5.00
Confidence	1 to 5	4.54 ± .52	3.00	5.00
Inhibitors	1 to 5	4.35 ± .73	1.67	5.00
Social Support Received	6 to 30	26.89 ± 5.04	6	30
Social Support Attitudes	6 to 30	21.29 ± 1.85	15	26
Diabetes Self-Management				
General Diet	0 to 14	9.12 ± 5.07	.00	14
Specific Diet	0 to 14	8.90 ± 3.21	2	14
Exercise	0 to 14	4.14 ± 4.99	.00	14
Blood Glucose Testing	0 to 14	6.71 ± 6.02	.00	14
Foot Care	0 to 14	6.99 ± 6.01	.00	14
Medications Adherence	0 to 7	6.15 ± 2.18	.00	7
HRQL				
PCS-NBS	0 to 100	47.00 ± 8.15	21.37	60.73
MCS-NBS	0 to 100	43.78 ± 6.30	26.48	58.39
Physical Functioning-NBS	0 to 100	49.85 ± 9.32	21.18	57.54

Role Physical-NBS	0 to 100	46.71 ± 14.28	21.23	57.16
Bodily Pain-NBS	0 to 100	50.19 ± 8.21	26.52	62.00
General Health-NBS	0 to 100	34.18 ± 7.13	21.30	62.70
Vitality-NBS	0 to 100	42.42 ± 6.41	31.80	61.51
Social Functioning-NBS	0 to 100	50.08 ± 9.62	17.23	57.34
Role Emotional-NBS	0 to 100	49.36 ± 13.43	14.39	56.17
Mental Health-NBS	0 to 100	40.02 ± 4.61	24.71	53.48

Socio-Demographic Factors

The sample size was N =185. The participants' ages ranged from 19 to 86 years with a mean of 58.9 years (SD =12.21). Sixty percent (n =111) were male and 40% (n=74) female. The participants' Arabic backgrounds were varied; the majority were from Palestine (n =43; 23.2%), followed by Egypt (n =42; 22.7%), Jordan (n =37; 20%), Iraq (n =16; 8.6%), Syria (n =15; 8.1%), and Lebanon (n =14; 7.6), and the remaining (n=18; 9.7%) were from Somali, Yemen, Kuwait, Libya, Algeria, Saudi Arabia, Tunisia, Qatar, and Sudan.

The majority of the participants (n =117; 63.2%) reported an annual income of less than \$25,000 annually. Most of the participants (n =93; 50.3%) had a college/university degree, and 17 (9.2%) had a graduate degree. The majority of the participants (n =73; 39.5%) were employed, and the remaining were unemployed or retired. Most of the participants were married (n =158; 85.4%). The majority (n =137; 74.1%) had health insurance; 59 (31.9%) had a private health insurance and the remaining had Medicaid or Medicare.

Most of the participants (n =126; 68.1%) had been in the US for more than 10 years. The majority (n =121; 65.4%) were Muslims and the remaining were Christians. All the Muslim participants followed the Sunni denomination, while the majority of

Christian participants (n =64; 34.6%) identified their denomination as Catholic (n =35; 18.9%) and Orthodox (n =17; 9.2%).

Diabetes-Related Characteristics

The majority of the participants (n =123; 66.5%) reported a family history of diabetes. The participants were almost equally divided in length of diabetes diagnosis. Sixty-eight (36.8%) had been living with diabetes less than 5 years, 56 (30.3%) between 5 to 10 years, and 61 (33%) more than 10 years. Eighty-nine participants (48.1%) reported having at least one of the diabetes micro-complications; 73 (39.5%) reported retinopathy, 16 (18.6%) reported nephropathy, and 38 (20.5%) reported neuropathy.

The majority of the participants (n = 138; 74.6%) denied having any of the macro-complications of diabetes. Among those who reported having at least one macro-complication (n = 47; 25.4%), 40 reported CAD (21.6%), 14 reported PVD (7.6%), and 6 reported stroke (3.2%). Eighty percent (n =148) of the participants reported having at least one of the measured comorbidities; 98 reported HTN (53%), 106 reported hyperlipidemia (57.3%), 82 reported arthritis (44.3%), and 58 reported obesity (31.4%). In terms of classifying self-reported height and weight using the CDC's classification for BMI; 89 were obese (48.1%), 68 were overweight (36.8%), and 28 (15.1%) were healthy weight.

Spirituality/Religiosity

Among the overall study sample (N =185), 178 participants (96.2%) had high levels of spirituality/religiosity (positive attitude of spirituality/religiosity on individual health), while 7 (3.8%) had low levels of religiosity (negative attitude of spirituality/religiosity on individual health). Of the Muslim participants, 118 (97.5%) had

high levels of spirituality/religiosity, and of the Christian participants, 60 (93.8%) had high levels of spirituality/religiosity. This shows that Muslims participants were slightly more spiritual/religious than Christian participants in this study sample.

The spirituality/religiosity scores were transformed to a 100% score for the total score and the three factorial subscales as recommended by the original author of the instrument (Büssing, 2010). For the overall study sample, the mean for the total spirituality/religiosity score was 80.76 ± 15.83 . For Muslims and Christians participants, the means for the total spirituality/religiosity score were 84.7107 ± 13.86 and 73.28 ± 16.69 , respectively. For the overall study sample, the means for the spirituality/religiosity subscales were 76.04 ± 26.70 on the search subscale, 72.37 ± 22.17 on the trust subscale (intrinsic religiosity), and 95.32 ± 7.23 on the reflection subscale.

For Muslims participants, the mean scores for the search, trust, and reflection subscales were 82.71 ± 23.72 , 77.77 ± 18.98 , and 95.62 ± 6.91 , respectively. For Christian participants, the mean scores for the search, trust, and reflection subscales were 63.41 ± 27.60 , 62.17 ± 24.24 , 94.77 ± 7.84 , respectively. Participants exhibited high levels (76%) of intention to find or have access to spiritual/religious resource that may be beneficial to cope with illness and interest in spiritual/religious issues (search subscale; Büssing, 2010). Participants also exhibited high levels (72.4%) of conviction to be connected with a higher source that carries through and to be sheltered and guided by this source whatever may happen (trust subscale/intrinsic religiosity; Büssing, 2010).

Furthermore, the study sample exhibited high levels (95.6%) of cognitive reappraisal because of illness and subsequent attempts to change (reflection subscale; Büssing, 2010). Muslim participants scored higher than Christian participants on the

search and trust subscales, but the two groups scored almost equally on the reflection subscale.

In order to describe Muslims and Christians participants' perception of themselves as religious and spiritual (R+S+), religious but not spiritual (R+S-), spiritual but not religious (R-S+), and neither religious nor spiritual (R-S-), two items from the spirituality/religiosity questionnaire were analyzed ("to my mind I am a religious individual" and "to my mind I am a spiritual individual"; Büssing et al., 2007; Büssing, 2010). Of the Muslims participants, 87.6% indicated themselves as R+S+, 11.6% indicated themselves as R+S-, and 0.8% indicated themselves as R-S+; none were R-S-. Of the Christians participants, 87.5% indicated themselves as R+S+, 10.9% indicated themselves as R+S-, and 1.6% indicated themselves as R-S-; none were R-S+ (Table 4).

Table 4

Participants' Self-Perceptions of Spirituality and Religiosity

Religious Affiliation		R+S+	R+S-	R-S+	R-S-
Muslims	N	106	14	1	0
	%	87.6%	11.6%	.8%	0.0%
Christians	N	56	7	0	1
	%	87.5%	10.9%	0.0%	1.6%
Muslims &	N	162	21	1	1
Christians	%	87.6%	11.4%	.5%	.5%

Reliability statistics (Cronbach's alpha) for the total spirituality/religiosity instrument was 0.836. Cronbach's alpha for the reflection, trust, and search subscales were 0.562, 0.784, and 0.640, respectively.

Disease Acceptance

Participants exhibited high levels of disease acceptance with a mean of $4.39 \pm .5$ (possible range =0 to 5). The means of the IAD-R subscales including outlook, confidence, and inhibitors were $4.26 \pm .64$, $4.54 \pm .52$, $4.35 \pm .73$, respectively.

Participants also exhibited high levels of positive life views and perceptions about future health and well-being (outlook subscale; mean =4.3, possible range =0 to 5) and high levels of comfort in interacting with others and assurance that self care contributes to health (confidence scale; mean = 4.5, possible range = 0 to 5). Furthermore, the participants exhibited fewer life restrictions because of diabetes, such as social exclusion (mean =4.4, possible range =0 to 5).

In describing the disease acceptance for participants with micro-complications versus participants without micro-complications and those with macro-complications versus those without, two independent t-tests were conducted. Participants with micro-complications exhibited lower levels of disease acceptance than participants without micro-complications, with a mean of $4.3230 \pm .58$ vs. $4.45 \pm .42$. Participants with macro-complications also exhibited lower levels of disease acceptance than those without macro-complications, with a mean of $4.2787 \pm .57$ vs. $4.42 \pm .48$.

The reliability statistics (Cronbach's alpha) for the total disease acceptance instrument was 0.802. Cronbach's alpha for the outlook, confidence, and inhibitors subscales were 0.591, 0.660, and 0.678, respectively.

Social Support

Participants exhibited high levels of social support received and moderate levels of social support attitudes with means of 26.89 ± 5.04 and 21.29 ± 1.85 , respectively (possible range = 6 to 30). Cronbach's alpha for the social support received and social support attitudes scales was 0.868 and 0.806, respectively.

Self-Management Behaviors

Diabetes self-management behaviors included six subscales: general diet, specific diet, exercise, blood glucose testing, foot care, and medications adherence. The study participants exhibited moderate levels of following a diet plan and a healthy diet by eating more fruits/vegetables and fewer high-fat foods such as red meat or dairy products (mean =9, possible range =0 to 14). Participants exhibited very low levels of physical activity (mean =4, possible range =0 to 14). When asked to report their general physical activities for at least 30 minutes during the last 7 days, 46.5% of the participants did not exercise at all, and only 15.7% exercised every day. Furthermore, when asked to report their participation in a strict training exercise session during the last 7 days, 55.7% of participants did not exercise at all; only 12.4% of the participants exercised every day.

Approximately, 70% of the participants were checking their blood glucose levels at least once per week and 45% once or twice per day, while 30% of the participants had not checked their blood glucose levels at all in the last 7 days. Approximately 50% checked their feet every day, while 35% had not checked their feet in the last 7 days. For medications adherence, approximately 85% of the participants reported taking their medications every day, while 9.2% had not taken their medications in the last 7 days.

The reliability statistics (Cronbach's alpha) for the total self-management behaviors instrument was 0.771. Cronbach's alpha for general diet, physical activity, blood sugar testing, and foot care was 0.943, 0.917, 0.981, and 0.805, respectively. Cronbach's alpha for the specific diet was 0.202. The original authors of the self-management behaviors instrument dropped the specific diet subscale in the revised version for lack of internal consistency and listed this subscale as an additional item of use to researchers or clinicians (Toobert et al., 2000).

Toobert et al. (2000) emphasize the complexity of measuring the various components of a healthy diet or assessment of eating patterns in a single multi-item factor for diet. The purpose of this study was not to examine in depth the eating patterns of the study sample, but rather than to have a description of the participants' eating behaviors.

Hemoglobin A1c

Study participants exhibited high levels of HbA1c, ranging from 4.8% to 12.5%, means of 7.19 ± 1.43 . According to the ADA's classifications for HbA1c, 44.9% of the participants had $\text{HbA1c} \geq 7\%$. This result indicates 44.9% of the study sample had poor glycemic control.

Health-Related Quality of Life

Participants described their general health as "excellent" (15.1%), "very good" (15.1%), "good" (45.4%), "fair" (21.1%), and "poor" (2.7%). For the self-evaluated health transition item describing the participants' general health compared to one year previous, 14.6% indicated "much better now," 14.1% indicated "somewhat better now," 42.2% indicated "about the same," 24.3% indicated "somewhat worse now," and 4.9% indicated "much worse now."

Participants' overall SF-36 scale scores were compared to the 2009 US diabetes population norms T-scores. In norm-based scoring (NBS) using T-scores, each scale is scored to have the same average (50) and the same SD (10), meaning each point equals one-tenth of an SD. The NBS T-scores method makes it clear that whenever a scale score is below 50, health status is below average (Ware et al., 2007).

The study sample had average SF-36 scale scores lower than the 2009 US diabetes population norms on every scale except bodily pain (BP; NBS=50.19) and social functioning (SF; NBS=50.07). Three NBS scales scores (physical functioning [PF], role physical [RP], and role-emotional [RE]) were between 45 and < 50, two scores (vitality [VT] and mental health [MH]) were between 40 and < 45, and the general health (GH) score was 34.18. The mean NBS scales scores for the two health summary measures were 47.00 and 43.78 for the PCS and MCS, respectively. The NBS scales scores for the SF-36 profile of the study sample is shown in Figure 2.

Figure 2. The NBS T-scores of SF-36: Profile of the study sample.

The QualityMetric Health Outcomes™ Scoring Software 4.5 version estimated the first stage depression screening for the study sample. A positive first stage depression screening score is defined as an MCS score less than or equal to 42. Ware and Kosinski (2002) validated the use of this MCS cut point as a first stage screener for depression. Thirty-four percent of the study sample is at risk for screening positive for depression compared to the 18% reported on the US diabetes population norms of 2009. The first stage positive depression screening (% at risk) is shown in Figure 3.

Figure 3. The first stage positive depression screening (% at risk) of the study sample.

For the current study, the reliability statistics (Cronbach's alpha) for the MCS and PCS were 0.891 and 0.908, respectively. Cronbach's alpha for the eight health domains ranged from 0.729 to 0.981 and were as follows: MH=0.794, VT=0.756, SF=0.850, RE=0.969, GH=0.742, BP=0.729, PF=0.900, and RP=0.981.

Specific Aim # 2

The second specific aim of this study was to examine the strength and direction of the relationships between socio-demographic factors, diabetes-related characteristics,

spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, glycemic control, and HRQL in AA patients with type 2 diabetes. The relationships were presented for the two health summary measures of HRQL (MCS and PCS). The bivariate analyses of categorical variables for MCS scores are shown in Table 5, and of continuous variables in Table 6. The bivariate analyses of categorical variables for PCS scores are shown in Table 7, and of continuous variables in Table 8. The bivariate statistics are presented for the sample $N = 185$.

