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Moderators of Depression and Self-Management in Type 2 Diabetes Patients

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Walden University
2020

Abstract

Moderators of Depression and Self-Management in Type 2 Diabetes Patients

by

Cynthia Elaine Fraser

MA, Fordham University, 2007

BS, Long Island University, 2005

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

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Abstract

Although Type 2 diabetes can be reversed or controlled, many individuals choose not to adhere to treatment regimens, nor do they engage in self-management practices. The purpose of this cross-sectional study was to explore self-management among individuals with Type 2 diabetes, examining whether some psychosocial variables have a moderating effect on self-management. The psychosocial variables explored in this research were perception of body image, fear of hypoglycemia, level of family support, and depression. The biopsychosocial model was the theoretical framework. Using the Body Appreciation Scale, Diabetes Self-Management Questionnaire, The Family Relationship Scale, Hypoglycemic Fear Survey (HFS-II), and the Beck Depression Inventory-2, an independent samples t-test was used to explore levels of depression between 2 samples differing in depression levels; a linear regression model was used to examine the moderating effects of perception of body image, fear of hypoglycemia, and level of family support on depression and self-management. According to study results, there was a significant difference in level of glucose control among individuals with high levels of depression when compared to individuals with lower levels of depression. In addition, the psychosocial variables explored in this study (perception of body image, fear of hypoglycemia, and level of family support) had a moderating role with depression and self-management. These findings provide useful information to promote better health education programs and positive health behaviors among individuals diagnosed with Type 2 diabetes.

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Dedication

I awaited this day to dedicate my doctoral work to my late husband, David R. Fraser, who was the light of my life. Throughout the years that we shared, he provided unwavering support and love as I took this doctoral journey. I know that he would have been proud to share this extraordinary moment with me. I would also like to dedicate my work to Antoini Ramos Piris, husband and father of my sons. who encouraged me to return to school to pursue my doctoral studies. I will forever love and cherish you both.

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Chapter 1: Introduction to the Study

Diabetes is the third leading cause of death in the United States, accounting for 12% of all deaths (Center for Disease Control [CDC], 2017). Within the last 20 years, the number of incidents of diabetes has tripled and has now reached an estimated 30 million cases (American Diabetes Association [ADA], 2015). Among these cases, individuals with Type 2 diabetes comprise the largest percentage of diabetics, as 90 out of every 100 has a diagnosis of Type 2 diabetes (American Diabetes Association, 2015). Scholars have confirmed that Type 2 diabetes is highly treatable (Ahmad & Crandall, 2010; Perreautt & Faerch, 2014; Plotnikoff et al., 2010; Ratner, 2012); however, many researchers have found that the level of self-management of Type 2 diabetes is not effective (Garcia et al., 2013; Samaan, 2013). Nearly 50% of individuals with Type 2 diabetes are not engaged in self-management of this chronic medical condition (Sharma et al., 2014).

Background of the Study

Although understanding the medical underpinnings of Type 2 diabetes is a crucial part of managing this disease, understanding health behaviors, and how an individual chose to manage the disease are also important. There are psychosocial variables that may play a role in self-management of the disease, such as fear of hypoglycemia, perceptions of ideal body weight (Ahola et al., 2016; Raiz, 2014; Rosaland & Piette, 2011), and level of family support. The relationship of these psychosocial variables to self-management is not well understood. Although depression is a known comorbid condition of diabetes and other chronic diseases (Katon, 2009; Riley, McEntee, Gerson,

& Dennison, 2009), the association between level of depression and self-management is not known. In this study, I addressed this gap in the literature by examining the relationship between psychosocial variables and self-management while controlling for the level of depression. I offered an evidence-based platform toward positive social change in diabetes education.

Certain psychosocial variables may be associated with the level of self-management among individuals diagnosed with Type 2 diabetes. These psychosocial variables may include fear of hypoglycemia, level of family support, and the perception of ideal body weight and depression. Prior scholars have not explored whether these variables have a predictive role in Type 2 diabetes self-management (Perreault & Faerch, 2014). Because Type 2 diabetes affects individuals with diverse lifestyles, there are multiple psychosocial variables that could play a role in the choice to follow a healthy course of self-management of this disease.

Depression is often a factor in an individua's level of self-management of chronic disease. In this study, I explored the role that depression may have in diabetes self-management. Current researchers have not explored associations between depression and disease progression and treatment adherence. Researchers have noted that the absence of depression improves health outcomes with Type 2 diabetes (Shaw, Brown, Khan, Mau, & Dillard, 2013). Depression is associated with failure to comply with medication regimens and lack of fitness and proper nutrition among individuals with Type 2 diabetes (Ciechanowski et al., 2003). In this study, I expanded on the role of depression in the self-management of Type 2 diabetes.

Statement of the Problem

Although Type 2 diabetes is a highly treatable disease (Ahmad & Crandall, 2010; Perreautt & Faerch, 2014; Plotnikoff et al., 2010; Ratner, 2012), poor self-management of the disease among individuals diagnosed with Type 2 diabetes is increasing (García-Pérez et al., 2013; Samaan, 2013). Poor self-management of diabetes can be as high as 50% of the number of individuals diagnosed with Type 2 diabetes (Sharma et al., 2014). Scholars have noted many reasons for poor self-management among Type 2 diabetics. These findings, however, are inconclusive and stem primarily from a medical framework. What is not understood is whether other psychosocial variables play a role in the disease, such as family caregiver wellbeing, fear of hypoglycemia, and perceptions of ideal body weight (Ahola et al., 2016; Raiz, 2014; Rosaland & Piette, 2011). In this study, I explored this gap in the literature by investigating the moderating role these psychosocial variables may have in self-management of Type 2 diabetes.

Purpose of the Study

The purpose of this quantitative study was to explore the moderating role of psychosocial factors in the level of self-management among individuals with Type 2 diabetes who have varying levels of depression. These psychosocial variables include perception of body image, fear of hypoglycemia, and level of family support. The dependent variable in this study was the level of self-management. In this study, self-management was distinguished from treatment adherence and was defined as a person's ability to maintain an active and participatory role in his or her treatment of or recovery from a chronic medical condition.

Research Questions and Hypotheses

The following research questions were explored to gain a greater understanding of the relationships between the perception of body image, fear of hypoglycemia, the level of family support, and the level of self-management among individuals with Type 2 diabetes who have varying levels of depression:

1.   Is there a statistically significant difference in scores of self-management among Type 2 diabetes patients with a low level of depression when compared to patients with a high level of depression?

$H_0 1$: There is no statistically significant difference in scores of self-management among Type 2 diabetes patients with a low level of depression when compared to patients with a high level of depression?

$H_1 1$: There is a statistically significant difference in scores of self-management among Type 2 diabetes patients with a low level of depression when compared to patients with a high level of depression?

2.   Is the perception of body image a moderator of self-management and depression among patients with Type 2 diabetes?

$H_0 2$: Perception of body image is not a moderator of self-management and depression among patients with Type 2 diabetes?

$H_1 2$: Perception of body image is a moderator of self-management and depression among patients with Type 2 diabetes.

3.   Is fear of hypoglycemia a moderator of self-management and depression among patients with Type 2 diabetes?

$H_1$3: Fear of hypoglycemia is not a moderator of self-management and depression among patients with Type 2 diabetes

$H_1$3: Fear of hypoglycemia is a moderator of self-management and depression among patients with Type 2 diabetes.

4.   Is the level of family supports a moderator of self-management and depression among patients with Type 2 diabetes?

$H_0$4: Level of family support is not a moderator of self-management and depression among patients with type 2 diabetes who are depressed.

$H_1$4: Level of family support is not a moderate self-management and depression among patients with Type 2 diabetes who are depressed.

Each of the aforementioned variables were examined to determine its moderating effect on depression and self-management of Type 2 diabetes and were measured using instruments that a psychometrically appropriate for this research.

Theoretical Framework

The prevailing theoretical foundation for this study was the biopsychosocial model (Engel, 1980). To understand a broader perspective of disease process and management, Engel (year) asserted that there is a range of factors that are significant when considering a chronic disease. These factors not only encompass biological aspects of the disease but also psychological factors such as behavior, thoughts, and emotions, as well as factors that are socially relevant, including socioeconomic factors and family and community supports. This approach to understanding disease management can elucidate health behaviors regarding self-management of Type 2 diabetes. This model is a

metatheoretical perspective encompassing a range of factors to increase an understanding of illness and approaches to health (Meyer &Melchert, 2011).

The biopsychosocial model takes into account the interaction between the biological, social, and psychological factors that impact disease process and management. The model has been adopted by the World Health Organization (2016). The goals in the application of the model are to not only understand disease from the cellular and subcellular level but to also note the patient's subjective experience of the disease (Harvey, 2015). The biopsychosocial model places the patient and his or her medical condition in his or her social context. It encourages a diverse perspective and multidisciplinary effort that includes patient involvement in the management of disease. Management of chronic pain can be effectively approached using a biopsychosocial approach (Yeung et al., 2016).

In addition to clinical applications, scholars support the use of the biopsychosocial framework in behavioral health applications. Researchers have used this model to explore how early trauma among children can increase the activity of neurons and lead to anxiety and other mental health conditions (Moore, McDonald, Carlon, & O'Rourke, 2015). In recent years, mental health clinicians have placed greater emphasis on approaching mental health wellness from a multidisciplinary approach that employs the principles of the biopsychosocial model (Harvey, 2015; van Dorn, 2017).

Although there have been attempts to explore a broader range of factors that affect disease using the biopsychosocial model, there is a dearth of information on certain psychosocial variables that could help add to understand self-management health

behavior among patients with Type 2 diabetes. In this study, I emphasized the role of psychosocial variables, including fear of hypoglycemia, family caregiver wellbeing, and perception of ideal body weight and self-management among individuals with Type 2 diabetes with varying levels of depression. Through the prism of the biopsychosocial framework, I aimed to increase an understanding of self-management of Type 2 diabetes by exploring the moderating effects of these psychosocial variables on self-management among patients with Type 2 diabetes.

Nature of the Study

This study was a quantitative, quasi-experimental study. I used a cross-sectional design as participants were asked to respond to a survey at a single point in time. Participants were not followed longitudinally for additional assessment in this study. I employed a purposive sampling approach rather than a random sampling approach used in an experimental design. The dependent variable in the study was self-management. Psychosocial variables perception of body image, fear of hypoglycemia, and level of family support were measured to determine moderating effects on self-management. Depression, a covariate in the study, was controlled for by measuring the level of depression.

Participants with Type 2 diabetes were recruited from a large medical clinic via flyer postings/hand-outs available throughout a large clinic serving 200 patients daily. The flyers announcing the study included my name and contact information. Screening for inclusion/exclusion criteria was done via the demographic questionnaire, and participants were asked to read the informed consent form to acknowledge participation

in the survey and were further instructed to contact me if they had for questions before signing the consent form. All data were collected anonymously, and participants were instructed not to place their name on any of the survey instruments.

Data were analyzed using two approaches. First, an independent samples *t* test was conducted to determine if there was a difference in self-management among patients with high levels of depression compared to those with lower levels of depression. The second data analysis was a multiple linear regression analysis used to determine if a moderating relationship between variables explored in this study.

Definition of Key Terms

Body image: This term refers to a person's perception of his or her body type, often resulting in behaviors stemming from these self-perceptions (Brennon, Lalonde, & Bain, 2010).

Chronic disease: A disease that is persistent, has a major impact on daily functioning, and requires consistent and prolonged treatment (Ward & Black, 2016).

Family support: This term refers to the ability to which a family is an emotional resource upon which a member of the family impacted by chronic disease or illness can depend and from whom the family member impacted by chronic disease or illness can draw emotional resources (Racino, 2005).

Comorbidity: This term refers to two cooccurring disorders or disease processes referred to as comorbidity (Jakovljević & Ostojić, 2013).

Hypoglycemia: This term refers to a diabetic event in which the blood sugar levels are and become of medical concern (ADA, 2017).

Self-efficacy: This term refers to the effectiveness with which a person can succeed in each task or goal and a person's self-belief that results in an ability to be successful (Bandura, 1991).

Treatment adherence: This term refers to a patient's level of compliance with physical directives about the management of a chronic disease. I presented the distinction between treatment adherence and self-management; the emphasis of treatment adherence was on patient compliance rather than patient participation (WHO, 2016).

Type 2 diabetes: This term refers to a metabolic condition in which the body's insulin levels are irregularly high. The body has a resistance to insulin, thereby resulting in a lack of insulin (ADA, 2017).

Assumptions

I assumed that participants were truthful regarding their report of having a medical diagnosis Type 2 diabetes. The study's definition of diabetes aligns with the medical diagnosis. The understanding of Type 2 diabetes may be impacted by emerging definitions of the disease. The prevalence of the disease is far reaching, and medical providers have developed new terminology for those appearing to have diabetic symptoms as prediabetic. According to the ADA (2016), 18 million people in the United States ages 20 or older fall into this category of prediabetes. In the current study, I was specific in my definition of a diagnosis of Type 2 diabetes. To be eligible for the study, participants were required to have had a minimum of 2 years of a medical diagnosis of Type 2 diabetes. Because I relied on survey data, this assumption of truthful reporting on

the part of participants was necessary so that study data would be useful in advancing an understanding about self-management of Type 2 diabetes.

