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Race, Gender, and Retention in a Diabetes Self-Management Program

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2018

Abstract

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Marcia K. Bygrave

MSHA, Houston Baptist University, 2004

BSHRM, Faulkner University, 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Diabetes has quickly become an epidemic in the United States and affects all genders and races. Some ethnic groups are at greater risk for being diagnosed and face devastating health consequences due to poor diabetes self-management. Diabetes self-management education (DSME) is considered to be a positive step toward patient self-efficacy and diabetes management. The benefits of diabetes self-management education can only be realized if patients diagnosed with diabetes not only enroll, but complete the program. The purpose of this research study was to investigate the association between race and gender and dropout rates among participants enrolled in a DSME program. Archival data from a DSME were collected for 352 participants enrolled in the program. A multiple logistic regression was used to analyze whether independent variables of race and gender were predictors of dropout rates. Chi-square was used to explore if there was an association between race and gender and drop-out rates. Results revealed that there was no statistically significant association between race and gender and dropout rates from participants in a DSME program. Positive implications for social change include exploring the reasons participants choose to drop-out of a DSME program and potentially identify those at risk for droppoing out due to challenges and barriers.

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Dedication

No one is able to accomplish anything without the support and love of others. This experience has been humbling and has taught me about perseverance, persistence and the power of prayer. None of this would have been possible without the help of God, my Heavenly Father. Many days I asked for wisdom from God, and He always supplied more than enough. I dedicate this dissertation to one of God's gift to me, my wonderful husband, Marc Bygrave, who has loved and supported me through every step of this process. I want to thank my husband for praying with me when I felt like I wanted to give up and always praying for me. I also want to dedicate this dissertation to my mom, Cora Brooks. I am forever grateful for her love and support through this process. My mom always taught me the value of education and continues to be an example of the mom I one day aspire to be. A big thanks to my aunts, Helen and Janie Spencer, who are examples of strong women in my life and my late aunt Willie Barnes who always believed in me. To my awesome uncle, William Spencer for his love and support, and to my sister, Regina Miller for her encouragement and motivation. And to my awesome in-laws, Norman and Dorothy Foster. Your daily prayers and encouragement during this journey are so appreciated. Thank you for speaking God's word over my life. And last, but not least, to my late father-in-law, Daddy Bygrave. Although you are not here on earth to see this completed, you are here in spirit, in our hearts and you are truly missed. Thanks family for standing by me. You are truly a blessing.

Acknowledgement

I would like to thank the entire staff at Walden University for your support during this journey. I would also like to thank Dr. Kennedy for providing excellent feedback througout this process and my committee member, Dr. Rohrer for providing support and guidance. Thanks to both of you for your assistance and individual expertise. This has been both a learning and a most humbling experience.

Table of Contents

List of Tables

Chapter 1: Introduction to the Study

Introduction

Diabetes is estimated to affect as much as 33% of the population by 2050 (Chomko, Odegard, & Evert, 2016). According to Beckles and Chou (2016) the prevalence of diabetes has been on the rise since the 1990s. Although diabetes affects all ethnicities, African Americans, Hispanics, and the uneducated are among the highest populations affected (Beckles & Chou, 2016).

As diabetes has become an epidemic in the African American community, affecting African American women at an alarming rate, more research has been conducted on this population. As mentioned before, diabetes affects all nationalities, but some populations are more vulnerable to this disease. An abundance of literature is available on the prevalence of diabetes in African Americans, African American women, and Hispanics.

Diabetes self-management education is an integral part of decreasing the prevalence of diabetes in all populations. Although diabetes education centers document when participants choose to drop out of the program, it is of great importance to understand why participants drop out (Gucciardi, 2008). The purpose of this study was to examine the association between race, gender, and dropout rates from a diabetes self-management education program. The study population was adults 18 and older and diagnosed with Type 2 diabetes.

This study has the potential to promote social change by exploring the reasons participants of a diabetes self-management education program would choose to drop out. This study has the potential of identifying those at risk for dropping out due to challenges and barriers. Because factors for dropout may be identified there is a potential to develop strategies that consider individual and cultural needs that motivate participants to adhere to and complete diabetes education.

In this chapter, I will present an introduction to the study. This chapter includes an overview of the background, purpose of the study, cites theoretical frameworks that I used in the study, and research questions and hypotheses that I addressed in the study. I will also discuss the nature of the study, operational definitions, assumptions, and scope and delimitations of the study.

Background

Diabetes is a disease that can affect people of any ethnic and economic background, but unfortunately, African Americans are disproportionately burdened especially due to complications (Skelly et al., 2006). There are several factors that are thought to affect or contribute to the increasing incidence of diabetes. Factors such as lack of or little engagement in physical activity, poor eating habits, being obese, and family history are associated with this epidemic (Gill & Cooper, 2008).

A diabetes diagnosis affects health behaviors in different ethnic groups and translating the impact of a diabetes diagnosis is key to developing and implementing effective intervention programs (Okosum et al., 2003). The most beneficial programs

address diabetes from a theoretical and cultural perspective. Barriers to underutilized intervention programs are well known, but the importance in addressing cultural differences in at-risk populations is applied in theory rather than practice (Hughes, Love, Peabody, & Kardong-Edgren, 2001). Intervention programs that support people with diabetes are numerous, but African American women are less likely to use the services (Hughes et al., 2001).

Besides developing programs that address cultural differences, identifying readiness to change in at-risk populations may increase the impact of the delivery of intervention programs and how educational programs are received (Blue & Black, 2008). For example, "one size" programs developed for people with diabetes in a group setting may be ineffective for prevention programs focused on increasing physical activity in Type 2 diabetics (Gill & Cooper, 2008). Diabetes self-management education programs are structured to provide content that is all-inclusive. Although content in these programs may provide valuable information to increase diabetes knowledge, self-management and behavior change, the programs are not structured to meet the individual needs of at-risk populations (Skelly, Leeman, Carlson, Soward & Burns, 2008).

Participants choosing to drop out of diabetes education due to challenges and barriers is a real problem, but limited literature is available on factors associated or what influences individuals to drop out. Available study data is unclear regarding what influences individuals to drop out of a diabetes education program and most findings are

not consistent (Gucciardi, De Melo, Offenheim, Grace, & Stewart, 2007), which shows a need for further study.

Problem Statement

Diabetes is of particular concern for African Americans. Skelly, Leeman, Carlson, Soward, and Burns (2008) stated that more than 2.5 million African Americans adults over the age of 20 have diabetes. Chow, Foster, Gonzalez, and McIver (2012) documented that 4.9 million or 18.7% of African American adults ages 20 and older are unaware that they have diabetes. Moreover, African Americans are at a higher risk of developing complications normally seen in unmanaged diabetes such as retinopathy, kidney failure, and amputations (Skelly et al., 2008).

Most literature on this topic area specifically addresses interventions to improve diabetes management as it relates to increased knowledge, attitudes, and behaviors. Tang, Funnell, and Anderson (2006), suggested that diabetes self-management education (DSME) is the framework component of diabetes care. Although diabetes self-management programs are beneficial to individuals diagnosed with diabetes and those at risk for developing the disease, participants who choose not to attend or who choose to leave the program early do not receive the benefits that DSME programs offer (Gucciardi, 2008), and true benefits are not realized. Gucciardi, DeMelo, Grace, and Stewart (2007) suggested that poor self-management behavior and negative health outcomes are associated with participants failing to complete a diabetes education

program. Of the limited studies that examined dropout rates, identifying why and what prompts early dropout is still not clear. Therefore, it remains a gap in literature that examines whether race and gender are associated with drop-out rates from a diabetes self-management program.

The drop-out rate is of particular concern because participants do not get the full benefits of diabetes knowledge or skills for self-management of their diabetes and ultimately diabetics put themselves at risk for blood sugar problems and hospital admissions due to complications (Gucciardi, 2008). Eakin, Bull, Glasgow and Mason; Glasgow, Eakin & Toobert (as cited Whittemore, Melkus and Grey, 2004) suggests that Caucasian consumers are more likely to take advantage of programs aimed at diabetes education, yet diabetes is more likely to be prevalent in African Americans, especially African American women.

The American Heart Association suggests that although African American women are at a higher risk of developing diabetes, this ethnic group is either unaware, misinformed, or had received inaccurate information that leaves them open to higher death rates and they are less likely to adopt a healthy lifestyle change (Gaston, Porter, & Thomas, 2007). A study conducted by Wierenga and Wuethrich compared the health beliefs and drop-out rates of African Americans and Caucasians enrolled in a diabetes education program. Thirty-three percent of African Americans dropped of the program as compared to 10% of Caucasians. The study found that African Americans were less likely to follow a diet and exercise regimen as compared to Caucasians, but Caucasians

reported following a medication regimen as a barrier. The final results of this comparative study found that African Americans who did not complete the program likely did not see the benefits of a diabetes education program. This study highlights the need for program strategies that address diet and exercise beliefs related to cultural beliefs.

Purpose of the Study

The purpose of this quantitative, retrospective study was to investigate the association between race and gender and dropout rates among participants enrolled in a diabetes self-management education program. I explored whether drop-out rates for African Americans are higher than other races and whether women have higher drop-out rates than men. The independent variable in this study were race and gender. The dependent variable was the dropout rates from a diabetes self-management education program. Covariates included age, weight, education, A1C values, insulin use, employment status, marital status, and insurance status.

Research Questions

Is there an association between race and dropout rates from participants in a diabetes self-management education program?

$H_0$1: There is no association between race and dropout rates from participants in a diabetes self-management education program.

H_a1: There is an association between race and dropout rates from participants in a diabetes self-management education program.

Is there an association between gender and dropout out rates from participants in a diabetes self-management education program?

$H_0$2: There is no association between gender and dropout rates from participants in a diabetes self-management education program.

H_a2: There is an association between gender and dropout rates from participants in a diabetes self-management education program.

Theoretical Framework

The transtheoretical model (TTM) was developed by Prochaska and DiClemente to combine principles and processes of change. The TTM is usually helpful with individuals who are just beginning to change a behavior and do not follow the advice of a physician, those not likely to follow a treament regimen, and those who may not be looking to change a behavior. The TTM of behavioral change has been considered a useful framework for helping patients with diabetes move through the stages of change (Andres, Gomez, & Saldana, 2008). Tailoring programs in accordance to the TTM model would mean developing programs that take in consideration an individual's readiness to change. The TTM suggests that matching a person with where they are in the stages of change may facilitate progressive behavioral change (Mhurchu, Margetts, & Speller, 1997). According to Ruggiero (2000), research shows that interventions based on a person's readiness to change potentially have a better success rate than a one size fits all approach.

The TTM suggests that individuals do not experience a sudden change in behavior, but progress through five stages of change. Therefore, the impact of participating in a diabetes self-management education program, may be related to the stage at which the individual starts (Jackson, Asimakopoulou, & Scammell, 2007). People with diabetes are bombarded with the need to change behaviors related to nutrition, physical exercise, and overall self-management of the disease. Considering the difficulty that many individuals diagnosed with diabetes find in making these changes, patients may not be able to readily see the impact of change and therefore be at different stages (Gambling & Long, 2006).

