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Health Literacy, Social Support, And Diabetes Self Care Among Individuals Of Arab Descent

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HEALTH LITERACY, SOCIAL SUPPORT, AND DIABETES SELF-CARE AMONG INDIVIDUALS OF ARAB DESCENT

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DEDICATION

I would like to dedicate this dissertation to

first, my God (Allah) for helping me and guiding me through this journey,

to my Mom who I know this accomplishment would make her so proud,

to my Dad who inspired me,

to my brothers and sisters especially my youngest brother Arif, who provided me with much encouragement, support, and love, and

to my friends' real friends each of whom contributed to my success.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Background

In 2015, diabetes was the seventh most common cause of death in the United States (American Diabetes Association [ADA], 2017a; Centers for Disease Control and Prevention [CDC], 2017). The incidence of diagnosed diabetes among adults is high: In 2015, 30.3 million US residents (9.4%) had the condition (ADA, 2017a). Moreover, according to the CDC (2017), in 2015, 1.5 million adults aged 18 or older were newly diagnosed in the United States. The costs involved are prohibitive, reaching $245 billion in 2012 after diagnosis in the United States alone, with direct medical expenses totaling $176 billion (ADA, 2017a).

Excluding gestational diabetes, there are two types of diabetes: Type 1 diabetes insulin resistance, which can affect both adults and children, occurs when the body cannot produce insulin, the hormone that allows the body to break down carbohydrates into blood glucose to be used for energy. The glucose must then be transferred from the blood into the cells, which is another function of insulin. Type 2 diabetes is the more common type of the condition. Insulin is initially produced than is necessary with Type 2 diabetes, but over time the pancreas stops making sufficient amounts (ADA, 2018). This results in an abnormal blood glucose level (ADA, 2017b), possibly causing eye, kidney, nerve, and heart damage if not diagnosed and treated early (ADA, 2017b). Controlling and monitoring blood glucose levels is vital. This is one of the cornerstones of diabetes management, along with following a healthy lifestyle that includes regular exercise and a nutritious diet (ADA, 2017b).

Individuals of Arabic descent who live in the United States are at increased risk of diabetes as the Middle Eastern and North African regions have the second highest global rate of the disease. Rates are projected to increase by over 95% by 2035 (Abuyassin & Laher, 2016).

The prevalence of diabetes in individuals of Arabic descent living in the United States is relatively high, ranging from 4.8–23% (as cited in Abuelazem, El-Sayed, & Galea, 2018). In the Arab population, limited exercise, rapid urbanization, and obesity were identified as the primary factors contributing to the high prevalence of type 2 diabetes (Abuyassin & Laher, 2016).

Arab Migration to the United States

In the 1880s, Arabs migrated to the United States in large numbers, estimated at 3.7 million (Arab American Institute, 2018). These individuals are diverse in terms of both ethnic identity and country of origin. Although the majority of Arab Americans (AAs) are descended from Christian immigrants, the community has an increasing number of Muslims (Arab American Institute, 2018). Those whose origin is Egypt, Iraq, Lebanon, the Palestinian Territories, and Syria make up the majority of this population in the United States—that is, 82% (Arab American Institute, 2018).

More than two thirds of AAs live in the following ten states, ranked from highest to lowest in terms of size of population: California, Michigan, New York, Florida, Texas, New Jersey, Illinois, Ohio, Pennsylvania, and Virginia. Metropolitan Los Angles, Detroit, and New York are home to one third of this group (Arab American Institute, 2018), with Michigan ranking second highest in terms of the number of AAs residing in the state (Arab American Institute Foundation [AAIF], 2015). According to the most recent data published by the American Community Survey, in Michigan, out of the state's total population (9,909,877), individuals of Arab ancestry number 223,075 (2.25%) (AAIF, 2015). The number of individuals identifying as being of Arabic ancestry grew by more than 47% in the ten-year period from 2003 to 2013 (AAIF, 2015). The majority of the growth is represented by citizens of Yemeni, Iraqi,

and Lebanese origin (AAIF, 2015) (see Figure 1 below). In Michigan, AAs have Chaldean, Lebanese, or Assyrian roots, as reported by the Census Bureau (AAIF, 2015).

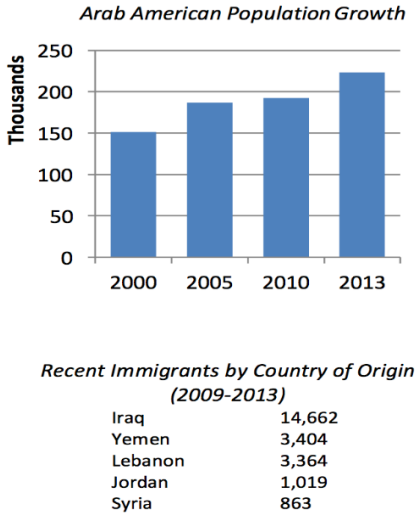

Figure 1. Arab Americans Population in Michigan

Diabetes Self-Care

Diabetes can be an overwhelming diagnosis as patients play an essential part in controlling their condition by engaging in self-care. They must have the skills, knowledge, and ability to make decisions and take action regarding their treatment. According to Shrivastava, Shrivastava, & Ramasamy (2013) patients can make significant improvements to their condition when they perform their own care. Diabetes self-care involves seven essential behaviors, including: (1) eating a healthy diet, (2) being physically active, (3) being compliant with medication, (4) monitoring blood glucose, (5) having good coping skills, (6) being able to problem-solve, and (7) engaging in health risk reduction behaviors. These behaviors are positively associated with improved glycemic control, reduced complications, and enhanced quality of life (Shrivastava et al., 2013).

Health Literacy

Health literacy is another requirement in improving diabetic patients' health and blood glucose control. According to the CDC (2016), health literacy is "the degree to which an individual can obtain, communicate, process, and understand basic health information and services to make appropriate health decisions." Many skills and abilities are required to attain a certain literacy level, including reading, interpretation of numbers (such as for dosage and interactive skills), and communication of health-related knowledge (Al Sayah, Majumdar, Williams, Robertson, & Johnson, 2013). Health literacy is a predictor of health promotion behaviors and is classified as functional, critical, and interactive (Nutbeam, 2000). Functional health literacy is defined as a superficial understanding of general health information, interactive health literacy involves having personal, cognitive, social, and literacy skills, and those with critical health literacy can undertake critical analyses and apply information that improves personal control (Logan & Siegel, 2017).

Low health literacy is commonly associated with a lower level of education and being of older age. Although affecting people of all ages, races, ethnicities, incomes, and levels of education, older individuals (Healthy People 2020, 2018) and those of lower socioeconomic status, with lower educational levels (American Health Literacy, 2008), and from minority groups (Healthy People 2020, 2018) are the most likely to have low health literacy.

Low health literacy affects various ethnic groups, including people of Arabic descent. According to Seibert et al. (2019), African Americans and non-Hispanic Caucasians have a low level of health literacy compared with Caucasian Hispanics. Wangdahl, Lytsy, Martensson, and Westerling (2014) conducted a cross-sectional study among 455 adult refugees who spoke

Arabic, Dari, Somali, or English in Sweden and found that the majority of participants had inadequate health literacy, as evidenced by an average score of 60% in functional health literacy.

Low health literacy has a direct effect on individuals' health because it can delay the effective management of chronic diseases including diabetes (WHO, 2013). Inadequate health literacy was associated with poor knowledge, control, and self-care of diabetes. Al Sayah et al. (2013), Saeed et al. (2018), and Tseng et al. (2017) indicated low health literacy results were associated with poor glycemic control. It was also clarified by Al Sayah et al. (2013) and Shrivastava et al., (2013) results low health literacy to be a predictor of diabetes knowledge and a contributory factor in inadequate diabetes self-care and poor blood glucose control.

Social Support

Social support was also identified as a predictor of diabetes self-care. Mohebi et al. (2018) defined social support as "a psychological sense of belonging, acceptance, and assistance which increases people's ability to cope better with stressful conditions" (p. 2). Perceived social support is the individual's perception of social support from family, friends, peers, and significant others. Mohebi et al. (2018) concluded social support is associated with diabetes self-care behaviors, with greater support from an individual's social network resulting in better diabetes self-care behaviors among Iranian patients with diabetes. The same situation has been found for African Americans (Karimy, Koohestani, &Araban, 2018; Tang, 2008).

Significance of the Study

According to Al Sayah et al. (2013), low health literacy's effect on diabetes is limited. Little is known about the level of health literacy among individuals of Arabic descent and its impact on diabetes self-care; in fact, a literature review indicated that no researchers had reported on the level of health literacy in individuals of Arabic descent who have diabetes.

A review of the literature revealed several gaps in the current body of knowledge that need to be addressed. Wangdahl et al. (2014) emphasized the need for further studies regarding health literacy among a minority group of Arab immigrants. Furthermore, it was shown in some studies featuring investigations of health literacy inconsistent results regarding diabetes self-care behaviors. According to Kim and Lee (2016), higher health literacy is linked to better diabetes self-care activities. However, Eyuboglu and Schulz (2016) noted no association between the two.

The link between diabetes self-care and health literacy among people of Arabic descent living in the United States remains unclear. No studies have been identified featuring investigations of the level of health literacy among this group, nor have been clarified the links between health literacy and diabetes self-care behaviors. Behaviors' been clarified association with social support also merits further investigation (Karimy et al., 2018; Tang et al., 2008).

Problem Statement

People of Arabic descent are a significant minority group who are understudied in terms of their health needs and risk (Abuelazem et al., 2018). The overarching aim of this study is to investigate the level of health literacy among this population and to examine the ability of perceived social support and health literacy to predict diabetes self-care behaviors in individuals of Arabic descent who have diabetes (type 1 and type 2). For convenience, the study will be restricted to those living in Michigan.

Study Questions

(1) What is the level of health literacy among people of Arabic descent living with diabetes?

(2) What is the correlation between health literacy and diabetes self-care behaviors (exercise, foot care, blood glucose self-monitoring, and diet) in individuals of Arabic descent living with diabetes?

(3) What is the correlation between social support and diabetes self-care behaviors (exercise, foot care, blood glucose self-monitoring, and diet) in individuals of Arabic descent living with diabetes?

(4) To what extent does the degree of perceived social support and health literacy predict diabetes self-care behaviors (exercise, foot care, blood glucose self-monitoring, and diet) in individuals of Arabic descent living with diabetes?

Assumptions

The assumptions of this study are the following (1) The majority of participants will be from low socioeconomic status. The data was collected from the Arab Community Center for Economic and Social Services (ACCESS), a largest comprehensive Arab community-based health in the United States (ACCESS, 2014). ACCESS is nonprofit services dedicated to providing social, economic and health care services to those in need and (2) The data will have no extreme outliers.

Limitations

The convenience sample will limit the generalizability of findings to target population sampled.

Conceptual & Operational Definitions

Dependent Variables

Diabetes self-care is defined as "evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of the diabetes in a social context" (Shrivastava et al., 2013, p. 2). Four diabetes self-care behaviors will be considered for the purpose of study (exercise, foot care, blood glucose self-monitoring, and diet). The diabetes self-care behaviors will be measured by A summary of diabetes self-care activities—Arabic version

(SDSCA-Ar), commonly used tool to assess the performance of diabetes self-care activities for the past 7 days (Toobert, Hampson & Glasgow, 2000).

Independent Variables

Health literacy is "the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions" (CDC, 2016) and will be measured by "The Short Test of Functional Health Literacy in Adult (S-TOFHLA)", an instrument that aims to test the patients' ability to read and understand health information (Baker et al., 1999).

Social support is the individual's perception of support from family, peers, spouse, friends, and significant others. "The Multidimensional Scale of Perceived Social Support" (MSPSS) will be used to measure the adequacy of social support from three sources: family, friends, and significant others (Zimet, Dahlem, Zimet & Farly, 1988).

CHAPTER 2: LITERATURE REVIEW

The literature review consists of three concepts diabetes self-care behaviors, health literacy, and social support. The review presents research used to determine the state of science related to diabetes self-care behaviors, health literacy and social support related to Arab people of Arabic descent. Essentially, the review emphasizes diabetes self-care with specific to the Arab population living in the United States and health literacy and social support as it is related to diabetes self-care behaviors. Also, studies that do not target people of Arabic descent with specific to health literacy and social support in relation to diabetes self-care behaviors are highlighted to identify gaps related.

The term "concept" and "variable" are used interchangeably across the paper.

1. The state of science on Diabetes self-care behaviors among Arab individuals living in the United States

Facilitators of and Barriers to Diabetes Self-Care Among Arab Individuals Living in the United States

Different themes were identified among the many factors that act as facilitators of or barriers to improving diabetes self-care among the Arab population living in the United States.

Family

Bertran et al. (2015) conducted a study using the focus group methodology that aimed to identify barriers to and supports for diabetes self-management education (DSME) in AAs. Daily stress resulting from family interaction served to impede diabetes self-management (Bertran et al., 2015; DiZazzo-Miller et al., 2017; Fritz et al., 2016). Participants discussed how having offspring who might not follow the family's customs or values had a negative influence on their diabetes (Bertran et al., 2015). Thus, family members may help a loved one improve his or her

quality of diabetes self-care by encouraging healthful eating or regular checking of blood glucose—or they may degrade the quality of diabetes self-care by doing the reverse (Bertran et al., 2015; DiZazzo-Miller et al., 2017; Fritz et al., 2016). Nevertheless, according to Fritz et al. (2016), providers always perceived family as providing critical support to diabetes self-management, while in DiZazzo-Miller et al.'s (2017) study, providers perceived family as both support and hindrance.

Because heredity and family history pose potential risks for diabetes, frequent screening of patients' family members, including of children and adolescents, is critical. Based on the success of the lifestyle intervention program among AAs, health care providers should be trained in the procedures of lifestyle intervention. The ADA (2019) recommends that lifestyle interventions emphasize the referred patients who at risk of diabetes to intense lifestyle intervention formed on Diabetes Prevention Program to lose weight and be active 130 min/week, an approach that can help control diabetes even before it is diagnosed.

Patient–Provider Interaction

Patient–provider interaction may facilitate or hinder diabetes self-management (Bertran et al., 2015; DiZazzo-Miller et al., 2017; Fritz et al., 2016). Some participants had a positive perspective of health care providers, believing them to be the best source of guidance and seeing them as authorities on diabetes self-care (Fritz et al., 2016). Other patients, however, believed that the responsibility for diabetes self-care was shared by both providers and themselves rather than being solely the purview of providers (Fritz et al., 2016). Still others held a negative view, believing that Arab American providers did not care as much as American providers did (Bertran et al., 2015; Fritz et al., 2016). Some participants believed that Arab American physicians took on more patients than they could comfortably attend to and thus did not follow up or focus on

diabetes self-care, instead emphasizing medication and lab results (Bertran et al., 2015; Fritz et al., 2016). By contrast, American physicians valued their good reputation and avoided making mistakes, unlike Arab physicians, who sometimes seemed not to care (Bertran et al., 2015). Participants described themselves as unwilling to publicly express dissatisfaction about their experiences with Arab doctors out of a sense of solidary, not wishing to negatively impact the doctors' reputations (Bertran et al., 2015).

Such negative views about patients' relationship with providers have also been discussed from providers' viewpoint. DiZazzo-Miller et al. (2017) and Fritz et al. (2016) perceived the views of health care providers on barriers to diabetes self-care. Most Arabs culturally tend to associate physicians with illness, producing a reluctance to seek care from providers and causing low adherence to providers' advice (DiZazzo-Miller et al., 2017; Fritz et al., 2016).

Culture (Stigma)

DiZazzo-Miller et al. (2017) and Fritz et al. (2016) also identified the stigma attached to illness—which sees illness as weakness—as a barrier to support of diabetes self-care. Providers emphasized that the stigma associated with diabetes might make patients reluctant to acknowledge their diabetes and cause them not to seek to engage in diabetes self-care properly. This stigma may even cause patients to refrain from seeking physical or mental health care or to isolate themselves from social activities (Fritz et al., 2016), unwilling to let others know that they have diabetes (DiZazzo-Miller et al., 2017).

Culture (Food Norms)

Culture affects diabetes self-care through food norms. Diet culture, with its emphasis on choosing high-quality, healthful food, can act as a facilitator to improve diabetes self-care (Bertran et al., 2015; Fritz et al., 2016). However, food habits are even more likely to hinder

diabetes self-care (Bertran et al., 2015; DiZazzo-Miller et al., 2017). In the Arab community, sharing of food is common—but a culture of food sharing impedes improvements to diabetes self-care (Bertran et al., 2015). Gatherings focus on food and encourages the eating of larger quantities. Some participants reported that life in America made them more likely to eat out of the home than in their previous country of residence, where they generally cooked at home (Bertran et al., 2015). The primary issue, they suspected, was not the quality of food but rather the quantity—in Arab culture, cooking is done in large quantities, which contributes to weight gain and impacts diabetes self-management.

Stress and Psychological Distress

Stress and physiological distress impede diabetes self-care (Bertran et al., 2015; Fritz et al., 2016). Some participants believed that wartime conditions in their previous country of residence had given them diabetes (Bertran et al., 2015). An Iraqi participant living in the United States reported that wartime stress had caused her to become psychologically distressed after having lost all her family members to the war (Bertran et al., 2015). Jaber et al. (2003) found that lower levels of acculturation were associated with diabetes prevalence in AAs in Dearborn. Acculturative stress related to economic difficulties and post-immigration life acts as a risk factor for impeded diabetes improvement (Bertran et al., 2017).

Understanding and Knowledge

Providers saw the main hindrance to diabetes self-care as being a lack of knowledge and understanding (DiZazzo-Miller et al., 2017; Pinelli et al., 2011). Abuelazem, El-Sayed, and Galea (2018) acknowledged that the disease burden borne by this minority group might result from a lack of awareness of and knowledge about diabetes care within the group. Providers perceived patients as being unable to understand the meaning of diabetes, as well as the severity

and seriousness of the disease and its complications, and they emphasized the importance of patients' keeping their diabetes under control by taking responsibility for managing their illness by adhering to medication, eating a healthful diet, controlling their weight, and exercising (DiZazzo-Miller et al., 2017).

Absence of Symptoms

Providers saw a lack of diabetic symptoms as further hindering diabetes self-care. Most patients experienced no symptoms and did not feel sick; as a result, they were unlikely to adhere to their medications or alter their diet (DiZazzo-Miller et al., 2017).

Fear/Denial

Fear of disease can be either a facilitator of or a barrier to diabetes self-care. Most AAs feared needles and saw the need to take insulin as, in providers' words, a "death sentence"—a view that impeded diabetes self-care (DiZazzo-Miller et al., 2017). Denial was also identified as a barrier to diabetes self-management. Patients tended not to take diabetes seriously and ate dessert believing that a little sugar would not affect them (DiZazzo-Miller et al., 2017). In response, health providers used scare tactics to provide motivation, regularly reminding patients that they risked vision loss and kidney failure by not seeking to control their diabetes (DiZazzo-Miller et al., 2017).

Misconceptions and Folk Remedies

Misconceptions also emerged as a main theme among physicians and other health care providers identifying barriers to diabetes self-care. Some patients saw diabetes medication as a cure that did away with the need to control blood sugar, giving them a false feeling of security (DiZazzo-Miller et al., 2017). Such patients were likely to take no responsibility for diabetes self-care. Additionally, reliance on herbs such as cinnamon as alternative medicines for

controlling diabetes is common among some AAs, a practice that may result in ignorance of diabetes medications (Bertran et al., 2017; DiZazzo-Miller et al., 2017).

Religious Practices

Religious practices can act as both barriers to and facilitators of diabetes self-care among AAs—most notably during the Ramadan fast, as part of which AAs abstain from food and liquid from sunrise to sunset for 29 or 30 days. Pinelli et al. (2011) examined the diabetes-related practices of AAs during times of fasting, contrasting changes to lifestyle and pharmacological interventions with practices before Ramadan. Most AAs smoked frequently prior to Ramadan, but 50% of smokers reduced their quantity of cigarettes smoked during Ramadan. Also, most who fasted the entire month reported no changes in diet, body weight, or food intake (Pinelli et al., 2011).

Other practices related to diabetes and diabetes self-management did change during fasting. Prior to Ramadan, most AAs performed blood self-monitoring and exercised regularly (45–60 min/week), whereas during Ramadan, exercise frequency reduced among a few participants while others perform exercise the same way before Ramadan (Pinelli et al., 2011). Furthermore, 26% reported weight gain during Ramadan. Importantly,33% reported measuring blood glucose self-monitoring on time, 17% reported not testing their sugar at all, and 25% reported increased the frequency of their testing; the same percentages reported decreased frequency during Ramadan. Also, 67% of AAs consulted with a physician prior to Ramadan, but only 9 consulted with a physician during Ramadan, although 78% followed up after Ramadan (Pinelli et al., 2011). Participants' desire to fast superseded their doctors' advice, potentially impeding their diabetes self-care (Bertran et al., 2015). Lack of Ramadan-focused diabetes self-care education regarding the risk of fasting for some patients, indications for breaking the fast,

adjustments to meal plans, timing of doses, and hindrances to exercise hindered diabetes self-management (Pinelli et al., 2011).

Because religious practices are an important factor affecting diabetes self-care among AAs, it is important to adapt a religious and culturally sensitive program, such as a Ramadan-focused education program that targets patients and their family members. Lack of Ramadan-focused diabetes self-care education about the risk of fasting for some patients, indications for breaking the fast, adjusting meal plans, timing doses, and exercising hinders self-management of diabetes (Pinelli et al., 2011). Pinelli et al. (2011) have suggested that education about safe fasting for patients who have diabetes can be delivered by pharmacists. Notably, most patients prefer to consult their religious leader, not their health care provider, on questions of fasting—so a Ramadan-focused education program should involve religious leaders, including community imams (Hassanein et al., 2017).

