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**DETERMINANTS OF SUCCESSFUL DIABETES SELF-MANAGEMENT BEHAVIORS
AMONG WOMEN OF ARAB DESCENT WITH TYPE 2 DIABETES**

by

MONA R. ALANAZI

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2020

MAJOR: NURSING

Approved by:

Advisor

Date

DEDICATION

This work is dedicated to my parents, without your continues support my success would not have been possible. I am grateful for your continues prayers to protect me and my family, I am thankful for you for teaching me hard work is worth the effort.

To my husband and partner in this journey, Talal, for his ongoing love and support. It would not have been possible without his support and encouragement. I am always and forever grateful for having you in my life. To my wonderful daughters, Sadan and Haneen, for filling my heart and life with joy and happiness. To my twins, Fahad and Mohammed, for doubling the joy in my life.

I am thankful to all of my family members, my sisters and brother, whose words of encouragement and push for success ring in my ears. I am thankful to my sisters and brothers in law who have never left my side and are very special. I also dedicate this dissertation to my many friends who have supported me throughout the journey. I will always appreciate all they have done.

Thank you all for helping to give me the life I have today.

ACKNOWLEDGMENTS

After all these years of being as a PhD nursing student, now is the time to write my final words on my dissertation by acknowledging those who stood for me all the way through this amazing journey. I would like to acknowledge my dissertation committee members for their continued support, guidance, commitment, and persistent advises to achieve my dream.

I would like to express my deepest appreciation to my doctoral advisor and my esteemed dissertation chair Dr. Nancy Hauff, for her expert guidance, continued encouragement and support throughout this journey. I would like also to thank my esteemed member of my committee Dr. Joan M Visger, if it is not for her continuous support, motivation, and guidance, I could not have succeeded. I would like also to acknowledge my two other dissertation esteemed committee members: Dr. Hossein Yarandi and Dr. Durrenda Onolemhemen, for their constant guidance and words of motivation that make me a better researcher. I would like to express my appreciation and gratitude to all of my committee esteemed members for their guidance, commitment, and persistent support to help me achieve my dream.

It was really an honor for me to have them in my committee and to learn from their expertise.

I would like to acknowledge the support of King Saud bin Abdulaziz University for Health Science for sponsoring my academic education. Special thanks to Wayne State University Graduate School and College of Nursing, and Blue Cross Blue Shield of Michigan (BCBSM) Foundation for their funds to support this dissertation.

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Chapter 1 “Introduction”

Background

Type 2 Diabetes (T2D) continues to be an escalating public health problem that contributes to increased morbidity and mortality worldwide (American Diabetes Association, 2017b). According to the National Diabetes Statistics Report (2017), approximately 30.3 million (9.4%) Americans have T2D. It accounted for 252,806 deaths in 2015 in the United States (Centers for Disease Control and Prevention [CDC], 2017). T2D requires life-long self-management and daily decision making. If not managed successfully, diabetes can cause serious health problems such as neuropathy, nephropathy, and retinopathy (American Diabetes Association, 2017a). Diabetes self-management (DSM) behaviors include healthy diet choices, physical exercise, blood glucose level monitoring, foot care, and medication adherence. These behavioral changes have been identified as challenges for diabetes care, and many patients with diabetes fail to adhere to DSM (García-Pérez, Álvarez, Dilla, Gil-Guillén, & Orozco-Beltrán, 2013). Thus, the patient plays a central role in treating and managing diabetes and diabetes-related complications.

Significant diabetes-related health disparities exist among ethnic minorities, as indicated by high prevalence of T2D, poor diabetes control, and high rates of diabetes-related complications (Peek, Cargill, & Huang, 2007). Little is known about diabetes control among Arab population living in the U.S., and there is a limited research specific to women of Arab descent in general.

Arab Population

Although the term White or Caucasian is used as a reference category for health comparisons in the United States, this classification encompasses a varied and heterogeneous group comprised of individuals from many different ethnic and cultural backgrounds (Office of Management and Budget, 1997). According to the Office of Management and Budget (1997),

“non-Hispanic White” refers to individuals who have origins from Europe, North America, or the Middle East (Arabs). Thus, designating these diverse ethnic minorities within one category, White, may obscure the identification of variations in health status that exist within this group. The Arab-American population is one such group; it has been found that Arabs have a higher prevalence of diabetes and hypertension compared to other groups within the same category (Aswad, 2001; Dallo & Borrell, 2006; Kridli, Herman, Brown, Fakhouri, & Jaber, 2006). This subgroup exhibits unique characteristics that not only distinguish Arabs from the rest of the U.S population but may also influence their successful DSM.

The majority of the Arab population is a collectivist society, which means that the needs of the group come before the individual’s needs (Mourad & Carolan, 2010). Each member of the Arab family has a unique role; however, women are responsible for the entire family, including household duties, childcare, and sustaining family stability. Therefore, they have a submissive role within the home structure. The husband, who is considered “Rab Albait” (God of the House) is responsible for the family financially (Mourad & Carolan, 2010).

Despite the heterogeneity of the Arab population, they still share the same values, beliefs, and cultural practices (Aboul-Enein & Aboul-Enein, 2010). Aspects of Arabic cultures such as family dynamics, significance of food, and preparation of food rituals may have a significant impact on their abilities to successfully manage diabetes (Aboul-Enein & Aboul-Enein, 2010).

Diabetes among Arab Population. No national statistics are available in the literature specific to the diabetes prevalence among the Arabs in the U.S. However, there is local studies done in Michigan. For example, a study done by Jaber and her colleagues in 2003 found that the rates of glucose intolerance were 32.3% for women and 49.8% for men among 626 participants. Diabetes is highly prevalent among Arab population in Michigan and represents a major clinical

and public health problem (Jaber, Brown, Hammad, Howak et al., 2003). Arabs have a higher prevalence of T2D compared to other groups in the U.S. including the African American and Hispanic populations (Jaber, Brown, Hammad, Howak et al., 2003; Aswad, 2001; Dallo & Borrell, 2006; Dallo, Schwartz, Ruterbusch, Booza, & Williams, 2012; Kridli et al., 2006). Moreover, the mortality rate of chronic diseases including diabetes and diabetes-related complications is higher among Arabs compared to the non-Hispanic White population (El-Sayed, Tracy, Scarborough, & Galea, 2011).

Diabetes Self-Management among Arab Population. Arabs exhibit worse diabetes management than the general population in the U. S. (Berlie, Herman, Brown, Hammad, & Jaber, 2008a). Indeed, 26% of Arabs had an HbA1c $> 9.5\%$ as compared to 18% of the rest of the U. S. population (Berlie et al., 2008a). HbA1c is a test to measure glucose level in the blood in the last 2-3 months. Even though diabetes and diabetes complication represent a significant problem among Arab population, they receive suboptimal care compared to other ethnic minorities in terms of diabetes treatment and self-management education (Berlie et al., 2008a; Berlie, Herman, Brown, Hammad, & Jaber, 2008b; Bertran et al., 2015; Jaber, Brown, Hammad, Howak et al., 2003). The effect of healthy behavioral changes is improved diabetes management, but the Arab population has a low prevalence for engaging in these preventive measures (Bertran, Pinelli, Sills, & Jaber, 2016). Lifestyle changes to manage diabetes require long term DSM adherence, which may be affected by many contextual factors. Factors that affect the Arab population's DSM activities include language barriers, Arab culture, lack of culturally sensitive education programs, stigma, folk remedies, diabetes myths, and patient-provider relationship (Bertran et al., 2015; Bertran et al., 2016; DiZazzo-Miller et al., 2017; Fritz et al., 2016).

Although research supports the efficacy of self-management behaviors in managing T2D, Arabs exhibit a low prevalence of engaging in these preventive measures (Bertran et al., 2016). Factors responsible for the high prevalence of T2D and its complications among the Arab population are not yet clear nor is it understood why this population is less likely to engage in self-management behaviors (Jaber, Brown, Hammad, Howak et al., 2003). Therefore, this study is designed to close the gap and describe DSM behavior of the women of Arab descent and highlight the factors that affect and predict DSM.

Diabetes among Women of Arab Descent. The prevalence of Type 2 diabetes is two to three times higher in men than in women (Hilding et al., 2006). However, women have a higher prevalence of diabetes-related complications (Deshpande, Harris-Hayes, & Schootman, 2008). A contributing factor may be women's taking care of others may lead to them neglecting their own care. Also, family support was associated with better HbA1C among males, but worse HbA1C in females with diabetes (Stopford, Winkley, & Ismail, 2013). To illustrate, males have more family support and females have less family support. Women may also be more vulnerable to the stresses of their social and family relations (Stopford et al., 2013). These findings highlight the importance of gender differences and suggest family support is an important influence on how families interact and support themselves around chronic diseases, including diabetes.

There are differences in the association between family influences and disease self-management based on patient gender. To illustrate, husbands with chronic illnesses benefit from support offered by their family and spouses more than wives with chronic diseases; whereas wives benefit from support offered by their friends more than the support that is offered by their families and spouses (Ofstedal, 2014; Stopford et al., 2013). Therefore, women with diabetes may receive less family support than men.

Few studies have been conducted to measure the feasibility of diabetes management interventions and to identify the factors that lead to successful diabetes management among the Arab community. Bertran et al. (2015) reported family factors in the Arab-American community impacts the ongoing DSM. However, family factors could be a source of stress (Fritz et al., 2016).

The diagnosis of a chronic health condition such as T2D alters an individual's lifestyle and may add unexpected anxiety and stress. The individual's family has a significant influence that either facilitates or impedes the new changes in patient's lifestyle for diabetes management and adaptation. The association between DSM and social/ family-support have been researched extensively in the literature in regard to children's health (Naranjo, Mulvaney, McGrath, Garner, & Hood, 2014b). However, the family influence on Arabic women's ability to maintain DSM is not clearly understood, nor is it clear its effects on their psychological adjustment to diabetes.

Problem Statement

Although the complications of T2D are a major threat to the health of women of Arab descent, there is lack of information about the health practices and diabetes self-management behaviors of this population. Moreover, the factors that influence the achievement of glycemic control and self-management practices of the women are still not understood. Given a dearth of such research, it is important to study factors that influence DSM among women of Arab descent with T2D living in U.S. The impact of diabetes knowledge, acculturation, social/ family support, and psychological adjustment to diabetes on DSM among this population warrants further investigation. Advancement of DSM practices among women of Arabic descent with T2D living in U.S. requires a better understanding of health and wellness needs as well as the determinants of healthy lifestyle practices.

Significance to Nursing

Extensive research in diabetes care has been conducted; however, there is a serious knowledge gap related to the factors that influence the achievement of glycemic control and self-management practices of the women of Arab descent. Moreover, there is lack of information regarding the health practices and self-management behaviors of this population. Accordingly, nursing must be able to determine to what degree DSM behaviors are unique to the women of Arab descent. Moreover, it is imperative that nursing be able to assess facilitators and barriers to successful DSM of women of Arab descent living in the U.S. Moreover, nursing should also be able to identify women who are more likely to have difficulty managing their diabetes. If healthcare providers could make accurate predictions in this regard, the greater the likelihood that diabetes would be managed with greater success among this population. The results of this study will highlight the significant factors that affect and predict DSM behaviors among Arab-American women with T2D.

Specific Aims and Hypothesis

The purpose of this dissertation is to examine the impact of diabetes knowledge, social/family support, acculturation, and psychological adjustment to diabetes on DSM behaviors and glycemic control among women of Arab descent utilizing the Roy Adaptation Model.

The specific aims of this study are the following:

Specific Aim 1: *To describe the prevalence of DSM behaviors and diabetes control (HbA1C) among women of Arabic descent with T2D.*

Specific Aim 2: *To investigate the relationship among diabetes knowledge, social/family support, acculturation, and psychological adjustment to diabetes on DSM behaviors and glycemic control among women of Arab descent.*

Hypothesis 1: There is an association between diabetes knowledge and DSM behaviors among women of Arabic descent with T2D.

Hypothesis 2: There is an association between social/family support and DSM behaviors among women of Arabic descent with T2D.

Hypothesis 3: There is an association between psychological adjustment to diabetes and DSM behaviors among women of Arabic descent with T2D.

Hypothesis 4: There is an association between acculturation and DSM behaviors among women of Arabic descent with T2D.

Hypothesis 5: Sociodemographic characteristics, physiologic characteristics, diabetes knowledge, social/family support, psychological adjustment to diabetes, and acculturation, predict DSM behaviors among women of Arabic descent with T2D.

Key Variables

This research included the following independent variables: diabetes knowledge, social support/family support, psychological adjustment to diabetes, and acculturation. The dependent variables is DSM behaviors and the glycemic control. The covariates for this study are the following: age, BMI, social economic status (employment and income), marital status, education, medical insurance coverage, and years of residence in the U.S.

Diabetes Knowledge

Theoretical definition. Knowledge of diabetes refers to possession of skills, information, and facts about diabetes that is gained through education or experience (Fonseca et al., 2012).

Operational definition. Diabetes knowledge was measured by the revised Michigan Diabetes Knowledge Test- Arabic version (DKT-2). The DKT-2 is a 23-items scale aimed to assess patients' general knowledge of diabetes including diet, exercise, blood glucose levels, and

testing and self-care activities. It was revised and updated in 2016 based on the current education and diabetes care standards. Both Arabic and English version were used.

Social Support/Family Support

Theoretical definition. The relationship between the individual with diabetes and his/her family and friends as a source of gaining information and emotional support to adhere to the diabetes regimen (Fitzgerald et al., 1996).

Operational definition. Social support was measured by the subscale Social Support Scale (SSS) which obtained from the Diabetes Care Profile (DCP), which assesses the support received by patients with diabetes, and developed by Fitzgerald et al. (1996). Both Arabic and English version were used. The DCP includes 14 scales with 234 items.

Psychological Adjustment to Diabetes

Theoretical definition. The ability to manage the emotions related with adjustment to diabetes (Polonsky et al., 1995).

Operational definition. Psychological adjustment was measured by Problem Area in Diabetes (PAID) scale that assesses diabetes related distress and psychological adjustment in carrying out DSM (Polonsky et al., 1995). Both Arabic and English version were used.

Acculturation

Theoretical definition. Acculturation has been defined as “Culture change that is initiated by the conjunction of two or more autonomous cultural system” (Clark & Hofsess, 1998, p. 37).

Operational definition. Acculturation was measured by the Acculturation Rating Scale for Arab Americans-II, both Arabic and English version were used (Jadalla & Lee, 2015).

Diabetes Self-Management

Theoretical definition. The tasks of the necessary healthcare behaviors to manage the routine diabetes tasks in order to improve health status (Toobert & Glasgow, 1994).

Operational definition. The DSM was measured by the Diabetes self-care activities (SDSCA). Both Arabic and English version were used.

Glycemic Control

For the purpose of this dissertation, glycemic control is defined as good, acceptable or poor when the HbA1C levels is less than 7%, 7% to 8% and more than 8%, respectively.

Demographic Characteristics

The covariates for this study are the following: age, social economic status (employment and income), marital status, education, medical insurance coverage, years of residence in the U.S. and BMI. These covariates were measured by the Demographic Data form developed by the principal investigator for the purpose of this study. In addition, study's participants were asked about the duration of their type 2 diabetes, type of treatment, number of comorbidities, and the number of diabetes-related medical complications.

Chapter 2 “Theoretical Framework and Literature Review”

This chapter presents an overview of research conducted on the diabetes literature that used Roy’s theory of adaptation, diabetes knowledge, acculturation, psychological adjustment to diabetes, and social/ family support in relation to DSM and glycemic control. The final section summarizes related research in Arab-American women, highlighting the gaps in the literature and the contributions that this study made to the health care field in the U.S.

Theoretical Framework

The proposed theoretical framework was developed deductively based on Roy’s Adaptation Model and the current literature on diabetes self-management among women of Arab descent. The use of nursing theoretical framework is imperative to provide logical hypothesized relationships among the concepts. In addition, integrating the current literature related to the phenomena provides a comprehensive understanding of the phenomena and helps to define each concept theoretically and empirically. Moreover, utilizing both, the nursing framework and the literature, hypothesize the theoretical assumptions and the relationships between the concepts.

