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Diabetes Distress Among Adults Living in Texas

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This is to certify that the doctoral dissertation by

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Walden University
2022

Abstract

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by

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ADN, Houston Community College, 1993

MS, Texas Southern University, 1983

BS, Texas Southern University, 1981

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

About 34.2 million Americans (approximately 10.5% of the total U.S. population) live with diabetes. African Americans are twice as likely to be diagnosed with diabetes and more likely to be less compliant with treatment medication regimens and suffer from related complications, compared to non-Hispanic Whites. Such disparities brought attention to the need to investigate and understand better the diabetes distress of diverse groups of diabetics. The purpose of this cross-sectional study was to examine the relationships between demographic factors (race, age, gender, and educational level), diabetes education, diabetes management, and diabetes distress of adult diabetics in Texas. The theory of reasoned action was the conceptual framework and the instruments used in the study were the Diabetes Management Self-Efficacy Scale and Problem Areas in Diabetes Scale. Among the 161 participants in the sample, bivariate and ordinal regression analysis revealed that there was statistically significant lower diabetes distress among the group of college educated respondents in this study and a statistically significant negative relationship between diabetes management and diabetes distress. The significant negative correlation between diabetes management and diabetes distress existed when controlled for race, age, gender, educational level, and diabetes education. This study can contribute to positive social change by leading to a better understanding of the diabetes management and diabetes distress among adults in Texas, which can be useful by practitioners and patients to improve care and management of diabetes and help reduce long-term health complications.

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Chapter 1: Introduction to the Study

Introduction

Diabetes mellitus is a chronic, metabolic disease characterized by elevated levels of blood glucose, with possible long-term complications leading to severe damage to the heart, blood vessels, eyes, kidneys, and nerves (Gatwood et al., 2018; Papatheodorou et al., 2018; Rathod et al., 2017). More simply called diabetes, there are two types (Type 1 and Type 2), which together comprise one of the top four most prevalent chronic diseases worldwide (Bullard et al., 2018). Type 1 diabetes is generally a lifelong condition, while Type 2 has a later onset and can be preventable (Hansen et al., 2019). According to the 2020 National diabetes statistics report, about 34.2 million Americans live with diabetes (Centers for Disease Control and Prevention [CDC], 2020). That number represents 10.5% of the total United States population. Also noted in prior studies were the 88 million (34.5% of the American adult population) with prediabetes (Cheng et al., 2020).

Diabetes was the seventh leading cause of death in the United States (prior to COVID-19 pandemic), with racial and ethnic minorities more adversely affected than other demographic groups (Lee et al., 2019). For example, African Americans are almost twice more likely to be diagnosed diabetic and more likely to suffer from related complications, compared to non-Hispanic whites (Shiyanbola et al., 2018). Major barriers among inner-city African American diabetics include lack of diabetes knowledge, lack of support, and lack of diabetes management skills and resources (Campbell & Egede, 2020). Shiyanbola et al. (2018) reported that African Americans tend to be less compliant with treatment medication regimens, leading to greater complications and a need for

more studies to investigate other related racial disparities among adults with diabetes mellitus.

An important related concern is diabetes distress, defined as the emotional response to specific stressors in the context of managing diabetes-related conditions (Hansen et al., 2019). There have been many studies on diabetes in the United States, leading to a consensus about the existence of diabetes-related distress and the disparities between non-Hispanics and other races in the United States (Hansen et al., 2019; Lee et al., 2019; Shiyanbola et al., 2018). However, a knowledge gap continues to exist regarding diabetes distress, race, and other demographic and lifestyle factors (Hansen et al., 2019; Hawkins et al., 2018; Hurt et al., 2020). In this study, I examined the possible relationships between demographic factors (race, age, gender, and educational level), diabetes education, diabetes management, and diabetes distress of adult diabetics in Texas. Results of the study could lead to a better understanding the factors related to diabetes distress, leading to recommendations to help lower the odds of complications due to diabetes.

This chapter includes the background of the study, problem statement, purpose, research questions, and hypotheses. It also includes discussions on theory of reasoned action (TRA), which was the theoretical framework first introduced by Fishbein and Ajzen (1977). The nature of the study, definitions, assumptions, scope and delimitations, limitations, and significance of the study complete the chapter.

Background of the Study

Diabetes mellitus is the fourth most prevalent chronic disease affecting at least 30 million people in the United States and almost 420 million worldwide (Bullard et al., 2018; Cheng et al., 2021). Reported costs for managing and treating the disease are approximately 327 billion dollars in the United States and 825 billion dollars worldwide in (CDC, 2019). Diabetes mellitus requires continuous care. Contrary to lay understanding, management of the disease goes beyond the control of sugar levels and requires multi-factorial strategies (Hill-Briggs et al., 2021). In the majority of patients, effective self-management can prevent several long-term complications such as cardiovascular disease, stroke, and foot ulcers.

What has been concerning is the higher prevalence of diabetes with increased diagnosis among racial and ethnic minority populations in the United States, compared to non-Hispanic Whites (Tomić, 2018). People who live in areas with more significant health disparities and less health equity have a greater risk of diabetes (Hill-Briggs et al., 2021). Among these groups, Black adults are more likely than Whites to develop diabetes-related complications, and men are 13% more likely to be diagnosed diabetic than women. Given such findings, research occurred to explore the effects of behavioral, environmental, demographic, and personal factors on diabetes self-management, prevention, and awareness (Hawkins et al., 2018; Hurt et al., 2020; Lee et al., 2019). The study by Hurt et al. (2020) was anchored on the gender centered ecological framework, while Hawkins et al. (2018) focused on age-related diabetic factors in relation to race (African American men who were 55 years or older).

Most of the existing studies on diabetes mellitus and race revolved around prevention, awareness, appropriate diet, and behavior. These studies led to the development of several awareness and prevention programs, like Save Our Sons (Thornton et al., 2020), Diabetes Coaching Program adapted for Blacks (Lehrer et al., 2017), Fit Body and Soul (Berkley-Patton et al., 2020), Project Diabetes Interventions Reaching and Educating Communities Together (Berkley-Patton et al., 2020), and the Lifestyle Balance Church Diabetes Prevention Program (McElfish et al., 2020). Despite the ongoing emphasis on education and prevention, managing blood glucose can be a delicate balancing act, with levels fluctuating in response to insulin, exercise, and diet, as well as less direct or recognizable stimuli such as emotions (Hansen et al., 2019).

Substantial proportions of Black and Latino Americans experience serious diabetes-specific emotional and mood concerns, making psychosocial functioning a high priority for diabetics, especially among minorities who may be experiencing elevated challenges (Carreon et al., 2021). Evidence from previous qualitative and quantitative studies of the contextual factors influencing diabetes disease perceptions and self-care practices left gaps in knowledge about population-based diabetes distress and its relationship to variables of interest (Hansen et al., 2019). Despite previous scholarly efforts, there is a noticeable paucity of studies including diabetes distress in relation to demographic factors (race, age, gender, and educational level), diabetes education, and diabetes management. This study may help to fill that gap in knowledge.

Problem Statement

The general problem pertained to racial disparities of diabetes diagnosis and outcomes in the United States, with a significant gap in knowledge about diabetes-specific distress and management, especially among minorities who may be experiencing elevated challenges (Campbell & Egede, 2020; Carreon et al., 2021). The specific problem addressed is a lack of understanding about the possible predictors of diabetes distress among the adult diabetics in Texas. There is a continuing interest in how diabetes distress and related complications manifest among Latino and Black Americans, which can be understood better through evidence regarding the potential predictors of diabetes distress, such as demographic, educational, and management factors (Carreon et al., 2021).

Associated with increased health expenditure and low quality of life, diabetes ranks high on the international health agenda as a global threat to both human health and economies (Bellou et al., 2018; Kudel et al., 2018). Despite the strides in early detection and the management of diabetes in the United States, the condition, and its subsequent complications have not changed significantly among Latino and Black Americans (Carreon et al., 2021; Cheng et al., 2019; Lee et al., 2019). Rathod et al. (2017) posited that improvement in glycemic control can prevent microvascular complications; thus, finding ways to mitigate some of the diabetic-related difficulties requires improved glycemic control. Although a dearth of studies revolved around assessing the reasons for racial disparities in the glycemic control (Fayyaz et al., 2019; Gupta et al., 2017), there

has been a lack of clarity about the role of psychosocial functioning and diabetes distress in disease control, especially among minorities (Carreon et al., 2021).

Diabetes distress is one of the most important psychosocial concerns among adult diabetics and is an emotional response to the real and perceived stressors of the condition (Wise et al., 2021). It is crucial to be able to explain the link between the disease and emotional distress, but significant potential predictors of diabetes distress have not yet been documented or substantiated (Hansen et al., 2019), especially as experienced by Latino and Black Americans of different genders, educational levels, and ages. This study may help to solve the problem of a lack of understanding about the possible predictors of diabetes distress among the adult diabetics in Texas.

Purpose of the Study

The purpose of this quantitative study was to examine the possible relationships between demographic factors (race, age, gender, and educational level), diabetes education, diabetes management, and diabetes distress of adult diabetics in Texas. Understanding how these factors might relate to diabetes distress and diabetes management could lead to potential ways of improving interventions and treatment, consequently reducing complications from the disease. This quantitative research was a cross-sectional correlation study, and the predictor variables were demographic factors (race, age, gender, and educational level), and diabetes education, while the outcome variable for RQ1 was the diabetes-related distress, measured through the PAID scale (Polonsky et al, 1995), and for RQ2 was diabetes management, measured by Management Self-Efficacy Scale (Bijl et al., 1999). The population was adult diabetics

living in Texas. Completion of an anonymous online survey by a volunteer convenience of diabetics led to data required to answer the research questions.

Research Questions and Hypotheses

RQ1: What are the relationships between demographic factors (race, age, gender, and educational level), diabetes education, and diabetes distress of adult diabetics in Texas?

$H_0$1: There are no statistically significant relationships between demographic factors (race, age, gender, and educational level), diabetes education, and diabetes distress of adult diabetics in Texas.

H_a1: There are statistically significant relationships between demographic factors (race, age, gender, and educational level), diabetes education, and diabetes distress of adult diabetics in Texas.

RQ2: What is the association between diabetes distress and diabetes management among adult diabetics in Texas, controlled for race, age, gender, educational level and diabetes education?

$H_0$2: There is no statistically significant association between diabetes distress and diabetes management among adult diabetics in Texas, controlled for race, age, gender, educational level and diabetes education.

H_a2: There is a statistically significant association between diabetes distress and diabetes management among adult diabetics in Texas, controlled for race, age, gender, educational level and diabetes education.

Theoretical Framework

This study's foundational theory was the reasoned action approach, which has its foundation in the theory of reasoned action (Fishbein & Ajzen, 1977; Nisson & Earl, 2020) and the theory of planned behavior (Ajzen et al., 2018). The reasoned action approach represents a comprehensive model for understanding behavior and precursors. In his address of the reasoned action approach to promote health, Fishbein (2008) discussed the importance of considering emotions, compulsions, and other less rational determinants of human behaviors. The reasoned action approach, according to Fishbein, encompasses mood and emotions, viewed as variables that may influence attitudes, perceived control, and other beliefs that influence intentions and behaviors.

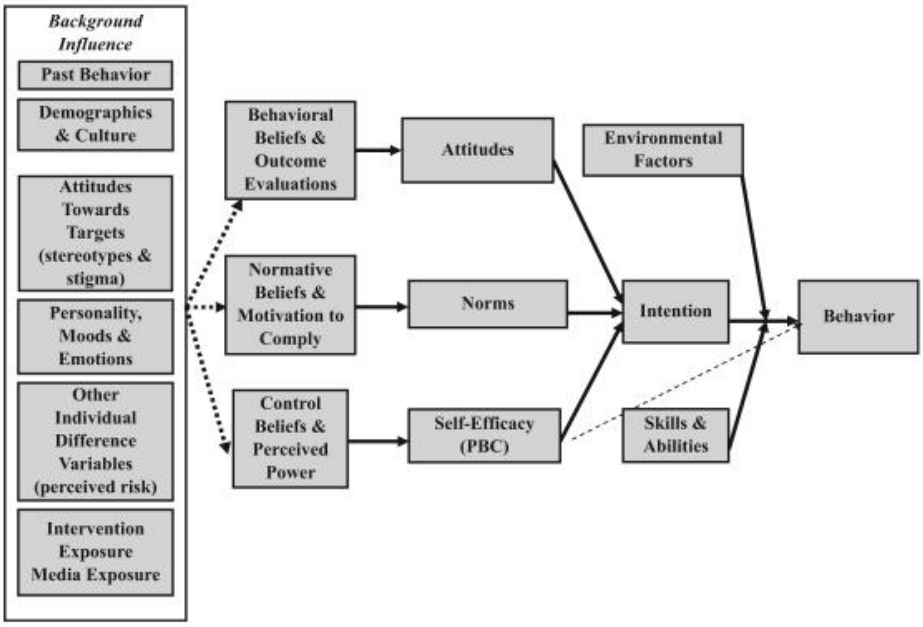
The reasoned action approach framework applied in studies about adherence to desired behaviors, predictions, and changes in health behaviors (Nisson & Earl, 2020; Stolte et al., 2017). The framework has been widely applied to health promotion studies and has been a subject of continuous meta-analytical studies (Conner, 2020; Nisson & Earl, 2020; Teixeira & Marques, 2017). The reasoned action approach is among the most commonly cited models for health behavioral change, also applied in prior studies of diabetes distress, which invariably included cognitive and emotional constructs pertaining to personal attitudes, beliefs, perceptions, and expectations (Chew et al., 2017).

The reasoned action approach framework situates behaviors as functions of intentions influenced by three components: attitudes, subjective norms, and control (perceived ability, including skill and resources, to enact in an intended way) (Nisson & Earl, 2020). According to the reasoned action approach framework, these three

components are fundamentally determined by an individual's dispositions (personality traits, emotions, intelligence, etc.), demographics, and quality of information available to the individual (Stolte et al., 2017). Figure 1 is a visual depiction of the reasoned action approach framework.

