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Comparing Diabetes Self-Care Activities and Health Promotion Lifestyles Among South Asian Women with New and Established Type 2 Diabetes Diagnoses

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COMPARING DIABETES SELF-CARE ACTIVITIES AND HEALTH PROMOTION LIFESTYLES AMONG SOUTH ASIAN WOMEN WITH NEW AND ESTABLISHED TYPE 2 DIABETES DIAGNOSES

by

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Dedication

Dedicated to my wonderful grandchildren: Noah, Zara, Ali, Evan, Zayde, Cason, and Emma. The joy you have brought to my life is immeasurable.

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COMPARING DIABETES SELF-CARE ACTIVITIES AND HEALTH PROMOTION LIFESTYLES AMONG SOUTH ASIAN WOMEN WITH NEW AND ESTABLISHED TYPE 2 DIABETES DIAGNOSES

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Abstract

The South Asian population is one of the fastest growing minority groups in the US, has a high prevalence of diabetes mellitus and the highest rate of cardiovascular disease in the world. Although men and women are equally affected, women tend to have poorer outcomes. Yet little is known of their diabetes self-care activities and health promotion practices. The purpose of this study was to explore differences and similarities in diabetes self-care practices and health promotion lifestyles between South Asian women (Bangladeshis, Indians and Pakistanis) with newly diagnosed diabetes (within 1 year) and those with an established diagnosis (more than 1 year). A cross-sectional descriptive comparative design was utilized with a convenience sample of 60 South Asian women (30 for each group) attending various religious facilities, a local business and a health clinic. Data was collected by survey method using a demographic questionnaire, a measure of health promotion (HPLP II) and the Summary of Diabetes Self Care Activities (SDSCA). Data was analyzed by descriptive analysis, analyses of covariance (ANCOVA) and Pearson partial correlation. Study findings found no significant differences in diabetic self-care activities and health promoting lifestyle

changes between the two groups. Both groups scored low on nutrition and physical activity with indications for linkages to cultural practices. Those who were partnered did better than those without partners in both groups. Diabetes self-care management of South Asian women should emphasis the importance of diet and exercise and consider the effects of culture in planning individualized care.

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List of Abbreviations

A1C	Hemoglobin A1C
ADA	American Diabetes Association
AACE	American Association of Clinical Endocrinologist
ANCOVA	Analysis of Covariance
ASCVD	Atherosclerotic Cardiovascular Disease
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CVD	Cardiovascular Disease
DCCT	Diabetes Complications and Control Trial
DM	Diabetes Mellitus
HPM	Health Promotion Model
IDF	International Diabetes Federation
IOM	Institute of Medicine
IRB	Institutional Review Board
HPLP II	Health Promoting Lifestyle Profile II
MetS	Metabolic Syndrome
NHANES	National Health and Nutrition Examination Survey
NHLBI	National Heart Lung and Blood Institute
NIDDK	National Institute of Diabetes and Digestive and Kidney Disease
PI	Principal Investigator

SAHLI	South Asian Heart Lifestyle Intervention
SD	Standard Deviation
SDSCA	Summary of Diabetes Self Care Activities
SPSS	Statistical Package for the Social Sciences
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
UKDPS	United Kingdom Diabetes Prospective Studies
US	United States
UK	United Kingdom
USDHHS	United States Department of Health and Human Services

Chapter 1 Introduction

This chapter examines the problem of the high prevelance of diabetes mellitus (DM), cardiovascular disease (CVD) and Metabolic Syndrome (MetS) among South Asian women living in the United States (US). The background and significance of the problem, purpose of this study, theoretical framework, study design, and research questions are also described.

INTRODUCTION

In the United States, the prevalence of diabetes is now 30.3 million or 9.4% of the population: 23.1 million individuals with diagnosed diabetes and 7.2 million with undiagnosed diabetes of which 11.7 million of those diagnosed with diabetes are women (Centers for Disease Control and Protection [CDC], 2017). The National Diabetes Statistics Report (2017) shows 84.1 million people over age 18 have prediabetes. If no action is taken to improve the medical condition of individuals with prediabetes, these individuals could develop diabetes within the next five years (CDC 2017). Diabetes is a costly disease. According to the CDC (2017), health costs for treatment of diabetes, complications arising from the disease, lost wages and productivity is currently $245 billon dollars annually. In spite of empirical evidence that both Type 1 Diabetes (T1DM) and Type 2 Diabetes (T2DM) can be controlled and complications prevented through adequate diabetes self-management (Diabetes Complications and Control Trial [DCCT], 1993; United Kingdom Diabetes Prospective Study [UKDPS], 1998), diabetes prevalence continues to escalate causing an upward trend in morbidity and mortality rates. Given the current trend, the alarming implication for the population born in 2000 is that 1 in 3 people will develop diabetes in their

lifetime (Boyle et al, 2010; CDC, 2014). In addition, ethnic groups in the US such as Hispanic/Latino, African American, American Indians, Asians, and Pacific Islanders are at greater risk for diabetes than Caucasians (Joslin Diabetic Center, 2017; ADA 2017; Maskarinec et al., 2015).

PROBLEM STATEMENT

South Asians (individuals from Bangladesh, India and Pakistan) living in the US are disproportionately affected by diabetes mellitus (DM), cardiovascular disease (CVD), and metabolic syndrome (MetS) (Kanaya et al., 2010; Misra & Khurana, 2009; Mohanty et al., 2005; Misra 2015; Gupta, Wu, Young and Perlman 2011). Compared to other ethnic groups, DM and CVD occur 5 to 10 years earlier in South Asians (Goyal & Yusuf, 2006), at a lower body mass index (BMI) (Misra, 2015, Hsu et al., 2015) and irrespective of socioeconomic status (Kanaya et al., 2010). Furthermore, diabetic complications may already be present at the time of diagnosis (Ramachandran & Snehalatha, 2010; Raymond et al., 2009). Additionally, South Asians exhibit age-specific mortality 2 to 3 times higher than Caucasians in the US (Bhopal et al.,1999; Wild et al., 2007). Compared to Caucasians, South Asians also have a 40% higher mortality rate from diabetic complications (Balarajan, 1995; Wild & McKeigue, 1997) and develop renal and cardiovascular complications much earlier than other populations (Davachi, Flynn, & Edwards, 2005; Sohal, 2006). Although men and women of South Asian origin have similar rates of diabetes, women tend to have poorer outcomes and higher mortality rates than men (Bajaj et al., 2013; International Diabetic Federation [IDF], 2011). Misra et al., (2010) conducted a large randomized study in the US and reported a higher prevalence (17.4%) of diabetes in Asian Indians than that reported for Hispanics (10.45%), African Americans (11,9%), Caucasians (6.6%) or Asian Americans (7.5%) in previous smaller studies.

While diabetes can be controlled and complications may be delayed or prevented through adherence to recommended guidelines for diabetes control (ADA, 2014), South Asians tend to

have high levels of physical inactivity, unhealthy diets and poor diabetes knowledge; all factors that may negatively impact their management of diabetes. High rates of diabetes among people of South Asians descent have been attributed to genetics, according to the "thrifty gene" hypothesis, i.e., that there are genes that enable individuals to efficiently collect and process food to deposit fat during periods of food abundance in order to provide for periods of food shortage, or feast and famine (Misra & Khurana, 2009; Yajnik, 2002). South Asians have high prevalence of abdominal obesity a risk factor for diabetes (Abate & Chandalia, 2007). Other factors contributing to higher rates of diabetes in South Asian populations include lifestyle factors; migration to a more affluent societies that result in greater consumption of processed food, increased meat and fat intake (Varghese, 2002), insulin resistance; and physical inactivity (Abate & Chandalia, 2007; Greenhalgh, 1997; Isharwal, Misra, Wasir, & Nigam, 2009; Misra & Khurana, 2009; Prasad, Zubair, Dash, & Das, 2010).

TYPE 2 DIABETES MELLITUS

Type 2 Diabetes (T2DM), previously referred to as noninsulin-dependent diabetes, accounts for 90-95% of diabetic cases. Other types of diabetes are Type 1 diabetes (T1DM), formerly called insulin-dependent diabetes, gestational diabetes; and diabetes by other causes which account for the other 5% (CDC, 2014). Type 2 Diabetes is a metabolic disorder characterized by insulin resistance and impaired insulin secretion (Kasper et al., 2016). The severity of T2DM depends on the amount of damage to beta-cells and level of insulin resistance (Kasper et al., 2016). Risk factors for T2DM are categorized as modifiable factors—such as obesity, physical inactivity, glucose intolerance, and previous history of gestational diabetes—or unmodifiable factors including aging, family history of diabetes, and ethnicity (CDC, 2014). While DM has

been common among adults older than 40 years, the increased prevalence among children, teens, and young adults is alarming (CDC, 2014).

History of T2DM Treatment and Innovative Research

In 1916, the primary treatment for diabetes in the US was "the starvation diet," as prescribed by Dr. Eliott Joslin and Dr. Fredick Allen, which required patients to fast repeatedly followed by a prolonged period of undernutrition. There was little evidence of the treatment's effectiveness, but it was the only available treatment at that time. The first book on the topic was "*Treatment of Diabetes*" published by Dr. Joslin, a renowned educator and researcher in the field of diabetes, in 1916 (American Diabetes Association [ADA], 2015).

The ADA was founded in 1940 as a result of the increasing incidence of diabetes and the consequential complications witnessed. In 1949, Dr. Levine discovered how "insulin worked like a key," which allowed cellular glucose uptake in patients with T2DM. This led to research of the glucose transport system and the subsequent discovery in 1971 of insulin receptors on the cell membrane, which eventually facilitated the development of medications to treat T2DM (ADA, 2015). The advent of the glycosylated hemoglobin A1C test in 1977 facilitated long-term glucose control monitoring. The test can be repeated every three months and assists the health care team in evaluating the efficacy of patient self-care management (ADA 2015).

Current Type 2 Diabetes Treatment

The Standards of Diabetes Care, developed by the ADA, is the framework for diabetes treatment in the US. It follows the chronic care model in which patients newly diagnosed with T2DM receive a complete evaluation of the disease process—including

assessment and treatment of comorbidities such as hypertension, hyperlipidemia, and obesity (ADA, 2017). Diabetes education includes instruction by professionals about the disease process, potential complications of chronic hyperglycemia, medical management including medication, A1C monitoring, and the importance of follow-up and self-care to adequately manage their diabetes (ADA 2017). In addition to medical treatment for diabetes, patients are treated for any existing comorbidities and are encouraged to implement diabetes self care management and health promotion lifestyle changes (ADA 2017, CDC 2014).

Complications Associated with T2DM

Chronic uncontrolled diabetes is associated with the development of long-term complications such as CVD (including stroke, myocardial infarction, and angina), retinopathy, end-stage renal disease, neuropathy and lower limb amputation, and leads to high mortality rates (ADA, 2014). The risk for heart attack and stroke in adults with diabetes is 65%. Diabetes is the leading cause of new onset blindness in the 24-74 years age group, and was responsible for 44% of new cases of renal failure in 2005. Sixty percent of nontraumatic lower limb amputations are due to diabetes (CDC, 2014; ADA, 2014).

Diabetes Self Care Activities

Recommended self-care activities for T2DM includes dietary adjustment, increased physical activity, glucose monitoring, foot care, smoking cessation, and stress reduction (Joslin Diabetes Center, 2017; ADA 2017). Self-care, for which patients are 95% responsible, is considered the cornerstone of diabetes management. Therefore, clinicians must consider each patient's preferences, health literacy, socio-cultural

barriers, and physical abilities when formulating care plans and setting goals for effective disease management (ADA, 2017; Joslin Diabetes Center, 2017). The aim of diabetes treatment is to control blood sugar, prevent further damage to the beta cells, manage any existing comorbidities, and prevent further complications (Powers et al., 2017). In addition, individuals with diabetes are encouraged to implement health promotion lifestyles to improve their overall health and quality of life (Powers et al., 2017). There have been many advances in health care regarding diabetes care in Caucasians in the US, Canada, and the UK. However, research on diabetes self care and health promotion in South Asians living in the US is lacking.

Health Promotion Lifestyles

Health promotion lifestyle practices are important for individuals with diabetes in order to optimally manage their illness and reduce the potential for other chronic illnesses. According to Pender (1996), health promotion activities help individuals to improve and maintain health. Studies have shown that South Asian women experience rapid diet modification after migration to Western countries (Holmboe-Otteson & Wandel, 2012; Misra, Patel, Davies, & Russo, 2000). Dietary changes include higher intake of sweetened beverages, fried foods, and carbohydrates, and increased intake of fats, all of which contribute to weight gain and obesity (Holmboe-Ottesen & Wandel, 2012; Jonnalagadda & Diwan, 2002). Cultural norms regarding modesty in dress deter South Asian women from using mixed-gender exercise facilities such as swimming pools and gyms (Goneka, 2008).

SIGNIFICANCE

The prevalence of diabetes continues to escalate worldwide, with particularly high rates in Asian countries that contribute to more than 60% of the global diabetic population (IDF, 2011; Ramachandran, Snehalatha, Samith Shetty, & Nanditha, 2012). Urbanization within India for economic purposes (Isharwal et al., 2009) and migration to more affluent countries have been associated with the increasing prevalence of diabetes among South Asians (Abate & Chandalia, 2007; Misra et al., 2000).

In addition, the contribution of assimilation factors to the growing health care burden that diabetes represents is not insignificant. Migrants from Bangladesh, India, and Pakistan are the fastest growing ethnic minority groups in the US, currently numbering 3.4 million. According to the United States Census Bureau (2010), the population of Indians has increased by 106%, while the Pakistani and Bangladeshi populations grew by 89% and 249%, respectively. Most South Asians settle in large cities such as New York, San Francisco, Chicago, and Houston.

