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The influence of race and ethnicity on the prevalence of social stigma for people with type 1 diabetes mellitus

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Abstract

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MA, Southern University A&M College, 2014

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Dissertation Submitted in Partial Fulfillment
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Doctor of Philosophy
Public Health Epidemiology

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Abstract

Various studies attempting to evaluate the prevalence of health-related social stigma in people with type 1 diabetes mellitus (T1DM) identified themes that coincide with increased prevalence including anxiety, low self-esteem, depression, fear of judgement, anger, and feeling ashamed. This phenomenon is believed to be due to the lack of knowledge and understanding about the differences between the diagnosis, treatment, and prevention strategies for T1DM and type 2 diabetes mellitus (T2DM). The Resilient, Empowered, Active Living intervention dataset (n=115) was utilized to further examine this phenomenon by determining whether race and ethnicity influence the prevalence of the following health-related social stigma themes in people with T1DM: anxiety/fear of negative judgement, feeling blamed/rejected/bad about yourself, and feeling depressed. This was accomplished using descriptive statistics, cross-tabulations, and binary logistic regression with chi-square analysis to evaluate the data. The results showed that statistically significant associations exist between the dependent variable feeling blamed/rejected/bad about oneself and independent variable ethnicity, as well as the dependent variable feeling depressed and independent variable race. Statistically significant *p*-values were associated with negative B coefficients amongst minority racial and ethnic groups. This means that individuals in these groups are less likely to report having such feelings. Identifying these reporting differences can enact social change by aiding in treatment of these social stigma themes as well as improving health outcomes that are commonly affected by their increased prevalence.

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Table of Contents

List of Tables

Chapter 1: Introduction to the Study

Introduction

Diabetes mellitus (DM) has become a major public health issue over the years. As one of the major contributing causes of death in the United States, DM lowers the quality of life and increases morbidity and mortality at higher rates for African American and Hispanic populations. Researchers have identified various factors as contributors to DM-related health complications, including health-related social stigma, which involves placing a negative connotation on a disease and the individuals who have it. However, due to lack of knowledge on the differences between the two types of DM, that is, Type 1 DM (T1DM) and Type 2 DM (T2DM), people with T1DM suffer more from the effects of health-related social stigma. People with T1DM often experience stigma geared toward aspects of T1DM and T2DM. Evaluating the effects of health-related social stigma in T1DM populations across different racial/ethnic groups aids in identifying those at high risk and allows public health officials to develop interventions geared toward enhancing self-management practices.

Background

DM is a chronic metabolic disorder that can develop into one of two main types, T1DM or T2DM. While other types of DM exist, for the purposes of this study, I focused on the main two. T1DM involves the autoimmune destruction of pancreatic β-cells that produce the hormone insulin. T2DM involves an insulin deficiency caused by the inadequate secretion of or diminished tissue responses to the hormone insulin (World Health Organization, 2020). When both types are poorly managed, increased amounts of glucose can accumulate in the bloodstream causing hyperglycemia. Additionally, hypoglycemia can occur when medication is taken to reduce the amount of glucose in the blood but results in dangerously low blood glucose levels. Neither type of DM is considered directly fatal; however, hypoglycemia must be treated immediately due to the risk of loss of consciousness. Extended periods of hyperglycemia can be fatal to bodily organs such as the heart, nerves, eyes, blood vessels, and kidneys (Sen et al., 2016). Given the seriousness of the health consequences, the American Diabetes Association ranked DM as the seventh leading cause or contributing cause of death in 2015 (Li et al., 2019). With incidence and prevalence rates steadily increasing, public health organizations have employed numerous strategies to research methods of prevention and treatment.