Table 5
Bivariate Analysis of Categorical Variables for MCS Scores

Variable	Category	N	Mean $\pm$ SD	P-Value
Gender	Male	111	44.28 $\pm$ 5.51	.210 ^a
	Female	74	43.02 $\pm$ 7.31	
Income	< 25,000	117	43.29 $\pm$ 7.03	.380 ^b
	25,000 to 90,000	62	44.58 $\pm$ 4.91	
	> 90,000	6	45.78 $\pm$ 2.04	
Education	< 12 years	75	43.22 $\pm$ 7.26	.475 ^b
	College/University	93	44.46 $\pm$ 5.33	
	Graduate degree	17	42.40 $\pm$ 6.80	
Marital Status	Single	8	43.73 $\pm$ 4.68	.705 ^b
	Married	158	43.82 $\pm$ 6.15	
	Separated	3	38.56 $\pm$ 9.22	
	Divorced	3	44.77 $\pm$ 0.45	
	Widow	13	44.18 $\pm$ 8.88	
Employment Status	Employed	73	44.93 $\pm$ 4.32	.027 ^{b*}
	Unemployed	52	41.90 $\pm$ 6.52	
	Retired	60	44.00 $\pm$ 7.71	
Health Insurance Status	Yes	137	44.13 $\pm$ 6.16	.207 ^a
	No	48	42.81 $\pm$ 6.66	
Health Insurance Type	Private	59	44.63 $\pm$ 4.65	.292 ^a
	Medicaid/Medicare	78	43.79 $\pm$ 6.99	
Length of Stay in US	< 5 years	44	42.75 $\pm$ 7.44	.268 ^b

	5 to 10 years	15	42.47 ± 5.94	
	> 10 years	126	44.29 ± 5.88	
Religious Affiliation	Muslims	121	43.96 ± 6.08	.580 ^a
	Christians	64	43.42 ± 6.73	
Religious Denominations	Sunni	121	43.96 ± 6.08	.789 ^b
	Catholic	35	43.76 ± 7.37	
	Orthodox	17	44.05 ± 4.76	
	Protestant	3	42.52 ± 9.60	
	Evangelical	9	41.23 ± 7.90	
Family History of DM	Yes	123	44.17 ± 6.10	.234 ^a
	No	62	43.00 ± 6.65	
Length of Diabetes Diagnosis	< 5 years	68	43.57 ± 5.78	.536 ^b
	5 to 10 years	56	43.25 ± 6.32	
	> 10 years	61	44.49 ± 6.86	
Presence of Micro-complications (self reported)	Yes	89	43.28 ± 6.80	.297 ^a
	No	96	44.24 ± 5.80	
Incidence of Micro-complications (self reported)	Retinopathy			
	Yes	73	43.39 ± 6.89	.502 ^a
	No	112	44.03 ± 5.90	
	Nephropathy			
	Yes	16	46.34 ± 6.48	.089 ^a
	No	169	43.54 ± 6.25	
	Neuropathy			
	Yes	38	43.66 ± 7.73	.913 ^a
	No	147	43.81 ± 5.91	
Presence of Macro-complications (self reported)	Yes	47	43.22 ± 7.68	.546 ^a
	No	138	43.96 ± 5.78	
Incidence of Macro-complications (self reported)	CAD			
	Yes	40	44.96 ± 6.48	.182 ^a
	No	145	43.45 ± 6.23	
	PVD			
	Yes	14	43.45 ± 8.56	.880 ^a
	No	171	43.80 ± 6.11	
	Stroke			
	Yes	6	33.28 ± 6.61	.000 ^a
	No	179	44.13 ± 6.00	
Presence of Comorbidities (self reported)	Yes	148	43.73 ± 6.56	.832 ^a
	No	37	43.95 ± 5.22	
Incidence of Comorbidities	HTN			
	Yes	98	43.24 ± 7.27	.209 ^a
	No	87	44.38 ± 4.96	
	Hyperlipidemia			
	Yes	106	43.92 ± 6.42	.721 ^a
	No	79	43.59 ± 6.17	
	Arthritis			
	Yes	82	43.38 ± 6.98	.459 ^a

	No Obesity	103	44.09 ± 5.72	
	Yes	58	43.16 ± 7.63	.420 ^a
Body Mass Index (BMI)	No Healthy	127	44.06 ± 5.60	
	Overweight	28	42.90± 6.30	.515 ^b
	Obese	68	44.41± 6.03	
		89	43.56± 6.52	
Hemoglobin A1c (HbA1c)	< 7% (Good)	102	43.58± 5.98	.637 ^a
	≥ 7 % (Poor)	83	44.02 ± 6.71	
Spirituality/Religiosity (Sp/Rg)	< 50 (Negative Attitude)	7	42.48± 7.90	.579 ^a
	≥ 50 (Positive Attitude)	178	43.83± 6.25	
Muslims Sp/Rg	< 50 (Negative Attitude)	3	42.13± 11.28	.599 ^a
	≥ 50 (Positive Attitude)	118	44.01± 5.97	
Christians Sp/Rg	< 50 (Negative Attitude)	4	42.73± 6.30	.834 ^a
	≥ 50 (Positive Attitude)	60	43.47± 6.80	

Note. * Significant at an alpha of 0.05; a. Independent T-test; b. ANOVA

Table 6

Bivariate Analysis of Continuous Variables for MCS Scores

Variable	R	P-Value
Age	.053	.476
BMI	.016	.828
HbA1c	-.031	.679
Sp/Rg	.137	.063
Search Subscale	.091	.219
Trust Subscale	.153	.038*
Reflection Subscale	.040	.585
Disease Acceptance	.173	.019*
Outlook	.148	.044*
Confidence	.079	.288
Inhibitors	.179	.015*
Social Support Received	.047	.527
Social Support Attitudes	-.039	.600
Diabetes Self-Management		
General Diet	.127	.084
Specific Diet	.101	.172
Exercise	-.007	.922
Blood Glucose Testing	.071	.337
Foot Care	.154	.036*
Medications	.004	.952

Note. *Significant at an alpha of 0.05

Table 7

Bivariate Analysis of Categorical Variables for PCS Scores

Variable	Category	N	Mean $\pm$ SD	P-Value
Gender	Male	111	48.30 $\pm$ 7.17	.011 ^{a*}
	Female	74	45.06 $\pm$ 9.14	
Income	< 25,000	117	45.29 $\pm$ 8.85	.001 ^{b*}
	25,000 to 90,000	62	49.95 $\pm$ 5.82	
	> 90,000	6	50.01 $\pm$ 4.84	
Education	< 12 years	75	45.86 $\pm$ 9.48	.342 ^b
	College/University	93	47.90 $\pm$ 6.80	
	Graduate degree	17	46.64 $\pm$ 2.08	
Marital Status	Single	8	49.09 $\pm$ 7.04	.000 ^{b*}
	Married	158	47.76 $\pm$ 7.42	
	Separated	3	34.33 $\pm$.38	
	Divorced	3	49.45 $\pm$ 3.52	
	Widow	13	38.90 $\pm$ 11.97	
Employment Status	Employed	73	50.53 $\pm$ 5.29	.000 ^{b*}
	Unemployed	52	45.96 $\pm$ 7.76	
	Retired	60	43.62 $\pm$ 9.63	
Health Insurance Status	Yes	137	46.39 $\pm$ 8.25	.102 ^a
	No	48	48.59 $\pm$ 7.81	
Health Insurance Type	Private	59	50.25 $\pm$ 5.31	.000 ^{a*}
	Medicaid/Medicare	78	43.76 $\pm$ 8.89	
Length of Stay in US	< 5 years	44	47.32 $\pm$ 8.88	.948 ^b
	5 to 10 years	15	47.17 $\pm$ 7.22	
	> 10 years	126	46.87 $\pm$ 8.04	
Religious Affiliation	Muslims	121	47.34 $\pm$ 7.63	.447 ^a
	Christians	64	46.37 $\pm$ 9.08	
Religious Denominations	Sunni	121	47.34 $\pm$ 7.63	.826 ^b
	Catholic	35	45.54 $\pm$ 9.82	
	Orthodox	17	47.79 $\pm$ 7.91	
	Protestant	3	46.23 $\pm$ 5.51	
	Evangelical	9	47.02 $\pm$ 9.93	
Family History of DM	Yes	123	46.91 $\pm$ 7.93	.823 ^a
	No	62	47.19 $\pm$ 8.63	
Length of Diabetes Diagnosis	< 5 years	68	48.46 $\pm$ 7.70	.017 ^{b*}
	5 to 10 years	56	47.84 $\pm$ 6.07	
	> 10 years	61	44.61 $\pm$ 9.73	
Presence of Micro-complications (self reported)	Yes	89	45.00 $\pm$ 9.01	.001 ^{a*}
	No	96	48.86 $\pm$ 6.78	
Incidence of Micro-complications (self reported)	Retinopathy			
	Yes	73	45.16 $\pm$ 9.04	.017 ^{a*}
	No	112	48.21 $\pm$ 7.30	
	Nephropathy			
	Yes	16	42.45 $\pm$ 10.94	.093 ^a
	No	169	47.43 $\pm$ 7.73	

	Neuropathy			
	Yes	38	42.17± 10.00	.001 ^{a*}
	No	147	48.25± 7.12	
Presence of Macro-complications (self reported)	Yes	47	45.53± 9.04	.152 ^a
	No	138	47.51± 7.79	
Incidence of Macro-complications (self reported)	CAD			
	Yes	40	44.87 ± 8.83	.062 ^a
	No	145	47.59 ± 7.88	
	PVD			
	Yes	14	43.94 ± 9.30	.144 ^a
	No	171	47.25 ± 8.02	
	Stroke			
	Yes	6	50.09 ± 10.15	.347 ^a
	No	179	46.90 ± 8.09	
Presence of Comorbidities (self reported)	Yes	148	46.34 ± 8.63	.003 ^{a*}
	No	37	49.65 ± 5.08	
Incidence of Comorbidities	HTN			
	Yes	98	45.70 ± 9.10	.018 ^a
	No	87	48.47 ± 6.66	
	Hyperlipidemia			
	Yes	106	46.04 ± 8.35	.062 ^a
	No	79	48.30 ± 7.73	
	Arthritis			
	Yes	82	44.38 ± 9.38	.000 ^{a*}
	No	103	49.09 ± 6.32	
	Obesity			
	Yes	58	43.60 ± 10.50	.001 ^{a*}
	No	127	48.56 ± 6.27	
Body Mass Index (BMI)	Healthy	28	49.47± 6.13	.104 ^b
	Overweight	68	47.47± 7.73	
	Obese	89	45.87± 8.85	
Hemoglobin A1c (HbA1c)	< 7% (Good)	102	47.34± 7.60	.537 ^a
	≥ 7 % (Poor)	83	46.59± 8.80	
Spirituality/Religiosity (Sp/Rg)	< 50 (Negative Attitude)	7	48.22± 6.81	.687 ^a
	≥ 50 (Positive Attitude)	178	46.96± 8.21	
Muslims Sp/Rg	< 50 (Negative Attitude)	3	47.46± 6.65	.977 ^a
	≥ 50 (Positive Attitude)	118	47.33± 7.67	
Christians Sp/Rg	< 50 (Negative Attitude)	4	48.80± 7.90	.586 ^a
	≥ 50 (Positive Attitude)	60	46.21± 9.19	

Note. * Significant at an alpha of 0.05; a. independent t-test; b. ANOVA

Table 8

Bivariate Analysis of Continuous Variables for PCS Scores

Variable	R	P-Value
Age	-.352	.000*
BMI	-.199	.007*
HbA1c	.028	.705
Sp/Rg	-.014	.848
Search Subscale	-.076	.302
Trust Subscale	.023	.754
Reflection Subscale	-.024	.749
Disease Acceptance	.359	.000*
Outlook	.336	.000*
Confidence	.119	.107
Inhibitors	.380	.000*
Social Support Received	.073	.324
Social Support Attitudes	.203	.006*
Diabetes Self-Management		
General Diet	-.047	.529
Specific Diet	.090	.221
Exercise	.063	.394
Blood Glucose Testing	-.058	.429
Foot Care	-.012	.867
Medications	-.154	.036*

Note. *Significant at an alpha of 0.05.

Socio-Demographic Factors

The relationships between socio-demographic factors and participants' MCS scores and PCS scores were examined. The socio-demographic factors examined were age, gender, income, education level, marital status, employment status, health insurance status and type, length of stay in the US, religious affiliation, and religious affiliation

denominations. Among those socio-demographic factors, only employment status had a statistically significant relationship with MCS scores ($p=.027$). Post hoc testing (Bonferonni) was performed among employed, unemployed, and retired participants with the participants' MCS scores. Employed participants had statistically significant higher MCS scores than unemployed participants (mean=44.93 vs. 41.90; $p=.027$). There was no statistically significant difference between employed participants' and retired participants' MCS scores (mean=44.93 vs. 44.00; $p=1.0$).

Several variables had statistically significant relationships with participants' PCS scores: age, gender, income, marital status, employment status, and health insurance type. Participant age had a statistically significant negative relationship with PCS scores ($r = -.352$; $p = .000$); PCS scores decreased as age increased. Gender had a statistically significant relationship with PCS scores ($p=.008$); male participants had statistically significant higher PCS scores than female participants (mean =48.30 vs. 45.05; $p = .008$). Income level had a statistically significant relationship with the PCS scores ($p = .001$); post-hoc testing (Bonferonni) performed among the three income level categories showed that participants with a gross household income of \$25,000-\$90,000 had statistically significant higher PCS scores than those with a gross household income under \$25,000 (mean =49.95 vs. 45.29; $p = .000$). There were no statistically significant differences in PCS scores between participants with a gross household income of \$25,000-\$90,000 and those with a gross household income over \$90,000 (mean =49.95 vs. 50.00; $p = .748$).

Marital status had a statistically significant relationship with PCS scores ($p=.000$); married participants had statistically significant higher PCS scores than other participants (mean =47.76 vs. 42.58; $p=.021$). Employment status also had a statistically significant

relationship with PCS scores ($p = .000$). Post hoc testing (Bonferonni) revealed that employed participants had statistically significant higher PCS scores than unemployed and retired participants (mean = 50.53 vs. 45.96 and 43.62; $p = .000$). Finally, health insurance type had a statistically significant relationship with PCS scores ($p = .000$); participants with private health insurance had statistically significant higher PCS scores than those with Medicaid or Medicare (mean = 50.25 vs. 43.76; $p = .000$).

Diabetes-Related Characteristics

The relationships between diabetes-related variables (family history of diabetes, length of diabetes diagnosis, diabetes micro-complications, diabetes macro-complications, comorbidities, and BMI) and participants' MCS and PCS scores were examined. Only the history of stroke as macro-complication had a statistically significant negative relationship with MCS scores ($p = .000$). Participants with a history of stroke had statistically significant lower MCS scores than those without a history (mean = 33.28 vs. 44.13; $p = .000$).