Roy Adaptation Model

Roy Adaptation Model (RAM), Figure 1, was developed by Sr. Callista Roy in 1970, which was further refined through the 1970s and 1980s (Roy, 1997). RAM was developed when Roy was challenged by the nurse theorist Dorothy Johnson to develop a conceptual nursing framework during her graduate education at the University of California in 1960s. Roy was inspired by the ability of children to adapt with an illness during her clinical practice as a pediatric nurse. This inspiration gave Roy the idea that “adaptation” could be a useful concept to build a conceptual nursing model and nursing theory. Moreover, Roy thought about the nurses’ ability and role in

promotion of adaptation of their patients, and how they can play an integral role in enhancing and promoting the adaptation process.

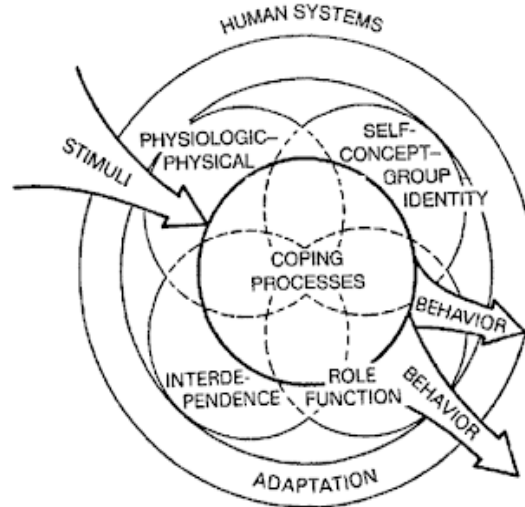


Figure 1. Roy Adaptation Model

According to Roy, an individual is viewed as an adaptive system who receive input through focal, contextual, and residual stimuli. A stimulus is defined as that which arouses a response within the adaptive system. The focal stimuli are the internal or external stimulus most immediately in the awareness of the human system; the event that most present in the consciousness which is the diagnoses T2D. The contextual stimuli are all other factors that present in the situation that contribute to the influence of the focal stimuli including the sociodemographic and physiologic characteristics of the women with T2D. Residual stimuli are all the background factors that its effects are not yet clear on the individual's situation such as, individual's beliefs or attitudes that may influence the situation. (Roy & Andrews, 1999).

According to the model, any stimuli trigger coping mechanisms that consider as the control process of the individual. These coping mechanisms are divided into two subsystems: physiologic mechanisms and cognator subsystem of cognitive-emotive mechanisms. As a sequence, these two

mechanisms result in four adaptive behavioral responses: the physiologic mode (neurochemical responses), the psychosocial modes including the self-concept mode, the role function mode and the interdependence mode (Roy & Andrews, 1991). These four adaptive modes produce behaviors. According to Roy, these behaviors are classified as adaptive response or ineffective response. Adaptive behaviors are those that enhance the person's integrity in the face of environmental stimuli and promote wholeness of the human system (Roy & Andrews, 1991).

The Philosophical Background of Roy Adaptation Model. Roy's view of human being, environment, health, and nursing represents a reciprocal-interaction worldview. According to Roy, human beings seen as a holistic adaptive system who is in a continuous interaction with their environment (Roy & Andrews, 1999). Roy defined human beings as a combination of biological, psychological, social, and spiritual features, who interact with the external environment constantly to accomplish goals and maintain balance (Roy & Andrews, 1999). According to Roy, environment is viewed as all circumstances, situations, and influences that present around individuals and affect their adaptive systems. Roy classified environment as stimuli: focal, contextual, and residual (Roy & Andrews, 1999). Roy defined health as the process of being and becoming an integrated and complete person that as a result of the interaction with the environment (Roy & Andrews, 1999). Moreover, according to Roy, health is established by four integrated adaptive modes: physiologic, self-concept, role function, and interdependence (Roy & Andrews, 1999). Nursing is viewed by Roy as a science and the purpose of this scientific science is to promote adaptation. Roy also stated that nursing can be distinguished from other disciplines by specific activities as the nursing process.

From the ontological perspective of RAM, Roy believes in objectivism and subjectivism and valuing both qualitative and quantitative ways of gaining knowledge. The paradigm that most

closely aligns with the philosophical belief and epistemological perspective of the RAM is the totality paradigm. Nursing's phenomenon of concern on this paradigm focuses on the human as a whole being, the environment, and health (Barrett, 2002).

Developing Middle Range Theory. This study is guided by Roy Adaptation Model. Theoretical substruction is used to develop a Middle Range Theory (MRT) of Adaptation to Diabetes that is deduced from Roy's Adaptation Model. Theoretical substruction is a strategy that is used to generate a new MRT by identifying major concepts and the relationships among the concepts and arranging them into a diagram. The diagram consists of a vertical and horizontal structure that represents the theoretical and operational systems (Dulock & Holzemer, 1991). While the vertical axis represents a descending level of abstraction of each concept adapted from the original theory, the horizontal configuration represents the relational statements including propositions and hypotheses (Dulock & Holzemer, 1991). Figure 2 explains the substruction of the theoretical framework from Roy Adaptation Model.

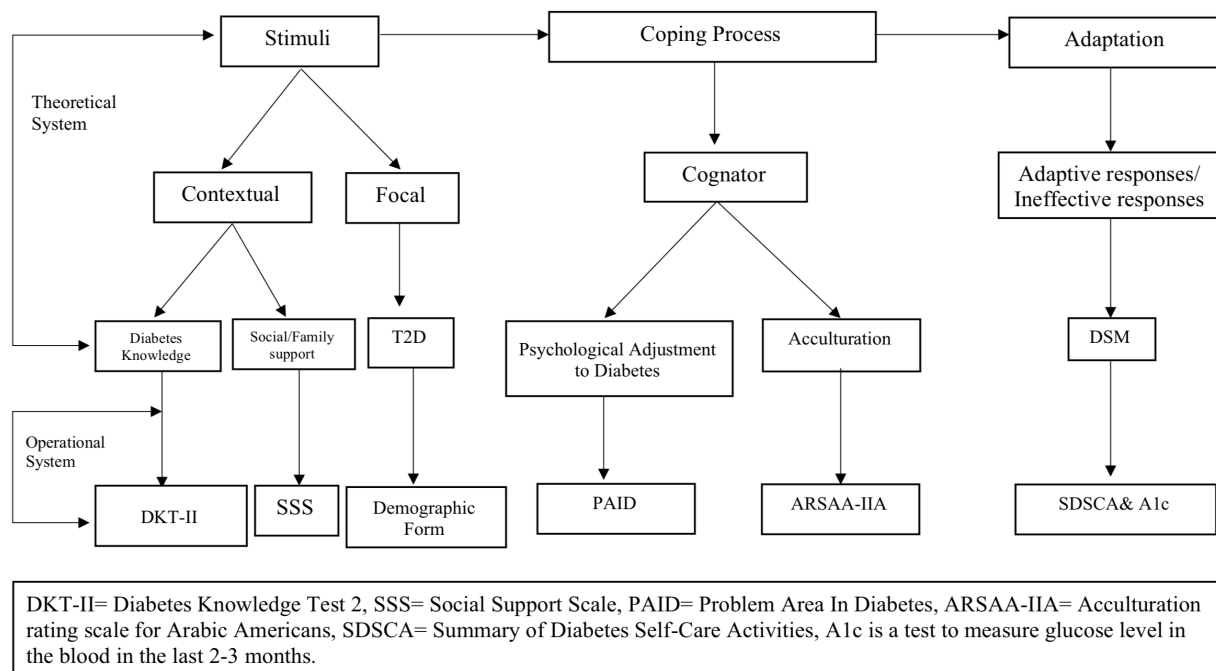


Figure 2. Pictorial Representation of the Substruction Model

For the purpose of this dissertation, some of RAM's concepts were utilized including stimuli (focal and contextual), coping process (cognator), and adaptation (adaptive response or ineffective response). These concepts were used to explain the relationship among this study's concepts.

The major concepts of this study are diabetes knowledge, social/family support, psychological adjustment to diabetes, acculturation, DSM behaviors, and glycemic control. In this study, the diagnosis of T2D is considered as the focal stimulus. Diabetes knowledge and social/family support are considered the contextual stimuli. Lack of diabetes knowledge or lack of social support may increase the risk of ineffective DSM. The psychological adjustment to diabetes and acculturation are proposed to be a cognator for the coping mechanisms. Finally, the adaptive response was effective DSM or ineffective DSM. Overall, RAM would help to predict the relationships among the concepts. Refer to figure 3, theoretical framework, for the proposed relationships among the concepts.

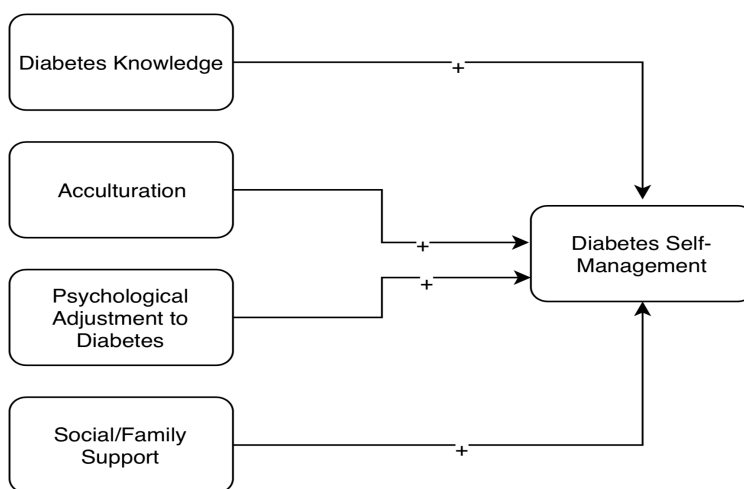


Figure 3. Theoretical framework.

Review of the Literature

Diabetes Management in the Arab Population

Although Arabs have a high rate of T2D in the U.S., their diabetes management is still worse than the rest of the U.S. population. This paper reviewed systematically all literature that focused on Arabs living in the U.S. and specifically on barriers and facilitators for diabetes management. The findings of this review would significantly help healthcare providers by consolidating research and providing directions for future interventions. Understanding the unique needs of this population can help providers modify currently practiced diabetes-management programs. Therefore, considering this review's recommendations will improve patient adherence to a diabetes regimen and improve health outcomes.

Significance to Nursing. Nurses are well positioned to advocate successful diabetes management among the Arab community, as primary care and complication prevention are major components of the nurse's role as a healthcare provider. However, there are no established programs or routines that assist nurses in improving diabetes among the Arab population (Saha et al., 2013). Identifying what might influence successful diabetes management among this minority group will help nurses adjust their practice to improve Arab's health status and reduce diabetes disparities among minorities.

Influencing Factors of Successful Diabetes Management Among the Arab Population: A systematic review

Factors that lead to diabetes disparities among different ethnic groups are not fully explained; however, cultural factors, such as significance of food in social gathering and food portion may play a significant role in diabetes management. Research has shown that interventions tailored to the Arab American population improve DSM significantly more than those developed

for the American population at large (Jaber et al., 2011). Despite many potential influencing factors, no study has attempted to describe them all, and to assess their impact on successful diabetes management in this population. In addition, there are no established programs or routines that would assist healthcare providers in better managing diabetes in the Arab American population. Thus, this literature review examined and critiqued the existing evidence regarding factors that influence diabetes management among the Arab's population living in the U.S. with the goal of improving health outcomes and reducing any diabetes-related disparities. Understanding the unique needs of this population can help health professionals modify current evidence-based practice diabetes-management strategies so they are more culturally appropriate and relevant to Arab Americans. The ultimate goal is to improve patient adherence to a diabetes regimen and improve health outcomes.

A systematic review was conducted to answer the following question: what are the known factors (barriers and facilitators) that influence successful diabetes management among the Arab population living in the U.S. Implications for future research and clinical practice were discussed based on findings from the review.

Identifying Relevant Studies

A comprehensive search of the literature was conducted in four databases (CINHAL, PubMed, Scopus, and PsycINFO), using Boolean combinations of the following search terms: diabetes, type 2 diabetes, self-management, and Arab American. A research librarian was consulted to determine the most effective strategies for searching each database. The reference lists of studies were also reviewed to ensure all relevant studies were included. The terms used for the search were purposely broad, to capture pertinent studies as much as possible. These search processes recognized studies until no new studies were identified. Both quantitative and qualitative

studies were included in this review to provide a comprehensive perspective of the phenomenon. No restriction on dates was applied due to the limited research conducted on the target population. Refer to figure 4 for a summary of the literature selection process.

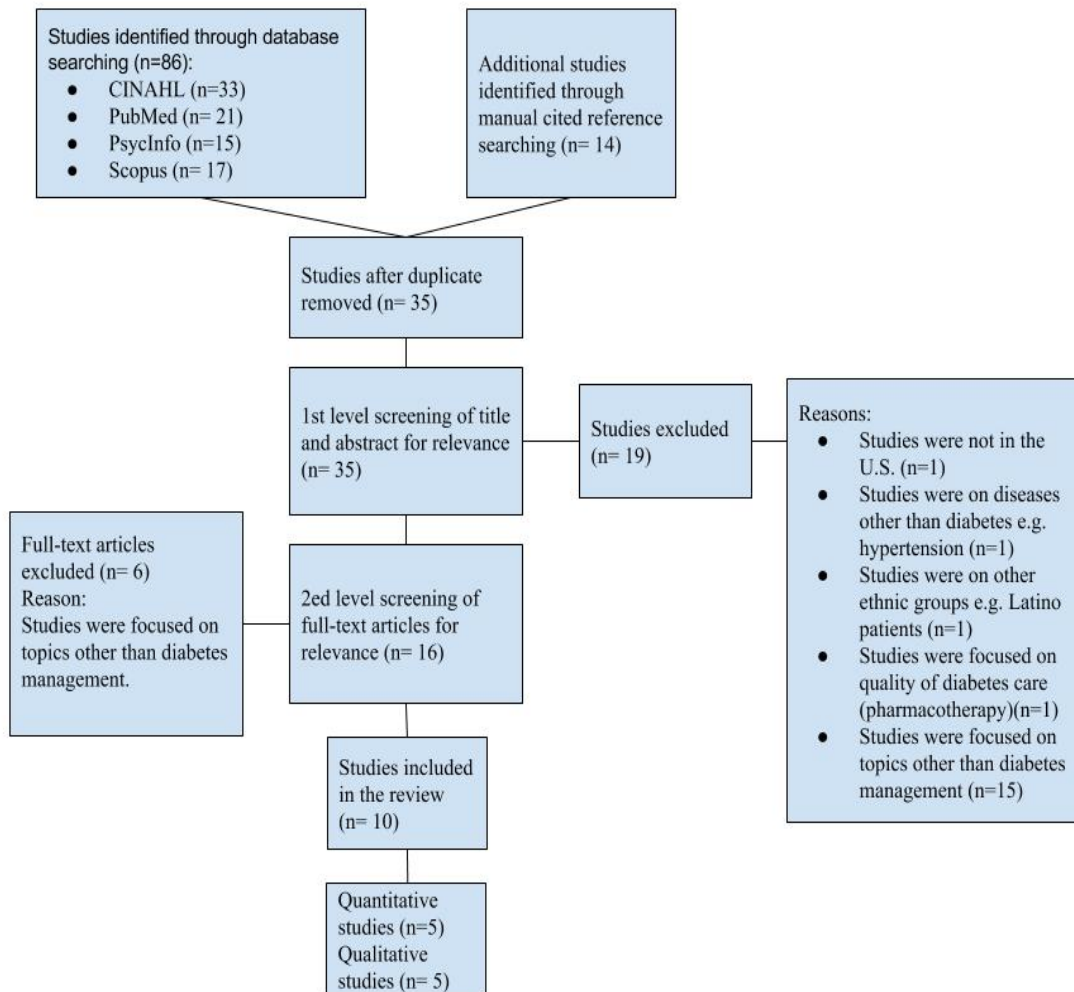


Figure 4. Summary of the literature selection process.

Study Selection

Each potential article identified was then examined in accordance with specific set inclusion and exclusion criteria.

Inclusion criteria. The inclusion criteria evaluated if each study focused on: (1) barriers, facilitators, challenges, and promoters for diabetes management and diabetes self-management, (2) the Arab American population, (3) full-text articles in English, and (4) original research.

Exclusion criteria. The following criteria were used to exclude studies. Articles were excluded if they were: (1) not on diabetes self-management, (2) conducted outside the U.S., (3) on patients other than Arab Americans, (4) focused on pharmacotherapy effects, and (5) focused on diseases other than diabetes.