Figure 1

Reasoned Action Approach



In context, components of the reasoned action approach can be placed in this study, as an explanatory tool, in the following ways. Attitudes towards behaviors could stem from beliefs, perceived power, and emotional influence, which could interact in ways that contribute to diabetes distress. Subjective norms include stereotypes based on age, race, and gender, among other factors, which might exacerbate emotional and psychosocial challenges that ultimately shape behavior (Priest et al., 2018). Ideas about what it means to belong to a certain group (including diabetics) could either reinforce or

undermine the adoption of healthful or compromising health behaviors, leading to internal or emotional conflicts that could exacerbate diabetes distress. Perceived behavioral control might also represent a source of conflict, such as when a diabetic patient may have high intentions to adhere to an appropriate lifestyle regime but may not be able to move from choices to actual behavior, escalating emotional responses that contribute to diabetes distress.

Nature of the Study

This research was a cross-sectional quantitative study. Cross-sectional surveys, according to Samphantharak et al. (2018), require that data are representative of naturally occurring situations or conditions at a given point in time, and there is not manipulation of variables over time. The predictor variables were demographic factors (race, age, gender, and educational level), and diabetes education. The outcomes variable was diabetes distress and diabetes management, as measured by the PAID scale and DMSES respectively. The population was the adult diabetics in Texas. The convenience sampling method did lead to participants willing to voluntarily complete an online survey, which included questions pertaining to the predictor and outcome variables.

By applying quantitative methods, researchers can use statistical techniques to test the hypotheses corresponding to this study's research questions, thereby answering the research question (Blanca et al., 2018). A quantitative methodology was the most appropriate means to testing the hypotheses statistically to answer the research questions for this study. Demographic variables (race, age, and gender) and diabetes education were categorical variables, with age being a continuous variable. The DMSES and the

PAID scale are interval level variables, measured by selections of fixed choice answers to close-ended questions. Given the opportunity to operationalize the variables, measure, quantify, and statistically analyze collected data, a quantitative method with a correlation design was a suitable choice for this study.

Definition of Key Terms

Diabetes distress: Diabetes distress is one of the most important psychosocial concerns among adults and reflects an emotional response to specific stressors in the context of the disease (Hansen et al., 2019); in this study, diabetes stress is operationalized and measured by the PAID scale.

Diabetes education: the process of facilitating the knowledge, skills, and abilities to understand and take steps toward diabetes prevention, screening, treatment, and care necessary for diabetes self-care (Powers et al., 2016).

Diabetes management: Adherence to proper testing, treatment, and lifestyle changes to prevent complications of diabetes (Powers et al., 2016), measured by the DMSES scale in this study.

Diabetes: A disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated glucose levels in the blood and urine (Hansen et al., 2019).

Gestational diabetes: Often developing between weeks 13 and 27 of pregnancy, this form of elevated blood sugar affects approximately 14% of expectant mothers throughout the world (Plows et al., 2018).

Hemoglobin AIC (Hba1c): The hemoglobin HbA1c is the average level of blood sugar over two to three months (Hansen et al., 2019).

Lifestyle modifications: Healthy eating, walking, exercise, and other physical activities for prevention or treatment of diabetes (Sweileh, 2018).

Type 1 diabetes mellitus: One of the most common chronic diseases in childhood (constituting 5-10% of all people with diabetes), more common among males with some genetic predisposition, the body does not produce enough insulin to regulate blood sugar (Kahanovitz et al., 2017; Klak et al., 2020).

Type 2 diabetes mellitus: Often preventable, due to the diminished response to insulin, it is also referred to as insulin resistance diabetes, and commonly diagnosed in persons older than 45 years, and accounts for 90% of all diabetes diagnoses (Blaslov et al., 2018).

Assumptions

Assumptions are beliefs about the conditions or possibilities of research that are deemed plausible or credible without definitive evidence of support (Herlihy & Turner, 2015). In this study, there was an assumption that the researcher would be able to collect enough data (as calculated from the minimum required sample size) to be able to draw a statistically meaningful conclusion from the study. It was also an assumption that the survey respondents would give honest answers to the questions, from which meaningful conclusions could be drawn. There was an assumption that the problem of diabetes distress is of concern to society in general, and that the research findings would be relevant and consequential to scholars, practitioners, and patients. An assumption in this

research was that the methodology, design, instruments, and theoretical framework would be suitable to help answer the research questions to narrow a critical gap in the related literature.

Scope and Delimitations

Scope

This study was focused on the population of adult diabetics in Texas. The sample for this study was from the heterogeneous population of adults in Texas, which was likely to include multiple races, varying ages, both genders, and certain degrees of educational levels. Eligibility for the study included a diagnosis of Type 1 or Type 2 diabetes. Excluded were cases of a diagnosis of gestational diabetes. Participants had to be fluent in English to complete the informed consent process and survey questions. Anyone below the age of 18 years when data were collected were excluded from the study. Nondiabetics and prediabetics were excluded from the study.

Potential Generalizability

This study's results did provide insights into the factors predictive of diabetes distress among adult diabetics. The study results were generalizable to the population of adults living in Texas, United States and may not be generalizable to the other adults living elsewhere. The study report of findings included detailed demographic information about the participants, which assist readers in judging the appropriateness of potential generalizations to other geographic areas or populations. People living, being educated and treated for diabetes, and managing diabetes distress in other states and countries

(outside of the United States) may experience systematically different circumstances, environments, and influences from the adults in Texas.

Limitations

The main limitation of this study was related to its generalizability. Because the research population were adult diabetics living in Texas, the results may not be generalizable to the other adult diabetics living elsewhere. The cross-sectional design leads to findings that reflect data collected at a single point in time and do not represent changes, historical, or longitudinal findings. It was also not possible to examine every possible factor that may contribute to diabetes distress. Due to the cross-sectional nature of this study, it was not possible to establish causation. The limitations included focus on a narrow set of demographics, educational, and management factors implicated as possibly related to diabetes distress.

Significance

This study helped to narrow the gap in the literature regarding the factors related to diabetes distress and diabetes management among American adults in Texas. Many diabetes studies were about prevention and awareness through increased knowledge of appropriate diet and behavior (Hawkins, 2019; Hawkins et al., 2018; Lee et al., 2019). There were explorations of the issues of race, masculinity, and family member involvement as lifestyle-motivating factors, all mainly from the perspective of diabetes prevention (Hawkins et al., 2018; Hurt et al., 2020). There have been studies about diabetes stress in relationship to other lifestyle factors, such as work or familial involvement (Hansen et al., 2019; Wise et al., 2021). However, there have been limited

attempts at studying diabetes related stress through examining possible relationships of demographic factors (race, age, gender, and educational level), diabetes education, diabetes management, and diabetes distress of adult diabetics in Texas.

Implications for Positive Social Change

This research resulted in empirical evidence that can be useful knowledge for significant stakeholders (diabetic patients, relatives, caregivers, and clinicians) concerned about diabetes distress, which could impact diabetes control, management, and complications. It was a hope that such enhanced understanding would lead to improved knowledge about disparities, care, and management of diabetes and its related conditions, such as diabetes distress. The ability to understand the psychosocial and emotional aspects of diabetes could help to design appropriate interventions that might help prevent longer-term complications of the disease, such as heart diseases, stroke, kidney disease, blindness, nerve damage, leg and foot amputations, and death (American Diabetes Association, 2020).

Summary

According to the 2020 National diabetes statistics report, about 34.2 million Americans live with diabetes (Bullard et al., 2018; Cheng et al., 2021). That number represents 10.5% of the total United States population, in addition to the 88 million (34.5% of the adult American population) who are prediabetic (CDC, 2020). Diabetes is the seventh leading cause of death in the United States, with racial disparities surrounding the diagnosis, treatment, complications, and outcomes of the management of the disease (Lee et al., 2019). There are pieces of evidence that better knowledge of diabetes

significantly improves the outcomes of the disease. Therefore, this study's primary purpose was to examine the potential statistically significant predictors of diabetes distress and the relationships among demographic factors (race, age, gender, and educational level), diabetes education, diabetes management, and diabetes distress of adult diabetics in Texas.

Chapter 2 included a comprehensive literature review pertaining to the concepts that are foundational to the study. Detailed in the chapter are the literature search strategy, theoretical foundation, and previous findings pertaining to the variables selected in this study. The chapter culminates in further identifying the gap in the related literature that the results from this study helped to fill.

Chapter 2: Literature Review

Introduction

Despite the strides in early detection, the management of diabetes, and the claim by the CDC (2017) that the incidence of diabetes in the United States is leveling off, the disease and its subsequent complications have not changed among racial minorities. This indicates a notable gap worth evaluating to better understand diabetes distress and its possible relationships with demographic factors, lifestyle, and education, hoping to provide empirical data for clinicians in identifying the best places to put efforts for better outcomes from the diabetes disease. Accordingly, the purpose of this study was to examine the possible relationships between demographic factors (race, age, gender, and educational level), diabetes education, diabetes management, and diabetes distress of adults living with diabetes in Texas.

This chapter is divided into three sections. The introduction consists of an overview of the content, organization, and strategy utilized for the literature search. Section 2 is a review the foundational theory, Fishbein and Azjen's (1975) TRA, which anchors that current study. Section 3 is a review of literature which includes the background on diabetes, related disparities, the management of diabetes, and the complications of diabetes mellitus, including diabetes distress. Section 3 closes with a discussion of the relevant literature to this study and the social change impact of the research. Section 4 is the summary and transition to Chapter 3.

Literature Search Strategy

The research strategy utilized in this literature review consisted of examining mostly peer-reviewed articles from the year 2016 to the year 2022, except for a few documents with particular relevance to the study, such as the seminal theories. The search was based on the Boolean system and used keywords and phrases such as diabetes, diabetes mellitus, demographic terms, diabetes complications, diabetes management, knowledge of diabetes, attitudes towards diabetes, and diabetes distress. Literature searches through PUBMED, Google Scholar, ProQuest online dissertation and thesis search, and other Walden University Library databases were conducted. Although the literature search revealed an exhaustive list of diabetes and diabetes-related studies, there was a specific gap in the availability of scientific studies about the knowledge level demographic relationships to diabetes distress in the United States, including lifestyle and educational factors.

The literature search included reviewing each article's abstract first, when available, before examining the full article. Due to the total number of articles available on diabetes, an outcome was developed to assist in narrowing down the focus of the literature review. Priority was set as follows: any non-English language study was eliminated, all studies that were not peer-reviewed were omitted, and studies older than 10 years (literature review conducted in 2021) were also eliminated except for a few due to their relevance to the current study. Finally, all articles that involved diabetes mellitus, diabetes, race, diabetes management, diabetes, education level, and complications of

diabetes, especially diabetes distress and findings pertinent to the Southwest United States were given special attention.

Theoretical Foundation

The TRA, developed by Fishbein and Azjen (1975), is a dominant theory used to explain why human beings behave the way they do, but also encompasses an emotional component that drives perceptions of experiences. TRA postulates that majority of human behaviors are intentional. Essentially, intentions are the most important determinant of people's behavior (Yang et al., 2018). It assumes that behavior is determined by the individual's will or intention to perform or not perform a specific behavior or vice versa (Kusnanto et al., 2017).

Thus, TRA posits that if a person believes that conducting a favorable action such as taking medications or exercising will yield positive outcomes, they will be more likely to have a positive attitude toward the stated behavior. However, if a person believes that performing the same behavior will lead to an unfavorable outcome, that individual will hold a negative attitude toward the same behavior and not perform those actions. Yet, in his address of the reasoned action approach to promote health, Fishbein (2008) discussed the importance of taking into account emotions, compulsions, and other less rational determinants of human behaviors. The reasoned action approach, according to Fishbein, encompasses mood and emotions, viewed as variables that may influence attitudes, perceived control, and other beliefs that influence intentions and behaviors.

TRA framework applied in studies about adherence to desired behaviors, predictions, and changes in health behaviors (Nisson & Earl, 2020; Stolte et al., 2017).

The framework has been widely applied to health promotion studies and has been a subject of continuous meta-analytical studies (Conner, 2020; Nisson & Earl, 2020; Teixeira & Marques, 2017). The TRA approach is among the most commonly cited models for health behavioral change, also applied in prior studies of diabetes distress, which invariably included cognitive and emotional constructs pertaining to personal attitudes, beliefs, perceptions, and expectations (Chew et al., 2017).

TRA situates behaviors as functions of intentions influenced by three components: attitudes, subjective norms, and control (perceived ability, including skill and resources, to enact in an intended way). According to the reasoned action approach framework, these three components are fundamentally determined by an individual's dispositions (personality traits, emotions, intelligence, etc.), demographics, and quality of information available to the individual (Fishbein & Ajzen, 1977; Nisson & Earl, 2020). In his address of the TRA approach to promote health, Fishbein (2008) discussed the importance of considering emotions and mood that may influence attitudes, perceived control, and other beliefs that influence intentions and behaviors. Previous researchers also showed that patients' attitudes and subjective norms influence adherence and compliance to managing the disease so that therapeutic efficacy can be achieved (Kusnanto et al, 2017; Yang et al., 2018). The TRA connects an individual's intentions to perform a behavior such as taking prescribed medications or exercising to manage their diabetic better and then actually performing the said action, however influenced by emotions, which can also lead to distress.

Theoretically, if historically marginalized groups are grounded with an accurate knowledge base of diabetes, its complications, and the outcome of utilizing medication and lifestyle changes to manage their disease better, they become empowered in their approach and management of diabetes. However, what is unknown is the influence of emotions and the possible relationships between factors underlying the TRA and diabetes distress.