Several diabetes-related variables (length of diabetes diagnosis, presence of micro-complications, presence of comorbidities, and BMI) had statistically significant relationships with PCS scores. Length of diabetes diagnosis had a statistically significant relationship with PCS scores ($p = .017$); post hoc testing (Bonferonni) showed that participants with a length of diagnosis less than 5 years had statistically significant higher PCS scores than those with a length of diagnosis more than 10 years (mean = 48.46 vs. 44.61; $p = .017$). There was no statistically significant difference in PCS score between participants with a length of diabetes diagnosis of 5 to 10 years and more than 10 years (mean = 47.84 vs. 44.61; $p = .092$).

Participants with micro-complications had statistically significant lower PCS scores than those without micro-complications (mean =48.86 vs. 45.00; $p = .001$). Among self-reported micro-complications, presence of retinopathy and neuropathy had statistically significant relationships with participants' PCS scores. Participants with retinopathy had statistically significant lower PCS scores than those without retinopathy (mean =45.18 vs. 48.21; $p = .017$), and participants with neuropathy had statistically significant lower PCS scores than those without neuropathy (mean =42.17 vs. 48.25; $p = .001$).

Participants with comorbidities had statistically significant lower PCS scores than those without comorbidities (mean =46.34 vs. 49.65; $p = .003$). Among self-reported comorbidities, presence of HTN, arthritis, and obesity had statistically significant relationships with participants' PCS scores. Participants with HTN had statistically significant lower PCS scores than those without HTN (mean =45.70 vs. 48.47; $p = .018$), participants with arthritis had statistically significant lower PCS scores than those without arthritis (mean =44.38 vs. 49.09; $p = .000$), and those who self-reported obesity had statistically significant lower PCS scores than those who did not (mean =43.60 vs. 48.56; $p = .001$). BMI had a statistically significant negative relationship with PCS scores ($r = -.199$; $p = .007$); participants' PCS scores decreased as their BMI increased.

Spirituality/Religiosity

The total spirituality/religiosity score for the study sample $N=185$ was not statistically significant with participants' MCS ($r = .137$; $p = .063$) or PCS scores ($r = -.014$; $p = .848$). Participants' spiritual/religious attitudes on individual health was not statistically significant with HRQL. Muslim participants had statistically significant

higher total spirituality/religiosity scores than Christian participants (mean =84.71 vs. 73.28; $p = .000$). The total spirituality/religiosity score was not statistically significant with Muslims or Christians participants' MCS (mean = 43.97 vs. 43.42; $p = .580$) or PCS scores (mean =47.34 vs. 46.37; $p = .447$), respectively.

Of the spirituality/religiosity subscales recommended by Büssing (2010), there was a statistically significant positive relationship between the trust subscale (intrinsic religiosity) and MCS scores ($r = .153$; $p = .038$). Participants with a strong conviction to be connected with a higher source that carries through and to be sheltered and guided by this source whatever may happen had higher MCS scores than other participants. The search and reflection subscales were not statistically significant with MCS scores ($r = .091$, $p = .219$; $r = .040$, $p = .585$) or PCS scores ($r = -.076$, $p = .302$; $r = -.024$, $p = .749$).

Diabetes Acceptance

For overall the study sample, the participants' disease acceptance had a statistically significant positive relationship with the participants' MCS scores ($r = .173$, $p = .019$) and PCS scores ($r = .359$, $p = .000$). Participants with greater disease acceptance had higher MCS and PCS scores. The three disease acceptance subscales were examined in relation to the participants' MCS and PCS scores. The outlook subscale had a statistically significant positive relationship with the participants' MCS scores ($r = .148$, $p = .044$) and PCS scores ($r = .336$, $p = .000$). Participants with higher levels of positive life views and perceptions about future health and wellbeing had higher MCS and PCS scores. The inhibitors subscale had a statistically significant positive relationship with the participants' MCS scores ($r = .179$, $p = .015$) and PCS scores ($r = .380$, $p = .000$). Participants with less life restrictions had higher MCS and PCS scores. The confidence

subscale was not statistically significant with the participants' MCS ($r = .079$, $p = .288$) or PCS scores ($r = .119$, $p = .107$).

Two independent t-tests were conducted to examine disease acceptance between groups. There were no statistically significant differences in disease acceptance between those with micro-complications and those without (mean = 4.32 vs. 4.46; $p = .104$) or between those with macro-complications and those without (mean = 4.28 vs. 4.42; $p = .090$).

Social Support

Social support received scores were not statistically significantly related to participants' MCS ($r = .047$; $p = .527$) or PCS scores ($r = .073$; $p = .324$). Social support attitude scores were not statistically significantly related to MCS scores ($r = -.039$; $p = .600$), but did have a statistically significant positive relationship with PCS scores ($r = .203$; $p = .006$). Participants with greater social support attitudes had higher PCS scores.

Self-Management Behaviors

Only two of the six measured domains of self-management behaviors had statistically significant relationships with the participants' MCS and PCS scores. Foot care had a statistically significant positive relationship with MCS scores ($r = .154$, $p = .036$); participants with greater foot care had higher MCS scores. Medication adherence had a statistically significant negative relationship with PCS scores ($r = -.154$; $p = .036$); those with greater medications adherence had lower PCS scores.

Hemoglobin A1c

For the study sample, HbA1C < 7% versus HbA1c $\geq$ 7% was not statistically significant with participants' MCS scores (43.58 vs. 44.02; $p = .637$) or PCS scores (47.34 vs. 46.59; $p = .537$). Additionally, HbA1C as a continuous variable was not statistically significant with participants' MCS scores ($r = -.031$; $p = .679$) or PCS scores ($r = 0.028$, $p = .705$).

Specific Aim # 3

The third specific aim of this study was to generate two statistical significant models (MCS and PCS) that are fitted to the data explaining the variance in HRQL among AA patients with type 2 diabetes. The contribution of socio-demographic factors, diabetes-related characteristics, spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, and glycemic control to the effect of HRQL (MCS and PCS) were explored. There were statistically significant relationships between employment status, history of stroke as a macro-complication, trust subscale, outlook subscale, inhibitors subscale, and foot care with the participants' MCS scores and statistically significant relationships between gender, age, income, marital status, BMI, employment status, health insurance type, presence of micro-complications, presence of retinopathy and neuropathy, presence of comorbidities, presence of HTN and arthritis, length of diabetes diagnosis, social support attitudes, outlook subscale, inhibitors subscale, and medications adherence with the participants' PCS scores.

As a result of these statistically significant findings, multiple linear regressions were conducted to assess the effect of these factors in predicting participants' MCS and PCS scores. A small percentage ($R^2 = 0.152$) of the variance in MCS could be explained

by employment status, history of stroke, trust subscale (intrinsic religiosity), outlook subscale, inhibitors subscale, and foot care. A moderate percentage ($R^2=0.473$) of PCS variance could be explained by gender, age, income, marital status, BMI, employment status, health insurance type, presence of micro-complications, presence of retinopathy and neuropathy, presence of comorbidities, presence of HTN and arthritis, length of diabetes diagnosis, social support attitudes, outlook subscale, inhibitors subscale, and medications adherence.

Table 9 provides results from the regression analyses for MCS. The data fit the final model for MCS ($F [6,178] = 5.302$; $p < .000$) with an R-squared value of 0.152, explaining 15.2% of the variance in MCS. After adjusting for all other variables in the model, only two significantly predicted MCS: trust subscale (intrinsic religiosity) and history of stroke. Participants with higher scores on the trust subscale (higher intrinsic religiosity) had higher MCS scores ($\beta = .043$; $p = .036$). Participants with a history of stroke had lower MCS scores ($\beta = -10.208$; $p = .000$). Despite the bivariate significant relationship between employment status, outlook subscale, inhibitors subscale, and foot care, they were not statistically significant predictors in the multivariate regression model.

Table 9

Multivariate Analysis of MCS Scores

Variable	Slope (B)	S.E	P-Value
History of Stroke	-10.208	2.531	.000*
Employment Status	.023	.527	.966
Foot Care	.124	.074	.094
Trust Subscale	.043	.020	.036*
Outlook Subscale	-.049	.876	.955
Inhibitors Subscale	1.107	.769	.152

Note. Total $r^2 = .152$, $P = .000$; * Significant at an alpha of 0.05

Table 10 provides results from the regression analyses for PCS. The data fit the final model for PCS ($F [18,147] = 7.333$; $p < .000$) with an R-squared value of 0.473 explaining 47.3% of the variance in PCS. After adjusting for all other variables, five significantly predicted PCS: presence of neuropathy, employment status, BMI, marital status, and social support attitudes. Participants with neuropathy had lower PCS scores ($\beta = -3.397$; $p = .039$), unemployed or retired participants had lower PCS scores ($\beta = -1.656$; $p = .046$), participants with higher BMI had lower PCS scores ($\beta = -.306$; $p = .005$), married participants had higher PCS scores ($\beta = 3.168$; $p = .037$), and participants with greater social support attitudes had higher PCS scores ($\beta = .824$; $p = .007$). Despite the bivariate significant relationship between gender, age, income, health insurance type, presence of micro-complications, presence of retinopathy, comorbidities, HTN, and arthritis, length of diabetes diagnosis, outlook subscale, inhibitors subscale, and medication adherence, they were not statistically significant predictors in the multivariate regression model.

Table 10

Multivariate Analysis of PCS Scores

Variable	Slope (B)	S.E	P-Value
Gender	-1.689	1.190	.158
Presence of Micro-complications	-.295	2.214	.894
Presence of Retinopathy	-.860	2.026	.672
Presence of Neuropathy	-3.397	1.633	.039*
Presence of Comorbidities	.406	1.611	.801
Presence of HTN	-1.669	1.205	.168
Presence of Arthritis	.894	1.328	.502
Income Status	1.261	1.247	.314
Marital Status	3.168	1.503	.037*
Employment Status	-1.656	.824	.046*
Health Insurance Type	-.373	.838	.657
Length of Diabetes Diagnosis	-.411	.697	.556
Age	-.107	.058	.065
BMI	-.306	.107	.005*
Medications Adherence	-.164	.302	.587
Social Support Attitudes	.824	.300	.007*
Outlook Subscale	1.827	1.137	.110
Inhibitors Subscale	1.150	.990	.247

Note. Total $r^2 = .473$, $P = .000$; * Significant at an alpha of 0.05

To detect multicollinearity of all predictor variables together in the MCS and PCS models, the tolerance and VIF statistical tests were performed. Typically, a value of 0.1 serves as the cut off point; where a tolerance value for a given predictor is less than 0.1, multicollinearity is a distinct problem (Tabachnick & Fidell, 2007). Generally, a value of VIF greater than 10 indicates multicollinearity concerns (Tabachnick & Fidell, 2007). Multicollinearity was ruled out in this study for both multiple regression models of MCS and PCS. Tables 11 and 12 present the collinearity statistics for both models.

Table 11

MCS Model Collinearity Statistics

Variable	Tolerance	VIF
History of Stroke	.936	1.068
Employment Status	.949	1.053
Foot Care	.965	1.036
Trust Subscale	.929	1.076
Outlook Subscale	.595	1.681
Inhibitors Subscale	.595	1.680

Table 12

PCS Model Collinearity Statistics

Variable	Tolerance	Tolerance
Gender	.703	1.422
Presence of Micro-complications	.195	5.131
Presence of Retinopathy	.239	4.176
Presence of Neuropathy	.562	1.779
Presence of Comorbidities	.621	1.609
Presence of HTN	.664	1.506
Presence of Arthritis	.544	1.837
Income Status	.648	1.543
Marital Status	.885	1.130
Employment Status	.491	2.038
Health Insurance Type	.684	1.462
Duration of DM	.710	1.409
Age	.461	2.169
BMI	.777	1.287
Medications Adherence	.799	1.251
Social Support Attitudes	.840	1.191
Outlook Subscale	.442	2.264
Inhibitors Subscale	.441	2.265

Additional Exploratory Aim

The additional exploratory aim of the study was to describe the reliability of the instruments utilized in this study of AA patients with diabetes. Cronbach's alpha coefficient was calculated for each instrument and its subscales and total score, demonstrating acceptable internal consistency for all instruments used. CFA was also used to verify the original factor structure of the IAD-R (Dion, 1990) in the study sample.

The CMIN statistic for the current model fit is 245.7 (DF =159), which is large enough to reject the null that the model is a good fit to the data. However, this is due to the large sample size for chi-square, which is very sensitive to large sample size (a type-II error – accepting a false null hypothesis). Thus, CMIN or χ^2 statistic should not be used at the sole indicator of the goodness of fit between model and data (Bryant, 2000). Instead, other model fit indices were evaluated.

The CMIN/DF or relative chi-square is a test used to assess the fit of model in CFA in which the minimum discrepancy is divided by its degrees of freedom. By using the CMIN/DF, the chi-square test becomes less dependent on sample size. The actual value of the CMIN/DF should be close to 1; a value greater than 2 represents an inadequate fit (Byrne, 1989). The CMIN/DF of the current study is approximately 2:1, and the actual value is 1.545. This result is not significant at alpha of 0.05, and so the model is a good fit to the data.

CFI values range from 0 to 1, with 1 indicating a perfectly fit model. Bentler (1990) suggests that a CFI value $> .90$ indicates an acceptable model. The CFI value of the current study was approximately .90 (CFI =.88).

A RMSEA value of 0.06 or less indicates a good-fitting model relative to the

model degrees of freedom (Hu & Bentler, 1999); a value greater than 0.10 represents a poor-fitting model (Browne & Cudeck, 1993). The RMSEA of the current study is .054, indicating the model is a good fit to the data. In addition, the PCLOSE of this study is greater than 0.05, indicating the model is a good fit to the data.

The GFI and AGFI range between 0 and 1, with a cut off value of .9 generally indicating acceptable model fit (Baumgartner & Hombur, 1996). The GFI and AGFI of this study were 0.89 and 0.85, very strong evidence for the model fit for the CFA.

All factors correlations for the 20 items ranged from 0.4 to 0.7. Cronbach's alpha for the 20 items was 0.802. Cronbach's alpha values for the outlook, confidence, and inhibitors subscales were 0.591, 0.66, and 0.678. Table 13 shows the factor loadings for diabetes acceptance scale.