The initial search of the four databases yielded a total of 86 citations plus 14 citations added through manual search of bibliographies of relevant published articles. After removing duplicate publications (65), 35 studies were identified for potential eligibility in this review. After screening titles and abstracts of the 35 articles according to stated inclusion and exclusion criteria, 16 studies were accepted for further review and full-text reading. Each of the remaining 16 studies were read in their entirety and evaluated according to set criteria. This analysis yielded a total of 10 studies, which were included in this review.

Study Characteristics

All the studies included only adult participants, ranging in age from 18 to 75 years. The samples were recruited mainly from clinics and public places in Dearborn, MI, and southeastern Louisiana. Data on ethnicity was reported in all studies and were exclusively Arab or Arab Americans. The sample sizes for quantitative studies ranged from 27 to 520 participants. The sample sizes for the qualitative studies ranged from 8 to 23 participants in 2 to 8 focus groups. Three studies included patients with T2D (Bertran et al., 2015; Fritz et al., 2016; Pinelli & Jaber, 2011), while six studies included healthy participants or adults at high risk for developing diabetes (Al-Dahir et al., 2013; Bertran, Pinelli, Sills, & Jaber, 2016; Jaber, Brown, Hammad, Zhu, &

Herman, 2003; Jaber et al., 2011; Pinelli, Brown, Herman, & Jaber, 2011; Pinelli, Herman, Brown, & Jaber, 2010). While most studies focused exclusively on patients, one paper looked at only healthcare providers (DiZazzo-Miller et al., 2017), and another examined both patients and healthcare providers (Fritz et al., 2016). Refer to APPENDIX C for a summary of the studies.

Results of the Review

There were two main themes that emerged from the analysis of these studies: (1) Patient-related factors and (2) Health provider-related factors.

Patient-Related Factors

Diabetes Knowledge. Type 2 diabetes (T2D) is a complex chronic illness that has many challenges for its successful management. A large part of this management falls on the individual. Self-management has a major influence on T2D outcomes, and with successful self-management, diabetic patients can sustain long and healthy lives. Many research studies have investigated knowledge in relation to diabetes and indicate that a low level of diabetes knowledge and awareness has been found as a major barrier in the management of diabetes (Al-Qazaz et al., 2011; McCleary-Jones, 2011). Therefore, educational programs are urgently needed to maximize the desirable diabetes outcomes. A large body of knowledge (Atak, Gurkan, & Kose, 2008; Funnell et al., 2009; Norris, Engelgau, & Narayan, 2001; Norris, Lau, Smith, Schmid, & Engelgau, 2002) supports the importance of DSM educational programs in diabetes management outcomes. In addition, research has also demonstrated that lack of proper educational program may lead to increase diabetes complications (Atak et al., 2008; Norris et al., 2002).

DSM educational programs should not only be comprehensive, but also tailored to the target group. For instance, Arabs exhibit unique characteristics that distinguish them from the rest of the U.S population. In this population, T2D is highly prevalent and these complications might

be due to the lack of the culturally sensitive educational programs. For instance, research has shown that interventions tailored to the Arab-American population improve DSM significantly more than those developed for the American population at large (Jaber et al., 2011).

Despite the heterogeneity of cultural values among the Arab-American population, Islam is the most practiced religion. The desire to participate in this religion, e.g., fasting during Ramadan, could supersede the advice of healthcare providers and potentially impede DSM (E. Bertran et al., 2015). Among Arabs, there is a common belief that fasting fosters physical and spiritual purification; however, fasting can contribute to hypoglycemia, a complication of diabetes. A subsequent study done by Pinelli and Jaber (2011) have shown that 73% of the participants reported less exercise frequency during Ramadan. According to the same study, even though the majority of the participants had consulted their healthcare providers for fasting prior to Ramadan (67%), most of them did not receive any education regarding medications (46%), risks of fasting (62%), indications to breakfasting (69%), meal plans (88%), and exercise (85%). Lack of patient education prior to Ramadan may contribute to the suboptimal practices reported (Pinelli & Jaber, 2011). Therefore, culturally and religious sensitive educational programs must be provided and discussed with women of Arabic descent living in the U.S.

Social/ Family Support. In diabetes literature, research has focused on the influence of family milieu of children with type 1 diabetes on children's adherence to diabetes treatment including insulin, diet, and physical activity. A variety of family-related variables have been identified that promote DSM. Positive family functioning, family cohesion, family communication, and family support were positively associated with children's adherence to diabetes management, glycemic control, and quality of life (DiMatteo, 2004; Naranjo, Mulvaney, McGrath, Garner, & Hood, 2014a; Pereira, Berg-Cross, Almeida, & Machado, 2008). On the

other hand, family-related variables could be also obstacles and oppose successful DSM. Family conflict, an absence of family support, and family rigidity are negatively associated with children's adherence to diabetes management (DiMatteo, 2004).

Similar to children and adolescents with type 1 diabetes, DSM of adults with T2D are affected by family-related factors. Research has suggested that family support assists family members by buffering diseases-related stress, enhancing self-efficacy, and promoting healthy lifestyle changes (DiMatteo, 2004; Miller & DiMatteo, 2013). Social support, which incorporates family support, was positively associated with better self-care and self-efficacy among patient with low health literacy (Osborn, Bains, & Egede, 2010). This suggests that for patients with limited health literacy, promoting social and family support may significantly enhance DSM and improved glycemic control. A similar result was found among Chinese diabetic patients. Social support has been found to impact glycemic control and self-management indirectly by affecting beliefs and self-efficacy (Yin Xu, Toobert, Savage, Pan, & Whitmer, 2008). Likewise, while there was no direct association between family support and glycemic control, there was a trend toward a protective association in diabetic patients with low level of cognitive functioning (Strizich et al., 2016). This would suggest that family support may buffer the effect of cognitive function on glycemic control. Other family behaviors have been found to be negatively associated with chronic diseases management outcome. In a systematic review study, high family control, high-structured family relationship, and family criticism were found to be associated with worse health outcome and worse diabetes control (Rosland, Heisler, & Piette, 2012)

Family support was one of the most important facilitators for successful diabetes management and weight loss among Arabs (DiZazzo-Miller et al., 2017; Pinelli et al., 2011). According to DiZazzo-Miller et al. (2017), support from family members could be a “watchful

eye,” helping a patient maintain a good diet and avoid sweets and overeating. According to the same study, even children and grandchildren could be supportive by encouraging older patients with diabetes to exercise. In another study, (Pinelli et al., 2011), family support was a very important factor for successfully reach the 7% weight loss goal after providing educational intervention to prevent T2D. However, family support was measured only by the attendance of a family member with the participant. Family support can include various behaviors and not only the presence of a family member during the participation of the client in any type of intervention.

Psychological Adjustment to Diabetes. T2D usually occurs later in life at time when people have already established life routines and close relationships. Therefore, adjustment to the new changes have been identified as challenges for the majority of patients (García-Pérez et al., 2013).

Psychological adjustment to diabetes defined as the ability to manage undesirable emotions related with general adjustment to DSM (Polonsky et al., 1995). Diabetes-related psychological distress is well-known to be correlated with poor glycemic control and DSM (Polonsky, Anderson, Lohrer, & Welch, 1995; Serge, Agnes, Serge, & Agnes, 2001). Previous research has reported the importance of psychological concerns, problem solving ability, and collaborative care to support patients with their adaptation to diabetes (Lorig et al, 2001; Piatt et al, 2006; Siminerio et al, 2005; Siminerio, 2008; Weigner & Leighton, 2008). Psychological issues including depression may act as barriers to successful DSM (McKellar, Humphreys, & Piette, 2004; S. T. Miller & Elasy, 2008; Peyrot et al., 2005). These factors must be considered to maximize desirable outcomes, successful adaptation to diabetes. It is imperative to examine the extent to which psychosocial adjustment to diabetes protect, or buffer, women of Arab descent from the negative consequences like diabetes-related complications through their DSM and adaptation to diabetes.

Acculturation. Acculturation has been defined as “Culture change that is initiated by the conjunction of two or more autonomous cultural system” (Clark & Hofsess, 1998, p. 37). According to Berry (2005), Acculturation also means changes in cultural attitudes, values, and behaviors. Moreover, these changes may include changes in diet habits and health practices (Berry, 2005). Previous research has suggested that a correlation exists among acculturation, lifestyle behaviors, and other risk factors that may result in higher incidence of diabetes among immigrants in the U.S. (Kandula et al., 2008; Mainous III et al., 2006; Y Xu, Pan, & Liu, 2011).

Findings from research that have investigate the correlation between acculturation and diabetes risk have found inconsistent results. For example, Hara, Egusa, and Yamakido (1996), found that increasing acculturation is associated with higher diabetes risk among Japanese Americans. On the other hand, according to Jaber, Brown, Hammad, Zhu, and Herman (2003), a lack of acculturation is a risk factor for diabetes among Arab-American women. Another study by Al-Dahir et al., (2013) found that a negative correlation was exist between Arab acculturation related variables and diabetes risk among males and American acculturation related variables among females. These findings highlight the inconsistent results depend on the immigrants’ country of origin. Therefore, the associations between acculturation, and DSM behaviors among women of Arab descent have not been well studied.

Religious Beliefs. Despite the heterogeneity of cultural values among the Arab-American population, Islam is the most practiced religion. The desire to participate in this religion, e.g., fasting during Ramadan, could supersede the advice of healthcare providers and potentially impede diabetes self-management (Bertran et al., 2015). Among Arab Americans, there is a common belief that fasting fosters physical and spiritual purification; however, fasting can lead to diabetes complication such as hypoglycemia. A subsequent study done by Pinelli and Jaber (2011) have

shown that 73 % of the participants reported less exercise frequency during Ramadan. According to the same study, even though the majority of the participants had consulted their healthcare providers for fasting prior to Ramadan, most of them did not receive any education on topics including medications, risks of fasting, indications to breakfasting, meal plans, and exercise. Lack of patient education prior to Ramadan may contribute to the suboptimal practices reported (Pinelli & Jaber, 2011). Equally important findings were found on another study by Bertran et al. (2016): religious and community centers are highly appreciated among this population and lifestyle interventions should utilize these centers for culturally accepted interventions.

Healthcare Providers Related Factors

Some aspects of the Arab American culture may also encourage patient-provider relationships that can improve DSM. For instance, cultural norms may support an authoritative patient-provider relationship style. According to Bertran et al. (2015), Arab American women believe that it is imperative to follow the advice of healthcare providers and encourage authoritative relationships with doctors and nurses (Bertran et al., 2015). These beliefs may result in patients being more willing to engage in DSM that is prescribed by the healthcare provider. Similar results were noted by DiZazzo-Miller et al. (2017), who stated that Arab Americans tend to follow their doctor' recommendations in order to satisfy them (DiZazzo-Miller et al., 2017).

At the same time, DiZazzo-Miller et al. (2017) reported that Arab-Americans patients also hold negative attitudes about physicians, because they tend to link them with their disease (DiZazzo-Miller et al., 2017). Indeed, while Arab-American culture may encourage patient-provider relationships that are more authoritative, various factors could complicate communication between patients and providers and inhibit successful diabetes management. Some argue that the gap in communication may be related to the Arab culture. On the other hand, providers believe

that lack of resources that are tailored to Arab Americans individuals was one of the major barriers for successful patient-provider relationship. This in turn can further impede successful diabetes management among this population (Bertran et al., 2015; DiZazzo-Miller et al., 2017). Similarly, Fritz et al. (2016) have identified that lack of basic educational materials specifically designed for Arabic patients created a challenge for providers in communicating with Arabs about their diabetes. Another equally important challenge that was identified is the lack of Arabic speaking multidisciplinary teams available to assist Arabic speaking patients. As noted in the study, even though the use of over the phone interpreter is widely available, its use in primary care clinics is often underrepresented. These findings were also supported by DiZazzo-Miller et al. (2017) who noted that healthcare providers believed that if a multidisciplinary approach were available that included Arabic-speaking physicians, pharmacists, dietitians, and diabetes educators, then diabetes management would be more likely to succeed (DiZazzo-Miller et al., 2017).

Gender Role. The unique view of the Arab-American culture on gender roles has an impact on diabetes self-management, and mainly on female engagement in physical activity. As illustrated by Bertran et al. (2015), female participants felt that their cultural views restricted their engagement at mixed-gender fitness centers. A subsequent study (Bertran et al., 2016) have noted similar result and indicated that separate-gender exercise should be afforded to facilitate women's engagement in physical activity and to meet the cultural and religious expectations of female modesty. Moreover, Arab-American women are at higher risk for diabetes and for unsuccessful diabetes self-management due to their lack of acculturation as discussed above (Al-Dahir et al., 2013; Jaber, Brown, Hammad, Zhu, et al., 2003).

While Arab-American cultural views may inhibit diabetes self-management, they can also play an important role in managing familial health. Bertran et al. (2016) found that women are

considered very crucial when it comes to disseminating knowledge to the entire family and community. Moreover, women are in charge for routine medical care and for promoting healthy lifestyle in Arab-American families (Bertran et al., 2016). Thus, the important roles played by female members of the Arabic community are crucial to the successful management of diabetes within the family unit. Table 1 provides a comprehensive summary of known factors that might influence a successful diabetes management among the Arab American population. Important to note, is that some factors can work as either a facilitator or barrier depending upon circumstances and other influences. Thus, both of these possibilities must be considered by the healthcare provider in order to optimize care for the patient.

Limitations

There were several limitations pertaining to this literature review that need to be recognized. First, there were a relatively small number of studies focusing on Arab Americans with diabetes and none of them focused on women only. In addition, the existing studies were conducted by only a few researchers, which might limit their generalizability outside of the groups studied.

Table 1

A Comprehensive Summary of the Facilitators and Barrios

Facilitators	Barriers
American acculturation	
Cultural food norms (they don't eat outside home very often)	Arabic acculturation
Co-ethnic caregivers	Lack of American acculturation

program that primarily targets women	Cultural food norms (they cook large quantity, eat in big plate, and food sharing)
Providers' efforts to help patients understand diabetes	Food as a central for socializing
Arabic-speaking dietitians and diabetes educators	Stigma
Multidisciplinary team approaches	Diabetes is considered as weakness
Providers' methods for increasing patients' motivation for DSM	Language barriers
Involving and educating family members in helping patient manage diabetes	Negligence
Family support	Lack of awareness
Positive and negative views that affect patients' behavior	Lack of patient education prior to Ramadan
Resources for DSM education and support	Patients' lack of understanding of diabetes treatment and complications
Group therapy to decrease stigma	Patients' fears of diabetes medications and treatments
Family support	Dislike of physicians and/or medications
	Transportation
	Lack of health insurance

Risk perceptions related to diabetes	Characteristics of diabetes itself (frequently no symptoms) Characteristics of healthcare providers and the health care system Limited resources for DSM education and support Lack of family support
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Diabetes in Women of Arab Descent

Even though the prevalence of T2D is 2 to 3 times higher in men than in women (Hilding et al., 2006), women have a higher prevalence of diabetes-related complications (Deshpande et al., 2008). A contributing factor may be that women are the family caregivers who may neglect their own self-care. Also, family support was associated with better HbA1C, HbA1C levels are worse in females than males with diabetes (Stopford et al., 2013). These findings highlight the importance of gender differences and suggest that there is a significant influence on how families interact and support themselves around chronic diseases, including diabetes.

Gaps in the Literature

The findings from the reviewed studies pinpoint the inconsistent result on the importance of diabetes knowledge, family support, acculturation, and the psychological adaptation to diabetes in predicting successful diabetes self-management. Moreover, women of Arab decent need to be

studied in separation from men to provide a comprehensive understanding of the effects of those factors on the diabetes management.

The prevalence of diabetes is extremely high among Arab-American population in Michigan state and represents a major clinical and public health problem (Jaber, Brown, Hammad, Howak et al., 2003). Among women of Arab descent, T2D related complications are highly prevalent and require immediate attention (Dallo, Schwartz, Ruterbusch, Booza, & Williams, 2012; Jaber, Brown, Hammad, Howak et al., 2003). Therefore, it is imperative to examine factors that influence DSM among women of Arab descent with T2D that influence their adaptation to diabetes. The impact of diabetes knowledge, acculturation, social/ family support, and psychological adjustment to diabetes on DSM among this population warrants further investigation. Advancement of DSM practices among women of Arab decent requires a better understanding of their health and wellness needs as well as the determinants of their healthy lifestyle practices.