South Asians are a diverse group with many different religions, languages, customs, and socioeconomic status (Rangaswammy, 1995). According to the US Asian community group, South Asians Americans Living Together (SAALT 2007), the common myth that South Asians are the "model minority" of highly educated and wealthy individuals with few health issues this myth may mask the problems experienced by this community. While there are many wealth and highly educated South Asians many of whom are Asians Indians, a significant segment of the South Asian population lives at or below the poverty level and experiences multiple health disparities. Additionally, differences exist in earnings, education, language proficiency, and diabetes prevalence between people from India, Bangladesh, and Pakistan living in the US, as well as

between South Asian men and women (United States Census Bureau 2010). Women represent 46% of the South Asian population in the US and are subject to many disparities as compared with men of South Asian origin. For instance, there are language disparities, with women older than 25 years of age more likely to be limited in English proficiency than men (United States Census Bureau, 2010). Differences in income also exist among South Asian women, with 18% of Indian women earning more than $57,000 annually, followed by 10% of Pakistani women, and only 5% of Bangladeshi women (United States Census Bureau, 2010). Additionally, 59% of South Asian women do not have a high school diploma. Thus, South Asian women are a particularly vulnerable population, and all of these factors pose challenges with regard to health literacy.

Research related to effective methods to address shortcomings in diabetes self-management is sparse. According to a study conducted by the Institute of Medicine (IOM) and Women's Health (Smith Taylor, 2011), racial and ethnic women have not been adequately represented as research populations. Lack of patient knowledge about the disease and self-care skills has been documented (Clement, 1995), with significant racial and ethnic differences in diet, physical activity, and foot care behaviors (Nwasurba, Khan, & Egede, 2007). Additionally, differences have been reported between ethnic groups in diabetes prevalence, glycemic control, and self-care management (Adams et al., 2008; Kirk, Mutrie, MacIntyre, & Fisher, 2003; Mukhopadhyay, Forouhi, Fisher, Kesson, & Sattar, 2006). Lack of adequate diabetes self-care in South Asians results from knowledge deficits about the disease process (Egde & Dagogo-Jack, 2005; Macaden, 2007), low physical activity, poor access to health care, material deprivation (Choudhury

et al., 2009; Hill, 2006), language and cultural barriers in medication usage (Osborn et al., 2011; Grant et al., 2011).

Standard metrics used to evaluate risks are also being called into questions. Risk scores for identification and diagnosis specifically tailored for Caucasians may not be suitable for Asians, resulting in late diagnosis when complications are more likely (Ramachandran et al., 2012). Body Mass Index (BMI) has been used globally as a standard of measurement in defining overweight and obesity (Misra, 2015; Shih et al., 2014) and has been validated in Caucasians (Misra 2015). However, it may not be suitable for use in Asian Americans (Jih et al., 2014). South Asians characteristically have central adiposity and they develop type 2 diabetes at a lower BMI compared to Caucasians (Misra, 2015; Hsu et al., 2015; Jih et al., 2014). Under the standard BMI metric used for the general public, 25-30 kg/m^2 is defined as overweight and a BMI of 30 kg/m^2 or greater is classified as obese. The World Health Organization (2004) recommended a lower BMI criteria for Asian American patients: a BMI of 25 kg/m^2 or greater for obese and a BMI of 23-24.9 kg/m^2 as overweight. Screening for diabetes at a BMI of 23 or greater has been recommended for all Asian Americans (ADA 2017).

Diabetes education and self-care should begin at the time of diagnosis and the importance of structured care emphasized to patients (Davies et al., 2008). For effective management of this chronic illness, self-care teaching must include the patient's own goals, values, and motivations (Funnel & Anderson, 2004; Toobert & Glasgow, 1991; Wong et al., 2014). Patient empowerment to manage their condition has been recommended for optimized diabetes control (Feste & Anderson, 1995; Anderson & Funnell 2010: Scambler, Newton and Asimacopoulou, 2014; Wong et al., 2014).

Diabetes management involves following the recommended guidelines of balancing diet, physical activity, and medication regimens for daily glucose control (ADA, 2014). However, self-care remains a challenge, and many patients often have difficulty effectively managing this chronic illness (Beverly et al., 2013). It is critical that individuals newly diagnosed with T2DM receive diabetic education that includes a basic understanding of diabetes management and lifestyle change in diet and exercise to adequately control the illness and prevent future complications. Self-efficacy in diabetes management includes: (1) Maintaining a healthy diet, exercising portion control; incorporating more whole grains, fruits, and vegetables; and avoiding sweetened beverages; (2) engaging in daily physical activity; and (3) checking blood glucose levels as recommended. Individuals newly diagnosed with diabetes need to have glycosylated hemoglobin (HbA1C/A1C) assessed at regular 3-month intervals until their blood glucose levels are within the recommend range of ≤ 6.5% (American Association of Clinical Endocrinologists [AACE], 2015). Optimal diabetes management is critical to prevent complications of uncontrolled diabetes such as blindness, leg amputation, hypertension, heart disease, stroke, and kidney damage (National Institute of Diabetes and Digestive and Kidney Disease [NIDDK], 2017).

In addition to the overall higher risk of diabetes within this population, South Asian women have been shown to engage in lower levels of physical activity (Sriskantharajah & Kai, 2007: Daniel and Wilbur 2011) and to adopt Western dietary habits that include high consumption of white bread and sugar sweetened beverages, and low intake of high-fiber foods (Khunti, Khumar, & Brodie, 2009). These factors place South Asian women at increased risk of diabetic complications and necessary steps to

adequately manage diabetes pose a significant challenge for South Asian women who are more culturally bounded (e.g., prohibitions against using mixed-gender gyms or fitness centers and going out alone, or expectations to prioritize family commitments before themselves), placing them at additional risk of suboptimal diabetes management.

A review of existing literature revealed studies of the South Asian population in the United Kingdom and Canada, but few studies of South Asians in the US and, to date, no studies to assess and compare the diabetes self-care activities and health promoting behaviors in South Asian women with established diabetes. Therefore, a prospective cross-sectional, descriptive comparative study compared the health promoting behaviors and self-care practices of 30 newly diagnosed and 30 established patients with T2DM. This study sought to examine similarities and differences between these two vulnerable groups. Identification of such factors are critical for optimal diabetes management to reduce morbidity and mortality rates and help to contain the cost of diabetes in the US. Furthermore, the need to evaluate and compare health promoting behaviors and the diabetes self-care practices among women with new and established T2DM diagnoses is vital in order to develop culturally relevant diabetes education and management support that effectively addresses both long- and short-term compliance with diabetes management practices.

THEORETICAL FRAMEWORK

Pender Health Promotion Model

The theoretical framework for this study is the health promotion model (HPM) that was developed by Nora J. Pender (Pender, Murdaugh and Parsons, 2001). The HPM first appeared in 1982 and was revised in 1996 as a result of changing theoretical perspectives

and empirical evidence (Pender, Murdaugh, & Parsons, 2001). The HPM was created to assist nurses in understanding the major factors responsible for health behaviors and in using these determinants to promote healthy lifestyles. The HPM is an explanatory model of health behavior that emphasizes the role of expectation in shaping behaviors (Pender, 1996; Pender, Murdaugh, & Parsons, 2006). Additionally, the HPM integrates nursing and behavioral science outlooks on factors that influence health behavior. According to Pender, Murdaugh, and Parsons (2001), the HPM does not use "fear" or "threat" to motivate changes in health behavior. Instead, it focuses on achievement of increased well-being and self-actualization and can therefore be used with patients of all ages and applied to all disease processes (Pender, 1996). The HPM is grounded in concepts found in health belief theory, expectancy-value theory, and social cognitive theory (Pender, Murdaugh, & Parsons, 2001). The HPM evaluates individual behavior that results in health promotion and consists of three basic components: (1) individual characteristics and experiences (past behaviors and personal factors); (2) perceptions and knowledge of the desired behavior (i.e., perception of benefits, barriers, self-efficacy, and interpersonal influences); and (3) the desired health promotion behavior (i.e., commitment to the plan of action and competing demands). Pender's HPM recognizes that health promotion is multifactorial by nature and that all the major interactive factors in an individual's life and environment must therefore be considered to achieve optimal health promotion. It is simple and clearly structured to provide individual or group care that facilitates planning, intervention, and assessment of actions (Pender, Murdaugh, & Parsons, 2001). It has been used to study many populations, various chronic illness conditions, and worksite fitness and health protection (Pender, Murdaugh, & Parsons, 2001). The HPM was selected as

the framework for this study to evaluate the current health promoting behaviors of South Asian women with type 2 diabetes living in the US.

SPECIFIC AIMS

The goal of this descriptive, comparative, cross-sectional study was to identify factors that may strongly impact the behavioral change necessary for effective diabetes management in South Asian women with new and established T2DM diagnoses by examining their actual self-care activities and health promoting behaviors. Newly diagnosed patients (< 1 year) are faced with a myriad of recommended lifestyle changes for diabetes management that may be difficult to achieve because of cultural or individual challenges. However, they are more likely to be motivated at the initial diagnosis where poor outcomes are highly salient. Patients with established diagnoses (> 1 year) are generally more knowledgeable about the necessary self-care regimen, but may not have implemented the necessary changes due to barriers or perceived incompatibilities with cultural lifestyles.

This study compared the self-care and health promoting behaviors of South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses to identify factors that are easily achievable and sustainable across time and those that pose greater initial and long-term challenges. It also sought to distinguish relationships of factors to cultural practices (e.g., dietary practices) and individual characteristics (e.g., age and education).

Specific Aims and Research Questions

SPECIFIC AIM 1

The first aim was to assess diabetic self-care activities among South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, marital status, time in the US, and education.

RQ 1.1. What are the differences in diabetic self-care activities (i.e., diet, exercise, blood sugar testing, foot care, and smoking) in South Asian women with new and established T2DM diagnoses, controlling for age, marital status, time in the US, and education?

RQ 1.2. Is the pattern of relationships between self-care activities (i.e., diet, exercise, blood sugar testing, foot care, and smoking) different between South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, time in the US, and education?

SPECIFIC AIM 2

The second aim was to assess health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) in South Asian Women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, marital status, time in the US, and education.

RQ 2.1. Are there significant differences in health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, marital status, time in the US, and education?

RQ 2.2. Is the pattern of relationships between health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) different in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, time in the US, and education?

SPECIFIC AIM 3

The third aim was to assess the relationship between self-care activities (i.e., diet, exercise, blood sugar testing, foot care, and smoking) and health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, marital status, time in the US, and education.

RQ 3.1. What is the relationship between self-care activities (i.e., diet, exercise, blood sugar testing, foot care, and smoking) and health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, time in the US, and education?

RQ 3.2. Is the pattern of relationships between self-care activities (i.e., diet, exercise, blood sugar testing, foot care, and smoking) and health promoting behaviors (physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) different in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, time in the US, and education?

Chapter 2 Review of the Literature

This chapter presents an overview of Diabetes Mellitus, Cardiovascular Disease and Metabolic Syndrome and describes scientific literature on the burden and complications of chronic illness in the South Asian population. It also delineates the recommended standards for diabetes management and discusses factors such as gender, culture, ethnicity, and socioeconomic status that may create barriers to health promoting behaviors and diabetes self-care among South Asian women. Factors such as physical inactivity, poor diabetes knowledge, traditional health practices, and detrimental dietary changes as a result of immigration to more affluent countries, along with gender-related disadvantages make South Asian women more vulnerable to diabetic complications. Empirical evidence shows that with optimal diabetes management and practice of health promoting lifestyles, patients with diabetes can live healthy lives.

DIABETES, CARDIOVASCULAR DISEASE, AND METABOLIC SYNDROME IN SOUTH ASIANS

South Asians living in the United States and other western countries have a two to three times greater prevalence of T2DM compared with other ethnicities (Kanaya et al., 2010; Misra & Khurana, 2009; Mohanty et al., 2005) and develop diabetes at a lower body mass index (BMI) compared to Europeans (Goyal & Yusuf, 2006; Kanaya et al., 2010). South Asians have high visceral and central adiposity that shows a strong correlation with DM, CVD, and MetS (Misra & Khurana, 2009). South Asians also have higher rates of diabetic complications when newly diagnosed as compared to Europeans. For example, A study done by Chowdhury & Lasker (2002) found that a quarter of the south Asian population had at least one complication from diabetes at the time of

diagnosis. Further, south Asians had higher prevalence of CVD compared to the Europeans in the same study; prevalence of macrovascular disease among South Asians was 15.7% vs 9.4% in Europeans and prevalence of microvascular disease was 27.3% vs 16.5%, respectively (Chowdhury & Lasker, 2002). Additionally, studies have shown that South Asians have age-specific CVD mortality rates that are two to three times higher compared to indigenous Caucasians (Bhopal et al., 1999; Wild et al., 2007; Misra 2015)

Venkataraman, Nanda, Baweja, Parikh, and Bhatia (2004) conducted a community-based survey to investigate the prevalence of DM in 1046 Asian Indians (ages 20 years and older) in the US State of Georgia. The study found an overall prevalence of DM at 18.3% in this population, which was higher in the Asian Indian population than in Caucasians (4.3%), African Americans (8.2%), and Hispanics (9.3%) in the US based on data from National Health and Nutrition Examination Survey (NHANES) III reports. While the study was limited to assessment of prevalence in one region (state) of the US and may not have been representative, the sample size was large and robust.

Kanaya et al. (2010) conducted a cross-sectional study to investigate the prevalence and correlates of diabetes in 150 Asian Indians in the San Francisco Bay, California area along with three other ethnic groups: Chinese, Latinos, and African Americans. After adjusting for age, the findings revealed that the prevalence of diabetes among Asian Indians was 23%, which was greater than among Caucasians (6%), African Americans (18%), Latinos (17%), and Chinese Americans (13%). More alarmingly, 37% of the South Asian sample had prediabetes after adjustment for covariates. Other reported correlates of diabetes among Asian Indians were hypertension, fatty liver, high visceral

fat, microalbuminuria, and strong cultural beliefs. While the sample may have only reflected regional differences, the researchers suggested that findings strongly supported the need for more study of cultural factors in this population.