A second assumption of the study was that participants would present with a plethora of levels of self-management behaviors and will report accurately in this regard. For example, it was assumed that not all participants had the same level of commitment to the treatment goals of managing his or her symptoms of Type 2 diabetes and would accurately report his or her lifestyle and management behaviors that he or she currently practiced rather than respond to a perceived expectancy bias. I sought a broad and diverse demographic of participants and assumed that participants would be candid in their responses to regarding their approach to self-management of the disease.

Scope and Delimitations

In this study, I explored self-management among individuals with Type 2 diabetes within a certain age segment. The bounds of age determined for this study were a delimitation in that Type 2 diabetes touches a wide age demographic (ADA, 2015). I examined a specific segment of the age demographic, individuals ages 40-60. According to the ADA (year), this is the largest segment of those with a diagnosis of Type 2 diabetes, representing more than 20% of those diagnosed with Type 2 diabetes. Although the study encompassed a large segment of individuals with Type 2 diabetes, I did not include the entire larger population of individuals with Type 2 diabetes. Elderly patients are a growing segment of the population of individuals diagnosed with Type 2 diabetes (Yakaryılmaz & Öztürk, 2017). These older patients presented different and heightened risks of developing complications that may limit their ability to engage in self-

management of the disease (Zhuo et al., 2014). This study's emphasis was on patients who could actively engage in self-management of the disease.

Another delimitation of this study was participants' history before data collection may impact results. Specifically, although my inclusion criteria required that participants have a diagnosis of Type 2 diabetes for at least 2 years, some participants may have had a prolonged history of Type 2 diabetes before medical diagnosis or data collection. Given this possibility, those with longer histories of the disease may be more familiar with the effects of Type 2 diabetes and respond according to these preexisting biases, thus limiting the generalizability of study findings.

Limitations

Diabetes is a disease that impacts millions of people annually. In this study, I used participants from a larger population within one metropolitan area of the United States and not across several cities or regions of the United States. It was geographically limited to this particular area for both economical and time constraint reasons. Thus, the data gathered were a reflection of those who lived in this community who may have shared similar lifestyles regarding diet, exercise, and other health-related factors common in a geographic region.

Secondly, the variables measured in this study (i.e., fear of hypoglycemia, perception of body image, and level of family support) were defined in the context of this study. Given the operational definitions assigned to these variables for this research, another limitation is that these constructs may have broader meaning in other contexts. For example, the definition of family support in this study was the level of family

cohesion as measured by the instrument employed in this study. Although this construct of level of family support can be more broadly defined in other contexts, I aimed to measure cohesiveness of the family as a construct of level of family support.

A third limitation concerns this study's data analysis. I explored relationships between variables. Although it is expected that relationships between variables will be established in the study, inferences regarding causation are limited. Specifically, I employed a linear model to examine relationships between variables. This model was based on probabilities or correlations between these variables. Correlation is limited within the scope of concluding causation (Creswell, 2014). The current study was limited regarding what larger generalizations can be made about causality.

<div align="center">**Significance of the Study**</div>

It is anticipated that by the year 2050, one in three people will have some form of diabetes (International Diabetes Federation, 2011). Because Type 2 diabetics represents a larger segment of the population (ADA, 2015), gaining an understanding of factors that predict self-management among Type 2 diabetics is important. These factors that warrant further study include fear of hypoglycemia, family caregiver wellbeing, and perception of ideal body weight.

To date, most health education programs for individuals diagnosed with diabetes are designed to teach participants the metabolic implications of the disease to increase their awareness (Zurita-Cruz et al., 2018). Although these education programs are valuable, the findings from this study could advance health education curricula and bring positive social change by raising a greater level of understanding of Type 2 diabetes.

Specifically, it could expand current diabetes education programs by providing an evidence-based model regarding the role of psychosocial variables in self-management. Additionally, findings from this study could bring about positive social change by promoting a greater level of engagement of individuals with Type 2 diabetes in managing the disease, potentially bringing down the cost of care for the treatment of this chronic medical condition

Summary

Type 2 diabetes is a chronic health crisis impacting individuals worldwide. It has been reported as highly treatable (Perreault & Faerch, 2014). In this study, I explored self-management of Type 2 diabetes by considering variables that may moderate self-management, perception of body image, fear of hypoglycemia, and level of family support. Further, I took into account the level of depression experienced by individuals with the disease to more clearly identify the moderating effects of the variables on self-management.

Chapter 2 includes a discussion about the literature review strategy employed and a presentation of findings regarding Type 2 diabetes self-management in the current body of literature. Discussion regarding methodological limitations noted in prior studies in also included in the proceeding chapter.

Chapter 2: Literature Review

This literature review provides an in-depth look at the variables included in this study. These variables are self-management, perception of body image, fear of hypoglycemia, level of family support, and depression. Examination is given to prior research in the body of knowledge on each variable in the context of the topic in the current study. Further, I explore studies on the level of depression experienced by individuals with Type 2 diabetes. I demonstrate the need for the current research by presenting a critical review of the limitations of prior findings in studies that do not control for depression to identify the moderating effects of the variables on self-management.

Literature Search Strategy

I explored databases encompassing scholarly works. The search included electronic searches in scholarly journal databases including PubMed, Proquest, Psycharticles, Science Diet, and *Journal of the American Diabetes Association*. Within these databases, the keywords used to identify articles were *Type 2 diabetes self-management, disease self-management, barriers of self-management, hypoglycemia, body image, caregiver wellness, family support*, and *wellbeing*. These keywords were entered in the scholarly journal databases with a date range of 2012-2017. Other works relevant to the study were also found in these databases within a date range broader than the last 5 years.

Theoretical Foundation

The biopsychosocial model was the framework for this study (Engel, 1980). This theory integrates perspectives from a biological and psychosocial lens to better understand the complexities of chronic disease and its impact as well as the patient's subjective experience. In the biopsychosocial model, disease and chronic conditions are part of a dynamic interaction of biological and psychological, and social factors specific to each patient require a multidisciplinary approach to develop care models for and to improve the patient's overall quality of care. Engel (1977) described the model as an approach that systematically considers biological, psychological, and social factors and their complex interactions to gain information on the disease or chronic condition in its fullest context.

The model purports four basic premises. First, biological, psychological, and social factors lie along a spectrum of other natural systems (author, year). Each of these factors is distinct and brings into consideration different dynamics specific to each patient. Second, biological, social, and psychological factors require the application of a body of knowledge specific to it (author, year). Social and psychological factors are steeped in scientific knowledge of their own and can also be approached as well as a biological correlate in efforts to understand disease and chronic conditions. A third proposition of the biopsychosocial model is that humanistic qualities are valuable to deepening an understanding of biological, social, and psychological factors as related to human health (author, year). The fourth premise of the model is that these factors complement one another in that the biological factors require a focus on the smallest units

of the patient down to the subcellular level to understand human health. The psychological and social factors require an understanding of chronic medical conditions at broader levels of psychological and social continuum.

The biopsychosocial model has been applied in clinical contexts to elucidate how a patient experiences better health outcomes. Carter, Stabile, Gunn, and Sonota (2013), explored emotional support and quality of life among patients with gynecologic cancer. In their quantitative study, Carter et al. investigated relationships between standards of care and emotional support and the impact of these variables on the improvement of the symptoms and progression of gynecologic cancer. Carter et al. suggested a relationship between emotional support and physiological determinants of cancer's progression. Carter et al. concluded that it is imperative to consider the level of emotional support when making medical decisions about treatment and care.

Mayo et al. (2015) investigated 678 patients following stroke onset to gain an understanding of factors associated with positive health-related quality of life outcomes. Mayo et al. concluded that optimizing emotional supports and quality of life in the early days following a stroke is critical in achieving positive health outcomes and increased physiological functioning.

Although these scholars affirmed the importance of the biopsychosocial model and application of this framework in situations of chronic illness, they have not explored which psychosocial factors contribute to moderating a patient's ability to improve health outcomes. The current study extends these findings by exploring the moderating effects

of psychosocial variables, including the perception of body image, fear of hypoglycemia, and level of family support on patient self-management for improved health outcomes.

Overview of Type 2 Diabetes

According to the ADA (2016), every 23 seconds, there is a new diagnosis of diabetes, with 1.4 million new cases diagnosed each year. Type 2 diabetes is ranked as the seventh leading causes of death among people in the United States (Center for Disease Control, 2016). Prevalence differs by race and age. African Americans have the greatest incidence of Type 2 diabetes, with a reported rate of 13.2% reported (ADA, 2015). Individuals of Latino decent are also at a higher risk of developing Type 2 diabetes compared to Caucasians (ADA, 2015). Individuals in middle age and older adulthood remain the group in which there is the highest number of incidences of Type 2 diabetes (author, year). There is a growing number of individuals with diabetes who are under the age of 18 (Kanat, DeFronzo, & Abdul-Ghani, 2015).

In addition to the prevalence of this disease, the rising cost of care is also of concern. The treatment of diabetes costs the U.S. health care industry $322 billion annually (ADA, 2016). For every 5 dollars spent on health care, 1 dollar is spent on the care of individuals diagnosed with Type 2 diabetes (author, year). These costs are burgeoning for the individual healthcare consumer as well. People with a diagnosis of Type 2 diabetes incur $7,900 of medical expenses associated with the care of this disease annually, adding to additional medical costs they have that are not associated with the care of the disease.

The widespread prevalence of Type 2 diabetes extends further than the United

States. The International Diabetes Federation (2011) considered Type 2 diabetes a world

epidemic. Among individuals of other nations, including individuals of Asian descent (to

include Indian and Filipino descent), there is a growing risk of Type 2 diabetes, with 92.4

million Chinese adults already diagnosed as Type 2 diabetics (ADA, 2016). The

International Diabetes Federation projected that by the year 2050, one in three people will

have diabetes globally.

Type 2 diabetes is considered a chronic medical condition. It has multiple health

implications for those with a diagnosis of the disease; thus far, there is no cure. Type 2

diabetes is associated with long-term damage, dysfunction, and failure of various organs,

including the heart and kidneys. People with diabetes are also at a greater risk of kidney

problems, hypertension, cardiovascular disease, stroke, erectile dysfunction, foot

problems, neuropathy, retinopathy, amputation, blindness, and even death (Perreault &

Faerch, 2014; Ratner, 2012).

Treatment is crucial to mitigate symptoms and prevent complications. In most

cases, patients are recommended a treatment regimen that includes dietary changes,

regular physical activity, monitoring glucose levels, and medication or insulin (Kosaka,

Noda, & Kuzuya, 2004; Zhang & Fu, 2008). Because of these treatments, positive health

benefits have been noted (Chocran & Conn, 2008). In a study of 80 adults with diabetes,

change to a low carbohydrate diet was found to decrease glycated hemoglobin (otherwise

known as A1C) levels (Westman et al., 2007). Although these type of lifestyle

modifications have been shown to be effective, for many years, medication interventions were the primary focus for treatment of Type 2 diabetes (ADA, 2011; Garber, 2013).

Although treatment regimens can vary from patient to patient, there are standards of care recommended by the ADA (2016). Recommended care includes periodic testing of A1C levels, urinary albumin and lipids, and regular monitoring of retina and feet (ADA, 2016). Patients are also routinely advised to maintain a well-balanced diet and increase their physical levels of activity. Depending on the individual needs of the patient, the treatment regimen may be more complex and include a medication regimen.

There is some level of uncertainty about the efficacy of these treatment regimens. Although there is a consensus that recommended treatments are effective, treatment efficacy also relies on the individual's adherence to the treatment recommendations. Treatment efficacy may, thus, be best understood by monitoring an individual patient's progress rather than tracking global treatment efficacy statistics. In looking globally at treatment efficacy, it is largely tracked via self-report. Most patients with Type 2 diabetes report failure to control glycemia with diet and exercise (García-Pérez et al., 2013). In 23% of these cases of nonadherence, failure to regularly monitor A1C levels or blood pressure is also reported (author, year). Because these metrics are individualized and vary based on pharmacotherapy adherence, there may be a lack of accuracy in treatment efficacy outcomes reporting.

Another concern about treatment efficacy data is the multiplicity of measures used to determine treatment efficacy. For example, Medicare measures adherence by dividing the days covered by a prescription by the number of days between prescriptions

(Centers for Medicare and Medicaid Management, 2015). Although this approach may capture some of the treatment efficacy data, it does not account for those whose treatment regimen does not include pharmacotherapy. Treatment efficacy outcomes may be better understood on an individual patient level.

Given these challenges in understanding treatment efficacy, the weight placed on medical monitoring as a primary approach to treatment has shifted. Contemporary health care models now point to self-management as key in the containment and reversal of symptoms and overall improved health (Barlow, Wright, Sheasby, Turner, & Hainsworth, 2002; Kendall & Rogers, 2007). Patients are encouraged to be active participants in the management of chronic medical conditions, including Type 2 diabetes.

Psychosocial Variables and Type 2 Diabetes

In this study, I explored four variables regarding self-management of Type 2 diabetes: perception of body image, fear of hypoglycemia, level of family support, and depression. Although there is mention of these variables in different contexts of chronic diseases in the literature, few scholars have examined these variables in the context of Type 2 diabetes and self-management. The current study addressed this gap in the literature.