Gender Roles

Gender roles are an important factor in diabetes self-care (Bertran et al., 2015; Bertran et al., 2017). Females are less physically active in Arab populations as a result of religious practices that restrict mixed-gender physical activity (Bertran et al., 2015). Some participants described exercising with members of the opposite gender, regardless of exercise type, as culturally unacceptable. Other held flexible views, seeing exercise in mixed-gender facilities as acceptable so long as no bending, swimming, or movement was involved (Bertran et al., 2015; Bertran et al., 2017). Notably, in Arab culture, women—whether as mother or wife—are the family's primary source of information about diabetes, promote a healthful lifestyle, and provide routine care (Bertran et al., 2017).

Access/Resources

Limited access to health care is a barrier for AAs. Lack of medical insurance impeded adherence to medication for reasons of cost (Bertran et al., 2017; DiZazzo-Miller et al., 2017). Evidence from participants highlighted a lack of culturally oriented resources for Arab Americans, hindering the improvement of diabetes self-care and diabetes self-care education (Bertran et al., 2015; DiZazzo-Miller et al., 2017; Fritz et al., 2016).

2. The State of Science on the Effect of health literacy on Diabetes Self-Care Behaviors

The review yielded no studies that examined the effect of health literacy on diabetes self-care among Arabs living in the United States. Because of the absence of studies targeted individuals of Arabic descent living in the United States—or, for that matter, Arabs living elsewhere—this review considers the effect of health literacy on diabetes self-care for studies of other populations, regardless of ethnicity or race.

Health Literacy and Diabetes Self-Care

Four studies examined the association between health literacy and diabetes self-care behaviors, finding that the greater the level of health literacy, the better the diabetes self-care (Chen et al., 2018; Hahn et al., 2015; Jihye et al., 2014; Niknami et al., 2018). Niknami et al. (2018) conducted a cross-sectional study among Iranians with Type 2 Diabetes to explore the association between health literacy, diabetes self-care, and outcomes clinics. Using multiple regression analysis, they found that health literacy is a strong predictor for difficulty of diabetes self-care management; after controlling for the sociodemographic factors, they found that health literacy could predict 22.5% of variance in the difficulty of diabetes self-care. In short, the higher the health literacy, the less challenging the management of diabetes self-care.

Jihye et al. (2014), used a cross-sectional method in surveying 151 elderly subjects to assess the links among health literacy, diabetes knowledge, and self-care for low-income elderly residents in Korea. Jihye et al. (2014) reported the higher the level of health literacy and the greater the knowledge, the better the diabetes self-care ($r = .31$, $p < .001$). Jihye and colleagues (2014) also found that diabetes education experience, knowledge, and exercise all had a significant effect on diabetic self-care among low-income older patients, with a power of 34.4% ($F = 27.20$, $p < .001$). However, this study excluded health literacy from stepwise analysis regression, which might indicate more precisely the extent to which health literacy influence diabetes self-care. What's more, Jihye et al. (2014) correlated health literacy to total diabetes self-care score only rather than correlating health literacy with the subscale items diet, exercise, foot care, and blood glucose self-monitoring.

The two remaining studies found a relation between health literacy and only one or two diabetes self-care behaviors (Chen et al., 2018; Hahn et al., 2015). Hahn et al. (2015) examined the link between patients with diabetes characteristics, behaviors, and outcomes, explaining the role of health literacy as mediator of outcomes in English and Spanish speakers, and found a significant statistical interaction between health literacy and only two diabetes self-care outcomes (physical activity and foot care). Even so, health literacy did not mediate the relationship between health behaviors and the outcome. In one study, a systematic review and meta-analysis was conducted to identify the relationship between health literacy, diabetes foot care, and its risk (Chen et al., 2018). It was found that limited health literacy is an independent risk factor for poor diabetes foot care and health outcomes.

These findings are inconsistent in which no link was found between health literacy and diabetes self-care (Bains et al., 2011; Eyuboglu & Schulz, 2016; Maneze et al., 2016). Eyuboglu

and Schulz (2016) determined the effect of health literacy and patient empowerment in diabetes self-care among Turkish patients with diabetes. Bains and Egede (2011) determined the effect of health literacy on diabetes self-care, knowledge, and glycemic control among African American and White ethnic groups. Both studies with and without adjustment of cofounders found that health literacy has no link with diabetes self-care (Bains & Egede, 2011; Eyuboglu & Schulz, 2016). Eyuboglu and Schulz (2016) argued that health literacy showed no link to diabetes self-care because health literacy is highly related to decision making, whereas self-care is associated more with behavior, which might attribute to absent of association. The absence of association in both studies may be ascribed to cross-sectional design, small sample size, or the use of health literacy tools not specific to diabetes. Maneze, Eevertt, Astorga, Yogendran, and Salamonson (2016), using cross-sectional surveys, examined the association of the sociodemographic and psychological elements of health literacy with diabetes self-care. Using Brief Health Literacy Screening tool, those who were educated had high health literacy but reported poor self-management, indicating that health literacy does not definitively affect self-management behaviors that may yield better control of diabetes (Maneze et al., 2016). Older subjects who had low health literacy performed diabetes self-management tasks more, perhaps out of age-related concerns about health and mortality (Maneze et al., 2016) or as cognitive ability decreases with age, potentially affecting health literacy. This study used cross-sectional sampling of cohorts and relied on a short health literacy tool that thus might not accurately reflect levels of health literacy.

Diabetes-Related Programs and Health Literacy

Programs have been found to effectively raise health literacy levels while enhancing the use of diabetes self-care practices. Three studies found an association between health literacy

and diabetes-related educational/ intervention programs (Brunk, Taylor, Clark, Williams, & Cox, 2017; Maleki, Ansarimoghadam, Masoudy, Rakhshani, & Damani, 2017; Protheroe et al., 2016). Using a phenomenological approach, Brunk et al. (2017) explored participants' experience of T2D and evaluated the feasibility of adapting a patient-centered self-management intervention program to a Hispanic population of people who lived with the condition and exhibited low health literacy. On implementing the program, researchers found that lack of T2D knowledge was an issue for all participants and accordingly enrolled them in a program of education called GEM for its emphasis on "glycemic load diet, exercise, and self-blood glucose monitoring" (Brunk et al., 2017, p. 188). Similarly, in another randomized controlled trial (RCT) study, the authors used a training program to examine the effectiveness of educating Iranian diabetes patients (Maleki et al., 2017). In both studies, the authors concluded that participants' ability to read and understand information about their condition had increased by the program's end. Additionally, respondents' behaviors, nutritional habits, levels of self-care, and lifestyle choices improved after their training (Brunk et al., 2017; Maleki et al., 2017). Protheroe et al. (2016), in an RCT, explored the feasibility of using lay health trainers to enhance self-management among patients with low health literacy who had type 2 diabetes. Lay health trainers are part of a UK initiative that uses nonprofessional educators living in the local community to diminish inequalities by focusing on deprived population or living in the deprived area (Protheroe et al., 2016). Participants were randomly allocated to the interaction group, whose members received the services of a trainer, or to the control group, whose members received usual care at 7 months' follow-up. The intervention was linked to better diabetes self-care behaviors and lower use of resources among individuals who had low health literacy (Protheroe et al., 2016). Although this study did not explicitly associate health literacy with diabetes self-care, its findings indicated that

the diabetes-related intervention worked for low health literacy patients, a result that might be attributable to the intervention itself, not the patients' level of health literacy.

Conversely, one study explored the effects of a diabetes-related program on health literacy level and found that no clear relation exists (Vandenbosch et al., 2018). The researchers explored the effects of health literacy on a self-reported diabetes self-management education program using a multicenter observational pre–post study design. The effect of the Diabetes Self-Management Education (DSME) program was not influenced by patient's level of health literacy (it was not significantly different, because patients with high and low health literacy described benefits from DSME) (Vandenbosch et al., 2018). Although use of a health literacy tool not specific to diabetes might explain why health literacy had no link to diabetes self-care, use of a diabetes-related literacy tool might not necessarily be the issue, as evidenced by Vandenbosch et al.'s (2018) study, in which a health literacy–specific diabetes tool was used but also was not associated with improvements to diabetes self-care. It is worth noting that this study found that highly health-literate patients had higher diabetes health literacy (DHL)—especially critical and functional DHL—regardless of the intervention used (Vandenbosch et al., 2018). However, this study had several methodological limitations: General health literacy data were collected only at the baseline, findings were based on self-report questionnaires, and participants originated from nine separate countries and were thus highly heterogonous, potentially resulting in unclear findings (Vandenbosch et al., 2018).

Level of Health Literacy and the People of Arabic Descent

Because of a lack of studies assessing health literacy among individuals living in the United States, studies conducted among Arabs in the Arab world were considered. Two studies found health literacy is low among targeted participants of Arabs (Abdel-Latif and Saad, 2017;

Almaleh et al., 2017). Almaleh et al. (2017) examined the level of functional health literacy (FHL) and comprehensive health literacy (CHL) in said group, finding that half of their respondents had a poor level of FHL, while CHL was found to be lower in the participants with inadequate health literacy (around 34%). Both Abdel-Latif and Saad (2017) and Almaleh et al. (2017) found that the majority of participants had difficulties understanding health-related information, despite the fact that in the former study, half of participants were aware of what HL meant. Both sets of authors identified the level of health literacy as basic to high intermediate; only 16% had a sufficient level of health literacy. Furthermore, low CHL was linked with limited FHL in some participants, while others simultaneously had limited CHL and sufficient FHL (Almaleh et al., 2017).

These findings are inconsistent with four studies conducted, one among Lebanese (Fadda et al., 2016; and one among Iraqi (Al-Jumaili et al., 2015) and two among Saudi (Alamari, Aljasir & Habadi, 2017; Alkhaldi et al., 2018) individuals in which the level of health literacy was sufficient among majority of participants. Alamari, Aljasir and Habadi, (2017) identified the prevalence of insufficient health literacy in adult visitors of primary care in National Guard in Jeddah. The researchers found around 84% have had adequate health literacy, 16% had low health literacy level with 10% categorized as marginal and 6% had inadequate health literacy.

Three studies declared that the level of health literacy among Arabs was varied according to different measurements used which showed a discrepancy within the same three set of studies aimed at validating multiple health literacy Arabic version tools (Al-Jumaili et al.; 2015; Alkhaldi et al., 2018; Fadda et al., 2016). Using the Single Item Literacy Screener (SILS), 75.79% of participants have had limited ability to read while 24.21% had good reading ability evidence by their answer. After switching “sometimes” answer to the sufficient group, 40 had

limited and the rest categorized under good health literacy (Al-Jumaili et al., 2015). The Newest Vital Sign (NVS) measurement result indicated that 16.3% of participants classified as extremely low level of health literacy, 46.5 had possible poor level and 37.3 had adequate level of health literacy. Contradictory to NVS and SILS, S-TOFHLA score indicates only 8.6 % of participants had limited level of health literacy and 82% had sufficient health literacy (Al-Jumaili et al., 2015). Fadda et la. (2016) Most subjects have had a sufficient level of health literacy using S-TOFHLA while using Rapid Estimate Adult Literacy in Medicine-Revised (REALM-R), the result was slightly different with only 4 subjects scored less than 8 points. Al-Jumaili et al. (2015) showed difficulty of understanding numeric among Arabs evidence by passage questions answered more correctly than numerical questions. Blood sugar questions had higher correct response with percentages of 79.7% while doctor's appointment questions had highest incorrect response (Al-Jumaili et al., 2015). Alkhaldi et al., (2018) indicated by using STOFHLA, 84.4% of participants have sufficient health literacy while 49.4% almost half are with adequate health literacy using SILS.

A total of seven studies described the level of health literacy in people of Arabic descent used the same design cross sectional which may impact the result validity. Further, lack of consistency in findings has been identified when addressing the health literacy level. Some studies describe Arab as having basic or intermediate health literacy, others indicated the sufficient level of health literacy. The discrepancy in findings may be ascribed to use of different type of tools (subjective and/or objective) or may be the individual's cognitive ability.

The evidence may not be sufficiently complete to address the level among Arabs due to the lack of studies that have targeted the assessment of Arabs' health literacy level and the small sample sizes; sample sizes ranged from 95 to 805 across the studies.

Health Literacy and Diabetes Among the Arab Population

Few studies were found that examined diabetes and literacy or health literacy among Arab patients who had diabetes. One examined the link between literacy and diabetes: In an experimental design with random sampling, Al-Kaabi, Al Maskari, Cragg, Afandi, and Souid (2015) investigated the impact of illiteracy on diabetes- and foot care–related complications among Arabs living in the United Arab Emirate. Illiterate participants exhibited low levels of knowledge about diabetes and foot care as well as poor foot care and exercise practices. The researchers found that 80% of female participants were illiterate, compared to only 20% of males.

Jamal et al. (2015) examined the online seeking behavior of 334 Saudi patients with diabetes, finding that healthcare professionals were most patients' primary source of information about diabetes, followed by television. They identified a long family history of diabetes, unemployment, and low levels of education about diabetes as barriers to seeking information online.

Of these studies, three used a cross-sectional design, which could affect the validity of their results; only one used a quasi-experimental design. The evidence obtained from these studies might not be sufficient to draw a conclusion about the effects of health literacy on diabetes self-care among Arabs, for few studies have examined the health literacy and diabetes of Arabs' health literacy level and utilized small sample sizes.

Summary

This state of science review sought to assess the effects of health literacy on diabetes self-care among Arab people living in the United States, but studies to that effect were not available. What's more, studies that addressed the association between health literacy and diabetes self-

care produced inconsistent findings. Some studies found a linear relationship between levels of health literacy and diabetes self-care, but others failed to do so or found only a weak association, whether because they employed a small sample, a weak design, or different health literacy tools—as some studies used subjective tools, but others used objective measures and tools specific to diabetes. Studies of Arabs living in the United States were unavailable, and very few studies focused on Arabs living elsewhere—too few, indeed, to draw conclusions concerning the effect of health literacy on diabetes self-care among this group.

Those studies that were found had certain limitations: Most used a cross-sectional design, in which causal relation was absent, and some were highly heterogeneous, which could have affected their findings. As a result, no clear conclusions could be drawn about the effect of health literacy on diabetes self-care among Arabs, nor about the link between the two, regardless of population. Accordingly, further studies are needed: (1) studies of the effects of health literacy on diabetes self-care among Arab individuals living in the United States, (2) descriptions of health literacy among Arabs living in the United States, (3) and descriptions of health literacy and diabetes among large samples of Arabs mainly living in the Arab world.

3. The State of Science on the Effect of Social Support on Diabetes Self-Care Behaviors Among Adults of Arabic Descent

Overview of Social Relations Among People of Arabic Descent

In the Arab community, the most significant common family structure type is the extended family, and extended family identity tends to be more emphasized than individual identity. Among some Arab Muslims, no social interaction takes place between men and women outside the extended family (Hammad et al., 1999). Social norms are conservative; thus, this community does not accept out-of-wedlock relations or alcohol use. Conflict within the family is

managed not by the individuals involved but requires mediation through an agreement with the clan (several joint families) (Hammad et al., 1999).

Individuals' loyalty to the family exceeds any other social responsibilities (Hammad et al., 1999). Arab social interaction tends to be slow and easy-going, and social norms stress generosity and politeness in the social interface (Hammad et al., 1999). Furthermore, children are the main source of caring for parents and elderly members of the family (Hammad et al., 1999; Salma et al., 2018). A qualitative study by Ajrouch (2005) presented the point of view of Arab immigrants in the United States regarding their perception of social relations. Older Arab immigrants perceived that caring for the elderly was the children's duty as they matured, avoiding nursing home care. In addition, older individuals of Arabic descent expressed the desire to have a social connection with a wider community outside their immediate family (Ajrouch, 2005; Ajrouch & Antonucci, 2018; Salma et al., 2018). Ajrouch and Antonucci (2018), using preliminary benchmark data for 96 Arab-American participants, compared social relations among Arab Americans, Whites, and Blacks. Arab Americans reported more social contact than Blacks and Whites. Also, individuals of Arabic descent exhibit high networking among the closest family (inner circle) and less networking to others of the same ethnicity (77%) compared to Black (96%) and White (97%) individuals. This may be due to a preference to connect with wider society as the Arab community is not segregated. Arab participants also reported a high level of positive social support. Furthermore, Arabic social support increases when family members are sick, and it becomes more of a moral obligation for the ill individuals to avoid life-threating situations (Sukkarieh-Haraty & Howard, 2015).

Social Support and Health Among People of Arabic Descent

Aroian et al. (2017) examined the association between depression and social support for

immigrant women in the United States. In this longitudinal study lasting 3 years, the researchers investigated the social support of female Arabic immigrants in the United States as it related to depression. Examining data provided at three different time points, the study found that women with increased social support from friends and family are less depressed and experience less stress. A change in the husband's support at time 3 did not significantly affect depression, however, at time 1 led to the highest score of husband support. This study noted a socially increased rate of change over time in friends' support as it related to depression scores taken at time 3, while the family was not a significant predictor at time 3. Over 3 years, the women reported a significant decrease in daily troubles and increased social support from friends and family.

Researchers have also examined social dimensions associated with health. Salma et al. (2018) explored the social support engagement in health-related activities of Arab Muslim immigrants in Canada as it related to their aging. Women's stories highlighted the impact of social support on health-promoting practices. Participants constantly reported a lack of support despite a large social network as a barrier to managing chronic illness. The women in the study noted that the social network tended to be within the same ethnic community, making access to support from the wider community harder (Salma et al., 2018). Furthermore, women reported friends of the same age to be the best source of emotional support in dealing with life stressors (Salma et al., 2018). In addition, the women emphasized that they did not desire to express health-related distress to close family members as they saw the latter as having their own lives and being busy (Salma et al., 2018).

Diabetes and Social Support Among Arab Individuals Living in the United States

As family plays a central role in the Arab culture, it also offers a crucial function in improving diabetes. Four studies conducted among people of Arab descent clarified the role of family support in diabetes self-care (Bertran et al., 2015; Bertran et al., 2017; DiZazzo-Miller et al., 2017; Fritz et al., 2016). Bertran et al. (2017) assessed Arab Americans' views toward diabetes and their preferences in terms of lifestyle intervention. Many individuals perceived that involvement in lifestyle intervention was linked to supporting the family; this study viewed women as educators and leaders, while men were the leader inside the family. Bertran et al. (2017) suggested incorporating an educational session that specifically targeted women who care for the family to pledge healthy behaviors. Participants viewed the inclusion of family as facilitators, but at the same time, certain hindrances to diabetes self-care might also be related to family involvement. Bertran et al. (2015) used a sample size of 23 to conduct a study using focus group methodology that aimed to identify the barriers and aids to diabetes self-management education (DSME) in AAs from the participants' viewpoint. Fritz et al. (2016), in comparison, assessed the facilitators and barriers from both participants' and providers' perspectives. Meanwhile, DiZazzo-Miller et al. (2017) similarly examined the barriers and facilitators from the providers' perspective. Across these studies, as mentioned earlier, participants perceived family as facilitators and hindrances for ongoing diabetes self-care (Bertran et al., 2015; DiZazzo-Miller et al., 2017; Fritz et al., 2016).

Diabetes and Social Support in People of Arabic Descent (Living Outside United States)

Five studies conducted in four different Arab countries assessed the impact of social support on diabetes self-care behaviors. These studies took place in the United Arab Emirates

(UAE) (Ali, Baynouna, & Bernsen, 2010), Oman (Alghafri et al., 2017), Lebanon (Sukkarieh-Haraty& Howard, 2015; El-Haddam et al., 2018), and Kuwait (Jeragh-Alhaddad et al., 2015).

Out of the five, three studies identified social support as a possible barrier to diabetes self-care (Alghafri et al., 2017; Ali et al., 2010; Jeragh-Alhaddad et al., 2015). Two studies showed social support as a barrier to physical activity (Alghafri et al., 2017; Ali et al., 2010). Ali et al. (2010) included a total of 75 adult women in a focus group study in the UAE to determine the barriers and facilitators to weight management. The study found that a lack of social support reinforced a poor level of physical activity. Some participants perceived that walking with other women made them physically active, a main skill necessary to effective diabetes self-management (Ali et al., 2010). Others, however, perceived that lack of encouragement from family members was a barrier to being physically active and were quoted as saying, "My family won't encourage me; for example, if I want to bring a walking machine, they say there is no place to keep it" (p. 222). In addition, social norms involving restricted exercise, gathering occasionally, and eating while gathering impeded being physically active and resulted in gaining more weight (Ali et al., 2010). Similarly, Alghafri et al. (2017) identified perceived barriers to physical activity for adults with type 2 diabetes among Omani. Using a cross-sectional design with a sample of 305 participants, lack of social support was identified as the most frequently encountered barrier to being physically active; while this factor was found to be significant in both males and females, it was more frequently reported by female participants (Alghafri et al., 2017). This may be due to the conservative culture and social norms connected to female engagement in physical activity in public.

One study examined the barrier of social stigma as it related to medication adherence. Jeragh-Alhaddad et al. (2015) conducted a qualitative study involving 20 Kuwaiti patients with

diabetes to identify barriers to diabetes self-care, mainly in the area of medication adherence. Participants perceived consistent social support as leading to better diabetes self-care and adherence to medication. On the other hand, this study identified the social stigma toward diabetes as a barrier to adherence to medication. A few participants (10%), mostly the youngest in the group, reported fear and hesitation to take medication in front of others because of the stigma that associated diabetes with old age (Jeragh-Alhaddad et al., 2015).

Another study investigated the impact of social support on glycemic control. Sukkarieh-Haraty and Howard (2015) assessed the association between diabetes self-care, emotional distress, and social support and glycemic control (HbA1C) among adult Lebanese with diabetes. The researchers found that social support was correlated with glycemic control in that higher social support was tied to a lower level of HbA1C (OR: 2.69; CI, 1.29-5.63) and remained significant after controlling for other variables.