The objective of diabetes education is to help patients move to a level of diabetes management where they are confident in performing multiple self-care tasks and able to manage their diabetes independently. Studies suggest that people with diabetes may have difficulties performing these new routines all at once (Mishali, Omer, & Heymann, 2011). A diabetes diagnosis means not only coming to terms with the disease, but a lifestyle change. Most people are comfortable taking medications, so insulin injections, medication, and blood sugar monitoring compliance may not be as challenging for the patient as deciding to eat healthier or exercise (Mishali et al., 2011). For this reason, Bandura (as cited by Syx, 2008) stated that, in order for a person to be confident in self-management tasks, there must be a holistic view of their lifestyle and environment, including a specific, strategic plan.

The concept of self-efficacy is based on the social cognitive theory, which describes the interaction between behavioral, personal, and environmental factors in health and chronic disease (Sarkar, Fisher & Schillinger, 2006). Self-efficacy is a term that describes an individual's belief in their ability to perform health behaviors will influence which behavior they choose to engage in (Sarkar et al., 2006). Confidence in performing self-management tasks may determine if a person remains motivated even after the level of expectation in performing that task is reached or fails (Mishali, Omer, & Heymann, 2011). An individual's belief in their ability manage their health will either push a person toward positive behavioral change or toward behaviors that produce negative outcomes (Mishali et al., 2011). Bandura's social cognitive theory (SCT), was developed as the foundation for the self-efficacy theory and is related to an individual's readiness to change a behavior (Ounpuu, Woolcott, & Tossi, 1999). Diabetes self-management is a combination of personal, environmental, and behavioral factors, which makes the concept of self-efficacy an important part of improving self-management skills (Sarkar et al., 2006). A person's belief in their capacity to perform or change health behaviors has been shown to be a predictor of movement through the stages of behavioral change (Ounpuu et al., 1999).

Nature of the Study

My study was a retrospective analysis of program data collected from a diabetes and nutrition center. I used a retrospective, quantitative study design to analyze the relationship between the independent variables (race and gender) and dependent variable

(dropout rates) of enrollees of a diabetes self-management education program. Data were analyzed using multiple logistic regression. According to Campbell (2004), analyzing data using multiple logistic regression allows researchers to predict outcomes or explain the relationship between the independent and dependent variables.

Data were collected from the diabetes center registrar database and educator documentation. Using a retrospective study design allows the researcher the advantage of conducting a study over a longer period of time and with a larger participant pool. Additionally, retrospective study designs are cost-efficient, and information may be gathered that provides answers to questions if decisions need to be made when time is of the essence (Abbott, Barton, Terhorst & Shembel, 2016).

Quantitative data allows the researcher to understand how specific variables will affect the outcome (Creswell, 2009). Data were collected from a convenience sample of participants referred by their physician to the program. Data collected using a convenience sample cannot be generalized to other populations but may be useful in studying areas where there is no information or a gap in the literature (Shields & Twycross, 2008).

Operational Definitions

For the purposes of this study, I used the following definitions:

African American: Having roots in of the groups of Africa. Self-identifying as Black, African American or Negro (Centers for Disease Control and Prevention, 2015).

Blood glucose: Known as a sugar that provides the human body with energy (Gebel, 2011). Healthcare professionals can use blood glucose levels to assess compliance to diabetes management and regimens and to identify any treatment changes. Blood glucose can be monitored by blood tests for HbA1c levels and monitoring through self-management (Holt, 2014).

Culture: Related to a group's beliefs, values, actions and language (Alexander, Uz, Hinton, Williams & Jones, 2008). Culture can influence how diabetics manage their diabetes (Akohoue, Patel, Adkerson, & Rothman, 2015).

Diabetes: The inability to or insufficiency of producing insulin by the pancreas (Nazarko, 2011). According to the World Health Organization (WHO), Type 2 diabetes continues to affect a majority of people. Blood tests for HbA1c levels is usually performed to diagnose diabetes (Mayo, 2016).

Diabetes Self-Management: Increase competence and confidence in self-monitoring and tracking of diabetes (Hunt, Sanderson & Ellison, 2014). Diabetes Self-management is a significant part of controlling blood glucose levels. Management is not just about completing a daily regimen, but the diabetic should understand each activity is associated with lower HbA1c levels and lower risk of complications related to non-

compliance (Ruggiero et al., 1997). Lower blood glucose levels are especially relevant when the goal is to prevent complications that affect an individual's quality of life (Schmitt et al., 2016).

Obesity: Characterized as a BMI greater than 30 (Eckel, et al., 2011). BMI and diabetes screening is recommended by Healthy People 2020 to be performed by all primary care physician offices for all adult patients. A BMI >29.9 is considered overweight and therefore is at increased risk of Type 2 diabetes (Franklin, Thanavaro & Ellis, 2011).

Perceived barriers: A negative belief or perceived obstacle associated with taking a specific action (McGuire & Anderson, 2012). Perceived barriers are directly related to how a person will eventually change a behavior or not. If a person perceives a behavior as beneficial, they are likely to choose and continue the behavior. If a perceived barrier outweighs the benefit of changing a behavior, there is no perceived value in changing the behavior (Mohebi, Azadbakht, Feizi, Sharifirad, & Kargar, 2013).

Readiness to Change: Characterized as a person's desire to change or make lifestyle changes (Peterson & Hughes, 2002). Barriers to diabetes care may be directly related to a person's willingness to change behaviors (Peterson & Hughes, 2002). Whether a person is ready to change can be determined by their willingness to take responsibility for their health. O'Conner et al. (2004) conducted a study to evaluate if readiness to change was associated with better blood glucose management in adults diagnosed with diabetes after a one year follow-up. Participants were assigned to

categories (contemplators intended to change diabetes care within 6 months and preparers intended to change diabetes care within 1 month) based on how they responded to the following statements: (a) "I am intending to make changes in my diabetes care in the next 6 months" and (b) "I am intending to make changes in my diabetes care in the next month." Results showed that participants intending to make a change in their diabetes care in the next 6 months, would potentially have positive outcomes related to lower HbA1c. The study also takes into consideration medication compliance as an independent factor and additional influencer to lower HbA1c levels.

Self-efficacy: a person's perception that they are able to manage an activity on their own (Rodriguez, 2013). According to Bandura (as cited in Laar and Bijl, 2001), self-efficacy is strengthened when a person becomes proficient in performing a task through repetition and reinforcement and the achievement of success builds confidence and reduces the risk of rejecting the new behavior.

Transtheoretical Model(TTM): According to this model, the process of behavioral change moves through six stages: (a) precontemplation- no plans to change or not intending to change in the next 6 months; (b) contemplation- preparing to take action, but within the next 6 months; (c) preparation- considering a change within the next month; (d) action- behavior change has take place, but not well established; (e) maintenance- change in behavior has happened for more than 6 months and the individual is working to sustain the behavior; (f) termination- the change is permanent and there relapse at this stage is not likely (Vallis, et al., 2003; Prochaska, 2008).

Assumptions

I made several assumptions in this study. Determining assumptions can be simple; however, without justification, the research would be futile (Leedy & Ormrod, 2010). I assumed that participants who reported having type-2 diabetes were diagnosed by a physician. I assumed that each certified diabetes staff received the same educational materials in training in order to deliver the same level of information to participants. The American Diabetes Association (ADA) requires Diabetes Educators, Registered Nurses and Registered Dieticians attain 15 CEU hours per year. It is also assumed that participants were honest about their reasons for choosing to leave the program before completion. It is assumed that all data, although not collected by me, was accurate.

Scope and Delimitations

Delimitations are detailed information of the scope of interest for a study (Creswell, 2009, p. 118). Delimitations include a specific population, variables, research questions, or anything that is in the researcher's control (Creswell, 2009). For this study, I focused on adults over 18 years of age who have been diagnosed with Type 2 diabetes. I analyzed the association between drop-out rates and race and gender of participants of a diabetes self-management education program and these variables were addressed due to the diabetes epidemic affecting all races and genders, in particular African American women. The fact that diabetes self-management education programs are seen as a vital component to individual diabetes self-management (Gucciardi, 2008), and despite the benefits of self-management programs, participants of these programs fail to complete or

dropout before completion due to full-time employment, age, race, location to the education center, or educational level (Adams et al., 2013). Individuals diagnosed with type 1 diabetes or those at risk for diabetes and individuals younger than 18 years of age, were excluded from this study.

Limitations

All research has limitations (Creswell, 2009) that need to be addressed. The consideration of limitations does not give research less credibility but does show a researcher's intention regarding clarity and study specifics (Bowman, 2014). The data used in this study were collected by the center's diabetes educators for the purpose of administering a diabetes self-management education program and not for research. Only participants ages 19 years and older participated in the study. Results of the study only applied to dropout rates based on race and gender. Although a diagnosis of diabetes is not based on an individual's race or gender, African American women are more likely to struggle with the disease and are more likely to have a body mass index (BMI) greater than 25%, (Gumbs, 2012), which is believed to be related to poor nutrition and unhealthy intake of foods high in fat as compared to other populations (Rahim-Williams, 2011). These behaviors are culturally driven by traditions and family ideals passed on from generation to generation (Rahim-Williams, 2011). This literature by Rahim-Williams (2011) speaks to the need for diabetes education that considers the intricate traditional values and beliefs that are a part of African American culture. Although African Americans have the highest incidence of diabetes, this study analyzed data of participants

from all ethnic backgrounds. Due to information being obtained from a proprietary database I will be unable to verify that all participants have been diagnosed with diabetes.

Significance

The research was used to evaluate the association between race, gender and dropout rates from a diabetes self-management education program. It is expected that this study may assist programs in developing strategies to identify participants who are at risk for early dropout. There is a potential that the results from this study will prompt diabetes educators to use the results as predictors of early dropout. Diabetes self-management education has the potential to increase self-care behaviors that motivate participants to adhere to medication, diet and physical activity. This continuous adherence will eventually reduce the need for emergency room and hospital admissions due to diabetes complications.

Summary

Intervention programs targeting individuals diagnosed with diabetics must do more than provide education and basic information on risk factors and symptom recognition. There continues to be a gap and limited studies on factors that influence individuals to dropout of diabetes education with no clear reasons. Efforts to change harmful health behaviors and promote good behaviors are beneficial in improving self-management. A lack of attention to a population's perception of an illness and understanding a readiness to change a negative behavior hinders efforts to reduce the prevalence of diabetes in the most vulnerable population (Waters, Times, Morton, Crear

& Way, 2001). Additionally, failure to complete diabetes education only increases chances of complications due to reduced self-efficacy and self-care behaviors.

Chapter 2 includes the available literature relevant to diabetes risk factors in African American women. The chapter includes information on diabetes complications, prevention, escalating costs associated with poor diabetes self-management and the African American perspective in research. Chapter 2 also includes a review of the literature on the framework for this study. Chapter 3 includes the methodology for the study, research design, study participants, data collection methods and instruments, and data analysis methods

Chapter 2: Literature Review

Introduction

The purpose of this study was to examine the association between race, gender, and drop-out rates from a DSME program. I assessed if gender was independently related to drop-out rates and if race is independently related to drop-out rates. In chapter 2 I will address the literature on the effectiveness of diabetes self-management education for African Americans, who make up the majority of diabetes diagnoses. Little is known about the attrition rates in this population or reasons why participants drop out of diabetes education when studies show remaining in these programs produce positive health outcomes.