Table 13

Factor Loadings for IAD-R (Dion, 1990)

	Scale Items	Factor 1	Factor 2	Factor 3
1	I fell hopeful about my future. ^a	.608	.273	-.170
2	I don't tell other people about having diabetes until I know them well. ^{**b}	-.068	.471	.543
3	I lead a less satisfying life than other people because of my diabetes. ^{**a}	.389	-.006	.531
4	I am comfortable talking about my diabetes with my coworkers. ^b	.126	.511	.168
5	I can do everything that people who do not have diabetes can do. ^a	.606	-.003	.409
6	Taking care of my diabetes is important. ^b	.018	.544	-.156
7	Some people don't invite me out because they know I have diabetes. ^{**c}	.006	.018	.489
8	I can't schedule my life around a management	.413	-.001	.125

	plan.** ^c			
9	I lead a full and productive life. ^a	.579	.241	-.024
10	I expect to be healthy for long time to come. ^a	.583	.351	-.224
11	I talk about having diabetes in a matter of fact way. _b	.103	.691	.066
12	If I follow my management plan, I will reduce the chance of future complications. ^b	.145	.535	.198
13	I don't have many good things to look forward to in life because of my diabetes.** ^c	.707	.160	.212
14	I speak with ease about having diabetes to others who are interested. ^c	.203	.514	.443
15	I won't be able to lead a normal life because of my diabetes.** ^c	.640	.061	.373
16	Having diabetes doesn't affect my social life. ^a	.148	.100	.408
17	If I follow my doctor's orders, my health will be good. ^b	.049	.558	.129
18	I would have more friends if I didn't have diabetes.** ^c	.331	.035	.640
19	Diabetes prevents me from participating actively in sports or recreational activities.** ^c	.607	-.080	.240
20	Having diabetes does not affect the way people feel about me or relate to me. ^a	-.003	.139	.406
	% of variance explained	16.188	12.202	11.849
A	Item was originally an outlook item and hypothesized to load together	.591		
B	Item was originally a confidence item and hypothesized to load together	.66		
C	Item was originally an inhibitors item and hypothesized to load together	.678		
	Cronbach's alpha for total scale	.802		

Note. ** using reverse score

Summary

This chapter presented the results from the analysis of the data collected in a sample of AA adults with type 2 diabetes. Six of the eight HRQL domains and both health summary measures (MCS and PCS) were below the 2009 average health norms for diabetes patients in the US. There were statistically significant positive correlations between employment status, history of stroke as a macro-complication, trust subscale (intrinsic religiosity), outlook subscale, inhibitors subscale, and foot care and MCS scores. These factors explained 15.2% of the variance in participants' MCS.

Employed participants had significantly higher MCS scores than unemployed participants. Participants with a history of stroke had significantly lower MCS scores than those without a history of stroke. Participants with higher intrinsic religiosity, those with greater positive views about their future health, and those who felt less inhibited by diabetes, and participants with greater foot care had significantly higher MCS scores than other participants. Only trust subscale and history of stroke were statistically significant predictors for the participants' MCS after adjusting for all other variables in the regression model.

There were statistically significant relationships between gender, age, income, marital status, BMI, employment status, health insurance type, micro-complications, comorbidities, length of diabetes diagnosis, social support attitudes, outlook subscale, inhibitors subscale, and medications adherence and participants' PCS. These variables explained 47.3% of the variance in PCS. After adjusting for all other variables in the regression model, presence of neuropathy, employment status, BMI, marital status, and social support attitudes were statistically significant predictors for PCS. Participants with

neuropathy had significantly lower PCS scores than those without neuropathy.

Unemployed and retired participants had significantly lower PCS scores than employed participants. Those with higher BMI had significantly lower PCS scores than other participants. Finally, married participants and participants who had greater social support attitudes had significantly higher PCS scores than other participants.

CHAPTER 5

DISCUSSION, RECOMMENDATIONS, AND LIMITATIONS

This study examined socio-demographic factors, diabetes-related characteristics, spirituality/religiosity, diabetes acceptance, social support, self-management behaviors, and glycemic control as possible predictors of MCS and PCS (HRQL) of AA patients with type 2 diabetes. Significant predictors of MCS included history of stroke as a macro-complication of diabetes and intrinsic religiosity. Significant predictors of PCS included marital status, employment status, BMI, social support attitudes, and presence of neuropathy as a micro-complication of diabetes.

Stroke

The prevalence of stroke among participants of the current study (3.2%) was consistent with previously reported prevalence rate of 2 to 11% (Liebl et al., 2002; Nazimek-Siewiak et al., 2002; Sacco et al., 2001). History of stroke was a significant predictor for the participants' mental health in this study. This finding is consistent with several previous studies that identified high prevalence and adverse effects of mental health among patients with stroke (King, 1996; Robinson, 1997; Kotila, Numminen, Waltimo, & Kaste, 1998; Hermann, Black, Lawrence, Szekely, & Szalai, 1998;

Tuomilehto et al., 1995; Burvill, Johnson, Jamozik, Anderson, 1997; O'Rourke, MacHale, Signorini, & Dennis, 1998). On the other hand, history of stroke was not a significant predictor for physical health in this study, which is inconsistent with several previous studies that found history of stroke was strongly correlated with poorer physical health (Haan & Weldon, 1996; Worley et al., 1998; Otiniano et al., 2003).

One possible explanation is the method of recruitment for the study sample. Ninety-eight percent of the sample was recruited in public gatherings of Arabic communities. It can be posited that individuals with physical disabilities due to stroke might not be able to participate in these activities. Less active social participation for stroke patients with greater physical disabilities was reported in previous studies (Lai, Studenski, Duncan, & Perera, 2002; Gurcay, Bal, & Cakci, 2009); it is possible that study participants with a history of stroke retained some physical functioning following their stroke, although level of physical functioning was not assessed as a study variable.

Future studies should include level of physical functioning in relation to HRQL in this population and seek broader recruitment of participants whose stroke-related physical disabilities prevent them from participating in public gatherings. Furthermore, this study did not measure time since the stroke event, so it is possible that some participants experienced their strokes quite some time ago. There is evidence that more than half of stroke survivors remain dependent on others for self-care tasks or daily living, but in the long term, a majority of patients report their overall physical health to be at least "good," even up to 20 years after stroke (de Haan, Limburg, Van, Jacobs, & Aaronson, 1995; Tuomilehto et al., 1995; Grensham et al., 1998).

The finding of a history of stroke as a predictor for mental health but not a predictor for physical health supports the idea that stroke may be related to some decrease in HRQL even for those with no post-stroke disabilities. This was reported in the Kansas City Stroke Registry study (2002), demonstrating stroke patients who were considered recovered continued to have impaired HRQL (Lai et al., 2002).

Many people require mental health treatment after stroke to address depression, anxiety, frustration, or anger (National Institute of Mental Health, 2011). Several factors may affect the risk and severity of depression after stroke, including the area of the brain where stroke damage occurred, personal or family history of depression or other mood or anxiety disorders, and level of social isolation before the stroke (Boden-Albala, Litwak, Elkind, Rundek, & Sacco, 2005). Stroke survivors who are depressed may be less likely to follow treatment plans and may be more irritable or have changes in personality (Depression Guideline Panel, 1993).

The current study estimated the first stage depression screening for the study sample of 34% compared to 18% for the US diabetes population norms of 2009. Post-stroke depression is a treatable condition and early diagnosis is of paramount importance to prevent progression to chronic depressive disorders, as post-stroke depression has been associated with increased chances of suicidal ideation (Fuller-Thomson, Tulipano, & Song, 2012). Therefore, mental health must be addressed in future studies of diabetic AA patients with a history of stroke in an attempt to improve HRQL.

Spirituality/Religiosity

In this study, the total score of the SpREUK 15-item (Büssing, 2010)

measuring the attitudes of spirituality/religiosity on health was not statistically significant with participants' HRQL (MCS and PCS). Among the three subscales of the SpREUK-15, only the trust in higher guidance/source subscale reflecting intrinsic religiosity (Büssing, 2010) was a statistically significant predictor of mental health for Muslim and Christian AA participants.

This finding is consistent with several previous studies that demonstrated a positive relationship between religious involvement and health and QoL (Baetz et al., 2004; Koenig, McCullough, & Larson, 2001; Harrison et al., 2005; McCullough et al., 2000; Lutgendorf et al., 2004). Seventy-two percent of the studies that examined religious commitment and mental health appearing in the *American Journal of Psychiatry* between 1978 and 1989 demonstrated a positive relationship between the two (Larson et al., 1992).

In a more recent meta-analysis, 79% of the studies demonstrated a significant relationship between religious beliefs and life satisfaction, happiness, positive affect, morale, and other indicators of wellbeing (Koenig & Larson, 2001). Among the general AA population, less religiosity was associated with depression (Amer & Hovey, 2007). Abudabbeh and Hamid (2001) reported that Islamic religious beliefs were the main factor in preventing substance abuse and related psychological problems among AA Muslims and Christians. The current study findings support the importance of future research into spirituality/religiosity as a predictor of HRQL of AA patients with diabetes.

Several dimensions of spirituality/religiosity have been studied in the literature in the context of different religious denominations comparing degrees of religious involvement such as church attendance, non-organizational religiosity, subjective

religiosity, religious commitment, intrinsic religiosity, extrinsic religiosity, search for spirituality/religiosity, and reflection (Moreira-Almeida, Nato, & Koenig, 2006; Allport, 1967; Büssing, 2010). Three spiritual/religious dimensions were assessed in the current study: intrinsic religiosity (trust subscale), search for spirituality/religiosity, and reflection (Büssing, 2010). The dimension that predicted the mental health of AA patients with diabetes was intrinsic religiosity, which indicates that participants are strong believers in God as a higher power.

In Islam, strong believers are always praising Allah for any good or tragedy encountered during their lives such as those related to health, life crisis, social well-being, or financial loss (Salman & Zouha, 2010). Strong believers accept these events with patience and prayer and submit their will to Allah. Congruently, Christians from the Maronite and Chaldean Catholic traditions place their trust in a loving God who is omnipresent. Thus, the high levels of disease acceptance in both the Muslim and Christian participants may reflect these attitudes of trust, but more in-depth investigation of this study area is needed.

Islam in Arabic means total submission to the will of Allah. There are two sources for the Islamic teaching and laws: the Noble Qur'an, revealed to the last messenger Prophet Mohammad peace be upon him (PBUH), and the Sunnah, or the sayings, deeds, and sanctions of Prophet Mohammad PBUH. In the Islamic context, illness and suffering are believed to be a test to a believer's faith and a purifying process from sins, especially if the patient went through prolonged suffering and accepted it with patience and praise to Allah (Salman & Zouha, 2010). Allah says in the Noble Qur'an "And We will surely test you with something of fear and hunger and a loss of wealth and lives and fruits, but give

good tidings to the patient. Who, when disaster strikes them, say, indeed we belong to Allah, and indeed to Him we will return" (Surat Al-Baqarah: 155-156). Prophet Mohammad PBUH said "no fatigue, no disease, nor sorrow, nor sadness, nor hurt, nor distress befalls a Muslim, even if it were the prick he receives from a thorn, but Allah expiates some of his sins for that" (Khan, 1994). The interpretations of these words help Muslim patients and families accept their illnesses and suffer with patience.

In the Maronite and Chaldean Catholic traditions, which constitute the majority (but certainly not the entirety) of Christian traditions among AA Christians, a similar attitude toward the redemptive power of suffering is emphasized. While the Christian churches in the tradition of the Eastern Rite have complex and varied theological positions, the Christian Bible constitutes a major textual source. The figure of Christ is viewed as a healing mediator between humanity and God, and disease or suffering is viewed as a means of growing closer to God and sharing in Christ's redemptive sufferings (1 Peter 4:12-13).

Participants in this study exhibited high levels of trust in Allah/God (78% and 62% for Muslims and Christians, respectively). This is consistent with other findings of spirituality/religiosity in Arabic Muslims from Palestine and Christians from Germany demonstrating that Arabic Muslims patients had significantly higher trust in Allah than German Christians (85% and 50%; Büssing et al., 2007). However, data are difficult to interpret given the documented decline in formal religious participation and praying within some European cultures (Büssing et al., 2006; Büssing, Matthiessen, & Ostermann, 2005).

The Noble Qur'an emphasizes that illness is given by Allah to remember and redirect. Also, the Christian Bible emphasizes that healing is connected with the imperative to change life, to behave differently (Isaiah 58:8). The current study sample demonstrated a strong positive interpretation of disease (reflection) for AA Muslims and Christians (95.6% and 94.8%, respectively). This is also consistent with the findings demonstrated by Arabic Muslims with HTN in Palestine and Christian patients with chronic conditions (excluding cancer) in Germany, where there was a strong positive interpretation of disease in Muslim patients versus a moderate positive interpretation of disease in German Christians. This finding indicates that spirituality/religiosity can be posited as a potential factor in how AA patients with diabetes deal and cope with their illness, and suggests the need for further study.

One of the interesting findings in the current study is that the majority of the participants (Muslims 87.6% and Christians 87.5%) regard themselves as R+S+. In regards to the Muslims participants, this finding would support that in Islam there is no distinction between religion and spirituality and religion is a way of life (Rassool, 2000; Büssing et al., 2007). Comparatively, 78% of the Arabic Muslims patients in Palestine regarded themselves as R+S+ (Büssing et al., 2007). Rassool (2000) emphasized that for Muslims, Allah's unity must be maintained spiritually, intellectually, and practically in all facets of life.

To date, this is the first study identified that documents AAs' perceptions of spirituality/religiosity. Interestingly, 87.5% of the AA Christian participants in this study regarded themselves as R+S+. This finding is in contrast to findings from a group of Christian patients in Germany, 24% of whom regarded themselves as R+S+ (Büssing et

al., 2007). According to the Gallup poll (2002), only 4% of Americans regarded themselves as R+S+, 50% R+S-, 33% R-S+, and 11% R-S-. It is important to acknowledge these differences in AA participants and general US population. Thus, individuals may differ widely in the way they find meaning in disease and see that meaning in relationship to their spiritual source (Büssing et al., 2007; Büssing, Ostermann, & Matthiessen, 2005; Büssing et al., 2006).

For the current study sample, intrinsic religiosity was a positive predictor for their mental health. According to the Harvard psychologist Allport (1979), persons with intrinsic religious orientation are those who find their motives in religion. These findings indicate that for both Muslim and Christian AA patients with diabetes, spirituality/religiosity may constitute an important factor contributing to development of effective coping strategies for living with diabetes and improving their mental health. However, further study is needed to investigate the precise relationships between and among the discrete concepts of spirituality, religiosity, and HRQL.