Misra et al. (2009) investigated the prevalence of DM, CVD, and MetS risk factors in a randomized national study of 1038 Asian Indian participants (ages 18 years and older) from seven major cities across the US. The prevalence of diabetes among participants was 17.4%, while 33% had prediabetes. After adjusting for age, MetS was higher in women than men (29.1% versus 25.3%, respectively). MetS rates in women increased with age; however this association was not observed in men. Participants with diabetes had the highest rates of central obesity and triglyceride values, as well as increased systolic and diastolic blood pressure and low-density lipoprotein. The national sample and randomization were substantial strengths of this study compared to earlier studies. The authors suggested that their results provided a firm basis for future randomized research in this high-risk population (Misra et al., 2009).

The prevalence of T2DM continues to escalate among South Asians in the US and Europe, and their genetic predisposition for diabetes and tendency toward visceral adiposity, low physical activity, and poor nutritional habits places them at increased risk for diabetic complications (Shaw, Sicree, & Zimmet, 2010). Studies have shown that morbidity and mortality from diabetes-related complications are greater in women as a result of limited access to treatment (IDF, 2011). In addition, women with coronary heart disease secondary to diabetes have lower survival rates than diabetic men (IDF, 2011). Women with diabetes between the ages of 25-44 also have a three times higher mortality than women without diabetes (CDC, 2014).

These increased risks are compounded by health beliefs about causes of illness that can impact how individuals with type 2 diabetes manage this chronic illness (Harvey & Lawton, 2009). Researchers have identified multiple barriers to optimal self-care of chronic illness in South Asians, such as religious beliefs, fatalistic attitudes, and gender related customs and social norms (Fleming & Gillibrand, 2009; Lucas, Murray, & Kinra, 2013). It is therefore necessary to examine diabetes self-care practices and health promoting behaviors to reduce morbidity and mortality in this high-risk population.

STANDARDS OF MEDICAL CARE FOR DIABETES

Type 2 DM is a chronic illness that requires multiple complex interventions (CDC, 2014). Uncontrolled diabetes can lead to numerous complications such as blindness, kidney damage, CVD, and lower limb amputation. However, good diabetes management between health care team and patient can lead to optimal control of the disease (CDC, 2014).

Guidelines for diabetes care can be found in the Standards of Medical Care in Diabetes [Standards of Care] that are maintained and revised annually by the ADA based on empirical evidence (ADA, 2017). The Standards of Care adhere to IOM guidelines and direct treatment using the chronic care model for patient care (ADA, 2017). The standards also provide a framework for diabetes self-management that guides clinicians and patients toward the best patient outcome, while recognizing differences presented by individual based on their circumstances and other factors such as race, gender, ethnicity, and community support. The 2017 recommendations include: evaluation of psychosocial issues with respect to all aspects of diabetes management; reducing disparities in diabetes treatment to improve patient outcomes; assessment of patients' social contexts and use of

local community support in diabetes self-management; and assessment of sleep patterns based on new evidence of their effect on A1C (ADA, 2017).

Adherence to the Standards of Diabetes Care is recommended to manage the illness and prevent complications (ADA, 2017). Diabetes self-care, or disease self-management, involves multiple consecutive steps. Weight loss, nutrition, and physical activity are the cornerstones of diabetes self-management and require patient knowledge of the disease, blood glucose monitoring, foot care, smoking cessation, and use of any prescribed medication.

A diabetes diagnosis can be overwhelming for new patients; reactions may include fear, confusion, denial, or misunderstanding of the seriousness of the illness (Lawton, Parry, Peel, & Douglas, 2005). At the time of T2DM diagnosis, patient blood glucose level is measured using the glycosylated A1C and the patient is evaluated for existing comorbidities that must be addressed and treated; and the patient is referred to a specialist based on the type of comorbidities (ADA, 2017). The health care team includes the physician, nutritionist, dietician, pharmacist, and nurse along with the patient and family members. Follow-up evaluation of A1C every three months—or sooner if needed—and preventative care including vaccinations, as well as annual eye and dental exams are recommended (ADA, 2017).

Studies have shown that if providers do not emphasize the seriousness of the disease, patients may not understand the importance of self-care/self-management in preventing complications (Lawton et al., 2005). Cabellero (2007) conducted a literature review on problems encountered by ethnic minorities in their diabetes care. It was revealed that patients from ethnic minority groups like Latinos and Hispanics may have

difficulty implementing one or more of the required steps needed to manage their illness and prevent complications. Even with adequate knowledge of appropriate diabetic self-management techniques, patients may be unaware of potential diabetes-related complications (Caballero, 2007). For effective and optimal care, providers must consider cultural factors such as acculturation, body image, beliefs about the disease, fears, use of alternative medicine, nutritional preferences, general and family support, educational level, health literacy, socioeconomic status, and depression that may prevent implementation of the required diabetes management. This may be more problematic in some populations, requiring providers and broad-based community assistance by those familiar with their cultural beliefs and the illness to develop strategies to improve diabetes care and set up tailored educational programs (Cabellero, 2007).

Recommended Weight Loss-Obesity Management for Diabetes Patients

As noted earlier, for South Asian patients, the recommended BMI cut-off values are lower, with a BMI of 25 kg/m^2 or greater considered obese and BMI of 23-24.9 kg/m^2 classified as overweight. For obese individuals, recommended behavior changes include reduced calorie diets and physical activity for weight loss, if not contraindicated. Pharmacotherapy may be initiated for patients with T2DM who fail to reach targeted weight loss based on their BMI and diagnostic criteria (AACE, 2015).

Recommended Physical Activity for Patients with Diabetes

Increased physical activity is recommended for people diagnosed with T2DM because exercise reduces blood glucose by increasing insulin sensitivity as muscles take up glucose and use any available insulin during and after physical activity; and by

contraction of muscles during physical activity that allows cells to take up glucose and use it for energy in the presence or absence of insulin (ADA, 2014). Physical activities such as stair climbing, squatting, and weight lifting achieve the greatest blood glucose reduction; however patients with medical conditions should consult their physician before beginning intensive exercise (National Heart Lung and Blood Institute [NHLBI], 2016). Additionally, regular moderate-intense exercise reduces blood pressure, triglycerides, obesity, overweight, C-reactive protein (inflammation)—which increases patient risk for heart disease; and increases high density lipoprotein—protective cholesterol, among other benefits (NHLBI, 2016).

Moderate-intensity aerobic activity is recommended to achieve the greatest health benefits. Examples include brisk walking (three miles per hour), ballroom dancing, general gardening, and tennis singles. A weekly regimen of 150 minutes (2.5 hours) for moderate-intensity activity or 75 minutes (1.25 hours) of vigorous-intensity activity such as jogging, swimming, running, aerobic dancing, heavy digging/gardening, or jumping rope. Physical activity for periods of 10 minutes can be spread out throughout the week. Weekly engagement in 300 minutes (5 hours) of moderate-intensity or 150 minutes of vigorous-intensity aerobic activity can produce even greater health benefits. Activities such as weight-lifting and resistance training are also recommended to increase muscle strength. Engaging in these types of moderate- or high-intensity activities two or more days weekly will facilitate involvement of all major muscle groups (United States Department of Health and Human Services [US-DHHS], 2008).

Physical Activity in South Asians

Physical inactivity and sedentary lifestyle are major risk factors for CVD (Eyeler et al., 2003) and contribute to the development of obesity and diabetes. Physical activity is a modifiable risk factor that can prevent morbidity and mortality from chronic disease (Eapen, Kalra, Merchant, Arora, & Khan, 2009). Migrant South Asian women have been shown to have lower participation in physical activity compared to other ethnicities (Ye, Rust, Baltrus, & Daniels, 2009) due to cultural habits (Sriskantharajah & Kai, 2007) and perceived barriers (Bajaj et al., 2013; Jepson et al., 2012).

Babakus and Thompson (2012) conducted a systematic mixed-method review of 26 quantitative and 12 qualitative studies of physical activity and sedentary lifestyles among immigrant South Asian women. The review indicated that South Asian women were less physically active than South Asian men and the host populations of the countries to which they had migrated. The researchers also found that South Asians in general had lower knowledge about the benefits of physical activity, and that some women did not believe they needed exercise because household chores and childrearing kept them busy. Other cultural barriers that emerged included the need for modest dressing and lack of female-only gym facilities. The differences in sampling, use of multiple and different measures across the studies were noted as limitations to the study. The authors suggested that future research using a standardized measure to evaluate physical activity levels in this vulnerable population could result in development of more effective health promotion strategies.

Kandula et al. (2015) conducted a randomized, controlled, mix-method pilot study of an intervention specifically tailored for South Asians that included classes, behavior counseling, and a trip to the grocery store. The South Asian Heart Lifestyle Intervention

(SAHELI) lasted 16 weeks and included 63 men and women from India and Pakistan residing in the Rogers Place community of Chicago. Participants ranged from 30-59 years of age with at least one risk factor (e.g., obesity, hypertension, prediabetes, or diabetes) for Atherosclerosis Cardiovascular Disease (ASCVD). The study was conducted in a South Asian community center that provided social services to the underserved South Asians population in that area. Participants were randomly assigned to a control or intervention group. Baseline data indicated that none of the participants met the national standard for recommended physical activity. The control group received printed information on ASCVD and health promoting behaviors such as diet, exercise, and weight loss. The intervention group participated in six interactive sessions on physical activity, healthy diet, weight loss, and stress management, and a follow-up telephone call at three and six months to provide additional support and reinforcement. The detailed SAHELI instruction to the intervention group was designed to address South Asians' social contexts and beliefs. Content included information about ASCVD, as well as benefits of physical activity and recommended types and amount. Participants were also given pedometers. They were also advised regarding portion control and healthy food choices specifically tailored to South Asian traditional cuisine, as well as one trip to the South Asian grocery store. The study included four heart health "melas" (Asian culture fairs) that were held at 3-month intervals in local parks over a 1-year period. Participants from the intervention group were invited to attend the fairs along with their families. Activities at the fairs included preparation of healthy meals by Asian chefs, yoga exercise instruction, and participation in traditional dances. All activities were designed to reinforce the instruction about healthy diet and exercise, and provide support

through community involvement. In addition to investigating the feasibility of using the SAHELI as part of a community based intervention, the study aimed to increase physical activity among participants in the intervention group to moderate/high intensity and reduce their intake of saturated fat. Results showed no significant differences between the groups in these two categories; however, there was greater weight loss in the intervention group than the control group (1.6 kg vs 0.2 kg, respectively) and 19% of the intervention group had at least a 5% weight loss as compared to only 3% in the control group. While not statistically significant, there was also a decrease in waist circumference and A1C for the intervention group. The A1C was elevated in the control group at the 3- and 6-month follow-ups. The authors concluded that the 100% retention rate of participants at three and six months was due to the use of a community-based study, and that this method was a good way to engage South Asians in health promotion programs. They recommended additional research using female populations. Possible confounding factors were the potential for cross communication between the control and intervention groups as participants were part of a close-knit community making separation of educational information and intervention activities logistically and pragmatically impossible. Future studies should conduct the study in two separate communities to provide for more control on cross contamination.

Jepson et al. (2012) conducted a qualitative study of 59 adult South Asian immigrants to Scotland from Pakistan, Bangladesh, and India to investigate factors that motivated them to participate and facilitate physical activities. Participants represented a variety of ethnic, religious, and professional groups. The study, which used focus groups and a semi-structured interview technique, identified barriers to physical activity that

were similar to those observed in the general population (e.g., childcare and lack of time). Exercise preference varied by gender. Men enjoyed going to the gym and partaking in sports such as cricket, football, and badminton, while women enjoyed walking, traditional Bollywood dancing, and using indoor gym equipment. Women expressed desires to go swimming and to go to the gym, but avoided these activities because of social modesty values and lack of access to female-only gyms and swimming facilities. Both males and females reported that engaging in physical activities allowed for socialization and enjoyment, in addition to some health benefits. Females preferred not to exercise alone and felt they would participate more frequently in physical activity as part of a community with someone guiding the sessions. The authors suggested that research conducted using focus groups in venues, such as community centers, and languages that are comfortable and relaxed for South Asians would facilitate group work sessions and generate increased female participation.

Recommended Nutrition Therapy for Diabetes Control

The AACE (2015) recommends education of diabetic patients about nutrition including advice to eat regular meals and snacks; consume a plant-based diet high in fiber and low glycemic index foods (i.e., foods with glycemic index of $\leq 55/100$ such as multigrain bread, pumpernickel bread, whole or unprocessed oats, lentils, chick peas, apples, legumes, mangos, brown rice, and yams); eat foods high in phytochemicals/antioxidants; and use mild cooking techniques, avoiding use of high heat. Patient education should also cover understanding and interpreting nutrition facts on food labels and discuss the three types of carbohydrates: sugars, starches, and fiber, including health effects of each type and recommended consumption of 7-10 servings per day of

healthy carbohydrates such as fresh fruits and vegetables, legumes, and whole grains (AACE, 2015).

Dietary Changes in Migrant South Asians

After years in the US, minority migrant groups have consistently shown a shift from a diet high in vegetables, fruits, and fiber and low in saturated fat to a diet that includes more processed foods, higher in fat, and with fewer servings of fruits and vegetables (Kim et al., 2010; Kulkarni, 2004; Satia, 2010). Migrant diets that include more fats and carbohydrates, less fiber, and greater meat intake have been linked to increased prevalence of cardio-metabolic disease (Misra, Singhal, & Khurana, 2010).