Perception of Body Image

Body image is a psychosocial variable and has been defined as a person's subjective beliefs about how he or she appears to self and others (Perloff, 2014). These beliefs about body image underlie the way a person feels and behaves toward his or her body. Perception of body image can range from what is considered a normal perception

to a perception of body image that leads to dysfunctional thoughts and actions and can impact the way an individual approaches health and wellness (Bucchianeri, Arikian, Hannan, Eisenberg, & Neumark-Sztainer, 2014). Within the last 30 years, an increased emphasis has been placed on body image in the health literature. Scholars have suggested a link between body image with disease process and treatment (Gaines & Burnett, 2014; Schuler et al., 2008).

Although body image emerges across multiple demographics at an early age, there are differences in perception of body image among different races and between the genders (Voelker, Reel, & Greenleaf, 2015). For example, European American women are less satisfied with their body image and strive to maintain lower ideal body weight than African American women (Jacobi, Taylor, & Fante, 2014). Older women had different perceptions of body shape and body mass index (BMI) than younger women (Gillen & Lefkowitz, 2011). An individual's perception of self is an important predictor of in weight management (Gillen, 2015). Given that there is also a well-documented association of weight management with positive diabetes treatment outcomes (Gillen, 2015; Jackson et al., 2014), these findings offer a relevant foundation for exploring a link between body image and Type 2 diabetes. Further, although findings in these studies contribute to the literature in this regard, these scholars do not discuss whether these perceptions of body image have a moderating role with Type 2 diabetes self-management.

Level of Family Support

Family support can serve as a resource for patients managing chronic illness (Peñarrieta et al., 2015). A growing body of research on chronic disease has been devoted to the perception of family support, or the level of family support from the perspective of the patient with the chronic disease (Murray, Kelley-Soderholm, & Murray, 2007; Smith, Greenberg, & Mallick-Seltzer, 2007). For example, Mayberry and Osborne (2012) studied 45 adults with Type 2 diabetes who participated in focus groups to discuss their perception of family support and found that participants who perceived that family members were less supportive had poorer self-management behaviors.

Studies on the level of family support have encompassed different aspects of family dynamics. In addition to exploring family support among biologically related family members, some researchers have examined family support between married couples. Spousal support was reported by the spouse with the chronic illness as being associated with better patient self-care behaviors (Fung, 2009; Peñarrieta et al., 2015). Others note that older partners with chronic illness are interdependent regarding emotional support (Nowakowski & Sumerau, 2017).

Emphasis has also been placed on models that help families be more supportive of increasing self-management and treatment outcomes. Rosland and Piette (2011) found that training families in supportive communication increased positive self-management behaviors among patients with chronic disease. Although Rosland and Piette focused on the importance of patients with certain chronic illnesses such as cancer and heart disease to believe that they are receiving family support, there is a dearth of research in the

literature regarding an association between level of family support and Type 2 diabetes self-management. Family caregiver support may also influence the management of other chronic illnesses

Fear of Hypoglycemia

Fear of hypoglycemia is a common problem among individuals with diabetes (Anderbro et al., 2010; Raiz, Misgar, & Laway, 2014). Diabetic patients may eat to keep their glucose levels at a "safety high" to avoid hypoglycemic episodes (Ahola et al., 2016). This can hamper keeping glucose levels at an acceptable low level. Fear of hypoglycemia has largely been studied specific to Type 1 diabetes. Nemeth et al. (2017) studied fear of hyperglycemia among individual with Type 1 diabetes. Using observations of 35 participants, Nemeth et al. found a higher level of variability among individuals reporting a high level of fear of hypoglycemia, suggesting that fear of hyperglycemia has a significant role in the management and treatment of Type 1 diabetes.

Because maintaining good glycemic control is also of concern among individuals with Type 2 diabetes, fear of hypoglycemia may be associated with behaviors that affect self-management of Type 2 diabetes. Few scholars, however, have explored the relationship between this psychosocial variable and self-management. The current study addresses this gap in the literature, aiming to extend these findings.

Depression

Depression is highly prevalent among patient with diabetes. Some note depression is 60% more common among individuals with a diagnosis of diabetes (Baek, Tanenbaum, & Gonzalez, 2014). This high rate of depression is relevant because of its

impact on treatment adherence among Type 2 diabetes. Individuals with depression are nearly 10% less likely to adhere to treatment (Harvey, 2015). Additionally, some of the symptoms of depression such as loss of appetite have a direct bearing upon a person being able to appropriately manage glycemic levels. Sacco and Yanover (2006) found that diabetes-related symptoms are positively correlated with depression.

Longitudinal studies also support the existence of a relationship between depression and daily functioning among individuals with diabetes (Da Silva et al., 2012; Huang, 2012). Specifically, in a recent study regarding depression and diabetes over time (Schimtz et al., 2014), researchers examined the long-term progression of depression among individuals with diabetes ages 18-20. Researchers found a reciprocal relationship between depression and daily functioning. They further noted that depression progresses with subsequent medical assessments of diabetes over time. The effects of depression can impede an individual's desire to attend regular medical visits and follow-ups (Brady et al., 2009). Depression can also hinder an individual's ability to maintain the needed medical supplies to manage his or her medical condition. Further, depression impacts a high quality of life (Kroft, DeLong, & Evers, 2009).

Another negative treatment outcome of diabetes that is linked to depression in regarding adherence to medication regimens. Specifically, according to some (Ciechanowski et al., 2003), depression is associated with failure to comply with a medication regimen. In a study on the effects of depression on diabetic health outcomes, researchers noted that the absence of depression improves health outcomes with type 2 diabetes (Shaw, Brown, Khan, Mau, & Dillard, 2013).

Self-management and Type 2 Diabetes

Self-management has become the impetus of many care models in chronic diseases, including type 2 diabetes. It encourages patients to be actively involved in the care and treatment of chronic conditions. It is also a patient-centered approach to care. Self-management helps patients become an active participant in care decisions; as well as, equip them with the skills to manage and control the disease (Jenerette & Murdaugh, 2008).

Self-management is part of a broader model of care for patients with chronic disease, the *chronic care model*. This model includes support for the patient to participate in care decisions and a quality healthcare culture. As part of this overall chronic care model, self-management has been effective in the management of type 2 diabetes (Kim, Newton, & Knopp, 2002). Specifically, in recent years, the number of patients engaged in self-management and are subsequently achieving the recommended levels of A1C, LDL, and blood pressure have increased (ADA, 2016). Additionally, patients are reporting improved dietary habits and overall higher quality of life (Ahmed et al., 2015).

Self-management has also simplified a complicated treatment regimen and broadened the patient's support system (Fu, LeMone, & McDaniel, 2004). Prior medical care approaches included complex regimens of medication and monitoring A1C levels. Self-management programs place a greater emphasis on overall lifestyle changes development in collaboration with and tailored to the individual. There is a recognition on the part of the medical care team that one-size-fits-all approaches do not necessarily meet the individual patient's needs and lifestyle of the patient or render optimal outcomes. Hence,

a patient-centered approach through self- management is a preferred care model (ADA, 2016).

Despite this emphasis on self-management of type 2 diabetes and the many benefits that have been noted, there are still many people living with type 2 diabetes who do not engage in self-management (Chlebowy, Wood, & LaJoie, 2010). Identifying the reasons why there remains a large percentage of individuals who do not engage in self-management practices is important. Doing so could help improve strategies and care models to address the rationale for these disparities. Further, it could help bring an understanding to this problem so that self-management efforts can increase.

The Emergence of Chronic Disease Self-Management

Self-management is one of the most recent of several approaches to managing type 2 diabetes that has emerged over the last several decades. Historically, before self-management approaches, management of type 2 diabetes was referred to as treatment compliance or treatment adherence. To more fully contextualize self-management, it is important to understand the distinctions between treatment compliance and self-management. Treatment compliance infers that the success of diabetes management is exclusively dependent on patient behaviors to a series of medically administered recommendations (Harvey, 2007). By contrast, self-management connotes a patient-driven and more interactive process of which the patient is a part. This shift in thinking from treatment compliance to self-management among patients and medical practitioners has positively impacted treatment outcomes (Glasgow, Fisher, Skaff, Mullan, & Toobert, 2007; Harvey, 2007). Some note that it has been found to relieve a burden of guilt a

patient with diabetes experiences when efforts to manage symptoms are unsuccessful

(Coulter & Ellis, 2007).

In its broadest definition, self-management is one's ability to manage changes to his

or her lifestyle to increase success in the treatment of a chronic disease or condition

(Lorig, Ritter, Villa, & Armas, 2009). Additionally, it is also the management of

treatment, including taking medications timely and attending to dietary needs. The

primary aim is for an individual to maintain the highest possible health. Self-

management has also been effective in easing the effects of symptoms of chronic disease.

In a recent study, findings revealed that healthy behaviors such as effective symptom

self-management significantly reduced much of the suffering of cancer (Hoffman, 2013).

Other benefits of self-management include reducing costs in care, minimize the

number of hospitalizations and re-hospitalizations, and encouraged better overall disease

management (Coulter & Ellis, 2007). The emphasis in self-management is on patients

being empowered to maximize choice and quality of life while maintaining treatment

recommendations of medical providers. It encourages patients to participate in treatment

choices and promotes mutual involvement between patients and their medical teams (Ory

et al., 2013).

Lack of self-management among individuals with chronic disease has devastating

effects. One effect is compromised communication with between patient and medical

care provider. Individuals who engage in self-management maintain solid

communications with their medical care teams (Ferrell, 2008; Nuño, Coleman, Bengoa,

Sauto, 2012). A choice, therefore, not to engage in self-management hinders this

collaborative partnership with the care team. This may decrease treatment efficacy. In a recent study on self-management among individuals with type 2 diabetes, continuity of communication between patients and their medical providers was explored. Findings indicated that patients with highly satisfied with maintaining constant communication with their medical provider. They received real-time information and advice, thus improving treatment outcomes.

Another consequence of lack of self-management is the loss of power in one's health, wellness, and quality of life. Specifically, central in self-management is building and supporting self-efficacy of the patient to increase the patient's level of empowerment and confidence. This is important for multiple reasons. First, it works to empower the patient in the treatment process. Some note that independence through self-management can enhance the patient's quality of life (WHO, 2011). Empowerment means not only equipping patients with knowledge about their disease or chronic condition.

Secondly, the absence of a self-management approach in the treatment of chronic disease could mean a loss of a patient-centered approach. Self-management works to put care decisions in the hands of the patient. Without self-management, the patient is a passive recipient of care rather than an active member of his or her health care team. Self-management equips the patient with the environment and the tools to build capacity in managing his or her care decisions (Nuño, Coleman, Bengoa, & Sauto, 2012).

Thirdly, a disenfranchisement of one's rights as a patient can be a consequence of not including self-management as part of patient care. Moreover, a patient has a right to be an empowered and active participant in his or her care from the time of diagnosis

throughout the trajectory of the illness is crucial to the success of treatment. These patient rights have long embraced the fundamental tenant of a patient's role as a central and active participant in his or her health choices. In fact, the U.S. Advisory Commission on Consumer Rights and Quality upholds this principle of patients themselves being an active and integral part of staying healthy. Patients who choose a passive role in their care are, in effect, making a choice not to exercise their rights as patients.

Another thing to note with self-management is that it extends beyond a mere cause and effect framework. Rather, there are multiple factors to consider with the course and treatment of chronic disease. Specifically, according to some, various factors including genetics, environmental factors, one's level of income and accessibility to what is needed to maintain a good diet and consistent exercise are all integral in self-management of type 2 diabetes (Watters, 2005). Given this, the current study draws on the biopsychosocial model, a theoretical premise that encompasses these factors in self-management of type 2 diabetes.

Types of Self-Management Programs

Increasing participation in self-care has become an important goal of treatment. Self-management programs and approaches that enhance care have increasingly been developed in recent years. These programs are now preferred over traditional patient education programs in the management of chronic disease (Duckworth et al., 2009). By comparison to traditional patient education, self-management programs differ on many fronts. One difference is that traditional patient education programs focus on patient performance of specific care activities. By contrast, self-management not only involves

one's knowledge of the diseases, but also one's beliefs, and self-regulatory skills and abilities (Ryan & Swain, 2009).

Another difference is that in traditional patient education programs, the patient learns largely from the health care professional. With self-management models, the patient learns as a collaborative and hands-on participant in treatment decisions. In this regard, the patient's engagement in self-management can include increasing knowledge about disease causes and what can influence the progression of the disease, learning about treatment options and taking an active role in selecting a course of treatment, and observing for changes in response to treatment.

Before patient self-management programs, there was greater emphasis on patients simply knowing how to use equipment or when to take medications. For example, persons with asthma would be taught about the condition as well as how to use equipment and medication (Akinbami et al., 2013). According to some researchers, patient education programs of this nature had a positive effect on the patient's knowledge of the disease; however, there were no significant changes noted in the patients' self-care behavior (Bradley & Lindsay, 2008; Krichbaum, Aarestad, & Buethe, 2003). Self-management programs extend beyond mere education. It encourages patients to give input in their care and actively collaborate with members of the medical care team. Further, it promotes a range of lifestyle changes to improve emotional, physical, and psychosocial well-being (Brady et al., 2013). Self-management programs can take on many forms. Current literature discusses self-management approaches that include motivational counseling, patient group training, and individual patient training (Zwar et

al., 2006).