The focus of DSME programs is to increase knowledge of diabetes and self-efficacy to improve self-management skills, thereby reducing complications (Brunisholz et al., 2014). DSMEs are beneficial, but only when participants complete the program. According to Adams et al. (2013), unless participants complete diabetes education, the likelihood of benefiting from the educational sessions is low. A retrospective study of 1560 participants (90% African American and 63% female) was conducted by Rhee et al. (2005). The purpose of this study was to examine the relationship between sporadic diabetes education attendance and poor health outcomes. Rhee et al. (2005) found that those who attended and completed diabetes education were more successful at keeping lower A1C levels than those who missed or failed to complete education sessions.

There is a gap in the literature regarding the relationship between race, gender, and drop-out rates relating to diabetes self-management education programs. DSME programs are beneficial and can be instrumental in providing information to people at risk and diagnosed with diabetes. What is not clear, is what factors influence the decision to miss or fail to complete education sessions. This literature review includes the theoretical foundation, diabetes causes, prevention, complications, costs, information on dropout rates, and a summary of significant articles.

Literature Search Strategy

I used the electronic search engines and databases from the Walden University portal. I used the following databases for an electronic literature search: CINAHL, Medline, ProQuest, PubMed, original peer-reviewed journal articles, and scholarly books. Relevant search terms included: *diabetes, African American, African American women, diabetes self-management, diabetes education, culture, obesity, blood sugar, diabetes risk, retention, attrition, dropout rates,* and *readiness to change.*

Theoretical Foundation

Transtheoretical Model (TTM)

James O. Prochaska and Carlo C. DiClemente developed the TTM in the 1980s to examine how people decided or considered a change in behavior (Astroth, Cross-Poline, Stach, Tilliss, & Annan, 2002). Prochaska and DiClemente concluded that individuals would be successful at behavior change when interventions were tailored and particular attention was focused on the current stage of change (Astroth et al., 2002). Prochaska

and DiClemente (as cited in Jackson, Asimakopoulou, and Scammell, 2007) initially developed the TTM to study smokers. Later, the model was used to explore health behaviors involving nutrition, weight loss, and physical activity (Jackson et al., 2007). Currently the TTM is being used in developing interventions that reduce the debilitating effects of preventable diseases (Bridle et al., 2005).

The readiness to change is the focus of the TTM of change. The TTM has been associated with both exercise and dietary interventions. The TTM was developed as a guide for an individual's current stage and takes the approach that interventions are valuable to the individual when they are associated with the current stage of change (Ruggiero, 2000). There are six stages outlined in the TTM precontemplation, contemplation, preparation, action, maintenance, and termination. In the precontemplation stage, an individual may not see that there is a need for behavior change or intentions to change the behavior is nonexistent (Lach, Everard, Highstein, & Brownson, 2004), and may be viewed as the "I won't" stage (Andres et al., 2008). For example, eating healthfully or exercising is not considered in this stage. The individual may be resistant to changing their behavior because they may not believe changing the behavior is beneficial although the negative behavior is causing harm (Astroth, Cross-Poline, Stach, Tilliss, & Annan, 2002). Progressing through each stage involves the individual taking ownership of the problem and adopting the new behavior (Astroth et al., 2002). In the contemplation stage, or the "I might" stage (Andres et al., 2008), individuals are considering a change in behavior, at least in the next 6 months (Lach et

al., 2004). Individuals are actively seeking out information on the disease and are considering how the current behavior is affecting their wellbeing, but they are not ready to make a change (Astroth et al., 2002). In order to move to the next stage, individuals in the contemplation stage need to make a decision to consider the benefits of changing their behavior (Astroth et al., 2002). In the preparation stage, or the "I will" stage (Andres et al.), individuals are preparing or intending to change a behavior in the next month (Lach et al., 2004). Individuals in this stage may need to begin setting realistic, short-term goals and work to be committed to following a healthy behavior in order to move to the next stage (Astroth et al., 2002). An individual in the action stage or the "I am" stage (Andres et al., 2008) has made a decision to start the new behavior and is actively engaging in the new behavior. The individual may be actively participating in an exercise program or choosing better eating habits. It is imperative that positive health behaviors are reinforced to prevent stage regression (Astroth et al., 2002). In the maintenance stage, or the "I have" stage (Andres et al., 2008), the new behavior has been practiced for 6 months or more. In this stage, individuals are less tempted to go back to the old behavior but work to prevent regression. Progression to the maintenance stage means long term behavior changes were successful (Astroth et al., 2002). And finally, a person in the termination stage has adopted the new behavior (Lach, Everard, Highstein & Brownson, 2004). At this stage, the individual is no longer tempted and believes in their ability to stay with the change, and relapse to unhealthy behaviors is not likely (Prochaska, 2008).

A study by Parchment, Arambula-Solomon, Noel, Larme and Pugh (2003), was conducted for the purpose of assessing the time it takes for patients diagnosed with Type 2 diabetes to move between stages when exposed to diabetes education. Results showed that the time frame of a patient's diabetes diagnosis was directly associated with how they moved between stages of change for "diet and exercise but not for SMBG" (p.131). Patients newly diagnosed with diabetes were more likely to move between stages for diet as compared to patients diagnosed two or more years prior to enrollment. Depending on how participants answered a set of questions related to their physical activity via interview, they were assigned an appropriate stage of change (Parchment et al.,2003).

According to Andres et al. (2008), "Individualizing an intervention in accordance with the Transtheoretical model would imply adapting it to the individual's stage of readiness for behavior change" (p. 32). Spencer, Adams, Malone, Roy and Yost (2006), examined literature and found 25 out of 31 stage-based interventions that were successful in moving participants between stages in changing physical activity behavior. Intervention programs based on the stages of change are more successful because they are more likely to effectively advance individuals between the stages of change. Therefore, assigning an intervention based on an individual's position in the stage of change substantially increases the likelihood that they will remain in a health promotion program (Andres et al., 2008).

The TTM has been applied to multiple studies involving diabetes interventions and observations (Andres et al., 2008). Self-efficacy strategies are a significant part in

the successful management of diabetes and individuals need to understand the benefits of a behavior change (Andres et al., 2008). The beginning of successful diabetes management is maintaining a healthy diet and exercise regimen. By determining that an individual's eating habits can be put into a particular stage of readiness, individuals can be classified based on their readiness to change, and by understanding these challenges, developing programs can be intentionally tailored and effective (Horwath, 1999).

According to Velicer, Prochaska, Fava, Norman, and Redding (1998), applying the TTM can be beneficial in developing interventions that are tailored to the individual's current stage, but is not an indicator of patient readiness to change. Velicer et al. (1998), suggested that using the TTM may be significant in decreasing retention rates during an intervention due to the model's ability to match needs with readiness to change.

Theory of Self-Efficacy

The theory of self-efficacy suggests that an individual's confidence in changing a health behavior is based on their ability to perform the new behavior (Al-Khawaldeh, Al-Hassan & Froelicher, 2012). Rosenstock, Strecher and Becker (as cited in Aalto and Uutela, 1997), regarded self-efficacy as an important component of the health belief model. According to Kavanagh et al., (as cited in Aalto and Uutela, 1997), an individual's understanding of diabetes self-maintenance translates into better treatment adherence. Beckerle and Lavin (2013), stated that an individual who believes they are capable of managing their diabetes is more likely to overcome the challenges and barriers associated with the diabetes. Bandura believed that belief determined whether an

individual performed a task, how much time would be given in building confidence in performing the task, and how long they would continue to perform the task (Krichbaum, Aarestad & Buethe, 2003).

Self-efficacy suggest that a person's behavioral change is connected to a belief that they are able to perform a task, such as self-management of diabetes, and there is an expectation that something will result from them performing the task (Sousa & Zauszniewski, 2006). Studies suggest that diabetes education alone does not ensure positive, long-term outcomes. Therefore, self-efficacy is of initial importance to individual behavioral change (Mohebi, Azadbakht, Feizi, Sharifirad & Kargar, 2013).

To look deeper into the idea of self-efficacy and diabetes education, Grossman worked with his team to develop a Diabetes Self-Efficacy Scale, which contained 24 diabetes items, 5 situational questionnaires and 6 general situation items (Krichbaum et al., 2003). Anderson et al (as cited in Krichbaum et al., 2003), explained that individuals with diabetes need to understand their feelings regarding living with a diabetes diagnoses, set personal attainable goals, develop on their own strategies to deal with difficulties and barriers and avoid making costly mistakes.

Diabetes and Its Causes

Diabetes is a condition that happens when the glucose in the blood is too high. Glucose can be found in foods and it is also found in the liver and muscles. The pancreas is responsible for making insulin, which is carried to cells in the body. When the pancreas fails to manufacture enough insulin, or the insulin does not function as intended,

glucose levels in the blood increase and may cause the condition known as diabetes (NIKKD, 2014).

There are two types of diabetes, Type 1 and Type 2. Type 1 diabetes, also known as juvenile diabetes, is associated with early childhood or young adults. Type 1 diabetes is characterized by the body's inability to make insulin or make enough insulin. Individuals with this type of diabetes are usually insulin dependent diabetics or the condition is referred to as IDDM, insulin dependent diabetes mellitus (NIKKD, 2014). Type 2 diabetes, known as adult-onset diabetes, can affect all age groups. This type of diabetes is more often seen in adults and obese individuals and people who are physically inactive. Most individuals diagnosed with Type 2 diabetes use diabetes medications to help with management and control of the condition (NIDDK, 2014).

Annually in the United States there are at least a half of a million new cases of Type 2 diabetes diagnoses among older adults, and minority groups are at higher risk for being diagnosed with Type 2 diabetes mellitus as compared to Caucasians (Koch, 2002). Diabetes significantly increases the risk of stroke and cardiovascular disease and may cause complications in kidney function and damage eye sight (Sadler et al., 2005). Many individuals are not aware that they have diabetes and unfortunately suffer from the acute and chronic diseases that result from poor diabetes management or uncontrolled diabetes (Porterfield, Din, Burroughs & Burrus, 2004). At least 2.7% of the United States population is unaware that they have diabetes and this number continues to be higher in minority populations (Porterfield et al., 2004).

The Centers for Disease Control and Prevention (CDC) (n.d.), has identified 644 counties in 15 Southern states as the *diabetes belt*. Diabetes affects about 11% of the residents living in these counties or near areas with high rates of diabetes. Residents in the diabetes belt have a higher prevalence of Type 2 diabetes as compared to other areas of the United States. These areas are more likely to have a high population of African Americans (CDC, n.d).

A report by the (ADA, n.d.), discussed the burden of diabetes in Alabama. In 2014, over 600,000 people or about 15% of the population had diabetes. Health risks and complications increases due to over 100,000 people not aware that they have diabetes, over 1.3 million are pre-diabetic and over 25,000 people in Alabama are diagnosed with diabetes annually. The cost of diabetes in Alabama is estimated to be $5.4 billion annually (ADA, n.d.).