CHAPTER 3 “METHODS”

The purpose of this study is to examine the DSM behaviors among women of Arabic descent with T2D living in U.S. utilizing the Roy adaptation Model (RAM). The model was utilized to guide the description of DSM behaviors and the identification of the determinants of these behaviors among Arab-America women. DSM is the cornerstone of successful diabetes management (CDC, 2017). It is hypothesized that diabetes knowledge, psychological adjustment to diabetes, social/family support, and acculturation are separately and collectively associated with the DSM and HbA1C level among women of Arab descent with T2D living in the U.S.

Study Design

This study design is a non- experimental correlational descriptive design. A descriptive correlational design is appropriate to answer the proposed research question as correlational research is employed to investigate whether relationships among variables exist. Thus, this particular design provided a preliminary framework regarding the strength of any relationship among the variables of interest. The findings of this study provided a foundation for further advanced research design including experimental designs to expand the knowledge of this phenomenon and how to manage this disease successfully yet a culturally appropriate method (Polit & Beck, 2012).

Protection of Human Subjects

Human Subjects Involvement and Characteristics

The sample of this study was women of Arab descent living in Michigan, USA.

Benefits of this Research to the Subjects and Others

The findings may lead to improve planning of health resources and education for the community. In addition, the development of improved or targeted interventions that can be directly applied to this population in the future.

Potential Risks

Minimal risk is the potential distress that may be experienced when the participants complete the Problem Area in Diabetes Scale. If distress were to occur, the PI notified the health care provider at both sites.

Confidentiality

Numerous strategies to protect participants were conducted. The PI is culturally competent and fluent in both Arabic and English. These characteristics facilitated the interactions with the participants. Moreover, several precautions were used to ensure confidentiality of the participants' data were undertaken. A unique identified ID number was assigned to each study participant consent form and measure. A code key linking the names of the participants and ID numbers was kept separately from other data. All data papers kept in locked files in principal investigator's locked office. In addition, published reports of results will not include any subject identifiers.

Sample and Setting

Sample. The accessible population was all women of Arab descent with T2D who attend the recruitment sites described below. G*Power computer software was used to calculate the sample size. Based on the criteria of 80% power, a medium effect size, 10 predictors, and an alpha level of 0.05, a convenience sample size of 118 subjects was required to address these research questions.

Inclusion and exclusion criteria. The women participate in the study if they were (1) of Arabic descent (2) diagnosed with T2D for at least a year, (3) 18 years and older, (4) non-pregnant, and (5) able to speak and read either English or Arabic. Participants were excluded if they have severe medical or psychiatric problems that could impact their physical and cognitive ability as this would affect their responses and influence the results.

Setting. This study was conducted at two sites: the Arab Community Center for Economic and Social Services (ACCESS) and a primary care clinic, both in Dearborn, Michigan. ACCESS is considered the largest nonprofit organization that serve Arab population in the U.S. in eight different locations with more than 100 programs serving metro Detroit area. This organization serves a diverse population and provides variety of programs including social, economic, health and educational services. The primary care clinic is an internal medicine clinic in an ambulatory care facility located in Dearborn, MI. The client population comes from diverse socioeconomic backgrounds.

Incentive

Each woman received a \$15-dollar-gift card incentive at the conclusion of data collection as an appreciation for their time.

Recruitment and Data Collection Procedures

The approval was obtained from the institution's IRB and the recruiting sites (ACCESS and the primary care clinic) prior to conducting the study. A member of the office staff approached prospective study participants first and asked if they would like additional information regarding the study. If interested was demonstrated, the principal investigator (PI) then explained the study and obtained informed consent. The PI was responsible for screening and enrolling participants.

Once consent obtained, data collection was initiated. Data were collected using a self-

reported questionnaire made up of five research instruments plus a demographic data form. Participants were given the questionnaires in a pre-arranged private area to protect their privacy and were reminded that their participation was voluntary, and that they could withdraw at any time without penalty. Participants were allowed to take 10 minutes break if they preferred. All questionnaires were provided in both English and Arabic so, participants could choose their preference. 20 to 30 minutes were required for completion of the instruments. The data were collected at the time of recruitment with the collection period encompassing seven months. As the PI is fluent in both languages, Arabic and English, participants were assisted if there were questions regarding the questionnaires.

Instruments

Data was collected using a self-reported questionnaire made up of five research instruments plus a sociodemographic and physiological data questionnaire (Appendix A). The participants answered the following instruments as follow: Sociodemographic and Physiological Data Questionnaire, Revised Michigan Diabetes Knowledge Test, Social Support Scale, Problem Area in Diabetes Scale, Acculturation Rating Scale for Arabic Americans-II, and Diabetes Self-Care Activities. The English versions of the instruments were available to the researcher in the public domain, so no permission was required. However, permission was obtained for the Arabic version for each instrument by the first author of each translated instrument.

Revised Michigan Diabetes Knowledge Test. The Revised Michigan Diabetes Knowledge Test, both Arabic and English version, was used to assess patients' knowledge of diabetes including diet, exercise, blood glucose level, and self-care activities. The original tool was developed by a panel of nationally recognized experts in diabetes education and diabetes care who identified key content domains and developed test items. This tool was revised by Fitzgerald and

his colleague in 2016 based on the current self-management education and practice standards and name the Revised Michigan Diabetes Knowledge Test (Fitzgerald et al., 2016). It is a 23 items self-report questionnaire. The scale has 2 subscales: a 14-item general test that applied to all patients with T2D and a 9-item insulin use subscale for patients treated with insulin. Only the 14-item subscale was used in this study.

Scoring. This tool consists of 14 items. Each item has four choices. A score of 1 is given for a correct answer and 0 for incorrect answer. The score ranged from 0 to 14. A higher score indicated a higher level of diabetes knowledge. This type of data is at the continuous level of measurement.

Reliability and Validity. DKT-II is a valid and reliable measure for estimating patients' general understanding of diabetes. The Arabic DKT-2 received an internal consistency score Cronbach's alpha of 0.75. The outcomes of the test-retest revealed excellent instrument reliability with a mean Intraclass correlation coefficient of 0.90. (Alhaiti, Alotaibi, Jones, DaCosta, & Lenon, 2016).

Social Support Scale. Social Support Scale (SSS), both Arabic and English version were used to measure the support received by patients with diabetes. The tool was obtained from the Diabetes Care Profile (DCP) that was developed by Fitzgerald et al. (1996). The DCP includes 14 scales with 234 items. The SSS is a self-report questionnaire that consists of two questions, each consisting of six items, representing social support received and social attitudes.

Scoring. A total of 12 items labeled "a" to "f" are measured on 6-point Likert Scale (Strongly disagree=1, Somewhat Disagree= 2, Neutral=3, Strongly Agree=4, Somewhat Agree=5, Does not Apply= 6). The accumulative score ranges from 0 to 60, where 0 indicates less support

and 60 indicates a high level of support related to diabetes and its management by social and family (Fitzgerald et al., 1996). This type of data is at the continuous level of measurement.

Reliability and Validity. This scale has been used widely in the literature among various populations and has been translated to Arabic and used among Arab-American population. It has been used with Arab-American adults with T2D, the reliability analyses revealed in a Cronbach's alpha reliability coefficient of 0.88 (Sukkarieh, 2011).

Problem Area in Diabetes scale. Problem Area in Diabetes (PAID) scale, both Arabic and English version were used to evaluate diabetes related distress and psychological adjustment in carrying out DSM (William H Polonsky et al., 1995).

Scoring. A total of 20 items measured on a Likert scale from 0 to 4 ("Not a problem" to "Serious Problem"). The final score was multiplied by 1.25 to transform the final score to a 0 to 100 value for greater interpretability (Polonsky et al., 1995; G. W. Welch, Jacobson, & Polonsky, 1997). The cut-off point is 50 indicating high emotional distress, and a need for immediate intervention. The immediate intervention included notifying the health care provider in the same clinic. On the other hand, very low score (from 0 to 10) with poor DSM means the patient is in denial for having diabetes (William H Polonsky et al., 1995; G. W. Welch et al., 1997). This type of data is at the continuous level of measurement.

Reliability and Validity. The reliability of this tool was supported by the reported internal consistency with Cronbach's alpha ($r= 0.95$). The test re-test validity was established by re-taking the tool two months after the first time administrating with Cronbach's alpha of $r= 0.83$ (Polonsky et al., 1995; Welch et al., 1997). Concurrent validity was established through correlation with other well validated instruments including the Diabetes Social Support Scale, the Health Belief Model Attitudes Scales and Subscales of ATT39, and Diabetes Coping Measure (Welch, Dunn, &

Beeney, 1994; Welch et al., 1997). PAID has been translated into the Arabic language and reliability resulted in Cronbach α of 0.92 (Alragum, 2008).

Acculturation Rating Scale for Arabic Americans-II (ARSAA-II). Acculturation Rating Scale for Arabic Americans-II, both Arabic and English version (ARSAA-IIA, ARSAA-IIIE) were used to assess the psychological, behavioral, and attitudinal changes that follow the continuous contact with different cultures (Cuellar, Arnold, & Maldonado, 1995; Jadalla & Lee, 2015). Originally, this instrument was developed by Cuellar, Arnold, and Maldonado in 1995 to measure the acculturation of Mexican Americans, the Acculturation Rating Scale for Mexican Americans-Revised (ARSMA-II) (Cuellar, Arnold, & Maldonado, 1995; Cuellar, Harris, & Jasso, 1980). The English version of this tool was modified for use with English-speaking Arab Americans. The words like Spanish, Mexican, and Mexican Americans were changed to Arab or Arabic and Arab Americans (Jadalla & Lee, 2015). This version was translated into the Arabic language by Jadalla and named the Acculturation Rating Scale for Arab Americans-II Arabic (ARSAA-II). In this modified version, two items were added to the scale given their importance in the Arabic culture and two items were eliminated due to their inapplicability to the Arabic culture. Therefore, the final version of the ARSAA-II includes two subscales: 13 items were included in the Attraction to American Culture (AAmC) and 15 items were included in Attraction to Arabic Culture (AArC).

Scoring. It is a 5-point Likert scale range from 1= not at all to 5= extremely often or almost always. The cumulative score can range from 13 to 65 for AAmC and from 15 to 75 for the AArC. The higher the score means the higher acculturation toward American or Arabic culture. This type of data is at the continuous level of measurement.

Reliability and Validity. The Arabic and English version of the ARSAA-II are both widely used in the literature and used among Arab-American population to measure their acculturation in the USA. The reliability of the subscales, AAmC and AArC, were reported with Cronbach's α coefficients of .89 and .85, respectively (Jadalla & Lee, 2015). Moreover, their construct validity was supported by the negative correlation ($r = -.185$) that confirm they measure two related, yet different facets of acculturation in a sample of 297 Arab American adults (Jadalla & Lee, 2015).

Diabetes self-care activities. The Diabetes self-care activities (SDSCA), both Arabic and English version were used to provide a brief measure of self-care for several different regimen assessed are diet (four questions), exercise (two questions), blood glucose testing (two questions), foot care (two questions), and medication taking (two questions) (Toobert, Hampson, & Glasgow, 2000). This tool was developed in 1994 and revised in 2000 by Toobert & Glasgow (Toobert, Hampson, & Glasgow, 2000). The SDSCA was translated to Arabic by Sukkariah, Ola Ali in 2011 (Sukkarieh, 2011).

Scoring. It is a 12-item self-report questionnaire of the frequency of completing different task activities over the preceding seven days. The final score was measured by taking the raw score from each category and converting it to a standardized score with a mean of zero and standard deviation of 1. This standardized score is then averaged into a composite score for each category; therefore, items with different scales are equal weighting. This type of data is at the continuous level of measurement.

Reliability and Validity. Due to the small number of questions in each category, inter-item correlation was used to support the internal consistency. The mean inter-item correlation for the diet scale for the original and the Arabic version were 0.64 and 0.32 respectively. The exercise-scale inter-item correlation scores for the original and the Arabic version were 0.63 and 0.61

respectively. SDSCA has demonstrated adequate evidence of reliability with a Cronbach's alpha value above 0.50 (Jannoo & Khan, 2018). The concurrent validity of the subscales was established through correlations with dietary logs, glucose meter recordings, behavioral inventories and interviews (Toobert & Glasgow, 1994).

Demographic Data Form. Participants completed a Demographic Data Form (Appendix A) that includes the following variables: age, social economic status (employment and income), marital status, religion, education, medical insurance coverage, years of residence in the U.S., country of origin and BMI. Participants also completed a physiological data questionnaire that includes the following variables: age at onset of diabetes, duration of diabetes, type of treatment, number of comorbidities, and the number of diabetes-related medical complications. Demographic Data Form developed by the principal investigator for the purpose of this study. This type of data is at the nominal or ordinal level of measurement.

Data Management and Analysis

A descriptive analysis of all quantitative data was performed, including the summarization of data and the use of descriptive and inferential data analytic techniques. If statistical assumptions are violated, data transformations and other nonparametric methods were employed. The first phase of the analysis involved utilizing descriptive statistics to compute the mean, median, standard deviation, and range for the variables measured on interval or ratio scales and frequency distributions (absolute frequency and percent) for the variables measured on nominal or ordinal scales. The significance level was set at a p-value equal to or less than 0.05. All statistical analyses were performed using the SPSS software (Version 25).

To address Research Question 5, multiple regression analysis was used to examine the relationships between diabetes knowledge, social/family support, psychological adjustment, and

acculturation and DSM. Residual analysis was conducted to identify sources of model misspecification, outliers, multicollinearity, and possibly influential observations. In predicting DSM, step-type regression analysis was used to obtain the optimal model.

CHAPTER 4 “RESULTS”

This chapter represents the statistical analysis of the study which examine the relationships among (variables). The first section analysis the demographic data and physiologic characteristics of the participants. the second section presents the analysis of the independent variables studied. The third section presents results of Spearman correlation and multiple regression to test each hypothesis.

Data Management

A total of 118 participants completed the study measures at ACCESS (70 participants) and a medical clinic located in Dearborn, Michigan (48 participants). No participants were removed from the study; however, 14 participants had missing data on some but not all of the questionnaires. In order to fulfill the purpose of the hypotheses, descriptive statistics, Spearman’s, Pearson r correlations and multiple regression were used to address the study hypotheses. Significant level was set at $p < 0.05$. the latest version of SPSS was used to analyze the data.

Characteristics of Respondents

Demographic Characteristics

Table 2 summarizes the demographic characteristics of the participants. The majority of the women were between the ages 50- 59 years ($n = 39$, 33.1%), followed by 40- 49 years ($n = 29$, 24.6%), and 60- 69 years ($n = 25$, 21.2%). Nineteen women (16.1%) were more than 70 years and the smallest cohort was between 30- 39 years ($n = 6$, 5.1%).

Table. 2

Demographic Characteristics of Participants

Variable	Frequency	Percent
Age 30-39	6	5.1%

	40-49	29	24.6%
	50-59	39	33.1%
	60-69	25	21.2%
	70 and above	19	16.1%
Employment	Employed full time	9	7.6%
status	Employed part time	7	5.9%
	Unemployed (but physically able to work	54	45.8%
	Unable to work due to health problems	42	35.6%
	Retired	6	5.1%
Smoking	Never smoked	82	70.7%
statues	Ex- smoker	20	17.2%
	Current smoker	14	12.1%
Income status	Less than \$500	40	35.7%
	\$500- \$1499	55	49.1%
	\$1500- \$2999	12	10.7%
	More than \$3000	5	4.5%
Marital status	Single	2	1.7%
	Married	81	68.6%
	Divorced	9	7.6%
	Widowed	24	20.3%
	Separated	2	1.7%
Education	Less than 10 years	54	46.6%

	12 years or high school	41	35.3%
	Diploma degree	10	8.6%
	Undergraduate degree	8	6.9%
	Graduate degree	3	2.6%
Health insurance	Yes	108	91.5%
	No	10	8.5%
Living in the U.S.	Less than 5 years	10	8.5%
	5 to 10 years	12	10.2%
	More than 10 years	96	81.4%
Country of origin	Iraq	45	38.1%
	Yemen	26	22%
	Lebanon	18	15.3%
	Syria	10	8.5%
	Egypt	2	1.7%
	Saudi	2	1.7%
	Jordan	1	0.8%

Employment status. Nearly half of the women (n=54, 45.8%) were unemployed but physically able to work. One third of the women (n=42, 35%) were unable to work due to health problems. Women were employed full time and part time percentages were 7.6% and 5.9%, respectively. Only 6 participants (5.1%) reported retirement status.