Like many other chronic diseases and health related issues, racial/ethnic minorities suffer disproportionately from DM related complications. In general, 23.6 million Americans are living with DM; 13.2% are African American, 11.9% are Hispanics, and 7.1% are European American (Wilkes et al., 2011). However, statistical data on T1DM is limited. What is known is that 5% of all diagnosed cases of DM are T1DM, while the remaining 90%-95% are T2DM. Spanakis and Golden (2013) briefly noted that T1DM is most prevalent in children and highest in non-Hispanic Whites while T2DM is was relatively low within these communities. The difference in statistics provide a framework to understanding the differences in development, treatment, and prevention of both types of DM, aspects that are commonly misunderstood.

My mother was diagnosed with Type 1 diabetes when she was 25. She is now 52. Over the years, she has experienced a plethora of treatment regimens to self-manage her diabetes. When asked what her most significant challenge has been, she has consistently explained that race is often the first thing healthcare workers see when she reveals that she is a diabetic. Without question, health care workers often assume that she has Type 2 diabetes and begin treating her as such. Having had Type 1 diabetes for over 25 years, my mother is aware that certain medications such as Glucophage and Metformin are used to treat Type 2 diabetes. She recalls telling many healthcare professionals, sometimes repeatedly, that she has Type 1 diabetes and that those medications are not used to treat her condition. She has recalled the surprise of healthcare professionals when she explains this to them, and her surprise when they respond by asking her if she has been tested to determine that she has Type 1 diabetes. My mother concludes that this is because she is African American. She believes that Type 2 diabetes is associated with race/ethnic minority groups and that people with Type 2 diabetes are considered the cause of their condition. The lack of knowledge and stereotypes associated with between T1DM and T2DM serves as a major hindrance to prevention and treatment efforts of DM. As previously stated, T1DM occurs due to an auto-immune response that facilitates the cellular mediated destruction of the insulin producing pancreatic β-cells. Once considered a disease that manifests in children, recent research has shown that the disease can develop at any stage in life, and that genetics can play a major role in development. In contrast, T2DM occurs more frequently, about 90%-95% of all DM cases, and is the result of an insulin deficiency that influences either partial or total insulin resistance (American Diabetes Association, n.d.). This form of the disease is often associated with certain ethnic groups and being overweight or obese. However, a larger body of research exists evaluating the prevalence of T2DM and major contributors of disease. While this research was focused on health-related social stigma in T1DM populations, it is important to understand the negative connotations of T2DM that are experienced by people with T1DM.

Problem Statement

Previous researchers have identified health-related social stigma as a main contributor to DM-related health complications and note its impact on T1DM populations. Theoretically, social stigma can be divided into three categories: social psychological, sociological, and interactionist (Schabert et al., 2013). Social psychological stigma associates the stigmatized attributes with undesirable characteristics. Stigmatized attributes are any aspect of treatment and/or prevention of a disease that can be looked at as unfavorable. Sociological stigma is defined in terms of disease characteristics that become disassociated from the disease and are given a negative connotation in social environment. Interactionist stigma combines aspects of both social psychological and sociological stigma. This type of stigma involves identifying and labeling human differences, linking the differences with negative stereotypes, separating stereotyped individuals from others in the community, and evoking feelings of discrimination.

Health related social stigma can be any characteristic of a disease to which society may attach a negative connotation/theme. These negative attributes can serve as a hinderance to self-management behaviors in T1DM communities. Browne et al. (2014) conducted a study geared toward evaluating social stigma and the attached negative connotations/themes in T1DM communities. Using semistructured interviews administered to 27 Australian adults, Browne et al. (2014) found that people with T1DM reported experiencing both T1DM and T2DM related stigma. These social stigma experiences were categorized by the following negative connotations/themes felt by the interviewees: blame, negative judgement, stereotyping, exclusion, rejection, and discrimination. The researchers' stated that the identification of these themes, while significant, may not be transferable to rural/urban populations and/or non-Australian populations due to lack of representation in the study (Browne et al., 2014). Additionally, Jeong et al. (2018) identified five main themes exhibited by people with T1DM who have experienced health-related stigma. The five themes are (a) desire to be seen as a person, (b) wanting to be normal, (c) feeling ashamed managing diabetes in public, (d) struggling to overcome anger and distress, and (e) feeling distrusted by others (Jeong et al., 2018). The researchers found that these themes tend to evoke negative feelings of judgement and discrimination serving as a barrier to performing self-management behaviors including glucose monitoring and insulin dosing. Self-management practices play a large role in the daily management of T1DM. The rejection of self-management behaviors can be directly associated with increases in incidence and prevalence of the disease (Jeong et al., 2018). Thus, evaluating the interconnections between health-related social stigma themes and race/ethnicity can serve as a map to understanding adherence to self-management practices in T1DM. For this research, I evaluated the following health-related social stigma themes identified by Browne et al.: fear of negative judgement/anxiety, feeling blamed/rejected/bad about oneself, and feeling depressed.