Neuropathy

In the current study, the presence of neuropathy as a micro-complication of diabetes was a significant predictor for the participants' physical health. This finding is consistent with several previous studies that found neuropathic symptoms were the most strongly associated with physical health among diabetes patients (Gulliford & Mahabir, 1999; Evans et al., 1999; Solli, Starem, & Kristiansen, 2010). Retrospective and prospective studies have suggested a strong relationship between poor glycemic control and the development and severity of diabetic neuropathy (DCCT Research Group, 1995; Boulton et al., 2005). The precise influence of hyperglycemia on the injury of peripheral

nerves is not known, but likely is related to mechanisms such as polyol accumulation, injury from AGEs, and oxidative stress (Fowler, 2008).

In the current study, 44.9% of the participants had poor glycemic control, and the highest prevalence of neuropathy was found to be among these participants. Better metabolic control has been associated with lower incidence and fewer symptoms of diabetic neuropathy (DCCT Research Group, 1995). Although in the current study there was no direct association between glycemic control and HRQL, this finding is consistent with several previous studies (Bagne, Luscombe, & Damiano, 1995; Aalto, Uutela, & Aro, 1997; Kalda, Rätsep, & Lember, 2008). There is strong evidence that enhancing glycemic control results in reduction of diabetes complications (DCCT, 1993; UKPDS, 1998).

In the current study, two diabetic complications including stroke and neuropathy were predictors for participants' HRQL. Therefore, it can be posited that enhancing glycemic control among this population would minimize the incidence of diabetes complications, and, ultimately, increase HRQL. Future studies examining the relationships between glycemic control, diabetes complications, and HRQL are warranted.

Self-Management Behaviors

Proper self-management behaviors have a great impact in achieving glycemic control (Rubin & Peyrot, 1999; Toljamo & Hentinen, 2001). This study sample exhibited high levels of adherence to medication and a healthy diet. However, participants also demonstrated very low levels of exercise, and moderate levels of foot care and blood glucose monitoring. These findings are consistent with a previously reported study of AA

patients with type 2 diabetes residing in Michigan designed to assess quality of care received by this population by assessing adherence to the ADA clinical practice recommendations (Berlie et al., 2008). Berlie et al. (2008) reported that the quality of diabetes care in an AA population was sub-optimal according to the ADA clinical practice recommendations, and the majority of the AA subjects studied were treated less aggressively with pharmacologic agents than recommended by the ADA. However, the current study was not designed to assess the quality of diabetes care received by the study participants. Future research should be conducted among diabetic AA patients in multiple sites for that purpose.

Furthermore, Berlie et al. (2008) reported that 66% of AA patients with diabetes did not receive diabetes education from their healthcare providers. The current study did not assess whether participants received diabetes education from their healthcare providers nor their knowledge of appropriate diabetes management. It can be posited that the very high levels of diabetes acceptance in this sample indicate that these participants were perhaps more receptive to learning appropriate diabetes management in contrast with persons who have lower levels of acceptance or denial (Büssing, Matthiessen, & Mundle, 2008). Future research in the AA population should focus on documentation of levels of proper diabetic self-management behaviors and the relationship of such behaviors to levels of diabetes education received from healthcare providers.

In the current study findings, it is important to note that none of the six aspects of self-management were significant predictors for the participants' HRQL. However, taking diabetes oral medications was significantly associated with lower physical activity.

It is possible that this study population was relying on medication adherence for diabetic control instead of other important self-management behaviors, such as physical activity.

Physical inactivity is a documented health problem in the AA population, and the low level of physical activity reported by the current study participants is consistent with the low level of physical activity reported in other previous studies conducted among AAs in California and Michigan (Qahoush, 2006; Qahoush, 2009; Jaber et al., 2003; Berlie et al., 2008). Physical activity has a crucial role in primary prevention of type 2 diabetes in high-risk people and in the secondary prevention of diabetes complications in patients already diagnosed with diabetes.

The ADA (2008) emphasizes the importance of physical activity because of its ability to improve insulin sensitivity, decrease blood glucose, decrease blood pressure level, improve weight loss, provide stress relief, and promote well being. Fourteen (14) controlled trials with exercise interventions in adults with type 2 diabetes reduced HbA1c, even with no significant change in BMI (Boulé, Haddad, Kenny, Wells, & Sigal, 2001). Boulé et al. (2001) conducted a meta-analysis that concluded that as the intensity of physical activity increases, cardiorespiratory fitness improves and HbA1c levels are reduced in patients with type 2 diabetes. Therefore, it is appropriate to propose future intervention studies in the diabetic AA population involving increased physical activity, with a consequent examination of its relationship to the enhancement of glycemic control, decrease in diabetic complications, and enhancement of HRQL.

Obesity

Obesity was a significant predictor for physical health of the current study sample. The calculated BMI in the current study demonstrated that 84.9% of the

participants were obese or overweight, and 48.1% were obese. This prevalence rate of obesity is consistent with previous reported obesity rates among diabetes patients in US, where 82.7% of patients were obese or overweight, and 53% were obese (CDC, 2007). The negative effect of obesity in lowering the physical health among diabetes patients and general population is well documented in the literature (Glasgow et al., 1997; Rejeski et al., 2006; Al-Shehri et al., 20008; Hill-Briggs et al., 2002; Akinci et al., 2008). Obesity is a serious health problem in the AA population. Several previous studies demonstrated high prevalence of obesity and overweight among the AA population in California, Michigan, and Washington, ranging between 62.2% and 76.5% (Qahoush, 2006; Shara et al., 2010; Corteville et al., 2010).

As demonstrated in the current study and several other previous studies, the majority of AAs demonstrated very low physical activities and high prevalence of obesity and overweight. These data may indicate that enhancing regular physical activity and reducing weight in AA patients with diabetes constitute a challenge for healthcare providers. Enhancing physical activity and weight reduction strategies have been shown to improve the physical and emotional health of patients (Glasgow et al., 1997; Caruso et al., 2000; Maddigan et al., 2005). Primary intervention strategies must be developed and tested to encourage physical activities and weight reduction for the general AA population (Hatahet, Khosla, & Fungwe, 2002; Qahoush, 2006). As a secondary intervention for patients with diabetes, the quality of social support can be posited as a critical factor in enhancing physical activities and weight reduction strategies development. This possibility is supported by the significant positive association identified between marital status and social support attitudes and levels of physical

health. Therefore, future studies examining the complex relationship between social support, obesity, and HRQL in the AA population are indicated.

Sample Demographics

In the current study, the majority of the participants had high levels of education, low levels of annual income, and were insured with Medicaid or Medicare. There was a high rate of unemployment and retirement status among the study participants, and thus a consequent high level of governmental health insurance programs. In the US, persons below certain economic levels may be eligible for Medicaid and persons over age sixty-five for Medicare (Gross et al., 1999). Five percent (n=8) of the participants reported having Medicare in addition to a private health insurance.

Employment status was a significant predictor for the participants' physical health. Employed participants reported significantly higher physical health than unemployed and retired participants. This finding is consistent with the national health surveys reporting poorer HRQL for retired or unemployed (CDC, 2005). Also, this finding is consistent with a meta-analysis of the diabetes literature indicating that employed patients with diabetes have better HRQL than retired or unemployed patients (Rubin & Peyrot, 1999).

In the current study, unemployed or retired participants represent the low income and Medicaid/Medicare participants. Unemployed or retired participants with low income and with Medicaid/Medicare health insurance had significantly lower physical functioning than employed participants with higher income and private health insurance. The positive relationship of higher income and having private health insurance to physical health in diabetes patients is well documented in the literature, just as having

inadequate access to primary care and preventative services are negatively related to physical health (Glasgow et al., 1997; Rubin & Peyrot, 1999; Maddigan et al., 2006).

According to the Medicare Payment Advisory Commission (MEDPAC, 2004), only 69.5% of physicians surveyed were willing to accept new Medicaid patients, substantially fewer than the number willing to accept new privately insured patients (99.3%), Medicare patients (95.9%), and even the uninsured (92.8%). This disparity holds for primary care physicians as well as medical and surgical specialists (MEDPAC, 2004). Low physician participation in Medicaid has been shown to reduce enrollees' access to medical care and increase the rate of emergency department visits (Cunningham & Nichols, 2005). Moreover, Tanner (2006) demonstrated that Medicaid beneficiaries face more difficulties scheduling adequate and timely follow-up care after initial treatment for an illness than those with private insurance.

Patients with diabetes require regular follow-up with their healthcare providers to maintain an appropriate diabetes regimen. The current study sample with Medicaid or Medicare demonstrated a statistically significant lower level of physical health than participants with private health insurance. These findings have implications for policy makers and researchers as the Affordable Care Act (ACA) is operationalized in the US. While it is posited that accessibility to primary care and preventative services for patients with diabetes will increase following full implementation of the ACA, future longitudinal studies will be critical. Examination of the long-term relationship between access to health care, physical health, and HRQL in the US diabetic population in general will be important, and specific examination of these relationships in the AA population will yield important data.

In the current study, there was a significant inverse correlation between participant age and length of diabetes diagnosis with physical health. This inverse correlation has been well documented in the diabetes literature (Glasgow et al., 1997; Rubin & Peyrot, 1999; Redekop et al., 2002). Aging and increased duration of having diabetes could increase the incidence of diabetic complications (Mayou et al., 1990; Glasgow et al., 1997; Gregg et al., 2000). This study's findings demonstrate that being unemployed, retired, low SES, a recipient of Medicaid/Medicare health insurance, elderly, or having an increased length of diabetes diagnosis is related to having poorer physical health. Therefore, it is important for future studies to examine more fully the relationship of these characteristics in AA patients with diabetes, as a basis for future research exploring the relationship of these variables to physical health and HRQL.

Marital status was a predictor for the physical health of the current study participants. Married participants had better physical health than those who were not married. This finding is consistent with previous studies of patients with diabetes (Trief et al., 2001; Jacobson et al., 1994), as well national surveys of the general population (CDC, 2005). This can be attributed to the social support provided by spouse, children, or friends. Marriage has a critical role in providing emotional fulfillment, intimate relationships, and social connection satisfaction that could have implications for both physical and mental health (House, Umberson, & Landis, 1988). A spouse may play a critical role in monitoring and encouraging healthy behaviors such as good eating habits and regular exercise (Simon, 2002). Also, marriage has been found to reduce depressive symptoms for both men and women (Kim & Mckenry, 2002; Lamb, Lee, & DeMaris, 2003).

The majority of this study's sample was married (85.4%) and reported high levels of social support received and moderate levels of social support attitudes. Data from this study are reflective of the strong family ties central to Arab culture. However, this study was not designed to identify the primary source of social support. Rather, it determined the type and effect of social support in HRQL among a group of AA patients with diabetes. Future studies should examine more closely the specific roles that spouses, children, other family members, and friends play in supporting AAs in health self-management and HRQL.

Social Support

In the current study, social support received was not a predictor for participants' mental or health functioning. This is inconsistent with several previous studies (Wang & Fenske, 1996; Maclean & Lo, 1998; Garay-Sevilla et al., 1999; van Dam et al., 2005; Wysocki & Greco, 2006). However, social support attitude was a predictor for the participants' physical health, which supports the results of a previous study of the AA elderly in which AAs' perception of their children's nervousness was associated with lower life satisfaction (Ajroush, 2007). Future studies that focus additionally on the quality and quantity of social support are warranted in exploring its relationship to physical health and HRQL in this population.

Sherbourne et al. (1992) conducted a study of 1198 patients diagnosed with chronic illnesses. For those patients with diabetes, quality of support (a composite score of perceived support, emotional connections, interpersonal closeness) was a predictor of self-care, whereas quantity of social support (number of close friends and family an individual has) was not a predictor. Similarly, the amount of social support in Caucasian

and African American adults with type 2 diabetes had no association with self-care or glycemic control (Chlebowy & Garvin, 2006). In studying social support variables in African Americans with type 2 diabetes, the only variable that did not predict self care or QoL was the amount of received social support (Tang et al., 2008). Therefore, it can be posited that social support attitudes may positively influence AAs physical health through encouraging proper self-management behaviors. The relationships between quality and quantity of social support, enhancement of physical health, and the promotion of self-management behaviors constitute an important future research area in establishing more effective care of diabetic AAs.

Health-Related Quality of Life (HRQL)

A hybridization of Ferrans' conceptual model of QoL (1990) and the integrative HRQL theory guided this study. While the hybridization of conceptual models has inherent limitations, including generalizability of study findings, its use for this study was founded upon concerns that a holistic view of diabetes in the AA population be utilized in the study.

Ferrans' (1990) conceptual model of QoL was useful in organizing a major portion of the study domains. The model consists of a health and functioning domain, socioeconomic domain, psychological/spiritual domain, and family domain. In this study, three variables were measured in the health and functioning domain (micro-complications, macro-complications, and BMI) and found to be significant predictors for HRQL. Two variables were measured in the socioeconomic domain (marital status and employment status) and also found to be significant predictors for HRQL. Additionally, spirituality/religiosity was used to represent the spiritual domain and found to be a

significant predictor for HRQL.

Social support attitudes scale (social domain) was also found to be a significant predictor for HRQL. Finally, the psychological domain was represented by diabetes acceptance. Diabetes acceptance had a significant positive relationship with HRQL, but was not a significant predictor of HRQL in the multiple regression models, possibly due to interrelation effect of several variables in the model.

The integrative HRQL theory was used to provide two additional study domains, the biological domain and cognitive domain. In the current study, HbA1c represented the biological domain and was not a significant predictor for HRQL. Alternately, higher levels of HbA1c were associated with increased risks of developing diabetes complications. Therefore, HbA1c can be posited to have an indirect effect on HRQL in diabetes patients, although the exact mediation of this effect would require much further study.

The last domain measured in this study was the cognitive domain represented by self-management behaviors. Two of five self-management behaviors – foot care and medications adherence – were significantly correlated with HRQL. None of the self-management behaviors were significant predictors of HRQL in the multiple regression models, possibly due to interrelation effect of several variables in the model. Future studies involving larger populations and fewer threats to internal validity will be useful in establishing the relationships between self-management behaviors and HRQL.

This study's findings support the value of Ferrans' conceptual model of QoL in guiding future research studies among the AA population, while suggesting that the development of more inclusive models may be needed to avoid the problems inherent

with a hybridized model. It seems that the variables used to measure the QoL and HRQL domains were representative for patients with diabetes with the exception of the psychological and cognitive domains. Using other variables such as depression for the psychological domain and dementia for the cognitive domain might provide more valuable information. Future researchers might consider developing a more inclusive single model that incorporates HRQL as a basis for testing the relationship between these variables and HRQL in AA patients with diabetes.

Implications and Recommendations

While results from this study constitute a beginning in the development of a knowledge base in caring for AA patients with type 2 diabetes, some implications and recommendations for clinical practice and patient education can be tentatively proposed. Data from this study obviously do not constitute a basis for clinical practice at this point and the following implications are not to be considered prescriptive. Nevertheless, these findings present an intriguing first look at the needs of AAs who have type 2 diabetes and have implications for healthcare providers to consider when caring for this population.