Smoking statuses. The majority of the women never smoked (n=82, 70.7%). Women reported history of smoking and currently smoker were almost equivalent (n= 20, 17.2% and n= 14, 12.1% respectively).

Income status. Half of the participants (n=55, 49.1%) reported a monthly income between \$500 and \$1499. Over one third of the participants (n= 40, 35.7%) reported a monthly income less than \$500. Twelve participants (10.7%) reported a monthly income between \$1500 and \$2,999, while only 5 participants (4.5%) of them reported a monthly income more than \$3,000.

Marital status. Majority of the participants were married (n=81, 68.6%) followed by widowed (n=24, 20.3%). Nine women (7.6%) were divorced. Single and separated women were equal and representing the least group (n=2, 1.7%).

Years of completed education. To assess the women educational status, the choices were the following: “Less than 10 years”, “12 years or High school”, “Diploma degree”, “Undergraduate degree”, and “Graduate degree”. The largest group of women (n=54, 46.6%) had less than 10 years of education, followed by 41 women (35.3%) had 12 years or high school. Participants with diploma degree and undergraduate degree were almost equivalent (n= 10, 8.6% and n= 8, 6.9% respectively). Only 3 participants (2.6%) reported having a graduate degree.

Health insurance. The majority of the women have health insurance coverage (n=108, 91.5%), while only 10 (8.5%) reported having none.

Length of time living in the United States. The majority of the participants lived in the U. S. for more than 10 years (n=96, 81.4%). While those who lived for less than 5 years and between 5 and 10 years were almost equivalent (n= 10, 8.5% and n= 12, 10.2% respectively).

Country of origin. Participants reporting primary coming from Iraq (n= 45, 38.1%), Yemen (n= 26, 22%), Lebanon (n= 18, 15.3%), Syria (n= 10, 8.5%), Egypt (n= 4, 3.4%), Morocco (n= 2, 1.7%), Saudi (n= 2, 1.7%), and Jordan (n= 1, 0.8%).

The demographic data showed that the majority of study participants were between the ages of 50 to 59, were unemployed but physically able to work, received a monthly income of less than \$500. In addition, the majority of study participants were married, had less than 10th grade education, were non-smokers, lived in the United States more than ten years, and had some form of health insurance.

Physiologic Characteristics

Table 3 describes physiologic data related to participant's diabetes management.

Table 3

Physiologic Characteristics of Participants

Variable		Frequency	Percent
Diabetes education	Yes	61	51.7%
	No	57	46.5%
Body mass index		M= 31.4	R= 21.95 to 43.27
Age at onset of diabetes		M= 45	R= 20 to 69
Length of time diagnosed with diabetes	Less than 5 years	50	43.1%
	33	28.4 %	11 to 16 years
	5 to 10 years	20	17.2%
	More than 17 years	13	11.2%

Medication of diabetes	Yes	103	87.3%
	No	15	12.7%
Type of treatment	Oral hypoglycemic medication only	103	87.3%
	Oral hypoglycemic and insulin injection	19	16.1%
Health status	Excellent	12	10.2%
	Very Good	8	6.8%
	Good	49	41.4%
	Fair	26	22%
	Poor	23	19.5%
Problems associated with diabetes.	High blood sugars	73	62%
	Low blood sugar	63	55%
	Nerve damage	50	42.4%
	Damage to the retina of the eye	40	34%
	Heart problems	25	21.2%
	Sexual difficulties	6	5.1%
	Kidney problems	6	5.1%

Diabetes education. This item of the questionnaire asked the participant whether or not they have received any diabetes education from a health care provider, including physician, nurse,

dietician, or diabetes educator. Nearly 52% of the participants (n=61, 51.7%) reported receiving diabetes education while the other half (n=57, 46.5%) reported receiving none.

Body mass index. The mean BMI for the women was 31.4, ranging between 21.95 to 43.27.

Age at onset of diabetes. The mean age of the women at the onset of diabetes was 41 years old, ranging from 20 to 69 years old.

Length of time diagnosed with diabetes. Almost half of the women (n=50, 43.1%) had diabetes for less than 5 years. While the other 28.4 % (n=33) had diabetes for 11 to 16 years, 17.2% (n=20) had diabetes for 5 to 10 years, and the least group (n=13, 11.2%) had diabetes for more than 17 years.

Medication of diabetes. The majority of the women (n=103, 87.3%) reported they were on medication and only 12.7% (n=15) were not.

Type of treatment. More than three quarters of the women (n= 103, 87.3%) reported they were on oral hypoglycemic medication only, while 16.1% (n= 19) reported they were on oral hypoglycemic and insulin injection.

Health status. Twelve participants (10.2%) rated their health as “Excellent”. Eight participants (6.8%) rated their health as “Very Good”. The largest group of the participants (n= 49, 41.4%) rated their health as “Good”, followed by “Fair” (n= 26, 22%) and Poor (n=23, 19.5%).

Problems associated with diabetes. More than half of the sample (n=73, 62%) indicated having high blood sugar. Of the 118 participants, 63 (55%) reported having nerve damage, 50 (42.4%) having low blood sugar, 40 (34%) having eyes problem, 25 (21.2%) having heart problem, and 6 (5.1%) reported having sexual and kidney problems. Only 4 (3.4%) of the sample indicated not having any problem associated with diabetes.

Hemoglobin A1C. The mean HbA1C of the participants was 6.9% (SD=1.2), ranging between 5% to 11.4%. For the purpose of this dissertation, the HbA1C levels were categorized into three groups as good, acceptable or poor when the HbA1C levels was less than 7%, 7% to 8% and more than 8%, respectively. The HbA1C levels were measured within the past 3 months period and were obtained from patients' file at their visit at the clinic. Almost 60% (n=70) reported good HbA1C. Twenty-one participants (17.8%) reported an acceptable level of HbA1C and 22.9% (n=27) reported poor HbA1C levels.

Reliability and Validity of the Instruments

In this section, the reliability testing for the instruments used in the study for this sample are presented in Table 4. The analyses of internal consistency reliability were computed using the Cronbach's alpha coefficients. All the internal consistency reliabilities of the instruments were acceptable except one scale, the "Revised Michigan Diabetes Knowledge Test".

Table 4

Reliability Testing for the Scaled Measured

Measure	Scale	Cronbach's Alpha
Revised Michigan Diabetes Knowledge Test	DKT	0.44
Social/Family Support	SSS	0.69
Psychological adjustment to Diabetes	PAID	0.94
Acculturation	ARSAA-II	0.89
Diabetes Self-Management	SDSCA	0.82

Research Questions and Associated Hypotheses

The purpose of this dissertation was to examine the impact of diabetes knowledge, social/family support, acculturation, and psychological adjustment to diabetes on DSM behaviors and glycemic control among women of Arab descent utilizing the Roy Adaptation Model.

Specific Aim 1: *To describe the prevalence of DSM behaviors and diabetes control (HbA1C) among women of Arabic descent with T2D.* Table 5 presents a detailed description for each SDSCA sub-scales. SDSCA subscales are composed of diet (4 items), exercise (2 items), self-monitoring of blood glucose (2 items), foot care (2 items), and medication (2 items). Among this sample, women reported moderate level of following healthy diet (M=15, range= 0- 28), moderate level of exercise (M= 6.4, range= 0- 14), moderate level of glucose testing (M= 7.5, range= 0- 14), low level of foot care (M=5.3, range= 0- 14), and high level of medication adherence (M= 12.7, range= 0- 14). The mean HbA1C of the participants was 6.9% (SD=1.2), ranging between 5% to 11.4%.

Table 5

Descriptive Statistics for SDSCA Sub-Scales

SDCS sub-scale	Sample Actual Range				Possible Range
	Minimum	Maximum	Mean	SD	
Diet (4 items)	4	22	15	5	0 to 28
Exercise (2 items)	0	14	6.4	5.1	0 to 14
Glucose Testing (2 items)	0	14	7.5	5.5	0 to 14
Foot Care (2 items)	0	14	8.3	5.3	0 to 14
Medication (2Item)	8	14	12.7	2.1	0 to 14

Specific Aim 2: *To investigate the relationship among diabetes knowledge, social/family support, acculturation, and psychological adjustment to diabetes on DSM behaviors and glycemic control among women of Arab descent.*

Hypothesis 1: There is a positive association between diabetes knowledge and DSM behaviors among women of Arabic descent with T2D.

The Shapiro-Wilk test for the assumption of normality was used to confirm the appropriate use of parametric inferential or non-parametric statistics for variables measured on interval scales. None of the variables showed normality distribution. Therefore, the null hypothesis of normal distribution was rejected, and the non-parametric test were conducted to test the research hypotheses.

In order to fulfill the purpose of the hypothesis, Spearman's correlation was used to test the statistically significant relationships at $p < 0.05$ between the DKT scale (independent variable) and SDSCA (dependent variable). There was a statistically significant association between the DSM behaviors and the diabetes knowledge ($r_s = 0.35$, $p = 0.01$).

Hypothesis 2: There is association between social/family support and DSM behaviors among women of Arabic descent with T2D. In order to fulfill the purpose of the hypothesis, Spearman's correlation was used to test the statistically significant relationships at $p < 0.05$ between the Social Support Scale (independent variable) and SDSCA (dependent variable). Based on the SSS subscales, only the social support received subscale demonstrated a statistically significant relationship with diabetes DSM behaviors ($r_s = 0.222$, $p = 0.05$). Therefore, this research hypothesis was partially supported.

Hypothesis 3: There is association between psychological adjustment to diabetes and DSM behaviors among women of Arabic descent with T2D. In order to fulfill the purpose of the

hypothesis, Spearman's correlation was used to test the statistically significant relationships at $p < 0.05$ between the PAID scale (independent variable) and SDSCA (dependent variable). The research hypothesis supported at $p = 0.01$. There was a significant association between the psychological adjustment to diabetes and DSM behaviors ($r_s = 0.30$, $p = 0.001$). Therefore, the increase in the psychological diabetes adjustment was associated with an increase in DSM behaviors in this sample.

Hypothesis 4: There is association between acculturation and DSM behaviors among women of Arabic descent with T2D. In order to fulfill the purpose of the hypothesis, Spearman's correlation was used to test the statistically significant relationships at $p < 0.05$ between the ARSAA-II sub-scales (independent variable) and SDSCA (dependent variable). The association between acculturation and DSM behaviors among women of Arabic descent with T2D was not statistically significant ($r_s = 0.02$, $p = 0.800$). Therefore, the hypothesis was rejected. See table 6 for the correlation among variables.

Table 6.

Spearman's Rho Correlation for Diabetes Self-Management, Social Support Received, Social Support Attitude, Arabic Acculturation, American Acculturation, Psychological Adjustment, and Diabetes Knowledge

Variable	DSM	SS Received	SS Attitude	Ar-Acc	Am-Acc	Psychological Adjustment	DK
DSM	1.00						
SS Received	.222*	1.00					
SS Attitude	.096	.412*	1.00				
Ar-Acc	.024	.143	.106	1.00			

Psychological Adjustment	-.292**	.006	.003	.197*	.221*	1.00	
DK	0.346*	.099	.116	.024	-.173	-.172	1.00

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

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

Hypothesis 5: Sociodemographic characteristics, physiologic characteristics, diabetes knowledge, social/family support, psychological adjustment to diabetes, and acculturation, predict DSM behaviors among women of Arabic descent with T2D. In order to fulfill the purpose of the hypothesis a step-type regression model was used to estimate the optimal model. The optimal model included BMI, diabetes knowledge, psychological adaptation to diabetes, and the level of HbA1C explained 28% of the variance in DSM behaviors. Other variables, namely social/family support and acculturation were not significant.

With other variables held constant (see table 7), DSM behaviors were negatively related to BMI decreasing by 0.77 for every extra unit increase in BMI. Similarly, DSM behaviors were negatively related to psychological adjustment to diabetes decreasing by 0.14 for every extra unit increase in psychological adjustment to diabetes. On the other hand, DSM behaviors were positively related to diabetes knowledge and HbA1C. For instance, DSM behaviors increased by 1.31 for every extra unit increase in diabetes knowledge. Refer to table 7 for the regression analysis in predicting the DSM behaviors.

The results of the study showed statistically significant results for the relationships between the independent variables (diabetes knowledge and psychological adjustment to diabetes) and the dependent variable (DSM behaviors) among women of Arabic descent with T2D. The relationship

between the independent variables (social/family support and acculturation) and the dependent variable (DSM behaviors) among women of Arabic descent with T2D was not supported.

Table 7

Regression Analysis Predicting DSM Behaviors

Variable	B	SE B	Beta	t	p value
BMI	-0.77	0.24	-0.27	-3.26	0.001
Diabetes Knowledge	1.31	0.38	0.29	3.43	0.001
Psychological adjustment to diabetes	-0.14	0.06	-0.19	-2.32	0.023
HbA1C	2.20	1.01	0.18	1.18	0.032

$R^2 = 0.28, F = 10.24, p < 0.0001$)

Note: B: Unstandardized Regression Coefficient

SEB: Standard Error

Beta: Standardized Regression Coefficient

CHAPTER 5 “FINDINGS, CONCLUSION, AND IMPLICATIONS”

Introduction

This is the first known study that examined the relationships among diabetes knowledge, social/family support, acculturation, psychological adjustment to diabetes, and DSM behaviors along with the glycemic control (HbA1C levels) of women of Arabic descent utilizing the Roy Adaptation Model. Although the complications of T2D is a major threat to the health of women of Arab descent, there is lack of information about the health practices and DSM behaviors of this population. This chapter discusses the findings, conclusion, implications for nursing clinical practice, and future research in light of the Roy Adaptation Model and the existing literature. Results were discussed in reference to the proposed research aims and related hypothesis. In addition, discussion will elaborate on implications for future nursing research and clinical practices to contribute to the body of knowledge in diabetes self-management among the Arab population in the U.S.

Summary of Study

This dissertation sought to examine the relationships among diabetes knowledge, social/family support, acculturation, psychological adjustment to diabetes, and DSM behaviors along with the glycemic control (HbA1C levels) of women of Arabic descent utilizing the Roy Adaptation Model. It was hypothesized that there is an association between the four independent variables: “diabetes knowledge, social/family support, acculturation, and psychological adjustment to diabetes” and the dependent variable: “DSM behaviors and glycemic control” among women of Arab descent utilizing the Roy Adaptation Model.

Findings

Demographic and Physiologic Characteristics

The majority of the participants were unemployed but physically able to work (n=54, 45.8%), were receiving a monthly income between \$500 and \$1499 (n=55, 49.1%), were married (n=81, 68.6%). Approximately half of the participants had less than 10 years of education (n=54, 46.6%). Similar findings including employment status, income status, marital status, and educational status have been previously reported in the literature in Michigan (Al-Dahir et al., 2013; Jaber et al., 2003). Most of the women were covered with a health insurance (n=108, 91.5%), were living in the U. S. for more than 10 years (n=96, 81.4%), and were from Iraq (n= 45, 38.1%), Yemen (n= 26, 22%), and Lebanon (n= 18, 15.3%). These findings are consistent with the literature, the largest number of new Arab immigrants to Michigan are from Iraq, Yamen, and Lebanon, according to the census data. Moreover, previous research with the Arab population in Michigan had the majority of their sample originally from Iraq, Lebanon, and Yemen (Ashgar, 2019).

In addition to the demographic data, this study assessed some physiological characteristics. Seventy percent of the women never smoked (n=82, 70.7%). which is consistent with the literature. According to Aqtash, & Servellen (2013), 80% of the respondents (n=100) never smoked. Regarding diabetes education, half of the participants (n=61, 51.7%) reported receiving diabetes education and the other half reported receiving none. This is also consistent with the literature. According to Pinelli & Jaber (2011), there is lack of diabetes education programs that tailored to this ethnicity group. Also, according to the literature, Arab population receive less attention compared to other ethnic minorities in terms of diabetes treatment and self-management education

(Berlie et al., 2008a; Berlie, Herman, Brown, Hammad, & Jaber, 2008b; Bertran et al., 2015; Jaber, Brown, Hammad, Howak et al., 2003).