Misra et al. (2000) conducted a cross-sectional exploratory study using the Health Promoting Lifestyle Profile II (HPLP II) to examine health promoting behaviors in 261 Asian Indian immigrants from Gujrat, India, living the US. Participants had low scores in the areas of physical activity and nutrition, with those in the 25-50 years age group having the least physical activity. Participants scored higher on spiritual growth and interpersonal skills, and women had higher scores than men on health responsibility because they reported health concerns to their doctors and educated themselves on health issues by reading and watching television. The study's limitations included the cross-sectional design, limited recruitment and limitation to participants from one city in India.

GENDER RELATED DIFFERENCES IN CHRONIC ILLNESS CARE AND OUTCOMES

Gender differences in women's access to care and diabetes treatment results in higher mortality and morbidity from diabetes related complications (IDF, 2015). Southeast Asian women aged 50-59 accounts for 25% of all diabetic mortality in women,

while the death rate among diabetic men in the same age group is only 15% (IDF, 2015). Regular physical activity coupled with healthy dietary habits reduces the risk of T2DM (Tuomilehto et al., 2001). As women are less physically active than men, this increases their risk for DM, CVD, and depression (US-DHHS, 1996). Women's health promotion behaviors have been studied less extensively than those of men (Hayes, Weisman, & Clark, 2003). Although South Asian women are genetically predisposed to diabetes, increased prevalence of diabetes among migrant South Asian women is strongly associated with increased levels of obesity resulting from physical inactivity, poor nutritional practices, and minimal knowledge about health promoting behaviors and diabetes. When formulating diabetes education and management strategies for South Asians, health professionals should consider their cultural views, health beliefs, and practices. Use of community resources to educate this population about lifestyle changes with respect to diet and exercise can prevent increased incidence of overweight and obesity in South Asian women and children.

HEALTH BELIEFS AND PRACTICES IN SOUTH ASIANS WITH CHRONIC ILLNESSES

Health beliefs, causes of illness and culture can impact how South Asians with chronic illness manage their disease (Harvey & Lawton, 2009). Studies have shown that South Asians have multiple barriers such as religious beliefs, fatalistic attitudes, gender related customs and social norms can affect optimal self -care in chronic illness (Fleming & Gillibrand, 2009; Lucas, Murray, & Kinra, 2013).

Lawton et al. (2008) conducted a qualitative study in Scotland using in-depth interviews to explore heath perceptions and practices in Pakistani men and women (n=32) taking oral hypoglycemic agents to treat their diabetes. Respondents perceived British

medications as superior to those from India and were more trusting of Scottish providers; however, they did not take medications as prescribed or reduced the dose without consulting their physicians. Participants reported several reasons for their noncompliance, including their belief that the prescribed medication could damage their health if taken for an extended period or could be harmful if taken with traditional foods.

Jonnalgadda and Diwan (2005) examined the correlates of health behavior and self-rated health in immigrant Asian Indian men and women living in the US and aged 50 years and older. Information about variables including physical activity, adequacy of diet, BMI, length of residency, perceived control, perceived quality of social support, cumulative chronic disease score, depression, self-rated health, and smoking habits were collected via telephone survey. Study findings indicated that respondents with younger age, longer residency in the US, and identification as bicultural or more American engaged in more physical activity. Those who had higher incomes, identified as bicultural with an American identity, or reported depression had higher fat intakes. Older age, female gender, BMI greater than 25, and greater number of chronic disease conditions were associated with poor self-rated health status. The authors suggested that perceived health is an important factor when planning culturally appropriate health promotion interventions. Study limitations include self-reported data (especially evaluations of BMI, dietary intake and mental health such as depression), participation via telephone survey and limited generalization outside the sample.

HEALTH BELIEFS AND PRACTICES IN OTHER ETHNICITIES WITH CHRONIC ILLNESSES

Given that the data on diabetes care and health promotion among South Asians is limited, the literature on Latinos was examined as a parallel ethnic minority immigrant

group living in the US. Latinos of diverse origins living in the US also have a high prevalence of diabetes: Mexicans have the highest rate of diabetes at 18.3%, followed by 18% in Puerto Ricans and Dominicans (Schneiderman et al., 2014). Metabolic syndrome in women was 41% in Puerto Ricans and 27% in South Americans (Heiss et al 2014). High rates of acculturation were associated with high rates of cardiovascular disease, and risk factors identified were poor nutrition, low physical activity and obesity (Daviglus et al., 2012). Latinos were also found to have poor awareness of diabetes (58.7%) (Schneiderman et al, 2014).

SUMMARY

Empirical studies (DCCT, 1993; UKPDS, 1998) and other research have resulted in the development of the current standards of diabetes care and the introduction of physical activity guidelines for health promotion by the US-DHHS (2008). Studies of diabetes management and health promoting lifestyles have improved available resources for education and promotion of lifestyle changes. Diabetes and its associated complications are increasing, especially in the South Asian population, in the US and around the world (Fishbacher, Hunt, & Alexander, 2004; Gopichandran et al., 2012; Goenka, 2008; Holmboe-Ottesen & Wandel, 2012; Natesan et al., 2015; Rajeshwari, Nicklas, Pownall, & Berenson, 2005). South Asians with established diabetes do not achieve target glycemic goals as compared with Caucasians, increasing their risk for complications from diabetes (Mostafa et al., 2010).

GAPS IN THE LITERATURE

Diabetes self-care among South Asian women living in the US is an important area of concern given the high prevalence of diabetes in this population. Studies have shown that South Asian women are not physically active, have poor dietary habits, adjust their medication without consulting their physicians, and do not engage in health promoting behaviors. These poor health practices can lead to complications from diabetes. A review of existing literature clearly identified a paucity of studies on diabetes self-care activities and health promoting behaviors of South Asian women in the US. Given overwhelming evidence that South Asians are at higher risk for diabetes complications and face unique cultural challenges that decrease compliance with health promoting behaviors to combat the disease, identification of effective approaches to mitigate these barriers is needed. To date, no studies have examined these issues in South Asian immigrants living in the US with new and established diabetes diagnoses. Differences between these two groups may be critical because the recipient's frame of mind can crucially impact the timing of interventions.

Chapter 3 Methodology

Chapter 3 presents the research design of this study including details of the study sample and size, setting, data collection methods, ethical considerations of the subjects and the Institutional Review Board (IRB) approval, and a description of the statistical methods used in this study.

STUDY DESIGN

A quantitative cross-sectional descriptive comparative design was used to compare diabetic self-care activities and health promoting lifestyle behaviors between two groups of South Asian women in Houston, Texas—those newly diagnosed with T2DM and those with an established diagnosis of T2DM—to answer specific research questions. Participants were asked to complete a questionnaire regarding personal factors such as age, time in the US, educational level, health insurance, perceptions of health, and body measurements such as height and weight.

SAMPLE AND POPULATION

Thirty women with established diagnoses of T2DM and 30 women with new diagnoses of T2DM were recruited from the Houston, Texas metropolitan area. Texas is among the top three states with the largest numbers of South Asians. According to the 2010 United States census, there are 245,981 Asian Indians in Texas, with a Pakistani population of approximately 104,000 and a Bangladeshi population of approximately 9,500 (United States Census Bureau, 2010). The areas with the highest concentrations of South Asian Indians are in the Stafford (7.35% of 27,677), Sugarland (7.20% of 108,607), and Missouri City (3.4% of 65,701) areas of Houston (Zip Atlas, 2013).

INCLUSION AND EXCLUSION CRITERIA

Inclusion

The sample included a total of 60 South Asian women (self-identified as of Pakistani, Asian Indian, or Bangladeshi origin) with a diagnosis of type 2 diabetes; ages 21-75 years of age; able to speak, read, and write English; and living in the US for at least one year. The requirement for at least one year of residency was intended to minimize the impact of cultural practices that may contradict Western proscriptions for diabetes management.

Exclusion

Volunteers who were unable to read, write, and speak English; male; under 21 or over 75 years; diagnosed with T1DM; or had lived in the US for less than one year were excluded.

SETTING

Participants for the study were recruited from three sites: (a) a mosque (b) a South Asian clothing store and (c) a charity clinic, all located in Houston, Texas. In addition, the Principal Investigator (PI) had established strong ties with the leaders of charitable organizations and mosques as a volunteer nurse practitioner at the Southeast Charity Clinic and has also been a guest speaker on breast cancer awareness and prevention at the mosque. The PI sought assistance from the leaders of the faith-based institutions to distribute flyers informing their members about the study and to help recruit participants. The PI made multiple scheduled visits to the various centers when the membership

turnout was likely to be high, and women who were interested in the study were encouraged to contact the PI.

RECRUITMENT PROTOCOL

IRB approval was obtained from the University of Texas Medical Branch in Galveston, TX and with permission from the directors and leaders of the recruitment sites, flyers describing the research study were posted along with information cards that included the PI's contact information and the web address for the online survey. Participants were invited to contact the PI with any questions about the study. Most participants preferred to complete paper surveys at the recruitment sites; however a few participants contacted the PI and surveys were mailed to them with a self-addressed stamped envelope for anonymous return. Only one participant used the online survey. No identifying information was included on the survey, and completion and return of the survey was assumed to constitute consent. Sampling continued until 60 participants were enrolled in the study.

INSTRUMENTS

The instruments used in the study were: (a) a demographic data questionnaire; (b) the Health Promoting Lifestyle Profile II (HPLP II); and (c) the Summary of the Diabetic Self-care Activities (SDSCA).

Demographic Data Questionnaire

The data questionnaire collected information on age; marital status (married, single, widowed, or divorced); employment status (full-time, part-time, or unemployed); income; number of household members; educational level; time in the US; and health

insurance status (insured or not). Additional variables included time since diagnosis of diabetes and self–reported height, weight, and hemoglobin A1C, as well as a single item assessing self-rated health status.

The Health Promoting Lifestyle Profile II

The HPLP II instrument was developed by Walker, Sechrist, and Pender (1995) and is designed to measure health-promoting behaviors. It was derived from the Behavior-Specific Cognitions and Affects section of the HPM and was designed for use in primary care to assist in developing individualized health promotion plans for patients. The HPLP II consists of a 52-item summated behavior rating scale, and uses a 4-point Likert scale (1=*never*, 2=*sometimes*, 3=*often*, 4=*routinely*) to measure the frequency of self-reported health promoting behaviors in the following six domains : (a) health responsibility (9 items); (b) physical activity (8 items); (c) nutrition (9 items); (d) spiritual growth (9 items); (e) interpersonal relations (9 items); and (f) stress management (8 items). Higher scores represented higher levels of health promoting behavior and lower scores reflected lower levels of health promoting behaviors. The HPLP II has been translated into multiple languages and used in many countries around the world. Cronbach's alpha coefficients for the subscales of the HPLP II have been reported as follows: health responsibility α=.86, physical activity α=.85, nutrition α=.89, spiritual growth α=.86, internal relations α=.87, stress management α=.79, and total HPLP II α=.94 (Walker et al., 1987). Misra et al. (2000) used the HPLP II in a sample of 261 South Asian Indian men and women in the US to evaluate their health promoting behaviors; alpha coefficients for subscale scores were: health responsibility α=.81, physical activity α=.84, nutrition related behavior α=.76, self-actualization α=.81,

interpersonal relations α=.79, and stress management α=.76. Internal consistency of the total scale was .94.

The Summary of the Diabetic Self-care Activity (SDSCA)

The SDSCA has been widely used with various racial/ethnic populations to measure their diabetic self-management activities. It has been translated into multiple languages including Taiwanese, Spanish and Chinese with Cronbach's alpha coefficients of .83, .68 and .70of .83, .68, Jungling Cao, 2013; Vincent, McEwan, & Pasvogel 2008; Wa Shu Fang et al., 2007). The original SDSCA was developed to measure five areas of diabetes management: general diet, specific diet, exercise, medication, and blood glucose monitoring (Toobert, Hampson, & Glasgow, 2000). The instrument was revised after the authors did a review of the SDSCA on data from seven different studies (five randomized and two observational studies). They found that SDSCA is a valid multidimensional tool for measurement of diabetes self-care management. Measures can be generalized to different diabetic subpopulations including insulin status, sex, number of comorbid conditions, and diabetic duration. The authors also examined factors such as norms, reliability, validity, and sensitivity to change.

The revised SDSCA now consists of 11 items with an optional expanded version consisting of an additional 14 items. The expanded version provides information to clarify patients' understanding of their self-management goals. It also provides researchers and clinicians with a basis for evaluation of the relationship between patients' perceived recommendations and their actual self-reported levels of self-care (i.e., adherence) (Toobert et al., 2000). In addition, the new revised version now includes measures of foot care and cigarette smoking. Respondents are asked to circle the number

of days in the prior 7 days that they engaged in diabetes-specific self-care behaviors. Response choices range from 0 to 7, with higher scores indicating better self-care performance. Items are scored on the number of days that the behavior was performed (0-7), then compared to a standard score with a mean of zero and a standard deviation of 1. The mean is then calculated for each score by averaging the standard scores. Measurement based on days per week rather than percentage was recommended to simplify the scoring and interpretation of the revised SDSCA scale. The authors concluded that the strength of the 11 core items on the revised SDSCA is the brevity and ease of scoring, which enhances the instrument's practicality for both research and clinical applications (Toobert et al., 2000). The authors placed the instrument in the public domain to encourage its use. It has since been widely used around the world and has become a valuable tool for the evaluation of self-care among diabetics. The Summary of Diabetes Self Care Activity was utilized in one previous study by Gopichand et al., 2012, in an South Asian population in India, results showed similar to this study: low scores in nutrition and physical activities.

ANONYMITY AND CONFIDENTIALITY

Appropriate ethical standards for human subjects' research were applied. Participants were fully informed about the study through the initial welcome page of the online and paper survey and brief descriptions provided on flyers and information cards distributed at recruitment sites. Because study participation was completely anonymous and voluntary, participation was assumed to constitute consent. Anonymity and confidentiality were guaranteed through survey completion with only voluntary contact if the participant chose to ask the PI questions or to request a paper survey from study

personnel or clinic staff. No personally identifying information was included on the survey.