Diabetes has been among the top 10 diseases that increase the likelihood of death associated with cardiovascular and peripheral vascular illnesses (Kovar, Harris, & Hadden, 1987). According to the CDC (2014), 29.1 million people in the United States have diabetes and these numbers have increased by 3 million since 2010. According to Melkus and Fain (as cited in Koch, 2002) approximately 14 million people in the United States are diagnosed with diabetes. Diabetes is diagnosed in about 2.8 million hospital admissions and causes about 36,000 deaths yearly (Kovar et al., 1987). Between 1935 and 2004, 100 million more people were diagnosed with diabetes (Nazarko, 2011).

In 2009, the World Health Organization (WHO) estimated that there were 170 million people with diabetes and this number is expected to more than double by the year 2030 (Campbell, 2009). This increase in diabetes is in correlation with the number of overweight and obese persons living with and at risk for diabetes (Campbell, 2009). According to The State of Obesity: Better Policies for a Healthier America (2016), Alabama's obesity rate is second in the nation showing an increase from 22.6 percent in 2000 to 35.6 percent in 2016.

Diabetes in the United States is becoming an epidemic with the number of diagnosed and undiagnosed cases increasing among those aged 20 and older (Campbell, 2009). The increased rates are not specific to any specific ethnic or racial group or educational background (Tilghman, 2003). Diabetes does not discriminate; therefore, all ethnic groups are vulnerable to this disease and its complications. According to the National Diabetes Education Program (NDEP) (n.d.) as compared to White Americans, Asian Americans are at an 18% higher risk of being diagnosed with diabetes, Hispanics are at a 66% higher risk and African Americans are at the highest risk at 77%. As diabetes risk increases, so do the complications of diabetes in these ethnic groups.

The incidence of diabetes is disproportionately higher in African Americans. African Americans are at a higher risk of being hospitalized from a debilitating illness or complication as a result of diabetes (Skelly, Leeman, Carlson, Soward & Burns, 2008). Although diabetes does not discriminate, women are at higher risk of being diagnosed with diabetes than men (Skelly, et al., 2008). Given the fact that the prevalence of

diabetes increases with age, African American women continue to be the highest at risk in this category as well. With all estimates considered, African Americans diabetes rates are predicted to triple by 2050 and diabetes rates are predicted to double in Caucasians (Deshpande, Harris-Hayes & Schootman, 2008).

Complications and Risk Factors

Coping with a diabetes diagnosis can have a debilitating effect no matter what the ethnic or socioeconomic background. A diagnosis of diabetes increases the risk for cardiovascular disease, kidney problems, blindness, and the risk of amputation due to untreated or uncontrolled diabetes (Deshpande, Hayes & Schootman, 2008). The diabetes epidemic, across all ethnic, economic and geographic lines shows a need for interventions that are effective in reducing the debilitating complications of diabetes and improving the management of diabetes in those with diabetes and at risk for developing diabetes (Deshpande et al., 2008). The successful management of the complications and symptoms of diabetes depends on how individuals with diabetes are educated about effective self-management techniques and how individuals at risk are equipped with effective lifestyle changes that will slow or prevent the onset of diabetes (Cox, Carpenter, Bruce, Poole & Gaylord, 2004). Healthcare professionals need to understand how health beliefs affect how patients view their need to manage their symptoms and be able to assess a patient's readiness to change, knowledge intake and whether behavior modification is occurring (Cox et al., 2004).

Risk Factors

Although diabetes can be diagnosed in all ethnic groups and in either male or female, African Americans are at a higher risk of being diagnosed. African American women are more likely than Caucasian women, African American men and Caucasian men to be diagnosed with diabetes (Schultz, Zenk, Odoms-Young, Hollis-Neely, 2005). Known risk factors associated with developing diabetes are obesity and physical inactivity. The prevalence of obesity has increased over the last several years. Currently at least one-third of adults in the United States are considered obese (Middelbeek & Abrahamso, 2014). Additional risk factors include older age, family history of diabetes and prior gestational diabetes history (CDC, 2015). Risk factors can be classified as being modifiable or non-modifiable. Obesity and physical activity are considered modifiable. Obesity causes cholesterol problems, high blood pressure, insulin resistance and blood sugar issues (Laakso, 2005). Non-modifiable risk factors include age and ethnicity and low birth weight. The risk of Type 2 diabetes increases with age, which contributes to more than 50% of cases in those over 60 years of age (Laakso, 2005).

Unfortunately, African American women are more likely to be overweight and have less participation in physical activity (Schultz et al., 2005). According to the ADA (as cited in Murrock and Gary, 2010), African American women have some of the highest overweight and obesity rates, 78 and 51 percent, respectively. A body mass index (BMI) determines whether a person is overweight or obese and considers height and weight to calculate a number. A person with a BMI between 25 and 29 are

considered overweight and 30 or more is considered obese (Gumbs, 2012). The percentage of African American women considered obese is alarmingly higher than African American men, about eighty percent (Gumbs, 2012). In a previous review of literature, a study found that African American women over the age of 65, who were considered obese, were satisfied with their weight (Rajaram & Vinson, 1998).

In addition to obesity and physical inactivity, emotional stress may trigger over eating and poor nutritional habits (Gaston, Porter & Thomas, 2007). The risk increases even higher among African American women with existing health issues such as high blood pressure and high cholesterol (Gaston et al., 2007). These comorbidities contribute to poor health outcomes without proper management and lifestyle changes. According to the American Heart Association (as cited in Gaston et al., 2007) poor health outcomes are due to African American women's inadequate knowledge of diabetes and its risks to overall health status.

Symptoms

The CDC (2015) lists symptoms associated with diabetes as "frequent urination, excessive thirst, unexplained weight loss, extreme hunger, vision changes, very dry skin and sores slow to heal." Symptoms such as nausea and vomiting may be present when diagnosed with Type 1 diabetes (CDC, 2015). Persons diagnosed with Type 1 diabetes usually have symptoms that have a sudden onset, while Type 2 diabetic symptoms progress slowly and may be often undetected (Nazarko, 2010).

Patients diagnosed with diabetes may or may not present with any symptoms. O'Conner et al., (2006) suggests that the fact that more and more patients are asymptomatic at the time of diabetes diagnosis may indicate the ineffectiveness of early diabetes screening so patients and healthcare providers should become more aware of this disease. A study conducted by O'Conner et al. (2006), examined how diabetes is diagnosed and symptoms that were present at the time of physician visit or annual checkup. Results showed that over 30% of the 504 participants diagnosed with diabetes had symptoms, at the time of diagnosis 7% percent had complications related to diabetes and 61% percent were asymptomatic (O'Conner et al. 2006). These findings suggest that there is a need to educate patients and healthcare practitioners on early detection of symptoms to improve health outcomes and reduce the prevalence of chronic complications.

Prevention

The public health community urges a proactive approach to primary, secondary and tertiary prevention (Price, 2008). Specific intervention programs are based on meeting the assessed needs of the community. Primary prevention focuses on practicing health behaviors that prevent diabetes from occurring. It promotes a protective effect to reduce the diabetes risk (Price, 2008). Primary prevention is designed to decrease or eliminate a disease or issue in a healthy population. Prevention may involve incorporating healthy eating or physical activity (Wyness, 2009). The evidence of physical activity in the prevention of diabetes has been clearly established. Studies that

included diabetic counseling and educational intervention were shown to be effective in preventing the onset of diabetes as well as being more cost effective when compared to medication costs (Deshpande, Dodson, Gorman, & Brownson, 2008).

Secondary prevention is aimed at taking measures after a diabetes diagnosis, to delay the onset of complications associated with the disease (Price, 2008). Risks are identified and removed and targets at-risk populations. Secondary prevention programs involve monitoring or screening an individual's A1C levels (Price, 2008). Tertiary prevention attempts to prevent lasting effects that can result from the complications of diabetes. Tertiary interventions may involve assisting newly diagnosed diabetics or high-risk populations in the understanding of sign and symptoms, medication education and implementing healthy behaviors for diabetes management (Price, 2008).

Diabetes is best controlled when individuals diagnosed with the disease have an understanding of the disease, treatment options and healthy behaviors. The significance of this understanding contributes to better diabetes self-management, monitoring and psychological wellbeing (Clarke, 2009). Most studies have examined health outcomes that result from individual perception and management of the disease, but studies have not given attention to how newly diagnosed diabetics are coping with the diagnosis, how they perceive their ability to manage their diet and include physical activity, if a support system is available and the capacity for self-management or monitor glucose levels (Clarke, 2009).

Financial Burden

The ADA (as cited in Deshpande, Harris-Hayes & Schootman, 2008) estimates the financial burden of diabetes in the United States in 2002 at $132 billion. Of the $132 billion, $92 billion were associated with direct costs, in which $25 billion of the direct costs was associated with cardiovascular complications associated with diabetes and $40 billion were associated with indirect costs (Deshpande et al., 2008). Additional estimates collected by the American Diabetes Association [ADA] (2008) sets diabetes expenditures at $174 billion in 2007.

In 2007, 1 in 10 people were diagnosed with diabetes and this number was predicted to increase by 165% and more than doubling by 2050. The largest increase is expected to be persons over the age of 75 (Costantino, Stacy, Song, Xu, & Bouchard, 2014). The expected increase in diabetes diagnoses in this population and potential medical expenditures is in line with individuals eligible for Medicare (Costantino et al., 2014).

The debilitating conditions associated with diabetes cost in excess of $245 billion yearly in healthcare costs and loss of employment, in addition to increased Medicare spending (Ali, Bullard, Gregg & Rio, 2014). The Health Care Cost Institute reported a rapid increase in employee insurance coverage of diabetes of at least 3 percent more than those without diabetes (Diabetes-related spending, 2016). In 2014, diabetes spending was estimated to exceed $10,000 for persons diagnosed with diabetes as compared to non-diabetics (Diabetes-related spending, 2016).

Considering the cost of medication for diabetic patients is significant in the management of the disease, Leichter, Faulkner and Camp (2000), in a study, surveyed 128 participants, 75 women and 53 men. Of the 4-5 medications used daily by these participants, 3-4 were medications used to treat their diabetes. Total monthly cost for medications and treatment supplies were estimated to be $115 to $170.00 (Leichter et al., 2000).

The burden of complications that accompany diabetes factors into the cost of healthcare. Individuals diagnosed with diabetes will spend more time managing a disease that at times will seem to control their lives. The probability is higher among people with diabetes that they will spend more money on health care associated with medications, acute complications that require emergency room visits that eventually lead to hospital stays, than people without diabetes (Zhang et al., 2010). Between 2012 and 2014, the rise in diabetes spending was due in part to the increase in hospital visits (8.1%) and diabetes related medications (8.7%) and diabetics were more likely to use mental health and cardiology services (Diabetes-related spending, 2016). These estimates are predicted to increase due to the growth of populations at high risk for diabetes and as obesity increases in the United States (Deshpande et al., 2008).

Women and Diabetes

Diabetes is a disease that affects all genders, ethnic groups and economic classes. Although this is the case, specific genders, ethnic groups and economic classes are at higher risk for developing diabetes. The CDC (2012) suggests that of the millions of

adults in the United States affected by diabetes, fifty percent are women. One of the most life-threatening complications is heart disease, which occurs more in women than men. Survival rate is poor after a heart attack and a diagnosis of diabetes increased death rates up to three times (CDC, 2012).