Kusnanto et al. (2017) utilized the principles of the TRA in their study to assess how the understanding and application of TRA can influence patients with T2DM in decision making about dietary changes in managing their disease. Kusnanto et al. found that most patients with diabetes (T2DM) failed to follow the dietary recommendation due to lack of motivation, memory, and intention. They concluded that the implementation of the TRA could improve dietary and physical activity adherence in patients with both T1DM and T2DM, but the role of mood and emotions went unstudied.

Zeidi et al. (2020) evaluated the efficacy of an intervention based on Fishbein and Azjen's theory of planned behavior for improving foot care in patients with T2DM in Iran. Although this was conducted with a completely different population and in another country (Zeidi et al., 2020), the outcome of the study was similar to the survey by Kusnanto et al. (2017). The study by Zeidi et al. consisted of an interventional and a controlled group. The interventional group received education about the causes and risk factors associated with foot ulcers. They were given the guidelines that patients with diabetes must be familiar with when caring for their feet, educated on daily foot care activities, and the positive and negative outcomes of adherence and nonadherence to foot

care behaviors. Results indicated that once individuals became aware of diabetic foot care behaviors' benefits, the mean score increased compared to the mean score of variables before the implementation. However, this study also did not account for other demographic factors or the role of mood and emotions in the complications of diabetes, including diabetes distress.

There is a plethora of studies in healthcare utilizing the Fishbein and Azjen's (1975), most likely because the TRA provide a foundation for combing through and making sense of multi-layered barriers (Agu, 2017), such as those that exist in understanding the disparity in diabetes diagnosis and distress. The current study mirrors previous research, particularly the research by Kusnanto et al. (2017) in utilizing the Fishbein and Azjen's TRA, applied with an emphasis on the role of emotions and mood as emphasized by Fishbein (2008).

Literature Review Related to Key Variables

Background of Diabetes

Diabetes mellitus is not new; it was first recognized as a disease around 3,000 years ago by the ancient Egyptians and Indians (Sami et al., 2017). It is a disease in which an individual's blood glucose or blood sugar levels are too high due to the lack of or inability to use insulin, which enables blood sugar to enter the cells in the body where it can use it for energy. Diabetes is a complex and chronic disease that requires continuous care with multi-factorial strategies to reduce risks beyond the control of sugar levels (Cefalu, 2017).

Diabetes is associated with increased health expenditure and low quality of life (Bullard et al., 2018; Cheng et al., 2021). According to Cefalu (2017), two major types of Diabetes Mellitus are Type 1 diabetes mellitus (T1DM) and Type 2 diabetes mellitus (T2DM). Although several other forms of diabetes exist, the diagnosis is primarily classified into T1DM and T2DM. With T1DM, the body does not produce enough insulin to regulate blood sugar (Blaslov et al., 2018). In contrast, T2DM, which is the more common form of Diabetes Mellitus, is when the body does not make or use insulin well (CDC, 2019). Thus, glucose remains in the body, resulting in the diagnosis of diabetes or high blood sugar. T1DM is one of the most common chronic diseases in childhood, and some individuals have a genetic predisposition to T1DM (Klak et al., 2020). It is also more common in males, and individuals with T1D constitute 5-10% of all people with diabetes (Kahanovitz et al., 2017).

A plethora of studies supports several interventions to help improve outcomes among patients with diabetes (Cefalu, 2017). Multiple pharmacological strategies for treating diabetes have been documented and applied, with much emphasis on lower HbA1c levels. It is often difficult for patients to reach the targeted HbA1c levels when drug therapy is used alone. The majority of patients are required to implement several lifestyle changes such as engaging inadequate physical exercise and adhering to a healthy diet, demanding motivation and willingness of the patient (Gopalakrishnan & Geetha, 2017). Despite efforts to emphasize lifestyle, diet, education, and medications, diabetes distress continues as a concern for diabetics and their families, caregivers, and providers (Carreon et al., 2021).

Diabetes Mellitus: Type 1 and Type 2

Although T1DM can appear at any age, it commonly presents in childhood or adolescence. An autoimmune disease mediated by T-cells is the primary driver of many inflammatory and autoimmune diseases in the human body (Kumar et al., 2018). This T-cells mediated autoimmune disease causes the destruction of pancreatic B-cells, which causes insulin deficiency and eventually leads to hyperglycemia, an excess glucose level in the body (Kahanovitz et al., 2017). Hemoglobin HbA1c and blood glucose levels are used to diagnose and manage T1DM (Bullard et al., 2018). HbA1c is a reliable biomarker for the diagnosis and prognosis of diabetes and was initially identified as unusual hemoglobin in patients with diabetes 40 years ago (Gupta et al., 2017). It is an indicator of mean blood glucose concentration and provides a reliable measure of chronic hyperglycemia and also correlates well with the risk of long-term diabetes complications (Gupta et al., 2017). The hallmark of HbA1c is its ability to provide evidence about a patient's average blood glucose levels during the previous two to three months.

Only about 5% of patients diagnosed with diabetes have T1DM, and there is no established cure (Bullard et al., 2018). However, management is by utilizing different approaches prescribed by the patients' clinician. For instance, excess glucose levels can be controlled by exogenous insulin injections several times a day (Kahanovitz et al., 2017). Patients can also utilize lifestyle changes which involve dietary modification to control or manage their diagnosis (Berkley-Patton et al., 2020).

Kahanovitz et al. (2017) explained that T1DM can present with mild fasting high blood sugar or diminished glucose tolerance that can rapidly transition to severe

hyperglycemia when the individual has an infection or under stress. Individuals at increased risk of developing T1DM can be identified by genetic markers and by the presence of characteristic autoantibodies (Redondo et al., 2018). For this to occur, individuals must know the symptoms and be willing to visit their healthcare provider for a test. The burden for the management of this diagnosis lies with the patient and their healthcare provider's collaborations (Hawkins, 2019; Zahedi et al., 2020).

T2DM is a common chronic metabolic condition, often present with most individuals diagnosed with diabetes mellitus. Accounting for 90% of all diabetes diagnoses, usually defined as insulin resistance, unlike T1DM, which occurs mainly in childhood, T2DM is most seen in persons older than 45 years of age (Blaslov et al., 2018). Further, Shubrook, Chen, and Lee (2018) noted that before receiving this diagnosis, the patient typically has a long prediabetes period. T2DM is associated with irreversible risk factors such as age, genetics, race, ethnicity, and reversible factors such as diet, physical activity, and smoking. In most patients with T2DM, the disease is preventable, and effective self-management can help prevent many complications related to the illness (Gopalakrishnan & Geetha, 2017).

Due to the factors that contribute to T2DM, combined with the absence of signs for pre-diabetes, the American Association of Clinical Endocrinologists and the American Diabetes Association encourages the screening for diabetes and prediabetes (Shubrook et al., 2018). Although there are few if any apparent signs of prediabetes, the signs and symptoms of diabetes are often obvious. Symptoms such as excessive urination, thirst, hunger, weight loss, increased susceptibility to infections, especially

yeast or fungal infections (CDC, 2019). Diagnosis is made by testing the blood for sugar levels. Blood is tested in the morning after fasting overnight. Physicians also utilize HbA1c, an important indicator of long-term glycemic control because it can reflect a combined glycemic history of the previous two to three months (Gupta et al., 2017).

According to a World Health Organization report (2017), an HbA1c level of 6.5% or higher is indicated as a diagnosis of diabetes. However, a value of less than 6.5% does not necessarily rule out diabetes as patients with prediabetes can often present with HbA1c levels of 5.7% to 6.4% (Myhre et al., 2021). Due to its accuracy, the utilization of HbA1c by health care providers extends past the diagnosis of diabetes, used as a marker of glycemic control. It serves as an indicator of how well an individual can manage their diabetes. Myhre et al. (2021) asserted that the HbA1c also serves as an indicator for diabetes-associated risk factors for complications and mortality.

One of the notable factors about T2DM is that most of the patients with T2DM are obese or have higher body fat percentages, distributed predominantly in the abdominal region (Blaslov et al., 2018). It is also known that a lack of physical activity and hypertension can also increase a person's risk of developing T2DM. The primary target in patients with T2DM, obese, is weight loss (Borse et al., 2021). Because T2DM has been linked to many nongenetic factors as T1DM, Bellou et al. (2018) concluded that T2DM results from an interaction between genetic and environmental factors. Therefore, it can be managed by the individuals if they have the knowledge to do so.

Diabetes Knowledge

Improving adherence to proper diabetes management, medication use, and diabetes outcome often focuses on educational approaches targeted at improving the people's knowledge of diabetes (Yeh et al., 2018). The related rational assumption is that diabetes knowledge might affect patients' adherence to their treatment regimen and ultimately lead to better outcomes (Zowgar et al., 2018). This assumption was rigorously assessed in a cross-sectional study involving 540 adult patients with T2DM attending the Diabetes Outpatients Clinic at Pulau Penang Hospital (McElfish et al., 2020). Using the validated Michigan Diabetes Knowledge Test for measuring the patients' diabetes knowledge and Morisky Medication Adherence Scale for measuring the patient's adherence to their diabetes medications, the McElfish et al. (2020) also examined the relationship between the patients' diabetes knowledge and their HbA1C levels. The researchers found that patients' knowledge about diabetes is associated with better medication adherence and better glycemic control (McElfish et al., 2020), thereby reinforcing the importance of improving the diabetes knowledge among the patients.

Other studies have shown the importance of better diabetes knowledge in improving the overall diabetes patient outcomes (Yeh et al., 2018). For example, Moyeda-Carabaza et al. (2020) investigated the effects of a diabetes education intervention on diabetes-related factors among Mexican-origin Hispanics. The authors reported that enhancing the patients' diabetes knowledge and the use of nutrition education is effective in improving diabetes-related factors, dietary intakes, and

ultimately in improving diabetes outcomes among Mexican-origin Hispanics in both Mexico and the United States (Moyeda-Carabaza et al., 2020)**.**

The importance of diabetes education and knowledge in the health outcomes of diabetes patients has motivated many researchers and led to the development and validation of many instruments for measuring the level of diabetes knowledge. Some of those tools include Diabetes Knowledge Scales, rigorously validated and shown to have high reliability (Moyeda-Carabaza et al., 2020; Tomić, 2018). Another popular diabetes knowledge assessment tool is the Brief Diabetes Knowledge Test, which has two components: a general test with 14 items and an insulin-use subscale with nine items (Zowgar et al., 2018). All these instruments and their high reliability have aided further studies of the effects of diabetes knowledge on health outcomes, but they do not singularly account for the relationship between diabetes education and knowledge (Adam et al., 2018; Dedefo et al., 2019; Jeon & Park, 2018).

Complications of Diabetes

Diabetes complications are common among patients with T1DM and T2DM diabetes, but it is also responsible for significant morbidity and mortality (Papatheodorou et al., 2018). There are multiple complications ascribed to the diagnosis of diabetes. There are broadly classified into two distinct groups: microvascular and macrovascular (Papatheodorou et al., 2018). Studies contend that there is an intersection between micro and macrovascular complications, and the two disorders seem to be strongly interconnected (Khunti & Seidu, 2019). Understanding this connection helps educate the

patient on signs and symptoms to watch for and how they can better manage their diagnosis.

Microvascular complications refer to damage to small blood vessels (WHO, 2019). Neuropathy involves the nerves, which leads to impotence and diabetic foot disorders, and can have severe infections leading to amputation (Papatheordorou et al., 2018). Diabetes-related nephropathy can involve renal failure and according to WHO (2019), patients may feel tired, become anemic, not think clearly, and even develop dangerous electrolyte imbalances. Gatwood et al. (2018) linked evidence of the occurrence of chronic kidney disease (CKD) with cases of diabetes. Retinopathy affects damage to the eyes and may lead to blindness, blurred vision, and other visual disabilities (Papatheordorou et al., 2018). Neuropathy symptoms often involve numbness and pain in extremities and eventual impotence (WHO, 2019). The decreased sensation to feet can lead to patients not recognizing cuts, thereby developing foot infections (Papatheordorou et al., 2018). Vascular complications in a given tissue are often accompanied by evidence of pathology in other vascular areas (Khunti & Seidu, 2019).

Macrovascular complications consist of cardiovascular diseases such as heart attacks, stroke, and peripheral artery disease (Papatheodorou et al., 2018). Khunti and Seidu (2019) asserted that much attention has been focused on the management of macrovascular complications such as stroke and acute coronary syndrome in recent years. According to the WHO (2019), while early detection of these complications can delay progression, it is essential for individuals to recognize other risk factors such as smoking, high blood pressure, high serum cholesterol, and obesity because these are even more

important. In a study comparing the occurrence of different chronic illnesses and physical function, Gatwood et al. (2018) observed that many patients with diabetes have a minimum of one other chronic condition that increases the disease's burden and the overall quality of life. Although CKD is often evaluated in patients with diabetes, a patient's kidney functions may largely be impaired even before the disease is diagnosed. In essence, diabetes increases the severity of CKD.

Balbale et al. (2018) suggested the implementation of the Chronic Care Model (CCM) that supports strategies such as patient self-management, integration of different provider teams, and the incorporation of health information systems to support a productive relationship between patients and their providers. However, for this implementation to be effective, practitioners must first be able to understand, educate, and support diabetics in their self-management. Darawad et al. (2017) asserted that self-management can be time-consuming for the patient, as the implementation of recommended behaviors has been estimated to take up two hours per day for an average adult with T2D. Hence, the process of self-management, changes in lifestyle, or even a lack of sufficient diabetes education could be contributors to diabetes distress.

Thus, improving individuals' understanding of diabetes self-management and practitioners understanding of groups vulnerable to diabetes complications, including diabetes distress could strengthen the broad evidence base for psychology (Darawad et al., 2017). This assertion further supports the argument for the relevance of this current study.