Clinical Practice

Overall, this study sample exhibited a higher physical health component than the mental health component. While the factors underlying a poor mental health status are complex, healthcare providers need to assess mental health and social functioning in AA patients who present with diabetes. AA patients with type 2 diabetes, a history of stroke or neuropathy, or who are unemployed, retired, unmarried, or have a high BMI may need enhanced monitoring of their HRQL. In addition, patients with greater physical

disabilities due to stroke should be assessed for degree of social isolation (Lai, Studenski, Duncan, & Perera, 2002; Gurcay, Bal, & Cakci, 2009).

Patient Education

Muslim and Christian AAs who participated in the study demonstrated a strong association between spirituality/religiosity and their acceptance of diabetes. Thus, the enhancement of cultural sensitivity in healthcare providers regarding the role of spirituality/religiosity in their patients' lives across cultural groups would be beneficial. While future intervention studies are needed, the potential integration of spiritual/religious beliefs in educational programs and their use as a coping strategy for AA Muslims and Christian living with diabetes warrants further exploration. The sample exhibited high levels of diabetes acceptance, possibly indicating an enhanced receptivity to educational interventions designed to enhance self-management behaviors and HRQL.

Preventative measures or therapies to prevent neuropathy among AA patients with diabetes should be addressed in their management plans by healthcare providers. This could be accomplished by managing glycemic control (DCCT Research Group, 1995; Boulton et al., 2005). Participants in this study exhibited high levels of medication adherence and following appropriate healthy diet. On the other hand, they exhibited very low levels of exercise and had high rates of obesity and being overweight. Healthcare interventions should encourage AA Muslims and Christian patients with diabetes to increase their physical activities in an attempt to reduce weight in an attempt to improve their glycemic control. Also, healthcare providers should be aware of and follow the ADA recommendations for best practices and assess whether AA patients are being under-treated, as documentation of under-treatment for diabetes exists in this population.

Limitations and Future Research

This study represents the first published attempt to establish a knowledge base about factors contributing to HRQL in the AA population. Its strength lies in its attempt to capture a previously unexplored study area of great complexity. However, as a small, initial study, it also contains several limitations, which are described below. Findings from the study do indicate some important areas for future research, which are presented following the study limitations.

Design Limitations

This study utilized a cross sectional design, which by its nature gives a one-time “snapshot” of a complex healthcare phenomenon. Future studies that utilize a longitudinal design would be useful in examining the long-term effect of determinants of HRQL. The ability of researchers to track multiple factors affecting HRQL over time in the AA diabetic population would yield important data regarding the complex mediating factors, including social support, spirituality, religiosity, and SES, that either promote or decrease HRQL over time. The study’s use of self-reported data carries a risk to validity, as self-reporting may be affected by such external factors as the Hawthorne effect. Future studies that use digitized medical record data regarding precise information on such factors as comorbidities and complications of diabetes may provide more valid approaches when used in a triangulation approach with self-reported data.

Another potential design limitation was the use of a hybridized conceptual model, which was necessitated by the researcher’s concern that a more holistic view of this study population was needed than the current Ferrans’ (1990) model provides. Such an approach may result in a potential lack of conceptual cohesiveness with accompanying

threats to generalizability. In future studies, the researcher looks forward to developing an inclusive model suitable for use in the AA population.

The choice of specific variables may have presented a potential threat to validity. A history of coronary artery disease (CAD) and peripheral vascular disease (PVD) were used as variables for macro-complications of diabetes because they represented as a broad diagnosis comprising several specific diseases. However, the third macro-complication presented was stroke (a specific disease from a group of cerebral vascular diseases). Future researchers might consider using specific disease categories for diabetes complications instead of broad groups of diseases.

Additionally, the use of the variable of spirituality/religiosity represents a potential threat to conceptual clarity. Future investigations will need to define more clearly the measurement of the distinct concepts of spirituality and religiosity in regards to both Muslim and Christian AA populations.

The use of the variable “length of stay in the US,” while an important datum regarding how far removed the participant was from the immigration event, needs further consideration in studying an immigrant population. The concept of length of stay in the US is not interchangeable with the concept of degree of acculturation. In future studies, administering a valid and reliable tool to assess degree of acculturation will give researchers additional information regarding the complex relationships between factors contributing to HRQL.

Sampling Limitations

This study sample was relatively small, as is appropriate in initial descriptive work in an under-researched study area. Thus, the generalizability of study findings is

limited. Other factors are potential limitations to generalizability as well, and provide implications for future researchers undertaking work in this population group.

All participants were recruited from the Southern California area. Future multi-site studies of AAs living in various areas of the US are needed. All the Muslim participants belonged to Sunni denomination. The inclusion of other Muslims, such as the Shi'ah Muslims, in future studies may provide different findings. All participants recruited in this study were mainly from mosques or churches, and therefore may not represent all diabetic AAs who are either not affiliated or unable to attend a place of religious worship. The recruitment from places of worship is reflected in the finding that the majority of the study sample 96.2% was found to be spiritual/religious. Thus, recruiting participants from a variety of settings might result in a population with less spiritual/religious attitudes and provide different perspectives and findings.

It will be especially important, given the finding of a high level of physical functioning in post-stroke participants, to recruit participants from non-social settings in future studies. Access to persons severely disabled by a stroke who currently remain community-dwelling but home-bound will be needed to give a more complete picture of this subject population. While very time consuming, the recruitment of participants from outpatient settings who have multiple comorbidities associated with diabetes and are highly disabled following a stroke will yield valuable information about the multiple factors contributing to HRQL.

The current study did not assess the generational differences in AAs, particularly data regarding AAs who were born in an Arabic country and immigrated to the US versus AAs who were born in the US. Such generational differences are profoundly important to

consider as the US population of AAs grows. Persons from younger cohorts who were born in the US and experienced socialization similar to their non-AA peers will have different health-related needs than those of their immigrant parents. The use of technology will become an important part of future generations' access to health information and enhancement of HRQL.

Finally, the relatively low-income status of this population and its reliance on non-private sources of health insurance must be considered. Given that low SES and lack of access to private health insurance have been documented as strongly associated with poor physical health, future studies must focus more deeply on these particular factors in the AA population. Lack of employment or under-employment are also related to poor mental health status, and the economic challenges facing a largely immigrant population in the contemporary US can intuitively be associated with a decreased HRQL. Future research addressing economic stressors on immigrant populations that includes the AA population and its relationship to such variables as HRQL is imperative in meeting the goals of Healthy People 2020.

Future Research

The areas of future research suggested by these study data are multiple. Data from this study may inform future mid-range theory development in this population for nurse theorists and serve as a basis for future nursing research. Specific future research implications are presented below.

These findings suggest a need to develop and test a culturally-sensitive interventional program designed for AA patients with diabetes. Given the diverse nature of the AA community in the US, identifying the unique needs of the sub-populations

(e.g., Somali Muslims, Maronite Christians) is a needed step. This study was an initial step in exploring a relatively unknown phenomenon, and thus drew from a diverse subject population. Future studies focused more narrowly on variables such as the nature of religiosity and HRQL of specific populations, such as Sunni Muslims, will be useful in designing culturally-competent interventions.

In addition to addressing AA sub-population needs, future researchers will need to consider carefully the variables chosen to examine this complex study area. The relationships between depression, stress, and anxiety with HRQL are multifaceted and complex. The use of a longitudinal design to examine the interactions between and among key variables over time will be needed. The development of an intervention to improve HRQL in any population is a complex undertaking. In the case of the diabetic AA population, the development of appropriate interventions to enhance HRQL will require the use of multiple methods, including qualitative data regarding lived experiences triangulated with quantitative data.

This study did not assess participants' knowledge of proper self-management behaviors or their healthcare providers' adherence to ADA medication guidelines. Therefore, future research should assess this population's knowledge of proper self-management behaviors and the adequacy of the education and treatment modalities provided by their healthcare providers.

This study's findings suggest that certain factors, including unemployment or retirement, low SES, Medicaid/Medicare health insurance, longer length of diabetes diagnosis, and increased age may place an individual at risk for decreased HRQL. Given adequate time and a larger sample, further studies exploring the relationship between

these factors ultimately could result in the identification of a symptom cluster most predictive of a lower HRQL and would prove useful to healthcare providers for assessing high-risk patients.

There is also a need to explore more deeply the role of both quantity and quality of social support in enhancing HRQL in this population. Research into the dimensions of social support available for AA Muslims and Christian persons with diabetes is needed. Furthermore, investigators need to develop intervention studies examining the quality of social support received by diabetic AA patients referred to mainstream diabetic support groups, compared with participation in groups of diabetic persons from the same ethnic background.

Finally, this study explored the reliabilities of all the measurement instruments utilized to support their use in future studies of AA populations. In addition, a CFA was conducted for the Arabic translated version of IAD-R (Dion, 1990) to measure diabetes acceptance showing preliminary acceptable psychometric properties. This finding suggests that this instrument is appropriate for further testing in future studies of various sub-populations of AAs with different chronic conditions.

Summary

In summary, this chapter discussed the limitations and implications of this study of multiple factors contributing to HRQL in AA Muslim and Christian patients with diabetes. While not prescriptive, some initial implications for clinicians and patient education were presented. The study's limitations in design and sampling were described, with strategies suggested for overcoming these limitations in future studies. Finally, this chapter provided some directions for future research in this population, including the importance of longitudinal analyses and the consideration of sub-population research.

Conclusion

The purpose of this dissertation was to describe determinants of HRQL in AA patients with type 2 diabetes. HRQL is a national health outcome measure that has received a great deal of attention in the last two decades in the attempt to better understand the burden of disease and treatment effectiveness. This initial study of AA patients with diabetes, while limited, suggests a critical need to explore more fully the significance and impact of determinants of HRQL among AA patients with type 2 diabetes.

The results of the study revealed significant mental health and physical health components of the HRQL framework. In terms of mental health, the history of stroke as a macro-complication of diabetes and intrinsic religiosity were significant predictors of the mental health in AA Muslims and Christians patients with diabetes. Participants with a history of stroke demonstrated worse mental health while simultaneously displaying better physical health. This finding emphasizes the need for future research into emotional or mental disorders that may impact HRQL. Additionally, participants with higher intrinsic religiosity demonstrated a better mental health status, which emphasizes the importance of future study of the role of spirituality and religiosity as mediators of mental health status in the diabetic AA population.

In regard to the physical health component, several predictors of HRQL were identified, including presence of neuropathy, marital and employment status, BMI, and social support attitudes. Participants with neuropathy as a micro-complication of diabetes reported poorer physical health. This result could be due to poor glycemic control, and it emphasizes the importance of improving glycemic control in this population.

Married participants demonstrated better levels of physical health, suggesting that spousal social support is related to physical health in this population. Employed participants demonstrated better physical health, which emphasizes the importance of future study of the role of SES in this population in mediating physical health. Not surprisingly, participants with increased BMI demonstrated poor physical health. The study sample demonstrated a high prevalence of obesity and overweight and low levels of physical activity, which illustrates the need for developing and testing health care interventions to encourage this population to improve their physical activity and decrease their weight, thus improving their physical health.

Participants with greater social support attitudes also demonstrated better physical health. This finding suggests that the quality of social support, rather than quantity, needs to be examined as a mediator of physical health of AA patients with diabetes. Finally, this study explored the reliability of different instruments used to measure the study variables, demonstrating evidence for possible utilization in future studies in the AA population.

The final chapter of this dissertation described implications for HCPs, including nurse practitioners, regarding the care of Muslim and Christian AA patients with diabetes. Implications for future research include the longitudinal study of HRQL and its determinants in the development of preventative, management, and educational programs specifically targeting the sub-populations of the rapidly growing AA community.

This study provides a starting point for enhancing the knowledge base regarding a complex study area in this culturally and ethnically diverse population. This is the first study exploring determinants of HRQL in AA patients with diabetes. While limited by

some design and sampling characteristics, the study yielded significant findings and indicates that further research definitely is warranted in this area. In particular, the data suggest that the relationship between determinants of HRQL in the AA diabetic population is a promising field of research, and its exploration may ultimately result in enhanced health for a rapidly growing segment of the American population.

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Appendix A

Socio-Demographic Factors

Code#:

Please answer the following questions that best describe you:

1. Current Age:years
2. Gender: Male ☐ Female ☐
3. What is your birth place
4. What is your height Feet Inches.
5. What is your weight (without shoes) Pounds.
6. What is your family income before taxes:
☐ Less than \$25,000
☐ \$25,000 - \$90,000
☐ Greater than \$90,000
7. What is your highest level of education completed:
☐ Less than 12 years of education
☐ College/ University degree
☐ Graduate degree
8. What is your marital status:
☐ Single
☐ Married
☐ Separated
☐ Divorced
☐ Widow
☐ Other (Explain).....

9. What is your employment status:

- ☐ Employed
- ☐ Unemployed
- ☐ Retired

10. Do you have health insurance:

- ☐ Yes (Type).....
- ☐ No

11. For how long you have been in United State:

- ☐ Less than 5 years
- ☐ 5 to 10 years.
- ☐ More than 10 years

12. What is your religious affiliations:

- ☐ Muslim (Type)
- ☐ Christian (Type)
- ☐ Other please specify

Appendix B

Diabetes-Related Characteristics

Code#:

Please answer the following questions that best describe you:

1. Have any of the following members of your family been diagnosed by healthcare professional with diabetes?

☐ Father ☐ Sister
☐ Mother ☐ Brother
☐ None

2. For how long you have been diagnosed with type II diabetes?

☐ Less than 5 years
☐ 5 to 10 years
☐ More than 10 years

3. Have you ever been told by healthcare professional that you have any of the following conditions?

Retinopathy	☐ Yes	☐ No
Nephropathy	☐ Yes	☐ No
Neuropathy	☐ Yes	☐ No
Coronary artery disease	☐ Yes	☐ No
Peripheral vascular disease	☐ Yes	☐ No
Stroke	☐ Yes	☐ No
Hypertension	☐ Yes	☐ No
Hyperlipidemia	☐ Yes	☐ No
Arthritis	☐ Yes	☐ No
Obesity	☐ Yes	☐ No

Appendix C

Glycemic Control Form

Code #:

Date of Recruitment:

HbA1c Value:

HbA1c Date Taken:

Appendix D

SpREUK 15-Item (Spirituality/Religiosity) Instrument

Code #:

SpREUK © Prof. Dr. Arndt Bussing, University Witten/Herdecke Each person has its own and unique point of view which must not necessarily apply to yours. Thus, read the statements you will find here carefully and then indicate how true each is for you and your situation by circling one number per line.		does not apply at all	does not really apply	I don't Know	applies quite well	definitely applies
F2.6 *	To my mind I am a religious individual.	0	1	2	3	4
F1.1 *	To my mind I am a spiritual individual.	0	1	2	3	4
F1.4	My illness has brought me a renewed interest in spiritual or religious questions.	0	1	2	3	4
F1.5	I am convinced that finding access to a spiritual source can have a positive influence on my illness.	0	1	2	3	4
F1.6	I am searching for an access to spirituality/religiosity.	0	1	2	3	4
F1.9 *	It urges me on to spiritual or religious insight, whether it diminishes my difficulties in life or not.	0	1	2	3	4
F2.5	Whatever may happen, I trust in a higher power which carries me through.	0	1	2	3	4
F3.2	Something that happens to me is a hint that I should change my life.	0	1	2	3	4
F3.3	My illness encourages me to get to know myself better.	0	1	2	3	4
F3.4 *	I am convinced that my illness has meaning.	0	1	2	3	4
F3.5 *	My illness is a chance for my own development.	0	1	2	3	4
F3.7	Because of my illness, I reflect on what is essential in my life.	0	1	2	3	4
37	I have faith in spiritual guidance in my life.	0	1	2	3	4
38	To my mind I am connected with a „higher source“.	0	1	2	3	4
39	I am convinced that death is not an end.	0	1	2	3	4

Appendix E

Ideas About Diabetes-Revised (Diabetes Acceptance) Instrument

Code #:

This survey asks your opinion about having diabetes. Each statement describes how you might feel in certain situations.