The participants were mainly obese according to the BMI calculated ($x= 31.3$ $SD=5.2$). The mean age of the women at the onset of diabetes was 41 years old. Almost half of the women (42.2%) had diabetes for less than 5 years. The majority of the women ($n= 103$, 87.3%) were on oral hypoglycemic medication only. The largest group of the participants ($n= 49$, 41.4%) rated their health as “Good”. Similar findings were reported in the literature (Bertran et al., 2015). Bertran and his colleagues (2015) studied barriers and facilitators of diabetes self-management education among Arab American patients with diabetes. In the study, most of the participants rated their health status as “Good”.

Almost 20% ($n=23$) had a poor level of HbA1C (HbA1C level $> 8\%$). This result is consistent with the literature. Berlie and his colleagues (2008) examined the quality of diabetes care in Arab population in the U.S. and found that 26% of Arabs had an HbA1c $> 9.5\%$ (Berlie et al., 2008a). These results are alarming for healthcare providers and might be due to the lack of proper diabetes education.

Diabetes Self-Management Practices

In this dissertation, women consumed a healthy diet an average of 4.42 days per week, had 5 portions per week of fruits and vegetables, and had 3 portions per week of full fat products (such as full fat milk and red meat). Participants participated in 30 minutes workout on an average of 4 days per week. Participants examined their glucose levels 4 days per week. Participants inspected their feet and inside their shoes on an average of 4 days per week. Participants had their medications on average of 6.41 days per week. The lowest score obtained on SDSCA subscales

was the participation in 30 minutes of regular exercise; while the highest score was for adherence to the medication regimen.

Relationships among Key Variables

Diabetes knowledge demonstrated a statically significant positive association with DSM behaviors. The literature also supports the importance of diabetes knowledge in the context of diabetes control and successful diabetes management. For instance, it has been found that a low level of diabetes knowledge and awareness is a major barrier in the management of diabetes (Al-Qazaz et al., 2011; McCleary-Jones, 2011). Despite the importance of diabetes knowledge, almost half of the participated women in this study did not receive any kind of diabetes education. This is also supported in the literature, for instance, it has been found that Arab population receive the least amount of attention compared to other ethnic minorities in terms of diabetes treatment and self-management education (Berlie et al., 2008a; Berlie, Herman, Brown, Hammad, & Jaber, 2008b; Bertran et al., 2015; Jaber, Brown, Hammad, Howak et al., 2003). This might be due to lack of the proper educational programs or due to the shortage of Arabic speaker healthcare providers. Therefore, DSM educational programs should not only be available, but also it should be tailored to this minority group. For instance, research has shown that interventions that target the Arab-American population specifically improve DSM significantly more than those developed for the American population at large (Jaber et al., 2011).

Another equally important point is that Arabs exhibit unique characteristics that distinguish them from the rest of the U.S population. For example, most of the Arab population are practicing Islam (E. Bertran et al., 2015). Despite the heterogeneity of cultural values among the Arabs population, Islam is the most practiced religion. The desire to participate in this religion, e.g., fasting during Ramadan, could supersede the advice of healthcare providers and potentially impede

DSM (E. Bertran et al., 2015). Among those who practice Islam, there is a common belief that fasting promotes physical and spiritual purification; however, fasting can lead to serious diabetes complications, hypoglycemia as an example. A study done by Pinelli and Jaber (2011) have shown that even though the majority of the sample had consulted their healthcare providers for fasting prior to Ramadan (67%), most of them did not receive any education regarding medications (46%), risks of fasting (62%), indications to breakfasting (69%), meal plans (88%), and exercise (85%). Lack of diabetes educational programs that include religious practices may contribute to the suboptimal diabetes management reported (Pinelli & Jaber, 2011). Therefore, culturally and religious sensitive educational programs are urgently needed to be discussed with this minority group.

The association between social/family support and DSM behaviors among women of Arabic descent with T2D was partially supported in this dissertation. If we look deeper into SSS, this tool consisted of two parts, the first part included 6 questions that represented social support received while the other part (6 questions) represented social attitudes. Previous research did not report the results of each subscale of the SSS separately. However, it is worth mentioning that when SSS was divided based on its subscales, the social support received subscale demonstrated a statistically significant relationship with diabetes DSM behaviors.

This result is comparable to the findings in the literature. The effects of social/family support among this population is still unclear. To illustrate, family members could be a source of support according to Bertran et al (2015) and they could be a source of stress as well (Fritz et al., 2016). Another important point was found in the literature is that there is a gender differences among this population in the context of receiving social/family support. For an example, it has been found that husbands with chronic illnesses benefit from support offered by their family and

spouses more than wives with chronic diseases, whereas wives benefit from support that offered by their friends more than the support that offered by their families and spouses (Ofstedal, 2014; Stopford et al., 2013). This may suggest that women of Arabic descent may receive less family support compare to male family members.

This is the first study to examine the association between the psychological adjustment and diabetes management among this population. According to PAID scale, the cut-off point is 50. Participants who report below 50 indicate a good level of psychological adjustment while those who report more than 50 indicate high emotional distress, and a need for instant intervention. The instant intervention in this study was notifying the health care provider in the same clinic (William H Polonsky et al., 1995; G. W. Welch et al., 1997). The findings of this dissertation are alarming to healthcare providers. Surprisingly, almost half of the participants (n=48, 45.3%) scored more than 50 on PAID scale. This indicates that women of Arabic descents are not prepared to accept that they are diagnosed with diabetes and they may have high level of anxiety. This might be due to inadequate diabetes educational programs that tailored to this population or to lack of health care services or access and needs to be further explored to understand how this population is adapting to a diagnosis of diabetes. It is also important to explore how the health care system in the U.S. can affect the dissemination of knowledge and education of diabetes self-care among the female Arab population living in the U.S.

According to Jaber et al., (2003), a lack of acculturation is a risk factor for diabetes among Arab-American women. Moreover, the findings from the same study noted that high blood sugar (poor glycemic control) was associated with older age at immigration, unemployment, high consumption of cultural food and less assimilation into American culture. Another study by Al-Dahir et al., (2013) found that a negative correlation was exist between Arab acculturation related

variables and diabetes risk among males and American acculturation related variables among females. These findings suggest that less acculturation may contribute to high risk of diabetes and low DSM behaviors among women of Arabic descent. Therefore, this research hypothesis about the associations between acculturation and DSM behaviors among women of Arab descent is inconsistent with the literature and need to be further studied.

The findings of this study support a subset of the variables examined, namely BMI, diabetes knowledge, psychological adaptation to diabetes, and the level of HbA1C explained 28% of the variance in DSM behaviors. Other variables, namely social/family support and acculturation were not significant.

To illustrate, DSM behaviors were negatively related to BMI decreasing by 0.77 for every extra unit increase in BMI. This finding indicates that being overweight or obese decreases the level of DSM behaviors among women with diabetes. On the other hand, DSM behaviors were negatively related to psychological adjustment to diabetes decreasing by 0.14 for every extra unit increase in psychological adjustment to diabetes. Similarly, DSM behaviors were positively related to diabetes knowledge. For instance, DSM behaviors increased by 1.31 for every extra unit increase in diabetes knowledge. These findings indicate that for those who are psychologically adapted to diabetes and with high level of diabetes knowledge, their level of DSM behaviors are better than those who have not adapted to diabetes or those who have low level of diabetes knowledge.

Future Research

Comprehensive evaluation that involves health practices, social, psychological and behavioral status is the basic and essential step to initiate diabetes educational programs. Ultimately, successful diabetes educational program must be tailored to fits patients' need and

capabilities. With the findings of this dissertation, healthcare providers will have a better insight on the needs of women of Arabic descents with T2D, therefore, they will be able to initiate new educational programs that targeting the needs of this group. Future research will be testing the effectiveness of the educational programs in terms of optimizing glucose control and enhancing DSM behaviors.

Limitations

One limitation of this dissertation pertains to generalizability due to the lack of randomization. Therefore, future research might recruit larger sample size with randomization. Another limitation is that the sample consisted of only patients with T2D. Further research is needed to determine if the same results can be applied to individuals with type 1 diabetes.

Conclusion and Implication for Future Nursing Practice

The findings of this study are quite alarming for health care practitioners. For instance, diabetes educational programs that culturally and religious sensitive are urgently needed to maximize the desirable diabetes outcomes. Diabetes knowledge demonstrated a very important aspect in enhancing DSM behaviors and successful diabetes management. Healthcare providers need to also consider the patient's perceived risk in their assessment. Perceived risk is an integral factor in the adoption of any preventative behavior, especially among Arabs (Pinelli et al., 2010). Education that targets the risk and the seriousness of diabetes may enhance the patient's motivation to engage in diabetes management. Finally, weight management, healthcare providers' knowledge of cultural practices and their understanding of how religion influences the lives of Arab may result in more effective DSM. For example, education prior to Ramadan, including medications, risks of fasting, indications to break fasting, meal plans, and exercise should be discussed with the patient prior to Ramadan. Providers with this awareness will be able to offer instructions and

advice that patients can use in carrying out their daily regimens that both respect their cultural and religious preferences while also maintaining adherence to DSM. Another important point to include on diabetes education is enhancing the psychological adjustment. According to the literature, the level of the psychological adjustment among patients were related to more education (Gois et al., 2012). According to the same study, psychological adjustment fostered patient self-growth, self-integration and resilience. However, among the participated women. Half of them reported high level of distress and they were referred to the healthcare provider on the same clinic. This is an urgent matter and must be addressed by healthcare providers.

Family related factors are among the most important. Involvement of family members in diabetes care would significantly help the patient and the family as well. Many family members report that they are willing to support their diabetic family member; however, they don't know how to be involved (Kovacs Burns et al., 2013). Therefore, engaging family members in this process could help them to better understand the seriousness of diabetes and how they can help their diabetic relative. For example, teaching the family about topics like food preparation, portion control, and how to de-emphasize the significance of food in social gathering would be very helpful. The findings of this dissertation also support the importance of perceived family support.

The findings of this dissertation highlight that half of the women were psychologically not adapted to diabetes and that would significantly affect their diabetes successful management. This is a serious problem and must be considered by healthcare providers when working with this population. Healthcare providers should also consider level of acculturation in their assessment of Arab patients with diabetes, since lack of acculturation may increase the risk for unsuccessful diabetes management. Culture shapes health attitudes, beliefs, and perceptions that ultimately impact health promoting behaviors. The effects of culture on DSM may be especially significant

for minority groups such as Arab population, whose health beliefs, practices, and traditions influencing lifestyle choices maybe substantially different from the general population in the U.S. (Aboul-Enein & Aboul-Enein, 2010).

APPENDIX A: Research Questionnaire

Demographic Data Form

Instructions: Please check the answer that best describes you.

1. What is your age?
 - a. 18- 29
 - b. 30-39
 - c. 40-49
 - d. 50-59
 - e. 60-69
 - f. 70 and above
2. What is your current employment status? (check one)
 - a. Employed full time
 - b. Employed part time
 - c. Unemployed (but physically able to work)
 - d. Unable to work due to health problems
 - e. Retired
3. What is your monthly income from all sources (circle one)?
 - a. <\$500
 - b. \$500- \$1499
 - c. \$1500- \$2999
 - d. > \$3000
4. What is your current marital status?
(Check one):
 - a. Single
 - b. Married
 - c. Divorced
 - d. Widowed
 - e. Separated
5. Years of completed education
 - a. Less than 10 years
 - b. 12 years or High school
 - c. Diploma degree
 - d. Undergraduate degree
 - e. Graduate degree
6. Do you have health Insurance?
 - a. Yes
 - b. No
7. How long have you been living in the United States?

- a. < 5 years
- b. 5 to 10 years
- c. > 10 years
8. What is your country of origin?

9. What is your Height? _____(cm)
Weight _____(Kg)
10. What was your age at the onset of diabetes? _____
11. How many years have you lived with diabetes?
- a. Less than 5 years
- b. 5-10 years
- c. 11-16 years
- d. 17 years and above
12. Do you take medication for diabetes?
- a. Yes
- b. No
- If yes, then please indicate the type of treatment:

c. Insulin

d. Pills

e. Both
- f. No medications
13. In general, would you say your health is:
- a. Excellent
- b. Very good
- c. Good
- d. Fair
- e. Poor
14. Have you ever received diabetes education _____ from physician/dietician/nurse in the past?
- a. Yes
- b. No
15. Which if any, of the following problems sometimes associated with diabetes have you experienced? (check all that apply):
- Low blood sugar (<80mg/dl)
- High blood sugars (>300 mg/dl)
- Heart problems
- Sexual difficulties

- Damage to the retina of the eye
- Nerve damage (e.g. numbness or tingling of the hands or feet, or foot ulcers)
- Kidney problems
- None of the above

16. Do you smoke?

- a. Still smoking
- b. Quit smoking
- c. Never smoked

17. Your HA1C is _____

نموذج تعبئة البيانات

تعليمات: الرجاء اختيار الإجابة الأنسب لك:

10. كم كان عمرك حين بداية مرض السكري معك؟
11. كم سنة عشت مع مرض السكري؟
12. هل تأخذ دواء لمرض السكري؟
13. ما هي حالتك الصحية الآن:
14. هل سبق لك أن تلقيت دورة عن مرض السكري من طبيب / أخصائي تغذية / ممرضة؟
15. أي المشاكل يمكن وصفها أنها متعلقة بالسكري؟
16. هل تدخن؟
17. ما هو معدل HA1C في جسمك؟
1. كم عمرك؟
2. ما هي حالة وظيفتك الحالية؟
3. ما هو معدل دخلك الشهري؟
4. ما هي حالتك الاجتماعية الحالية؟
5. ما هو مستواك التعليمي؟
6. هل يوجد لديك تأمين صحي؟
7. منذ متى وأنت تعيش في الولايات المتحدة؟
8. ما هو بلدك الأصلي؟
9. ما هو طولك؟ (سم)
ما هو وزنك؟ (كغ)
- a. 18 - 29
b. 30 - 39
c. 40 - 49
d. 50 - 59
e. 60 - 69
f. 70 وما فوق.
- a. دوام كامل.
b. دوام جزئي.
c. غير مرتبط بعمل (لكنني أستطيع العمل).
d. لا أستطيع العمل.
- a. أقل من \$500.
b. \$500 - \$1499.
c. أعلى من \$3000.
- a. أعزب / عزباء.
b. متزوج / متزوجة.
c. مطلقة.
d. أرمل / أرملة.
e. منفصل.
- a. أقل من 10 سنوات.
b. ثانوية عامة أو أكثر من 12 سنوات.
c. شهادة الدبلومة.
d. شهادة البكالوريوس.
e. دراسات عليا.
- a. نعم.
b. لا.
- a. أقل من 10 سنوات.
b. بين 5 - 10 سنوات.
c. أكثر من 10 سنوات.
- a. ما هو طولك؟ (سم)
b. ما هو وزنك؟ (كغ)
- a. أقل من خمس سنوات.
b. بين 5 - 10 سنوات.
c. أكثر من 10 سنوات.
- a. نعم.
b. كنت مدخن.
c. لا.
- a. إبر الأنسلولين.
b. الحبوب.
c. الأثنان جميعا.
d. لا أستعمل أي دواء.
- a. ممتازة.
b. جيدة جدا.
c. جيدة.
d. عادلة.
e. سيئة.
- a. نعم.
b. لا.
- a. أي المشاكل يمكن وصفها أنها متعلقة بالسكري؟
b. انخفاض معدل السكر في الدم. (أقل من 80 مغ لكل dl)
c. ارتفاع معدل السكر في الدم. (أكثر من 300 مغ لكل dl)
d. مشاكل القلب.
e. المشاكل الجنسية.
f. المشاكل المتعلقة بشبكية العين.
g. تلف الأعصاب. (مثل وخز اليدين أو القدمين أو قرحة المعدة)
h. مشاكل الكلى.
i. مشاكل أخرى.