The CDC and the Agency for Healthcare Research and Quality [AHRQ] (2011) collaborated to evaluate how women at risk and not at risk for diabetes utilized healthcare resources as related to access, prevention and a woman's perception of the disease. The study found that minority women, economically disadvantaged and those with less education reported an overall feeling of poor health; women at risk for diabetes were more likely to have limited access to healthcare due to inconsistency in health insurance and physical inactivity (CDC & AHRQ, 2011).

African American Women and Diabetes

The fact that diabetes is more prevalent in African American women is deeply rooted in culture and perceptions of health and beauty. Historical and socio-cultural factors are some reasons for the overwhelming number of black women diagnosed with diabetes. Unhealthy eating and nutritional habits, family traditions and socioeconomics are all contributing factors to the obesity issues of black women (Rajaram & Vinson, 1998). Unfortunately, many minority communities do not have access to foods that are low in fat and high in nutritional value (Rajaram & Vinson, 1998). In some ways, higher body weight, has become an acceptable cultural norm (Rajaram & Vinson, 1998). Cultural beliefs are passed down from generation to generation intertwined in food

choices that have meaning and are symbolic socially and religiously (Goody & Drago, 2009). This fact suggests that African American women are less likely to associate being overweight with an increased risk of chronic diseases (Rajaram & Vinson, 1998).

A high risk of diabetes in African American women is due to the fact that more women of this ethnic group have a BMI that puts them in the obese category (Rahim-Williams, 2011). Cultural beliefs play a big part in the health behavior of African American women as it relates to food and exercise. African American women are usually guilty of unhealthy cooking or cooking with high fat ingredients and putting beauty before health as a reason to lose weight (Rahim-Williams, 2011). Unhealthy use of high fat ingredients is often due to traditions and usually staples in family recipes. Liburd (2003) examined how the African American women's food choices are associated with family culture, social networks, and deeply rooted in tradition. Food preparation and selection is often associated with information that has been passed down from generation to generation (Liburd, 2003).

Self-Management

The goal for diabetes self-management is usually addressed with healthcare professionals teaching about diabetes, demonstrating skills to monitor blood sugars and medication administration (Krichbaum et al., 2003). Diabetics are usually the sole providers of the management of their diabetes. Not only are diabetics in charge of managing their diabetes, they must make several decisions daily that affect whether health outcomes are negative or positive (Krichbaum et al., 2003). Whether an individual

maintains good diabetes self-management is dependent on their confidence in performing daily activities (Po, 2000). An individual's confidence in performing daily activities effects self-management compliance, which in turn affects whether long-term goals are reached (Po, 2000).

At the forefront of a clinical perspective, the looming question centers around, how to help people move toward a lifestyle change that positively impacts A1C levels (Whittemore, 2000). To see the long-term effects of diabetes management, programs will need to offer continuous support and reinforcement of self-management skills and behaviors (Funnell, Tang & Anderson, 2007). Even the most disciplined diabetic must meet the daily challenges of managing medication regimens, choosing the right meal, garnering the energy for physical activity and monitoring blood sugars, all which are significant for diabetes self-management (Whittemore, 2000).

Self-management of diabetes is the foundation for whether the disease is controlled, debilitating or causes complications that result in death (Rahim-Williams, 2011). Being physically active, eating properly, monitoring blood sugars, regular doctor visits and adhering to a physician prescribed medication regimen are all self-management activities (Rahim-Williams, 2011). Self-care behaviors are believed to be paramount in reducing or preventing complications that can arise from poor self-management (Gumbs, 2012).

Factors that affect adherence to self-management behaviors include not associating proper nutrition and physical activity with managing the disease, the belief

that the diabetes is a serious illness and not believing that they can manage their diabetes by making lifestyle changes (Montague et al., 2005). Ultimately, diabetes self-management education should motivate diabetics to make decisions that will promote healthy habits and decrease the incidence of emergency room visits and hospital stays due to complications (Krichbaum et al., 2003).

Educating diabetics on self-management has shown to have positive effects on blood sugar monitoring, and lifestyle changes. Although other factors are needed to maintain positive health outcomes, educating and encouraging diabetes self-management is a step in the right direction (Walker, Stevens, & Persaud, 2010).

Diabetes Self-Management Education (DSME)

Diabetes self-management education is a process in which individuals diagnosed with diabetes gain knowledge and skills as the foundation to change behaviors and improve self-efficacy (Chomko, Odegard, & Evert, 2016). Brunisholz et al. (2014) describes DSME as a strategic endeavor to educate and give or improve available resources to diabetics who want to achieve control of their diabetes, with the goal of reducing the likelihood of complications and decrease the burden of healthcare costs on the heatlhcare system.

The goal of diabetes education is an emphasis on the importance of increasing self-care behaviors (Davis, 2010). Persons diagnosed with diabetes are challenged with dealing with managing this disease and its complications if improved self-management skills are not achieved. Powers et al (2015), addresses critical times for diabetes

education, recommended by ADA standards. The critical times are newly diagnosed Type 2 diabetics, yearly checkups and preventative services, new challenges with diabetes self-management and changes in how care is provided. Powers et al. (2015) stressed the importance of programs considering a population's health belief, culture, social support systems, educational background and other any othere factors that may derail gaining or improving self-management skills.

Settings for diabetes education traditionally have been hospitals, community clinics, private office settings, employee worksites and lately, telephone maintenance and management (Tomky, 2013). Currently there are not enough nurses and nutritionists to provide diabetes education, which means programs may not be able to keep up with educational demands. Because the role and responsibilites of providing diabetes education has widened, the American Association of Diabetes Educators (AADE) suggests guidelines for individuals trained as diabetes educators (Tomky, 2013). Besides a nurse shortage, the predicted increase in diabetes cases is expected to triple by 2050, and a shortage of primary care physicians and diabetes specialities further complicates the access to diabetes self-management care (Chomko, Odegard, & Evert, 2016).

Dropout Rates

Drop-out rates from diabetes education programs are not a topic with a lot of literature (Gucciardi, 2008). Program participant retention must be a priority if the goal is to reduce complications from poorly managed diabetes and help those challenged with diabetes realize the benefits of completing DSME (Rhee et al., 2005). Several studies

have been conducted to examine the reason for participant dropout. A study conducted for the purpose of determining the factors for participant drop-out of a nurse led diabetes education program in a low-income demographic yielded several factors for diabetes dropouts. The participants were Type 2 diabetics and ethnically diverse. In a multivariate analysis, insurance status, high blood pressure and blood sugar levels and smoking habits were predictors of program dropout (Benoit, Ji, Fleming, & Philis-Tsimikas, 2004). Those without insurance were 95% more likely to remain in the program than participants with insurance. Since the uninsured were required to pay an enrollment fee due to fewer healthcare options, initial investment was a motivator to remain in the program. Individuals with high blood pressure and blood sugar levels could not complete the program due to illness. The dropout factor of smoking was not clear, but it was assumed that those who smoked may be less interested in healthy living or may sense rejection by educators that view their behavior as bad (Benoit et al., 2004).

Another study conducted by Gucciardi, DeMelo, Offenheim, and Stewart (2008), investigated factors that may influence dropout rates from a diabetes self-management program. Telephone interviews were conducted with 267 participants with Type 2 diabetes. From that number, 44% or 118 participants were early dropouts. Results showed full-time employment, lack of interest in diabetes education, denial of the seriousness of a diabetes diagnoses, conflict with center hours and being unaware of the complications of diabetes were all factors. Graber, Davidson, Brown, McRae and

Wooldridge (1992) in their study found smoking, participant distance from education center and eventual issues with A1C levels as dropout predictors.

Summary

In this literature review I identified research that shows the overwhelming effect of diabetes in African Americans and especially African American women. It addresses the need for DSME programs to not only provide knowledge about the disease but, identify behaviors that lead to debilitating complications. Because DSME is an integral part of teaching knowledge, self-care skills and self-efficacy and changing behaviors that lead to a reduction in complications, the reasons for a participant choosing to leave the program needs to be understood. This is an opportunity for diabetes programs to develop strategies that reach individuals before the decision is made to dropout of diabetes education. Chapter 3 addressed the methodology of the study. It addressed the research design, hypotheses, data collection, study population, instrumentation and data analysis.

Chapter 3: Research Method

Introduction

The purpose of the quantitative, retrospective study was to examine the association between race, gender, and dropout rates among participants enrolled in a diabetes self-management education program. This chapter includes a detailed description of the research study and rationale for the research methodology used in this project. This chapter includes and outline of the research design, the sample and setting, description of the intervention, instrumentation and materials, data collection and analysis, and potential threats to validity. This chapter concludes with a discussion of the actions taken to protect human subjects involved in the interventions.

Diabetes Self-Management Education Program

Patients diagnosed with diabetes, individuals at-risk for diabetes, or as being prediabetic are referred by physicians to the diabetes and nutrition center. The DSME program consists of one-on-one and group sessions. The first session is a one-on-one session with a diabetes educator. The one-on-one sessions are an opportunity for registered nurses to document and review with participants an initial assessment of A1C levels, weight, height, and demographic information. After the initial one-on-one session, patients are enrolled to participate in the DSME program. In the group session, participants learn to manage their diabetes and how and when to check their blood sugar. Participants learn what the blood sugar numbers mean and the purpose of diabetes medications. Patients need to understand how each self-management activity relates to

the other, so that there is an effective management of the disease (Chau et al, 2012). This session lasts for 1 to 1.5 hours.

Each group session is taught by a dietician and/or registered nurse and intended to educate the participant on management of diabetes through meal planning, healthy eating, and healthy cooking in order to manage blood pressure and control cholesterol and ultimately learn what foods to eat to keep their blood sugar under control.

Research Design and Rationale

This study was a quantitative, retrospective study analysis using secondary data from the diabetes and nutrition center. I used a multiple logistic regression to analyze the data. In a retrospective study design, researchers examine data previously collected and study phenomena that has already occurred (Abbott, Barton, Terhorst, & Shembel, 2016). A retrospective design is a cost-effective way to answer research questions (Abbott et al., 2016). The purpose of this study was to develop strategies to reduce dropout rates from a diabetes education program. In this study, I examined independent and dependent variables to assess their relationships. The dependent variable was drop-out rates and the independent variables were race and gender.

A quantitative study design allows the researcher to investigate several variables, how they may influence each other, and their relationship to the research question (McCusker & Gunaydin, 2015). The relationship among variables is used to devise research questions (Creswell, 2009). The findings associated with extracting information from a quantitative study design may be a valuable asset for policy changes based on

numerical data (McCusker & Gunaydin, 2015). I used a quantitative research design because of the availability of time and resources and, cost efficiency (McCusker & Gunaydin, 2015).

Methodology

Population

The population for this study was adults 19 years and older with a diagnosis of Type 2 diabetes. I used a convenience strategy for this study because of the availability of clients referred to The Diabetes and Nutrition Center. Included in the sample were participants referred by their physician to attend a scheduled program at The Diabetes and Nutrition Center. Excluded from the sample were patients who were prediabetic, and patients who were at-risk for diabetes. I kept the participant's information confidential for the period during this study. Participants were able to read, write, and comprehend English.