Read each statement. Decide the extent to which you agree with it. Circle the appropriate letter to the left of the statement. Use the following scale:

SA = Strongly Agree

A = Agree

U = Uncertain

D = Disagree

SD = Strongly Disagree

SA	A	U	D	SD	1. I fell hopeful about my future.
SA	A	U	D	SD	2. I don't tell other people about having diabetes until I know them well.
SA	A	U	D	SD	3. I lead a less satisfying life than other people because of my diabetes.
SA	A	U	D	SD	4. I am comfortable talking about my diabetes with my coworkers.
SA	A	U	D	SD	5. I can do everything that people who do not have diabetes can do.
SA	A	U	D	SD	6. Taking care of my diabetes is important
SA	A	U	D	SD	7. Some people don't invite me out because they know I have diabetes.
SA	A	U	D	SD	8. I can't schedule my life around a management plan.
SA	A	U	D	SD	9. I lead a full and productive life.
SA	A	U	D	SD	10. I expect to be healthy for long time to come.
SA	A	U	D	SD	11. I talk about having diabetes in a matter of fact way.
SA	A	U	D	SD	12. If I follow my management plan, I will reduce the chance of future complications.
SA	A	U	D	SD	13. I don't have many good things to look forward to in life because of my diabetes.
SA	A	U	D	SD	14. I speak with ease about having diabetes to others who are interested.

SA	A	U	D	SD	15. I won't be able to lead a normal life because of my diabetes.
SA	A	U	D	SD	16. Having diabetes doesn't affect my social life.
SA	A	U	D	SD	17. If I follow my doctor's orders, my health will be good.
SA	A	U	D	SD	18. I would have more friends if I didn't have diabetes.
SA	A	U	D	SD	19. Diabetes prevents me from participating actively in sports or recreational activities.
SA	A	U	D	SD	20. Having diabetes does not affect the way people feel about me or relate to me.

Appendix F

Diabetes Care Profile (Social Support Received & Attitudes Scales)

Code #:

Q1. My family or friends help and support me a lot to:

(Circle one answer for each line)

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	Does Not Apply
a) follow my meal plan.	1	2	3	4	5	0
b) take my medicine.	1	2	3	4	5	0
c) take care of my feet.	1	2	3	4	5	0
d) get enough physical activity.	1	2	3	4	5	0
e) test my sugar.	1	2	3	4	5	0
f) handle my feelings about diabetes.	1	2	3	4	5	0

Q2. My family or friends: (circle one answer for each line)

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
a) accept me and my diabetes.	1	2	3	4	5
b) feel uncomfortable about me because of my diabetes.	1	2	3	4	5
c) encourage or reassure me about my diabetes.	1	2	3	4	5
d) discourage or upset me about my diabetes.	1	2	3	4	5
e) listen to me when I want to talk about my diabetes.	1	2	3	4	5
f) nag me about diabetes.	1	2	3	4	5

Appendix G

**Summary of Diabetes Self-Care Activities-R (Self-Management Behaviors)
Instrument**

Code #:

The questions below ask about your diabetes self-care activities during the past 7 days. If you were sick during the past 7 days, please think back to the last 7 days that you were not sick.

Diet	Number of days							
1. During the last seven days, for how many days did you follow a healthy diet?	0	1	2	3	4	5	6	7
2. How well did you follow your diet during the last month (rate of days in the week)?	0	1	2	3	4	5	6	7
3. On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?	0	1	2	3	4	5	6	7
4. On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full-fat dairy products?	0	1	2	3	4	5	6	7
 Exercise								
5. During the last seven days, for how many days did you practice physical activities in general for at least 30 minutes? (Total minutes of activities including walking)	0	1	2	3	4	5	6	7
6. During the last seven days, for how many days did you practice a strict training exercise session (such as swimming, walking ...etc) exclude activities that are performed around your house or at your work?	0	1	2	3	4	5	6	7

Blood Sugar Testing

7. During the last seven days, for how many days did you test your blood sugar level? 0 1 2 3 4 5 6 7

8. During the last seven days, for how many days did you test your blood sugar level according to your physician's instructions? 0 1 2 3 4 5 6 7

Foot Care

9. During the last seven days, for how many days did you check your feet? 0 1 2 3 4 5 6 7

10. During the last seven days, for how many days did you check the interior of your shoes (to insure that there are no materials that could cause any injury to your feet)? 0 1 2 3 4 5 6 7

Medications

11. On how many of the last SEVEN DAYS, did you take your recommended diabetes medication? 0 1 2 3 4 5 6 7

Appendix H

SF-36v2 ® Health Survey Standard, Saudi Arabia

Your Health and Well-Being

This questionnaire asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. *Thank you for completing this survey!*

For each of the following questions, please mark an ☒ in the one box that best describes your answer.

1. In general, would you say your health is:

Excellent	Very good	Good	Fair	Poor
▼	▼	▼	▼	▼
☐	☐	☐	☐	☐

2. Compared to one year ago, how would you rate your health in general now?

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
▼	▼	▼	▼	▼
☐	☐	☐	☐	☐

3 The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, limited a lot ▼	Yes, limited a little ▼	No, not limited at all ▼
Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	☐	☐	☐
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing billiard	☐	☐	☐
Lifting or carrying groceries	☐	☐	☐
Climbing <u>several</u> flights of stairs	☐	☐	☐
Climbing <u>one</u> flight of stairs	☐	☐	☐
Bending, kneeling, or stooping	☐	☐	☐
Walking <u>more than one kilometre</u>	☐	☐	☐
Walking <u>several hundred metres</u>	☐	☐	☐
Walking <u>one hundred metres</u>	☐	☐	☐
Bathing or dressing yourself	☐	☐	☐

4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Cut down on the <u>amount of</u> time you spent on work or other activities.....	☐	☐	☐	☐	☐
Accomplished less than you would like	☐	☐	☐	☐	☐
Were limited in the kind of work or other activities	☐	☐	☐	☐	☐
Had difficulty performing the work or other activities (for example, it took extra effort).....	☐	☐	☐	☐	☐

5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Cut down on the <u>amount of</u> time you spent on work or other activities.....	☐	☐	☐	☐	☐
Accomplished less than you would like	☐	☐	☐	☐	☐
Did work or other activities <u>less carefully than usual</u>	☐	☐	☐	☐	☐

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

Not at all	Slightly	Moderately	Quite a bit	Extremely
▼	▼	▼	▼	▼
☐	☐	☐	☐	☐

7. How much bodily pain have you had during the past 4 weeks?

None	Very mild	Mild	Moderate	Severe	Very severe
▼	▼	▼	▼	▼	▼
☐	☐	☐	☐	☐	☐

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
▼	▼	▼	▼	▼
☐	☐	☐	☐	☐

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Did you feel full of life?	☐	☐	☐	☐	☐
Have you been very nervous?	☐	☐	☐	☐	☐
Have you felt so down that nothing could cheer you up?	☐	☐	☐	☐	☐
Have you felt calm and peaceful?	☐	☐	☐	☐	☐
Did you have a lot of energy?	☐	☐	☐	☐	☐
Have you felt downhearted and depressed?	☐	☐	☐	☐	☐
Did you feel worn out?	☐	☐	☐	☐	☐
Have you been happy?	☐	☐	☐	☐	☐
Did you feel tired?	☐	☐	☐	☐	☐

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐	☐	☐	☐	☐

11. How TRUE or FALSE is each of the following statements for you?

	Definitely true ▼	Mostly true ▼	Don't know ▼	Mostly false ▼	Definitely false ▼
I seem to get sick a little easier than other people	☐	☐	☐	☐	☐
I am as healthy as anybody I know	☐	☐	☐	☐	☐
I expect my health to get worse	☐	☐	☐	☐	☐
My health is excellent	☐	☐	☐	☐	☐

Thank you for completing these questions!

Appendix I

Socio-Demographic Factors (Arabic)

قياس الصفات الشخصية

الرقم السري للمريض

الرجاء الاجابه على الاسئله التاليه:

1. العمر سنة

2. الجنس: انثى ☐ ذكر ☐

3. مكان الولاده

4. ما هو طولك قدم انش

5. ما هو وزنك (بدون حذاء) باوند

6. ما هو دخل عائلتك قبل الضريه

☐ اقل من 25.000 دولار☐ من 25.000 الى 90.000 دولار☐ اكثر من 90.000 دولار

7. ما هو تحصيلك العلمي / مؤهلك العلمي

☐ اقل من 12 سنه دراسه☐ كلية/جامعه☐ دراسات عليا

8. الحاله الاجتماعيه

☐ اعزب☐ متزوج☐ منفصل☐ مطلق☐ ارمل

9. خيارات اخرى (الرجاء ذكرها).....

ما هر حالتك الوظيفيه

☐ موظف☐ عاطل عن العمل☐ متقاعد

10. هل يوجد لديك تأمين صحي

☐ نعم (الرجاء التحديد).....

☐ لا

11. مدة الإقامة في أمريكا

☐ أقل من خمس سنوات

☐ من خمسة الى عشرة سنوات

☐ أكثر من عشرة سنوات

12. ما هي ديانتك

☐ الاسلام (الرجاء التحديد).....

☐ المسيحية (الرجاء التحديد).....

☐ خيارات اخرى . (الرجاء ذكرها)

Appendix J

Diabetes-Related Characteristics (Arabic)

قياس الصفات الشخصية المصاحبة لمرض السكري

الرقم السري للمريض

الرجاء الاجابة على الاسئلة التالية :

1. اي من افراد العائلة التالية تم تشخيصه بالسكري

- ☐ الاب
- ☐ الاخت
- ☐ الام
- ☐ الاخ
- ☐ لا يوجد

2. منذ متى تم تشخيصك بمرض السكري من قبل الطبيب

- ☐ اقل من 5 سنوات
- ☐ من 5-10 سنوات
- ☐ اكثر من 10 سنوات

3. هل تم اخبارك من قبل الطبيب بانك مصاب باي من ما يلي

☐	لا	☐	نعم	مشاكل بالعيون
☐	لا	☐	نعم	مشاكل بالكلى
☐	لا	☐	نعم	مشاكل بالاعصاب
☐	لا	☐	نعم	امراض القلب والشرابين
☐	لا	☐	نعم	امراض الاوعية الدموية
☐	لا	☐	نعم	جلطة دماغية
☐	لا	☐	نعم	ارتفاع الضغط
☐	لا	☐	نعم	ارتفاع الدهون في الدم
☐	لا	☐	نعم	التهاب المفاصل
☐	لا	☐	نعم	السمنة

Appendix K

Glycemic Control Form (Arabic)

الملف الطبي للمريض

الرقم السري للمريض

تاريخ المشاركة بالدراسة

نتيجة فحص السكر التراكمي في الدم

تاريخ فحص السكر التراكمي في الدم

Appendix L

SpREUK 15-Item (Spirituality/Religiosity) (Arabic)

قياس الفقرات الدينية/ الروحانية

الرقم الممرى للمريض

الرجاء الاجابة على الاسئلة التالية :

SpREUK Questionnaire استبيان الفقرات الدينية/ الروحانية		لا ينطبق أبدا	لا ينطبق	لا أعرف	ينطبق إلى حد ما	ينطبق تماما
F2.6	حسب فكري أنا إنسان متدين	0	1	2	3	4
F1.1	حسب فكري أنا إنسان روحي	0	1	2	3	4
F1.4	يعتبر مرضى سببا في رجوعى إلى الدين والحياة الروحية	0	1	2	3	4
F1.5	أنا على الفئاع بأن وجود مصدر روحي في حياتي له أثر إيجابي على مرضي	0	1	2	3	4
F1.6	أبحث عن مصدر ديني / روحي في حياتي	0	1	2	3	4
F1.9	أشعر بأن هناك حاجة ماسة للدين والروحانية سواء ساعد ذلك في التخلص من متاعبي في الحياة أم لا	0	1	2	3	4
F2.5	مهما يحدث لي أبقى بوجود قوة علوية تعطيني	0	1	2	3	4
F3.2	حدث شيء ما لي إشارة بأنه علي أن أغير مسار حياتي	0	1	2	3	4
F3.3	مرضى بمثابة تشجيع لي لمعرفة نفسي أكثر وأكثر	0	1	2	3	4
F3.4	أنا على قناعة تامة بأن لمرضى مغزى ومعنى معين	0	1	2	3	4
F3.5	مرضى بمثابة فرصة متاحة لنموي وتطورى	0	1	2	3	4
F3.7	بسبب مرضى. عنت ورجعت إلى ما هو جوهري في حياتي	0	1	2	3	4
37	أعتقد بأهمية التوجيه الروحي في واقع حياتي	0	1	2	3	4
38	حسب فكري وتصوري أنا على صلة بمصدر علوي	0	1	2	3	4
39	أنا على قناعة تامة بأن الموت لا يعتبر النهاية الأبدية	0	1	2	3	4

Appendix M

Ideas About Diabetes-Revised (Diabetes Acceptance) (Arabic)

قياس قبول مرض السكري

الرقم السري للمريض

الرجاء الاجابه على الاسئله التاليه :