Benefits of Self-management Programs

Self-management programs have been noted to bring a myriad of positive benefits. Some note that self-management programs promote self-efficacy. Albert Bandura defined self-efficacy as an individual's belief's in his or her abilities to achieve or accomplish specific goals or challenges (1977). A high level of self-efficacy results in one's ability to set and attain high goals (Cramm, Strating, Roebroeck, & Nieboer, 2013). In the management of chronic disease, one's level of self-efficacy can play a critical role in one's level of success with this challenge (Barlow et al., 2002). How a person perceives their symptoms and formulates their beliefs based on these perceptions formulates their behavior and subsequent actions (Bandura, 1986). A patient's self-management has been found to be associated with a high level of self-efficacy. In a study of 69 patients with a diagnosis of sickle-cell disease, researchers found that participation in a self-management program increased the level of self-efficacy patients reported by more than 30% over a 12-week period (Ahmadi, Simin-Jahani, Tabesh, & Keikhaei, 2014). Other researchers have reported similar findings (Cramm et al., 2013). In a study of 298 adolescents with chronic conditions, researchers found that adolescents with higher levels of self-efficacy could manage their condition more effectively.

Approaches to Symptom Management of Type 2 Diabetes

Typically, the treatment regimen for individuals with type 2 diabetes encompasses a modified diet, an increase in exercise, monitoring one's glycemic levels, and medication if needed. If an individual has excessive weight, a program of weight management may

also be recommended. Individuals are also encouraged to attend diabetes education to learn more about the progression, management, and prevention of the disease (Lawn, 2009). While these approaches are supported be evidenced based research as effective in the management of type 2 diabetes, there is a notable gap between the routine of this recommended treatment and the patient's emotional engagement in the process (Marmot & Bell, 2009).

In recent years, there has been great emphasis on a treatment model that promotes patient adherence to specific interventions to manage the symptoms of the disease. This emphasis on adherence has encouraged tracking rates of compliance rather than the level of quality of life of individuals with type 2 diabetes. These rates are limited in what they can convey. For example, although adherence rates are reported as relatively high among individuals who are on regimens of glycemic control medication (Harvey, 2014), these rates are not reported concerning the complexity of the medication regiment or the number of times daily that the medication is prescribed to be taken. When these factors are considered, the rate of treatment adherence is much lower (Chew, 2015).

By contrast to traditional treatment regimens, self-management programs seek to encourage patients to become active participants in their care rather than passive recipients of treatment recommendations (Ferrell, 2008). Some note that self-management is one's ability to manage the disease by containment of symptoms and the results of consequences of treatment (Lawn et al., 2009).

Barriers to Self-Management of Chronic Disease

Patients can be disengaged from care of chronic disease for multiple reasons (Barlow et al., 2002). These reasons are linked to three basic areas that a patient with the chronic disease must manage. Specifically, according to Corbin and Strauss (1989), individuals who are faced with a chronic disease must manage the medical aspects of the disease, continue to manage the everyday challenges in their lives, and contend with the psychological impact of the disease. These reasons manifest as barriers to care. Common barriers include emotional barriers, relational barriers, socioeconomic barriers, and lack of family support.

Relational Barriers

Another barrier to engagement in care is relationship challenges. According to some, patients with type 2 diabetes must navigate a myriad of relationships which include healthcare providers, family, and in some cases, personal care attendants. In each case, the patient may feel he or she must conform to the expectations of the individual with whom he or she had a relationship (Funnell & Anderson, 2004)). This may put another emotional burden on the patient, interfering with his or her ability to attend to treatment (Glanz, Lewis, & Rimer, 2002).

Psychosocial Barriers

The toll of other demands in the life of the individual with type 2 diabetes can also be a barrier to self-management. Patients with diabetes may be working adults with families whose needs are competing with their own. This may leave the patient feeling that he or she must choose between caring for their health and tending to the needs of their children.

Some early studies on parental chronic illness note that parents with chronic illness have difficulty managing the care of the children, leaving children more vulnerable to developmental challenges (Roy, 1990). While these findings have been disputed (Prilleltensky, 2004), chronically ill parents face the guilt of not being fully available to their children (Watson, 2006).

Socioeconomic Barriers

Socioeconomic status can also be a major barrier to a patient's ability to manage his or her treatment of type 2 diabetes. Specifically, a lower level of income may preclude some patients from accessing quality health care (Glasglow, Toobert, & Gillett, 2001). Income may be a significant barrier given prevalence statistics among individuals with financial challenges. According to some, a low level of income is associated with a higher incidence of type 2 diabetes (Stomach et al., 2005); low-income families are twice as likely to have diabetes when compared to families with a higher level of income.

This barrier of socioeconomic status touches all facets of diabetes treatment. For example, access to healthy foods may be challenging of rhinoviruses with a lower level of income (Booth & Hux, 2003). Food often encouraged include poultry, fish, vegetables and other items that are of often costlier to include in a regular diet. Further, depending on the community in which a patient with diabetes resides, it may be difficult to access locations that offer healthier food selections.

Socioeconomic status may also impact access to medications needed to manage hypoglycemic levels. According to the Centers for Disease Control (2015), 1 in 10 Americans cannot afford needed medications. Data reported from the National Health

Interview (2013) revealed that nearly 10% of Americans reported not taking their

medications because of an inability to pay for them. The need for multiple medications

poses an even greater economic challenge to patients with diabetes, making self-

management of the disease even less likely (Glasglow, Toobert, & Gillette, 2001).

Low Family Support as a Barrier

Another barrier to consider is a low level of family support. It has been widely

documented that family support is an important factor in the management of chronic

disease (Carter-Edwards, Skelly, Cagle, & Appel, 2004). This factor has been linked to

positive health outcomes among those with chronic cardiovascular conditions (Ryan,

Wan, & Smith, 2014) and with cancer and infectious diseases (Roberts, Smith, &

Jackson, 2009). Some note that family members can offer both emotional support to a

patient, as well as help in the development of goals to encourage positive self-care

behaviors (Rosland, 2009). Patients participating in focus groups report that family

members who are supportive help lower their level of stress regarding their condition

(Burke et al., 2001).

Regarding emotional support, family members can set the tone for the way an

individual with a chronic illness approaches his or her care and the outlook he or she has

about the chronic condition. This type of emotional support has been noted among

couples. Specifically, some note that spouses are an important source of support for to

their partner as he or she adjusts to the diagnosis of a chronic illness (Rafferty, Billig, &

Mosack, 2015). Couples can find shared meaning during a chronic disease, and this

shared meaning can become the source of strength for both the partner who is chronically ill and the partner who is supportive (das Chagas Medeiros, Ferraz, & Quaresma, 2000).

By contrast, low family support has been found contribute to low level of psychosocial well-being among those who are chronically ill (Hogan, Linden & Najarian, 2002). Low family support can be the result of multiple factors. For example, families may offer limited support to a chronically ill family member due to the high demands of their lives (Gleeson-Kreig, Bernal, & Woolley, 2002). Family members caring for a chronically ill family member are often employed and must balance the demands of their employment with the needs of the family member in need of care (Hogan, Linden, & Najarian, 2002).

A low level of family support can also be attributable to family relationship dynamics. For example, a strained relationship between couples can result in a low level of support during the chronic illness of one of the partners. This strained relationship dynamic lead to negative relationship beliefs and have been found to negatively impact the emotional well-being of a family member trying to adjust to a chronic medical condition (Holt-Lunstad et al., 2010).

Minimal levels of family support may also be due to faulty communication and messaging with the family member impacted by chronic illness. Specifically, confrontational styles of communication styles may alienate the member of the family who is impacted by a chronic medical condition and thus hinder positive health outcomes. Some note that control and criticism where among negative messaging

behaviors of family members toward an ill family member that lead to poor health outcomes (Gallant, 2007).

Self-awareness and Self-management

Many of the barriers noted in the self-management literature related to barriers in the patient's environment. For example, relational barriers, family support barriers, psychosocial barriers, and socioeconomic barriers are environmental barriers that may affect a patient's ability to fully engage in a self-management program. There are other barriers, however, that are more intrinsic. For example, a patient's level of fear of hypoglycemic episodes, perception of ideal body weight are variables that relate to the patient's self-awareness.

The current literature includes few studies that explore self-management from this vantage point. Of these studies, even fewer delve into how these barriers impact the level of self-management when the level of depression is considered. For example, in a recent study (Carroll, Tiggemann, & Wade, 1999), perception of body weight among women with and without type 2 diabetes was explored. A total of 215 women participated in the study, more than half who had a diagnosis of type 2 diabetes. Researchers found that women with type 2 diabetes had a higher level of dissatisfaction compared to women who did not have type 2 diabetes. Further, it was found that the level of body dissatisfaction was also related to self-esteem among women with type 2 diabetes. While the study found a link between type 2 diabetes and the perception of body weight and its effects on self-esteem, there was no discussion on how this association impacted the self-management of the disease. The current study expands on this association between

perception of ideal body weight among individual with type 2 diabetes and the role of depression in the self-management of this chronic condition.

In another study, weight loss and the perception of BMI were explored. Researchers (Schuck, Munsch, & Schneider, 2018). examined the number of unhealthy eating days about dissatisfaction with body weight. They noted that the number of unhealthy eating days was associated with high levels of dissatisfaction with body weight, thus impacting BMI. As BMI is an important factor is type 2 diabetes self-management, this finding has implications for individuals with type 2 diabetes. This study expands on these findings, taking a closer look at the perception of body weight and BMI among individuals with type 2 diabetes.

Another introspective barrier in self-management of type 2 diabetes marginally mentioned in the literature is a patient's fear of hypoglycemia. This variable in diabetes management is a concern because hypoglycemia is a precursor to a diabetic event (Duckworth et al., 2009).

In the current study, this model is as a basis for exploring other factors that contribute to health behaviors. Prior literature has emphasized the medical aspects of treatment and wellness. This study, by contrast, aims to present psychosocial factors that may play an equally important role in health behaviors and disease management, particularly among individuals with type 2 diabetes.

Methodological Critique of Current Literature

Regarding methodological differences when considering the current study in the context of the literature, few prior studies on self-management explore self-management

among an age demographic of older adults. Instead, recent research on this topic has been primarily devoted to a younger demographic patient (Berg et al., 2011; Cram et al., 2013; Watters, 2005). This may be due, in part to the growing concerns of obesity younger patients (National Collaborative on Childhood Obesity Research, 2014). Specifically, type 2 diabetes is noted to have increased among youth by 21% within the last five years. Although these numbers are alarming, evidence suggests that the age demographic most impacted by type 2 diabetes are middle-aged and older adults (Shorr et al., 2000). Despite this, there are few studies that focus on self-management of type 2 diabetes among this age demographic. The current study addresses this gap in the literature, focusing on this demographic of patients, ages 45-60.

Another methodological area of interest regarding prior studies is study design. Prior studies are descriptive, identifying barriers or factors hindering self-management (Schultz et al., 2001; Watters, 2005). These studies leave moderating relationships of these known barriers and self-management of the chronic condition essentially unaddressed. For example, some studies note that a patient's refusal or inability to change dietary habits is a barrier in self-management of type 2 diabetes (Shorr et al., 2000). This study deepens this finding by exploring an underlying related psychosocial variable, perception of body image, as a possible moderator in self-management. Given this more targeted approach, the current study design may help shed more light on the reasons why a patient may choose not to modify dietary habits as a function of self-management.

Finally, this study goes further regarding the type of variables explored in self-management of type 2 diabetes. In addition to exploring the role of two psychosocial

variables in self-management, perception of body image and level of family support, this study examines a psychosocial construct that is a protective variable in the management of type 2 diabetes, fear of hypoglycemia. Current research includes little about fear of hypoglycemia as a possible moderator in self-management of type 2 diabetes. Studies on this variable, rather, focus primarily on fear in relationship to type 1 diabetes and hypoglycemia (Gonder-Fredrick et al., 2011; Leiter et al., 2005; Taylor, Crawford, & Gold, 2005; Wild et al., 2007). The current studies examine this protective variable in depth, thus addressing a gap in the literature in this area.

Summary and Conclusion

The focus of this literature review was to survey and evaluate information in the current body of knowledge regarding self-management of type 2 diabetes and, more broadly, in the context of chronic disease. It presented background on type 2 diabetes, a disease that is associated with long-term damage, dysfunction, and failure of various organs resulting in serious metabolic complications if untreated. People with diabetes are at greater risk of kidney problems, hypertension, cardiovascular disease, stroke, erectile dysfunction, foot problems, neuropathy, retinopathy, amputation and even death (Clark & Lee, 1995; Diabetes Management, 2000; Kristinsson, 1995; Nathan, 1993; Reily et al., 2011). Type 2 diabetes is often accompanied by depression (Da Silva et al., 2012l; Schmitz et al., 2014).