Disparities and Diabetes

Scott et al. (2017) demonstrated that low socioeconomic status is associated with higher morbidity and mortality rates for patients with T1DM. The same could be argued for patients with T2DM, considering the disparity that exists with diabetes diagnosis between racial and gender groups (Hurt et al., 2020). The consequences of these complications are vast. Papatheordorou et al. (2018) contended that it has a cumulative impact on almost every country, age group, and economy across the world.

Racial minorities (mainly non-Hispanic blacks and Latinos) have a higher incidence of being diagnosed with T2DM, compared to other groups (Hawkins et al., 2018). The risk of diabetes among Blacks is more than double that for Whites (Hurt et al., 2020). African Americans are almost twice as likely to be diagnosed with diabetes as non-Hispanic whites (Cheng et al., 2021). Almost 19% of all African American adults are 60% more likely to be diagnosed with diabetes mellitus than non-Hispanic white adults, and the rate of diabetes diagnosis is 13.4% among non-Hispanic black men compared to 7.5% among non-Hispanic white men (United States Department of Health and Human Services, 2021). Although African American males are affected by T2DM later in life, they are four times more likely to have T2DM than other races (Hurt et al., 2020).

Furthermore, African American men are also more likely to suffer complications from diabetes, such as end-stage renal disease and lower-extremity amputations. While these numbers are staggering, Yang (2018) explained that the reasons for the degree of these disparities are not clear. However, behavioral, environmental, socioeconomic, physiological, and genetic contributors have all been postulated. Hurt et al. (2020) argued

that one reason for the disparity is that some demographic groups (such as Black men) are less likely to seek out prevention programming and stay involved in interventions.

In tandem with the assertions made by Hurt et al. (2020) regarding the reasons for the disparity of diabetes diagnosis between gender and racial groups, Waqas et al. (2017) added that among diabetic patients, diabetes awareness and management are still the significant challenges. Further, Lee et al. (2019) argued that the overwhelming issue among non-Hispanic Black men may not be their lack of desire to participate in their care or take control of managing their diabetes. Instead, there have been mixed, unclear, and confusing study results from efforts to study diabetes complications, including distress, as it may be related to education, lifestyle, and other possible demographic predictors.

Regarding racial and gender research of diabetes mellitus, Zowgar et al. (2018) purported the problem of underrepresentation of some groups (such as non-Hispanic Black men) in health research as a barrier to understanding and treatment of various illnesses, such as diabetes. Langford et al. (2017) postulated that lack of representation may be due to barriers such as a lack of awareness and disparities in offering research opportunities, lack of knowledge, and a misconception about the research process distrust of the health and medical system. This argument directly validated findings from Lee et al. (2019) regarding the mention of conflicting information from healthcare providers.

Diabetes Distress

The negative impact of diabetes on emotions and mood may be explained by diabetes distress (Farm et al., 2017). Diabetes distress is an emotional consequence of living with and managing diabetes, not otherwise attributable to other mental health

illnesses (Schmitt et al., 2017). Many adult diabetics live with distress symptoms and experience high levels of emotionally crippling concerns and worries about diabetes (Golden et al., 2017; Halliday et al., 2017). Diabetes distress, including depressive signs and symptoms, has been reported to affect more than 40% of diabetic patients and could undermine self-care efforts, lead to greater physical and mental health complications, and contribute to suboptimal management outcomes (Nanayakkara et al., 2018).

In light of the plethora of research about diabetes, a large gap in the research pertains to diabetes distress (Farm et al., 2017). As diabetes is projected to continue to rise exponentially, affecting 592 million by 2035, diabetes distress is becoming a greater concern, which could escalate morbidity, mortality and healthcare costs (Nanayakkara et al., 2018). Distress may be mediated by suboptimal self-management, inadequate self-care, poor medication adherence, lifestyle or health-related quality of life struggles, or more common pathophysiological mechanisms (Martinez-Vega et al., 2016). Relationships among these possible mediators, predictors, and relationships among variables, including demographic variables remain unknown.

What is known is that timely recognition and treatment of diabetes distress may improve quality of life of patients, and their family members, caregivers, and significant others (Carreon et al., 2021). Population-based surveys demonstrated that diabetes distress is more prevalent among adults with T2DM (Nanayakkara et al., 2018). Despite this knowledge, there is limited other data and studies about the factors associated with diabetes distress among different groups of people across the world.

Nanayakkara et al. (2018) hypothesized that significant levels of diabetes distress among Australian adults with T2DM are related to demographic, self-care, and healthcare factors. Nanayakkara et al. reported that among the 2,552 diabetics studied, there were factors associated with measures of diabetes distress that differed by gender, with a greater of women reporting distress, especially when younger in age, insulin dependent, with higher HbA1c, needs for interpreter, diet and lifestyle difficulties, and less education about glucose monitoring. Results demonstrated that there may be significant predictors of diabetes distress and relationships among variables that could inform researchers, practitioners, and patients.

Diabetes distress among patients from ethnic minorities is still a concern yet still poorly understood. Ozcan et al. (2018) studied groups of Caucasian, Asian, Moroccan, African, Latin American, Turkish, and Hindu groups in an effort to understand the association between ethnicity and diabetes distress among ethnic minority groups with T2DM in the Netherlands. Using the 20-item PAID scale to assess diabetes distress, Ozcan et al. also included sociodemographic and lifestyle data. Ordinal regression analysis showed participants in minority groups had worse health outcomes, compared to Caucasians, and diabetes distress was more prevalent among all other groups, even after adjusting for other sociodemographic and lifestyle variables. Ozcan et al. suggested further research to explain the higher prevalence of diabetes distress among minority groups to be able to develop more effective interventions.

Martinez-Vega et al. (2016) similarly studied diabetes distress among T2DM patients in Mexico; findings were that those with greater obesity and poorer adherence to

lifestyle and medical management had significantly higher distress scores. Martinez-Vega et al. reported that findings were similar those of studies performed in European countries in that diabetes distress could be related to efforts to manage lifestyle and a poor understanding of the practical skills required to manage their disease. The authors in the Mexican and European studies did not attempt to examine possible differences among other various demographic groups. However, there was a consensus that findings highlighted the need for better education for self-care and a more comprehensive collaborative team-based care approach involving psychologists, nutritionists, and other health providers (Martinez-Vega et al., 2016).

LeBron et al. (2014) reported that Latino and Black diabetics do experience higher diabetes-related distress but that among Latinos studied, there was a relationship between measures of diabetes distress and perceptions of discrimination. Multiple linear regression applied by LeBron et al. (2014) to survey data from 157 adult diabetics in Detroit showed that discrimination was significantly associated with higher diabetes distress measures for Latinos; the positive association was present but not significant for African Americans, which was an indicator that there may be stressors unique to racial/ethnic minorities related to diabetes distress, which if known and understood could help to improve diabetes-related interventions and outcomes.

Hood et al. (2018) studied diabetes distress among urban Black American adults with a mixed-method approach. Results indicated the need for more research aimed at ultimately helping patients cope with diabetes-related distress. Particularly important to participants were culturally appropriate psychosocial support resources for distress

coping, such as gender-stratified support groups and groups for different age groups (Hood et al., 2018).

PAID (Polonsky, et al., 1995) is one of the most used measures to assess diabetes distress and several authors used the PAID scale in various intervention trials targeting diabetic-related distress. Stühmann et al. (2020) discussed the administration of the PAID scale in various forms, across the world, in numerous languages, administered on the phone, electronically, or on paper. Chew et al. (2017) conducted intervention trials that measured diabetes distress with the PAID questionnaire, whereby higher scores represent higher distress; Chew et al. interpreted one standard deviation above the mean to be a score that warrants special attention. Totesora et al. (2019) used the PAID scale to study the 42.6% of diabetic Filipinos with emotional distress registering moderate to severe; of those studied, 51.1% had suboptimal lifestyle, with younger people experiencing greater distress. Chawla et al. (2020) recommended the PAID scale as a validated tool for periodic assessment of psychosocial well-being of diabetics, specifically concerned with rural and urban Native American populations across 15 states, which is another group with a strikingly high prevalence of diabetes and diabetes-related distress.

Diabetes Management

Diabetics must manage multiple concepts and tasks throughout the treatment and management of their chronic disease. The management is essential in preventing chronic kidney, central nervous system, and blood vessel complications. Blood sugar control depends on the administration of insulin or oral hypoglycemic medications, lifestyle

management involving nutritional choices and physical exercise, and other daily activities to manage their disease (Messina et al., 2018).

What has been known for decades is that patients consider managing self-care activities among the most difficult aspect of their diabetes diagnoses (Messina et al., 2018). Being highly self-efficacious is a recognized factor in the successful management of chronic disease (Brands & Custers, 2017; Dallolio et al., 2018). The American Diabetes Association recommended that healthcare providers consider the burden of treatment and the levels of self-efficacy of patients for management and self-care behaviors (Young-Hyman et al., 2016).

The concept of self-efficacy originated from social learning theory and pertains to the idea that individuals have varying degrees of beliefs in their capacities to organize and execute actions necessary for success in prospective situations (Bandura, 1998). Self-efficacy is less general nature and more dependent on specific situations and tasks. Self-efficacy as it pertains to own's perceptions about capabilities in self-managing health should be an important consideration of health care providers, especially when dealing with chronic illnesses (Messina et al., 2018).

Hamzah et al. (2013) conducted a systematic review of studies that included the measurement of self-efficacy among T2DM management, which revealed that the DMSES by Bijl et al. (1999) is the most widely used scale in the United States and in other countries. The DMSES is a set of 20 questions used to measure functional diabetes management behaviors revolving around the self-care activities most typically required to manage diabetes and prevent complications (Messina et al., 2018). The advantages of

using the DMSES was the opportunity to attempt to assess lifestyle, self-care, weight control, medication adherence, and blood glucose measurements.

Summary and Conclusions

Diabetes and its complications place a significant self-management burden on affected individuals and their families (Darawad et al., 2017). Previous research has shown the severity of diabetes on the individual, family, and the world. Although researchers agree that tremendous progress has been made on the fight against diabetes and its complications, there is also a consensus that much remains to be done, especially regarding the disparity and increasing occurrence of this diagnosis and diabetes-related distress. Moreover, previous studies have conceded that since the primary cause of this disparity is unknown, it is relevant to understand the possible relationships between demographic factors (race, age, gender, and educational level), diabetes education, diabetes management and diabetes distress.

In Chapter 3 there is discussion of the methodology and design. Included are the details about the rationale for the selected methodology and design. Discussed are the population and sampling technique, data collection and analysis plans, and the steps intended to address ensure valid, reliable, and ethical research.

Chapter 3: Research Method

Introduction

The purpose of this cross-sectional study was to examine the possible relationships between demographic factors (race, age, gender, and educational level), diabetes education, diabetes management, and diabetes distress of adult diabetics in Texas. Understanding how these factors might relate to diabetes distress could lead to potential ways of improving interventions and treatment, consequently reducing complications from the disease. This chapter includes the details about the methodology and design. Contained in the chapter is the rationale for the selected methodology and design, the population and sampling technique, plans applied to data collection and analysis, and the steps that ensured valid, reliable, and ethical research.

Research Design and Rationale

This research was a cross-sectional quantitative study with a multiple regression modeling approach. This was a cross-sectional study because the data for the variables were collected at a single point in time, recorded simultaneously. This was a quantitative study because statistical techniques were used to test the hypotheses corresponding to the research questions, thereby answering the research question. Using correlation tests allows for the opportunity to test for statistically significant relationships among variables (Ernst & Albers, 2017). The predictor or independent variables were demographic factors (race, age, gender, and educational level), and diabetes education, while the outcome or dependent variables were the diabetes-related distress of diabetic adults (measured through the PAID scale) and diabetes management (measured through the DMSES).

An alternative to the quantitative methodology is qualitative research (Alpi & Evans, 2019). Qualitative researchers examine, explore, discover, and describe phenomena of interest by using words and relying upon mostly nonnumerical data (Kozleski, 2017). Hansen et al. (2019) noted the considerable evidence from qualitative studies that revealed contextual factors, but also underscored the need for quantitative methodologies to study diabetes distress, describing the evidence from population-based studies as sparse. Qualitative research would allow for the gathering and analysis of in-depth revelations about a small group's experiences with or perceptions of diabetes distress, but would not allow for inferences, generalizations, or comparisons of different groups of people on a larger scale.

Fixed numerical answer choices in a quantitative study can be subject to the appropriate selection of statistical tests, which often includes correlation research designs (Tobi & Kampen, 2018). Statistical tests of relationships made it possible to examine identified factors, including the possible relationship between diabetes management and diabetes distress. An alternative quantitative research design is experimental, with the purpose of generating causal evidence derived from data obtained from a random sample; variables are often manipulated and experimental designs typically involve a control group (Schweizer et al., 2016). The purpose of this research was to generate conclusions based on predictive or correlational findings and not causal evidence; random sampling and control groups were not possible, which eliminated the experimental design as a suitable choice.

Instead, quantitative correlation research can help to identify measurable relationships among variables through statistical tests, such as regression methods (Elmousalami, 2019). Calculating correlation coefficients or performing simple linear regression would be appropriate for two variables (Blanca et al., 2018). In this study, there were multiple variables, some of which were categorical and may be significant predictors of diabetes distress. Therefore, a correlation design with additional ANOVA and regression tests were appropriate and revealing choices for this study.

Methodology

Population

The population for this study were the adults diagnosed with Type 1 or Type 2 diabetes in Texas, the United States, who were 18 years old or older. The population excludes expectant mothers diagnosed with gestational diabetes because there are unique factors surrounding pregnancy and the experience and management of gestational diabetes which would not be included in this study. The prevalence of diabetes increased over the past decade, both in Texas and across the nation (Hawes, 2019). In 2017, 2.5 million people in Texas had diabetes, which was approximately 11.4% of the adult population, in addition to the 23.8% of adult Texans who had diabetes and were not aware of it (Johnson et al., 2019). People living outside of Texas, who have not been diagnosed with diabetes, and those below the age of 18 were excluded from the study.