Not only does family support enhance diabetes self-care, but also family function is linked with better knowledge about diabetes self-care behaviors. El-Haddam et al. (2018), in a cross-sectional study with 206 Lebanese participants, aimed to test the effectiveness of diabetes self-management education on knowledge. The study findings indicated that female knowledge score increased by 0.625 while living with a family member decreased the knowledge score by .97 (p=0.02).

Additional Findings

Gender role. Social support from women was identified as the most significant source for diabetes self-care. A woman, whether mother or wife, serves as the main educator for her family concerning diabetes, promoting a healthy lifestyle, and providing routine care (Ali et al., 2010; Bertran et al., 2017).

Diabetes and Spouse Concordance. One study examined the association between spouse concordance (comparable behaviors and health related between spouses) and diabetes. Al-Sharbatti, Abed, Al-Heety, and Basha (2016), conducting a cross-sectional study with a sample of 270 married women in the UAE, assessed the concordance of diabetes between members of couples who were not genetically related. The study found that 39.3% of women having a husband with diabetes and approximately 40% of women having a husband with non-diabetes have diabetes (p>0.05). Al-Sharbatti et al. (2016) with control of cofounders, found having a husband suffering from diabetes predicted hyperglycemia for women who did not have diabetes. The rate of abnormal blood sugar among women who are not diabetic with a husband with diabetes was significant, compared to having a husband who was not diabetic (p=0.001). These findings might be affected by the fact that the study targeted only women as well as the design being absent of causal relationship and having limited generalizability to a wider population (Al-Sharbatti et al., 2016). However, the evidence suggested a need to screen the spouses of patients with diabetes for hyperglycemia.

Social Support and Diabetes Within Non-Arab Studies

In this section, a review was conducted to identify the effect of social support on diabetes within non-Arab populations.

Social Support and Diabetes Self-Care. Evidence from various investigations found social support to be a predictor for diabetes self-care (Karimy, Koohestani, & Araban, 2018; Koetsenruijter et al., 2015; Mohebi et al., 2018; Tang, 2008). Mohebi et al. (2018) concluded that social support is associated with diabetes self-care behaviors: in this study, greater support from an individual's social network resulted in better diabetes self-care behaviors among Iranian patients with diabetes. The same situation has been found for African Americans (Karimy et al., 2018; Tang, 2008).

Koetsenruijter et al. (2015), using a cross-sectional study of 1,692 participants from six European countries, explored social support and its association with diabetes self-care capabilities. This study found a positive association between social support (informational social network, emotional network) and belonging to community organizations with better diabetes self-care capability. The link was strong in informational support with the low-education group ($p<0.01$), while emotional support was high for the high-education group (Koetsenruijter et al., 2015). This study emphasized the importance of having many members who provide informational or emotional support as opposed to support from a family member. The study recommended self-management intervention that focused on involving a social network instead of individuals (Koetsenruijter et al., 2015). The study did not identify any difference in findings between countries and different cultures. In addition, the use of a cross-sectional method may have impacted the findings.

Strom and Egede (2012) conducted a systematic review of 37 articles to identify the effect of social support on behavior in terms of clinical outcomes and physiological factors among individuals with diabetes (Strom & Egede, 2012). The evidence uncovered in this study suggested that higher social support is linked with better diabetes outcomes and diabetes self-

care. In particular, the study suggested that social support increased adaptation of behaviors related to diet and an active lifestyle to manage chronic disease and enhance health decision-making (Strom & Egede, 2012). Similarly, Usman and Pamungkas (2018) conducted a systematic review of 23 studies to determine the social approach to improving diabetes self-management. The study found that a lack of social support had a negative impact on diabetes self-care. For example, family members encouraged patients in the study to eat more food (Usman & Pamungkas, 2018).

Social support and quality of life related to diabetes. Peer support was found to improve quality of life (QOL) related to diabetes. Ghasemi et al. (2019) conducted a randomized control trial intervention study among Iranians to identify the effects of peer education on QOL for patients with diabetes. This study used a parallel design and provided eight educational sessions conducted by participants' peers on the topics of diabetes self-care, QOL, and worries related to diabetes. The researchers found that peer support increased the QOL in patients with diabetes. After receiving intervention, the score for QOL was significant immediately (t=8.63; p=0.001), while the influence of diabetes treatment (t=8.63, p=0.001) and satisfaction with diabetes treatment (t=11.33, p=0.001) increased significantly after peer education (Ghasemi et al., 2019). This result showed that peer education worked better in the intervention group compared to the control group who received education from the researchers (Ghasemi et al., 2019).

In contrast, one study found no link between social support and QOL for patients with diabetes. Bown et al. (2015) assessed the association between social support, self-efficacy, and quality of life among 187 African Americans and Caucasian older adults with diabetes using secondary analysis. Although this study found no association between the amount of social

support received and quality of life among patients with diabetes, it revealed a high level of satisfaction with social support related to diabetes. In addition, higher self-efficacy was associated with better QOL in patients with diabetes (Bown et al., 2015). In all, the researchers found that social support is a main component of enhancing diabetes self-care (Bown et al., 2015).

Two studies focused on the family's role in diabetes (Kadilrvelu et al., 2012; Withidpanyawong, Lerkiatbundit, & Saengcharoen, 2018). Withidpanyawong et al. (2018) used RCT to investigate the impact of family intervention on diabetes, mainly glycemic control. The study included a follow-up at 9 months. In this investigation, the family members were actively involved in an intervention focused on diabetes self-care. Withidpanyawong et al. (2018) noted a greater reduction in the HbA1c, a blood sugar level test for the previous 3 months, in the intervention group than in control group (-1.37% and -.21% respectively; $p<0.001$). In addition, this study found greater levels of family support, diabetes knowledge, medication compliance, and self-care in the intervention group. The positive results may be attributed to a larger sample size ($n=180$; 98 participants in each group) and the longer follow-up of 9 months in the intervention group ($p<0.001$) compared to the control group. Withidpanyawong et al. (2018) indicated a greater reduction in HbA1c when a spouse or woman was among the caregivers.

Kadilrvelu et al. (2012) examined information about the role of social support as it impacts diabetes self-care. In this study, Kadilrvelu and colleagues found that social support was correlated with diabetes self-care (diet, exercise, foot care, and blood glucose testing). These results imply that involving family in the intervention may improve the patients' behaviors and diabetes outcomes (Kadilrvelu et al., 2012). However, the researchers also found that family and friends can alternatively act as a barrier to improving diabetes self-care (Kadilrvelu et al., 2012).

Furthermore, the quality of the patient's relationship with family matters. Usman and Pamungkas (2018) reported that good relations between family members and patients resulted in better diabetes self-care and outcomes.

Summary

Evidence regarding the effect of social support on diabetes self-care for people of Arab descent is highly lacking. The review of studies conducted on people of Arab descent discussed the role of social support in diabetes self-care from a qualitative point of view with a small sample size. Furthermore, an absence of interventions or experimental studies that assessed family involvement in diabetes self-care was noted. Studies discussed the implications for culturally sensitive intervention and stressed the need to involve family as active members in interventions related to diabetes self-management (Alghafri et al., 2017; Ali et al., 2010; Bertran et al., 2015; Bertran et al., 2017; DiZazzo-Miller et al., 2017; Fritz et al., 2016; Jeragh-Alhaddad et al. 2015; Sukkarieh-Haraty& Howard, 2015). Also, the need for a culturally sensitive approach toward facilitating exercise via facilities that allow gender separation became clear (Alghafri et al., 2017; Bertran et al, 2015; Bertran et al., 2017; DiZazzo-Miller et al., 2017; Fritz et al., 2016).

Further evidence suggested that significant others need to become highly integrated in diabetes education to provide critical information in order to contribute to better management of diabetes for loved ones (Alghafri et al., 2017; Ali et al., 2010; Jeragh-Alhaddad et al., 2015; Sukkarieh-Haraty& Howard, 2015).

In this review, the majority of studies conducted among Arabs living in the United States that discussed social support were qualitative, in comparison to cross-sectional studies examining the Arab population living in Arab countries. As a result, it is difficult to infer the impact of

social support on diabetes due to the absence of causality in this design. For people of Arabic descent regardless of their country of residency, social support can be a facilitator or a hindrance to diabetes self-care. The study findings were remarkably similar in that family was the most significant source of support discussed among Arab participants. The main reason for hindrance involved the social norms of Arab society such as disapproval of public exercise or lack of encouragement from family to focus on healthy diet. Concerning studies among non-Arabs, social support from family and peers was seen to improve diabetes self-care and QOL.

PART II: THEORETICAL FRAMEWORK

Introduction

Orem's Self Care Deficit Theory of Nursing (SCDNT) originated with nursing theorist Dorthea Orem, and focuses on self-care, self-care deficits, and the nursing system (Fawcett & DeSanto-Madeya, 2013). Orem began to develop her grand theory in the 1950s as a potential curriculum for nursing educational programs (Fawcett & DeSanto-Madeya, 2013). In it, she focused on her unique knowledge of nursing to create a model designed to solve the problem of nursing (Fawcett & DeSanto-Madeya, 2013). This section explores the SCDNT framework; mainly the self-care theory conceptualization of diabetes self-care. The key concepts used to develop the theory of diabetes self-care focused on diabetes self-care, health literacy, and social support. Based on a review of philosophical assumptions and literature on concepts related to diabetes self-care, SCDNT was chosen as the framework.

Description of Model

The SCDNT framework focuses on helping humans preserve their independence, specifically by allowing them to perform their own actions. In it, Orem has emphasized "nurses' deliberate action related to the operational necessary to design, plan, evaluate system of

therapeutic self-care for individual and multiple units who have limitations in their abilities" (Fawcett & DeSanto-Madeya, 2013, p. 185). Moreover, she has categorized operational nursing systems into three types: "wholly compensatory," in which individuals are totally dependent and unable to perform their actions, requiring total care (as in the case of comatose patients); "partially compensatory," in which individuals are partially dependent and require assistance; and "educative supportive," in which individuals are independent and perform their own actions without assistance (Fawcett & DeSanto-Madeya, 2013). The SCDNT views nursing interventions as being exemplified through five methods of helping: acting for the individual, teaching, guiding, supporting, and providing a supportive environment.

The model also views individuals as being susceptible to external forces and seeks to enable them to protect themselves from those forces. Orem proposed the existence of "therapeutic self-care demands": "universal requisites" for life such as air, food, water, and security from harm (Fawcett & DeSanto-Madeya, 2013). These support the need for self-care at different stages of development, whether in situations that promote development, through engagement in self-care, or when outside factors interfere with personal development throughout the life course—and, indeed, deviations from these requisites for self-care may present as injury or disease.

The Philosophical Assumptions

Fawcett and DeSanto-Madeya (2013) identified the metaparadigm nursing concepts of human being, environment, nursing, and health—four concepts that are all highly relevant to the phenomenon. Diabetes self-care is strongly linked to the characteristics of individuals who have diabetes and although health care providers seek to support such patients, the quality of diabetes self-care ultimately relies on the patient. Thus, the *human* aspect derives from individuals who

have diabetes, who play a critical role in improving their own diabetes by utilizing self-care behaviors. According to the ADA (2019), self-monitoring of glucose is an excellent tool that can be used to guide the treatment of individuals while helping them evaluate the result. *Environment*, by contrast, encompasses social, cultural, political, and economic influences on the health of the person (Fawcett & DeSanto-Madeya, 2013), with poor control of diabetes often linked to poor, minority, and rural areas. Fawcett and DeSanto-Madeya (2013) have defined *nursing* as nurses' actions that produce an outcome in patients. Nurses play a critical role as educators who help individuals understand and manage their diabetes, providing essential information and concepts of diabetes self-care behaviors. *Health*, finally, is a measure of the outcomes achieved by patients who have diabetes when they successfully implement diabetes self-care.

The most relevant relational statement concerning the phenomenon of diabetes self-care is that "the discipline of nursing is concerned with the nursing actions or processes that are beneficial to human beings" (Fawcett & DeSanto-Madeya, 2013, p. 6). Diabetes self-care is influenced by individuals, environments, and nurses' guidance, with better individual compliance, nurse supervision, and family support resulting in better diabetes self-care and improved health outcomes.

The middle range theory of diabetes self-care incorporates the following philosophical assumptions: (1) Humans are unitary beings who can care for themselves, (2) Humans require health literacy and the ability to make the decisions needed to perform diabetes-related care for themselves, and (3) Diabetes self-care comprises deliberate behaviors that are influenced by social support.

Middle Range Theory of Diabetes Self-Care

The SCDNT framework, which originated with nursing theorist Dorothea Orem, comprises three core theories addressing self-care, self-care deficits, and the nursing system (Fawcett & DeSanto-Madeya, 2013). Because the theory of self-care is fundamental to the SCDNT, the middle range theory of diabetes self-care will be developed deductively, based on Orem's theory of self-care.

Paradigm/Philosophical Perspective of Theory

Orem's theory of self-care emphasizes the metaparadigm concepts, human being, health, environment, and nursing, with *person* meaning one person or many and *health* defined as the state of well-being. *Nursing*, a major component of Orem's model, indicates nursing agency or hospital units (Fawcett & DeSanto-Madeya, 2013). *Environment* defined as the combination of social, cultural, biological, and socioeconomic features (Fawcett & DeSanto-Madeya, 2013). These metaparadigms are congruent with the middle range theory of diabetes self-care and its three central concepts: diabetes self-care, health literacy, and social support: *Person* is an individual who has diabetes. *Health* refers to the general health state of an individual. According to Orem's model, nursing is needed when individuals suffer limitations or have other cause to require the help or guidance of a nurse (Fawcett & DeSanto-Madeya, 2013), and in the middle range theory of diabetes self-care, a *nurse*'s intervention is thus essential when an individual's health literacy level is altered, while social support is a key concept consists with environment. Facilitators of and hindrances to diabetes self-care may also be related to social support from family and peers, culture, access to care, and environment lived in. For example, family members may help a loved one improve his or her quality of diabetes self-care by encouraging healthful eating or regular checking of blood glucose—or may degrade the quality of diabetes

self-care by doing the reverse.

Orem links these four nursing metaparadigm concepts, observing that nursing is service: action provided by nurses to "help human being[s] (individual or group) to maintain or change condition of themselves or their environment" (Fawcett & DeSanto-Madeya, 2013, p. 203). The essential relational statement within the middle range theory of diabetes self-care is that such diabetes care is influenced by individuals' characteristics, environmental factors, health literacy, and nursing action, all of which affect the overall health state and well-being.

Ontological and epistemological views of nursing include the reaction, reciprocal interaction, and simultaneous action worldviews, of which reciprocal interaction focuses on synthesizing the components from totality, simultaneity, change, interaction, and organisms (Fawcett & DeSanto-Madeya, 2013). The paradigm perspective of the middle range theory of diabetes self-care fits with the reciprocal interaction worldview. From this perspective, diabetes self-care changes depend on individuals themselves as well as on encircled factors such as social support. Brunk et al. (2017) have reported that an individual's determination to change his or her lifestyle is vital. Such changes are often made to enhance a person's chances of survival (Fawcett & DeSanto-Madeya, 2013)—as indeed they should be in the context of diabetes self-care, which depends on the interaction of patients with health care providers.

According to Fawcett and DeSanto-Madeya (2013), Orem's assumptions include "human beings are holistic; parts are viewed only on the context of the whole" (p. 9). An approach based on Orem's theory assumes that individuals have the right to care for themselves." Indeed, Fawcett and DeSanto-Madeya (2013) have described Orem's theory as being based on unique scientific and philosophical knowledge about nursing science that centers on human beings while recognizing that individuals are distinct persons who have their own features. The Orem model

also views *nursing* as a form of action and interaction between patients and nurses, with individual self-care behaviors and independence learned through life experiences within a sociocultural system, so that use of symbols and ideas distinguishes a particular individual from other people. In such a view, individuals are being prone to external forces and should be equipped to protect themselves from those forces. Accordingly, the individual should be intimately aware of what is happening in his or her body, so that he or she can seek treatment, including medication, or even modify his or her lifestyle as needed (Fawcett & DeSanto-Madeya, 2013).

Theory Building Strategies and Appropriateness

Synthesis is one of the basic approaches used to build the theory. According to Walker and Avant, (2011), synthesis permits for creating new theory from the existing observational and descriptive body of knowledge about the phenomena. Synthesis of literature and a grand theory nursing model were used to build the theory. The middle range theory of DM self-care is derived from Orem's framework, primarily its self-care theory aspect. Accordingly, the theoretical assumptions of Orem's theory can be used to guide the construction of this middle range theory. Orem's focus on individual ability to provide self-care is congruent with the middle range theory of diabetes self-care's focus on linking the concepts of health literacy and social support to that of diabetes self-care as a primary step in helping individuals care for themselves. Another strategy used to drive a unique knowledge is review of the application of a model to various health-related issues. Orem's self-care model has been used widely within the field of nursing and applied to a range of health-related issues, including as a way of enhancing self-management of diabetes (Kumar, 2007) and supporting weight management (Pickett, Peters, & Jarosz, 2014).

Conceptual and Theoretical Concepts to be Investigated

The middle range theory of diabetes self-care centers on three primary concepts—*social support*, *health literacy*, and *diabetes self-care*—derived from concepts associated with Orem's theory of self-care: respectively, basic conditioning factors (BCFs), self-care agency, and self-care (see Figure 2).

In particular, the concept of *social support* is congruent with the theoretical concept of BCFs—factors that affect the individuals' ability to perform self-care, such as gender, age, health state, and family system (Fawcett & DeSanto-Madeya, 2013), the last of which includes the social supports already mentioned and their effect on diabetes self-care. In the middle range theory of diabetes self-care, demographic characteristics: age, gender, nationality, level of education and income, health state, age when diagnosed with diabetes, and type and duration of treatment might also influence diabetes self-care.

The middle range theory of diabetes self-care (See Figure 3 below) also involves the concept of *health literacy*, as derived from Orem's theory concept self-care agency (individuals' ability to engage in self-care, which itself incorporates an element, known as "self-care operations," that reflects an individual's knowledge about himself or herself and the action needed to perform self-care [Fawcett & DeSanto-Madeya, 2013]). According to the middle range theory of diabetes self-care, health literacy is an individual's ability to make appropriate decisions and engage in diabetes self-care and involves self-care operations (ability to engage in diabetes self-care) and a power component (the ability to make decisions about care [Fawcett & DeSanto-Madeya, 2013]).

The concept of *diabetes self-care* is derived from that of self-care in Orem's theory, which in turn refers to "action taken by individuals to regulate their function" (Fawcett &

DeSanto-Madeya, 2013, p. 188). In the middle range theory of diabetes self-care, diabetes self-care refers to four diabetes self-care behaviors: diet, exercise, foot care, and blood sugar self-testing.

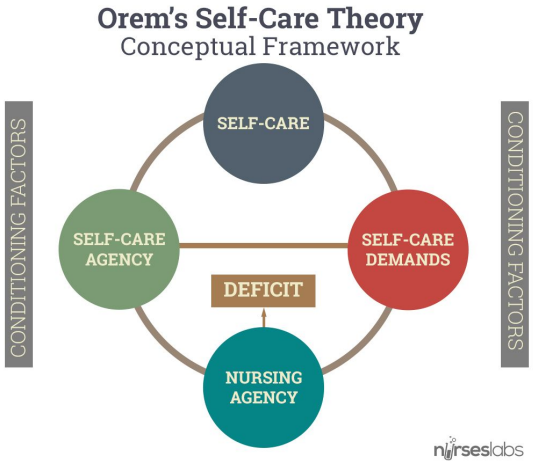

Figure 2: Orem Self Care Theory Framework (Orem, 2001)

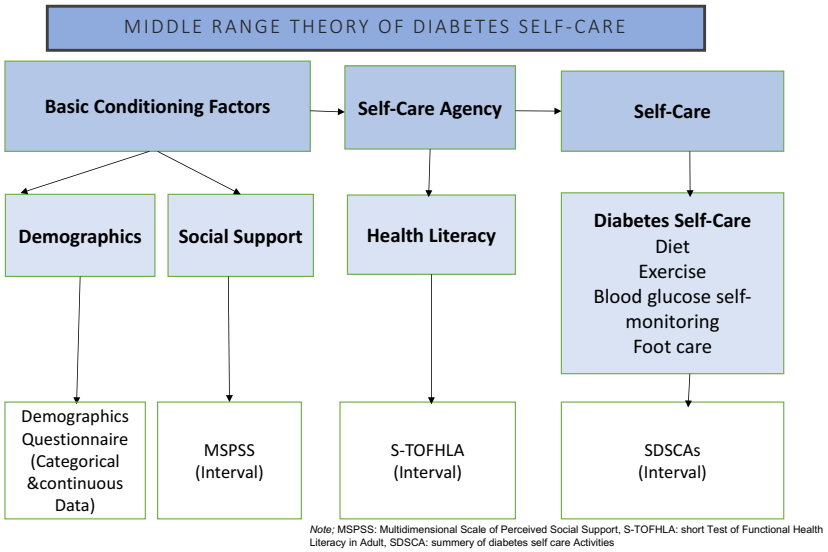

Figure 3: Subtraction Model: Middle range theory of diabetes self-care

Empirical Indicators

The concepts in the proposed study were operationalized in order to test the proposed relationships. The concepts and their empirical measures are as follow: 1) Diabetes self-care (diet, exercise, blood glucose testing, and foot care) was measured using SDSCA, an interval scale, 2) Health literacy was measured using S-TOFHLA, an interval scale, 3) Social support was measured by using Multidimensional Scale of Perceived Social Support (MSPSS), an interval scale, 4) Demographics characteristics including diabetes related characteristics data was obtained using the demographics questionnaire, which was developed by the PI and measured using self-report (Detailed explanations about the measurement will be presented in Chapter 3).