This literature reviews also presented a comprehensive discussion of self-management and differentiated it from prior medical models designed to treat chronic disease. Based on current literature, it is widely known that self-management can be useful if patients

choose to engage in it. Further, through self-management of symptoms, including

behavioral and lifestyle changes and active participation in one's care, the symptoms of

type 2 diabetes can be reversed or controlled (García-Pérez et al., 2013). Lack of self-

management, however, is a common problem among type 2 diabetes (Ahmad & Crandall,

2010; Perreautt & Faerch, 2014; Plotnikoff et al., 2010; Ratner, 2013). What is not

known is what variables the role of specific psychosocial variables and depression in type

2 diabetes self-management. Understanding these variables could be pertinent in

increasing self-management among patients with type 2 diabetes. This study explores

this question further, examining whether these variables play a moderating role in type 2

diabetes and depression.

   Chapter 3 provides a further delineation of the methodology employed in this study. It

discusses the sampling method for the study and the approach used to determine the

sample size identified for this study. The chapter also offers an in-depth rationale for the

selection of instruments and the method for data collection and analysis. It also presents

discussion regarding ethical considerations pertinent to this research.

Chapter 3: Research Method

The purpose of the study was to explore the moderating effects of psychosocial variables on self-management among individuals with Type 2 diabetes. These variables included perception of body image, fear of hypoglycemia, and level of family support. The following chapter encompasses the methodology of this study. It includes a discussion of the instruments and participant sampling in this study. Information on how the study was designed, participant recruitment, and the research questions explored in this study are included in this chapter. Further, I expound upon the variables investigated in this study, fear of hypoglycemia, perception of body image, and level of family support, and depression on self-management of Type 2 diabetes.

Four research questions were explored in this study. The aim of the first research question was to increase an understanding of self-management among patients with cooccurring depression. I explored scores of self-management between Type 2 diabetes patients with a high level of depression and Type 2 diabetes patients with a low level of depression. In the remaining three research questions, I aimed to explore whether there is a moderating role of psychosocial variables in self-management among patients with Type 2 diabetes and cooccurring depression.

Research Design and Rationale

I employed a cross-sectional survey study design. The cross-sectional survey design was chosen for this study for three reasons. First, this study design required a large sample frame. A power analysis was conducted to determine the sample size needed for this study. Using the conventional level of power, .80 and an alpha level of

.05 (Cohen, 1988), the minimal sample size for this study was 102 participants. To account for possible drop-out rate in the study, an additional 10 participants were included for a total sample size of 112 participants. A large sample size is important in a study to generalize about the larger population (Creswell, 2014). A large sample size was important in the context of this study because of the known prevalence of Type 2 diabetes among a broad age and racial demographic (Ahmad & Crandall, 2011).

A second reason that a cross-sectional study was appropriate for this research is that this study design allows for data to be collected at a single point in time. Because time and resources constraints of potential study participants was a consideration in this study, a design that encompassed collecting data at a single point in time was important in this research. Further, this approach eliminated the risk of maturation, practice, and history effects (Campbell & Stanley, 1963; Trochim & Donnelly, 2001).

A third reason that I employed a cross-sectional study design is that this design allowed for the gathering of a range of data that could be analyzed in many ways (Kendell & Jablenski, 2003; Lee & Lee, 2012). Data that can be analyzed in many ways are important in the current study because the data gathered from participants were analyzed on using two different approaches. For the first research question, data were analyzed using an independent samples t test. This was used to examine mean scores of self-management among Type 2 diabetes patients with a high score of depression and Type 2 diabetes patients with a low score of depression. For Research Questions 2 through 4, the data collected in this cross-sectional design were used to conduct a liner regression analysis to examine moderating effects of psychosocial variables. The cross-

sectional study design was appropriate to examine data using these two analytical approaches.

Methodology

Participants

In the current study, participants were recruited from a larger population of individuals with Type 2 diabetes in a large metropolitan area of the United States. This geographic region was appropriate for recruitment of participants because of the large and diverse demographic sought for this research. According to the New York Department of Health and Mental Hygiene (2013), diabetes is epidemic in large metropolitan areas. For example, in New York, the prevalence of diabetes has more than doubled over the past 10 years with an estimated 650,000 New York citizens impacted by this chronic medical condition (author, year). The New York Department of Health and Mental Hygiene further indicated that more than 1 in 5 adults age 65 and older report having diabetes, with a nearly equal prevalence of Type 2 diabetes among men and women and a higher prevalence of the disease reported among African Americans and Hispanic Americans than among European Americans. The current study draws the sample frame from a similar large metropolitan community with a known prevalence of Type 2 diabetes.

The sample from the larger population were individuals with a diagnosis of Type 2 diabetes between the ages of 40 to 65. The sample comprised both males and females within this age demographic. Participants included multiple racial backgrounds. Participants identifying as biracial or multiracial were also included in the study if other

study criteria are met. Demographic data of participants were collected with a demographic questionnaire that included questions about age, race, ethnicity, age of onset of Type 2 diabetes, level of education, and occupation.

Sampling Strategy

The sampling strategy used in this study was a purposive sampling strategy. This strategy is a nonprobability sampling method that targets a group with shared characteristics (Creswell, 2014). Accordingly, participants who met inclusion criteria were recruited for this study. The inclusion criteria were that the participants be between the ages of 40 and 65 with a documented diagnosis of Type 2 diabetes. Participants had to report having obtained diagnosis of Type 2 diabetes by a licensed medical provider and were monitored regularly for this condition for a minimum of 2 years. Because the instruments in the study were provided in English, prospective participants were required to read and understand the English language to be included in this study. Regarding exclusion criteria, casual walk-ins of the clinic who were not provided regular medical care at the clinic were not considered eligible for study participation. To control for other extraneous variables such as gestational diabetes, women who were pregnant were also excluded from study participation.

The recruitment approach encompassed two outreach strategies. First, flyers were posted throughout the clinic at which the study was conducted. Flyers contained an announcement of the study and my dedicated telephone contact information for this study so that potential participants could obtain further information about where the designated

area in the clinic was to review the study consent form and complete the study instruments.

The second sampling recruitment strategy that was employed in this study was recruitment via group announcement. I asked the instructor of the class to allow time for me to make an announcement in the diabetes education classroom in the clinic at which the research was conducted. The announcement of the study took place before the class session began. During that announcement, attendees were told about the study and invited to participate if they had an interest in doing so. They were given my contact information to follow up with me with questions as well as information. The participant was also notified of the designated clinic classroom that he or she will meet with me for review of the informed consent form and completion of study instruments. Upon acknowledging consent for participation, the participant was provided the study instruments.

Instruments

Five variables were the focal point in this study: the level of fear of hypoglycemia, perception of the ideal body weight, self-management, and level of family support, and depression. The first independent variable, fear of hypoglycemia, was measured using the HFS-II (Gonder-Frederick et al, 2011). Its research applications include use with patients diagnosed with either Type 1 diabetes or Type 2 diabetes (Irvine et al., 1994). It is a 33-item questionnaire with three emergent factors, fear, avoidance, and interference. The instrument employs a Likert scale of 1(*never*) to 5 (*always*). Regarding its psychometric properties, the instrument's internal consistency was found to

be high with Cronbach's Alpha at .89 (author, year). The instrument's construct validity was tested by collecting data from1,460 adults from five different countries (author, year). Data revealed that subscales were strong regarding fit. The instrument also showed good point-measure correlations (Irvine et al., 1994). Reliability of the instrument was also found to be high with coefficients ranging from .75 to .90 (author, year). These high scores of reliability supported the appropriateness of this instrument for this study.

The second independent variable, perception of ideal body image, was measured by the Body Appreciation Scale (Tylka & Wood-Barcalow, 2015). This scale is a brief 13-item questionnaire that measures favorability of body image. Each item is rated using a scale of 1 (*never*) to 5 (*always*); The Body Appreciation Scale was normed with a sample of 820 females and 767 males. Ten items were selected from this instrument following an exploratory factor analysis. Following a confirmatory factor analysis, the instrument's construct validity was found to be high (Avalos et al., 2005). The instrument's internal consistency was also high. Cronbach's Alpha was .92 for men and .94 for women (author, year). Test-retest reliability was also high, making this instrument an appropriate match for this study.

Self-management was another variable in this study. It was measured with the Diabetes Self-Management Questionnaire (Schmitt et al., 2013). This questionnaire was designed to measure self-care associated with glycemic control. Items are rated on a scale from 0 (*Does not apply to me*) to 3 (*Applies to me very much*). Regarding the content of the instrument, seven of the questionnaire's items were positively formulated,

and nine were negatively formulated (Schmitt et al., 2013). This approach to the development of questionnaire items is done to decrease response set bias, and it guards against the respondent demonstrating acquiescent behaviors (Benson & Hocevar, 1985; Cronbach, 1950; Nunnally, 1978; Wright & Masters, 1982).

The Diabetes Self-Management Scale has four subscales relevant to glycemic control including glucose management, dietary control, physical activity, and health care use (the sum of the scale scores). The instrument's internal consistency was noted to be high. Cronbach's Alpha was .84 (author, year). A four-factor structure showed correlations that were statistically significant with their corresponding scales (author, year). The instrument's prior research applications, coupled with its high internal consistency, supported its appropriateness for use in this study.

Another variable that was measured in this study was level of family support. The instrument that was used to measure this variable was the Family Relationship Scale (Moos & Moos, 1994). This instrument is a summary index of the larger Family Environment Scale (Moos & Moos, 1994). Its items were rated T (true) or F (false) by the participant, yielding a raw score value for each response rated T and each response rated F. The total value of the participant's responses was summed and converted to a standard score ranging between 10 and 100 using the instrument's conversion table.

One of its research applications is measuring family relationships when there is strain or change in the familial environment including the care of a family member with chronic illness. The instrument's internal consistency estimates are reported to range from 61 to .78 (Moos & Moos, 1979). Test-retest reliability was a high a .91 (author,

year). Content validity was supported by a comparative analysis of samples comprised of families who are stressed and families who are not distressed (author, year). This instrument was appropriate selection for this study based on its research applications in prior studies as well as its reliability and validity.

Depression was another variable that was measured in the current study. For this measure, the Beck Depression Inventory-2 (Beck, Steer, & Brown, 1996) was used. The Beck Depression Inventory is a 21-item questionnaire with a 4- point Likert-type scale; 0 to 4. The scores from this instrument yield one of four ratings, minimal depression, mild depression, moderate depression, and severe depression (author, year). Regarding its psychometric properties, the normative sample of the instrument was 944 respondents across both genders and races (author, year). The instrument's reliability was high across six samples. The reliability coefficients ranged from .79-90 (author, year).

The instrument's construct validity was arrived at by comparing its content of similar instruments. Correlation coefficients of the Beck Depression Inventory and the Beck Hopelessness Scale had a range of .38-.76 across the normative samples (author, year). When compared to a similar instrument, the Hamilton Rating Scale for Depression, the correlation coefficient ranged from .40 to .86 across the normative samples (author, year). The instrument's prior research applications aligned with its use in this study.

Data Collection

Prospective participants learning of the study from the flyers posted in the clinic or at the diabetes education classes were informed of where to go in the designated area

in the clinic to complete the demographic questionnaire to determine if the eligibility criteria are met. If the participant met eligibility criteria as determined by the demographic survey, the participant was given the consent form and asked to review it. The participant was provided an opportunity to review the informed consent and ask any additional questions before signing the consent form. Upon the participant's acknowledgment of consent, the participant was given the study instruments.

The participants completed the study instruments in a designated private area of the clinic. Upon completion and submission of study instruments, I debriefed the participant, reiterating that responses to study instruments were anonymous and confidential. During the debrief, participants were also provided information that study results will be made available to study participants upon request.

Data Analysis

The data collected in this research were analyzed using the statistical software package for the social sciences (i.e., IBM SPSS (2015). There were two data analyses performed to answer the research questions in this study. The first analysis was an independent samples t test. This test was appropriate for this research because the first research question was explored differences in mean scores between two groups.

Before commencing data analysis, the data were cleaned and prepared for analysis. Each dataset for each instrument was reviewed for completion of responses, missing responses on study instruments, and outliers. A list of codes for each of the variables was established to ensure consistency and standardization across instruments submitted by all study participant in this research.

At the conclusion of the data analysis, the research question was answered as posed at the outset of the study. The research questions were as follows:

1. Is there a statistically significant difference in scores of self-management among Type 2 diabetes patients with a low level of depression when compared to patients with a high level of depression?

$H_0 1$: There is no statistically significant difference in scores of self-management among Type 2 diabetes patients with a low level of depression when compared to patients with a high level of depression?

$H_1 1$: There is a statistically significant difference in scores of self-management among Type 2 diabetes patients with a low level of depression when compared to patients with a high level of depression?

2. Is the perception of body image a moderator of self-management and depression among patients with Type 2 diabetes?

$H_0 2$: Perception of body image is not a moderator of self-management and depression among patients with Type 2 diabetes?

$H_1 2$: Perception of body image is a moderator of self-management and depression among patients with Type 2 diabetes.

3. Is fear of hypoglycemia a moderator of self-management and depression among patients with Type 2 diabetes?

$H_1 3$: Fear of hypoglycemia is not a moderator of self-management and depression among patients with Type 2 diabetes

$H_1$3: Fear of hypoglycemia is a moderator of self-management and depression among patients with Type 2 diabetes.

4. Is the level of family supports a moderator of self-management and depression among patients with Type 2 diabetes?

$H_0$4: Level of family support is not a moderator of self-management and depression among patients with type 2 diabetes who are depressed.