DATA ANALYSIS

Data were analyzed using the Statistical Package for Social Sciences (SPSS) software (Version 18). Significance was calculated at ∂=.05 and at power=0.8. All data was examined for normality and homogeneity. There were no issues of heterogeneity. Preliminary analyses included descriptive statistics, frequencies, percentages, means, medians, modes, and standard deviations for both demographic and study variables. In addition, Cronbach's alpha coefficients were also computed for the subscales of the HPLP II to ensure reliability.

Chapter 4 Results

This chapter presents the findings from a comparison of diabetes self-care activities and health promotion lifestyles among South Asian (SA) women (from Bangladesh, India, and Pakistan) living in the United State with new (within the past year) and established (more than 1 year) diagnoses of type 2 diabetes. The purpose of the study was to identify factors that strongly impact behavioral changes for diabetes management and health promotion. It was expected that the women with established diabetes diagnoses would be more knowledgeable about their disease and would have implemented the necessary treatments and lifestyle changes for optimal diabetes management. However, they may not have made the necessary changes due to barriers, perceived incompatibilities with cultural lifestyles, or individual characteristics (e.g., age and education). The chapter presents a description of the sample, the reliability of the study instruments, data analyses of the research questions, and a chapter summary.

DESCRIPTION OF THE SAMPLE

The convenience sample consisted of 60 South Asian adult women who were residents of the United States for longer than 1 year and diagnosed with type 2 diabetes. The study was conducted over a period of 11 months from October 2014 through September 2015. Table 1 displays the descriptive characteristics for this sample. South Asian women with type 2 diabetes who participated in this study varied in age from 22 to 75 years, with a mean age of 46.2 years. The majority of the participants were Pakistanis, followed by Indians and Bangladeshis. All participants were immigrants, with an average of 11.4 years in the United States and a range of 2 to 40 years. Most participants were

partnered, unemployed, insured, and had not completed a high school education. The average annual income was $19,381.00, with a median of $12,500,00, which is a better reflection of central tendency given the extreme range reported by participants.

Characteristics	*N*	Mean (SD) or %	Range
Age	60	46.2 (15.9)	22-75
Years in the US	60	11.5 (9.9)	2-40
Education in Years	60	11.4 (3.48)	5-18
Annual Household Income	60	$19,381 (22.2)	$0-150,000
Ethnicity			
Pakistani	39	65%	
Indian	12	20%	
Bangladeshi	9	15%	
Immigration Status			
Immigrants	60	100%	
Non Immigrants	0	0%	
Marital Status			
Partnered	46	76.7%	
Unpartnered	14	23.3%	
Employment			
Employed	12	20%	
Unemployed	48	80%	
Health Insurance			
Insured	35	58.3%	
Uninsured	25	41.7%	
Health Status			
Good/Excellent	39	65%	
Fair/Poor	21	35%	

Table 4.1: Sample Characteristics

A majority of the women rated their health as good or excellent. Sample characteristics of the women in this study were similar to those of a recent study in the same population on physical activity levels of South Asian women (Matthew, 2014); however, in this study most of the women were unemployed rather than employed and

the newly diagnosed had shorter time in the United States than those with an established diagnosis (11.4 years versus 18.8 years). However, there were no significant differences between the two groups on any demographic variable.

Demographic Variable	Study Group	*N*	Mean (SD) or %	Significance
Age	Established	30	50.30 (16.39)	t=11.99, p=.320
	Newly Diagnosed	30	42.27 (14.77)	
Education	Established	30	11.67 (3.82)	t=-.554, p=.211
	Newly Diagnosed	30	11.17 (3.13)	
Years in the US	Established	30	12.33 (10.69)	t=-.650, p =.369
	Newly Diagnosed	30	10.67 (9.12)	
Income	Established	30	$23,080.00 (15,989.19)	$0-150,000
	Newly Diagnosed	30	$15,683.33 (26,845.50)	
Ethnicity				
Pakistani	Established	30	17 (56.7)	
	Newly Diagnosed	30	22 (13.3)	
Indian	Established	30	7(23)	
	Newly Diagnosed	30	5 (16.7)	
Bangladeshi	Established	30	6 (20)	
	Newly Diagnosed	30	3 (10.0)	
Marital Status				
Partnered	Established	30	22 (73.3)	χ^2=.373 df=1
	Newly Diagnosed	30	24 (80)	p=.542
Unpartnered	Established	30	8 (26.7)	
	Newly Diagnosed	30	6 (20)6 (20)	
Employment				
Employed	Established	30	7 (23.3)	χ^2=.417, df=1,
	Newly Diagnosed	30	5 (16.7)	p=.519
Unemployed	Established	30	23 (76.7)	
	Newly Diagnosed	30	25 (83.3)	
Health Insurance				
Insured	Established	30	11 (36.7)	χ2=.617, df=1,
	Newly Diagnosed	30	19 (63.3)	p=.432
Uninsured	Established	30	14 (46.7)	
	Newly Diagnosed	30	16 (53.3)	
Health Status				
Good/Excellent	Established	30	18 (60)	χ2=.659 df=1,
	Newly Diagnosed	30	21 (70)	p=.417
Fair/Poor	Established	30	12 (40)	
	Newly Diagnosed	30	9 (30)	

Table 4.2: Group Differences on Demographic Variables

Table 4.2 shows a comparison of demographic variables between the established and the newly diagnosed groups. The student's t-test and chi square test were used to analyze the interval and nominal variables. There were no significant differences in any of the demographic variables between the established and the newly diagnosed groups, indicating an equitable distribution of demographic factors across both groups.

PSYCHOMETRIC ANALYSES

The Summary of Diabetes Self-Care Activities (SDSCA) is an 11-item instrument used to report the self-care activities of the individuals with diabetes over a 7-day period with a focus on five self-care activities: diet, exercise, glucose testing, foot care, and cigarette smoking. Because participants are asked to list the number of times (counts) in the previous 7 days that they performed specific self-care activities, the scale does not measure latent constructs and, thus, is inappropriate for reliability analyses. Table 4.3 displays the descriptive analyses for the SDSCA subscales, with higher scores indicating better management of diabetes. The possible range of scores varies across subscales; therefore an examination of the standardized mean indicates that the participants had the lowest mean score on physical activity and the highest mean score on diet, while blood sugar and foot care were similar. None of the participants reported tobacco use as a result smoking was removed from the analysis.

The Health Promoting Lifestyle Profile (HPLP II) consists of a 52-item summated behavior rating scale and uses a 4-point Likert scale (1= *never*, 2 = *sometimes*, 3 = *often*, 4 = *routinely*) to measure the frequency of self-reported health promoting behaviors in the following six domains: (a) health responsibility (9 items); (b) physical activity (8 items); (c) nutrition (9 items); (d) spiritual growth (9 items); (e) interpersonal relations (9 items); and (f) stress management (8 items). Higher scores represent higher frequency of

health promoting behaviors and lower scores indicate that health promotion activities were practiced less frequently. Table 4.3 presents the descriptive results for each HPLP II subscale. Overall, participants scored higher than the midpoint (2.5), with the highest scores on spiritual growth and interpersonal relationships and the lowest scores on physical activity. These findings suggest areas of strength and challenges for this population.

Subscale (# items)	Raw Mean	SD	Standardized Mean	Actual Range	Possible Range
SDSCA					
Diet Score (4)	14.05	5.48	3.52	0-28.00	0-28.00
Physical Activity Score (2)	5.98	3.95	2.99	0-14.00	0-14.00
Blood Sugar Score (2)	6.38	4.28	3.19	0-14.00	0-14.00
Foot Care Score (2)	6.20	4.39	3.10	0-14.00	0-14.00
Smoking (1)	0	0	0	0	Variable
HPLP II					
Health Response (9)	23.02	4.62	2.56	15.00-36.00	9.00-36.00
Physical Activity HPLQ (8)	17.37	5.29	2.17	8.00-30.00	8.00-32.00
+Nutrition (9)	23.47	3.50	2.61	17.00-30.00	9.00-36.00
Spiritual Growth (n=59) (9)	24.39	4.33	2.71	17.00-36.00	9.00-36.00
Interpersonal Relationships (9)	24.72	4.32	2.75	17.00-35.00	9.00-36.00
Stress Management (8)	20.70	4.01	2.59	12.00-30.00	8.00-32.00

Table 4.3: Descriptive Analyses for Instrument Subscales

The HPLP II is designed to measure latent constructs related to health promotion. As such, it is appropriate for reliability analyses. Cronbach's alpha coefficients for the subscales of the HPLP II are displayed in Table 4.4. All subscales except nutrition demonstrated adequate to excellent reliability. The high alpha coefficient of the physical activity subscale suggests a degree of redundancy.

Subscale	Cronbach's Alpha	Number of Items
Health Response	.779	9
Physical Activity HPLQ	.901	8
Nutrition	**.582**	9
Spiritual Growth	.825	9
Interpersonal Relationships	.744	9
Stress Management	.743	8
Total Scale	.945	52

Table 4.4: Cronbach's Alphas for HPLP Subscales and Total Scale

A closer examination of the nutrition subscale (see Table 4.5) suggests that some items may be significantly impacted by cultural practices and norms. For instance, lactose intolerance is highly prevalent among East Asians and other ethnic groups, affecting up to 90% of the adult population in some communities (National Institute of Health Department and Human Services, 2010). This would have a direct effect on responses to item 32, with a low response negatively reflecting on score interpretation. Other food practices could also contribute significant variability to responses on this scale, undermining internal reliability and challenging construct validity.

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2. Choose a diet low in fat, saturated fat, and cholesterol.

8. Limit use of sugars and food containing sugar (sweets).

14. Eat 6-11 servings of bread, cereal, rice, and pasta each day.

20. Eat 2-4 servings of fruit each day.

26. Eat 3-5 servings of vegetables each day.

32. Eat 2-3 servings of milk, yogurt, or cheese each day.

38. Eat only 2-3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.

44. Read labels to identify nutrients, fats, and sodium content in packaged food.

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50. Eat breakfast.

Table 4.5: Nutrition Subscale

Further evidence for this problem can be found through an examination of inter-correlations between HPLP nutrition items. Logically, items measuring the same construct should be highly correlated. Reliability of subscales is undermined when there are low correlations between individual items. As presented in Table 4.6, only two pair of items demonstrated any significant relationship: choosing a low-fat diet (HP2) and reading labels (HP44); and eating vegetables (HP26) and eating limited protein (HP38).

		HP8	HP14	HP20	HP26	HP32	HP38	HP44	HP50
HP2	**R**	.120	-.121	.002	.231	.383**	.271*	**.534****	.198
	P	.362	.357	.990	.076	.003	.036	.000	.129
HP8	**R**		-.144	.117	-.199	.138	-.081	-.130	.074
	P		.273	.373	.128	.294	.536	.321	.572
HP14	**R**			-.128	.091	-.030	.210	.109	-.134
	P			.331	.487	.822	.108	.409	.307
HP20	**R**				.215	.097	.213	.137	.021
	P				.100	.460	.102	.295	.873
HP26	**R**					.256*	**.437****	.256*	.284*
	P					.049	.000	.049	.028
HP32	**R**						.361**	.248	.253
	P						.005	.056	.051
HP38	**R**							.386**	.146
	P							.002	.266
HP44	**R**								.052
	P								.691

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4.6: Correlations Between Nutrition Items (n=60)

A similar comparison between the HPLP II nutrition items and the SDSCA diet items (see Table 4.7) suggests that the HPLP II nutrition subscale may be multifactorial rather than unidimensional and composed of disparate items. The correlation pattern shows significant positive relationships between healthy eating habits and low-fat diets;

and between eating vegetables, dairy, and protein and reading labels on packaging. The failure to demonstrate any significant relationships with eating breakfast or limitation of sugars and carbohydrates suggests that these items may not assess the same domain or achieve convergent validity.

		HPLP II								
SDSCA		Low fat diet	Limit sugars	6-11 servings carbs	2-4 servings fruits	3-5 servings veg.	2-3 servings dairy	2-3 servings protein	Read labels	Eat breakfast
Followed a healthy eating plan for 7 d	r	**.653****	-.099	.039	.147	**.339****	**.368****	**.357****	**.677****	.159
	p	.000	.453	.769	.263	.008	.004	.005	.000	.224
Followed healthy eating plan for 1 m	r	**.687****	-.055	-.002	.109	**.394****	**.270***	**.296***	**.615****	.160
	p	.000	.674	.987	.409	.002	.037	.022	.000	.222
5+ fruits in 7 d	r	**.298***	-.034	**-.255***	**.336****	.249	.131	.148	**.315***	**.311***
	p	.021	.797	.049	.009	.055	.318	.258	.014	.016
Eat high fat foods for 7 d	r	-.106	.025	**-.268***	.124	-.081	-.188	-.238	-.166	.079
	p	.421	.848	.039	.346	.540	.151	.067	.204	.546

Table 4.7: Correlations Between HPLP II Nutrition Items and SDSCA Diet Items

The current sample is too small to allow for further psychometric analyses to explore this possibility (e.g., factor analysis), but further examination of this factor as measured by this particular subscale is warranted. The implication is that diet may be an area in which compliance with diabetic management practices is most at risk and challenging to achieve. However, given the low reliability, the nutrition subscale for the HPLP II was excluded in the study analyses because the results are largely uninterpretable. However, the diet subscale for the SDSCA was retained since it was an actual count of behavioral instances rather than a latent variable.

SPECIFIC AIMS AND RESEARCH QUESTIONS

Specific Aim 1

The first aim was to assess diabetic self-care activities among South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, marital status, time in the US, and education.

RQ 1.1. What are the differences in diabetic self-care activities (i.e., diet, exercise, blood sugar testing, and foot care) in South Asian women with new, and established T2DM diagnoses, controlling for age, marital status, time in the US, and education?