Propositions That Link the Concepts of Interest

The middle range theory of diabetes self-care, proposed the following relational statements based on the philosophical assumptions and synthesis of evidence (see figure 4):

1. Majority of people of Arabic descent living with diabetes are at marginal health literacy level.
2. A correlation exists among health literacy and diabetes self-care (diet, exercise, foot care and blood glucose testing).

   Health literacy (+) → Diabetes self-care (diet, exercise, foot care and blood glucose testing)

3. A correlation exists among social support and diabetes self-care (diet, exercise, foot care and blood glucose testing).

   Social support (+) → Diabetes self-care (diet, exercise, foot care and blood glucose testing)

4. Both health literacy and social support predict diabetes self-care (diet, exercise, foot care

and blood glucose testing).

Health literacy + social support ⟶ diabetes self-care (diet, exercise, foot care and blood glucose testing).

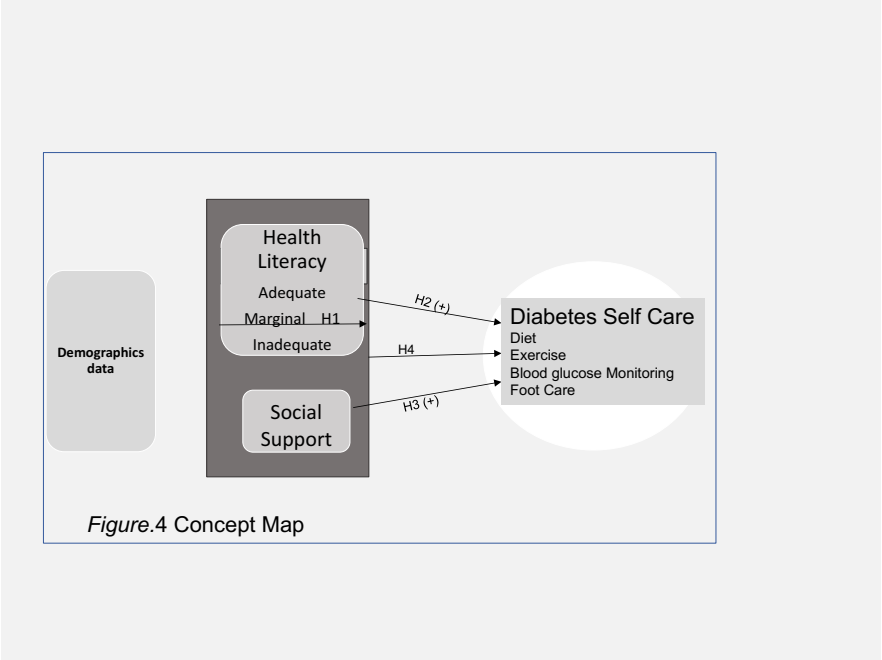

*Figure.*4 Concept Map

Figure 4. Concept Map: Illustrates the proposed relationships among the concepts.

Conclusion

The middle range theory of diabetes self-care is the first middle range theory to focus on health literacy's potential importance as a factor linked to diabetes self-care. In this theory, health literacy and social support are core factors influencing diabetes self-care. Accordingly, this theory can help health care providers assess patients' engagement in self-care— important because health literacy has thus far received little attention from researchers. Future studies could focus on health care providers' role in health literacy, as the middle range theory of diabetes self-care provides propositional statements able to be tested by researchers, allowing them to derive theoretical knowledge from empirical research. Use of such a theoretical framework will be essential, as thus far studies have not clearly focused on investigating, for

example, health literacy effects on diabetes self-care. Also, as nurses play a crucial role, as educators and scholars, in improving diabetes self-care and health literacy, the middle range theory of diabetes self-care can guide future scholars and nursing professionals, helping them accumulate knowledge that can then become a part of the science of nursing.

CHAPTER 3: METHODOLOGY

Research Design and Rationale

This study sought to describe the level of health literacy among adults of Arabic descent residing in Michigan who live with diabetes while also determining the association, if any, between health literacy, social support, and diabetes self-care behaviors, using a non-experimental, descriptive correlational design. To date, no studies have described health literacy among adults of Arabic descent who live with diabetes, nor have any investigated the association of health literacy with diabetes among this group; accordingly, the use of a non-experimental correlational design is a good fit.

Measures of individual demographic characteristics (age, gender, level of education, marital status, income, and length of stay in the U.S) including characteristics related to diabetes (type of diabetes, treatment regimen, age at diagnosis, duration, and family history), health literacy, social support, and diabetes self-care behaviors were obtained. Information is provided on the four questionnaires: demographic and diabetes-related characteristics (Appendix A), S-TOFHLA (Appendix B), SDSCA (Appendix C), and MSPSS (Appendix D). All necessary permissions were obtained for use of these questionnaires.

Design

A non-experimental descriptive correlational design was used. Descriptive and inferential statistics were used to analyze the data. To strengthen the study, multiple regression was used to examine the magnitude and direction of the relationship among the variables.

Sample and Setting

The study population was comprised of 83 subjects recruited from two sites: the Arab American and Chaldean Council (ACC) and ACCESS, the largest comprehensive Arab

community-based health in the United States. ACC is nonprofit human organization that delivers healthcare, counseling, employment training, and behavioral services for Middle Eastern and typical communities living in southeast Michigan. ACC committed to "make a difference" in lives of multiethnic community living in Metropolitan Detroit (ACC, 2019). ACCESS, a "one-step service center," provides primary care services, family medicine, physical examinations, checkup pap smears, and a variety of other medical, social, economic, and support services (ACCESS, 2014).

Based on a formulation of 80% power, a critical effect size of 0.15 ($R^2 = 0.13$), at least 3 predictors, and a significance level of 0.05, a sample of 77 subjects were deemed sufficient to address the research questions. The G*power computer software (Version 3) was used to calculate the required sample size (Faul, et al., 2009).

Inclusion Criteria

The study population included individuals of Arabic descent who had been diagnosed with diabetes (Type 1 or 2) for 6 months or more, aged 18 years or older, and able to read Arabic and/or English. Both males and females were included in this study.

Exclusion Criteria

Exclusion criteria included participants who were diagnosed with severe mental health issues or females who were pregnant.

Sampling

Convenience sampling included 85 individuals of Arabic descent who were recruited from the AAC and ACCESS clinics. All participants completed the informed consent form prior to completing the study. Two participants were excluded from analysis; one did not meet the

study criteria and one withdrew from the study. The final sample size included in the analysis was 83 participants.

Variables/Instruments

Diabetes Self-Care (Dependent Variables)

Diabetes self-care is a behavioral variable. For the purposes of this study, diabetes self-care involves four behaviors (diet, exercise, blood glucose monitoring, and foot care). SDSCA, originally developed by Toobert, Hampson, and Glasgow (2000), was used to track diabetes self-care activities. Specifically, the Arabic version (SDSCA-Ar) was used to allow the adults of Arabic descent to self-report diabetes self-care activities over the past 7 days by circling a number from 0 to 7 on the following scales: diet (four items), exercise (two items), blood glucose monitoring (two items), foot care (two items). The higher the combined result, the more diabetes self-care was performed (Toobert et al., 2000).

Despite its reliance on self-reporting, this widely used tool has been shown to exhibit reliability and validity. Inter-item correlations for the original version were high (mean = 0.47) and expect diet test–retest correlations were moderate ($r = 0.40$) (Toobert et al., 2000).

The main translated SDSCA-Ar includes 10 items on four subscales (diet, exercise, blood glucose monitoring, and foot care) and were used in this study. The SDSCA-Ar has been adapted and tested for its validity and reliability among Arabs (AlJohani et al., 2016; Sukkarieh-Haraty& Howard, 2016). AlJohani and colleagues (2016), for a total sample of 243, tested test–retest and split half reliability scores of .91 and .90, respectively. Inter-item reliability is satisfactory for the translated scale (.42–.92), and Cronbach's alpha was .76; Cronbach's alpha scores for the subscales were .89 (diet), .83 (exercise), .77 (foot care), and .92 (blood glucose monitoring) (AlJohani et al., 2016). Also, testing of this tool for content validity produced a representative

score content validity index of 95.3% and a clarity score of 94.8% (AlJohani et al., 2016). It was translated, then back-translated for confirmation and reviewed by a panel of experts (AlJohani et al., 2016; Sukkarieh-Haraty & Howard, 2016).

The convergent validity was tested by correlation items with its corresponding scale that measure the same variable. Sukkarieh-Haraty & Howard (2016) reported convergent validity, using a correlating matrix as the coefficient, was satisfactory (82%). Correlation coefficients were statistically significant, with healthful diet and the exercise subscale (r = .23; P = .04), the blood sugar subscale and checking of feet (r = .22; p = .009), and blood sugar monitoring and the foot care subscale (r = .17; p = .04) all exhibiting a positive association but the correlation exercise and specific diet (r = –.19, p = .021) showing a negative association. AlJohani et al., (2016) also assessed validity using principle component analysis, revealed each component of the subscale to have an eigenvalue greater than 1.

Health Literacy (Independent Variable)

To assess the levels of health literacy among adults of Arabic descent, the S-TOFHLA instrument—which tests patients' ability to read and understand health information—was used to collect data (Baker et al., 1999). Both the English and the Arabic versions of the S-TOFHLA will be used.

The S-TOFHLA has 36 items and takes 12 minutes rather than the 22 minutes required by the full TOFHLA. In the current study, Translated Arabic version of STOFHLA 35 items was used (Alkhaldi et al., 2018; Al-Jumaili et al., 2015). The maximum scores are 70 for the self-administered reading component (2 points per question for 35 questions) and 30 for the verbally administered numeracy component (7.5 points per selection) (Alkhaldi et al., 2018; Al-Jumaili et al., 2015). This tool has two sections: reading comprehension (two prose passages) and

numeracy (four items). The 7-minute reading component describes the process of preparing for an upper GI X-ray (4th-grade level) and lists Medicaid rights and responsibilities (10th-grade level). In the numeracy component, patients are presented with a label from a prescription bottle and asked four questions that test their ability to understand numbers, read appointment slips, interpret glucose monitoring, and understand bottle prescriptions (Baker et al., 1999). Scores can indicate inadequate health literacy (0–53), marginal health literacy (54–66), or adequate health literacy (67–100) (Baker et al., 1999).

S-TOFHLA is a valid and reliable tool for identifying individuals who have difficulty understanding health-related materials (Baker et al., 1999). The English version has shown good internal consistency for the reading comprehension component, with a Cronbach's alpha of 0.79; the score for the numeracy level was .60 (Baker et al., 1999). The correlation between the two sections was 0.60 (Baker et al., 1999). The construct validity was tested by correlating the tool with another health literacy tool, the Rapid Estimate of Adult Literacy in Medicine (RELAM). The correlations between the two was .80 (Baker et al., 1999). Regarding prediction validity, age and number of years of education were found to predict health literacy, with younger age and receipt of more than eight years of education being associated with adequate heath literacy (Baker et al., 1999).

S-TOFHLA, which has been translated into Arabic and psychometrically tested for validity and reliability when used among an Arab population, is the best valid and reliable health literacy tool available in an Arabic version (Alkhaldi et al., 2018; Al-Jumaili et al., 2015; Fadda et al., 2016; Hussein, Almajran & Albatineh, 2018). Fadda et al., (2016) conducted a descriptive study testing the validity of three Arabic-version tools, S-TOFHLA, REALM-R, and the Brief Health Literacy Screening Tool, among a sample of 230 participants: S-TOFHLA showed very

good reliability (alpha = .94), with correction between numerical scores and reading r = .44. Al-Jumaili et al. (2015) conducted a cross-sectional study among Iraqis and compared three tools designed to measure health literacy, evaluating the validity of their Arabic versions among a convenience sample of 95 participants. The Cronbach's alpha of S-TOFHLA's Arabic version (.89) compared to that of the English version, indicating very good reliability—but with the numeric section of S-TFOHLA (Cronbach's alpha of .615) excluded (Al-Jumaili et al., 2015). Alkhaldi et al., (2018) validated the S-TOFHLA in the Gulf Region, assessing health literacy and identifying associations between education and health literacy. In this study, the researchers found a Cronbach's alpha of .9 for the reading component; the figure for the numeracy component was an acceptable .6. Furthermore, use of Pearson's correlation test to evaluate the numeric and reading components of S-TOFHLA and the two tools S-TOFHLA and SILS found the reading section of S-TOFHLA to be significantly (p = 0.008) correlated with the numeric section (r = 0.3) (Alkhaldi et al., 2018).

Regarding criterion validity, mainly predictive validity among Arabs, a positive correlation was found between S-TOFHLA and education level (r = 0.4, p = 0.0001) (Alkhaldi et al., 2018). The level of education predicted the level of health literacy. Fadda et al., (2016) assessed the link between health literacy and sociodemographic variables, correlated between two tools (S-TOFHLA and Brief Health Literacy Screening), and age, education, and self-efficacy, finding that youth and education were associated with higher health literacy scores. A significant correlation between S-TOFHLA and age (r = –.25), education (.39), and self-efficacy (.39) was noted (Fadda et al., 2016).

Construct validity for the Arabic version also has been tested. Brief Health Literacy Screening items were all correlated with the S-TOFHLA reading comprehension component.

The S-TOFHLA was highly correlated with self-efficacy, age, and level of education: Less educated and older respondents had poorer scores on the health literacy test (Fadda et al., 2016). The measure has also been adapted to Arabic with the original tool tested for cross-cultural. The S-TOFHLA was found to be equivalent to the original for all items except one item that has been deleted because when translated it does not make sense in the context of Arabic culture (Alkhaldi et al., 2018; Al-Jumaili et al., 2015; Fadda et al., 2016).

Al-Jumaili et al., (2015) indicated a positive association of the Arabic version of TOFHLA between its sections and between and within TOFHLA and NVS. However, Alkhaldi et al., (2018) did find that the correlation between STOFHLA and SILS was not significant (p = 0.08), perhaps because SILS is a subjective test whereas STOFHLA is an objective one.

The contents of S-TOFHLA have been validated in translation from English to Arabic, back-translated to English and reviewed by expert panel for accuracy (Alkhaldi et al., 2018; Al-Jumaili et al., 2015; Fadda et al., 2016).

Social Support (Independent Variable)

MSPSS used to measure the adequacy of respondents' social support from three sources: family, friends, and significant others. The MSPSS is a 12-item tool for assessing these three support factors, with each item rated on a 7-point Likert scale (1 = very strongly disagree, 7 = very strongly agree), where higher scores indicate higher perceptions of social support (Zimet, Dahlem, Zimet & Farly, 1988).

The original version of MSPSS was tested psychometrically (Zimet et al., 1990). Coefficient alpha ranged from .84 to .92 for the scale as whole, with subscale scores of .81–.90 (family), .90–.94 (friends), and .83–.98 (significant other) (Zimet et al., 1990). The validity of the test was measured using the multivariate analysis of variance with married or single residents

and an adolescent sample (Zimet et al., 1990). Married residents received greater support from their significant other than did single residents, but the other two subscales revealed no significant difference. In the adolescent sample, subjects rated their frequency of sharing concerns with their mother rather than a friend or significant other; as frequency rose, support from family members increased (Zimet et al., 1990).

MSPSS has been translated and psychometrically tested in Arab populations. Merhi & Kazarian, (2012) conducted a study to identify the validity and reliability of the Arabic-MSPSS's 12 items after translation, as administered to Lebanese adults. Among 221 participants, the three factors of MSPSS (friends, family, and significant others, having alphas of .82, .86, and .85, respectively) showed high reliability and internal consistency (total sample Cronbach's alpha = .87). MSPSS was linked with sex and religion but not with age, marital status, education, or income. Social support score was correlated with the Emotion Regulation Questionnaire (Arabic ERQ) cognitive reappraisal (global social support r = .17; family support r = .17; significant others support r = .29). Furthermore, the discriminant validity of MSPSS was correlated with subjective well-being (global social support r = .33; family r = .32; significant other support r = .29). MSPSS family score correlated with friends and significant other, and friends correlated with significant other. The Arabic translation of MSPSS thus was shown to be a reliable and valid measure in Arab contexts (Merhi & Kazarian, 2012).

Demographic Characteristics

Demographic characteristics such as, age, gender, marital status, income, level of education, length of stay in the U.S, diabetes-related characteristics (type of diabetes, treatment regimen, age at diagnosis, duration, and family history), was developed by the PI. Data was collected using self-reporting.

Human Subjects Considerations

Approval from Wayne State University's Institutional Review Board was received prior to data collection. Participants were informed about the voluntary nature of the study, the right to choose not to take part in this study, and right to only answer only selected questions without penalty.

Procedures for Recruitment

To begin recruitment, the ACC and ACCESS organizations were contacted to locate the clinics and to reach out to facility administrators who have access to files or electronic health records of patients who visit the centers as well as acquire approval. A meeting scheduled with the facility administrator was held to discuss the inclusion characteristics of the participants in the study, support was obtained, and the protocol was developed. Clinic staff introduced the study to potential participants who met the inclusion criteria. All interested potential participants were referred to the PI for additional information and informed consent. Protheroe et al. (2016), who conducted a study measuring health literacy among individuals who had diabetes, supported recruitment by someone known to potential participants as being more likely to increase response rate. Furthermore, flyers containing PI contact information were posted at the targeted clinics to assist in recruitment.

After identifying potential participants, the PI obtained informed consent and acquired their contact information. Appointment visits at the local clinic were scheduled at the time and date of their choosing, if the current time was not convenient.

Data Collection Procedures

The PI carried the questionnaires in a closed file, met each individual face-to-face and distributed questionnaire at convenient private locations in Dearborn's selected clinics. Polit and

Beck (2017) recommend face-to-face meetings to encourage a high rate of response. The PI explained to the participants that all data will be treated confidentially. Identifier numbers were written for each participant at the top of the consent form and each questionnaire. The length of time was between 15-35 minutes.

All questionnaires were available in Arabic and English, and participants were asked to choose their preferred language. The PI provided brief instructions explaining the aim of study and the questionnaires. Each individual was asked to fill out the demographics form and both questionnaires. One questionnaire (S-TOFHLA) measured patients' ability to read and understand health-related information and should be completed within 12 minutes for both the reading and numeracy components, with its reading component taking no more than 7 minutes (Baker et at., 1999). Participants were asked to self-administer the S-TOFHLA questionnaires. The PI started a stopwatch timer when the participant began to work on the S-TOFHLA. Baker et at. (1999) recommended that respondents not be told ahead of time that the test was stopped after 7 minutes; after the 7 minutes allotted to the first section of the questionnaire are up, the participant will be informed that his or her answers up to this point are sufficient for the researcher's purposes; the last given answer was marked with a pen. If the participant prefers to continue, the PI allowed the participant to do so but first marked with a pen the last question answered by the participant before the expiration of the allotted time. The PI reviewed all participants' questionnaires and forms to ensure the completeness of the data supplied. Then the participant was given a $20 Walmart gift card. After finishing, the questionnaires were collected in sealed envelopes.

Strategies for gaining the consent of as many participants as possible included the use of an in-person approach by health care providers, collection of data on participants' visits to a

clinic at a time convenient for them, and the making of financial compensation for participants' time commitment.

Data Management

Consent forms were kept in a secured envelope until disposition in a locked cabinet. Data were entered by the PI using participants' identifier numbers. All files were kept in a secure cabinet. Entered data were kept in a secured and password-protected file. Only the PI had access to the data.

The PI encoded each participant's forms using the same numerical code, beginning with the participant's presentation with the informed consent form. All questionnaires were encoded using an identified number from 01 to 0 83 (the total number of the participants) before creation of the database in SPSS.

Each questionnaire included all scales and represented one participant. To ensure the integrity and quality of the data, the PI double-checked each participant's data and compared the data in the database with those appearing on the paper questionnaire forms. After data in the database are confirmed to match those on the paper questionnaire forms, the paper questionnaires will be stored in a locked cabinet at the College of Nursing at Wayne State University.

Data Analysis

Data are classified using numerical scores. Statistical analysis was completed using SPSS 25.0. All data was entered into a database created by the PI for this purpose. Descriptive analysis (mean, standard deviation, minimum, maximum, and percentage) was used to describe the demographic characteristics of the participants and each key variable. Two sample *t*-tests was used to compare the mean. The PI used one group of participants and calculate three separate scores for each individual: one for health literacy, one for social support, and one for diabetes

self-care behaviors. Descriptive statistics was used in checking assumptions of normality to ensure appropriate use of parametric inferential statistics.

For addressing Research Question 1, frequency distribution was computed to determine the level of health literacy among people of Arabic descent living with diabetes? For Research Questions 2 & 3, Spearman's correlation analysis was used to determine the significance of the relationship between health literacy and diabetes self-care behaviors and between social support and diabetes self-care behaviors. Spearman rank correlation coefficient was considered since the normality assumptions were not met. For addressing Research Questions 4, multiple regression equations were used to evaluate the potential impact of perceived social support and health literacy on diabetes self-care behaviors.

Data Analysis Challenges

Two challenges related to data analysis may be encountered during the study. First, data entry is disposed to error (Polit & Beck, 2017). Therefore, in order to manage the data, the PI considered, entered, verified, and cleaned data after entering

The second challenge involves missing data. Polit and Beck (2017) suggested imputation, known as "filling data with values believed to be good estimates of what the value would have been, had they not been missing," as the preferred way to deal with missing data (p. 431). Thus, the PI applied the method of imputation with missing data. In addition, mean substitution was used to deal with continuous missing data, if any. For example, if age was missing and the mean age sample was found to be 35.2 years, then 35.2 can be used for the missing age.

CHAPTER 4: RESULTS

Introduction

The purpose of this non-experimental, descriptive correlational study was to assess the relationships between health literacy and social support to diabetes self-care among individuals of Arabic descent.