$H_1$4: Level of family support is not a moderate self-management and depression among patients with Type 2 diabetes who are depressed.

The data analyses chosen for this study were appropriate for the questions posed in this study. For Research Question 1, an independent samples t test was conducted to determine if there is a statistically significant difference in self-management among individuals with higher levels of depression when competed with individuals with lower levels of depression. This test was appropriate because participants were placed in one of two groups of depression level based on scores of depression. Tests for normally distributed data were then run. Once it was determined that the datasets were normally distributed, an independent samples t test was run. Levene's test (1960) for normal distribution was conducted to make this determination for this dataset.

Other assumptions for use of the independent samples t-test for question were conducted and assumptions were met for this test. These assumptions included that the two groups are independent with no overlapping participants. The participants were assigned to the group based on a high or a low score. Participants with minimal to mild scores of depression levels will comprise one group, low level of depression and participants with

moderate to severe were in a second group, high level of depression. No single participant was in both groups.

For research questions 2 through 4, a multiple linear regression analysis was conducted to determine if a moderating relationship exists between variables explored in this study. Moderation between variables was based on the observed relationship between two variables that was dependent on a third variable (Creswell, 2014). This data analysis method was appropriate for questions 2-4 because in the current study three independent continuous variables were observed in this regard, perception of body image, level of family support and fear of hypoglycemia. Further, the level of data for the variables in this study met the assumptions for this analysis as they are continuous variables. Additional tests were conducted upon collection of data to determine if other assumptions for this analysis are met. These tests included a test for normality, linearity, multicollinearity, and homoscedasticity.

To further analyze moderation of the level of depression on the causal relationship between the psychosocial variables in this study (perception of body image, fear of hypoglycemia, and level of family support) and self-management Baron and Kenny's method (1986) will also be used. Specifically, the strength of the relationship between variable X, psychosocial variables, and Y, level of self-management, were measured and observed for interaction effects.

Threats to study validity

While this study design conformed the conventions of a cross-sectional study design, there were several threats to study validity worthy of consideration. One consideration in this regarding was selection bias. In its broadest sense, selection bias pertains to sampling strategies that may compromise the randomization of the selection of study participants. This study did employ an experimental design requiring random selection of participants. Rather, study participants who met specific criteria were recruited for participation in this study. Selection bias, hence, was not a threat to this study's external validity.

Another threat commonly considered in quantitative study designs is history and maturation biases. These concerns arise with study designs that measure variables at multiple points in time (Creswell, 2016). In this research, the variables involved (perception of body weight, fear of hypoglycemia, level of family support, depression and self-management) are measured at one point in time, eliminating the risks of maturation and history effects and minimizing the time commitment asked of participants.

Another consideration regarding threats to study validity was defining the overarching constructs that are being investigated in the study. In this study, self-management was a key construct being explored. This construct is closely related to other broader frameworks of treatment adherence and treatment compliance within the literature of chronic disease management. To address possible construct threats and increase the ability to generalize this study's findings to the broader population, a specific operational definition was given in the study for self-management. Additionally, the instrument for

measuring this variable was examined to ensure that the research application for the instrument aligned with the questions investigated in this study.

Ethical Considerations

Several ethical considerations were considered for this research. It was important to ensure that this research was aligned with legal requirements for the treatment of human subjects in research. This research was, thus, submitted to the Institutional Review Board (IRB) for review and approval. Within this IRB approval process, an informed consent form was approved for use in this research. The informed consent form was designed to delineate the voluntary nature of participation in the study as well as the risks and benefits of this research to study participants.

Ethical consideration was also given regarding the approach for obtaining access to prospective participants for the study. To address this consideration, leaders and decision makers at the location at which the research was conducted granted written permission for the research to be conducted. A plan was provided for participant recruitment as well as the recruitment materials, the flyers announcing the study participation opportunity to leaders at the recruitment location.

Regarding confidentiality and privacy of study participants, steps were taken to ensure the confidentiality of study participants. Specifically, participants were asked not to place their names or any other identifying information on data collection materials. Each of the data collection materials for each participant was coded to prevent any risk of identity. Further, in accordance with HIPPA standards, at no time will participants be required to present private medical information. Participants will self-report regarding

self-management and will not be required to present medical information. Participants were able to complete study questionnaires in a private area of the clinic to further protect privacy and confidentiality or on a website set up for the completion of the study instruments. Protection of the confidentiality of data will also be given. Specifically, data collected were locked and stored in a password-protected database. Devices and files storing the collected data were handled solely by the researcher.

Finally, regarding rights involved in study participation, the consent form provided to each study participant will include a detailed statement about the participants' right to withdraw from study participation. Additionally, participants were reminded during data collection that they can withdraw from study participation at any time

Summary and Conclusions

This study aimed to examine moderating effects of specific psychosocial variables on self-management and depression among patients with type 2 diabetes. These variables include perception of body image, fear of hypoglycemia, and level of family support. It is believed that these variables will show a moderating relationship. The study employed a positivist methodology, measuring each variable with normed instruments. The sampling frame was drawn from a larger population with a known prevalence of type 2 diabetes. The data was aggregated an analyzed using SPSS statistical software package and inferences emerged and were highlighted from study findings.

Chapter 4: Results

This cross-sectional quantitative research was conducted for the purposes of investigating the moderating effects of psychosocial factors on self-management on individuals with Type 2 diabetes. The primary psychosocial variables of focus in this study were perception of body image, fear of hypoglycemia, and level of family support. Because depression has been noted as common among individuals with Type 2 diabetes (Jackson et al., 2014; Peltzer & Pengpid, 2016), the role of depression in self-management among individuals with Type 2 diabetes was also deemed relevant and was included in this investigation. In this chapter, findings regarding important questions of interaction effects are presented.

Each of the variables explored in this research (perception of body image, fear of hypoglycemia, level of family support, depression, and diabetes self-management) was measured using instruments that were psychometrically appropriate for this research. Two methods of recruitment, flyer postings and in-person announcements, were used to identify participants for this research. The recruitment method that produced the greatest number of participants was in-person announcements.

Description of the Sample

Prior to the completion of the study instruments, each participant submitted a demographic survey. The demographic survey yielded a range of relevant information regarding individual characteristics, including the age, gender, race, income, and education level, employment status, and marital status of the participants. Using the descriptive function in SPSS (2017), frequency counts were run to examine the individual

characteristics of participants in this study sample. Aggregated results of the

demographic questionnaire revealed that the sample for this study included 45 males

(40%) and 67 females (60%). I also found that there were 46 participants who identified

as African American (41%), 21 participants who identified as European American (18%),

27 participants who identified as Hispanic American (24%), three participants who

identified as Asian American or Pacific Islander (2.7%), and 15 participants who

identified as multiracial or other (14.3%).

The inclusion criterion for the age range in this study was 40 years of age to 60

years of age. Within this larger range, four subsets of age (40 to 45, 46 to 50, 51 to 55,

and 56 to 60) were further examined. Frequency counts for age revealed that 57% of

participants ($n = 64$) reported being between the ages of 50 and 55. This number

represented more than half of the study sample and is important to note for later

discussion regarding the larger population of individuals with Type 2 diabetes. Further

review of the descriptive statistics revealed that the mean age of participants was, $M =$

51.4, with the youngest participants reporting age 40 and the oldest participants reporting

age 60. Of the total sample, only 16% of participants ($n = 18$) reported being in the

lowest range level for this study, ages 40 to 45. Table 1 presents the demographics by

gender, race, and age.

Table 1

Frequency Counts for Gender, Age and Race N =112

Variable	Category	*N*	%
Gender	Female	67	60
	Male	45	40
Race	African American	46	41.4
	White	21	18.9
	Hispanic	27	30.6
	Asian / Pacific Islander	3	2.7
	Multiracial / other	15	6.4
Age	40-45	18	16.3
	46-50	10	8.9
	51-55	64	57
	56-60	20	17.8

In addition to age, gender, and racial identity, data were collected on other demographic factors, including education level, employment status, and level of income. These demographics were included in this research based on the body of knowledge regarding patients with Type 2 diabetes. For example, with regard to employment, employment characteristics such as stressful work can be a barrier to glucose control in patients with diabetes (Eriksson, van den Donk, Hilding, & Östenso, 2013; Zamani-Alavijeh, Araban, Koohestani, & Karimy, 2018). Other scholars noted an association between the burden of Type 2 diabetes patients who are employed and the level of self-management (Breton et al., 2013). Frequency counts using descriptive statistics function of SPSS revealed that more than half of the study participants reported were employed (53.4%). Additionally, an equal number of participants reported being either unemployed (23.3%) or retired (23.3%).

Regarding education level, education level may correlate with Type 2 diabetes (Steele, Schöttker, & Marshall, 2017). Education level was, thus, important to consider in this investigation. Demographic data on the education level in this study revealed that the greatest number of participants reported having achieved high school completion was 67%. Nearly 22% reported completing a bachelor's degree, and the smallest number of participants (11%) reported earning a graduate degree. When considering the differences between those reporting a high level of depression (HD) and those reporting a low level of depression (LD) depression, there is an even wider gap between individuals who completed a high school education and individuals who achieved an education level of graduate degree or higher. Table 2 depicts these differences.

Table 2

Education Level with Low Level of Depression, LD (n=54), and High Level of Depression, HD (n= 58)

LD	%	HD	%
Did not finish HS	2.3	Did not finish HS	21.4
HS completion	57.4	HS completion	51.7
BA/BS	26.2	BA/BS	21.8
Graduate degree or higher	14.1	Graduate degree or higher	5.1

Income level has also been associated with Type 2 diabetes (Houle, Lauzier-Jobin, & Beaulieu, 2016) and was of interest as an individual characteristic on the demographic questionnaire in this research. Table 3 presents these demographics.

Table 3

*Income Level with Low Level of Depression, LD (n =54) and High Level of Depression,
HD (n= 58)*

LD	%	HD	%
0-$9,999	3.8	0-$9,999	2.6
$10,000- $20,000	5.3	$10,000- 20,000	6.1
21,000-30,000	17.4	21,000-30,000	19.4
31,000-40,000	28.4	31,000-40,000	32.9
41,000-50,000	40.9	41,000-50,000	36.7
50,000 or above	4.2	50,000 or above	2.3

Of the 112 respondents reporting income level, more than half reported income in

the range of $20,00 to $39,000. The smallest percentage of participants reported earnings

in the highest range of income, more than $50,000. These aforementioned individual

characteristics (education level, employment status, and level of income) were

particularly relevant to this research in the context of reported level of depression.

Hence, crosstabulation with respect to the level of depression and income level yielded a

more exhaustive review of these individual characteristics, and this demographic

information was useful in later discussion.

Analysis and Results

The first research question concerned the level of depression and self-

management of Type 2 diabetes. This question was grounded in the prior research that

depression is often cooccurring in many patients with chronic medical conditions

including Type 2 diabetes (Jackson et al., 2014; Peltzer & Pengpid, 2016). The first question in this research was:

RQ1. Is there a statistically significant difference in scores of self-management among Type 2 diabetes patients with a low level of depression when compared to patients with a high level of depression?

$H_0$1: There is no statistically significant difference in scores of self-management among Type 2 diabetes patients with a low level of depression when compared to patients with a high level of depression.

$H_1$1: There is a statistically significant difference in scores of self-management among Type 2 diabetes patients with a low level of depression when compared to patients with a high level of depression.

To measure these two variables for this research question, Beck's Depression Inventory (Beck, 1996) and the Diabetes Self-Management Questionnaire (Schmitt, 2013) were used. A review of the completed study instruments revealed that all 112 participants responded to each item on these two instruments. No missing data were noted.

The sample was divided into two groups based on scores of levels of depression. Participants with a score of 20 or greater on Beck's Depression inventory (Beck, 1996) were identified as Group 1—HD. Conversely, participants scoring below 20 on the Beck's Depression Inventory (1996) were identified as Group 2—LD. Based on frequency counts of depression level responses on Beck's Depression Scale, 52% of the

112 participants, $n = 58$, scored in the HD level and were in Group 1 and 48% of the participants, $n = 54$, scored in the LD level and were in Group 2.

The other instrument used to answer this research question was the Diabetes Self-Management Questionnaire (Schimitt, 2012). Subscales of glucose self-management and dietary control were examined in RQ1. Glucose self-management was coded as GSM, and dietary control was coded as DC. On each of these two subscales, composite scores ranged from 0 to 10, with 0 representing the lowest score of self-management and 10 representing an optimal level of self-management. Each participant had a composite score for each of the two subscales. The subscales of GSM and DC were analyzed separately for this research question, yielding results for each subscale on RQ1.

The LD group ($N = 54$) was associated with GSM level $M = 7.51$ ($SD = 1.02$). Comparatively, the HD group ($N = 58$) was associated with a numerically lower level of GSM level $M = 4.51$ ($SD = 1.04$). To test this study's hypothesis, that Type 2 diabetes patients with low depression levels and high depression levels were associated with statistically different mean levels of GSM, an independent t test was appropriate. As was noted in Table 3, the skew and kurtosis for the LD group and the HD group were below an absolute value of 2 and 3 respectively, hence satisfying the assumption of normality to conduct a t test (Schmider, Ziegler, Danay, Beyer, & Buhner, 2010). Table 4 presents these descriptive statistics.