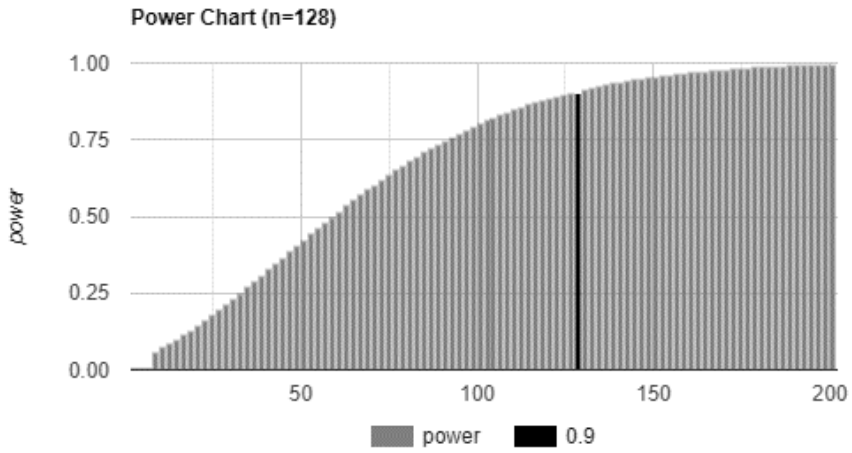
Sample Size

The ability of a statistical test to lead to useful results depends on different factors, including sample size. The minimum sample size required for this study was

estimated using the G*Power application software. The outcome indicated that for multiple linear regressions with seven predictor variables, at a 5% significance level, a sample size of 128 participants was needed to detect a medium effect size with power at 90% (see Figure 2). Accordingly, the sample included a minimum of 128 participants from the stated study population who meet the eligibility criteria of the study.

Figure 2

G Power Sample Size Estimation Graphs*



Research Questions

*RQ*1: What are the relationships between demographic factors (race, age, gender, and educational level), diabetes education, and diabetes distress of adult diabetics in Texas?

$H_0$1: There are no statistically significant relationships between demographic factors (race, age, gender, and educational level), diabetes education, and diabetes distress of adult diabetics in Texas.

H_a1: There are statistically significant relationships between demographic factors (race, age, gender, and educational level), diabetes education, and diabetes distress of adult diabetics in Texas.

*RQ*2: What is the association between diabetes distress and diabetes management among adult diabetics in Texas, controlled for race, age, gender, educational level and diabetes education?

$H_0$2: There is no statistically significant association between diabetes distress and diabetes management among adult diabetics in Texas, controlled for race, age, gender, educational level and diabetes education.

H_a2: There is a statistically significant association between diabetes distress and diabetes management among adult diabetics in Texas, controlled for race, age, gender, educational level and diabetes education

Instrumentation and Operationalization of Constructs

Instrumentation

Demographic questions did pertain to race, age, gender, and educational level, as well as diabetes education. Race was treated as a categorical variable with the following categories: Caucasian, Asian, Black/African American, Hispanic/Latino, American Indian, and Others. For each of the study participants, the education level reflects the highest education status/degree attained by the participants, categorized as no high school degree, high school graduate or GED completed, some college credit but no degree, college degree. Questions about lifestyle practices included servings per day of carbohydrates, sugared beverages, and amount and frequency of exercise.

The outcome variable for RQ1 was the diabetes-related distress of diabetic adults, measured through the previously validated and widely used PAID scale (Polonsky, et al., 1995). The questionnaire has been useful for measuring diabetes-related emotional distress and includes 20 questions about a range of negative emotional problems of patients related to diabetes (Lee et al., 2014). There have been reduced question items on various versions of the PAID scale, but using statistical methods, researchers validated the original 20-item PAID scale, and demonstrated reliability, predictive validity, and convergent validity. The scale is publicly available to use with permissions for clinical and research purposes (Stanulewicz et al., 2019).

The outcome variable for RQ2 was diabetes management, measured by the DMSES, which consisted of 20 questions about diabetes management self-care items (Bijl et al., 1999). The stem phrase *I am confident* preceded each item. Related research demonstrated good internal reliability and high internal consistency of the scale. The DMSES has also been negatively correlated with diabetes distress scores measured by the PAID scale and with HbA1c in studies abroad. The validated English version of the survey is publicly available and now permissions for use are needed for both clinical and research use (Sturt et al., 2010).

Procedures for Recruitment

Research must recruit participants in an ethically appropriate and unbiased manner (Iemca et al., 2018). Web-based recruitment through social media sites are more widely used for recruiting prospective participants using specific geographic and demographic criteria (Frampton et al., 2020). Internet-based social media recruitment is a

low-cost technique for sampling a population (McRobert et al., 2018). I used social media to recruit participants for this study. The invitation flyer is in Appendix A which includes the online survey link. The online survey link first opened an informed consent page for participants to electronically sign. Those who indicated consent to the terms advanced to the survey questions. The informed consent form is in Appendix B. Informed consent terms that are concise and comprehensible can enhance willingness to participate (Faranoff et al., 2018).

Data Collection

In this study, data collection was via a web-based online survey site, Survey Monkey. Survey questions are in Appendix C. The utilization of online data collection is growing (Cook et al., 2016). The online survey is less expensive and may have a better response rate, compared to paper surveys (Fitzgerald et al., 2019). Web-based surveys have also been shown to be a preference by some demographic groups studied (Mlikotic et al., 2016). The demographic distributions are a part of the published findings to recognize potential sources of bias that might result from the use of an online survey with recruitment via social media.

The design of the online survey required every participant to answer the same questions asked in the same order and format, which can improve data quality, collection, organization, and completeness (Ebert et al., 2018). Instructions preceded survey questions, which, according to Colbert et al. (2019) help respondents understand and appropriately interpret questions, items, and response options. Scores for survey questions whereby respondents are rating experienes with diabetes are often numerical

(de Melo Ghisi et al., 2021; Moyeda-Carabaza et al., 2020; Youssef et al., 2019; Zowgar et al., 2018). The answer choices were all fixed choice, requiring numerical answers for every question. The expected time frame to complete the survey was no longer than 30 minutes. The answers to the survey questions were downloadable in numerical form, then inspected, cleaned, and analyzed.

Data Analysis

Statistical Software

Statistical Package for Social Sciences (SPSS) version 25 was used for the statistical analyses in this study. The robustness and feature-rich nature of SPSS and its widely used modeling toolkits (such as regression analysis tools) make SPSS the appropriate statistical software for this study. The software has expanding capabilities to support complex statistical testing electronically (Duricki et al., 2016). SPSS is useful for testing of assumptions, handling missing data, and generating tables and figures of results (Vanus et al., 2019). SPSS is a useful tool to test for relationships among variables and performing multiple regression tests using predictor and outcome variables (Bruland & Dugas, 2017).

Data Cleaning

Data cleaning was carried out before actively working on the data analysis for the descriptive statistics and the inferential statistics. While doing the data cleaning, raw data can be preprocessed and organized into a format usable by SPSS (Bruland & Dugas, 2017). Rows with missing values or extensive outliers were excluded from further consideration and removed from the dataset and analysis. Data cleaning can involve

inspection, coding, and addressing apparently erroneous, missing data, obvious outliers (Greenwood-Nimmo & Shields, 2017; Kulkarni, & Bakal, 2014). I performed data cleaning before analysis to ensure complete datasets that were ready for analysis and appeared free from errors.

Descriptive Statistics

The analysis of quantitative data sets typically begins with the generation of descriptive statistics, leading to hypotheses testing (Cheung & Jak, 2016). Accordingly, data analysis started with the generation of descriptive statistics (including measures of central tendency). The distribution and the characteristic nature of each of the predictor variables and the outcome variable were explored and presented using numerical descriptive statistics and graphical descriptive statistics (such as bar/column charts and histograms). The exploration of data and the presentations of descriptive statistics help readers appreciate the overall data and distributions of the dataset (Shreffler & Huecker, 2021; Vetter, 2017). Mean, standard deviation, skewness and kurtosis were used for describing the continuous variables. Modes, proportions, and frequency distributions were calculations for categorical variables.

Inferential Statistics

Through inferential statistics techniques, statistical tests for each of the null hypotheses make it possible to answer each of the research questions with statistical evidence rigorously (Blanca et al., 2018; Shreffler & Huecker, 2021). To rigorously answer each of the research questions raised in this study, inferential statistics techniques tested the null hypotheses corresponding to each of the research questions. This was done

using ANOVA, correlation coefficients, and regression analysis, carried out with seven predictor variables. At a 5% significance level, a sample size of at least 128 participants was necessary to detect a medium effect size with power at 90%.

Correlation analysis was suitable and appropriate for this study because it was designed for analyzing and understanding the relationships between more than one predictor variable and the outcome variable (Ahlbom, 2017). The predictor or independent variables were demographic factors (race, age, gender, and educational level), and diabetes education, while the outcome or dependent variables were diabetes distress and diabetes management of adult diabetics in Texas, measured by the previously validated PAID and DMSES scales, respectively. For each of the listed predictor variables, a correlation matrix quantified relationships and contributions in determining participants' diabetes distress. Their respective *p*-values reflected the statistical significance of each of the predictors.

Assumptions

Shapiro-Wilk test of normality and checks for homoscedasticity using Levene's test are tests for the assumptions of normality and equality of variances, respectively and they were used in this study (García-Castilla et al., 2020). The assumption tests under classical statistics are applicable when data are measurable and precise (Aslam, 2019). The equality of variance assumption was evaluated using Levene's test for equality of variances, as recommended by Daniel and Cross (2018). The assumptions of ordinal regression were an ordinal level dependent variable with continuous, ordinal, or categorical independent variables, which was the case in this study. The VIF and

Tolerance tested for collinearity and likelihood ratio tests indicated proportional odds (Bürkner & Vuorre, 2019). Ordinal regression was a suitable choice because data were not normally distributed and the dependent variable was derived from a Likert type scale, where the scores for the dependent variable data were cumulative.

Study Validity

Threats to External Validity

A strong relationship exists between external validity and generalizability of a study's results (Ahlbom, 2017). Given that this study was limited to the population of adults in Texas, United States, this study's results may be generalizable only to the diabetic adults in Texas, United States. There was essentially no rigorous method for generalizing the results of a study that focuses on the population of adults in Texas, United States, to other people that were not represented in the population studied because the populations may generally be different in many ways from the studied population and such differences would not be captured by the study. Since such differences between the people of adults in Texas, United States, and other populations cannot be rigorously accounted for in this study, there was a threat to the external validity of the results of the research outside of the population of adults in Texas, United States.

Threats to Internal Validity

Threats to internal validity can result from factors or variables that are difficult to measure and whose effects are too difficult to be controlled (Daniel & Cross, 2018), thereby posing threats to internal validity (Ahlbom, 2017). On the other hand, reducing the chances for confounding generally leads to an increase in internal validity. The use of

widely acceptable statistical analysis techniques and previously validated surveys for the dependent variables contributed to reducing the threats to internal validity in this study.

Threats to Construct Validity

The level to which a test, a parameter, or a variable can measure what it sets out or claim to measure refers to that test's, a parameter's, or a variable's construct validity (Daniel & Cross, 2018). Educational level can approximate socioeconomic status; however, such an approximation may be threatening to construct validity because education level alone is generally not an excellent approximation of an individual's socioeconomic status. In addition, the construct validity of the PAID and DMSES scales (outcome variables) has been already confirmed since these are already validated instruments (Bijl, 1999; Polonsky, 1995).

Ethical Procedures

The research did comply with the guidelines of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (1979), known as the Belmont Report, which includes conducting research that is just, beneficent, and safe. This study's proposal was sent for review by the Institutional Review Board (IRB) of Walden University for approval before further work was done. After the IRB made revision suggestions, those were completed prior to the continuation of the study. The study was conducted only after written approval was received from the IRB, and all the policies and procedures related to ethical research standards were complied with. The IRB review ensures minimal risks and with potential benefits that are fair, and that

participation is voluntary, with an adequate informed consent process (Bracken-Roche et al., 2017).

The right of a participant to remain anonymous, withdraw at any time, and skip questions coincides with ethical research (Hokke et al., 2018; Kearney et al., 2018). The online survey was anonymous and participants de-identified; the data lacked all personal information that could have potentially made it possible to trace the data back to any individual from whom the data came. Informed consent forms were made available as the first page of the online survey. Participants were only able to progress to the survey questions after consenting to the informed consent by checking the "I consent" box on the first online survey page. The informed consent form included the right to withdraw from the study at any time (including not answering questions or skipping questions). There were no risks to participation, other than the minimal discomfort of using the computer and answering questions anonymously online. There were no incentives for participating and no consequences for withdrawing. A high level of research integrity, assessing information with objectivity, and using rigorous statistical techniques were shown. The researcher was not biased and sought to obtain reliable results through the use of appropriate and thorough statistical methods.

Summary

In this chapter, the research design and methodology for examining the potential relationship among stated variables with adult diabetics living in Texas were presented. The chapter included explanations of sampling and sampling procedure, the data analysis

plan, instrumentation, threats to validity, and ethical considerations. Chapter 4 includes a presentation of the result of the data analyses followed by interpretations.

Chapter 4: Results

The purpose of this quantitative study was to examine the possible relationships between demographic factors (race, age, gender, and educational level), diabetes education, diabetes management, and diabetes distress of adult diabetics in Texas. This quantitative research was a cross-sectional correlation study, and the predictor variables were demographic factors (race, age, gender, and educational level), with the population of adult diabetics living in Texas. Completion of an anonymous online survey by a convenience sample of 161 diabetics led to data required to tests the hypothesis and answer two overarching research questions.