The data were analyzed using SPSS 25 version. The results of the data were divided into three sections: The first section used frequency distribution or descriptive statistics to describe the sample characteristics. The second section used Spearman's correlation test to examine the association between scaled variables. The third section used multiple linear regressions to examine the magnitude of association between variables. All decisions of statistical analysis were made using a criterion alpha level of .05.

The sample for this study consisted of 85 individuals of Arabic descent who were recruited from two places, the AAC and ACCESS clinics located at Dearborn, MI. All participants provided informed consent prior to data collection. Two participants were excluded from analysis; one did not meet study criteria and one withdrew from study. The final sample size included in the analysis was 83 participants.

Sample Characteristics

Table 1 describes the demographic charactristics of the sample. For language preference, 91.6% (*n*= 76) of the participants prefered use of the Arabic language over English. The majority of the participants were male (*n*=45, 54.2%), 60 years of age or older (*n*=39, 47%) followed by participants 50-59 years of age (*n*=31, 37%), and married (*n*=68, 81.9%). The majority of participants were born in Lebanon 33.7% (*n*=28) followed by Iraq 24.1% (*n*= 20), Syria 15.7% (*n*=13), and Yemen 12% (*n*=10). A large number of participants originated from Lebanon 36.1%

(*n*=30) followed by Iraq 26.5% (*n*=22), Syria and Yemen each14.5% (*n*=12). The majority of participants identifed themselves as US and Arab citizens (*n*=22, 26.5%), followed by Lebanese (*n*=19, 22.9%), and Iraqi (*n*=12, 14.5%). Thirteen percent of the participants identified themselves as US citizens.

When asked about educational achievement, the majority of participants (34.9%) reported having a high school diploma followed by 31% having less than a high school education. Nearly 17% received Bachelor degrees, 9.6% reported earning associate degrees and only 4.8% earned graduate degrees. The majority of participants were unemployed 45.8% followed by 26.5% being retired, and 14.5% being employed full time. Moreover, majority of participants were low income 71% reporting less than $15,000 a year, with 18.1% of the participants reporting an annual income of $15,001 to $35,000.

In addition, Table I shows the diabetes charactristics of the study sample. Participants were asked to specify the type of diabetes diagnosis: Type 1, Type 2, or I don't know. Nearly 60% of the study participants reported having Type 2 Diabetes, while only 6% reported having Type 1 Diabetes. Of concern was that 34.9% of the study participants reported not knowing what type of diagnosis they had. The majority of participants reported having family history of diabetes (*n*= 55, 66%) while 33.7% of participats reported no family history of diabetes. The majority of participants were had been diagnosed with diabetes for 1-5 years (38.65%) followed by 25.3% reported being diagnosed with diabetes between 11-20 years. Nearly one fourth of the study participants (24.1%) had been diagnosed with diabetes between 6-10 years, while 9.6% have had diabetes since they were 21 years and over. Only two participants reported having diabetes for less than a year. For current treatment, 65.1% reported being non-insulin dependant, and 18.1% reported being insulin dependant. Fourteen of the participants provided no response.

More than three quarters of the sample were on oral insulin medication 94%, and 4.8% reported taking no diabetes medications. Furthermore, Majority of participants were non-smokers (77.1%). Participants were asked to report if they have good control of diabetes. The majority of participants reported having good control of their diabetes(45.8%), while 39.8% reported they did not have good control of their diabetes. In addition, 14.5% of the participants reported not knowing if they have good control of their diabetes.

Table 1
Demographic Characteristics of the Sample (N = 83)

Demographic Characteristics	Frequency	Percent
Language Preferences		
Arabic	76	91.6
English	7	8.4
Gender		
Male	45	54.2
Female	38	
		45.8
Age (in years)		
30-39	5	
40-49	8	6.0
50-59	31	9.6
60 and older	39	37.3
		47.0
Marital Status		
Single, Never Married	2	2.4
Married	68	81.9
Divorced	6	7.2
Widow	7	8.4
Country of Birth		
Lebanon	28	33.7
Iraq	20	24.1
Syria	13	15.7
Yemen	10	12
Jordon	3	3.6
Kuwait	3	3.6
Saudi Arabia	1	1.2
Palestine	1	1.2

Demographic Characteristics	Frequency	Percent
Egypt	1	1.2
Sierria Herrona	1	1.2
No response	2	2.4
Country of Origin		
Lebanon	30	36.1
Iraq	22	26.5
Syria	12	14.5
Yemen	12	14.5
Palestine	3	3.6
Jordon	2	2.4
Saudi Arabia	1	1.2
Egypt	1	1.2
Nationality		
Arab American	22	26.5
Lebanese	19	22.9
Iraqi	12	14.5
American	11	13.3
Syrian	7	8.4
Yemeni	5	6.0
Jordanian	2	2.4
Arab	2	2.4
Saudi	1	1.2
Palestinian	1	1.2
Palestinian Syrian	1	1.2

Demographic Characteristics	Frequency	Percent
Level of education		
Less than high school	26	31
High school diploma	29	34.9
Associate degree	8	9.6
Bachelor degree	14	16.9
Graduate degree	4	4.8
Others	1	1.2
No response	1	1.2
Employment Status		
Unemployed	38	45.8
Retired	22	26.5
Employed full time	12	14.5
Employed part time	9	10.8
Student	2	2.4
Annual Household Income		
Less than $15,000	59	71.0
$15,001 to $35,000	15	18.1
$35,001 to 50,000	3	3.6
$50,001 and over.	2	2.4
No response	4	4.8
Type of Diagnosis		
Type 1 Diabetes	5	6.0
Type 2 Diabetes	49	59.0
I don't know	29	34.9
Family History of Diabetes		
No	28	33.7
Yes	55	66.3
Length of time diagnosis with Diabetes		
Less than a year	2	2.4
1-5 years	32	38.6
11-20 years	21	25.3
6-10 years	20	24.1
21 years and over	8	9.6
Type of Treatment (Insulin Dependent)		
Yes		
No	15	18.1
No response	54	65.1

Demographic Characteristics	Frequency	Percent
	14	16.9
Type of Treatment (Oral Medication)		
Yes		
No	78	94.0
No response	4	4.8
	1	1.2
Smoking Status		
Yes		
No	18	21.7
No response	64	77.1
	1	1.2
Having Good Control of Diabetes		
Yes	38	45.8
No	33	39.8
I don't know	12	14.5

Table 2 summarizes descriptive statistics of continous demographic data. The mean length of stay in US was 18.81 years (*n*=82, SD= 13.53). The mean age at diabetes diagnosis was 48.62 years (*n*=78, SD11.125).

Table 2

Descriptive Statistics:Length of Stay in US & Age at Diagnosis

	N	Minimum	Maximum	Mean	Std. Deviation
Length of stay in US	82	0	64	18.81	13.537
Age at Diagnosis	78	19	72	48.62	11.125

Diabetes Self Care

Table 3 summarizes diabetes self-care measures including general diet, specific diet, exercise, blood glucose monitoring, and foot care. For diabetes self care, the mean were 33.98, SD= 12.22. The higher the percent, the higher level of self care. The highest levels of self care

were following a specific diet (mean= 4.5, SD= 1.58), blood glucose testing (mean=4.3, SD=2.73), and following a general diet (mean= 4.12, SD= 2.36). Specifically, participants monitored their blood glucose levels on average of 4.5 days/week. For general diet, participants reported that on average of approximatly eating a healthy diet four days per week (mean=4.1, SD=2.4) with five or more daily servings of fruit and vegetables (mean= 4.02, SD= 2.5). For specific diet, participants reported following their specific diet plan four days per week with an average of three days per week consumption of high fat red meat or diary products (mean=3.00, SD= 2.02).

Lower levels of self care were reported for foot care (mean=3.06, SD=2.53), and exercise (mean= 1.80, SD= 2.04). Participants averaged of two days per week of 30 minute exercise (mean=2.0, SD=2.34) and an average of 2.8 days per week checking their feet (mean 2.8, SD=3.06).

Table 3

Summary Measures: Diabetes Self Care (N=83)

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Diabetes Self-care	78	8.00	61.00	33.9872	12.22356
General Diet	83	.00	7.00	4.1265	2.36829
Specific Diet	83	.50	7.50	4.5120	1.58302
Exercise	83	.00	7.00	1.8072	2.04646
Blood Glucose	83	.00	7.00	4.3735	2.73621
Foot Care	83	.00	7.00	3.0602	2.53680

Social Support

Table 4 summarizes social support and the three subscale factors including family, friends, and significant other. A mean of 1 – 2.9 indicated low support, 3-5 moderate support, and 5.1 to 7 high support. More than half of participants had high social support (52.5%), with

35% reporting moderate support and 12.5% low social support. In 75.3% of the study participants, their "significant other" was reported as providing high support, followed by "family members" (70%). Finally, 24.4% of participants reported "friends" as a high source of support.

Table 4

Summary measures: Social Support (N=83)

Variables	Frequency	Percent
Social Support		
Low	10	12.0
Moderate	28	33.7
High	42	50.6
No Response	3	3.6
Significant Others		
Low	9	10.8
Moderate	10	12.0
High	58	69.9
No Response	6	7.2
Family		
Low	10	12.0
Moderate	14	16.9
High	56	67.5
No Response	3	3.6
Friends		
Low	30	36.1
Moderate	32	38.6
High	20	24.1
No Response	1	1.2

Research Questions

Question #1: What is the level of health literacy among people of Arabic descent living with diabetes?

Table 5 summarizes health literacy in this sample. Nearly half of the participants (48.1%) had adequate health literacy (scored 67–100) (*n*=37) while 32.5% had inadequate health literacy (scored 0–53) (*n*=25). Only 19.5% had marginal health literacy (54–66) (*n*=15). Six of the participants did not respond.

Numeracy had a higher health literacy level than reading. For S-TOFHLA-Numeracy section, (49.4%) of the participants answered the four numeracy items correctly. For the reading, only one participant answered the two questions correctly. Appointment slip had the highest correct response (95.2%), followed by 84.3% answering the normal blood sugar item correctly. Reading medication labels (item 1 & item 4) had lowest correct response rate (69.9% and 72.3%) respectively.

Table 5

Summary Measures: Health literacy (N=83)

Variables	Frequency	Percent
Health Literacy		
Inadequate HL	25	30.1
Marginal HL	15	18.1
Adequate HL	37	44.6
No response	6	7.2
Numeracy		
Item #1: Label on prescription bottle		
Incorrect	25	30.1
Correct	58	69.9
Item #2: Blood sugar level:		
Incorrect	13	15.7
Correct	70	84.3
Item #3: Clinic appointment slip		
Incorrect	4	4.8

Correct	79	95.2
Item #4: Label on prescription bottle		
Incorrect	23	27.7
Correct	60	72.3

The mean for the total scale and subscales are shown in Table 6. For the health literacy, out of 100 points the mean was 63.97 (SD= 22.358). The S-TOFHLA Reading section showed that out of 70 points the mean was 39.88, (SD=18.51) while for Numeracy section the mean score was 24.12 out of 30 points (SD=6.93).

Table 6

Descriptive Statistics: Health Literacy Scale and Subscales (Reading & Numeracy)

	N	Minimum	Maximum	Mean	Std. Deviation
S-TOFHLA Reading	80	6.00	70.00	39.8809	18.51052
S-TOFHLA Numeracy	83	7.50	30.00	24.1265	6.93429
Health Literacy	80	13.50	98.00	63.9746	22.35839

Additional Related Findings

The current study conducted further analysis to show the association of health literacy, social support, and diabetes self-care to gender, and health literacy to education.

Using independent *t* test, the current study found no differences exist between males and females and: health literacy (*t*=-1.339, p=.18), social support (*t*=-.306, *p*=.76), and diabetes self-care (*t*=.008, *p*=.99).

Education and health literacy. Performing Pearson *r* correlation, the current study found a positive correlation between health literacy and education level (*r*=.039, *p*=.006).

Question#2. What is the correlation between health literacy and diabetes self-care behaviors (exercise, foot care, blood glucose self-monitoring, and diet) in individuals of Arabic descent living with diabetes?

Spearman's correlation was used to test the association between health literacy and diabetes self-care. Based on Spearman's correlation, none of the diabetes self-care subscales [diet (general & specific), exercise, blood glucose testing, and foot care] revealed statistically significant relationships with health literacy (Table 7).

Table 7

Correlation Coefficients and p Values between Health Literacy and Diabetes self-care (N = 83)

Variables	Health literacy		Diabetes self-care		General Diet		Specific Diet		Exercise		Blood Glucose Testing		Foot Care
	r	*P*	*r*	*P*	*r*	*P*	*r*	*P*	*r*	*P*	*r*	*P*	*r p*
Health literacy	--												
Diabetes Self- care	-.076 .52		--										
General Diet	.021 .85		.617	.00	--								
Specific Diet	-.060 .60		.278	.01	.350**	.00	--						
Exercise	-.023 .84		.380**	.01	.269*	.01	.105	.34	--				
Blood Glucose	-014 .90		.593**	.00	.230*	.03	.062	.57	-.048	.66	--		
Foot Care	-.173 .13		.538**	.00	.185	.09	-.073	.51	.003	.97	.147	.18	

**. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed).

Question #3: What is the correlation between social support and diabetes self-care behaviors (exercise, foot care, blood glucose self-monitoring, and diet) in individuals of Arabic descent living with diabetes?

Spearman's correlation was used to test the association between social support and diabetes self-care (Table 8 & Table 9). Based on Spearman's correlation, the association between diabetes self-care and social support is not significantly correlated (social support p=.17, family p=.26, friends p=.52, significant others p=.22). Also, none of the diabetes self-care subscales (exercise, blood glucose testing, foot care, and specific diet) showed statistically significant relationships with social support (exercise p=.68, blood glucose testing p= .65, foot care p= .68, specific diet p= .75) except for general diet (p=.05). Therefore, there is an exist association between social support and general diet; the greater the social support, the better the diet. Precisely, family support was associated with general diet (p=.04).

Table 8

Correlation Coefficients and p Values between Social Support Subscales and Diabetes Self-Care Subscales (N = 83)

Variables	Social support		Diabetes Self Care		Family		Friends		Significant Other	
	r	*P*	*r*	*P*	*r*	*P*	*r*	*P*	*r*	*P*
Social Support	--									
Diabetes Self Care	.155	.17	--							
Family	.841**	.00	.132	.26	--					
Friends	.824**	.00	.074	.52	.563**	.00	--			
Significant Others	.813**	.00	.145	.22	.780**	.00	.438**	.00	--	
General Diet					.228*	.042	.168	.132	.197	.086
Specific Diet					.117	.302	-.054	.633	.127	.271
Exercise					-.011	.922	.071	.527	.083	.471
Blood Glucose testing					.013	.908	-.021	.855	.085	.464
Foot Care					-.072	.527	-.028	.806	-.118	.305

Table 9

Correlation Coefficients and p Values between Social Support and Diabetes Self-Care Subscales (N = 83)

Variables	Social support	General Diet	Specific Diet	Exercise	Blood Glucose Testing	Foot Care
	r *P*	*r* *P*	*r* *P*	*r* *P*	*r* *P*	*r* *p*
Social Support	--					
General Diet	.215 .05	--				
Specific Diet	.035 .75	.350** .00	--			
exercise	-.046 .68	.269* .01	.105 .34	--		
Blood Glucose testing	.050 .65	.230* .03	.062 .57	-.048 .66	--	
Foot Care	-.046 .67	.185 .09	-.073 .51	.003 .97	.147 .18	

Question #4: Does social support and health literacy predict diabetes self-care behaviors (exercise, foot care, blood glucose self-monitoring, and diet) in individuals of Arabic descent living with diabetes?

Using linear regression (Table 10), neither of the independent variables social support and health literacy had a significant relationship on diabetes self care (F=.91, p=0.40). Coefficient of determination (R^2= .02) indicated about 02% variance in diabetes self-care is explained by social support and health literacy. Moreover, there was no linear relationship exist between diabetes self-care and social support controling for health literacy (t=1.3, p= .19). Also, there was no linear relationship exist between diabetes self-care and health literacy controling for social support (t=-.6, p= .54). Furthermore, there was no linear relationship between diabetes

self-care subscales (general diet, specific diet, blood glucose, exersice and foot care) and social support controlling for health literacy (all *p* value >.05). Also. there was no linear relationship between diabetes self-care subscales (general diet, specific diet, blood glucose, exercise and foot care) and health literacy controling for social support.

Table 10
Regression Analysis Predicting Diabetes Self-Care (N = 83)

Variable	*b*	*SEb*	*β*	*t*	*p*
Social Support	1.25	.954	.158	1.312	.194
Health Literacy	-1.031	1.688	-.074	-.611	.543
R^2= .02, *F* = 0.91, *p* = .40					

R**e**liability of the measures (Cronbach's alpha) is shown (Table 11). The instruments had a good to acceptable internal consistency except for S-TOFHLA numeracy. For this study, Numeracy had a Cronbach's α=0.40 with an α=0.60 in the previous studies. The original S-TOFHLA version showed good internal consistency for the reading comprehension component with a Cronbach's α=0.79 (Baker et al., 1999).

Table 11
Reliability of Instruments: N=83

Instruments	**N**	**Cronbach's Alpha**
MSPSS	74	.92
S-TOFHLA	79	.89
S-TOFHLA (Reading)	79	.93
S-TOFHLA (Numeracy)	83	.40
SDSCAs	80	.62

CHAPTER 5: DISCUSSION

This study is the first effort to explore the relationships among health literacy, social support, and diabetes self-care in a population of individuals of Arabic descent living in the United States. Of the 83 individuals who consented to participate in the study, most were male (84.2%), over 50 years old (84%), married (81.9%), attained an educational level of high school graduate or less (65.9%), and reported a low income (71%). This discussion will focus on the key variables, relationships among them, and the current literature.

Diabetes Self-Care

Diabetes self-care includes specific behaviors such as general diet, specific diet, exercise, blood glucose testing, and foot care. Participants reported higher levels of diabetes self-care in the areas of general diet and blood glucose testing. More specifically, participants self-monitored their blood sugar on average of 4.5 days/week. In case of general diet, participants ate a healthy diet approximately 4 days per week, consuming 5 or more servings of fruit and vegetables on those days. Additionally, for specific diet, participants followed their specific diet plan an average of 4 days per week. Low level of self care regarding foot care (M=3.06, , SD=2.53) and exercise (M= 1.80, SD= 2.04*)*were also reported. Similarly, prior studies have highlighted lack of exercise among individuals of Arab descent (Alghafri et al., 2017; Ali et al., 2010). Social norms involving restrictive exercise practices and gatherings involving significant amounts of food hindered physical activity and resulted in gaining more weight (Ali et al., 2010). Similarly, Alghafri et al. (2017) identified perceived barriers to physical activity for adults with type 2 diabetes among the Omani population. Using a cross-sectional design with a sample of 305 participants, Alghafri et al. identified lack of social support as the most frequently encountered barrier to being physically active; while this factor was found to be significant in both males and

females, it was more frequently reported by female participants (Alghafri et al.,2017). This may be due to the conservative culture and social norms associated with female engagement in physical activity in public.

Level of Health Literacy Among Individuals of Arabic Descent

Health literacy was described using 3 levels: adequate, marginal, and inadequate. In this study, 48.1 % of participants had adequate health literacy, 19.5% had marginal health literacy, and 32.5% had inadequate health literacy. These results are simular to another study conducted amongimmigrants from Poland. Leszko and Timoszyk-Tomczak (2019) completed a cross sectional study among Polish immigrants living in Chicago and found that more than quarter of participants had inadequate health literacy (27%). In previous research, the S-TOFHLA score indicated that only 8.6 % of participants had limited level of health literacy while 82% had sufficient health literacy (Al-Jumaili et al., 2015; Fadda et al. (2016).

Findings from this study are supported by other studies conducted among individuals with diabetes. Hussein, Almajran, and Albatineh (2018) assessed health literacy among 352 patients living with diabetes in Kuwait and found that approximately 35.5% as having adequate health literacy, 19% as having marginal health literacy, and 45.5% were categorized as having inadequate health literacy. Mohammadi et al (2015) assessed health literacy among 407 patients with diabetes in Iran and concluded 18.2% had adequate health literacy,11.8% marginal health literacy, and70% had inadequate health literacy.

In this study, 41 participants had a high level of numeracy skills and answered the four numeracy questions correctly (49.4%). Additionally, appointment slip had highest correct response by 95.2% followed by 84.3% answered the normal blood sugar item correctly. While medication labels (item 1 & item 4) had lowest correct response 69.9% and 72.3% respectively.

Contradictory, Al-Jumaili et al. (2015) study found blood sugar questions had higher correct response with percentages of 79.7% while doctor's appointment questions had highest incorrect response (Al-Jumaili et al., 2015). Alghodaier, Jaradi, Mohammad, and Bawazir (2017) who examined the numeracy skills of patients with diabetes in Saudi Arabia, concluding that patients with diabetes needed numeracy skills to improve their diabetes. Alghodaier and colleagues (2017) concluded low numeracy skills are linked to poor control of diabetes, low level of education, and older age. However, it is important to note that level of education did not reflect level of numeracy and that health care providers may not notice a low level of numeracy. These authors found that participants had difficulties in calculating a carbohydrate ratio when using food labels and determining the appropriate amount needed for insulin therapy (Alghodaier et al., 2017). Also, this study found medication labels had lowest correct response. These findings revealed the need for health care providers to follow up with patients to avoid incorrect use of prescription medications.