Table 4

Descriptives for High-level and Low-level Depression Groups

Group	*M*	*SD*	Skew	Kurtosis
GSM	4.51	1.04	0.042	2.3
DC	5.21	1.03	0.061	2.87
GSM	7.51	1.02	0.047	2.93
DC	6.73	1.13	0.018	2.91

To further support the assumption of normality, both the skew and kurtosis values were divided by the standard error values, yielding a result that was below ±1.96, supporting that both datasets are normally distributed. The homogeneity of variances test, Levene's F test, revealed $F(110) = 1.71$, $p = .281$, further satisfying the assumptions for this independent samples *t* test. On the subscale of GSM, results of this independent samples *to* test revealed a statistically significant difference $t(110) = 1.82$, $p = .003$. Hence, for GSM, patients in the LD group were associated with a level of glucose self-management that was statistically significant and higher than patients in the HD group. The null hypothesis was, therefore, rejected for the subscale of GSM.

Moving to the second subscale of self-management investigated in this research question, an independent samples *t* test was also conducted on the subscale of DC. The HD group ($N = 58$) was associated with a DC, $M = 5.21$ ($SD = 1.03$). When compared to

the LD group, dietary self-management was numerically lower, $M = 6.73$ ($SD = 1.13$). As with the GSM dataset, to test whether there was a statistically significant difference in mean scores of the subscale DC, the independent samples t test was conducted, t (110) = 1.76, $p = .064$, revealing that there was no significant difference in scores of self-management on the subscale of dietary control. Table 5 provides a presentation of the independent samples t tests for RQ1 and results for the subscales of both GSM and DC. The null hypothesis is, thus, not rejected for the subscale of dietary control.

Table 5

T-*test Results for Subscales of GSM and DC*

Subscale	T	P	Result
GSM	1.82	.003	Reject the null hypothesis
DC	1.76	.064	Fail to reject the null hypothesis

The second research question addressed the moderating effects of perception of body image on the level of depression and self-management. This question investigated whether the nature of the relationship or the strength of the relationship between two variables significantly changes as a result of a third variable (Howell, 2013). The question posted in this research was the following:

RQ2. Is the perception of body image a moderator of self-management and depression among patients with Type 2 diabetes?

$H_0$2: Perception of body image is not a moderator of self-management and depression among patients with Type 2 diabetes.

$H_1 2$: Perception of body image is a moderator of self-management and depression among patients with Type 2 diabetes.

To measure the perception of body image, the Body Appreciation Scale (Tylka & Wood-Barcalow, 2015) was used. Composite scores ranged from 10, indicating a negative perception of body image to 50, a high perception of body image. A review of this instrument completed and submitted by each participant revealed that all responses were entered for every item on this instrument. No missing data were noted.

The statistical analysis appropriate to test the hypothesis for this research question was a linear multiple regression analysis. This analysis was chosen to observe interaction effect where the dependent variable, glucose self-management (GSM), was the predicted value from the interaction of the two independent variables perception of body image (PBI) and depression. The interaction for this regression analysis can be expressed in the equation $Y = b_0 + b_1 X_1 + b_2 X_2 + e$ where:

- Y is the level 1 dependent variable

- X is the level 1 predictor variable

- b_0 is intercept of the dependent variable in group j

- b_1 refers to the slope for the relationship between the predictor and the dependent variable.

- e is the random errors of prediction for the level 1 equation.

The interaction in this model is represented as the product of the two independent variables, perception of body image and level of depression. As was mentioned in the first research question, two subscales of self-management were examined in this study,

GSM and dietary control. Because the mean scores of the subscale GSM were found to be significant among patients reporting high levels of depression when compared to patients reporting low levels of depression in the first research question, this subscale, glucose management, was further examined in RQ2, RQ3, and RQ4.

The assumptions for the multiple regression analysis were considered prior to conducting the regression analysis. First, a correlation was run in SPSS to observe the bivariate correlations of depression and glucose self-management, substantiating linearity. A significant correlation was observed between depression and GSM at $r =$ .235. The assumption of multicollinearity was also considered. Multicollinearity occurs when two or more independent variables are highly correlated with one another. This leads to problems understanding which of the independent variables contribute to the variance explained in the dependent variable (Field, 2013; Howell, 2013). To detect whether this model had multicollinearity, linear regression statistics were run to observe the variance inflation factor (VIF). The variance inflation factor is the ratio of variance in a model that has two or more independent variables, divided by the variance of a model with one variable alone (*James, Gareth; Witten, Daniela, Tibshirani, 2017),* and provides the severity of multicollinearity in a model.

Multicollinearity diagnostics using SPSS revealed that the VIF and tolerance statistics were well below 10. A multicollinearity threshold that is widely used (Field, 2013). As shown in Table 6, the results are within acceptable range hence assuring that multicollinearity in this linear regression model is not problematic.

Table 6

Variance Inflation Statistics for RQ2

Model		Tolerance	VIF
1	PBI	.232	2.241
	GSM	.281	2.112

The assumption of homoscedasticity was also considered before conducting the

multiple regression analysis. Using the liner regression functions in SPSS, the plots

function was selected for the values for the dependent variable residuals and the residuals

for the predictor or independent variable. Visual inspection of the dependent residuals

revealed that the datapoints on the plot were distributed evenly both above and below the

x-axis, satisfying the check for of homoscedasticity (Field, 2013).

The multiple regression was conducted to predict GSM based on the level of

depression and PBI. A significant regression equation was found $F(2, 111) = 2.70$, $p =$

.034, with an R^2 of .613. Table 7 presents the linear regression model.

Table 7

Linear Regression Model Results

Model	R	R squared	Adjusted R squared	Std Error of the Estimate
1	.613	.376	.341	16.889

Predictors depression, PBI

Table 8 presents the unstandardized and standardized coefficients and the significant

interaction effect of depression and PBI. Results of this linear regression model support

that there is a significant interaction of PBI and depression on the dependent variable

GSM at -.251, hence, the null hypothesis was rejected.

Table 8

Coefficients for Depression and PBI (Dependent Variable: GSM)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	Constant	92.456	2.152		37.062	.000
1	Depression	2.261	-.005	0.603	4.126	.000
	PBI	.015	0.301	0.059	0.386	0.421
	Depression-PBI	.016	0.003	-0.251	-2.231	0.034

In the third research question, a different psychosocial variable, fear of hypoglycemia, was observed for moderating effects on the level of depression and self-management. As with RQ2, this research question also aimed to see if the nature or strength of the relationship between depression and self-management appeared to change significantly as a result of a third variable, fear of hypoglycemia. The specific question posted in this research was:

RQ 3 Is fear of hypoglycemia a moderator of self-management and depression among patients with type 2 diabetes?

H_1: Fear of hypoglycemia is not a moderator of self-management and depression among patients with type 2 diabetes

H_1: Fear of hypoglycemia is a moderator of self-management and depression among patients with type 2 diabetes.

To measure the fear of hypoglycemia, the Hypoglycemia Fear Survey II (Irvine et al., 1994) was used. A review of the participant instruments for this research question revealed that all items on the instrument were completed by all participants. There was

no missing data. This instrument comprised two subscales, behavior and worry. The subscale of interest in this research was the subscale of worry. This subscale is relevant to this analysis in that the biopsychosocial frame from which this research draws holds that worry is closely associated biological factors of chronic illness (Jones, McGillivray, Kroll, Zohoor, & Connaghan, 2011). This subscale comprised 17 items and was scored by summing the totals for each item in the subscale and dividing by the number of items in the subscale, 17. This computation yielded a mean item score for the subscale of worry that was further analyzed using linear regression. Linear regression analysis was chosen to observe interaction effect where the dependent variable, glucose self-management (GSM), was the predicted value from the interaction of the two independent variables fear of hypoglycemia which was coded FOH and depression.

As with RQ2, the assumptions for the multiple regression analysis were also considered for RQ3 prior to conducting the analysis. For the assumption of multicollinearity, the variance inflation factor (VIF) was analyzed. With FOH as the psychosocial variable observed for this research question, multicollinearity diagnostics using SPSS revealed that the VIF and tolerance statistics were below 10 for both FOH and GSM. This level of VIF, as mentioned in the analysis of RQ2, is a multicollinearity threshold that is widely used (Field, 2013). Hence, as shown in Table 9, the results are within acceptable range and multicollinearity in this linear regression model for RQ3 is not problematic.

Table 9

Variance Inflation Statistics for RQ3

Model		Tolerance	VIF
1	FOH	.214	2.361
	GSM	.226	2.142

The assumption of homoscedasticity was also considered before conducting the

multiple regression analysis for RQ3. Using the liner regression functions in SPSS, the

plots function was also selected for the values for the dependent variable residuals and

the residuals for the predictor or independent variable. Visual inspection of the

dependent residuals revealed that the datapoints on the plot were distributed evenly both

above and below the x-axis, satisfying the check for of homoscedasticity (Field, 2013).

Following a review of these assumptions, the multiple regression analysis was

conducted to predict GSM based on the level of depression and FOH. A significant

regression equation was found $F(2, 111) = 1.97$, $p = .040$ with an R^2 of .395 as can be

seen in Table 10.

Table 10

Linear Regression Model Results for RQ3

Model	R	R squared	Adjusted R squared	Std Error of the Estimate
1	.581	.395	.352	16.338

Table 11 presents the unstandardized and standardized coefficients and the significant

interaction effect of depression and FOH. Results of this linear regression model support

that there is a significant interaction of FOH and depression on the dependent variable

GSM; hence, the null hypothesis was rejected.

Table 11

Coefficients for Depression and FOH (Dependent Variable: GSM)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	*t*	Sig.
1	Constant	90.234 2.176	2.112		34.265	.000
	Depression	2.176	0.041	0.511	3.924	.000
	FOH	.127	0.297	0.031	0.357	0.493
	Depression_FOH	.004	0.02	-0.243	2.154	0.027

 The final research question in this study considered another psychosocial variable, level of family support (LFS). This variable was selected based on prior research noting family environment is as an important factor with chronic medical conditions (Theofanidis, 2014; Wilson, Martire, & Sliwinski, 2017). Family environment is also core to biopsychosocial model, from which this research draws. The specific research question was:

RQ4. Is the level of family support a moderator of self-management and depression among patients with type 2 diabetes?

H_0: The level of family support is not a moderator of self-management and depression among patients with type 2 diabetes who are depressed.

H_1: The level of family support is not a moderate self-management and depression among patients with type 2 diabetes who are depressed.

For this psychosocial variable, level of family support, the Family Environment Scale (Moos & Moos, 1994), was used. This instrument is comprised 10 subscales and

measures three dimensions of family environment. Of its subscales, family cohesion was of interest in this research. This subscale was selected for analysis because this research defined level of family support as the cohesion demonstrated by and among family members in the family environment (Lee et al., 2019).

A visual inspection of participant instruments revealed that all items on this instrument were completed. There were no missing data. The subscale of focus for the fourth research question in this study was family cohesion, referred to in this study as the level of family support (LFS) because of its alignment with the definition of level of family support used in this research. Each instrument was scored by reviewing participant responses against the scoring grid, which revealed raw scores. Using the instruments conversion table, participant raw scores for this subscale were converted to standard scores. The standard scores were analyzed to answer RQ4 in this study.

As with RQ2 and RQ3, the linear regression analysis was also appropriate for RQ4. The prior steps for linear regression analysis were taken with this research question. The assumptions were explored for this analysis of the level of family support. First, the VIF for this psychosocial variable was analyzed. As shown in Table 12, the VIF and tolerance statistic for LFS revealed that both VIF and tolerance level were below 10, hence satisfying the assumption of multicollinearity (Field, 2013).

Table 12

Variance Inflation Statistics for RQ4

Model	Variable	Tolerance	VIF
1	LFS	.225	3.121
	GSM	.273	2.112

The assumption of homoscedasticity was also satisfied for analysis of this research question. The datapoints on the plot were distributed evenly both above and below the x-axis, satisfying the check for of homoscedasticity upon visual inspection (Field, 2013). A linear regression analysis was conducted using SPSS. Following a review of these assumptions, the multiple regression analysis was conducted to predict GSM based on the level of depression and LFS. A significant regression equation was found $F(2, 111) = 1.93$, p $= .041$, with an R^2 of .341 as can be seen in Table 13.

Table 13

Linear Regression Model Results for RQ4

Model	R	R squared	Adjusted R squared	Std Error of the Estimate
1	.584	.341	.312	16.247

Table 14 presents the unstandardized and standardized coefficients and the significant interaction effect of depression and LFS. Results of this linear regression model support that there is a significant interaction of LFS and depression on the dependent variable GSM, hence, the null hypothesis was rejected.