Pilot Study

After receiving Walden's IRB approval (02-09-22-0427848), a field-testing process preceded the data collection for the main study. The pretest of the instrument ensured the online survey design was logical and that the survey link was operable and accessible. Questions were reviewed for wording and a pre-test of the survey link confirmed the informed consent process and answer choices progressed and were recorded as intended. Field testing of the survey questions and online design format, through the participation of three respondents from the population, helped determine that informed consent form, questions, instructions, and answer options were understandable and sensible. During field-testing minor revisions to the survey included correcting typographical errors and ensuring that answer files were downloadable into a usable format for data analysis., I published the survey link and included the published link in

the invitations to prospective participants. Data collected through field-testing were excluded from main study data and the results of the data analysis that followed.

Data Collection

The design of the online survey, field testing, and participant recruitment followed IRB approval. Main study data collection occurred between March 6 and March 30, 2022. After field testing, the invitation flyers with the survey link were posted repeatedly on several social media sites. Recruitment continued for one month, after which time the survey was closed. At the time the survey was closed, 161 respondents had consented to the terms of participation in the study and completed all the survey questions. Data cleaning began with downloading the data from the completed surveys. Inspection of the data files indicated some missing answers among the surveys started and after deleting incomplete surveys, 161 completed surveys remained to include only completed surveys in the data analysis, which was sufficient to meet the minimum sample size of 128. Twenty-three incomplete surveys were deleted. Data cleaning also included ensuring answers to the demographic questions were consistent with the eligibility criteria.

Study Results

The study results include the descriptions of the sample, or sample demographics. The descriptive statistics include an assessment of assumptions pertaining to the data. The report of results continues with the hypotheses testing to determine the answers to the research questions.

Sample Demographics

There were 161 respondents who consented to the terms of participation in the study and who completed all the survey questions. The mean age of the sample was 55 years of age, with an age range of 23 through 82. As shown in Table 1, the sample was 48.1% female and 51.9% male.

Table 1

Frequencies of Gender

	N	% of Total
Female	76	48.1 %
Male	82	51.9 %

As summarized in Table 2, the largest racial group in the sample (39.8%) was Hispanic/Latino, including 30 women and 32 men, followed by 37.9% Black/African American (including 29 women and 22 men) and 20.5% Caucasian (11 women and 22 men). A smaller number of American Indian (one woman), Asian (three women and five men), and other races (two women and one man) comprised the balance of the sample.

Table 2

Frequencies of Race

	N	% of Total
American Indian	1	0.6 %
Asian	8	5.0 %
Black/African American	52	32.3 %
Hispanic/Latino	64	39.8 %
Caucasian	33	20.5 %
Other	3	1.9 %

The largest portion of college graduates were among the Caucasian racial group, with about 19% of the sample having graduated from college, as shown in Table 3. The majority of Hispanic/Latino and Black/African American respondents completed up to a high school diploma or equivalency. Approximately 29% of the sample completed some college (46 respondents).

Table 3

Sample Demographics: Race and Educational Level

Ed. Level	Am. Indian	Asian	Black/African American	Hispanic Latino	Caucasian
College Grad	1 (.6%)	4 (2.5%)	2 (1.25%)	3 (1.9%)	21 (13.1%)
Some College	0 (0%)	4 (2.5%)	19 (11.9%)	16 (10%)	7 (4.4%)
HS/GED or Less	0 (0%)	0 (0%)	31 (19.4%)	45 (28.2%)	5 (3.1%)
Total	1 (.6%)	8 (5%)	52 (32.5%)	64 (40%)	32 (20%)

Approximately 52% of the sample completed an in-office or on-site diabetes education program. As shown in Table 4, 41% of the sample reported they did not complete any kind of diabetes education. One person reported having completed an online diabetes education program.

Table 4

Frequencies of Diabetes Education

Diabetes Education	Am. Indian Other	Asian	Black/Af American	Hispanic/ Latino	Caucasian
In-Office	4 (2.5%)	5 (3.1%)	31 (19.4%)	28 (17.5%)	16 (10%)
No	0 (0%)	3 (1.9%)	17 (10.6%)	34 (21.3%)	17 (10.6%)
Online	0 (0%)	0 (0%)	4 (2.5%)	2 (1.25%)	0 (0%)
Total	4 (2.5%)	8 (5%)	52 (32.5%)	64 (40%)	33 (20.6%)

Research Question 1

What are the relationships between demographic factors (race, age, gender, and educational level), diabetes education, and diabetes distress of adult diabetics in Texas? The null hypothesis was no statistically significant relationships between demographic factors (race, age, gender, and educational level), diabetes education, and diabetes distress of adult diabetics in Texas. Data analysis began with a test of assumptions, starting with normality. A Shapiro-Wilk test for normality confirmed that data for diabetes distress were not normally distributed, as summarized in Table 5. The mean of the sample was 38.3, with a higher score indicative of more diabetes distress. The right skewed data reflected that more respondents rated more problem items as *minor* or *moderate* problems, or *not a problem at all*, rather than more serious problems. A nonparametric test (Spearman's correlation coefficient) applies to data that are not normally distributed and the Spearman test is more appropriate than the Pearson's test for Likert-type data (Schechtman & Shelef, 2018).

Table 5

Diabetes Distress (PAID score) Descriptive Data

	Diabetes Distress
N	161
Missing	0
Mean	38.3
Median	34
Standard deviation	23.5
Shapiro-Wilk W	0.959
Shapiro-Wilk p	< .001

Figure 3 is the histogram for the data for diabetes distress variable, measured by a summated score of the 20 items on the PAID scale. The histogram shows that data are skewed to the right, or positively skewed. The data are not normally distributed. The histogram depicts how the mean of the sample was skewed toward lower, rather than higher, perceptions of diabetes distress. More of the sample considered the issues on the PAID scale either not a problem or a minor problem, rather than serious or somewhat serious problems.

Figure 3

Histogram Diabetes Distress

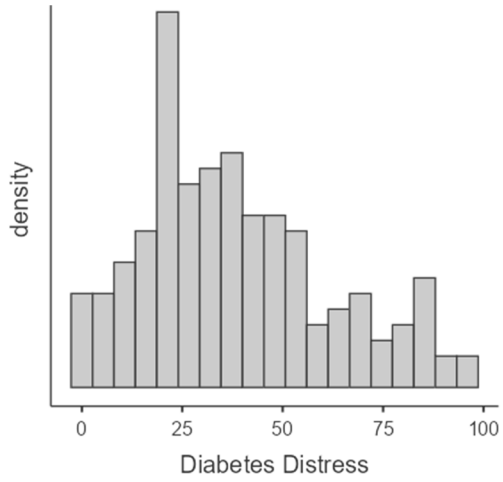
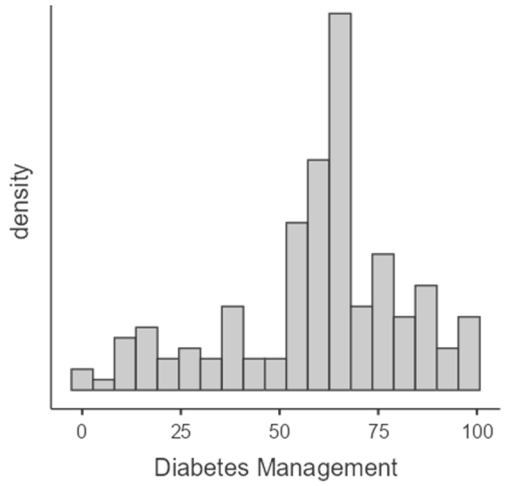


Figure 4 is the histogram for the diabetes management variable. The data were not normally distributed. Data were skewed to the left, or negatively skewed. The left skewed depiction of data reflected the finding that more participants had higher, rather than lower, confidence in their abilities to manage their diabetes, as measured by the DMSES. Data were not normally distributed. Therefore, nonparametric tests were the most appropriate option for the data analysis that followed the tests of assumptions.

Figure 4

Histogram: Diabetes Management



A Shapiro-Wilk test for normality confirmed that the diabetes management data are not normally distributed, as depicted by the histogram and as summarized in Table 6. The mean of the sample is 59.8, which higher than the midpoint of 50. These findings indicate that there were more positive self-ratings of confidence in diabetes management by the participants in the sample. The non-normal right skewed data reflects that more respondents in the study sample rated more problem items as *somewhat* or *fairly confident*, rather not confident or only slightly confident in managing various aspects of their diabetes. Relatively fewer respondents reported that they were either *completely confident* or *not confident at all* in managing the stated aspects of their diabetes. The smallest portion of the sample claimed that they were *not confident at all* in managing their diabetes.

Table 6

Diabetes Management (DMSES Score) Descriptive Data

	Diabetes Management
N	161
Mean	59.8
Median	63
Standard deviation	22.3
Skewness	-0.692
Std. error skewness	0.191
Kurtosis	0.147
Std. error kurtosis	0.380
Shapiro-Wilk W	0.940
Shapiro-Wilk p	< .001

Prior to tests for relationships, measures of central tendency included generating the means and standard deviations for the dependent variables, beginning with diabetes distress. The means and standard deviations for diabetes distress were calculated for the different groups represented in the sample. As shown in Table 7, the highest group mean for Diabetes Distress, as measured by the PAID scale, was the group pf Hispanic/Latino men (M = 47.1). The lowest Diabetes Distress was among the American Indian, college educated female (M = 14), and the group of Caucasian males (M = 26). The largest range of responses was among the Black/African American females (PAID scores ranging from 1 to 96). The overall mean for mean was higher (M = 39.3) for the group of men than for the group of women (M = 37.5). The overall means were higher for all of the men in each race category, expect for the group of Caucasian males, whereas the difference between the diabetes distress of Caucasian males and females was more than

15. The largest difference overall (21.1) was between Caucasian males and Hispanic males, which was statistically significant at the .05 alpha level (p = .048).

Table 7

Diabetes Distress (PAID Score), Race and Gender

Race	Gender	N	Mean	SD	Min	Max
American Indian	F	1	14.0		14	14
Asian	F	3	35.0	18.19	24	56
	M	5	39.0	24.97	20	79
Black African American	F	29	38.4	22.86	1	96
	M	22	41.0	27.01	0	88
Hispanic/ Latino	F	30	33.2	20.31	1	76
	M	32	47.1	24.78	3	95
Caucasian	F	11	41.7	26.32	4	90
	M	22	26.0	15.46	0	58

Table 8 includes the nonparametric ANOVA (Kruskal-Wallis) results with respect to diabetes distress and the categorical variables. The results of the Kruskal-Wallis test revealed that there were no statistically significant relationships among gender, diabetes education, or race. The results were statistically significant at the .05 alpha level for educational level only. Although race was not statistically significant at the .05 alpha level, it is statistically significant at the .10 alpha level (marginal statistical significance). The group of Caucasians has lower diabetes distress scores, compared to other racial categories. ANOVA and Post-hoc tests revealed that Caucasian males.

Table 8

Kruskal-Wallis Test on Diabetes Distress

	χ^2	df	p	ε^2	χ^2
Gender	0.11	1	0.74	7.26e-4	
Diabetes Education	0.03	2	0.99	1.72e-4	0.03
Race	8.12	4	0.08	0.05	8.12
Educational Level	11.1	2	0.004	0.07	11.1

Table 9 includes the measures of central tendency for the diabetes distress, according to educational levels. The mean for college graduates (M = 28.5) was lower than the means for the other two groups. The group reporting some college had the highest mean of diabetes distress scores (M = 44.3).

Table 9

Diabetes Distress, Education Level

	Educational Level	N	Mean	SD	Minimum	Maximum
Diabetes Distress	College	31	28.5	21.7	0	90
	High School GED	84	38.7	24.7	0	96
	Some College	46	44.3	20.4	8	84

Table 10 includes the results of the *Dwass-Steel-Critchlow-Fligner* Post-Hoc test for the statistically significant difference revealed by the Kruskal-Wallis test with respect to diabetes distress and educational level. There was a statistically significant difference between the groups reporting some college and college graduates, p = .002. The group

reporting some college had a significantly higher diabetes distress mean than the group of college graduates.

Table 10

Diabetes Distress, Post-Hoc Test on Educational Level

Educational Level	Educational Level	W	p
College	High School GED	3.14	.07
College	Some College	4.83	.002
High School GED	Some College	2.20	.27

Table 11 includes the results of the nonparametric Spearman correlation coefficient calculations. Spearman was a more appropriate test for correlations because the data were not normally distributed. The results of the Spearman's correlation coefficients were that there was a statistically significant inverse (or negative) relationship between diabetes management and diabetes distress. The statistically significant correlation coefficient between diabetes management and diabetes distress would be considered strong, $rho(159) = -.78$, $p < .01$. As diabetes management increases, diabetes distress decreases. There is also an inverse relationship between diabetes management and age, although not statistically significant at the .05 alpha level. As age increases diabetes management decreases. As age increases, diabetes distress also increases, but the correlation between the two variables was not statistically significant.

Table 11

Correlation, Diabetes Distress (PAID Score) and Diabetes Management (DMSES Score)

		Diabetes Distress	Age
Age	Spearman's rho	0.10	
	p-value	0.19	
Diabetes Management	Spearman's rho	-0.78	-0.08
	p-value	< .01	0.31

Given that data were not normally distributed, which would violate an assumption for linear regression, ordinal regression tests were performed. Logistic regression was also considered which does not require the assumption of normality to be met, but typically requires binary or categorical dependent variables. The VIF and Tolerance were close to or less than one for all variables, indicating no collinearity and the likelihood ratio tests showed data met the assumption of proportional odds. Ordinal regression is a suitable choice for when data are not normal and the dependent variable is derived from a Likert type scale, especially when the scores for the dependent variable data are cumulative (Bürkner & Vuorre, 2019).

Table 12 includes the results of the ordinal regression analysis for the first research question. Results of regression analysis with the criterion variable Diabetes Distress, and the predictor variables revealed that educational level is a statistically significant predictor of diabetes distress (p = .01) between the group with some college and college graduates. As demonstrated with the nonparametric ANOVA tests, the

difference between those with some college and college graduates was statistically significant.