Sampling and Sampling Procedures

I used G*Power 3.1.9.2 as a statistical test to calculate sample sizes and perform power analysis. I used the *z*-test family, the logistic regression was used as the statistical test and for power analysis, *apriori*. The power analysis for a two- tail analysis, an effect of 0.5, a probability of .05, power of .95, the number of cases available was 337 and the estimated power was 0.9500770. I used the entire database in selecting records from the proprietary registrar of participants who attended the diabetes and nutrition center's diabetes program between January 2014 and December 2016. I used the selected

information from the data based on eligibility criteria. I calculated the sample size as an estimation of the minimum sample size that was needed to complete data analysis.

Procedures for Recruitment, Participation, and Data Collection

I selected participants from a proprietary database who were enrolled in the DSME program at the diabetes and nutrition center. To protect the confidentiality of the patients, I had no contact with the patients and only used patient data that had no identifying marks. I collected data from educational sessions that participants had already completed. I requested following information was: race, gender, age, weight, insurance status, marital status, employment status, education, those diagnosed with Type 2 diabetes, available data on insulin use, A1C levels on first visit and reason for leaving was categorized as dropout rate for the purpose of this study.

Instrumentation and Operationalization of Constructs

I performed a secondary analysis using retrospective archival data from the The Diabetes and Nutrition Center propriatary data base. The only information that I needed for the study was: race, gender, age, those diagnosed with Type 2 diabetes, insulin use, weight, marital status, education, insurance status, employemnt status, A1C on first visit, and reason for leaving. The covariates that I tested were age, A1C values, weight, education, employment status, maritial status, insurance status, and insulin use. The outcome variable was dropout rates and the independent variables was race and gender.

Dependent Variable

Dropout rates. To be described as a participant who dropped out of the diabetes self-management program, he or she was documented as not completing or not present at the end of the program. Because the outcome variable was measured as completed or not completed, the variable was coded as 1= Yes (completed program) and 2 = No (did not complete program). I extracted the reasons for leaving from the proprietary database and they were documented as characteristics of program participants.

I defined the dependent variable (DV) drop-out rate as not completing or not present at the end of the program. Gucciardi, Demelo, Offenheim, and Stewart (2008) defined a drop out as someone who missed at least four sessions over a period of 1 year. Participants meeting with educators less than three times were considered as nonusers (Gucciardi, et al., 2008).

Independent Variables

Race. I documented race as it was listed in the proprietary database and as recorded from the participant. I divided the variable race into four categories. The four categories were recorded as: 1= Black/African American, 2= Caucasian, 3= Hispanic and 4= other for the purposes of this study.

Gender. Gender was recorded as 1= male and 2= female and documented as recorded by participants.

Covariates.

Age. I recorded the covariate age as the number of years from birth until the start of the diabetes program. I divided the variable age into four categories. The four categories were recorded as: 1= 18-29 years, 2= 30-44 years, 3= 45-59 years and 4= >60 years.

AlC Levels. I divided the A1C on first visit into three categories. The three categories were recorded as: A1C < 5.7 is normal, A1C between 5.7 and 6.4 is prediabetic and A1C > 6.5 is Type 2 diabetes.

Weight. I recorded weight as the number recorded by the participant at the beginning of the diabetes program. The variable was divided into four categories. I recorded the four categories as: 1= 100-120 lbs., 2 = 121-140 lbs., 3 = 141-160 lbs., and 4 = >160 lbs. Huang and Zheng (2015) conducted a study to examine the association between generational status and diabetes. BMI was indicated as a covariate in relation to race and percentage of body fat. BMI levels were used to indicate weight categories as underweight, normal weight, overweight and obese Huang & Zheng, 2015).

Education. I measured education as the level of attempted or attained learning at the time of the start of the diabetes program. I divided the variable education into four categories. The four categories were recorded as: 1= less than 12^{th} grade education, 2= some college, 3 = college completion, 4= graduate school, and 5 = high school.

Insulin use. I recorded insulin use as 1= Yes and 2= No.

Insulin use by participants were similar to a study conducted by Graber et al. (1992) when investigating factors contributing to patient dropout rates from an outpatient diabetes education program.

Insurance status. For purposes of this study I recorded and categorized insurance status as: 1 =insured, 2 =grants, 3 =flat fee, 4 =employee wellness, and 5 = Medicaid/Medicare. A study conducted by Benoit, Ji, Fleming, and Philis-Tsimikas (2004) documented insurance status as an important factor of predicting whether participants would drop out of a diabetes program in San Diego.

Marital status. I recorded marital status as 1 =single, 2 =married, 3 = divorced or 4 = widowed. Gucciardi, DeMelo, Offenheim and Stewart (2008) included marital status in their study based on analysis of similar studies focusing on factors contributing to drop out rates in diabetes education programs.

Employment status. For purposes of this study employment status was recorded as 1= Yes employed and 2= No not employed. Gucciardi, DeMelo, Offenheim, Grace, and Stewart (2007) recorded employment as a predictor variable based on assessment of previous studies.

Data Analysis Plan

According to Fitzpatrick et al., 2004 and McDermott & Sarvela, 1999, (as cited in McKenzie, Neiger and Thackeray, 2009, p. 375), data analysis is the process of breaking down collected research data in a way that produces useful information to meet

objectives and answer research questions. To understand information from the analysis, the variables (independent and dependent) must be identified (McKenzie et al., 2009, p. 375). The independent variable in the study was race and gender. The dependent variable in the study was dropout rates.

I used descriptive statistics to define participant demographics in the targeted population as it related to age, gender, and race. I used descriptive statistics and multivariate logistic regression to analyze the data. I used Chi-square analysis and SPSS software to investigate if there was an association between the race and gender (independent) variable and dropout rates (dependent) variable. I answered the following research questions regarding the association between race gender and dropout rates from a diabetes self-management education program:

Is there an association between race and dropout rates from participants in a diabetes self-management education program?

$H_0$1: There is no association between race and dropout rates from participants in a diabetes self-management education program.

H_a1: There is an association between race and dropout rates from participants in a diabetes self-management education program.

I used Chi-square to explore if there was an association between race (independent variable) as a predictor of dropout rates (dependent variable) from participants in a diabetes self-management education program.

Is there an association between gender and dropout out rates from participants in a diabetes self-management education program?

$H_0$2: There is no association between gender and dropout rates from participants in a diabetes self-management education program.

H_a2: There is an association between gender and dropout rates from participants in a diabetes self-management education program.

I used Chi-square to assess if there was an association between gender (independent variable) as a predictor of dropout rates (dependent variable) from participants in a diabetes self-management education program.

I used a multiple logistic regression analysis to explain the association between the dependent variable (dropout rate) and the independent variables (race, gender). I used this type of analysis to explain the relationship among the variables.

Threats to Validity

Internal validity takes into account any changes in the study brought on or due to any manipulation by the researcher or program itself (McKenzie et al., 2009, p. 368; Creswell, 2009, p. 162) or experiences that affect the participant (Creswell, 2009, p. 162). A potential threat to internal validity was the likelihood that events occurred that affected whether participants dropped out of the program that were outside of the study variables. The threat of external validity is the result of a program or intervention that can be generalized to other populations or groups (McKenzie et al., 2009, p.369). I collected archival data from the diabetes and nutrition center's proprietary database and data were

a representative sample of patients diagnosed with Type 2 diabetes, referred by their physician for participation in the DSME program. A threat to external validity exists because this study was designed to examine an association between dependent and independent variables. A potential threat to external validity existed because the sample population was collected from one diabetes education site and I was unable to generalize the results to patients in other diabetes education sites.

Ethical Procedures

In this quantitative, retrospective study design, I kept patient's names and other personal information confidential. I kept participant responses to all instruments and health assessments confidential. Only staff at the research site knew the identity of the participants and I did not need or have any access to the identity of the participants to complete the data collection. It was not necessary for me to document participant names and/or contact information for data collection. I only collected data from records and did not need any contact with the participants. Only records from participants 18 years and older were part of the convenience sample. I collected all data on site and no materials or instruments were removed from the site. I stored all collected data on a password-protected computer in an office accessible only to me. I will store the data for a minimum of 5 years as suggested by Walden University.

Summary

The purpose of this study was to examine the association between race, gender and dropout rates from a DSME program. The study was a quanititative, retrospective

study, and I used multiple logistic regression to analyze data. I used a multiple logistic regression analysis to analyze whether there was an association between variables. I will discuss results and data analysis in Chapter 4.

Chapter 4: Results

Introduction

The primary purpose of this research was to investigate the association between race and gender and drop-out rates among participants enrolled in a diabetes self-management education program. I explored dropout rates for African Americans as compared to other races and drop-out rates between men and women. Independent variables were race and gender and the dependent variable was drop-out rates, while controlling for age, weight, education, A1C values, insulin use employment status, marital status, and insurance status.

In this chapter, I provide analysis of the data collected from The Diabetes and Nutrition Center. I used descriptive statistics of the study participants as they related to age, gender, and race, as well as multivariate logistic regression to analyze the data. Chi-square analysis using SPSS software was used to investigate whether there was an association between race and gender (independent variables) and drop-out rates (dependent variable).

Research Questions and Hypotheses

In this study, I addressed the following questions and hypotheses to examine the association between race, gender, and drop-out rates from a diabetes self-management education program.

RQ1: Is there an association between race and dropout rates from participants in a diabetes self-management education program?

$H_0$1: There is no association between race and dropout rates from participants in a diabetes self-management education program.

H_a1: There is an association between race and dropout rates from participants in a diabetes self-management education program.

RQ2: Is there an association between gender and dropout rates from participants in a diabetes self-management education program?

$H_0$2: There is no association between gender and dropout rates from participants in a diabetes self-management education program.

H_a2: There is an association between gender and dropout rates from participants in a diabetes self-management education program.

Data Collection and Management

For this quantitative, retrospective study, I collected secondary data from The Diabetes and Nutrition Center after gaining Walden Institutional Review Board (IRB) approval (IRB approval No. 12-20-17-0068282) to conduct the study. I collected data from a proprietary database of participants who attended the DSME program at the Diabetes and Nutrition Center between January 2014 and December 2016. Based on the power analysis described in Chapter 3, the study required a minimum of 337 participants. I randomly selected 352 participants for my study from the research site's proprietary database. The sample size was larger than the minimum sample estimated in the power analysis in Chapter 3. Before performing a data analysis, I recoded some variables. I excluded the Hispanic and other variable of race, the A1C category <5.7, and the weight

categories of 100-120 lbs. and 121-140 lbs. The insurance status category only included insured, grants, and Medicare/Medicaid. Marital status only included categories single and married. For the purpose of this analysis, I combined college and grad school, and less than high school, high school and some college were combined for fewer categories.