Michigan Diabetes Research and Training Center's Revised Diabetes Knowledge Test

1. **The diabetes diet is:**
 - a) The way most American people eat
 - b) A healthy diet for most people
 - c) Too high in carbohydrate for most people
 - d) Too high in protein for most people
2. **Which of the following is highest in carbohydrate?**
 - a) Baked chicken
 - b) Swiss cheese
 - c) Baked potato
 - d) Peanut butter
3. **Which of the following is highest in fat?**
 - a) Low fat (2%) milk
 - b) Orange juice
 - c) Corn
 - d) Honey
4. **Which of the following is a "free food"?**
 - a) Any unsweetened food
 - b) Any food that has "fat free" on the label
 - c) Any food that has "sugar free" on the label
 - d) any food that has less than 20 calories per serving
5. **A1C is a measure of your average blood glucose level for the past:**
 - a) Day
 - b) Week
 - c) 6-12 weeks
 - d) 6 months
6. **Which is the best method for home glucose testing?**
 - a) Urine testing
 - b) Blood testing
 - c) Both are equally good
7. **What effect does unsweetened fruit juice have on blood glucose?**
 - a) Lowers it
 - b) Raises it
 - c) Has no effect

8. Which should not be used to treat low blood glucose?

- a) 3 hard candies
- b) 1/2 cup orange juice
- c) 1 cup diet soft drink
- d) 1 cup skim milk

9. For a person in good control, what effect does exercise have on blood glucose?

- a) Lowers it
- b) Raises it
- c) Has no effect

10. What effect will an infection most likely have on blood glucose?

- a) Lowers it
- b) Raises it
- c) Has no effect

11. The best way to take care of your feet is to:

- a) Look at and wash them each day
- b) Massages them with alcohol each day

- c) Soak them for one hour each day
- d) Buy shoes a size larger than usual

12. Eating foods lower in fat decreases your risk for:

- a) Nerve disease
- b) Kidney disease
- c) Heart disease
- d) Eye disease

13. Numbness and tingling may be symptoms of:

- a) Kidney disease
- b) Nerve disease
- c) Eye disease
- d) Liver disease

14. Which of the following is usually not associated with diabetes?

- a) Vision problems
- b) Kidney problems
- c) Nerve problems
- d) Lung problems

اختبار المستوى المعرفي لمرض السكري: نسخة منقحة من مركز متشغن للابحاث والتدريب في مجال السكري

1. النظام الغذائي لمرض السكري هو:
- أي طعام عليه علامة خالي من السكر
- أي طعام يحتوي على أقل من 20 سعر حراري
- الطريقة التي يأكل بها معظم السعوديين
- النظام الغذائي لمعظم الناس
5. اختبار خضاب الدم السكري (الهيموغلوبين الغليكوزيلاتي) هو أحد الاختبارات التي تقيس متوسط مستوى السكر في الدم قبل:
- اليوم
- أسبوع
- النظام الذي يحتوي على نسبة عالية من البروتين لمعظم الأشخاص
2. أي من الأغذية التالية يحتوي على نسبة عالية من الكربوهيدرات؟
- 6 الي-12 أسابيع
- 6 أشهر
- الدجاج المشوي
6. ماهي أفضل الطرق التالية لفحص سكر الدم في المنزل؟
- جبن شيدر
- فحص البول
- بطاطس مشوية
- فحص الدم
- زبدة الفول السوداني
- كلاهما جيد
3. أي من الأطعمة التالية يحتوي على نسبة عالية من الدهون؟
7. ما هو تأثير عصير الفاكهة الغير محلاة على مستوى السكر في الدم؟
- حليب قليل الدسم (2%)
- يخفض منه
- عصير برتقال
- يساهم في ارتفاعه
- ذرة
- ليس له تأثير
- عسل
4. أي من الأطعمة التالية يعتبر خالي من الكربوهيدرات؟
8. أي من التالي لا يجب استخدامه لعلاج سكر الدم المنخفض؟
- الأطعمة الغير محلاة
- أي طعام عليه علامة خالي الدهون
- ثلاث حبات من التمر

- نصف كوب عصير برتقال
- كوب مشروب غازي خالي من السكر
- كوب حليب قليل الدسم
9. بالنسبة للشخص المتحكم بمعدل جيد للسكري، ما هو تأثير التمارين الرياضية على مستوى سكر الدم؟
- تقلل منه
- تساهم في زيادته
- ليس لها تأثير
10. ما هو تأثير العدوى الأكثر احتمالاً على سكر الدم:
- ارتفاع في سكر الدم
- انخفاض في سكر الدم
- لا تؤثر عليه

11. أفضل وسيلة لرعاية قدميك

- الاهتمام بها وغسلها يوميا
- التدليك بالكحول يوميا
- نقعها لمدة ساعة يوميا
- شراء حذاء بمقاس أكبر من المعتاد
12. تناول أطعمة ذات دهون أقل تقلل من خطورة الإصابة

بـ:

- امراض الاعصاب
- أمراض الكلى
- أمراض القلب

أمراض العين

13. الشعور بالوخز والتنميل ربما يكون أعراض لـ:

- أمراض الكلى
- أمراض الأعصاب
- أمراض العين
- أمراض بالكبد

14. أي مما يلي عادة لا يرتبط بمرض السكري:

- مشاكل بالرؤية
- مشاكل بالكلى
- المشاكل العصبية
- مش

Social Support Scale (SSS)

Q1. My family or friends help and support me a lot to: (Circle one answer for each line)

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	Dose not apply
a) follow my meal plan.	1	2	3	4	5	6
b) take my medicine.	1	2	3	4	5	6
c) take care of my feet.	1	2	3	4	5	6
d) get enough physical activity.	1	2	3	4	5	6
e) test my sugar.	1	2	3	4	5	6
f) Handle my feelings about diabetes.	1	2	3	4	5	6

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

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
------------------------------	------------------------------	----------------	---------------------------	---------------------------

a) accept me and my diabetes. 1 2 3 4 5

b) feel uncomfortable about me because of my diabetes. 1 2 3 4 5

c) encourage or reassure me about my diabetes. 1 2 3 4 5

d) discourage or upset me about my diabetes. 1 2 3 4 5

e) listen to me when I want to talk about my diabetes. 1 2 3 4 5

f) nag me about diabetes. 1 2 3 4 5

قياس الدعم العائلي و دعم الاصدقاء

1. يقوم كل من الدعم العائلي و دعم الاصدقاء (ضع دائرة حول رمز الاجابة الصحيحة لكل سطر)

غير مطابق	موافق بشدة	موافق بعض الشيء	متردد	أعارض بعض الشيء	أعارض بشدة	
6	5	4	3	2	1	1. اتباع خطة الطعام
6	5	4	3	2	1	2. تناول الأدوية
6	5	4	3	2	1	3. العناية بالقدمين
6	5	4	3	2	1	4. القيام بالتمارين الرياضية
6	5	4	3	2	1	5. القيام بفحص السكر
6	5	4	3	2	1	6. الاهتمام بمشاعري تجاه السكري

2. العائلة و الاصدقاء (ضع دائرة حول رمز الاجابة الصحيحة لكل سطر)

غير مطابق	موافق بشدة	موافق بعض الشيء	متردد	أعارض بعض الشيء	أعارض بشدة	
6	5	4	3	2	1	1. قبولي و قبول مرض السكري
6	5	4	3	2	1	2. الشعور بعدم الراحة نحوي بسبب مرض السكري
6	5	4	3	2	1	3. تشجيعي و دفعي نحو مرض السكري
6	5	4	3	2	1	4. عدم تشجيعي و احباطي نحو مرض السكري
6	5	4	3	2	1	5. الاستماع لي حين أريد اتكلم عن مرض السكري
6	5	4	3	2	1	6. الحديث معي حول مرض السكري

Problem Areas In Diabetes (PAID)

Developed by W. Polonsky and colleagues (1995)

Translated by Alragum (2008)

Problem Areas in Diabetes (PAID) Questionnaire

INSTRUCTIONS: Which of the following diabetes issues is currently a problem for you? Circle the number that gives the best answer for you.					
	Not a Problem	Minor Problem	Moderate Problem	Somewhat Serious Problem	Serious Problem
1. Not having clear and concrete goals for your diabetes care.	0	1	2	3	4
2. Feeling discouraged with your diabetes treatment plan?	0	1	2	3	4
3. Feeling scared when you think about living with diabetes? ^[1] _[SEP]	0	1	2	3	4
4. Uncomfortable social situations related to your diabetes care (e.g., people	0	1	2	3	4

telling you what to eat)?					
5. Feelings of deprivation regarding food and meals?	0	1	2	3	4
6. Feeling depressed when you think about living with diabetes? ^[L] _[SEP]	0	1	2	3	4
7. Not knowing if your mood or feelings are related to your diabetes?	0	1	2	3	4
8. Feeling overwhelmed by your diabetes? ^[L] _[SEP]	0	1	2	3	4
9. Worrying about low blood sugar reactions? ^[L] _[SEP]	0	1	2	3	4
10. Feeling angry when you think about living with diabetes? ^[L] _[SEP]	0	1	2	3	4
11. Feeling constantly concerned about food and eating?	0	1	2	3	4

12. Worrying about the future and the possibility of serious complications? ^[1] _[SEP]	0	1	2	3	4
13. Feelings of guilt or anxiety when you get off track with your diabetes management? ^[1] _[SEP]	0	1	2	3	4
14. Not "accepting" your diabetes? ^[1] _[SEP]	0	1	2	3	4
15. Feeling unsatisfied with your diabetes physician?	0	1	2	3	4
16. Feeling that diabetes is taking up too much of your mental and physical energy every day?	0	1	2	3	4
17. Feeling alone with your diabetes?	0	1	2	3	4
18. Feeling that your friends and family are not supportive of your diabetes management efforts?	0	1	2	3	4

19. Coping with complications of diabetes?	0	1	2	3	4
20. Feeling "burned out" by the constant effort needed to manage diabetes?	0	1	2	3	4

إستبائين حول مشاكلك مع مرض السكر

تعليمات : أي من المشاكل التالية المتعلقة بمرض السكر تعاني حاليا ؟

ضع دائرة حول الرقم الذي يمثل أفضل أجاباتك . الرجاء الإجابة على جميع الأسئلة .

مشكلة خطيرة	مشكلة خطيرة نوع ما	مشكلة ذات تأثير معتدل	مشكلة بسيطة	ليست مشكلة	
.....4	.....3	.....2	.....1	.....0	1- عدم وجود أهدافا واضحة في رعايتكم لمرض السكر ؟
.....4	.....3	.....2	.....1	.....0	2- الشعور بالإحباط في إتباع خطة علاجك لمرض السكر ؟
.....4	.....3	.....2	.....1	.....0	3- الشعور بالخوف عندما تفكر في أنك سوف تعيش مع مرض السكر ؟
.....4	.....3	.....2	.....1	.....0	4- مواقف اجتماعية غير مريحة تتعلق برعايتكم لمرض السكر؟ (مثلا : يملئ الناس عليك ما تأكل)
.....4	.....3	.....2	.....1	.....0	5- الشعور بالحرمان بخصوص الطعام والوجبات ؟
.....4	.....3	.....2	.....1	.....0	6- الشعور بالاكنتاب عندما تفكر في الحياة مع مرض السكر ؟
.....4	.....3	.....2	.....1	.....0	7- عدم معرفة إذا كانت حالتك المزاجية أو مشاعرك ذات صلة بمرض السكر لديك ؟
.....4	.....3	.....2	.....1	.....0	8- الشعور بأن مرض السكر قد قهرك وتغلب عليك ؟
.....4	.....3	.....2	.....1	.....0	9- القلق من مضاعفات انخفاض السكر في الدم ؟
.....4	.....3	.....2	.....1	.....0	10- الشعور بالغضب حين تفكر في الحياة مع مرض السكر ؟
.....4	.....3	.....2	.....1	.....0	11- الشعور المستمر بالقلق تجاه الأكل والطعام ؟
.....4	.....3	.....2	.....1	.....0	12- القلق من المستقبل واحتمال حدوث مضاعفات صحية خطيرة ؟
.....4	.....3	.....2	.....1	.....0	13- الشعور بالذنب أو التوتر عند عدم الالتزام بإتباع خطة علاج مرض السكر ؟
.....4	.....3	.....2	.....1	.....0	14- عدم "تقبل" إصابتك بمرض السكر ؟
.....4	.....3	.....2	.....1	.....0	15- الشعور بعدم الرضا عن طبيبك المعالج لمرض السكر ؟
.....4	.....3	.....2	.....1	.....0	16- الشعور بأن مرض السكر يستولي على الكثير من طاقتك العقلية والجسدية كل يوم ؟
.....4	.....3	.....2	.....1	.....0	17- تشعر بأنك وحيد مع مرض السكر ؟
.....4	.....3	.....2	.....1	.....0	18- الشعور بعدم مؤازرة أصدقائك وعائلتك بجهدك المبذول للسيطرة على مرض السكر ؟

- 19- التعامل مع مضاعفات مرض السكر ؟01234
- 20- الشعور "بالإرهاق" بسبب الجهد المستمر الذي تتطلبه عملية السيطرة على مرض السكر ؟01234

مركز جوسلين لمرض السكر 1999

Acculturation Rating Scale for Arab Americans II (ARSAA-II)

Circle the number that best describes your response to each of the items below

No.	Item	Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always
1.	I speak Arabic	1	2	3	4	5
2.	I speak English	1	2	3	4	5
3.	I enjoy speaking Arabic	1	2	3	4	5
4.	I associate with Americans	1	2	3	4	5
5.	I associate with Arabs or Arab Americans	1	2	3	4	5
6.	I enjoy listening to Arabic language music	1	2	3	4	5
7.	I enjoy listening to English-language-music	1	2	3	4	5
8.	I enjoy Arabic TV	1	2	3	4	5
9.	I enjoy English language TV (American TV)	1	2	3	4	5
10.	I enjoy English language movies (American movies)	1	2	3	4	5
11.	I enjoy Arabic language movies (Arabic movies)	1	2	3	4	5
12.	I enjoy reading e.g., books in Arabic	1	2	3	4	5
13.	I enjoy reading e.g., books in English	1	2	3	4	5
14.	I write (e.g., letters, notes) in Arabic	1	2	3	4	5
15.	I write (e.g., letters, notes) in English	1	2	3	4	5
16.	My thinking is done in English language	1	2	3	4	5
17.	My thinking is done in Arabic language	1	2	3	4	5

No.	Item	Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always
18.	My contact with my home country has been	1	2	3	4	5
19.	My contact with the U.S.A. has been	1	2	3	4	5
20.	My <u>father</u> identifies or identified himself as An <u>Arab</u>	1	2	3	4	5
21.	My <u>mother</u> identifies or identified herself as an <u>Arab</u>	1	2	3	4	5
22.	My friends, while I was growing up, where of <u>Arabic origin</u>	1	2	3	4	5
23.	My friends, while I was growing up, where of <u>American origin</u>	1	2	3	4	5
24.	In my family, we cook Arabic foods	1	2	3	4	5
25.	My friends now are of Anglo origin (Americans)	1	2	3	4	5
26.	My friends now are of Arabic origin (Arabs)	1	2	3	4	5
27.	I like to identify myself as a <u>White American</u>	1	2	3	4	5
28.	I like to identify myself as an <u>Arab American</u>	1	2	3	4	5
29.	I like to identify myself as an <u>Arab</u>	1	2	3	4	5
30.	I like to identify myself as an <u>American</u>	1	2	3	4	5

Acculturation Rating Scale for Arab Americans II (ARSAA-IIA)

الرجاء الإجابة على كل من الأسئلة التالية بوضع دائره حول الرقم الذي يمثل إجابتك:

الرقم	أبدأ ¹	ليس غالباً ²	أحياناً ³	غالباً ⁴	دائماً ⁵
1	1	2	3	4	5
2	1	2	3	4	5
3	1	2	3	4	5
4	1	2	3	4	5
5	1	2	3	4	5
6	1	2	3	4	5
7	1	2	3	4	5
8	1	2	3	4	5
9	1	2	3	4	5
10	1	2	3	4	5
11	1	2	3	4	5
12	1	2	3	4	5
13	1	2	3	4	5
14	1	2	3	4	5
15	1	2	3	4	5
16	1	2	3	4	5
17	1	2	3	4	5
18	1	2	3	4	5
19	1	2	3	4	5
20	1	2	3	4	5

5	4	3	2	1	تعتبر والدتي نفسها عربية	21
5	4	3	2	1	كان معظم أصدقائي من أصل عربي في سنوات طفولتي و صباي	22
5	4	3	2	1	كان معظم أصدقائي من أصل أمريكي في سنوات طفولتي و صباي	23
5	4	3	2	1	في عائلتي نقوم بطهي الطعام والمأكولات العربية	24
5	4	3	2	1	أصدقائي حالياً من أصل أمريكي	25
5	4	3	2	1	أصدقائي حالياً من أصل عربي	26
5	4	3	2	1	أحبذ أن أعتبر نفسي أمريكياً <u>بحتاً</u> (غريباً)	27
5	4	3	2	1	أحبذ أن أعتبر نفسي عربياً أمريكياً	28
5	4	3	2	1	أحبذ أن أعتبر نفسي عربياً	29
5	4	3	2	1	أحبذ أن أعتبر نفسي أمريكياً	30

Acculturation Rating Scale for Arab Americans-II (ARSAA-II): Arabic version (Copyright Jadalla, 2007).