A two-way analysis of covariance (ANCOVA) was used to examine the differences in self-care activities between the two diagnostic groups and the two marital status groups on each subscale (SDSCA: 4), controlling for age and time in the United States (see Table 4.8). A marginally significant difference was found in the diet scores between the unpartnered and partnered marital groups (11.25 versus 16.00, respectively), with partnered women showing much higher diet scores that indicate diet practices in greater compliance with diabetic guidelines. No other differences were found for diagnostic or marital groups with respect to exercise, blood sugar testing, and foot care.

Self-care Activities	Diagnostic groups (n)	Marital groups (n)	M (SD)	Significance
Diet				F(5,54)=2.14, p=.074
Interaction DX x Marital	Established (30)	Unpartnered (8) Partnered (22)	11.25 (5.31) 16.00 (5.99)	F(1,54)=1.604, p=.211
	Newly Diagnosed (30)	Unpartnered (6) Partnered (24)	12.67 (7.15) 13.54 (4.18)	
Main Effect	Diagnostic Group	Established (30) Newly Diagnosed (30)	14.73 (6.11) 13.37 (4.77)	F(1,54)=.001, p=.978
Main Effect	Marital Group	Unpartnered (14) Partnered (46)	11.86 (5.95) 14.72 (5.22)	F(1,54)=1.751, p=.191
Exercise				F(5.54)=.871, p=.507
Interaction DX x Marital	Established (30)	Unpartnered (8) Partnered (22)	5.25 (1.58) 7.00 (4.52)	F(5,54)=.983 p=.326
	Newly Diagnosed (30)	Unpartnered (6) Partnered (24)	5.83 (3.86) 5.33 (3.95)	
Main Effect	Diagnostic Group	Established (30) Newly Diagnosed (30)	6.53 (4.01) 5.43 (3.87)	F(1,54)=.153 p=.697
Main Effect	Marital Group	Unpartnered (14) Partnered (46)	5.50 (2.68) 6.13 (4.27)	F(1,54)=.035, p=.852
Blood Sugar Testing				F(5,54)=1.090, p=.377
Interaction DX x Marital	Established (30)	Unpartnered (8) Partnered (22)	6.25 (4.17) 6.77 (4.78)	F(5,54)=.245 p=.623
	Newly Diagnosed (30)	Unpartnered (6) Partnered (24)	7.00 (4.56) 5.92 (3.99)	
Main Effect	Diagnostic Group	Established (30) Newly Diagnosed (30)	6.63 (4.56) 6.13 (4.04)	F(1,54)=.005 p=.939
Main Effect	Marital Group	Unpartnered (14) Partnered (46)	6.57 (4.18) 6.32 (4.36)	F(1,54)=.080 p=.779
Foot Care				F(5,54)=.235, p=.946
Interaction DX x Marital	Established (30)	Unpartnered (8) Partnered (22)	5.25(4.86) 6.77(4.90)	F(5,54)=.085 P=.772
	Newly Diagnosed (30)	Unpartnered (6) Partnered (24)	5.50(4.04) 6.17(4.00)	
Main Effect	Diagnostic Group	Established (30) Newly Diagnosed (30)	6.36(4.85) 6.03(3.94)	F(1,54)<.001 P=.997
Main Effect	Marital Group	Unpartnered (14) Partnered (46)	5.36(4.35) 6.45(4.41)	F(1,54)=.611 p=.438

Table 4.8: Differences in Self-care Activities Across Study Groups

RQ 1.2. Is the pattern of relationships between self-care activities (i.e., diet, exercise, blood sugar testing and foot care) different between South Asian women with

new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, time in the US, and education?

Table 4.9: Partial Correlations between Self-care Subscales by Diagnostic Group

Newly Diagnosed			
	Self-Care Activities [r, p (n)]		
Self-Care Activities	**Exercise**	**Blood Sugar**	**Foot Care**
Diet	.488, .008 (26)	.195, .319 (26)	.357, .062 (26)
Exercise		.548, .003 (26)	.456, .015 (26)
Blood Sugar			.452, .016 (26)
Established Diagnosis			
	Self-Care Activities [r, p (n)]		
Self-Care Activities	**Exercise**	**Blood Sugar**	**Foot Care**
Diet	.515, .005 (26)	.216, .269 (26)	.569, .002 (26)
Exercise		.470, .012 (26)	.409, .031 (26)
Blood Sugar			.344, .073 (26)

Diet, exercise, and blood sugar were all found to have significant positive correlations with foot care and exercise overall at the .36 to .55 effect level (i.e., low moderate), indicating that higher levels of foot care or exercise are associated with greater attention to diet and blood sugar. For both groups, the only factors that did not correlate were diet and blood sugar, suggesting that dietary practices do not correspond to monitoring of one's blood sugar.

Comparing the patterns between the two groups, correlations with diet were greater in the established group than in the newly diagnosed women, but correlations with exercise and blood sugar and foot care were greater in the newly diagnosed women than those in the established diagnostic group. In general, those who exercised had better dietary practices and those in the established group who exercised did better on their diets than those who exercised in the new group. This could be due to the possibility that established patients with diabetes have developed and practiced better dietary and exercise compliance, whereas newly diagnosed patients are still developing a coherent approach that involves exercise and diet modification.

Specific Aim 2

The second aim was to assess health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, marital status, time in the US, and education.

RQ 2.1. Are there significant differences in health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations and stress management) in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, marital status, time in the US, and education?

A two-way analysis of covariance (ANCOVA) was used to examine the differences in health promoting behaviors (physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) between the two diagnostic groups and the two marital status groups on each subscale (HPLP II: 6), controlling for age and time in the United States (see Table 4.10).

Only two subscales revealed significant differences. A significant main effect was observed for differences between marital groups on spiritual growth, with partnered women exhibiting significantly higher spiritual growth scores. A second difference was found on Interpersonal Relations between the marital groups but only for women with established diagnoses, resulting in a significant interaction effect. As with spiritual growth, partnered women with established diagnoses of T2DM had the highest interpersonal relationship scores across all four groups. Unpartnered women with established diagnoses had the lowest scores of all four groups.

Health Promotion Activities	Diagnostic Groups (n)	Marital Groups (n)	M (SD)	Significance

Health Responsibility				F (5,54)=.454 p=.81
Interaction DX x Marital	Established (30)	Unpartnered (8)	22.13 (5.72)	F(5,54)=.114 p=.74
		Partnered (22)	24.09 (3.85)	
	Newly Diagnosed (30)	Unpartnered (6)	21.67 (4.27)	
		Partnered (24)	22.67 (5.03)	
Main Effect	Diagnostic Group	Established (30)	23.57 (4.41)	F(1,54)=.299 p=.59
		Newly Diagnosed (30)	22.47 (4.83)	
Main Effect	Marital Group	Unpartnered (14)	21.93(4.97)	F(1,54)=.870 p=.36
		Partnered (46)	23.35(4.51)	
Physical Activity				F(5,54)=l.073 p=.39
Interaction DX x Marital	Established (30)	Unpartnered (8)	16.38 (4.31)	F(5,54)=.066, p=.80
		Partnered (22)	18.14 (5.38)	
	Newly Diagnosed (30)	Unpartnered (6)	16.17 (6.52)	
		Partnered (24)	17.29 (5.41)	
Main Effect	Diagnostic Group	Established (30)	17.67 (5.11)	F(5,54)=.565 p=.46
		Newly Diagnosed (30)	17.07 (5.55)	
Main Effect	Marital Group	Unpartnered (14)	16.29 (5.14)	F(5,54)=.606 p=.44
		Partnered (46)	17.70 (5.35)	
Spiritual Growth				**F(5,54)=3.26, p=.012**
Interaction DX x Marital	Established (30)	Unpartnered (8)	22.50 (4.04)	F(5,54)=.70, p=.682
		Partnered (22)	26.36 (4.09)	
	Newly Diagnosed (30)	Unpartnered (6)	21.00 (3.69)	
		Partnered (24)	24.04 (5.02)	
Main Effect	Diagnosed Group	Established (30)	25.33 (4.37)	F(5,54)=1.301 p=.259
		Newly Diagnosed (30)	23.41 (4.88)	
Main Effect	**Marital Group**	**Unpartnered (14)**	**21.86 (3.82)**	**F(5,54)=4.24 p=.044**
		Partnered (46)	**25.18 (4.69)**	
Interpersonal Relations				**F(5,54)=.2.89 p=.022**
Interaction DX x Marital	**Established (30)**	**Unpartnered (8)**	**22.00 (3.55)**	**F(5,54)=6.133, p=.016**
		Partnered (22)	**26.41 (3.76)**	
	Newly Diagnosed (30)	**Unpartnered (6)**	**25.50 (3.51)**	
		Partnered (24)	**23.88 (4.72)**	
Main Effect	Diagnostic Group	Established (30)	25.23 (4.15)	F(5,54)=.623, p=.433
		Newly Diagnosed (30)	24.20 (4.50)	
Main Effect	Marital Group	Unpartnered (14)	23.50 (3.84)	F(5,54)= .627, p=.432
		Partnered (46)	25.09 (4.43)	
Stress Management				F(5,54)=.612, p=.845
Interaction DX x Marital	Established (30)	Unpartnered (8)	19.63 (3.34)	F(5,54)=.389 p=.535
		Partnered (22)	21.64 (4.39)	
	Newly Diagnosed (30)	Unpartnered (6)	19.83 (3.31)	
		Partnered (24)	20.42 (4.04)	
Main Effect	Diagnostic Group	Established (30)	21.10 (4.18)	F(5,54)=.243, p=.624
		Newly Diagnosed (30)	20.30 (3.86)	
Main Effect	Marital Group	Unpartnered (14)	23.50 (3.84)	F(5,54)=.664, p=.419
		Partnered (46)	25.09 (4.43)	

Table 4.10: Differences in Study Groups across Health Promotion Activities

RQ 2.2. Is the pattern of relationships between health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress

management) different in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, time in the US, and education?

Pearson's partial correlation was used to examine the relationships between health promoting behaviors, controlling for age and time in the U.S. in each diagnostic group (newly diagnosed and established. Relationships were then reviewed to identify similarities and differences (see Table 4.11).

Newly Diagnosed				
Health Promoting Behaviors [r, p (n)]				
	Spiritual Growth	**Health Responsibility**	**Interpersonal Relations**	**Stress Management**
Physical Activity	.66, <.001 (26)	.81, .001 (24)	.47, .012 (25)	.71, <.001 (26)
Spiritual Growth		.76, <.001 (25)	.67, <.001 (25)	.75, <.001 (25)
Health Responsibility			.66, <.001 (26)	.75, <.001 (26)
Interpersonal Relations				.51, .006 (26)
Established Diagnosis				
Health Promoting Behaviors [r, p (n)]				
	Spiritual Growth	**Health Responsibility**	**Interpersonal Relations**	**Stress Management**
Physical Activity	.16, .410 (26)	.48, .011 (26)	.35, .066 (26)	.68, <.001 (26)
Spiritual Growth		.68, <.001 (26)	.69, <.001 (26)	.48, .010 (26)
Health Responsibility			.58, .001 (26)	.48, .011 (26)
Interpersonal Relations				.52, .004 (26)

Table 4.11: Correlation between Health Promoting Behaviors Controlled for Years in the United States and Years of Education for the Total Sample

There was a moderate positive correlation between health promotion subscales, with higher levels in one dimension associated with higher levels in the others. The same pattern was observed in both the established and newly diagnosed groups, with the

exception of a single non- significant relationship between physical activity and spiritual growth in the established group that contrasted with the highly significant relationship between the same two health promotion subscales in the newly diagnosed group. A second difference was a weaker relationship between physical activity and the other subscales for the established group compared to the newly diagnosed women, again suggesting that exercise and physical activity was less prominent in the established diabetic women.

Specific Aim 3

The third aim was to assess the relationship between self-care activities (i.e., diet, exercise, blood sugar testing and foot care) and health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) in South Asian women with new (< 1 year) and established (> 1 years) T2DM diagnoses, controlling for age, marital status, time in the US, and education.

RQ 3.1. What is the relationship between self-care activities (i.e., diet, exercise, blood sugar testing, and foot care) and health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, time in the US, and education?

Pearson's partial correlation was used to examine the relationships between self-care activities (diet, exercise, blood sugar testing, and foot care) and health promotion behaviors (physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) overall controlling for age and time in the United States (see Table 4.12).

There was a consistent pattern of significant moderate to high positive correlations between self-care and health promoting behaviors, reflecting the high degree of concurrence between dimensions measured by these subscales. Participants who scored higher on self-care activities also scored higher on health promotion behaviors. The exception was a single non-significant intercorrelation between compliance with blood sugar monitoring with spiritual growth, which may simply reflect complete independence in these dimensions.

	Self-Care Activities [r, p (n=55)]			
	Diet	**Exercise**	**Blood Sugar**	**Foot Care**
Health Promoting Behaviors				
Physical Activity	.41, .002	.70, <.001	.41, .001	.53, <.001
Spiritual Growth	.45, <.001	.35, .008	.21, .125	.46, <.001
Health Responsibility	.35, .008	.50, <.001	.36, .005	.44, .001
Interpersonal Relations	.45, <.001	.43, .001	.30, .024	.59, <.001
Nutrition	.48, <.001	.45, .001	.17, .196	.47, <.001
Stress Management	.52, <.001	.61, <.001	.23, .092	.53, <.001

Table 4.12: Correlation between Self-Care Activities and Health Promotion Behaviors Controlled for Years in the United States and Years of Education for the Total Sample

RQ 3.2. Is the pattern of relationships between self-care activities (i.e., diet, exercise, blood sugar testing, and foot care) and health promoting behaviors (i.e., physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) different in South Asian women with new (< 1 year) and established (> 1 year) T2DM diagnoses, controlling for age, time in the US, and education?

Pearson's partial correlation was used to examine the relationships between self-care activities (diet, exercise, blood sugar testing, and foot care) and health promoting behaviors (physical activity, spiritual growth, health responsibility, interpersonal relations, and stress management) controlling for age, time in the United States, and

education as appropriate to each group (newly diagnosed and established type 2 diabetes). The pattern of relationships was then reviewed to ascertain similarities and differences (see Table 4.13).