Table 12

Ordinal Regression, Diabetes Distress

Predictor	Estimate	SE	Z	p
Gender				
Male – Female	0.19	0.29	0.66	0.51
Race/Ethnicity:				
Black/African American – Asian	-0.07	0.69	-0.10	0.92
Hispanic/Latino – Asian	0.13	0.68	0.19	0.85
White – Asian	-0.25	0.66	-0.38	0.701
Other – Asian	2.34	1.18	1.99	0.05
Educational Level:				
High School GED – College	0.63	0.51	1.24	0.22
Some College – College	1.24	0.49	2.55	0.01
Diabetes Education:				
Online – In-Office	0.14	0.79	0.18	0.86
No – In-Office	-0.07	0.29	-0.24	0.81

In summary, there is a statistically significant negative relationship between diabetes management and diabetes distress. As demonstrated by ordinal regression and nonparametric ANOVA tests, there was also a statistically significant lower diabetes distress among the group of college educated respondents. Although diabetes distress increased with age, there relationship was not statistically significant at the .05 alpha level. Although the group of Caucasian respondents has lower diabetes distress than the other groups, the results were also not statistically significant at the .05 alpha level. There did not appear to be statistically significant relationships between diabetes distress and diabetes education or between diabetes distress and gender. The results of the ordinal

regression, ANOVA, and Spearman's correlation tests revealed a statistically significant relationship between some but not all of the variables, which is a reason to reject the null hypothesis corresponding to the first research question.

Research Question 2

What is the association between diabetes distress and diabetes management among adult diabetics in Texas, controlled for race, age, gender, educational level and diabetes education? The null hypotheses was that there is no statistically significant association between diabetes distress and diabetes management among adult diabetics in Texas, controlled for race, age, gender, educational level and diabetes education. Statistical tests performed included those that could reveal the nature and extent of any relationship between diabetes distress and diabetes management. Before testing for the relationships between diabetes distress and diabetes management, descriptive statistics were generated for the diabetes management scores.

Table 13 includes the descriptive data for diabetes management, measured by the DMSES instrument, displayed by reported racial group identification and genders of the participants in the sample. The highest mean for diabetes management, which indicates more confidence about managing diabetes, was among the group of Caucasian males (M = 69.9). The lowest mean scores were for the females in the racial group of others (M = 43). However, that group of female others included only two respondents. The females in the Asian, Black/African American, and Hispanic/Latino groups all had higher group means than their male counterparts in the same racial/ethnic groups.

Table 13

Diabetes Management (DMSES Score), Racial and Gender Groups

Gender	Race	N	Mean	SD	Min	Max
Female	American Indian	1	85.0		85	85
	Asian	3	66.0	7.00	61	74
	Black/AA	29	60.9	21.87	1	98
	Hispanic/Latin	30	63.5	20.11	21	98
	Caucasian	11	57.7	26.76	9	97
	Other	2	43	1.41	42	44
Male	Asian	5	52.2	21.05	16	68
	Black/African American	22	55.6	25.94	11	98
	Hispanic/Latin	32	52.2	24.80	2	96
	Caucasian	22	69.9	14.77	39	99
	Other	1	76.0		76	76

As shown in Table 14, when considering the form of diabetes education, the lowest mean score for diabetes management was for the group of respondents (n = 6) who completed the online education program (M = 56.8). The lower mean score for Diabetes Distress was among people with no prior diabetes education (M = 37.5), compared to the group with in-office education (M = 39.1). Similarly, the score for

Diabetes Management was slightly higher for the group without diabetes education (*M* = 60.9) compared to the group with in-office diabetes education (*M* = 58.7).

Table 14

Diabetes Management (DMSES Score) and Diabetes Education

	Diabetes Education	Diabetes Management
Mean	In-Office	59.3
	No	60.6
	Online	56.8
Standard deviation	In-Office	23.9
	No	20.6
	Online	21.6

As shown in Table 15, with respect to educational level, the highest mean score for diabetes management, as measured by the DMSES instrument, was among the group of college educated males (*M* = 68). The lowest score was among those males who reported some college (*M* = 52.1). In both gender groups, the mean diabetes management self-efficacy scores for those who completed some college was lower than the groups who reported completed a high school diploma, high school equivalency, or lower levels of schooling. The scores for college educated males were higher than for college educated females. However, the males in the other two educational groups had lower mean diabetes managements scores than the females in the non-college educated groups.

Table 15

Diabetes Management, Education Level

Gender	Educational Level	Mean	SD	Min	Max
F	College	67.8	23.3	9	97
	HS/GED	60.3	23.6	1	98
	Some College	58.4	18.5	19	92
M	College	68.0	19.5	16	99
	HS/GED	56.9	25.2	2	98
	Some College	52.1	21.7	13	83

The discussion of the first research question included findings of a statistically significant negative correlation between diabetes management and diabetes distress. Although there was a negative correlation between diabetes management and age, whereby increasing age related to decreasing diabetes management, the correlation was not statistically significant, *rho* (159) = -.08, $p = .31$. As shown in Table 16, additional ANOVA tests indicated no statistically significant differences between the diabetes management scores of the groups of gender, race, or diabetes education. There was a statistically significant difference in diabetes management scores based on educational level. The *Dwass-Steel-Critchlow-Fligner* Post-Hoc test for the statistically significant difference revealed by the Kruskal-Wallis nonparametric ANOVA test indicated a statistically significant difference ($p = .007$) between the college graduate group and the group who reported some college at the .05 alpha level.

Table 16

Kruskal-Wallis ANOVA, Diabetes Management

	χ^2	Df	P	ε^2
Gender	0.28	1	0.59	0.01
Diabetes Education	0.29	2	0.86	0.01
Race	3.28	4	0.51	0.02
Educational Level	8.86	2	0.01	0.06

Because data were not normally distributed, there is a violation of a key assumption for linear regression. Therefore, ordinal regression tests were performed. The assumptions were that there is an ordinal level dependent variable with continuous, ordinal, or categorical independent variables, which is the case in this study. The VIF and Tolerance were close to or less than one for all variables, indicating no collinearity and likelihood ratio tests indicated proportional odds, meeting all the required assumptions. Ordinal regression is a suitable choice for when data are not normal and the dependent variable is derived from a Likert type scale, especially when the scores for the dependent variable data are cumulative (Bürkner & Vuorre, 2019).

Table 17 includes the results of ordinal regression analysis for the second research question, which was an appropriate approach to dependent variables that are not normally distributed. The criterion variable in Diabetes Management, with the categorical predictor variables. Results revealed no statistically significant predictors, except for educational level ($p = .01$) and Diabetes Distress ($p < .01$) at the .05 alpha level. The results indicate

that the greatest statistically significant relationship is between Diabetes Management and Diabetes Distress, with less distress associated with better management. Educational level was statistically significant, with the group of college graduates having higher diabetes management scores than the group of participants reporting some college.

Table 17

Ordinal Regression Analysis, Diabetes Management

Predictor	Estimate	SE	Z	P
Diabetes Distress	-0.19	0.28	-0.69	0.49
Gender:				
Male– Female	0.73	0.66	1.11	0.27
Race/Ethnicity:				
Black/African American – Asian	0.45	0.645	0.69	0.49
Hispanic/Latino – Asian	0.69	0.62	1.10	0.27
White – Asian	-0.10	1.19	-0.08	0.94
Other – Asian				
Educational Level:				
High School GED – College	-0.72	0.50	-1.42	0.15
Some College – College	-1.19	0.48	-2.45	0.01
Diabetes Education:				
Online – In-Office	0.02	0.29	0.06	0.95
No – In-Office	-0.19	0.28	-0.69	0.49

Based on the data from the sample in this study, the significant negative correlation between diabetes management and diabetes distress exists when controlled for race, age, gender, educational level, and diabetes education. Based on the results of the statistical tests, there is justification to reject the second null hypothesis. There is a statistically significant association between diabetes distress and diabetes management among adult diabetics in Texas, controlled for race, age, gender, educational level and diabetes education.

Summary

In summary, there are justifications for rejecting the two null hypotheses, based on the results of the statistical tests performed on data collected from 161 diabetics in Texas. There was a statistically significant difference in diabetes management and diabetes distress scores based on educational level. Post-hoc tests indicated a statistically significant difference between the college graduate group and the group who reported some college at the .05 alpha level. There is a statistically significant negative relationship between diabetes management and diabetes distress. Chapter 5 contains a discussion of these results in light of the theoretical framework and compared to prior research findings, leading to recommendations based on study findings and suggestions for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

Chapter 5 includes a discussion of the answers to the two main research questions, considering the theoretical framework and prior peer-reviewed research findings. Discussions lead to the recommendations based on study findings and suggestions for future research. Also addressed are the limitations of the research and final conclusions to the study.

Interpretation of Findings

The following subsections include a discussion of the findings, in comparison to the theoretical framework and prior research results. The discussion begins with findings pertaining to the first research question, interpreted in light of the relevant aspects of the TRA framework and previously published study results. The interpretation of findings continues with an address of the results that led to the rejection of the second null hypotheses and which helped to answer the second research question.

Research Question 1

The results of the statistical tests revealed a statistically significant negative relationship between diabetes management and diabetes distress. Blood sugar control depends on the ability to administer insulin or oral hypoglycemic medication and manage lifestyle, including nutritional choices and physical exercise, among other daily activities required to manage diabetes (Messina et al., 2018). Being highly self-efficacious is a recognized factor in the successful management of chronic disease (Brands & Custers, 2017; Dallolio et al., 2018). This study revealed that the self-efficacy reflected in the dimensions of diabetes self-management was related to lower diabetes distress. As

diabetes management increases, diabetes distress decreases, which is a finding consistent with the expectations advanced by prior research.

There was a statistically significant lower diabetes distress among the group of college educated respondents in this study. What has been known for decades is that patients consider managing self-care activities among the most difficult aspects of their diabetes diagnoses (Messina et al., 2018). It could be construed that college graduates may feel a greater self-efficacy regarding the burden of treatment and management and self-care behaviors, which Young-Hyman et al. (2016) noted was necessary for optimal diabetes management. The concept of self-efficacy originated from social learning theory and pertains to the idea that individuals have varying degrees of beliefs in their capacities to organize and execute actions necessary for success in prospective situations (Bandura, 1998). Completing a college education might be related to the greater self-efficacy also associated with higher diabetes self-management.

Although diabetes distress increased with age, there relationship was not statistically significant at the .05 alpha level. Although the group of Caucasian respondents has lower diabetes distress than the other groups, the results were also not statistically significant at the .05 alpha level; however, there were statistically significant at the .10 level. Prior researchers did conclude that there is a need for culturally appropriate psychosocial support resources for distress coping, such as gender-stratified support groups and groups for different age groups (Hood et al., 2018). The finding in this study further support the justification for such appropriate psychosocial support resources for distress coping.

There did not appear to be statistically significant relationships between diabetes distress and gender. Regarding gender research of diabetes mellitus, Zowgar et al. (2018) identified the underrepresentation of some groups (such as non-Hispanic Black men) in health research as a barrier. Langford et al. (2017) postulated that lack of representation may be due to lack of awareness and disparities in offering research opportunities, lack of knowledge, and a misconception or distrust of the research process. This study was an effort to include a representation of both racial and gender groups in diabetes research. Lee et al. (2019) discussed conflicting information from healthcare providers and diabetes research pertaining to gender and race, which efforts such as this study help to address.

There did not appear to be statistically significant relationships between diabetes distress and diabetes education. Self-efficacy as it pertains to one's own perceptions about capabilities in self-managing health should are important considerations of health care providers, especially when dealing with chronic illnesses and efforts to help educate patients can help improve efficacy (Messina et al., 2018). With regard to study findings, there was not a way to assess the duration, frequency, quality, or extent of the diabetes education received or what respondents might have learned in the diabetes education experiences. Accordingly, findings from this study should be interpreted with those limitations in mind. Furthermore, although prior studies revealed that better diabetes knowledge improves overall diabetes patient outcomes (Yeh et al., 2018), including among different racial groups (Moyeda-Carabaza et al., 2020), these authors did not

account for diabetes distress. While diabetes education may be effective in improving diabetes-related factors, the impact on diabetes stress may not be the same.

Furthermore, Kusnanto et al. (2017) utilized the principles of the Fishbein and Azjen (1975) TRA theory, indicating that failures to manage diabetes, which in this study, related positively to diabetes distress, could be attributable to a lack of motivation, memory, or intention. Memory, motivation, and intention were not factors accounted for in this study, nor was it possible to determine, using the study design, if they were addressed in diabetes education programs. However, Zeidi et al. (2020) also attempted to evaluate the efficacy of an intervention based on Fishbein and Azjen's theory of planned behavior for improving foot care in patients with T2DM and noted the role of education in the improved outcomes for diabetics in their study in general. Considering other factors from the TRA framework could reveal more information about how educational in general and diabetes education specifically might have a role in diabetes distress.

Research Question 2

The significant negative correlation between diabetes management and diabetes distress existed when controlled for race, age, gender, educational level, and diabetes education. Based on the results of the statistical tests, there is justification to reject the second null hypothesis. The TRA framework situates behaviors as functions of intentions influenced by attitudes, subjective norms, and control (perceived ability, including skill and resources, to enact in an intended way); the three components are fundamentally determined by dispositions, demographics, and quality of information available to the individual (Fishbein & Ajzen, 1977; Nisson & Earl, 2020). In this study, educational

level was a significant factor in both diabetes distress and diabetes management. However, distress increased as management decreased, regardless of educational level and other demographic factors.

Accordingly, there may be other beliefs and attitudes that affect perceived control that influence intentions and behaviors with respect to diabetes management which directly negatively relates to diabetes distress. Being highly self-efficacious is a recognized factor in the successful management of chronic disease (Brands & Custers, 2017; Dallolio et al., 2018) and it is possible that patients' attitudes and subjective norms influence therapeutic and self-efficacy (Kusnanto et al, 2017; Yang et al., 2018). Additional influencers on diabetes management confidence and behaviors which could be considerations include intentions to perform behaviors, one's health and levels of good feelings in general, and support from close family members (Ghaffi et al., 20220), which may affect self-efficacy. Patients may also experience fatalistic attitudes with religious beliefs that undermine confidence that control is in the patients' hands (Al-Sahouri et al., 2019).