In this study, the numeracy section had higher response than reading. Contradictory, Al-Jumaili et al. (2015) showed the passage questions were answered correctly while many of the Arab participants had difficulty understanding numeric questions. A possible explanation for the findings in this current study is the number of questions in each section: numeracy had 4 while the reading passage had 35. Further possible explanation is that participants may be unlikely to compehend reading for medical written material due to low level of education. Within our sample, majority of participants (*n*= 29, 34.9%) reported having high school deploma followed by (*n*= 26, 31%) have less than high school, (*n*= 14, 16.9%). Previous studies have found the higher the level of education, the higher the health literacy (Almaleh et al., 2017; Alamari, et al. 2017; Fadda et al., 2016; Al-Jumaili et al., 2015; Leszko & Timoszyk-Tomczak, 2019).

Additional related findings. The current study found a positive correlation between health literacy and education level (r=.039, p=006). Seven studies conducted among Arab found level of education was found to be correlated with health literacy: the higher the level of education, the higher the health literacy (Abdel-Latif & Saad, 2017; Almaleh et al., 2017; Alamari, et al. 2017; Fadda et al., 2016; Al-Jumaili et al., 2015; Hussein et al., 2018; Youssef & Al Sebaee, 2018). However, Al-Jumaili et al. (2015) depicted the education was linked to health literacy when investigating health literacy with additional tool (the S-TOFHLA). Additionally, Fritz et al. (2016) emphasized providers viewed that diabetes self-care counseling programs needs to be matched with the patients' education level as the opposite acts as barrier to improve quality of diabetes care given.

In opposite to education level, the current study found no difference exists between men and women in the level of health literacy (t=-1.339, p=.18) social support (t=-.306, p=.76), and diabetes self-care (t=.008, p=.99). In contract to our study findings, gender was linked to health literacy in two studies conducted among Arab (Almaleh et al., 2017; Elsuos et al., 2017). In one study, males had an adequate level of functional health literacy (Almaleh et al., 2017) compared to females, while another study reported males were less likely to adhere to medication than females (Elsuos et al., 2017). The possible justification for the difference in health literacy between women and men. Almaleh et al. (2017) reported that health literacy and education-based gender disparities may be a result of a lack of investment in women's education. However, findings in the Alamari, et al. (2017) study with a relatively higher number of male subjects, found that females demonstrate higher levels of health literacy than males. The plausible explanation for that among Arabs, women are the advocates for the entire family regarding

health-related issues. Further, women provide needed care for the sick individuals in the family. As a result, women tend to read more to understand the best care for the family member.

Consistent with current study findings, four other studies indicated gender has no link to health literacy (Al-Jumaili et al., 2015; Fadda et al., 2016; Hussein et al., 2018; Youssef & Al Sebaee, 2018).

Health Literacy and Diabetes Self-Care

There was no evidence of statistically significant results in regards to the relationship of health literacy and diabetes self care scale, including the subscales (general diet, specific diet, excerscise, blood glucose testing, and foot care). The findings in this study are consistent with other studies conducted among patients wth diabetes. Osborn, Bains & Egede (2010) conducted a cross- sectional study for 130 patients with diabetes and concluded no direct relationship exists between diabetes self care and health literacy. Shin and Lee (2018) also used a cross-sectional design, and examined the link between health literacy and diabetes self care. One hundred and thirty-six particpants aged 60 and above took part in the study which found no direct or indirect significant relationship among health literacy and diabetes self care behaviors, particularly blood glucose monitoring and foot care.

Badpar, Bakhitarpour, Heidari& Moradimanesh (2019) conducted a cross-sectional study among 190 patients with diabetes in Iran and found health literacy is directly associated with diabetes self care (β=0.18, P<0.01). This study also found an indirect association between health literacy and diabetes self care through self efficacy (β=0.09, P<0.01). Another study found an indirect relationship between health literacy and self care through social support; participants with limited health literacy demonstrated improved diabetes self care as social support increased (Osborn, Bains & Egede, 2010). Shin & Lee (2018) concluded a relationship among

empowerment and health literacy, the higher the level of health literacy the greater the empowerment, and participants with higher empowerment are more likely to eat healthy and be physically active (Shin & Lee, 2018).

Yet , the link between health literacy and diabetes self care still remains questionable. Dahal & Hussiezadeh (2019) conducted a systematic review that included 14 RCT studies to investigate the link of health literacy to diabetes self care. While Dahal & Hussiezadeh (2019) found health literacy improved physical activity, the link of heath literacy to blood glucose self monitoring and foot care was inconclusive. Lee, Song & Im (2017) conducted a RCT among 51 Korean older adults to assess the effectiveness of a health literacy-self management program on various diabetes parameters including diabetes self-care behaviors. The program consists of 12 weekly sessions based on health literacy levels and health characteristics of Korean participants. The program involves a workbook with self-management checklists to track the improvement in diabetes self care and found health literacy improves diabetes self care (Lee, Song & Im, 2017). The study foundsignificant post-intervention differencesamong groups in the diabetes self-management program (p=0.0012). The intervention group had higher self-testing blood glucose (p=0.002) than the control group, pre/post change in diabetes self management program (p= 0.008), and diet subscale (p=0.029).

The lack of significant results regarding health literacy and diabetes self-care in this study may be due to the tool used in this study. The instrument is a general health literacy tool that examines reading comprehension and numeracy literacy related to general medical written material. Utilizing a diabetes-specific literacy and numeracy tool may have yielded different results.

Social Support

Social support plays a significant role in the Arab culture. In the current study, more than half of participants had high social support 52.5%, followed by 35% with moderate support, and 12.5% reported low social support. Also, participants indicated their sources of high suppport were significant others (75.3%), family (70%), and friends (24.4%). Other rresearchers have examined social support and its association with health. Salma et al. (2018) explored the social support engagement in health-related activities of Arab Muslim immigrants in Canada as it related to their aging. Women's stories highlighted the impact of social support on health-promoting practices. Participants consistently reported a lack of support despite a large social network as a barrier to managing chronic illness. The women in the study noted that the social network tended to be within the same ethnic community, making access to support from the wider community more difficult (Salma et al., 2018). Furthermore, women reported friends of the same age to be the best source of emotional support in dealing with life stressors (Salma et al., 2018). In addition, the women emphasized that they did not desire to express health-related distress to close family members as they saw the latter as having their own lives and being busy (Salma et al., 2018).

Aroian et al. (2017) examined the association between depression and social support for immigrant women in the United States. In this longitudinal study lasting 3 years, the researchers investigated the social support of female Arabic immigrants in the United States as it related to depression. Examining data provided at three different time points, the study found that women with increased social support from friends and family are less depressed and experience less stress. A change in the husband's support at time 3 did not significantly affect depression; however, such a change at time 1 led to the highest score of husband support. This study noted a

socially increased rate of change over time in friends' support as it related to depression scores taken at time 3, while the family was not a significant predictor at time 3. Over 3 years, the women reported a significant decrease in daily troubles and increased social support from friends and family.

Social Support and Diabetes Self Care

In the current study, Spearman correlation revealed no significant relationship among social support and diabetes self care, specifically the subscales of specific diet, exercise, foot care and blood glucose testing. Only the subscale of general diet revealed an association with social support (family). This findings is similar to the findings in Bouldin et al. (2017) study. Bouldin et al. (2017) using cross sectional examined the link of having and without having caregiver with social support and diabetes self care among patients with poor diabetes. Participants with caregiver; those who received assistance from spouses, freinds, family or significant others had higher social support ($p<0.001$) than those without. No significant difference had been found in foot care, excersice, blood glucose testing for those with caregivers and those without (Bouldin et al., 2017). Only diet has been associated with social support, greater social support associated with eating healthy (B=0.20, 95% CI: 0.02-0.38, p=0.029) (Bouldin et al., 2017). Similarly, many studies conducted among people of Arab descent clarified the role of family support in diabetes self-care (Bertran et al., 2015; Bertran et al., 2017; DiZazzo-Miller et al., 2017; Fritz et al., 2016). Participants perceived family as facilitators and hindrances for ongoing diabetes self-care (Bertran et al., 2015; DiZazzo-Miller et al., 2017; Fritz et al., 2016). Contradictory, two studies showed social support as a barrier to physical activity (Alghafri et al., 2017; Ali et al., 2010)

On the other hand, previous studies found the greater the social support the better diabetes self care (Badpar et al., 2019; Mohebi et al. 2018; Osborn, Bains & Egede, 2010; Kadilrvelu et al., 2012; Walker et al., 2014). Badpar et al. (2019), Osborn, Bains and Egede (2010) and Walker et al. (2014) concluded there is a direct relationship among diabetes self-care and social support (β=0.15, P<0.05) (r=0.27, P<0.01) (r= 0.15, p= 0.008) respectively.

Special Considerations

Studies conducted on Arab Americans living in the United States have highlighted that the main reason for the lack of studies among this group is the difficulty of reaching Arab participants (Jaber, 2003; Shara et al., 2016; Timraz et al., 2017). Shara et al. (2016) conducted a study that aimed to overcome methodological challenges related to recruitment of Arab American participants. The researchers emphasized using a culturally sensitive approach to collecting data from people of Arabic descent living in the United States. The authors focused their attention on privacy, language, and ensuring the same gender between participants and data collectors. Using this strategy, the study was able to recruit 136 participants over 18 months from five clinics. Timraz et al. (2017) also emphasized the slow recruitment of participants of Arab descent. Other studies that used a community-based approach involving community leaders (Campbell-Voytal 2018; Jaber, 2003; Shara et al., 2016) highlighted another challenge in the reluctance of community leaders concerning sensitive information. In one of these studies, the community leader suggested offering compensation for participants' time to increase the participants' response rate (Shara et al., 2016). In this study, the researcher used a culturally sensitive approach and offered each instrument in both Arabic and English to all participants.

Trust. Mistrust has been identified as a barrier to recruitment (Campbell-Voytal et al., 2018; Timraz et al., 2017). Campbell-Voytal (2018) conducted a study to explore the view of

Arab/Chaldean researchers to investigate challenges and strategies for conducting studies in the Arab community. The researchers reported concerns regarding privacy and fear that personal data might be used to harm or threaten citizens in countries where the study took place. Moreover, Arab and Chaldean community members are sensitive toward researchers. Campbell-Voytal et al. (2018) reported that the lack of studies conducted among Arabs isolates the Arab community from the process of research and leaves community members without an understanding of the aim of conducting research. Talking with participants in detail about the aim of a study along with its benefits as well as reassuring them about privacy and confidentiality will help to increase trust and therefore recruitment (Campbell-Voytal et al., 2018; Shara et al., 2016). In addition, social exchange is a main factor in building trust. Arab/Chaldean members perceived that taking a few minutes to build a relationship in an informal way such as smiling and taking part in conversation before inviting participants to take part will highly contribute to overcoming mistrust (Campbell-Voytal et al., 2018). These strategies were used in this study and helped to develop trust. In addition, the researcher is a member of the Arab community and stressed the importance of privacy and confidentiality during the informed consent process. Also, collaborating with physician faith leaders can increase the likelihood of participation (Campbell-Voytal et al., 2018; Timraz et al., 2017).

Family Decision/Male Authority. The Arab community is a collective society known for concerns toward sharing family-based decision-making related to health even with health-related researchers. Timraz et al. (2017) indicated that women of Arabic descent preferred to ask permission of family senior members or husbands to participate. During recruitment for a study on child abuse and family involvement, some husbands showed concern about their wives taking

part in the study, using the wife's well-being as an excuse not to participate. Timraz et al. (2017) suggested the need to include family members in the consent form decision-making process.

Language and Literacy. Literacy level and language barriers were obstacles for Arab Americans' involvement in studies. Some Arabs living in the United States who were approached for one study were illiterate in both languages (Timraz et al., 2017). Furthermore, Timraz et al. (2017) and Jaber (2003) indicated the preferred language for prospective participants was Arabic. The researchers suggested such strategies as using both languages for questionnaires, posting flyers in Arabic when needed, and making the effort to explain the study and study questions in the Arabic language using a neutral tone (Timraz et al., 2017). All instruments in this study were available in both Arabic and English.

Inadequate Knowledge/Misconceptions. Lack of knowledge and the existence of misconceptions were also identified as a barrier to recruitment of Arab American participants. Research showed that most participants had the view that no benefit would result to individuals or the community from study involvement (Jaber, 2003). Jaber (2003) clarified that media champions, including newspapers and radio stations that targeted the Arab community, were used to enhance recruitment of Arab participants to minimize misconceptions related to participation in research.

Clinical Implications

Previous studies discussed the implications for culturally sensitive interventions and stressed the need to involve family as active members in interventions related to diabetes self-management (Alghafri et al., 2017; Ali et al., 2010; Bertran et al., 2015; Bertran et al., 2017; DiZazzo-Miller et al., 2017; Fritz et al., 2016; Jeragh-Alhaddad et al. 2015; Sukkarieh-Haraty & Howard, 2015). Bertran et al. (2017) suggested incorporating an educational session that

specifically targeted women, the family caregivers, to learn how to incorporate healthy behaviors in daily life. Also, universal screening for health literacy level is recommended for all patients diagnosed with diabetes.

Research Implication

Health literacy involves making appropriate decisions about health. According to the Agency for Healthcare Research and Quality (AHRQ; 2015), family is a viable source in promoting literacy screening. In some cultures, family involvement in health decisions is common. In Arab culture, for example, health-related decisions are mainly family-based rather than individual (Hammad, 1999). For example, in the current study, some participants wanted to discuss their responses to the health literacy tool with family members prior to committing to an answer. However, since the health literacy tool is designed to be an individual effort to determine the ability to read and understand health-related material, family members were not permitted to assist participants with responses. Future research efforts could be used to develop a family-based health literacy tool.

The development of a health literacy tool focused on diabetes, with special emphasis on Arab culture is also highly needed. Therefore, future studies may consider the development of a culture-sensitive diabetes literacy tool examining diabetes-related literacy, numeracy skills and the link to diabetes self-care. The current study did not assess health literacy as mediator, therefore, testing health literacy as a mediator for diabetes self-care and social support is recommended.

Due to lack of consistency among previous studies and absence of associations in this study, further studies are needed to test the association of health literacy to diabetes self-care among individuals of Arab descent. Future researchers may consider using a larger sample and

examining the differences of health literacy and diabetes self-care among genders. In addition, future studies may explore the relationship of who is providing the social support and diabetes self-care behaviors.

Strengths

One strength of this study is the correlation of diabetes self-care to not only the diabetes self-care total scale, but also to sub-scales, which provided more accurate explanations for the analysis. Few studies considered examining the diabetes self-care subscales in addition to the total scale (Bouldin et al., 2017; Shin & Lee, 2018; Lee, Song & Im, 2017). Another strength of this study is the identification of diabetes self-care among individuals of Arabic descent using quantitative methods. Previous studies focused on diabetes self-care among AAs from qualitative perspectives (Bertran et al., 2015; DiZazzo-Miller et al., 2017; Fritz et al., 2016).

Limitations

This study has several limitiations. The first limitation is the use of a non-experimental descriptive design which resulted in the absence of a causal effect relationship. A second limitation is limited generalization to the overall population due to the small sample size, design, and targting only individuals of Arabic descent from two community based sites (ACC& ACCESS) . Finally, this study assessed health literacy level in this sample, but did not examine the association between health literacy and sociodemographic specific factors (gender, educational level) and diabetes self-care among individuals of Arab descent.

Conclusion

The purpose of this study was to describe the level of health literacy among individuals of Arabic descent living with diabetes, to examine the relationship between health literacy and diabetes self-care, and to examine the relationship between social support and diabetes self-care.

Specific to health literacy, nearly one-third of the sample (32.5%) showed inadequate health literacy levels with 19.5% marginal health literacy. This sample showed higher numeracy rates in the areas of reading appointment slips and blood glucose levels, but lower ability in reading medication labels. Health care professionals need to assess their patient's literacy level and confirm that they can properly read and understand their medication labels to reduce the incidence of errors. Also, education was correlated with health literacy. The higher the education level, the greater the health literacy score. The results of this study showed that participants reported higher levels of diabetes self-care in the areas of general diet and blood glucose testing, and lower levels of diabetes self-care in the areas of foot care and exercise. The development of interventions to improve diabetes foot care and culturally sensitive exercise programs may improve overall diabetic health. This study showed no statistically significant relationship between health literacy and diabetes self care or between social support and overall diabetes self care. Only the diabetes subscale of general diet, in this study, was associated social support by primarily family members.

In summary, despite the lack of association between variables, the information gained in this study will guide future research in ways to assess health literacy and diabetes self-care in the Arabic population. For health care professionals, the need to assess patient comprehension levels, the development of appropriate reading level Arabic educational tools, and the creation of culturally sensitive, gender specific diabetes self-care programs will lead to improve health outcomes.

APPENDIX A

Demographics Questionnaires

1- **Age**

- ☐ 19-29 Y/old
- ☐ 30-39 Y/old
- ☐ 40-49 Y/old
- ☐ 50-59 Y/old
- ☐ 60 Y/old and older

2- **Gender**

- ☐ Female
- ☐ Male

3- **Language preference:**

- ☐ Arabic
- ☐ English

4- **Please Specify your Country of birth?**

5- **What is your Country of Origin?**

6- **What is your Nationality?**

7- **How Long Have you been in the U.S?**

8- **Marital Status**

- ☐ Single, never married
- ☐ Married

☐Divorced

☐Separated

☐Widowed

Other: Please Specify ----------

9- Educational Level

☐Less than high school

☐ High school diploma

☐Associate degree

☐Bachelor degree

☐Graduate degree

☐Others: Please specify: ----------

10- Employment Statues

☐Unemployed

☐ Employed full-time

☐Employed part-time

☐Retired

☐Student

11- Annual Household Income

☐Less than $15,000

☐$15,001 to $35,000

☐$35,001 to 50,000

☐$50,001 and over

12- Have You ever been diagnosed with diabetes or told by your doctor or health care professionals you have diabetes?

☐ Yes

☐ No

13- Type of diagnoses

☐Diabetes type 1

☐ Diabetes Type 2

☐ I don't know

14- Family history of diabetes ☐ Yes ☐ No

15- Do you smoke?☐Yes ☐No

16- How many years have you had diabetes?

☐Less than one year: Number of months ---
☐1 - 5 years
☐6 - 10 years
☐11 years - 20 years
☐21 years and over

17- Please specify your age at diagnosis

18- Type of treatment
Insulin dependent ☐ Yes ☐ No

Oral diabetes medication(tablets) ☐ Yes ☐ No

19- Do you have good control of diabetes?☐ Yes ☐ No ☐ I don't know

)

إستبيان البيانات الديموغرافية
-------- :الرقم التعريفي للنموذج

1- العمر
١٩-٢٩ سنه□
٣٠- ٣٩ سنه□
٤٠-٤٩ سنه□
٥٠-٥٩ سنه□
٦٠ سنه او اكبر□

2- الجنس
انثي □
ذكر □

3 –اللغة المفضلة:
العربية □
الإنجليزية □

4- يرجى تحديد بلد ميلادك؟

5- ما هو بلدك الأصلي؟

6- ما هي جنسيتك؟

7- منذ متى وانت في الولايات المتحدة؟

8- الحالة الاجتماعية
عزباء لم يسبق لي الزواج /أعزب□
متزوجه/متزوج□
مطلقة /مطلق□
منفصلة /منفصل□
أرملة /أرمل□
)يرجى التحديد(غير ذلك □

9- المستوى التعليمي
أقل من الثانوي□
ثانوي□
شهادة دبلوم□
درجة البكالوريوس□
درجة دراسات عليا□

---------- :غير ذلك: يرجى التحديد

الوظيفة 10-
عاطله عن العمل /عاطل□
موظفه بدوام كامل /موظف□
موظفه بدوام جزئي /موظف□
متقاعده /متقاعد□
طالبه /طالب□

الدخل السنوي للعائلة -11
أقل من ١٥٠٠٠ دولار□
١٥٠٠١ دولار إلى ٣٥٠٠٠ دولار□
٣٥٠٠١ ـ ٥٠٠٠٠ دولار□
٥٠٠٠١ دولار وأكثر□

12- هل سبق أن تم تشخيصك بمرض السكري أو أخبرك طبيبك أو أخصائي الرعاية الصحية بأنك مصاب بمرض السكري؟
نعم□
لا□

13- نوع التشخيص
مرض السكري من النوع 1□
مرض السكري من النوع 2 □
لا أدري □

لا □نعم □14- هل هناك تاريخ عائلي لمرض السكري؟

لا □نعم □15- هل تدخن؟

16- كم عدد السنوات منذ تم تشخيصك بمرض السكري؟
اقل من سنه: عدد الأشهر_____□
سنه- ٥ سنوات□
٦سنوات-١٠ سنوات□
١١ سنه- ٢٠ سنه□
٢١ سنه او اكثر□

-17يرجى تحديد عمرك عندما تم التشخيص

18- نوع العلاج
إبر الأنسولين: نعم □ لا
لا حبوبنعم (دواء السكري عن طريق الفم□

19- هل مرض السكري لديك منتظم؟
نعم□لا أعرف□لا

APPENDIX B

The Summary of Diabetes Self- Care Activities (SDSCA)

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

Number of days

Diet

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

Exercise

5. 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).	0	1	2	3	4	5	6	7
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?	0	1	2	3	4	5	6	7

Blood Sugar Testing

7. On how many of the last SEVEN DAYS did you test your blood sugar?	0	1	2	3	4	5	6	7
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?	0	1	2	3	4	5	6	7

Foot Care

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

ملخص عن الانشطة المتعلقه بالعناية الشخصية لمرض السكري

الاسئلة الواردة ادناه هي عن الانشطة المتعلقة بعنايتك الشخصية لمرض السكري خلال السبعة الايام الماضية. اذا كنت مريضا خلال السبعة الايام الماضية , يرجى اعادة التفكير الى السبعة الايام الاخيرة التي لم تكن فيها مريضا.