Newly Diagnosed				
	Health Promoting Behaviors [r, p (n)]			
	Diet	Exercise	Blood Sugar	Foot Care
Health Promoting Behaviors				
Physical Activity	.41, .031 (26)	.76, .001 (26)	.36, .002 (26)	.54, .003 (26)
Spiritual Growth	.38, .049 (25)	.34, .086 (25)	.23, .244 (25)	.50, .008 (25)
Health Responsibility	.34, .078 (26)	.58, .001 (26)	.38, .045 (26)	.39, 038 (26)
Interpersonal Relations	.16, .423 (26)	.39, .039 (26)	.30, .119 (26)	.60, .001 (26)
Stress Management	.47, .012 (26)	.57, .001 (26)	.40, .036 (26)	.47, .011 (26)
Established Diagnosis				
	Self-Care Activities [r, p (n)]			
	Diet	Exercise	Blood Sugar	Foot Care
Health Promoting Behaviors				
Physical Activity	.18, .365 (26)	.50, .007 (26)	.15, .440 (26)	.37, .055 (26)
Spiritual Growth	.44, .081 (26)	.28, .147 (26)	.18, .362 (26)	.46, .013 (26)
Health Responsibility	.15, .436 (26)	.30, .125 (26)	.35, .006 (26)	.42, .026 (26)
Interpersonal Relations	.66, .001 (26)	.36, .057 (26)	.30, .124 (26)	.57, .001 (26)
Stress Management	.33, .082 (26)	.53, .004 (26)	-.02, .923 (26)	.47, .011 (26)

Table 4.13: Partial Correlation between Self-Care Activities and Health Promoting Behaviors Controlled for Years in the United States and Years of Education by Diagnostic Group

In the newly diagnosed women, diet was at least marginally or significantly moderately positively correlated with all health promotion behaviors except interpersonal relations. Blood sugar failed to correlate with spiritual growth or interpersonal relations. In the established group, diet failed to correlate marginally or significantly with physical activity or health responsibility—suggesting that diet was not as strongly linked to those two dimensions for the established group. However, diet did significantly correlate with

interpersonal relationships for the established group but not for the newly diagnosed. This difference highlights the differential importance of having a partner for each group.

Even more dramatic was the fact that blood sugar only demonstrated a single significant positive correlation with health responsibility in the established group and failed to show a significant relationship with any other factor. These differences strongly suggest that maintenance of health promoting behaviors by engaging in relevant self-care activities is more challenging for those with established T2DM than those with new diagnoses.

It is important to note that aggregating the data as was done in Table 4.12 obscured the fact that the link between instrument subscales is most relevant for the newly diagnosed group and not the established group. Thus, like the clinical data on diabetes that aggregated across all Asian Americans, it is necessary to assess relevant subgroups to accurately evaluate risk factors.

Chapter 5

Discussion, Recommendations and Conclusion

This chapter presents a summary of the study including aims, purpose, and study findings; discusses strengths and limitations of the study and implications for nursing; and provides recommendations for future research. The study was guided by the theoretical framework and substantiated by the available research studies.

SUMMARY OF THE STUDY

Overall, these findings show a consistent pattern of differential challenges and support based on time since diagnosis. For newly diagnosed individuals, exercise appears to be more easily maintained, possibly due to younger age and greater acceptance of participation in exercise activities by younger generations. Women with established diagnoses displayed a weaker pattern of relationships with diet, physical activity and blood sugar possibly as a result of aging effects. In both groups, having a partner exerted a positive influence, but the effect was greater in those with established diagnoses, which may also reflect the older population compared with the newly diagnosed women. There was a stronger relationship between exercise and diet in those with established diagnosis compared to newly diagnosed. This makes sense as people newly diagnosed with diabetes are still making major adjustments to dietary practices.

DISCUSSION

In comparing the established and newly diagnosed groups, most of the differences were related to marital groups. For instance, differences on the self-care subscales

indicated only a marginally significant main effect between marital groups on dietary practices, with partnered women having much higher scores indicating dietary practices that are more compliant with diabetic guidelines. These findings are similar to those reported by Millier and Dimatteo (2013) where diabetics with significant others performed better on diabetic self-management.

Similar differences between marital groups, but not diagnostic groups, were observed for the health promotion subscales. There was a significant main effect between marital groups on spiritual growth, with partnered women having significantly higher spiritual growth scores. A difference was found between the marital groups for women with established diagnoses, resulting in a significant interaction effect. As with spiritual growth, the established partnered group also had the highest interpersonal relationship scores across all four groups and the unpartnered established women had the lowest scores.

These findings seem to indicate that having a partner improves dietary compliance, interpersonal relations, and spiritual growth—especially within the women with established diagnoses. This is likely because the established patients were also older and perhaps more settled in their interpersonal relationships. These results suggest that efforts to support compliant diabetic management among younger, newly diagnosed patients should consider these differences when tailoring health care interventions.

When comparing patterns of correlation between health promoting behaviors and self-care activities, there was no significant relationship between blood sugar and diet for the overall group. Although there was no significant relationship for either group, the established group also demonstrated low correlations in exercise, growth, and health

responsibility. Again, differences in generational attitudes and practices could explain these findings. A study investigating barriers to lifestyle changes in a South Asian population reported that some participants attributed implementation difficulties to religious beliefs that diabetes control was not in their hands but "by the will of God" (Nicolaou et al., 2013). This may be a covariate with age and/or generation.

When examining correlations between self-care activities across the two groups, neither group demonstrated a significant correlation between diet and blood sugar. This failure emphatically underscores the challenge in controlling diabetes with diet alone for both groups. For self-promoting behaviors, there was a relationship between spiritual growth and physical activity for established patients that was not observed in those who were newly diagnosed. However, the pattern of correlation between physical activity and all other subscales was notably weaker in the established group. This may be due to the older age of established patients compared with newly diagnosed participants (50 versus 42), resulting in greater difficulty engaging in physical activity. A study of older South Asian women in the US found that 30% of older women engaged in little or no physical activity (Jonalgadda & Diwan, 2005).

The three major constructs of the Health Promotion Model (Pender, Murdaugh, & Parsons, 2001) are individual characteristics, behavior specific cognition, and behavioral outcome. Understanding these behaviors can aid in planning interventions to influence adoption of health promoting lifestyles. South Asians are a diverse group with different religious beliefs and cultural practices; however, low engagement in physical activity and preference for traditional foods seem to be common to this population.

While there is evidence supporting the prevalence of low physical activity and poor dietary practices among South Asian woman (Fischbacher et al., 2004; Goenka, 2008; Holmboe-Ottesen & Wandel, 2012; Lawton et al., 2008; Misra et al., 2000; Natesan et al., 2015) there is a lack of information about diabetes management and engagement in health promoting practices among South Asians living in the US. Only one study was found (Misra et al., 2000) that used the HPLP II to examine health promotion behavior in South Asians living in the US; however the study population did not have T2DM but was at high risk for chronic illness.

SIGNIFICANCE

This study is important because it identifies areas of weakness in the diabetes management and health promotion lifestyles of South Asian women with type 2 diabetes. It highlights the need for appropriate diabetes management in order to prevent complications in this minority population, as well as the need for different approaches tailored to newly diagnosed patients who may be more amenable to exercise and dietary modifications. The results also underscore the importance of familial support to promote increased efficacy of the recommended diabetes management approach. This information may help also health providers plan appropriate educational interventions and assist researchers in designing future studies.

IMPLICATIONS FOR NURSING AND RECOMMENDATIONS

Health care providers and other personnel working with South Asian women can have a tremendous impact on health promoting behavior and diabetes management. Physical inactivity and inadequate nutrition are specific areas that need to be addressed. Education on the importance of diet and exercise could help improve diabetes management and promote improved health. The study confirmed that physical inactivity

level is similar to what has been reported by other studies of South Asian women, however lack of physical activity could result from cultural practices rather than lack of motivation. Future studies of this topic and population are urgently needed to adequately assess the needs of South Asian women with Type 2 Diabetes living in the United States. South Asian migration to the United States, given current immigration patterns, will likely continue to increase. This population exhibits a higher prevalence of diabetes than the native population of all host countries, as noted in multiple studies around the world (Gupta, Wu, Young, & Perlman, 2011; Kanaya et al., 2010; Misra & Khurana, 2009; Mohanty et al., 2005; Venkataraman et al., 2004).

Future research should explore the efficacy of culturally tailored diabetes health care and health promotion strategies. While there are beliefs and traditions among this group that affect their level of physical activity and dietary modification, these elements are necessary and critical components of diabetic care. The question for South Asian women is how to achieve necessary changes in activity and diet while respecting tradition and maintaining the balance and harmony of the household. Formulation of diabetes management strategies should not only emphasize the risk of physical inactivity, but offer ways to achieve compliance goals within culturally proscribed cultural boundaries (e.g., how to increase walking without going out alone) by including specific activities such as walking on the spot in front of the television while watching their favorite show for only 30 minutes daily. This would improve levels of physical activity in this population who are disinclined to exercise and are culturally discouraged from engaging in regular physical activity in public places outside the home.

With regard to dietary modification, cuisine is a major element of South Asian culture. Specific nutrition counseling on portion size and special days for traditional foods represent initial steps towards optimal diabetic management. Simply adjusting the diet during the week to include higher fiber, control portion size, and include vegetables that are not overcooked, eating traditional foods only on weekends (the times when family and friends traditionally meet), may contribute to both healthy diabetes practices and maintain cultural traditions. These small steps toward a solution that could enable South Asian women to meld culture and tradition with adherence to a recommended diabetic diet regimen, may potentially prevent diabetes complications in this population.

Research examining the efficacy of these approaches can empower health care providers with the necessary tools to more significantly impact this vulnerable population. Providers can evaluate patient response by having them complete a home monitoring exercise diary and record the type and duration of exercise, and a nutritional diary tracking food/beverage intake. Not only will this build patient awareness of their invested time and effort, it will also be a helpful during the 3-month visit to evaluate the daily level physical activity and engage the patient in crafting more effective activities within their daily routines. Assigning simple tasks and evaluating them at follow-up visits may enhance compliance and foster partnership between caregiver and patient.

Evaluation of diabetic management and health promoting lifestyle profiles in South Asian women diagnosed with diabetes could be used to plan specific diabetes management approaches that best leverage of opportunities for exercise that younger populations are willing to try and find support alternatives for those with no established partner support. Health responsibility and stress management could be explored with

patients, and individual or customized education and management strategies could be suggested to improve areas of weakness.

Use of community resources and support through link and community health workers from ethnic communities has been recommended by the ADA (2017) to guide and assist minority groups by sharing information and encouraging improved health promotion practices. Additionally, newer studies have shown that South Asians prefer community-based activities that offer a learning opportunity as well as a form of socialization. This could also represent an opportunity to encourage increased participation in health promoting activities.

LIMITATIONS

There were several limitations to this study. The small convenience sample may not adequately represent all South Asian women living in the United States. Because all of the participants were immigrants, the study does not reflect diabetic care and health practices of non-immigrant South Asian women with Type 2 diabetes living in the United States. Additionally, the study was conducted locally and does not include women living in other cities across the United States. It also further excluded women who did not speak English. Results for those who are not familiar with the English language would be interesting, because they would be even more culturally isolated from the mitigation of acculturation effects. Many of the women did not have insurance and are unlikely to have sought preventative care before their diagnosis.

In addition, the instruments did not capture some of the important factors that may have significantly impacted outcomes. For instance medications were not assessed, nor was the actual level of blood sugar ascertained which are critical factors in the management of diabetes. The nutrition subscale on the Health Promoting Lifestyle Profile

failed to demonstrate sufficient reliability. As nutrition and diet are critical factors, informative measurement is desperately needed. It will be important to use valid and reliable measures in future studies.

CONCLUSION

Diabetes is a chronic illness that may be controlled through diet, nutrition, medication and lifestyle modifications such as daily exercise and weight loss. Adequate diabetes management can prevent complications associated with uncontrolled diabetes (Knowler et al., 2002. High risk populations are of particular concern when evaluating the efficacy of current diabetes management support strategies. Southeast Asians are not only one of the fastest growing immigrant populations in the US, are disproportionately affected by diabetes, cardiovascular disease, and metabolic syndrome (Gupta, Wu, Young, & Perlman, 2011; Kanaya et al., 2010; Misra & Khurana, 2009; Mohanty et al., 2005; Venkataraman et al., 2004). The prevalence of diabetes in South Asians is four times greater than that of the natives in large western countries to which they migrate. Studies show that South Asian women generally do not engage in adequate levels physical activity for various reasons, both cultural and religious (Johnson et al., 2013; Khunti, Khuma, & Brodie, 2009; Lawton et al., 2005). There is little data about diabetic self-care activities and health promoting lifestyle profiles of diabetic South Asian women, in particular those living in the US. South Asian women are known to have low participation in physical activities and high carbohydrate intake, high waist to hip ratio, and increased BMI. Physical inactivity, excessive intake of carbohydrates, and elevated BMI can lead to suboptimal diabetes management that increases their risk for diabetic complications. Research on South Asian women has identified a multitude of religious

and cultural barriers that seem to hinder dietary changes and participation in physical activity. Cultural factors such as caring for the family as a priority, assisting with a family business, or working to supplement income does not leave ample time for participation in physical activities. Going out alone or to mixed gender facilities have also been mentioned as activities that are usually discouraged in some traditional South Asian families (Williams, Stamatakis, Chandola, & Hamer, 2011).