Results

Descriptive Statistics

Table 1 shows a summary of the descriptive statistics for the participants sampled for this study. The results indicated that from the 352 participants, 43.2% were male and 56.3% were female. Participants were 42.9% Black/African American, and more than 50% were White/Caucasian. Age groups of participants were between 19 and greater than 60 years of age. A majority of the participants (39.5%), were between the ages of 45-59 years of age; and over 60 years of age. The majority of participants (308) reported a start-of-program weight of greater than 160 lbs. (87.5%). The weight categories were used because BMIs were not available for the enrolled population. Clinical judgement and familiarity of the enrolled population led to the determination of greater than 160lbs being classified as overweight. The majority of participants were single (52.8%). Participants in the combined education category finished high school, had some high school or college made up more than half of the sample, with 44.9% participants reporting a college or grad school education. Over half of the participants were recorded as being employed. Participants used several payment options to participate in the program. Health insurance and Medicare/Medicaid made up nearly 90% (47.7% and 42.9% respectively) of the recorded payment information.

Table 1

Descriptive Statistics of Patient Characteristics in a Diabetes Self-Management Education Program

Variable	Frequency	%
Gender		
Male	152	43.2
Female	198	56.3
Missing	2	.6
Total	352	100.0
Race		
Black	151	42.9
White	185	52.6
Missing	16	4.5
Total	352	100.0
Age		
19-29 yrs.	18	5.1
30-44 yrs.	54	15.3
45-59 yrs.	139	39.5
>60 yrs.	139	39.5
Missing	2	.6
Total	352	100.0
Weight		
141-160	27	7.7
>160	308	87.5
Missing	17	4.8
Total	352	100.0
Marital Status		
Single	186	52.8
Married	162	46.0
Missing	4	1.1
Total	352	100.0

(Table Continues)

Variable	Frequency	%
Education		
College/Grad School	158	44.9
Less than HS/HS/Some College	191	54.3
Missing	3	.9
Total	352	100.0
Employment		
Yes	151	42.9
No	199	56.5
Missing	2	.6
Total	352	100.0
Insurance Status		
Insurance	168	47.7
Grants	23	6.5
Medicare/Medicaid	151	42.9
Missing	10	2.8
Total	352	100.0
A1C		
5.7-6.4	34	9.7
>6.4	302	85.8
Missing	16	4.5
Total	352	100.0
Insulin Use		
Yes	78	22.2
No	272	77.3
Missing	2	.6
Total	352	100.0
Completed Program		
Yes	64	18.2
No	285	81.0
Missing	3	.9
Total	352	100.0

Three hundred and two (85.8%) participants were noted to have A1C levels greater than 6.5, and 9.7% (34) participants had A1C levels between 5.7 and 6.4. Most participants (77.3%) reported not being insulin users. A majority of participants (81%), did not complete the program while 64 (18.2%) of participants completed the program.

Addressing the Research Questions from the Research

I used a chi square analysis to determine the effect of each participant characteristic on the completion of the diabetes self-management education program. I assessed the ability of the model to predict program completion as it related to race and/or gender. The confidence level was predetermined at 95% and the *p* value was <0.05 when calculating the statistical analysis. The results of the chi-square and multivariate regression analysis are presented in Table 2, Table 3, Table 4 and Table 5.

Research Question 1

RQ1: Is there an association between race and dropout rates from participants in a diabetes self-management education program?

$H_0$1: There is no association between race and dropout rates from participants in a diabetes self-management education program.

H_a1: There is an association between race and dropout rates from participants in a diabetes self-management education program.

Table 2

Cross-Tabulation: Chi-Square Analysis of Race of Participants in a Diabetes Self-Management Education Program

	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.694[a]	1	.405		
Continuity Correction[b]	.478	1	.489		
Likelihood Ratio	.698	1	.403		
Fisher's Exact Test				.480	.245
Linear-by-Linear Association	.692	1	.406		
N of Valid Cases	335				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 27.95.

b. Computed only for a 2x2 table

This analysis examined whether there was a statistically significant association between race and diabetes self-management education program completion. The results from the Chi square analysis (Table 2) showed that there was no statistically significant association between race and program completion (*p* value 0.40). Therefore, the null hypothesis of no association between race and dropout rates from participants in a diabetes self-management education program cannot be rejected.

Research Question 2

RQ2: Is there an association between gender and dropout rates from participants in a diabetes self-management education program?

$H_0$1: There is no association between gender and dropout rates from participants in a diabetes self-management education program.

H_a2: There is an association between gender and dropout rates from participants in a diabetes self-management education program.

Table 3

Cross-Tabulation: Chi Square Analysis of Gender of Participants in a Diabetes Self-Management Education Program

	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.134[a]	1	.715		
Continuity Correction[b]	.051	1	.821		
Likelihood Ratio	.133	1	.715		
Fisher's Exact Test				.780	.409
Linear-by-Linear Association	.133	1	.715		
N of Valid Cases	349				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 27.69.

b. Computed only for a 2x2 table

This analysis examined whether there was a statistically significant association between gender and diabetes self-management education program completion. The results from the chi square analysis (Table 3) showed that there was no statistically significant association between gender and program completion (*p* value .71). Therefore, the null hypotheses of no association between gender and dropout rates from participants in a diabetes self-management education program cannot be rejected.

Results from Chi-Square Analysis

The results (see Table 4) indicated that there is a significant association between participant age (X^2 = 9.037, p = 0.0288); and A1C levels (X^2=5.923, p=0.0149) and

diabetes self-management education program completion. The highest dropout rates were among participants between the ages of 30-44, (47 out of 54 participants), and between the ages of 45-59 (120 out of 138 participants), showing 87% dropout rate within the both age groups. Chi square results indicated the highest dropout rates (97.1%) among participants with an initial visit A1C level of 5.7-6.4. Collecting blood via a blood sample is the most accurate way to obtain an A1C level. A1C levels between 5.7-6.4 are considered prediabetic and patients with levels greater than 6.4 are considered diabetic (Mayo, 2016). Age and A1C results show a slight statistical significance and are significant predictors of program completion. Weight categories were determined using clinical judgement and participants with a weight greater than 160lbs were captured in over 80% (307) of the enrolled population and classified as overweight. Also, participant BMIs were not available. However, race, gender, weight, marital status, education, employment status, insurance status, and insulin use, showed no statistical significant association to diabetes self-management program completion. Chi-square analysis resulted in *p*-values greater than 0.05.

Table 4.

Results From Chi Square Analyses

Variables	Completed Program (Yes)	%	Completed Program (No)	%	Total	Chi square
Gender						
Male	29	19.2	122	80.8	151	X^2(0.134)
Female	35	17.7	163	82.3	198	*p*(0.7143)
Race						
Black	25	16.6	126	83.4	151	X^2(0.694)
White	37	20.1	147	79.9	184	*p*(0.4048)
Age						
19-29 yrs.	6	33.3	12	66.7	18	X^2(9.037)
30-44 yrs.	7	13.0	47	87.0	54	*p*(0.0288)
45-59 yrs.	18	13.0	120	87.0	139	
>60	33	23.7	106	76.3	139	
Weight						
141-160	3	11.1	24	88.9	27	X^2(1.007)
>160	58	18.9	249	81.1	307	*p*(0.3156)
Marital Status						
Single	35	18.8	151	81.2	186	X^2(0.037)
Married	29	18.0	132	82.0	161	*p*(0.8474)
Education						
College/Grad school	29	18.4	129	81.6	158	X^2(0.000)
Less than HS/HS/Some college	35	18.4	155	81.6	190	*p*(<0.001)
Employment Status						
Yes	24	16.0	126	84.0	150	X^2(0.960)
No	40	20.1	159	79.9	199	*p*(0.3271)

Variables	Completed Program (Yes)	%	Completed Program (No)	%	Total	Chi square
Insurance Status						
Insurance	24	14.4	143	85.6	167	X^2(2.545)
Grants	4	17.4	19	82.6	23	p(0.2801)
Medicaid/Medicare	32	21.2	119	78.8	151	
A1C						
5.7-6.4	1	2.9	33	97.1	34	X^2(5.923)
>6.4	60	19.9	241	80.1	301	p(0.0149)
Insulin Use						
Yes	19	24.4	59	75.6	78	X^2(2.432)
No	45	16.6	226	83.4	271	p(0.1188)

Results of Multivariate Regression Analysis

I used a multiple logistic regression to explain the association between the dependent variable (dropout rate) and the independent variables (race, gender). The results (see Table 5) showed that race is not a statistically significant predictor of program completion. The results also showed that gender is not a statistically significant predictor of program completion. The results of the multiple logistic regression in Table 5 included covariates. Participants who reported an A1C between 5.7-6.4, had higher odds (6.85) of not completing the program. Although these results were almost significant (p = 0.064). A1C was not a significant predictor of program completion. The results in table 5 shows that the OR showed no statistical significance for the age group (19-29 [OR = 1.01, p = 0.983], 30-44 [OR = 2.23, p = 0.158, 45-59 [OR = 2.05, p = 0.066]). Although the age group between 45-59 yrs. showed results that were almost

significant, age was not a significant predictor of program completion. The following variables: weight, education, insulin use, insurance status, marital status and employment status, resulted in *p*-values greater than 0.05, which indicated no statistical significant association to program completion.

Table 5

Multivariate Regression Analysis Results Predicting Program Completion

Independent Variable	Odds Ratio (OR)	P-value
Race		
Reference = White		
Black	1.03	0.929
Gender		
Reference = Female		
Male	1.09	0.782
Age		
19-29 yrs.	1.01	0.983
30-44 yrs.	2.23	0.158
45-59 yrs.	2.05	0.066
A1C		
5.7-6.4	6.85	0.064
Weight		
141-160 lbs.	1.79	0.373
Education		
College/Grad School	0.82	0.584
Insulin Use		
Yes	0.84	0.637
Insurance Status		
Insurance	1.17	0.702
Grants	0.73	0.636
Marital Status		
Single	1.11	0.752
Employment Status		
Yes	1.14	0.735

Covariates

The results of the chi square analysis in Table 4 included covariates (age, weight, marital status, education, employment, insurance status, A1C and insulin use). The results indicated that there was a significant association between participant age (X^2 = 9.037, p = 0.0288) and program completion. Results showed an 87% dropout rate for participants between the ages of 30-44, and between the ages of 45-59. Chi square results also indicated that there was a significant association between A1C levels (X^2 = 5.923, p = 0.0149) and program completion. The results indicated the highest dropout rates (97.1%) in participants with an initial visit A1C level of 5.7-6.4. Age and A1C results showed a slight statistical significance and are significant predictors of program completion. However, weight, marital status, education, employment status, insurance status, and insulin use, showed no statistical significant association to program completion.

The results of the multiple logistic regression in Table 5 showed participants who reported an A1C 5.7-6.4, had higher odds (6.85) of not completing the program. Although these results were almost significant (p = 0.064). A1C was not a significant predictor of program completion. The results in table 3 shows that the *OR* showed no statistical significance for the age group. Although the age group between 45-59 years showed results that were almost significant, age was not a significant predictor of program completion.

Summary

In chapter 4, I discussed the data for analysis and results of the retrospective data collected for participants who were enrolled in the Diabetes and Nutrition Center's DSME program between January 2014 and December 2016. I examined if there was an association between race, gender (independent variables) and dropout rates (dependent variable) for participants in a DSME program. I used chi square analysis to assess if there was an association between gender and/or race and dropout rates in a diabetes self-management education program. A multiple logistic regression was used to explain the predictor relationship among the variables.