Summary of Diabetes Self-Care Activities (SDSCA)

1. How many of the last SEVEN DAYS have you followed a healthful eating plan? 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? 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? 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? 1 2 3 4 5 6 7
5. On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity? (Total minutes of continuous activity, including walking). 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? 1 2 3 4 5 6 7

7. On how many of the last SEVEN DAYS did you test your blood 1 2 3 4 5 6 7
sugar?
8. On how many of the last SEVEN DAYS did you test your blood 1 2 3 4 5 6 7
sugar the number of times recommended by your health care
provider?
9. On how many of the last SEVEN DAYS did you check your feet? 1 2 3 4 5 6 7
10. On how many of the SEVEN DAYS did you inspect the inside of 1 2 3 4 5 6 7
your shoes?
11. On how many of the last SEVEN DAYS, did you take your 1 2 3 4 5 6 7
recommended diabetes medication?

OR

12. On how many of the last SEVEN DAYS did you take your 1 2 3 4 5 6 7
recommended insulin injections?

ملخص عن الانشطة المتعلقة 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 فيه المشي)؟
0 1 2 3 4 5 6 7
- كم من الايام السبعة الماضية مارست تمرينا رياضيا معينا (مثل السباحة, المشي, ركوب الدراجة,) غير الذي 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 الماضية 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
- الدواء :**
- كم من الايام السبعة الماضية تناولت الدواء الخاص بالسكري الموصوف لك؟
0 1 2 3 4 5 6 7
- او
- كم من الايام السبعة الماضية اخذت حقن الانسولين الموصوفة لك؟
0 1 2 3 4 5 6 7

APPENDIX B: IRB Expedited Approval

**WAYNE STATE
UNIVERSITY**

IRB Administration Office
87 East Canfield, Second Floor
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
<http://irb.wayne.edu>

NOTICE OF EXPEDITED APPROVAL

To: Mona Alanazi
College of Nursing

For From: Dr. Deborah Ellis or designee S. Millis, Ph.D / SC
Chairperson, Behavioral Institutional Review Board (B3)

Date: May 28, 2019

RE: IRB #: 052219B3E

Protocol Title: Determinants of Successful Diabetes Self-Management Behaviors among Women of Arab Descent with Type 2 Diabetes

Funding Source:

Protocol #: 1905002254

Expiration Date: May 27, 2022

Risk Level / Category: Research not involving greater than minimal risk

The above-referenced protocol and items listed below (if applicable) were **APPROVED** following *Expedited Review* Category (#7)* by the Chairperson/designee for the Wayne State University Institutional Review Board (B3) for the period of 05/28/2019 through 05/27/2022. This approval does not replace any departmental or other approvals that may be required.

- Revised Protocol Summary Form (revision received in the IRB Office 05/22/2019)
- Research Protocol (received in the IRB Office 05/06/2019)
- HIPAA Summary Form (received in the IRB Office 05/06/2019)
- Research Informed Consent – English Version (revision dated 04/04/2019)
- Research Informed Consent – Arabic Version (revision dated 04/04/2019)
- Data Collection Tools (12): (I) Demographic Data Form – English Version, (II) Demographic Data Form – Arabic Version, (III) Diabetes Knowledge Test – English Version, (IV) Diabetes Knowledge Test – Arabic Version, (V) Social Support Scale (SSS) – English Version, (VI) Social Support Scale (SSS) – Arabic Version, (VII) Problem Areas In Diabetes (PAID) – English Version, (VIII) Problem Areas In Diabetes (PAID) – Arabic Version, (IX) Acculturation Rating Scale for Arab Americans II (ARSAA-II) – English Version, (X) Acculturation Rating Scale for Arab Americans II (ARSAA-II) – Arabic Version, (XI) Summary of Diabetes Self-Care Activities (SDSCA) – English Version, and (XII) Diabetes Self-Care Activities (SDSCA) – Arabic Version.
- Please note: This submission was reviewed under the IRB Administration Office Flexible Review and Oversight Policy, therefore the expiration date is 05/13/2022.

- * Federal regulations require that all research be reviewed at least annually. You may receive a "Continuation Renewal Reminder" approximately two months prior to the expiration date; however, it is the Principal Investigator's responsibility to obtain review and continued approval **before** the expiration date. Data collected during a period of lapsed approval is unapproved research and can never be reported or published as research data.
- * All changes or amendments to the above-referenced protocol require review and approval by the IRB **BEFORE** implementation.
- * Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the IRB Administration Office Policy (<http://www.irb.wayne.edu/policies-human-research.php>).

NOTE:

1. Upon notification of an impending regulatory site visit, hold notification, and/or external audit the IRB Administration Office must be contacted immediately.

2. Forms should be downloaded from the IRB website at each use.

*Based on the Expedited Review List, revised November 1998

Notify the IRB of any changes to the funding status of the above-referenced protocol.

APPENDIX C: Expedited Amendment Approval

**WAYNE STATE
UNIVERSITY**

IRB Administration Office
87 East Canfield, Second Floor
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NOTICE OF EXPEDITED AMENDMENT APPROVAL

To: Mona Alanazi
College of Nursing

From: Dr. Scott Millis or designee m. tarver, mo/em
Chairperson, Behavioral Institutional Review Board (B3)

Date: September 19, 2019

RE: IRB #: 052219B3E

Protocol Title: Determinants of Successful Diabetes Self-Management Behaviors among Women of Arab Descent with Type 2 Diabetes

Funding Source:

Protocol #: 1905002254

Expiration Date: May 27, 2022

Risk Level / Category: Research not involving greater than minimal risk

The above-referenced protocol amendment, as itemized below, was reviewed by the Chairperson/designee of the Wayne State University Institutional Review Board (B3) and is APPROVED effective immediately.

- Protocol – Research site changes including adding Dr. Raad Alsaraf's clinic to increase recruitment.

Notify the IRB of any changes to the funding status of the above-referenced protocol.

APPENDIX D: Summary of Reviewed Studies for the Systematic Review

Author & Year	Purpose	Research Design	Sample/Setting	Findings	Conclusion
Al-Dahir et al. (2013)	To investigate the relationship between acculturation and diabetes risk among Arab Americans	Cross-sectional	181 adult Arab Americans from community centers in Southeastern Louisiana	A negative correlation was found between Arab acculturation variables and diabetes risk among males and between American acculturation variables and diabetes risk among females	Lack of acculturation is an important risk factor for diabetes in immigrant Arab Americans. Development of a culturally competent diabetes intervention tool that tailored to Arab American is important.
Bertran et al., (2015)	To better understand barriers and facilitators of DSME among Arab American patients with diabetes	Qualitative 3 focus groups sessions: 2 mixed-gender groups and 1 female-only group	23 Arab American adults with managed diabetes snowball sampling from community	Cultural traditions such as food sharing, religious beliefs, and gender roles both facilitated and inhibited DSME. Key barriers to DSME is lack of available educational and supportive resources geared to special needs of Arab Americans	Development of DSME programs tailored to address related aspects of Arab culture might improve DSME outcomes in Arab American population
Bertran et al.,	To assess Arab Americans'	Qualitative 8 focus groups:	69 participants self-identified Arab or	Identified myths about	Future interventions

(2016)	knowledge and perceptions of diabetes and their preferences for a lifestyle intervention.	male-only, female-only, or mixed-gender	Arab Americans ≥ 30 years of age and without diabetes. Sample were randomly selected from different stages of a larger study	diabetes etiology, folk remedies, and social stigma attached to diabetes. The main barrier to healthcare was lack of health insurance or cost of care.	should address cultural preferences, diabetes myths, folk remedies, and gender-specific group education and exercise, utilization of family support and religious centers
DiZazzo-Miller et al. (2017)	To examine providers' perspectives on cultural barriers and facilitators to DSM in the Arab-American community	Qualitative 2 focus groups, (physicians and pharmacists)	8 Healthcare practitioners serving Arab-American patients living in the metropolitan Detroit area, physicians (n = 5, mean years of clinical practice 8.00 ± 8.89 SD), and pharmacists (n = 3, mean years of clinical practice 19.00 ± 11.00 SD)	Main barriers to DSM were the complication of the disease itself and patients' denial or refusal to recognize it, and stigma.	DSM education for Arab Americans will be most effective if developed and delivered in a culturally appropriate manner by healthcare providers.
Fritz et al. (2016)	To examine Arab American providers' and patients' perspectives of the meaning of DSM and perceived culture related to barriers and facilitators to DSM	Qualitative 5 focus groups: 2 groups with Arab American healthcare providers, and 3 groups with adult Arab Americans with diabetes	Arab American healthcare practitioners (n=8) Adult Arab American patients with T2D (n = 23)	Barriers to DSM were: limited resources for DSM education, lack of support, and stigma. Family support can be facilitators if accompanied with the appropriate education. Findings highlight differing views	There is a need to develop linguistically and culturally sensitive educational materials and relevant supports within the family and community for the Arab American population.

				among providers and patients on the family role in supporting DSM efforts	
Jaber, Brown, Hammad, Zhu, et al. (2003)	To examine the relationship between dysglycemia and acculturation, physical activity, and perceived stress in Arab immigrants in the U.S.	Cross-sectional population-based study	520 Arab Americans, aged 20–75 years who were born in the Middle East and immigrated to southeastern Michigan.	Among men, older age at immigration, shorter length of stay in the U.S., less activity in Arab organizations, and eating Arabic food were associated with dysglycemia independent of age and BMI. Among women, acculturation was very low and was confounded with age and BMI as powerful risk factors for dysglycemia	Lack of acculturation is an important risk factor for dysglycemia in immigrant Arab Americans. Intervention programs aimed at diabetes prevention should consider the acculturation process
Pinelli et al., (2011)	To examine factors facilitators of weight-loss goal attainment in a lifestyle intervention program designed to prevent T2D among Arab Americans	Longitudinal correlational study (24 weeks).	71 self-identified Arab or Arab Americans ≥ 30 years of age and with a BMI >27 kg/m ² and without diabetes	Demographic, socioeconomic, and psychosocial factors were not associated with goal attainment. Family support was an important predictor of	Family-centered lifestyle interventions are likely to succeed in Arab American communities and show promise in prevention of T2D

weight loss
goal attainment
in preventing
diabetes

Jaber et al., (2011)	To assess the effects of a structured educational intervention targeting knowledge gaps and health beliefs conducive to negative health behaviors on the willingness to engage in lifestyle change interventions	Prospective non-randomized trial.	71 self-identified Arab or Arab Americans ≥ 30 years of age and with a body mass index (BMI) ≥ 27 kg/m ² and without diabetes Setting?	After the educational intervention, 49 of the 63 enrolled individuals (78%) were willing to participate in the lifestyle intervention	A culturally-specific, DPP-adapted, group lifestyle intervention implemented in a community setting is feasible and effective in Arab Americans
Pinelli et al. (2010)	To examine the associations between self-reported perceived risk and willingness to engage in diabetes prevention activities among Arab-Americans	Correlational cross-sectional study.	116 self-identified Arab-Americans ≥ 30 years of age and with BMI ≥ 27 kg/m ² Selected from???	Individuals willing to participate in this study had higher perceived risk for multiple diseases and environmental conditions and an overall higher perceived risk for diabetes compared to those that declined to participate on the lifestyle intervention	Perceived risk, which pertains to the individual's beliefs and may contain misconceptions and lack scientific evidence, is an integral factor in the adoption of preventative behaviors

Pinelli and Jaber (2011)	To examine the practices of patients with T2D observing fasting (e.g. Ramadan) in regard to changes made to lifestyle or pharmacological interventions and frequency of complications.	Cross-sectional study.	27 adults with T2D, of native Arab ancestry, and observing fasting during Ramadan Setting?	Suboptimal practices were observed including reports of both decreased frequency and stopping HBGM during the month of Ramadan despite the majority reporting consultation with providers prior to fasting. Specific patient education regarding medications, risks of fasting, indications to break fasting, meal plans, and exercise was not provided.	Lack of patient education prior to Ramadan may contribute to the suboptimal practices reported and needs to be included by health providers so that patients are better informed about managing their diabetes while still adhering to religious observations.
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T2D type 2 diabetes

DSME diabetes self-management education

BMI body mass index

DPP diabetes prevention program

HBGM home blood glucose monitoring

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ABSTRACT**DETERMINANTS OF SUCCESSFUL DIABETES SELF-MANAGEMENT BEHAVIORS
AMONG WOMEN OF ARAB DESCENT WITH TYPE 2 DIABETES**

by

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Type 2 Diabetes (T2D) continues to be an escalating public health problem that contributes to increased morbidity and mortality worldwide (American Diabetes Association, 2017b). According to the National Diabetes Statistics Report (2017), approximately 30.3 million (9.4%) Americans have T2D. It accounted for 252,806 deaths in 2015 in the United States. Although the complications of T2D is a major threat to the health of women of Arab descent, there is lack of information about the health practices and diabetes self-management behaviors of this population. The purpose of this dissertation is to examine the impact of diabetes knowledge, social/family support, acculturation, and psychological adjustment to diabetes on DSM behaviors and glycemic control among women of Arab descent utilizing the Roy Adaptation Model.

The specific aims of this study are the following:

Specific Aim 1: *To describe the prevalence of DSM behaviors and diabetes control (HbA1C) among women of Arabic descent with T2D.*

Specific Aim 2: To investigate the relationship among diabetes knowledge, social/family support, acculturation, and psychological adjustment to diabetes on DSM behaviors and glycemic control among women of Arab descent.

Method: a non- experimental correlational descriptive design was implemented in this study. A convenience sample size of 118 women of Arab descent were recruited from two clinical sites. The women participate in the study if they were (1) of Arabic descent (2) diagnosed with T2D for at least a year, (3) 18 years and older, (4) non-pregnant, and (5) able to speak and read either English or Arabic.

Results: The majority of the women were between the ages 50- 59 years (33.1%), were unemployed (45.8%), were receiving a monthly income between \$500 and \$1499 (49.1%), were married (68.6%), not smoker (70.7%), had diabetes education (51.7%), had diabetes for less than 5 years (42.2%), treated with oral hypoglycemic medication only (87.3%), had a good level of HbA1C (60%).

Specific Aim 1: Among this sample, women reported moderate level of following healthy diet (M=15, range= 0- 28), moderate level of exercise (M= 6.4, range= 0- 14), moderate level of glucose testing (M= 7.5, range= 0- 14), low level of foot care (M=5.3, range= 0- 14), and high level of medication adherence (M= 12.7, range= 0- 14). Furthermore, the mean HbA1C of the participants was 6.9% (SD=1.2), ranging between 5% to 11.4%.

Specific Aim 2: There was a positive significant association between the DSM behaviors and the diabetes knowledge. There was a negative and significant association between the psychological adjustment to diabetes and DSM behaviors.

A step-type regression model was used to estimate the optimal model. The optimal model included BMI, Diabetes knowledge, psychological adaptation to diabetes, and the level of HbA1C

explained 28% of the variance in DSM behaviors. Other variables, namely social/family support and acculturation were not significant. With other variables held constant (see table 5), DSM behaviors were negatively related to BMI decreasing by 0.77 for every extra unit increase in BMI. Similarly, DSM behaviors were negatively related to psychological adjustment to diabetes decreasing by 0.14 for every extra unit increase in psychological adjustment to diabetes. On the other hand, DSM behaviors were positively related to diabetes knowledge and HbA1C. For instance, DSM behaviors increased by 1.31 for every extra unit increase in diabetes knowledge.

AUTOBIOGRAPHICAL STATEMENT

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