This study was undertaken to compare the diabetic self-care activities and health promotion lifestyles of South Asian women diagnosed with T2DM who have been residing in the US for at least one year. The women were categorized into two groups: (1) newly diagnosed diabetic women (< 1 year since diagnosis) and (2) established diabetic women (> 1 year since diagnosis). The purpose of this study was to characterize the diabetic self-care activities of each group, explore health promotion lifestyles of these women, and further identify similarities and differences in their diabetic care and health promotion practices. This information should facilitate appropriate care planning for South Asian women with both new and established diabetes diagnoses and better understanding of the extent to which they follow diabetic management and health promotion practices. These insights are essential to effectively address the needs of this vulnerable, high-risk population because adequate diabetes self-management is critical to prevent morbidity and mortality and allow these women to live their lives as normally as possible. Based on the results of this study, strengths and weaknesses can be addressed in future research to achieve more specific health care. Additionally, counseling of newly diagnosed women about the importance of optimal diabetic management and the dangers of uncontrolled diabetes could lead to better glucose control.

Many barriers to optimal diabetes management have been identified in this study population. The participants were all women and immigrants, a minority population with natural exacerbating effects of migration to a new and culturally different society. Health care providers can identify with South Asian women diabetes self care management and health promotion practices that may be easy for them to incorporate into their daily lives given their cultural practices.

Appendix A: Recruitment Flyer

Participants Needed

for

Anonymous Diabetes Research Survey

The purpose of this study is to assess and compare the diabetic self-care activities (such as diet blood sugar testing) **and the health promoting behaviors** (such as exercise, nutrition, stress culturally relevant health promotion and diabetic management) **of South Asian women** and reduce health disparities. It involves filling out a questionnaire (online or paper) that will take only 30 minutes. All responses are anonymous. There is NO identifying information asked for.

Please tell your family, friends, and neighbors!

Comparing Diabetic Self-Care Activities and Health Promotion Lifestyles Among Newly Diagnosed and Established South Asians Type 2 Diabetic Women

For more information, Contact the Researcher :
Rosana Draper RN, BSN, MSN, NP-C
Doctoral Nursing Student
Graduate School of Biomedical Sciences
University of Texas Medical Branch
Galveston, Texas
Email: rodraper@utmb.edu Phone: 832-640-7458

Study Overseen by Sheryl L. Bishop PhD
Approved by UTMB Institutional Review Board (IRB)

- Are you a South Asian woman from India, Pakistan or Bangladesh between the ages of 21 and 75?
- Have you **been diagnosed with** Type 2 Diabetes within the last year (newly diagnosed diabetic)?
- Have you been living in the United States for more than 1 year?
- Can you speak, read, and write English?

If you answered YES to these questions, you may be eligible to participate in this research study.

Web Link to Survey:
https://www.surveymonkey.com/s/TD2WOMEN

Appendix B: Survey

Health Promotion and Diabetes Care of South Asian Women

Welcome and Study Description

Dear Participants,

The purpose of this research project is to compare the diabetic self-care activities and health promotion lifestyles between South Asian women (from Pakistan, Bangladesh, and India) in the US who have been newly diagnosed with Type II adult onset or noninsulin dependent diabetes (diagnosed less that 1 year ago) and those with established diagnoses type II adult onset or noninsulin dependent diabetes (diagnosed for more than 1 year). Diabetes self -care activities involve all the important factors for adequate management of diabetes in order maintain a good quality of life and prevent the severe complications associated with diabetes. Health promotion lifestyles are those behaviors that promote and maintain good health and prevent illness.

The result from this research will be a significant first step in developing culturally appropriate health interventions for diabetic management and health promoting behaviors in South Asian Women to reduce health disparities and promote health and well -being. This project is part of my dissertation research. You are invited to participate in the research project because you are an Asian Indian, Pakistani or Bangladeshi woman with a diagnosis of type II adult onset or noninsulin dependent diabetes between 21 and 75 years of age and can speak, read and write English.

Your participation in this research study is voluntary and your consent is implied by filling out the questionnaire. You may withdraw from the study at any time without consequences. There are no costs to participate in this study or compensation. However, your insight and experience with diabetes is critical to helping us improve health care support for those that suffer from this condition. I deeply appreciate your contribution.

The procedure involves filing a survey (either online or a paper survey – your choice) that will take approximately 15-30 minutes. Your responses are confidential and we do not collect any personal identifying information such as your name, date of birth, social security number or address. The survey questions are about demographic data, diabetic self-care activities and health promoting lifestyle activities.

The result of this study will be used for scholarly purposes only and will not be entered into any kind of medical record. If you have any questions about the research study, please contact Rosana Draper, RN, BSN, MSN, NP-C at the contact address below.

This research has been reviewed according to the University of Texas Medical Branch (UTMB) Institutional Review Board (IRB) procedures for research involving human subjects. The contact phone number for the UTMB Institutional Review Board is 409 266-9475.

I would like to, again, personally thank you for your willingness to contribute to the research project. Your participation is critical to the success of this project.

Respectfully,
Rosana Draper, RN, BSN, MSN, NP-C
Doctoral Nursing Student,
University of Texas Medical Branch, Galveston, Texas
Email: rodraper@utmb.edu
Ph: 832-640-7458

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Qualifying Information

***1. Are you at least 21 years of age?**

- ◯ yes
- ◯ no

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*2. Are you...

- ◯ Pakistani
- ◯ Asian Indian
- ◯ Bangladeshi
- ◯ Other

If Other (please specify)

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*3. Have you been diagnosed with Type 2 Diabetes?

- ◯ yes
- ◯ no

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***4. Have you lived in the U.S. at least one year?**

- ◯ yes
- ◯ no

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Demographic Information

***5. What is your age?**

years

***6. Which of the following best describes your current relationship status?**

- ◯ Single, never married
- ◯ Single, but cohabiting with a significant other
- ◯ In a domestic partnership or civil union
- ◯ Married
- ◯ Separated
- ◯ Divorced
- ◯ Widowed

***7. What is your height in inches (Remove shoes before measuring.)**

Please answer in total inches (for example 5'4"=5x12=60+4=64):

***8. What is your weight?**

Pounds

***9. Where you born in the U.S.?**

- ◯ yes
- ◯ no

***10. How many years have you lived in the U.S.**

Years

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***11. Which of the following categories best describes your employment status?**

- ◯ Employed, working 40 or more hours per week
- ◯ Employed, working 1-39 hours per week
- ◯ Not employed, looking for work
- ◯ Not employed, NOT looking for work
- ◯ Student
- ◯ Homemaker
- ◯ Retired
- ◯ Disabled, not able to work

Other (please specify)

***12. Please indicate an overall general household income so that we can estimate your healthcare resources. It can be the combined income of all members in your household. You do not have to include special sources such as child support or income from trusts, etc. We are only interested in a general estimate of social economic status.**

Round up to whole dollars and don't use commas:

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***13. What is the highest level of education you have completed? Please choose one answer.**

- ◯ Did not attend school
- ◯ 1st grade
- ◯ 2nd grade
- ◯ 3rd grade
- ◯ 4th grade
- ◯ 5th grade
- ◯ 6th grade
- ◯ 7th grade
- ◯ 8th grade
- ◯ 9th grade
- ◯ 10th grade
- ◯ 11th grade
- ◯ Graduated from high school
- ◯ 1 year of college
- ◯ 2 years of college
- ◯ 3 years of college
- ◯ Graduated from college
- ◯ Some graduate school
- ◯ Master's Degree
- ◯ Doctorate or equivalent

***14. How long ago were you diagnosed with diabetes?**

- ◯ Less than 1 year
- ◯ 1 year or more

***15. If you know, please enter your hemoglobin A1c. (This is a specify blood test to evaluate your diabetic status).**

- ◯ I don't know my A1c.
- ◯ I don't know what this test is.
- ◯ My last A1c was

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***16. In general, how would you rate your overall health?**

- ◯ Excellent
- ◯ Very good
- ◯ Good
- ◯ Fair
- ◯ Poor

***17. Do you currently have health insurance, or not?**

- ◯ Yes, I do
- ◯ No, I do not

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Summary of Diabetic Self Care Activities

The questions below ask you 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.

*18. Diet

	0	1	2	3	4	5	6	7
1. How many of the last SEVEN DAYS have you followed a healthful eating plan?	◯	◯	◯	◯	◯	◯	◯	◯
2. On average, over the past month, how many DAYS PER WEEK have you followed your eating plan?	◯	◯	◯	◯	◯	◯	◯	◯
3. On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?	◯	◯	◯	◯	◯	◯	◯	◯
4. On how many of the last SEVEN DAYS did you eat high-fat foods, such as red meat or full-fat dairy products?	◯	◯	◯	◯	◯	◯	◯	◯

*19. Physical Activity

	0	1	2	3	4	5	6	7
5. On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity? (Total minutes of continuous activity, including walking).	◯	◯	◯	◯	◯	◯	◯	◯
6. On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?	◯	◯	◯	◯	◯	◯	◯	◯

*20. Blood Sugar Testing

	0	1	2	3	4	5	6	7
7.On how many of the last SEVEN DAYS did you test your blood sugar?	◯	◯	◯	◯	◯	◯	◯	◯
8.On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your health-care provider?	◯	◯	◯	◯	◯	◯	◯	◯

*21. Foot Care

	0	1	2	3	4	5	6	7
9. On how many of the last SEVEN DAYS did you check your feet?	◯	◯	◯	◯	◯	◯	◯	◯
10. On how many of the last SEVEN DAYS did you inspect the inside of your shoes?	◯	◯	◯	◯	◯	◯	◯	◯

*22. Smoking

11. Have you smoked a cigarette, even a puff, in the past SEVEN DAYS?

◯ No I have not.

◯ Yes I have smoked an average of ____ cigarettes per day.

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Health Promoting Lifestyle Profile

***23. DIRECTIONS: This questionnaire contains statements about your present way of life or personal habits. Please respond to each item as accurately as possible, and try not to skip any item. Indicate the frequency with which you engage in each behavior by choosing the best response.**

	Never	Sometimes	Often	Routinely
1. Discuss my problems and concerns with people close to me.	○	○	○	○
2. Choose a diet low in fat, saturated fat, and cholesterol.	○	○	○	○
3. Report any unusual signs or symptoms to a physician or other health professional.	○	○	○	○
4. Follow a planned exercise program.	○	○	○	○
5. Get enough sleep.	○	○	○	○
6. Feel I am growing and changing in positive ways.	○	○	○	○
7. Praise other people easily for their achievements.	○	○	○	○
8. Limit use of sugars and food containing sugar (sweets).	○	○	○	○
9. Read or watch TV programs about improving health.	○	○	○	○
10. Exercise vigorously for 20 or more minutes at least three times a week (such as brisk walking, bicycling, aerobic dancing, using a stair climber).	○	○	○	○
11. Take some time for relaxation each day.	○	○	○	○
12. Believe that my life has purpose.	○	○	○	○
13. Maintain meaningful and fulfilling relationships with others.	○	○	○	○
14. Eat 6-11 servings of bread, cereal, rice and pasta each day.	○	○	○	○
15. Question health professionals in order to understand their instructions.	○	○	○	○
16. Take part in light to moderate physical activity (such as sustained walking 30-40 minutes 5 or more times a week).	○	○	○	○
17. Accept those things in my life which I cannot change.	○	○	○	○
18. Look forward to the future.	○	○	○	○
19. Spend time with close friends.	○	○	○	○
20. Eat 2-4 servings of fruit each day.	○	○	○	○
21. Get a second opinion when I question my health care provider's advice.	○	○	○	○
22. Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).	○	○	○	○
23. Concentrate on pleasant thoughts at bedtime.	○	○	○	○
24. Feel content and at peace with myself.	○	○	○	○
25. Find it easy to show concern, love and warmth to others.	○	○	○	○
26. Eat 3-5 servings of vegetables each day.	○	○	○	○
27. Discuss my health concerns with health professionals.	○	○	○	○
28. Do stretching exercises at least 3 times per week.	○	○	○	○
29. Use specific methods to control my stress.	○	○	○	○

30. Work toward long-term goals in my life.	○	○	○	○
31. Touch and am touched by people I care about.	○	○	○	○
32. Eat 2-3 servings of milk, yogurt or cheese each day.	○	○	○	○
33. Inspect my body at least monthly for physical changes/danger signs.	○	○	○	○
34. Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking).	○	○	○	○
35. Balance time between work and play.	○	○	○	○
36. Find each day interesting and challenging.	○	○	○	○
37. Find ways to meet my needs for intimacy.	○	○	○	○
38. Eat only 2-3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.	○	○	○	○
39. Ask for information from health professionals about how to take good care of myself.	○	○	○	○
40. Check my pulse rate when exercising.	○	○	○	○
41. Practice relaxation or meditation for 15-20 minutes daily.	○	○	○	○
42. Am aware of what is important to me in life.	○	○	○	○
43. Get support from a network of caring people.	○	○	○	○
44. Read labels to identify nutrients, fats, and sodium content in packaged food.	○	○	○	○
45. Attend educational programs on personal health care.	○	○	○	○
46. Reach my target heart rate when exercising.	○	○	○	○
47. Pace myself to prevent tiredness.	○	○	○	○
48. Feel connected with some force greater than myself.	○	○	○	○
49. Settle conflicts with others through discussion and compromise.	○	○	○	○
50. Eat breakfast.	○	○	○	○
51. Seek guidance or counseling when necessary.	○	○	○	○
52. Expose myself to new experiences and challenges.	○	○	○	○

Health Promotion and Diabetes Care of South Asian Women

Thank you for your participation!

Please accept my deepest thanks for giving so freely of your time and feedback. Please know that your contribution to this study will help improve support and health care for managing diabetes in the community.

Warmest Regards,
Rosana

Health Promotion and Diabetes Care of South Asian Women

Thank you!

Thank you for your interest in the study. Unfortunately you must be 21 to 75 years of age, either Pakistani, Asian Indian or Bangladeshi, have lived in the U.S. at least one year and have a diagnosis of Type 2 Diabetes to participate. Please feel free to refer any friends or family to this survey site should they qualify.

Warmest regards,
Rosana Draper RN MSN NP-C

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