الاستبيان التالي يسالك عن وجهة نظرك بالاصابه بمرض السكري ، وكل جملة تصف احساسك ومشاعرك تجاه ظرف معين
اقرا كل جملة (عبارة) ، وقرر اي خيار يتناسب مع اجابتك
ضع دائرة حول الحرف المناسب الموجود على الجبهه اليسرى من الجملة (العبارة)
الرجاء استخدام الاختيارات التاليه بالترتيب

1. موافق بشده
2. موافق
3. غير متأكد
4. غير موافق
5. غير موافق بشده

غير موافق بشده	غير موافق	غير متأكد	موافق	موافق بشده
				احس بالتفاؤل تجاه مستقبلي
				لا اخبر احدا باصابتي بمرض السكري ،الا اذا كنت اعرفهم جيدا
				اعيش حياة اقل رضا من الاخرين بسبب اصابتي بمرض السكري
				اشعر بارتياح وعد الاحراج عند التحدث عن اصابتي بمرض السكري مع الاخرين بالعمل
				استطيع القيام ياي عمل يقوم به الاشخاص الغير مصابين بمرض السكري
				الاعتناء بنفسك كمريض بالسكري يعتبر مهم لدي
				بعض الناس لا يدعونني للخروج معهم لانهم يعلمون بانني مصاب بالسكري
				لا استطيع ان ارتب حياتي بطريقه منظمه
				اعيش حياه مفعمه بالانتاج
				اتوقع ان اعيش حياه صحية جيده لمدة طويله
				اتحدث عن اصابتي بمرض السكري على انه حقيقه
				اذا التزمت بالخطه العلاجيه ساقلل من المضاعفات المرضيه في المستقبل

- لا يوجد لدى تطلعات مستقبلية في الحياة بسبب اصابتي بمرض السكري					
- اتحدث بسهولة وبساطه عن اصابتي بالسكري مع الاشخاص المهتمين بحالتي المرضيه					
- لا استطيع العيش حياة طبيعية بسبب اصابتي بالسكري					
- اصابتي بمرض السكري لا تؤثر على حياتي الاجتماعيه					
- اذا اتبعت تعليمات الطبيب ، ساتمتع بصحه جيده					
- سيكون لدى اصدقاء اكثر ان لم اكن مصاب بمرض السكري					
- اصابتي بالسكري تمنعني من ممارسة الرياضة او المشاركه بالنشاطات الحيويه					
- اصابتي بمرض السكري لا تؤثر على طريقة الناس بالتعامل معي او الاحساس تجاهي					

Appendix N

Diabetes Care Profile (Social Support Received & Attitudes Scales) (Arabic)

قياس الدعم العائلي ودعم الاصدقاء

الرقم السري للمريض

الرجاء الاجابه على الاسئله التاليه :

1- يقوم كل من الدعم العائلي ودعم الاصدقاء (ضع دائرة حول رمز الاجابه الصحيحه لكل سطر)

غير مطابق	موافق بشده	موافق بعض الشيء	متردد	اعارض بعض الشيء	اعارض بشده	
0	5	4	3	2	1	اتباع خطة الطعام
0	5	4	3	2	1	تناول الادويه
0	5	4	3	2	1	العناية بالقدمين
0	5	4	3	2	1	القيام بالتمارين الرياضيه
0	5	4	3	2	1	القيام بفحص السكر
0	5	4	3	2	1	الاهتمام بمشاعري تجاه السكري

2- العائله والاصدقاء (ضع دائرة حول رمز الاجابه الصحيحه لكل سطر)

موافق بشده	موافق بعض الشيء	متردد	اعارض بعض الشيء	اعارض بشده	
5	4	3	2	1	قبولي وقبول مرض السكري
5	4	3	2	1	الشعور بعدم الراحة نحوي بسبب مرض السكري
5	4	3	2	1	تشجيعي ودفعي نحو مرض السكري
5	4	3	2	1	عدم تشجيعي واحباطي نحو مرض السكري
5	4	3	2	1	الاستماع لي حين اريد التكلم عن مرض السكري
5	4	3	2	1	ازعاجي بسبب مرض السكري

Appendix O

Summary of Diabetes Self-Care Activities-Revised (Arabic)

ملخص أنشطة العناية الشخصية لمرض السكري

الرقم السري للمريض

الرجاء الاجابة على الاسئلة التالية :

الاسئلة الواردة ادناه تهدف الى معرفة انشطتك الشخصية للعناية بمرض السكري خلال السبعة ايام الماضية . اذا كنت مريضا خلال السبعة ايام الماضية الرجاء العوده بالذاكره الى اخر سبعة ايام لم تكن مريضا بها واحتسب هذا اليوم كنهاية للفترة التي قررت تسجيلها . الرجاء وضع دائرة على الاجابه الصحيحه.

قسم التغذية

خلال السبعة ايام الماضية كم عدد الايام التي اتبعت فيها خطة غذاء صحي ؟	0	1	2	3	4	5	6	7
بالنسبة الى الشهر الماضي كم عدد الايام خلال الاسبوع التي اتبعت خطتك الغذائية؟	0	1	2	3	4	5	6	7
خلال السبعة ايام الماضية كم عدد الايام التي اكلت فيها خمسة او اكثر من الفواكه والخضراوات ؟	0	1	2	3	4	5	6	7
خلال السبعة ايام الماضية كم عدد الايام التي اكلت فيها طعام يحتوي على دهون عاليه مثل اللحوم الحمراء (مثل لحوم المواشي) ومنتجات الالبان كاملة الدسم ؟	0	1	2	3	4	5	6	7

قسم الرياضة

خلال السبعة ايام الماضية كم عدد الايام التي مارست فيها أنشطة بدنيه بصفه عامه لمدة 30 دقيقه على الاقل (مجموع الدقائق الكليه للأنشطة بما فيها المشي)	0	1	2	3	4	5	6	7
خلال السبعة ايام الماضية كم عدد الايام التي مارست فيها في جلسة تمرين رياضي محدد (السباحه ، المشي ، ...الخ) عدا تلك التي تقوم بها في محيط منزلك او التي تكون جزءا من عملك ؟	0	1	2	3	4	5	6	7

قسم فحص سكر الدم

خلال السبعة ايام الماضيه كم عدد الايام التى فحصت فيها سكر الدم ؟	0	1	2	3	4	5	6	7
خلال السبعة ايام الماضيه كم عدد الايام التى فحصت فيها سكر الدم حسب العدد المذكور في تعليمات طبيبك ؟	0	1	2	3	4	5	6	7

قسم العناية بالقدم

خلال السبعة ايام الماضيه كم عدد الايام التى فحصت فيها قدميك ؟	0	1	2	3	4	5	6	7
10- خلال السبعة ايام الماضيه كم عدد الايام التى فحصت فيها حذائك من الداخل (للتأكد من عدم وجود اشياء تسبب الجروح مثل قطع في الحذاء او نتوءات) ؟	0	1	2	3	4	5	6	7

قسم العلاج

11- خلال السبعة ايام الماضيه كم عدد الايام التى تناولت فيها حبوب السكر خلال اليوم ؟	0	1	2	3	4	5	6	7
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Appendix P

SF-36v2® Health Survey Standard, Saudi Arabia (Arabic)

حالتك الصحية العامة

يستفسر هذا الاستبيان عن وجهة نظرك في صحتك. هذه المعلومات سوف تساعد على تتبع ما تشعر به ومدى قدرتك على أداء نشاطاتك المعتادة. يرجى الإجابة بأكبر قدر ممكن من الدقة.

لكل سؤال من الأسئلة التالية يرجى وضع علامة ☐ في المربع الخاص بالإجابة التي تصف بشكل أفضل ما تشعر به.

1. بشكل عام، هل تعتبر أن صحتك:

ممتازة	جيدة جدًا	جيدة	لا بأس بها	صعبة
☐	☐	☐	☐	☐

2. مقارنة بالعام الماضي، كيف تقيم صحتك الآن بشكل عام؟

أفضل بكثير الآن من العام الماضي	أفضل إلى حد ما الآن من العام الماضي	تقريبًا مثل العام الماضي	أسوأ إلى حد ما الآن من العام الماضي	أسوأ بكثير الآن من العام الماضي
☐	☐	☐	☐	☐

3. الأسئلة التالية تدور حول النشاطات التي قد تقوم بها أثناء يوم عادي. هل صحتك الآن تحذ من قدرتك على القيام بالنشاطات التالية؟ إن كنت كذلك، فألى أي حد؟

نعم تحذ كثيرًا	نعم تحذ قليلًا	لا، لا تحذ أبدًا
☐	☐	☐
أ. النشاطات العنيفة مثل الركض ورفع الأشياء الثقيلة والمشاركة في رياضات شاقة.		
☐	☐	☐
ب. النشاطات المعتدلة مثل تحريك طاولة أو دفع مكتسة كهربائية، أو لعب البولينج أو البلياردو.		
☐	☐	☐
ج. رفع أو حمل كيس مشتريات البقالة.		
☐	☐	☐
د. صعود الدرج لحدو أبواب.		
☐	☐	☐
هـ. صعود الدرج لطابق واحد.		
☐	☐	☐
و. الانحناء أو الركوع أو جلوس القرفصاء.		
☐	☐	☐
ز. المشى لمسافة تزيد عن كيلومتر واحد.		
☐	☐	☐
ح. المشى ليضع يديك من الأمتار.		
☐	☐	☐
ط. المشى لمسافة مائة متر.		
☐	☐	☐
ي. الاستحمام أو ارتداء الملابس بنفسك.		

4. خلال الأسابيع الأربعة الماضية، كم من الوقت حصلت معك أي من المشاكل التالية خلال تأدية عملك أو نشاطاتك اليومية العادية الأخرى كنتيجة لصحتك الجسدية؟

كل الوقت	معظم الوقت	بعض الوقت	قليل من الوقت	أبدا	
▼	▼	▼	▼	▼	
☐	☐	☐	☐	☐	أ. خففت من مقدار الوقت الذي تقضيه في العمل أو النشاطات الأخرى
☐	☐	☐	☐	☐	ب. أنجزت أقل مما كنت تريد
☐	☐	☐	☐	☐	ج. كنت محدوداً في نوع العمل أو النشاطات الأخرى
☐	☐	☐	☐	☐	د. وجدت صعوبة في القيام بعملك أو أداء نشاطات أخرى (على سبيل المثال، أخذت منك مجهوداً إضافياً)

5. خلال الأسابيع الأربعة الماضية، كم من الوقت حصلت معك أي من المشاكل التالية خلال تأدية عملك أو نشاطاتك اليومية المعتادة الأخرى كنتيجة لمشاكل عاطفية (مثل شعورك بالكلية أو القلق)؟

كل الوقت	معظم الوقت	بعض الوقت	قليل من الوقت	أبدا	
▼	▼	▼	▼	▼	
☐	☐	☐	☐	☐	أ. خففت من مقدار الوقت الذي تقضيه في العمل أو النشاطات الأخرى
☐	☐	☐	☐	☐	ب. أنجزت أقل مما كنت تريد
☐	☐	☐	☐	☐	ج. أدت العمل أو النشاطات الأخرى .. بإهتمام أقل من المعتاد

6. خلال الأسابيع الأربعة الماضية، إلى أي مدى تعارضت صحتك الجسدية أو مشاكلك العاطفية مع نشاطاتك الاجتماعية العادية مع الأسرة، أو الأصدقاء، أو الجيران أو مجموعات أخرى من الناس؟

لم تعارض أبدا	تعارضت بشكل قليل	تعارضت بشكل متوسط	تعارضت بشكل كبير	تعارضت بشكل كبير جدا

☐	☐	☐	☐	☐

7. ما مدى شدة الأوجاع الجسدية التي شعرت بها خلال الأسابيع الأربعة الماضية؟

لا أوجاع	خفيفة جدا	خفيفة	متوسطة	حاددة	حاددة جدا

☐	☐	☐	☐	☐	☐

8. خلال الأسابيع الأربعة الماضية، إلى أي مدى تعارض الألم مع عملك العادي (بما في ذلك عملك خارج المنزل والعمل المنزلي)؟

لم يتعارض أبدا	تعارض بشكل قليل	تعارض بشكل متوسط	تعارض بشكل كبير	تعارض بشكل كبير جدا

☐	☐	☐	☐	☐

9. هذه الأسئلة تدور حول ما تشعر به وكيف سارت الأمور معك خلال الأسابيع الأربعة الماضية. الرجاء إعطاء إجابة واحدة عن كل سؤال بحيث تكون الأقرب لما كنت تشعر به. كم من الوقت خلال الأسابيع الأربعة الماضية...

كل الوقت	معظم الوقت	بعض الوقت	قليل من الوقت	أبداً	
▼	▼	▼	▼	▼	
☐	☐	☐	☐	☐	أ هل شعرت بأنك مفعم بالحوية؟
☐	☐	☐	☐	☐	ب هل كنت متوتراً جداً؟
☐	☐	☐	☐	☐	ج هل أحسست أنك محبط لدرجة أن لا شيء يمكن أن يهيجك؟
☐	☐	☐	☐	☐	د هل أحسست بالهذوء والطميرانية؟
☐	☐	☐	☐	☐	ه هل كانت لديك مشكلة كبيرة؟
☐	☐	☐	☐	☐	و هل أحسست بالحزن والاكتئاب؟
☐	☐	☐	☐	☐	ز هل شعرت بأنك مرهق جداً؟
☐	☐	☐	☐	☐	ح... هل كنت سعيداً؟
☐	☐	☐	☐	☐	ط هل شعرت بأنك متعب؟

10. خلال الأسابيع الأربعة الماضية، كم من الوقت تعارضت صحتك الجسدية أو مشاكلك العاطفية مع نشاطاتك الاجتماعية (مثل زيارة الأصدقاء والأقارب، إلخ...)?

كل الوقت	معظم الوقت	بعض الوقت	قليل من الوقت	أبداً
▼	▼	▼	▼	▼
☐	☐	☐	☐	☐

11. ما مدى صحة أو خطأ كل عبارة من العبارات التالية بالنسبة لك؟

خطأ بالتأكيد	خطأ غالباً	لا أعرف	صحيح غالباً	صحيح بالتأكيد	
▼	▼	▼	▼	▼	
☐	☐	☐	☐	☐	أ. يبدو أنني أمرض بسهولة أكثر بقليل من الآخرين.....
☐	☐	☐	☐	☐	ب. أنا على نفس القدر من الصحة كالآخرين الذين أعرفهم.....
☐	☐	☐	☐	☐	ج. أتوقع أن تبوء صحتي.....
☐	☐	☐	☐	☐	د. صحتي ممتازة.....

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