	عدد الايام							
الغذاء :								
•كم يوم من الايام السبعة الماضية اتبعت نظاما غذائيا صحيا ؟	0	1	2	3	4	5	6	7
•على مدى الشهر الماضي ,وبمعدل كم يوم في الاسبوع, اتبعت نظاما غذائيا صحيا خاصا بك؟	0	1	2	3	4	5	6	7
•كم من الايام السبعة الماضية تناولت خمس حصص او اكثر من الفاكهة او الخضار؟	0	1	2	3	4	5	6	7
•كم من الايام السبعة الماضية تناولت الاطعمة ذات الدهون العالية مثل اللحوم الحمراء او منتجات الالبان الكاملة الدسم؟	0	1	2	3	4	5	6	7
ممارسة الرياضة :								
•كم من الايام السبعة الماضية مارست نشاط رياضي لمدة 30 دقيقة على الاقل (مجموع الدقائق من النشاط المتواصل, بما فية المشي)؟	0	1	2	3	4	5	6	7
•كم من الايام السبعة الماضية مارست تمرينا رياضيا معينا (مثل السباحة, المشى, ركوب الدراجة,) غير الذى تفعله في المنزل او كجزء من عملك؟	0	1	2	3	4	5	6	7
اختبار نسبة السكر في الدم:								
•كم من الايام السبعة الماضية فحصت نسبة السكر في الدم؟	0	1	2	3	4	5	6	7
•كم من الايام السبعة الماضية فحصت نسبة السكر في الدم اي عدد المرات التي اوصى بها الفريق الصحي؟	0	1	2	3	4	5	6	7
العناية بالقدم:								
•كم من الايام السبعة الماضيه قمت بفحص قدميك؟	0	1	2	3	4	5	6	7
•كم من الايام السبعة الماضية تفقدت ما بداخل حذائك؟	0	1	2	3	4	5	6	7

Scale Source: Sukkarieh, O. A. (2011). *The Relationship among Diabetes Self-Care Psychological Adjustment, Social Support and Glycemic Control in the Lebanese Population with Type 2 Diabetes Mellitus* (Doctoral dissertation, Northeastern University).

Source; Toobert, D. J., Hampson, S. E., & Glasgow, R. E. (2000). The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. *Diabetes Care*, *23*(7), 943-950.

APPENDIX C

استبانة مختصرة لقياس قدرة المريض على قراءة وفهم المعلومات المتعلقة بالرعاية الصحية

S-TOFHLA – Reading Test (Arabic version)

القراءة والاستيعاب

❖ **ما هي هذه الاستبانة؟**

هي مقياس لقدرة المريض على قراءة وفهم المعلومات المتعلقة بالرعاية الصحية كالتحضير لإجراء تشخيص ما والحقوق والمسؤوليات المتعلقة بالرعاية الصحية والدعم الصحي.

❖ **تعليمات هامة لتعبئة الاستبانة:**

- سنقدم لك بعض التعليمات/الجمل التي يكثر استخدامها في المجال الطبي التي ينقصها بعض الكلمات، المطلوب خلال قراءتك للجمل في الصفحات التالية: عندما تصادف جملة ناقصة (فراغ)، يوجد ٤ كلمات محتملة أسفل الفراغ، وسيكون لديك الخيار لاختيار كلمة واحدة فقط تناسب صياغ الجملة لوضعها في الفراغ حتى يستقيم معنى الجملة. حين يقع اختيارك على كلمة بعينها ضع دائرة حول الحرف المقابل لتلك الكلمة ثم انتقل للجملة التي تليها.
- عند الانتهاء من الصفحة الأولى، اقلب الصفحة وانتقل إلى الصفحة التي تليها واستمر هكذا حتى تنتهي من جميع الصفحات.

القطعة (أ): فيما يلي تعليمات لإجراء الأشعة السينية: -

أرسلك طبيبك لتجري أشعة سينية لـ _____ ، فيجب أن تكون معدتك _____عندما تأتي لاجرائها.

أ. المعدة
ب. داء السكري
ج. الغرز
د. الجراثيم

أ. ربو
ب. فارغة
ج. نكاح
د. فقر الدم

سوف _____ إجراء الأشعة السينية من ١ إلى ٣ _____.

أ. يستغرق
ب.يشاهد
ج. يتكلم
د. يبدو

أ. أسِرّة
ب. أدمغة
ج. ساعات
د. حمية غذائية

تعليمات اليوم الذي يسبق إجراء الأشعة السينية:

لا تتناول في وجبة العشاء سوى _____ من الفاكهة كوجبة خفيفة، و_____ ومربى، مع القهوة أو الشاي.

أ. القليل
ب. حساء
ج. هجوم
د. غثيان

أ. أصابع القدم
ب. حنجرة
ج. خبز محمص
د. فخذ

وبعد _____، يجب عليك ألا _____ أو تشرب أي شيء _____ حتى تنتهي من _____ الأشعة السينية.

أ. دقيقة
ب. منتصف الليل
ج. خلال
د. قبل

أ. سهل
ب. أكل
ج. شرب
د. تأكل

أ. مريض
ب. بتاتاً
ج. سوى
د. أي

أ. تجري
ب. أجريت
ج. إجراء
د. أجرى

تعليمات متعلقة بيوم إجراء الأشعة السينية.

لا تتناول طعام _____، ولا _____ حتى _____.

أ. الموعد.	أ. تقود	أ. القلب
ب. المباشر.	ب.تشرب	ب. النفَس
ج. الإفطار.	ج. تلبس	ج. الماء
د. العيادة.	د. تجرّع	د. السرطان

في حالة وجود أية _____، اتصل بـ_____ الأشعة السينية على الرقم ٠٥٣٧٧٢٢٢.

أ. أجوبة	أ. قسم
ب. تمارين	ب. إلتواء
ج. مسالك	ج. صيدلية
د. أسئلة	د. ألم الأسنان

أنا أعلم _____ إن لم يناسبني _____ المتخذ في حالتي، فإن لدي _____ بالاعتراض أو الاستئناف.

أ. لذلك
ب. هذا
ج. بأنه
د. من

أ. الزيجي
ب. الوظيفة
ج. البالغ
د. القرار

أ. الساطع
ب. اليسار
ج. الخطأ
د. الحق

بإمكاني _____ إجراء الاستئناف عن طريق الكتابة أو _____ بالجهة المسئولة التي قدمت إليها الطلب.

أ. طلب
ب. رفض
ج. فشل
د. إصلاح

أ. العد
ب. القراءة
ج. الاتصال
د. الشم

إذا _____ الحصول على دعم للحالات الصحية من مكتب الضمان الاجتماعي لأيٍ من _____ أسرتك

أ. غسلت
ب. أردت
ج. غطيت
د. لصقت

أ. أفراد
ب. تاريخ
ج. وزن
د. حزام الأمان

فإنه يتوجب عليك _____ نموذج طلب خاص، _____ سوف نستخدم _____ المدون على ذلك

أ. استرخاء
ب. كسر
ج. استنشاق
د. توقيع

أ. حيث أننا
ب. سواء
ج. إلا أننا
د. لأننا

أ. الرئة
ب. التاريخ
ج. الوجبة
د. حوضيّ

النموذج لتحديد _____ للحصول على الرعاية الطبية.

أ. نقص سكر الدم.
ب. أهليتك.
ج. هشاشة العظام.
د. انفصام الشخصية.

* * *

استبانة مختصرة لقياس قدرة المريض على فهم وإدراك الأرقام ذات العلاقة بالرعاية الصحية

S-TOFHLA – Numeracy Test

فهم وإدراك الأرقام

❖ **ما هي هذه الاستبانة؟**

هي مقياس لقدرة المريض على قراءة وفهم الأرقام المتعلقة بالرعاية الصحية كمواعيد تناول الدواء، أوراق المواعيد...الخ، المطلوب منك قراءة التعليمات والإجابة عن الاسئلة الاربعة القادمة شفهيًا.

الفقرة الأولى: ملصق علبة الدواء

تناول حبة واحدة بالفم كل ٦ ساعات عند الحاجة.

السؤال١: إذا أخذت الحبة الأولى الساعة ٧ صباحًا، متى يتوجب عليك تناول الحبة التالية؟

الإجابة١: .....

الفقرة الثانية: مستوى سكر الدم

المستوى الطبيعي للسكر بالدم يتراوح ما بين ٦٠ – ١٥٠، ومستوى السكر بالدم لديك لليوم ١٦٠.

السؤال٢: بناءً على ما سبق، هل مستوى السكر بالدم لديك طبيعي اليوم؟

الإجابة٢: .....

الفقرة الثالثة: موعد العيادة

العيادة: عيادة السكري الدور: الثالث

اليوم: الخميس تاريخ الموعد: ٢ أبريل الساعة: ١٠:٢٠ صباحًا

السؤال٣: بناءً على ما سبق، متى يكون موعدك؟

الإجابة٣: .....

الفقرة الرابعة: ملصق علبة الدواء

تناول الدواء على معدة فارغة قبل ساعة واحدة من تناول الطعام، أو بعد ساعتين إلى ثلاث ساعات من تناول الطعام، ما لم يوجهك الطبيب بغير ذلك.

السؤال٤: إذا أردت تناول طعام الغداء الساعة ١٢ ظهرًا، وتريد تناول الدواء قبل موعد طعام الغداء، في أي ساعة يجب عليك تناول الدواء؟

الإجابة٤: .....

Back-translated version of the Arabic version of the Short-Version of Functional Health Literacy in Adults (S-TOFHLA)

S-TOFHLA – Reading Test

WHAT IS THIS SURVEY?

The following survey measures the patient's ability to read and understand health care information such as preparation for a diagnostic procedure and medical care rights and responsibilities.

PREFACETHE READING COMPREHENSION EXERCISE WITH:

" The following sentences have some of the words missing. Where a word is missing, a blank line is drawn, and 4 possible words that could go in the blank appear just below it. You want you to figure out which of those 4 words should go in the blank, which word makes the sentence make sense. When you think you know which one it is, circle the letter in front of that word, and go on to the next one. When you finish the page, turn the page and keep going until you finish all the pages."

PASSAGE A: RELATED TO X-RAY PREPARATION

Your doctor has sent you to have a_____X-ray. You must have ---------- --- stomach when you come for it.

a. Stomach	a. Asthma
b. Diabetes	b. Empty
c. Stitches	c.Intercourse
d. germs	d. Anemia

The X-ray will_____from 1to3_____to do.

a. take	a. beds
b. view	b. brains
c. talk	c. hours
d. look	d. diet

INSTRUCTIONS ON THE DAY BEFORE THE X-RAY

For supper have only a_____snack of fruit,_____and jelly, with coffee or tea.

a. little	a. toes
b. broth	b. throat
c. attack	c. toast
d. nausea	d. thigh

After_____, you must not_____or drink anything at_____until after you have_____the X-ray

a. minute	a. easy	a. ill	a. are
b. midnight	b. ate	b. all	b. has

c. during	c. drank	c. each	c. had
d. before	d. eat	d. any	d. was

INSTRUCTIONS ON THE DAY OF THE X-RAY

Do not eat_____.Do not_____,even_____.

a. appointment	a. drive	a. heart
b. walk-in	b. drink	b. breath
c. breakfast	c. dress	c. water
d. clinic	c. dose	d. cancer

If you have any_____,call the X-ray_____at05377222.

a. answers		a. Department
b. exercises		b. Sprain
c. tracts		c. Pharmacy
	questions	d. Toothache

PASSAGE B: INSTRUCTIONS ABOUT MEDICAL AID PROGRAM RIGHTS AND RESPONSIBILITIES

I agree to give correct information to_____if I can receive medical aid.

a. hair
b. salt
c. see
d. ache

I_____to provide the related authority information to_____any related data given

a. agree
b. probe
c. send
d. gain

a. hide
b. risk
c. discharge
d. prove

in this_and hereby give permission to

a. emphysema
b. application
c. gallbladder
d. relationship

the___to get such proof.

a. inflammation
b. religion
c. iron
d. the related authority

I_____that for medical aid I must report any_____in my circumstances

a. investigate
b. entertain
c. understand
d. establish

a. changes
b. hormones
c. antacids
d. charges

within_____(10) days of becoming_____of the change.

a. Three
b. one
c. five
d. ten

a. award
b. aware
c. away
d. await

I understand_____if I DO NOT like the_____made on my case,

a. thus
b. this
c. that
d. than

a. marital
b. occupation
c. adult
d. decision

I have the_____to a fair hearing

a. bright
b. left
c. wrong
d. right

I can_____a hearing by writing or_____the related authority where I applied.

a. request
b. refuse
c. fail
d. mend

a. counting
b. reading
c. calling
d. smelling

If you_____to have health support from social security office

a. wash
b. want
c. cover
d. tape

for any of your family_____,

a. member
b. history
c. weight
d. seatbelt

you will have to_____a different application form.

a. relax
b. break
c. inhale
d. sign

___, we will use the_____on this form

a. Since
b. Whether

a. lung
b. data

c. However c. meal
d. Because d. pelvis

to determine your_____.

a. hypoglycemia.
b. eligibility.
c. osteoporosis.
d. schizophrenia

S-TOFHLA – Numeracy Test

The followings test the patient's ability to understand numbers related to health care services such the times for taking medication and appointment time. You need to read the following 4 items and answer the questions verbally.

Item 1: Label on prescription bottle:

Take one tablet by mouth every 6 hours as needed.
Question: If you take your first ablet at 7:00a.m., when should you take the next one? Answer:----------

Item 2: Blood sugar level:

Normal blood sugar is 60–150. Your blood sugar today is 160.
Question: If this was your score ,would your blood sugar be normal today? Answer:---------

Item 3: Clinic appointment:

Clinic: Diabetic Location:3rd floor
Day:ThursdayDate:April 2nd Hour:10:20a.m. Question: Based on above details, when is your next appointment?
Answer: ----------

Item 4: Label on prescription bottle:

Takemedicationonemptystomachonehourbeforeortwotothreehoursafteramealunlessotherwisedirectedbyyourdoctor. Question: If you eat lunch at12:00noon, and you want to take this medicine before lunch, what time should you take it?
Answer: ----------

Source:Baker,D.W.,Williams,M.V.,Parker,R.M.,Gazmararian,J.A.,&Nurss,J.(1999).Developmentofa brieftesttomeasurefunctionalhealth literacy.*PatientEducCouns,38*(1),33-42.

Note: We did minor modifications on the original version after translation to fit Arabic culture.

APPENDIX D

Multidimensional Scale of Perceived Social Support

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the "1" if you **Very Strongly Disagree**
Circle the "2" if you **Strongly Disagree**
Circle the "3" if you **Mildly Disagree**
Circle the "4" if you are **Neutral**
Circle the "5" if you **Mildly Agree**
Circle the "6" if you **Strongly Agree**
Circle the "7" if you **Very Strongly Agree**

		Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree	Very Strongly Agree
1.	There is a special person who is around when I am in need.	1	2	3	4	5	6	7
2.	There is a special person with whom I can share joys and sorrows.	1	2	3	4	5	6	7
3.	My family really tries to help me.	1	2	3	4	5	6	7
4.	I get the emotional help & support I need from my family.	1	2	3	4	5	6	7
5.	I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7
6.	My friends really try to help me.	1	2	3	4	5	6	7
7.	I can count on my friends when things go wrong.	1	2	3	4	5	6	7
8.	I can talk about my problems with my family.	1	2	3	4	5	6	7
9.	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
10.	There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7
11.	My family is willing to help me make decisions.	1	2	3	4	5	6	7
12.	I can talk about my problems with my friends.	1	2	3	4	5	6	7

Source: Zimet, G.D., Powell, S.S., Farley, G.K., Werkman, S. &Berkoff, K.A. (1990). Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, 55, 610-17.

Appendix I: Arabic version of the Multidimensional Scale of Perceived Social Support (MSPSS)

إرشادات:

يتضمّن هذا الإستفتاء عدد من الإقتراحات التي تتعلّق بالدّعم الإجتماعي. إستعمل المقياس أدناه من 1 إلى 7 لتقييم كل بند من البنود من خلال وضع دائرة حول الرقم المناسب.

1 أعترض بشدة	2 أعترض باعتدال	3 اعترض قليلا	4 حيادي	5 أوافق قليلا	6 أوافق باعتدال	7 أوافق بشدة

1- هناك شخص مميّز بجانبي عندما أحتاجه.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2- هناك شخص مميّز أستطيع أن اشارك أفراحي و أحزاني معه.	1	2	3	4	5	6	7
3- عائلتي تحاول مساعدتي.	1	2	3	4	5	6	7
4- أنال مساعدة عاطفية ودعم من عائلتي.	1	2	3	4	5	6	7
5- هناك شخص مميّز هو/هي مصدر حقيقي للراحة لي.	1	2	3	4	5	6	7
6- أصدقائي يحاولون مساعدتي.	1	2	3	4	5	6	7
7- بامكاني الإعتماد على أصدقائي عندما تجري الأمور بشكل سيء.	1	2	3	4	5	6	7
8- بأمكاني التحدث عن مشاكلي مع عائلتي.	1	2	3	4	5	6	7
9- عندي أصدقاء استطيع ان اشارك أفراحي و أحزاني معهم.	1	2	3	4	5	6	7
10- هناك شخص مميّز في حياتي يهتم بمشاعري.	1	2	3	4	5	6	7
11- عائلتي ترغب في مساعدتي لإتخاذ القرارات.	1	2	3	4	5	6	7
12- أستطيع أن أتحدث عن مشاكلي مع أصدقائي.	1	2	3	4	5	6	7

Source; Merhi, R., &Kazarian, S. S. (2012). Validation of the Arabic translation of the Multidimensional Scale of Perceived Social Support (Arabic-MSPSS) in a Lebanese community sample. *Arab Journal of Psychiatry*, *23*(2), 159-168.

REFERENCES

Abdel-Latif, M., & Saad, Y. (2017). Health literacy among Saudi population: A cross-sectional study. *Health Promotion International*. doi:10.1093/heapro/dax043

Abuelezam, N. N., El-Sayed, A. M., &Galea, S. (2018). The health of Arab Americans in the United States: an updated comprehensive literature review. *Frontiers in Public Health*, *6*.

Abuyassin, B., &Laher, I. (2016). Diabetes epidemic sweeping the Arab world. *World Journal of Diabetes*, *7*(8), 165.

Alkhaldi, T. M., Al-Jumaili, A. A., Alnemer, K. A., Alharbi, K., Al-Akeel, E. S., Alharbi, M. M., ... & Khoja, A. (2018). Measuring the health literacy level of Arabic speaking population in Saudi Arabia using translated health literacy instruments. *Pharmacy Practice*, *16*(3).

Agency for Healthcare Research and Quality. (2015). *Health literacy universal precautions toolkit; consider culture customs and beliefs: tool#10*. Retrieved from https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/healthlittoolkit2-tool10.html

Ajrouch, K. J. (2005). Arab-American immigrant elders' views about social support. *Ageing &Society*, *25*(5), 655-673.

Ajrouch, K. J., &Antonucci, T. C. (2018). Social relations and health: Comparing "Invisible" Arab Americans to blacks and whites. *Society and Mental Health*, *8*(1), 84-92.

Al Sayah, F., Majumdar, S. R., Williams, B., Robertson, S., & Johnson, J. A. (2013). Health literacy and health outcomes in diabetes: A systematic review. *Journal of General Internal Medicine, 28*(3), 444-452.

Al-Jumaili, A. A., Al-Rekabi, M. D., &Sorofman, B. (2015). Evaluation of instruments to assess health literacy in Arabic language among Iraqis. *Research in Social and Administrative Pharmacy*, *11*(6), 803-813.

Al-Kaabi, M., Al Maskari, F., Cragg, P., Afandi, B., &Souid, K. (2015). Illiteracy and diabetic foot complications. *Primary Care Diabetes, 9*(6), 465–472.http://dx.doi.org/10.1016/j.pcd.2015.04.008

Al-Sharbatti, S. S., Abed, Y. I., Al-Heety, L. M., &Basha, S. A. (2016). Spousal concordance of diabetes mellitus among women in Ajman, United Arab Emirates. *Sultan Qaboos University Medical Journal*, *16*(2), e197

Alamari1 B, Aljasir B, Habadi M (2017) Assessing the Level of Health Literacy among Adult Visitors in the Primary Health Care Sitting of National Guard Health Affair, Jeddah Saudi Arabia. *Imperial Journal of Interdisciplinary Research (IJIR)* 3(10): 645 -654.

Alghafri, T., Alharthi, S. M., Al Farsi, Y. M., Bannerman, E., Craigie, A. M., & Anderson, A. S. (2017). Perceived barriers to leisure time physical activity in adults with type 2 diabetes attending primary healthcare in Oman: a cross-sectional survey. *BMJ open*, *7*(11), e016946.

Alghodaier, H., Jradi, H., Mohammad, N. S., &Bawazir, A. (2017). Validation of a diabetes numeracy test in Arabic. *PloS One*, *12*(5), e0175442.

Ali, H. I., Baynouna, L. M., &Bernsen, R. M. (2010). Barriers and facilitators of weight management: perspectives of Arab women at risk for type 2 diabetes. *Health & Social Care In The Community*, *18*(2), 219-228.

AlJohani, K. A., Kendall, G. E., & Snider, P. D. (2016). Psychometric evaluation of the summary of diabetes self-care activities–arabic (SDSCA-Arabic) translation and analysis process. *Journal of Transcultural Nursing*, 27(1), 65-72.

Alkhaldi, T. M., Al-Jumaili, A. A., Alnemer, K. A., Alharbi, K., Al-Akeel, E. S., Alharbi, M. M., ... &Khoja, A. (2018). Measuring the health literacy level of Arabic speaking population in Saudi Arabia using translated health literacy instruments. *Pharmacy Practice*, *16*(3).