Two research questions (RQ) were answered. In research question 1, I explored the association between race and dropout rates from participants in a DSME program. Based on the results, the alternative hypothesis of there is an association between race and dropout rates from participants in a DSME program was rejected and I accepted the null hypothesis that there was no association between race and dropout rates from participants in a DSME program.

In research question 2, I explored the association between gender and dropout rates from participants in a diabetes self-management education program. Based on the results, the alternative hypothesis of there is an association between gender and dropout rates from participants in a diabetes self-management education program was rejected and I accepted the null hypothesis that there was no association between gender and dropout rates from participants in a diabetes self-management education program.

In chapter 5, I will interpret these findings, discuss limitations of the study, evaluate implications for social change and describe recommendations for future research.

Chapter 5 Discussion, Conclusions and Recommendations

Introduction

Diabetes is a condition that presents as higher than normal blood sugar levels (Wyness, 2009). Diabetes is a widespread problem that affects all ethnic groups; however, African Americans have the highest prevalence of the disease (Walker, Stevens & Persaud, 2010). Diabetes has two forms: Type 1 and Type 2. A diagnosis of Type 1 diabetes usually requires daily insulin shots, whereas Type 2, which represents the majority of diabetes diagnoses, may or may not require insulin, but most cases are controlled with lifestyle modifications (Wyness, 2009). Researchers estimate that between 2015 and 2030, the prevalence of diabetes will increase more than 50%, affecting over 50 million Americans (Rowley, Bezold, Yasemin, Byrne, & Krohe, 2017). Several factors are associated with the incidence of diabetes. Beckles and Chou (2016), noted CDC data that show an association between socioeconomic issues and diabetic disparities among Caucasians and Hispanics, while an increase in obesity is shown to be related to an increase in prevalence of diabetes in African American women (Tilghman, 2003).

Management of diabetes includes a healthy diet and regular exercise. Following and maintaining ADA recommendations for people diagnosed with diabetes and

individuals at risk for diabetes is often difficult and cultural beliefs may determine how or if a person modifies behavior (Goody & Drago, 2009). Modifying traditional dietary food practices can be challenging for African American women due to the cultural association of food and traditional values (Liburd, 2003). It is important that people with diabetes are able to self-manage their diabetes to prevent adverse effects of the disease. Diabetes education has improved and has become the key to helping improve health outcomes in individuals diagnosed with diabetes (Mensing & Norris, 2003). Diabetes self-management education has been deemed necessary to increase knowledge, improve dietary and nutritional behaviors, and maintain blood sugar levels (Walker et al., 2010). Research has shown that diabetes education is beneficial and leads to better diabetes self-management (Gucciardi et al., 2008) and can be a key component in reducing the incidence of diabetic complications (Raffel, Goddu, & Peek, 2014). There is an abundance of literature that discusses diabetes and its causes and the importance of education programs, but what is not understood is drop-out rates in diabetes self-management education programs. There is a limited amount of literature that examines and identifies why and what causes participants to leave diabetes self-management education programs.

The purpose of this quantitative, retrospective study was to examine the association between race, gender, and drop-out rates from participants enrolled in a diabetes self-management education program. Also, this quantitative study was conducted in an effort to fill a gap in literature as it relates to possible associations

between race and gender and dropout rates from participants in a diabetes self-management education program. I collected data from The Diabetes and Nutrition Center. Secondary data were extracted from participants of a diabetes self-management education program.

Summary of Key Findings

The results of my data analysis showed that a majority of the participants (56.3%) were female, over half of participants were Caucasian, and over half were over the age of 45. A chi-square analysis showed a significant association between participant age (X^2 =9.037, p =0.0288), A1C levels (X^2 =5.923, p =0.0149) and program completion. Therefore, age and A1C levels are significant predictors of program completion. Race and gender showed no statistically significant association to diabetes self-management program completion. A multivariate logistic regression analysis of the data failed to show race and gender as statistically significant predictors of program completion. Although results showed that participants with A1C levels between 5.7- 6.4 and the age group between 45-59 years of age showed results that were almost significant, age and A1C levels are not significant predictors in the multivariate model.

Interpretation of the Findings

The objective of my study was to investigate the association between race and gender and dropout rates among participants enrolled in a diabetes self-management education program. I hypothesized that there was no association between race and drop-out rates among participants in a diabetes self-management education program. The

results indicated that the null hypothesis could not be rejected; therefore, race has no significant association with drop-out rates. I hypothesized that there was no association between gender and dropout rates from participants in a diabetes self-management education program. The results showed that the null hypothesis could not be rejected; therefore, gender has no significant association with dropout rates. However, the chi-square results indicated that age and A1C levels are almost statistically significant and are significant predictors of program completion, specifically, for those in the age group 30-59 years of age and participants with an initial A1C level between 5.7-6.4.

Interpretation of Findings with Relation to the Literature

The literature review indicated that little was known concerning attrition rates or why participants dropped out of diabetes self-management education programs. There is a gap in the literature regarding the relationship between race, gender, and drop-out rates of participants enrolled in a diabetes self-management education program. This study was intended to add to the literature and fill the knowledge gap related to what may influence the decision to drop out of diabetes self-management education programs.

The results of this study can neither support nor disprove the previous literature. Similar studies to which to compare my study findings were not available. The findings could however be used as initial research on the subject of race, gender, and retention in diabetes programs and exploring ways to develop programs that are formatted and delivered in a way that increases program completion. In a study conducted by Gucciardi et al. (2007), researchers explained how providing programs that are culturally significant

and address personal challenges may help participants maintain and practice recommended diabetes self-management education.

The lack of similar studies on race, gender, and retention rates for comparison does not refute significant studies related to some of the variables in the study. Previous studies regarding DSME programs document the benefits of increasing diabetes knowledge and modifying behaviors and agree that failure to complete a DSME program increases the risk of adverse health outcomes due to poor diabetes self-management care (Gucciardi et al., 2007). Consideration of covariates in this study was significant. Benoit et al. (2004) stated that participants with high A1C would likely leave diabetes self-management education programs due to illness from poor diabetes management. According to Gucciardi et al. (2008), participants with full-time or part-time work schedules may leave programs early as compared to unemployed participants because of the times and days diabetes centers offer diabetes education.

Limitations of the Study

There were several limitations to this study. I conducted this study in only one diabetes and nutrition center that enrolled participants in a diabetes self-management education program between 2014 and 2016; therefore, I was unable to generalize results to the diabetes population in other diabetes education sites. The results of the study may not be a representation of the diabetes population. Although the power analysis indicated a requirement of 337 sample cases for this study, a small sample size may have contributed to my being unable to generalize results to the targeted population.

The secondary data used in the study were collected by a third party and not directly by me. This introduced the potential for reliability issues with respect to how the data were collected. I was unable to collect missing information in participant records which caused this information to be omitted from the final analysis and results.

Recommendations

This study should be repeated using a larger sample size. A larger sample size may offer a better representation of the targeted population. Another recommendation would be to partner with other diabetes centers that offer DSME programs to discuss strategies to reduce drop-out rates in diabetes self-management programs. Partnerships are an opportunity to not only discuss strategies, but also pool resources to improve programs and eventually reduce diabetic patient visits to emergency rooms and hospital admissions due to exacerbation of symptoms and complications. With an increase in financial and human resources, diabetes centers may be able to offer more than one type of program, which would include self-management education tailored to the current challenges and barriers of the participant. The type of program the participant receives would depend on in-depth answers from participants.

I also recommend follow-up with participants who dropped out of the diabetes center's diabetes self-management education program for hospital admission due to diabetes complications. This may provide an opportunity to gather information from prior participants about self-management challenges or other barriers that may have led to negative outcomes or what influenced participants to drop out of the program. The

information also provides an opportunity for program evaluation and the inclusion of information that may benefit future program participants. Participants who drop out of diabetes programs may provide valuable information on what influences them to choose to leave the program. Understanding these influences may help diabetes educators pinpoint predictors and develop strategies to discuss possible challenges and barriers with participants prior to beginning a diabetes self-management program and hopefully lead to program completion.

To address the high drop-out rates in the program, I recommend a program self-evaluation, focusing on the point in the program at which participants fail to return. This may be a signal that participants are not seeing the benefits from completing the program because the information is not addressing the challenges or barriers that they are facing. Forming a focus group made up of former participants to evaluate and discuss the current curriculum and give feedback on how to improve the program as seen through the eyes of those who are affected by diabetes.

Thorough program self-evaluation will provide an opportunity for diabetes centers to evaluate staff teaching methods and strategies. Diabetes educators must present diabetes education in a way that causes participants to want to change current behaviors. Behavioral changes are influenced by whether participants view the educational information as realistic attainable goals. Participants will be able to take ownership of goals they feel they have the ability to accomplish.

I think it is important for programs to be flexible with program duration. For example, if the majority of participants are dropping out after completing three modules, a decision should be made to change the format or duration of the program. Longer detailed programs may need to be considered for individuals who were newly diagnosed with diabetes. Participants who have been diagnosed for more than 1 year and have previously completed a self-management education program, may be able to attend an abbreviated program with a focused specific curriculum.

Because there is a gap in research relating to race and gender and drop-out rates, further research would serve to benefit populations who are especially affected and at higher risk for being diagnosed with diabetes, such as African American women.

Social Change Implications

Although diabetes can be debilitating across all ethnic groups, African Americans are at a higher risk of being diagnosed with the disease and suffering devastating complications. Simply having programs that provide basic diabetes self-management education is not enough. A deeper examination of culture and traditions that influence unhealthy lifestyles, should be considered when developing diabetes self-management programs. Participants may be more likely to complete diabetes self-management education if they felt programs were developed with them in mind. Diabetes causes physical, emotional, and financial trauma and there is a need to improve how diabetes self-management programs are developed, implemented, and delivered to individuals diagnosed with diabetes and those at high risk for being diagnosed with diabetes.

Identifying predictors for program attrition, whether associated to race, gender, age, or other factors, is significant in developing strategies that may reduce the likelihood of failing to complete a diabetes self-management program and address challenges before they become barriers by breaking self-confidence in diabetes self-management. Self-efficacy is one of the most important factors in ensuring success in diabetes self-management. Improving self-efficacy may involve including participant social networks, such as family members, in some part of the program because family members or persons in the social network are often directly involved in providing post education support.

Conclusion

The results of this study reveal the need for future research on the reasons participants dropout of diabetes self-management education programs. This study provides additional information related to attrition in diabetes self-management education programs. Although the study results showed no significant association between race and gender and dropout rates from a diabetes self-management education program, participant age and A1C levels were almost significant and can be used as predictors of program completion. As previously mentioned, in the limited studies on diabetes program attrition, researchers agreed that diabetes self-management programs are beneficial, but participants are not completing the programs. Unfortunately, the benefits of completing these programs are not being realized by participants, which presents a challenge for diabetes program developers and educators. No longer can the presentation of diabetes programs be part of a checklist for completion in diabetes centers, but rather they must be

measures of success marked by a reduction in healthcare costs and emergency room and hospital admissions related to diabetes complications.

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