Previous researchers also showed that patients' attitudes and subjective norms influence adherence and compliance to managing the disease so that therapeutic efficacy can be achieved (Kusnanto et al, 2017; Yang et al., 2018). However, these researchers did not address the potential for the relationship of diabetes management and distress. It was apparent from the results of this study that a perceived lack of confidence in diabetes management related to an increase in distress. As the TRA connects an individual's intentions to perform a behavior (such as taking prescribed medications or exercising to

manage their diabetic better) and then actually performing the said action, regardless of emotions; however, it was possible for the acts of management to lead to distress. The results of this study did not support the idea that management leads to or exacerbates distress; instead, better perceived confidence to manage diabetes correlated strongly with reduced diabetes distress, as measured by the PAID scale.

Limitations

Although the sample size exceeded the minimum required for the parameters set for the study, a limitation of this study was its generalizability. Because the research population were adult diabetics living in Texas, who responded to invitations through social media site, the results may not be generalizable to diabetics living elsewhere who did not access social media sites. The cross-sectional design led to findings based on data collected at a single point in time and did not represent changes, historical, or longitudinal findings. It was also not possible to examine every possible factor that may contribute to diabetes distress. Due to the cross-sectional nature of this study, it was not possible to establish causation. The limitations included focus on a narrow set of demographics, educational, and management factors implicated as possibly related to diabetes distress.

Recommendations

Recommendations as a result of this research pertain to future actions of leaders, practitioners, and scholars. The next subsections include recommendations for leaders and practitioners, based on the results of the study. Suggestions for scholars include

addressing the need for future research, based on the results and limitations of this and other studies.

Recommendations for Leaders

The results of this study were consistent with the idea that being highly self-efficacious is a recognized factor in the successful management of chronic disease. Hence, steps to enhance the self-efficacy with respect to the dimensions of diabetes self-management are likely to help reduce diabetes distress. Recommendations from this study include improving efforts to address the need for culturally appropriate psychosocial support resources for distress coping, such as gender-stratified support groups and groups for different age groups. Self-efficacy as it pertains to patients' perceptions about their capabilities in self-managing health should are important considerations of health care providers, especially when dealing with chronic illnesses. Ongoing efforts should continue and improve to help educate patients about how to improve diabetes management efficacy.

Although there did not appear to be statistically significant relationships between diabetes distress and gender as well as race at the .05 alpha level, a continuing lack of representation of some groups in research (such as Pacific Islanders and Native Americans in this study) may be due to lack of awareness and disparities in recruiting particular populations into research opportunities, lack of knowledge, and a misconception or distrust of the research process. This study was an effort to include a representation of both racial and gender groups in diabetes research, but those efforts

could be improved to widen research participation to additional underrepresented populations.

Suggestions for Future Research

There was a statistically significant difference in diabetes management and diabetes distress scores based on educational levels, specifically between the college graduate group and the group who reported some college at the .05 alpha level. In this study, college graduates were grouped as a whole, and it was not possible to determine the nature of the influence of education on diabetes distress and management. Educational level can approximate socioeconomic status; however, such an approximation may be threatening to construct validity because education level alone is generally not an excellent approximation of an individual's socioeconomic status. It may be more appropriate in future studies to include a better assessment of socioeconomic status as a possible predictor of diabetes management or distress.

The predominate racial groups represented in the study were Hispanic/Latino, Black/African American, and Caucasians. There were too few American Indian/Pacific Islanders and groups of others to be able to adequately account for the possible association of race with diabetes distress and management among the underrepresented racial/ethnic groups. Accordingly, future studies that focus on these underrepresented groups may be more revealing of possible diabetes-related statistical associations (quantitative research) and real-lived experiences (qualitative research).

Diabetes education could be better explained in terms of the nature and type of diabetes education. In this study, there was an expectation that more respondents would

have reported some type of online diabetes education. However, that was not the case. Instead, the number of people who did and did not complete an in-office or on-site diabetes education comprised most of the sample. There was no way to determine the quality, content, and outcomes of the diabetes education reported by respondents. Thus, to better understand diabetes education in general, future research could encompass a focus on the types of diabetes education experienced by different diabetics in various in-office and on-site settings. This research could include outcomes of various interventions and their possible relationships to the problems leading to distress and the confidence underlying effective diabetes management.

There was a relationship between age and diabetes distress, as well as diabetes management, although not statistically significant at the .05 alpha level. It is possible that with increasing age, there is increasing distress and less confidence in managing the disease. There may be factors that coincide with increasing age that the TRA framework also accounted for, such as memory, comorbidity, and resource support. Estimates are that half of older diabetics are or will be cognitively impaired, which affects memory, attention to details, planning and reasoning abilities, decision-making, and information processing required for optimal diabetes management (Hopkins et al., 2016). Diabetics over age 60 also need an increased focus on strength-based activities to reduce functional disability risks; the study of special needs in the aging diabetic population can offer more insights into comorbidity and needs for special resources, cognitive, and physical support (Tomic et al., 2022). Self-efficacy among the elderly population may be an area of future

diabetes study, to be able to design more effective programs for an increasingly large aging population.

Social Change Implications

This research has positive social implications for significant stakeholders (including diabetic patients, relatives, caregivers, and clinicians) concerned about diabetes distress, which could impact diabetes control, management, and complications. It is a hope that such enhanced understanding can lead to improved programs for the care and management of diabetes and its related conditions, such as diabetes distress. Positive implications include the ability to understand some of the psychosocial and emotional aspects of diabetes, to design appropriate interventions that might help prevent longer-term complications of the disease, such as heart diseases. The results of this study can lead to improved knowledge about care and management of diabetes and its related conditions, such as diabetes distress. The ability to understand the psychosocial of diabetes could help to design and improve appropriate interventions to prevent longer-term complications of the disease.

Conclusions

This chapter included a discussion of the results of the study, the limitations, and recommendations for leaders, practitioners, and scholars. This research resulted in useful knowledge for significant stakeholders (diabetic patients, relatives, caregivers, and clinicians) concerned about diabetes distress, which could impact diabetes control, management, and complications. Understanding diabetes distress and diabetes

management could help to design appropriate interventions that might help prevent longer-term complications of the disease.

This study contribute to narrow the gap in the literature regarding diabetes distress and diabetes management among diabetic adults in Texas. The study contributed to diabetes studies about prevention and awareness through increased knowledge. There were explorations of the understudied issues of race, gender, confidence, and education, mainly from the perspective of diabetes distress and management. This research culminated in empirical evidence that represents potentially useful knowledge for significant stakeholders (diabetic patients, relatives, caregivers, and clinicians) concerned about diabetes distress, which could impact diabetes control, management, and complications.

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Appendix A: Invitation Flyer

Online Survey Study Seeks Participants:

Predictors of Diabetes Distress Among Adults Living in Texas

There is a new study called *"*Predictors of Diabetes Distress Among Adults Living in Texas**"** that could help leader better understand the possible relationships between demographic factors (race, age, gender, and educational level), diabetes education, diabetes management and diabetes distress of adult diabetics in Texas.

For this study, you are invited to describe your own experiences with diabetes by answering questions on an anonymous online survey.

This survey is part of the doctoral study for Jenny Ogadi, a PhD student at Walden University undertaking a Doctor of Philosophy (PhD) program in Public Health.

About the study:

- One 10-30 minute online survey
- To protect your privacy, no names will be collected

Volunteers must meet these requirements:

- 18 years old or older
- A diagnosis of Diabetes, Type 1 or Type 2
- Living in Texas and Fluent in English

To confidentially volunteer, click the following link:
[insert survey link]

Appendix B:

Informed Consent
CONSENT FORM

You are invited to take part in a research study about Predictors of Diabetes Distress Among Adults Living in Texas. The researcher is inviting Adult Diabetics living in Texas to be in the study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Jenny Ogadi, who is a PhD student at Walden University. ____

Background Information:
The purpose of this study is to to examine the possible relationships between demographic factors (race, age, gender, and educational level), diabetes education, diabetes management and diabetes distress of adult diabetics in Texas.

Procedures:
This study involves the following steps:
Click to the survey link provided on the invitation flyer.
Consent to the informed consent terms by electronically checking the designated "I consent" box.
Answer the survey questions.

Here are some sample questions:

Circle the number that gives the best answer for you:
0 Not a problem 1 Minor Problem 2 Moderate Problem
3 Somewhat serious problem 4 Serious Problem 5 Prefer Not to Answer

Feeling unsatisfied with your diabetes physician?
Feeling that your friends and family are not supportive of your diabetes management efforts? Feeling "burned out" by the constant effort needed to manage diabetes?

Voluntary Nature of the Study:
Research should only be done with those who freely volunteer. So everyone involved will respect your decision to join or not. You will be treated the same whether or not you join the study. If you decide to join the study now, you can still change your mind later. You may stop at any time. The researcher seeks 128 volunteers for this study.

Risks and Benefits of Being in the Study:
Being in this study could involve some risk of the minor discomforts that can be encountered in daily life, such as answering questions about distress. With the protections in place, this study would pose minimal risk to your wellbeing.

This study offers no direct benefits to individual volunteers. The aim of this study is to benefit society by enhanced understanding will lead to improved knowledge about disparities, care, and management of diabetes and its related conditions, such as diabetes distress.

Payment:
None.

Privacy:
The researcher is required to protect your privacy. Your identity will be kept anonymous, within the limits of the law. The researcher Jenny Ogadi, will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. If the researcher were to share this dataset with another researcher in the future, the researcher is required to remove all names and identifying details before sharing; this would not involve another round of obtaining informed consent. Data will be kept secure storage in a password protected computer. Data will be kept for a period of at least 5 years, as required by the university.

Contacts and Questions:
You can ask questions of the researcher by calling xxxxxxxxxxx. If you want to talk privately about your rights as a participant or any negative parts of the study, you can call Walden University's Research Participant Advocate at xxxxxxxxxx. Walden University's approval number for this study is **IRB will enter approval number here** and it expires on **IRB will enter expiration date.**

You might wish to retain this consent form for your records. You may ask the researcher or Walden University for a copy at any time using the contact info above.

Obtaining Your Consent

If you feel you understand the study and wish to volunteer, please indicate your consent by clicking on "I consent" in the box at the bottom of the screen.

Appendix C: PAID Scale (Diabetes Distress)

INSTRUCTIONS: Which of the following diabetes issues are currently a problem for you? Circle the number that gives the best answer for you. Please provide an answer for each question. Please bring the completed form with you to your next consultation where it will form the basis for a dialogue about how you are coping with your diabetes

0 Not a problem
1 Minor Problem
2 Moderate Problem
3 Somewhat serious problem
4 Serious Problem
5 Prefer Not to Answer

1. Not having clear and concrete goals for your diabetes care?
2. Feeling discouraged with your diabetes treatment plan?
3. Feeling scared when you think about living with diabetes?
4. Uncomfortable social situations related to your diabetes care (e.g., people telling you what to eat)?
5. Feelings of deprivation regarding food and meals?
6. Feeling depressed when you think about living with diabetes?
7. Not knowing if your mood or feelings are related to your diabetes?
8. Feeling overwhelmed by your diabetes?
9. Worrying about low blood sugar reactions?
10. Feeling angry when you think about living with diabetes?
11. Feeling constantly concerned about food and eating?
12. Worrying about the future and the possibility of serious complications?
13. Feelings of guilt or anxiety when you get off track with your diabetes management?
14. Not “accepting” your diabetes?
15. Feeling unsatisfi ed with your diabetes physician?
16. Feeling that diabetes is taking up too much of your mental and physical energy every day?
17. Feeling alone with your diabetes?
18. Feeling that your friends and family are not supportive of your diabetes management efforts?
19. Coping with complications of diabetes?
20. Feeling “burned out” by the constant effort needed to manage diabetes

Adapted from DAWN Interactive 2.
Text by Frank Snoek and Garry Welch.

Initial Version of DMSES scale (English-UK) (Diabetes Management)

	I am confident that
1	I am able to check my blood/urine sugar if necessary
2	I am able to correct my blood sugar when the sugar level is too high
3	I am able to correct my blood sugar when the blood sugar level is too low
4	I am able to choose the correct food
5	I am able to choose different foods and stick to a healthy eating pattern
6	I am able to keep my weight under control
7	I am able to examine my feet for cuts
8	I am able to take enough exercise, for example, walking the dog or riding a bicycle
9	I am able to adjust my eating plan when ill
10	I am able to follow a healthy eating pattern most of the time
11	I am able to take more exercise if the doctor advises me to
12	When taking more exercise I am able to adjust my eating plan
13	I am able to follow a healthy eating pattern when I am away from home
14	I am able to adjust my eating plan when I am away from home
15	I am able to follow a healthy eating pattern when I am on holiday
16	I am able to follow a healthy eating pattern when I am eating out or at a party
17	I am able to adjust my eating plan when I am feeling stressed or anxious
18	I am able to visit my doctor once a year to monitor my diabetes
19	I am able to take my medication as prescribed
20	I am able to adjust my medication when I am ill

Demographic Questions

Age:
Gender: M/F/Other
Race (Choose All that Apply): Black, Latino/Hispanic, Asian, Pacific Islander/Native American, Caucasian, Other.
Educational Level: (Choose One): Less than 12th Grade, HS Diploma/GED, Some College, Associates Degree, Bachelor's Degree, Graduate Degree.
Type of Diabetes Education: None, In-Office, Online.
Servings of Carbohydrates per day:
Servings of Sugared Beverages per day:
Exercise: Daily, 4-6 times per week, 2-3 times per week, less than 1 tim