Almaleh, R., Helmy, Y., Farhat, E., Hasan, H., &Abdelhafez, A. (2017). Assessment of health literacy among outpatient clinics attendees at Ain Shams University Hospitals, Egypt: A cross-sectional study. *Public Health,151,* 137–145.doi:10.1016/j.puhe.2017.06.024

American Diabetes Association. (2017a). *Statistics about diabetes*. Retrieved from http://www.diabetes.org/diabetes-basics/statistics/

American Diabetes Association (2017 b). *Facts about type 2diabetes*. Retrieved from http://www.diabetes.org/diabetes-basics/type-2/facts-about-type-2.html

American Diabetes Association. (2018). *Diabetes basics home*. Retrieved from http://www.diabetes.org/diabetes-basics/?loc=db-slabnav

American Diabetes Association. (2019). Standards of Medical Care in Diabetes-2019. *The Journal of Clinical and Applied Research And Education: a Publication of the American Diabetes Association*, *42*(1), 11.

American Health literacy. (2008). *Why we need accessible health information*? Retrieved from https://health.gov/communication/literacy/issuebrief/

Arab American and Chaldean Council. (2019). *History of ACC*. Retrieved from http://www.myacc.org/about-us/history-of-acc/

Arab American Institute Foundation (2015). *Michigan*. Retrieved from https://d3n8a8pro7vhmx.cloudfront.net/aai/pages/7706/attachments/original/1461267434/ Michigan_2015.pdf?1461267434

Arab American Institute. (2018). *Demographics*. Retrieved from https://www.aaiusa.org/demographics

Arab Community Center for Economic and Social Services. (2014). *Health & Wellness: Medical* Retrieved from: https://www.accesscommunity.org/health-wellness/medical

Aroian, K., Uddin, N., &Blbas, H. (2016). Longitudinal study of stress, social support, and depression in married Arab immigrant women. *Health Care for Women International*, *38*(2), 100-117.

Bains, S. S., &Egede, L. E. (2011). Associations between health literacy, diabetes knowledge, self-care behaviors, and glycemic control in a low-income population with type 2 diabetes. *Diabetes Technology & Therapeutics*, *13*(3), 335-341.

Baker, D. W., Williams, M. V., Parker, R. M., Gazmararian, J. A., &Nurss, J. (1999). Development of a brief test to measure functional health literacy. *Patient Education and Counseling*, 38, 33-42.

Badpar, S., Bakhtiarpour, S., Heidari, A., &Moradimanesh, F. (2019). Causal model of self-care based on social support and health literacy through self-efficacy in managing diabetes in diabetic patients. *Journal of Diabetes Nursing*, *7*(2), 752-763.

Bertran, E. A., Fritz, H., Abbas, M., Tarakji, S., DiZazzo-Miller, R., Pociask, F. D., ... & Jaber, L. A. (2015). The impact of Arab American culture on diabetes self- management education. *The Diabetes Educator*, *41*(6), 748-754.

Bertran, E. A., Pinelli, N. R., Sills, S. J., &Jaber, L. A. (2017). The Arab American experience with diabetes: Perceptions, myths and implications for culturally-specific interventions. *Primary Care Diabetes*, *11*(1), 13-19.

Bowen, P. G., Clay, O. J., Lee, L. T., Vice, J., Ovalle, F., & Crowe, M. (2015). Associations of social support and self-efficacy with quality of life in older adults with diabetes. *Journal of Gerontological Nursing*, *41*(12), 21-29.

Bouldin, E. D., Trivedi, R. B., Reiber, G. E., Rosland, A. M., Silverman, J. B., Krieger, J., & Nelson, K. M. (2017). Associations between having an informal caregiver, social support, and self-care among low-income adults with poorly controlled diabetes. *Chronic Illness*, *13*(4), 239-250.

Brunk, D. R., Taylor, A. G., Clark, M. L., Williams, I. C., & Cox, D. J. (2017). A culturally appropriate self-management program for Hispanic adults with type 2 diabetes and low health literacy skills. *Journal of Transcultural Nursing*, *28*(2), 187-194.

Campbell-Voytal, K. D., Schwartz, K. L., Hamade, H., Dallo, F. J., & Neale, A. V. (2018). Attitudes towards health research participation: a qualitative study of US Arabs and Chaldeans. *Family Practice*.

Center for Disease Control and Prevention. (2017). *National diabetes statistics report*. Retrieved from https://www.cdc.gov/diabetes/pdfs/data/statistics/national- diabetes-statistics-report.pdf

Centers for Disease Control and Prevention. (2016). *What is health literacy?* Retrieved from https://www.cdc.gov/healthliteracy/learn/index.html

Chen, P. Y., Elmer, S., Callisaya, M., Wills, K., Greenaway, T. M., &Winzenberg, T. M. (2018). Associations of health literacy with diabetic foot outcomes: a systematic review and

meta-analysis. *Diabetic Medicine*.

Dahal, P. K., &Hosseinzadeh, H. (2019). Association of health literacy and diabetes self-management: a systematic review. *Australian Journal of Primary Health*, *25*(6), 526-533.

DiZazzo-Miller, R., Pociask, F. D., Bertran, E. A., Fritz, H. A., Abbas, M., Tarakji, S., ... & Arnetz, J. (2017). Diabetes is devastating, and insulin is a death sentence: Provider perspectives of diabetes self-management in Arab-American patients. *Clinical Diabetes*, *35*(1), 43-50.

El-Haddam, A., Hallit, S., &Raad, E. B. (2018). Can diabetes self-management program improve patients' knowledge? a real-life evaluation study of Lebanese diabetic adults. *Journal of Pharmacy Practice and Community Medicine*, *4*(3).

Elsous, A., Radwan, M., Al-Sharif, H., & Abu Mustafa, A. (2017). Medications adherence and associated factors among patients with type 2 diabetes mellitus in the Gaza strip, Palestine. *Frontiers in Endocrinology*, *8*, 100. http://doi.org/10.3389/fendo.2017.00100

Eyüboğlu, E., & Schulz, P. J. (2016). Do health literacy and patient empowerment affect self-care behaviour? A survey study among Turkish patients with diabetes. *BMJ open*, *6*(3), e010186.

Fadda, M., Kanj, M., Kabakian-Khasholian, T., &` Johannes Schulz, P. (2016). Validation of three Arabic health literacy assessment tools in Lebanon. *Health Promotion International*, *33*(2), 261-267.

Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses, Behavior Research Methods, 41 (4), 1149-1160

Fawcett, J., &DeSanto-Madeya, S. (2013). *Contemporary nursing knowledge. Analysis and evaluation of nursing models and theories* (3rd ed). Philadelphia, PA: F.A. Davis Co.

Fritz, H., DiZazzo-Miller, R., Bertran, E. A., Pociask, F. D., Tarakji, S., Arnetz, J., ... & Jaber, L. A. (2016). Diabetes self-management among Arab Americans: patient and provider perspectives. *BMC International Health and Human Rights*, *16*(1), 22.

Ghasemi, M., Hosseini, H., &Sabouhi, F. (2019). Effect of peer group education on the quality of life of elderly individuals with diabetes: A randomized clinical trial. *Iranian Journal of Nursing and Midwifery Research*, *24*(1), 44.

Hassanein, M., Al-Arouj, M., Hamdy, O., Bebakar, W. M. W., Jabbar, A., Al-Madani, A., ... &Omar, M. A. K. (2017). Diabetes and Ramadan: practical guidelines. *Diabetes Research and Clinical Practice*, *126*, 303-316.

Hahn. E, Burns. J, Jacobs. E, Ganschow. P, Garcia. S, Rutsohn .J& Baker. D. (2015) Health Literacy and Patient-Reported Outcomes: A Cross-Sectional Study of Underserved English- and Spanish- Speaking Patients with Type 2 Diabetes, *Journal of Health Communication*, 20:sup2, 4-15

Hammad, A., Kysia, R., Rabah, R., Hassoun, R., & Connelly, M. (1999). Guide to Arab culture: Health care delivery to the Arab American community. *Dearborn, MI: Arab Community Center for Economic and Social Services (ACCESS)*.

Healthy People2020. (2018). *National Action Plan to Improve Health Literacy*. Retrieved fromhttps://health.gov/communication/HLActionPlan/pdf/Health_Literacy_Action_Plan.pdf

Hussein, S. H., Almajran, A., &Albatineh, A. N. (2018). Prevalence of health literacy and its correlates among patients with type II diabetes in Kuwait: A population based study. *Diabetes Research and Clinical Practice*, *141*, 118-125.

Jaber, L. A. (2003). Barriers and strategies for research in Arab Americans. *Diabetes Care*, *26*(2), 514-515.

Jaber, L. A., Brown, M. B., Hammad, A., Zhu, Q., & Herman, W. H. (2003). Lack of acculturation is a risk factor for diabetes in Arab immigrants in the US. *Diabetes Care*, *26*(7), 2010-2014.

Jamal, A., Khan, A., AlHumud, A., Al-Duhyyim, A., Alrashed, M., Bin Shabr, F., . . . Qureshi, R. (2015). Association of online health information–seeking behavior and self-care activities among type 2 diabetic patients in Saudi Arabia. *Journal of Medical Internet Research, 17*(8), e196. doi:10.2196/jmir.4312.

Jeragh-Alhaddad, Fatima B et al. (2015). "Barriers to medication taking among Kuwaiti patients with type 2 diabetes: a qualitative study." *Patient Preference and Adherence*, *9*, 1491-503. doi:10.2147/PPA.S86719

Jihye, J., Namhee, P., & So Young, S. (2014). The influence of health literacy and diabetes knowledge on diabetes self-care activities in Korean low-income elders with diabetes. *Journal of Korean Academy of Community Health Nursing, Jiyeog Sahoe Ganho Hakoeji, 25*(3), 217-224.

Kadirvelu, A., &SivalalSadasivan, S. H. N. (2012). Social support in type II diabetes care: a case of too little, too late. *Diabetes, metabolic syndrome and obesity: Targets and Therapy*, *5*, 407.

Karimy, M., Koohestani, H. R., &Araban, M. (2018). The association between attitude, self-efficacy, and social support and adherence to diabetes self-care behavior. *Diabetology &Metabolic Syndrome*, *10*(1), 86.

Kim, S. H., & Lee, A. (2016). Health-literacy-sensitive diabetes self-management interventions: A systematic review and meta-analysis. *Worldviews on Evidence-Based Nursing, 13*(4), 324-333. doi:10.1111/wvn.12157

Koetsenruijter, J., van Eikelenboom, N., van Lieshout, J., Vassilev, I., Lionis, C., Todorova, E., ... &Angelaki, A. (2016). Social support and self-management capabilities in diabetes patients: An international observational study. *Patient Education and Counseling*, *99*(4), 638-643.

Kumar, C. P. (2007). Application of Orem's self-care deficit theory and standardized nursing languages in a case study of a woman with diabetes. *International Journal of Nursing Terminologies and Classifications*, *18*(3), 103-110.

Leszko, M., &Timoszyk-Tomczak, C. (2019). Correlates of health literacy among polish immigrants with chronic health conditions: Preliminary results. *Gerontology and Geriatric Medicine*, *5*, 2333721419894772.

Lee, S. J., Song, M., &Im, E. O. (2017). Effect of a health literacy–considered diabetes self-management program for older adults in South Korea. *Research in GerontologicalNursing*, *10*(5), 215-225.

Logan, R. A., & Siegel, E. R. (Eds.). (2017). *Health Literacy: New Directions in Research, Theory and Practice* (Vol. 240). IOS Press.

Maleki, S., Ansarimoghadam, A., Masoudy, G., Rakhshani, F., & Damani, E. (2017). Analysis of the effect of training on the health literacy, awareness and behavior of diabetic type II patients, referring to the clinics of Zahedan within 2014. *American Scientific Research Journal for Engineering, Technology, and Sciences, 32*(1), 215-225.

Maneze, D., Everett, B., Astorga, C., Yogendran, D., &Salamonson, Y. (2016). The influence of health literacy and depression on diabetes self-management: a cross-sectional study. *Journal of Diabetes Research*, *2016*.

Merhi, R., &Kazarian, S. S. (2012). Validation of the Arabic translation of the Multidimensional Scale of Perceived Social Support (Arabic-MSPSS) in a Lebanese community sample. *Arab Journal of Psychiatry*, *23*(2), 159-168.

Mohebi, S., Parham, M., Sharifirad, G., Gharlipour, Z., Mohammadbeigi, A., &Rajati, F. (2018). Relationship between perceived social support and self-care behavior in type 2 diabetics: A cross-sectional study. *Journal of Education and Health Promotion*, *7*, 48. doi:10.4103/jehp.jehp_73_17

Mohammadi, Z., Tehrani Banihashemi, A., Asgharifard, H., Bahramian, M., Baradaran, H. R., & Khamseh, M. E. (2015). Health literacy and its influencing factors in Iranian diabetic patients. *Medical Journal of the Islamic Republic of Iran*, *29*, 230.

Niknami, M., Mirbalouchzehi, A., Zareban, I., Kalkalinia, E., Rikhtgarha, G., &Hosseinzadeh, H. (2018). Association of health literacy with type 2 diabetes mellitus self-management and clinical outcomes within the primary care setting of Iran. *Australian Journal of Primary Health*, *24*(2), 162-170.

Nutbeam, D. (2000) Health literacy as a public goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15, 259–267.

Orem, D. (2001). *Nursing concepts of practice* (6th Ed) St. Louis, Mo: Mosby.

Osborn, C. Y., Bains, S. S., &Egede, L. E. (2010). Health literacy, diabetes self-care, and glycemic control in adults with type 2 diabetes. *Diabetes Technology & Therapeutics*, *12*(11), 913-919.

Pinelli, N. R., &Jaber, L. A. (2011). Practices of Arab American patients with type 2 diabetes mellitus during Ramadan. *Journal of Pharmacy Practice*, *24*(2), 211-215.

Pickett, S., Peters, R. M., & Jarosz, P. A. (2014). Toward a middle–range theory of weight management. *Nursing Science Quarterly*, *27*(3), 242-247.

Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice* (10th ed.). Lippincott Williams &Wilkins.

Protheroe, J., Rathod, T., Bartlam, B., Rowlands, G., Richardson, G., & Reeves, D. (2016). The feasibility of health trainer improved patient self-management in patients with low health literacy and poorly controlled diabetes: A Pilot Randomized Controlled Trial. *Journal of Diabetes Research*, *2016*.

Saeed, H., Saleem, Z., Naeem, R., Shahzadi, I., & Islam, M. (2018). Impact of health literacy on diabetes outcomes: a cross-sectional study from Lahore, Pakistan. *Public Health*, *156*, 8-14.

Salma, J., Keating, N., Ogilvie, L., & Hunter, K. F. (2018). Social dimensions of health across the life course: Narratives of Arab immigrant women ageing in Canada. *Nursing Inquiry*, *25*(2), e12226

Seibert, R. G., Winter, M. R., Cabral, H. J., Wolf, M. S., Curtis, L. M., & Paasche-Orlow, M. K. (2019). Health Literacy and Income Mediate Racial/Ethnic Asthma Disparities. *Health literacy research and practice*, *3*(1), e9–e18. https://doi.org/10.3928/24748307-20181113-01

Shara, N. M., Yassin, S. A., Abu-Bader, S. H., Getaneh, A., Browning, S., Zeymo, A., ... &Shin, K. S., & Lee, E. H. (2018). Relationships of health literacy to self-care behaviors in people with diabetes aged 60 and above: Empowerment as a mediator. *Journal of Advanced Nursing*, *74*(10), 2363-2372.

Shrivastava, S. R., Shrivastava, P. S., &Ramasamy, J. (2013). Role of self-care in management of diabetes mellitus. *Journal of Diabetes & Metabolic Disorders*, *12*(1), 14.

Strom, J. L., &Egede, L. E. (2012). The impact of social support on outcomes in adult patients with type 2 diabetes: a systematic review. *Current Diabetes Reports*, *12*(6), 769-781.

Sukkarieh-Haraty, O., & Howard, E. (2015). Is social support universally adaptive in diabetes? A correlational study in an Arabic-speaking population with type 2 diabetes. *Holistic Nursing Practice*, *29*(1), 37-47.

Sukkarieh-Haraty, O., & Howard, E. (2016). Psychometric properties of the Arabic version of the summary of diabetes self-care activities instrument. *Research and Theory for Nursing Practice*, *30*(1), 60-69.

Tang, T. S., Brown, M. B., Funnell, M. M., & Anderson, R. M. (2008). Social support, quality of life, and self-care behaviors among African Americans with type 2 diabetes. *The Diabetes Educator*, *34*(2), 266-276.

Timraz, S. M., Alhasanat, D. I., Albdour, M. M., Lewin, L., Giurgescu, C., &Kavanaugh, K. (2017). Challenges and strategies for conducting sensitive research with an Arab American population. *Applied Nursing Research*, *33*, 1-4.

Toobert, D. J., Hampson, S. E., & Glasgow, R. E. (2000). The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. *Diabetes Care*, *23*(7), 943- 950.

Tseng, H. M., Liao, S. F., Wen, Y. P., & Chuang, Y. J. (2017). Stages of change concept of the trans-theoretical model for healthy eating links health literacy and diabetes knowledge to glycemic control in people with type 2 diabetes. *Primary Care Diabetes, 11*(1), 29–36.

Usman, A. M., &Pamungkas, R. A. (2018). A Social-ecological approach to determine barriers of DMSM practice for patients with type 2 diabetes mellitus: A literature review. *International Journal of Nursing and Health Services (IJNHS)*, *1*(1), 1-20.

Vandenbosch, J., Van den Broucke, S., Schinckus, L., Schwarz, P., Doyle, G., Pelikan, J., ... &Terkildsen-Maindal, H. (2018). The impact of health literacy on diabetes self-management education. *Health Education Journal*, *77*(3), 349-362.

Walker, R. J., Gebregziabher, M., Martin-Harris, B., &Egede, L. E. (2014). Understanding the influence of psychological and socioeconomic factors on diabetes self-care using structured equation modeling. *Patient Education and Counseling*, *98*(1), 34-40.

Wångdahl, J., Lytsy, P., Mårtensson, L., &Westerling, R. (2014). Health literacy among refugees in Sweden–a cross-sectional study. *BMC Public Health*, *14*(1), 1030.

Withidpanyawong, U., Lerkiatbundit, S., &Saengcharoen, W. (2018). Family-based intervention by pharmacists for type 2 diabetes: A randomised controlled trial. *Patient Education and Counseling*, *102*(1), 85-92.

World Health Organization. (2013). *Health literacy: The solid fact*. retrieved from http://www.euro.who.int/__data/assets/pdf_file/0008/190655/e96854.pdf

Youssef N. F.A, 2. Al Sebaee, H. (2018). Functional health literacy and associated factors among Egyptian hospitalized patients: a cross-sectional study. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 7, (*4*), 38-44.

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, 52, 30–41.

Zimet, G.D., Powell, S.S., Farley, G.K., Werkman, S. &Berkoff, K.A. (1990). Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, 55, 610-17.

ABSTRACT

HEALTH LITERACY, SOCIAL SUPPORT, AND DIABETES SELF-CARE AMONG INDIVUDALS OF ARAB DESCENT

by

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Introduction/Objectives: Individuals of Arabic descent who live in the United States are at increased risk of diabetes because the Middle Eastern and North African regions have the second highest global rate of the disease which, is also projected to increase by over 95% by 2035. Diabetes self-care involves seven essential behaviors, including: (1) eating a healthy diet, (2) being physically active, (3) being compliant with medication, (4) monitoring blood glucose, (5) having good coping skills, (6) being able to problem-solve, and (7) engaging in health risk reduction behaviors. Inadequate health literacy and poor social support have been associated with poor diabetes self-care. The link between diabetes self-care and health literacy among people of Arabic descent living in the United States remains unclear. No studies have been identified as featuring investigations of the level of health literacy among this group, nor have they clarified the links between health literacy and diabetes self-care behaviors. Such behaviors' association with social support also merits further investigation. The overarching aim of this study is to investigate the level of health literacy among this population and to examine the relationship between perceived social support and health literacy, and diabetes self-care

behaviors in individuals of Arabic descent who have diabetes (type 1 and type 2). For convenience, the study will be restricted to those living in Michigan. **Method:** Non-experimental descriptive correlational design comprised a convenience sample of 83 individuals of Arabic descent living in Michigan who have diabetes. Participants were older than 18, may be male or female. Data gathered using four questionnaires: Summary of Diabetes Self-Care Activities, Multidimensional Scale of Perceived Social Support, Short- Test of Functional Health Literacy in Adult. and demographic diabetes-related characteristics. SPSS version 25. Multiple linear regression and Spearman correlation performed to find the relationship between variables and identify whether social support and health literacy predict diabetes self-care, as well as to test the magnitude and direction of any such associations. **Result:** 48.1 % of participants had adequate health literacy, 32.5% had inadequate health literacy, and only 19.5% had marginal health literacy. Also, there was no evidance of statisticaly significant difference between health literacy and diabetes self care scale nor subscales (general diet, specific diet, excerscise, blood glucose testing, and foot care). Also, Spearman correlation revealed no significant direct effect between social support and diabetes self care and subscales (specific diet, excersice, foot care and blood glucose testing). Only subscales general diet, in current study, associated with social support mainly family. **Discussion/Implications:** Studies emphasized the need for further studies in regards to health literacy among a minority group of Arab immigrants. Furthermore, while current study revealed no evidance of statisticaly significant difference between health literacy and diabetes self care, it was shown in some studies featuring investigations of health literacy have shown inconsistent results regarding diabetes self-care behaviors. According to a set of studies, higher health literacy is linked to better diabetes self-care activities while other studies found no link exists. Further studies needed in regard to test the association of health literacy to

diabetes self-care among Arab. Future researchers may consider using a larger sample and examining the differences of health literacy and diabetes self-care among genders. In addition, future studies may explore the relationship of who is providing the social support and diabetes self-care behaviors.

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