Table 14

Coefficients for Depression and LFS (Dependent Variable: GSM)

Model

		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	Constant	93.117	2.212		32.247	.000
	Depression	2.082	.041	.606	3.762	.000
	LFS	.142	.289	.047	.341	.411
	Depression_LFS	.011	.002	.237	2.119	.018

Conclusion

This chapter presented analyses of data and results to answers the four research

questions posed in this study. The first research question examined differences in the

level of self-management based on reported levels of depression of two groups, a high

depression group, and a low depression group. Two subscales of self-management were

examined in this research question, glucose management, and dietary control. Of these

two subscales, a significant difference in mean scores of self-management was found on

scores of glucose management; hence, the null hypothesis was rejected. The other

subscale of self-management showed no significant difference in scores between the

group reporting a high level of depression and the group reporting a low level of

depression. Hence, the null hypothesis was not rejected for this subscale. For questions

2, 3, and 4, findings revealed moderating effects for each of the three psychosocial

variables examined: the perception of body image, the fear of hypoglycemia, and

the level of family support; hence, the null hypothesis was rejected in each of these three

research questions. The concluding chapter of this research offers further discussion of

these findings, the limitations of this study, certain recommendations for future research,

and a presentation of the implications of this research for positive social change.

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these findings, the limitations of this study, certain recommendations for future research,

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Chapter 5: Discussion, Conclusions, and Recommendations

This study's aim was to elucidate self-management among individuals with Type 2 diabetes by exploring the role of psychosocial variables in self-management. The quantitative cross-sectional study design was employed to explore self- and the moderating effects of psychosocial variables among individuals who reported a diagnosis of Type 2 diabetes. To examine these questions, this study included 112 participants recruited from a large metropolitan clinic serving individuals with Type 2 diabetes. The variables explored in this study were the perception of body image, fear of hypoglycemia, and level of family support. Depression, a common emotional component of many chronic diseases, was also a variable in this study.

These variables were deemed appropriate in this research because they are also noted factors in the biopsychosocial model, the overarching theoretical premise of this study. The conceptual and theoretical framework for this research was the biopsychosocial model. The biopsychosocial model takes into account more than simply a medical explanation for chronic disease and its progression. This model recognizes that the disease process can be complex, and a myriad of emotional, environmental, and social contributors can be at play. The model further asserts that each of these factors may have a unique role and be equally as relevant to a patient's experience as the medical factors (Bazzazian, 2017).

Interpretation of Findings

In this study, I addressed some of the long-standing gaps in prior research. Scholars found that depression is often a comorbid condition with Type 2 diabetes (Gogitidze, Hedrington, Briscoe, Tate, & Davis, 2010; Jackson et al., 2014). These researchers, however, did not address the association of levels of depression and self-management of Type 2 diabetes. I examined level of depression and self-management of Type 2 diabetes and found a negative relationship between the level of depression and GSM. Individuals with a high level of depression reported lower self-management scores than individuals reporting a low level of depression.

This finding has important implications for many reasons. First, it strengthens other assertions made in prior research. For example, Adu, Malabu, Malau-Aduli, and Malau-Aduli (2019) pointed out an association between glucose and emotional factors. Findings in the current study extend this assertion, associating high and low levels of depression with glucose management among individuals with Type 2 diabetes.

These findings associating the level of depression with glucose management are also important because they have implications for both patients with Type 2 diabetes and health educators. Scores of self-awareness and health literacy among patients with Type 2 diabetes are low (Nazar, Bojerenu, Safdar, & Marwat, 2015). In the findings from this study, I offered solutions to this health education challenge. This new knowledge that patients with higher levels of depression may encounter more challenges with glucose self-management could lead to improved health education curricula, bridging mental wellness to self-management of Type 2 diabetes. It could also positively impact self-

management efforts among patients with Type 2 diabetes by helping them become more aware of a need to manage their depression.

Another gap in the prior literature that this study raised was the absence of psychosocial explanations for self-management of Type 2 diabetes. Many prior studies were limited in this regard as they presented only medically based explanations for low levels of self-management. These reasons included nonadherence to medication regimens, lack of exercise, and poor diet (Aloudah et al., 2018; García-Pérez et al., 2013; Polonsky & Henry, 2016). Using the biopsychosocial model (Engel, 1980) as a predicate, I found that perception of body image, fear of hypoglycemia, and level of family support each had moderating effects on depression and self-management, suggesting that psychosocial factors are relevant contributors to Type 2 diabetes and deepen the complexity of this chronic condition.

In addition to addressing gaps in prior research, this study's data regarding the demographic characteristics of individuals with Type 2 diabetes also raised some compelling implications. The demographic data within the study sample was proportionately similar to what is observed in the larger population of individuals with Type 2 diabetes. Specifically, prevalence rates of Type 2 diabetes among African Americans are considerably higher than that among European Americans (ADA, 2018). In this study, participants reported a similar demographic breakdown, with more than three times as many African Americans who reported a diagnosis of Type 2 diabetes as European Americans. These similarities between the demographic profiles of a larger population of individuals with Type 2 diabetes and the study sample suggest that even

within smaller segments of the population of individuals with Type 2 diabetes, African Americans consistently report the greatest prevalence of this chronic condition.

These parallels between the study sample and the larger population regarding the prevalence of Type 2 diabetes among African Americans raise another useful implication. Depression is underdiagnosed among African Americans (Hudson, Eaton, Banks, Sewell, & Neighbors, 2018; Sohail, Bailey, & Richie, 2014). The inadequacy of information in the literature about the prevalence of depression among African Americans hamper efforts to learn more about treatment approaches of depression among African Americans. This study's findings may begin to address this paucity of information in the literature. More than half of the participants in this study who were African American reported having a high level of depression, suggesting that a diagnosis of Type 2 diabetes could open new paths in identifying and treating depression among African Americans.

These findings have important practical implications. They could promote a higher level of awareness about depression and type 2 diabetes among health care professionals. Specifically, the information that the level of depression and self-management could encourage health care professionals to include emotional supports as a recommended part of their patients' overall care plan to manage their diagnoses of type 2 diabetes. For health care professionals with serving demographic groups with a high prevalence of type 2 diabetes, these findings could prove especially useful as a basis for treatment approaches that include a mental health component to address depression.

Turning to the theoretical and conceptual framework of this research, this study broadened an understanding of the biopsychosocial model as related to individuals with

type 2 diabetes. Findings underscore that determinants of type 2 diabetes are more far reaching than what can be explained medically and can include one's thoughts, emotions, and socioeconomic factors such as income and education level. As the biopsychosocial model holds, chronic illness is a combination of multiple variables that are not mutually exclusive, but rather, coexist and interact collectively (Wade & Halligan, 2017). Findings in this study demonstrate that multiple variables contribute to chronic disease management.

Drawing further from the theoretical premise of the study, the complexities of each of the psychosocial variables in this study can further be understood. For example, in this study's findings, fear of hypoglycemia was observed to be associated with self-management and depression. Although it is a psychosocial variable, its role in type 2 diabetes self- has physiological implications. For example, in earlier studies, researchers found that many type 2 diabetes patients compensated for fear of hypoglycemia by intentionally elevating their glycemic levels (Wei, Zheng, & Nathan, 2014). Hence, the biopsychosocial lens employed in this study provides a framework to observe the intersection of emotional factors such as fear of hypoglycemia with the physiological factors and amplifies that each can contribute to self- of type 2 diabetes.

Limitations of the Study

While there are some compelling contributions that this study's findings offer to the larger body of knowledge, some important limitations of this study need to also be considered. One area of limitation is with respect to different aspects of self-management. This study's focus was on two specific aspects of self-management,

glucose, and dietary control. Data gathered from participants encompassed these two areas. Other factors of self-management, however, are relevant in self-management but are not part of this study. For example, physical fitness and exercise may have a regulating effect on insulin (van Dijk & van Loon, 2015). Because this study's focus did not include data regarding physical activity levels among participants, findings may have limited application among individuals with type 2 diabetes who have extensive exercise programs and physical activity.

Along similar lines, medication is another important aspect of type 2 diabetes self-management that was not a focus of this study. According to the ADA (2018), a range of medication therapies can be prescribed as part of a patient's self-management. These medication therapies include a plethora of categories including rapid, intermediate, and long-acting insulins—alpha-glucosidase inhibitors and biguanides—each with varying degrees of effectiveness. Because participants in this study did not report on medication types, dosages, and levels of adherence, findings may be limited in application among patients with extensive medication regimens.

Regarding the variables examined in this study, another limitation was the extent to which depression could be determined among study participants. Although participants responded to questions regarding depression, they were not questioned regarding whether they had a history of depression or were receiving medical treatment for depression. This lack of information about participants' history of depression could limit the application of study findings.

Another limitation of the study is the self-report method that was used to gather data. Self-report is reliant on responses provided by participants regarding their feelings, beliefs, and circumstances. This type of data-gathering approach assumes that individual participants are offering truthful responses (Creswell, 2014; Rosenman, Tennekoon, & Hill, 2014). Because this study used instruments requiring self-report from all participants, there are inherent validity challenges that may limit the application of findings. These challenges include participants providing overstated responses or not accurately reporting historical data due to flaws in memory (Rosenman, Tennekoon, & Hill, 2014).

Finally, this study has limitations in terms of data analysis. The linear model used in this study examines the relationships between variables. Although compelling inferences can be drawn based on these relationships, the generalization of findings is limited because causation is not conclusive with correlational data (Buhse, Rahn, Bock, & Mühlhauser, 2018). Additionally, the existence of covariates further narrows the interpretation of relationships between these variables. In this study, participants from a broad demographic and socioeconomic range were included. Within this diverse group, possible confounding variables include BMI, frequency of family contact, financial means to pay for proper medication, and other health-related complications.

Recommendations

While the body of scientific research regarding type 2 diabetes is expansive, much remains to be discovered regarding the complexities of this chronic metabolic disease. The current study offers a defensible foundation upon which to advance future study.

Specifically, this study's findings made known that level of depression is an important determinant in understanding self-management of type 2 diabetes. Further, the disparities of glucose that were noted between type 2 diabetics with a high level of depression and those with a low level of depression found in this study raise compelling new questions regarding the management of this disease. For example, levels of depression among type 2 diabetics could also be associated with other aspects of self-management such as level of physical activity. Future research is, thus recommended to gain further an understanding in this area.

A second recommendation for future research is to explore self-management of type 2 diabetes among individuals who have a prior history of depression. Although this study begins a discussion in the literature about the role of the level of depression in self-management of type 2 diabetes, further research is needed to examine self-management of type 2 diabetes among patients who report a history of depression.

Another recommendation for future study is regarding demographic characteristics gathered in this research. Specifically, the demographic data included socioeconomic information that raises new questions about this individual characteristic and diabetes self-management of type 2 diabetes. A majority of participants in this study reported an annual income at or below $50,000. This income is significantly below the national median income level of $61,000 (United State Census Bureau, 2018). Of these participants reporting a high level of depression, more than 60% earn below $50,000. Future study is recommended to explore whether these lower income levels play a role in self-management among individuals with type 2 diabetes who report having depression.

Lastly, future researchers could also investigate further regarding each of the three variables explored in this study, fear of hypoglycemia, perception of body image, and level of family support as related to type 2 diabetes. Regarding fear of hypoglycemia, much of the body of knowledge on fear of hypoglycemia is devoted to the study of this phenomenon among individuals with type 1 diabetes. This study added to a growing body of knowledge on fear of hypoglycemia among individuals with type 2 diabetes. More study is urged to answer additional questions, including questions regarding moderating effects of fear of hypoglycemia with depression and self-management among specific racial groups.

<div align="center">**Positive Social Change**</div>

Findings from this research extend beyond adding to the body of knowledge of type 2 diabetes; they also offer a potent tool for positive social change in health care. Specifically, health education has long been an important factor of wellness in type 2 diabetes treatment approaches. Most health education models have traditionally instructed on disease progression of type 2 diabetes and how patients with this chronic condition can change health behaviors to mitigate further complications (Cruz et al., 2013; Zhang & Chu, 2018). Findings from this study could contribute to positive social by inspiring new pathways in health education that include training modules on the role of specific psychosocial variables in self-management.

Another way that this research contributes to positive social change is that it highlights a need for co-management of chronic disease between medical and mental health professionals. According to recent studies (National Institute of Mental Health, 2018),

nearly one third of adults with a chronic medical condition also have a mental health need. As findings in this study underscore, comorbidity rates like this are high among patients with type 2 diabetes. They also present with depression and their treatment needs can be extremely complex, requiring dual treatment approaches and an extensive pharmacy plan that includes both medications for diabetes as well as for depression. This study's findings could strengthen practices and protocols in the management of co-occurring conditions between health care and mental health professionals by promoting more collaborative and unduplicated efforts between medical and mental health professionals in the treatment of co-occurring conditions. These collaborative efforts could, in turn, lead to streamlining overall costs associated with the care and treatment of type 2 diabetes.

Conclusion

This research sought to answer important questions about self-management of type 2 diabetes by examining whether psychosocial factors play a role in this health behavior. A sample of 112 individuals who reported having type 2 diabetes participated in this study. Through the lens of the biopsychosocial model (Engle, 1997), three psychosocial variables were examined, perception of body image, fear of hypoglycemia, and level of family support. Findings supported that these variables have a moderating effect on self-management of type 2 diabetes and contribute to the larger body of research by elevating the discussion of self-management beyond a medical model. A future study could include exploring the role of other psychosocial variables as well as examining the role of these psychosocial variables among specific racial groups. Findings of this research

impact positive social change in that health care educators can use this information to

pioneer new frameworks for diabetes education curricula. This research can also

promote more collaborative treatment efforts among medical and mental health

professionals.

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