Study Purpose

Eradication of public health issues such as T1DM is reliant on the cultural beliefs, attitudes, and behavioral practices of different racial/ethnic communities. Race/ethnicity influences an individual’s perceptions of health, illness, and death; ideas of what causes disease; and how they approach treatment, prevention, and information (Canadian Paediatric Society, 2018). In this quantitative study, I evaluated the influence that race/ethnicity had on the prevalence of health-related social stigma themes in people with T1DM. Evaluation of these variables allowed for better understanding of which races/ethnicities are associated with increased social stigma.

Research Questions and Hypotheses

The following research questions were examined:

RQ1: What is the difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across racial groups in T1DM populations?

$H_0$1: There is no difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across racial groups in T1DM populations.

H_a1: There is a difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement across racial groups in T1DM populations.

RQ2: What is the difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across ethnic groups in T1DM populations?

$H_0$2: There is no difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across ethnic groups in T1DM populations.

H_a2: There is a difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across ethnic groups in T1DM populations.

RQ3: What is the difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across racial groups in T1DM populations?

$H_0$3: There is no difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across racial groups in T1DM populations.

H_a3: There is a difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across racial groups in T1DM populations.

RQ4: What is the difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across ethnic groups in T1DM populations?

$H_0$4: There is no difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across ethnic groups in T1DM populations.

H_a4: There is a difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across ethnic groups in T1DM populations.

RQ5: What is the difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across racial groups in T1DM populations?

$H_0$5: There is no difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across racial groups in T1DM populations.

H_a5: There is a difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across racial groups in T1DM populations.

RQ6: What is the difference in the prevalence of T1DM related social stigma measured by feeling depressed across ethnic groups in T1DM populations?

$H_0$6: There is no difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across ethnic groups in T1DM populations.

H_a6: There is a difference in the prevalence of T1DM related social stigma measured by feeling depressed across ethnic groups in T1DM populations.

Theoretical Framework

Various social and behavioral theories and models can be used to evaluate the social stigma that influences self-management practices of persons with T1DM. The social construction of reality, a social theory presented by Berger and Luckmann in the

1960s, proposes that the real world is composed of socially and culturally authentic ideas, practices, and things (Kleinman, 2010). These aspects of the real world shape the thoughts and opinions of individuals and communities on different health disparities and how they should approach them. When creating health interventions, public health officials should consider the social construction of reality in different communities before implementation. In addition, the social cognitive theory is another framework that can be applied to these research questions. This theory suggests that behavioral learning occurs through the dynamic interaction between a person, environment, and behavior (Thojampa & Sarnkhaowkhom, 2019). It takes into account an individual's social environment and their past experiences that can be used to shape whether they will engage in specific behaviors. For example, if a behavior has a positive connotation, individuals are more likely to engage; however, if a negative connotation is placed on a behavior, individuals will be less likely to perform them. Understanding such influences can aid in tailoring community health interventions to the experiences or environmental challenges that reduce engagement in these unfavorable health behaviors.

Nature of the Study

I used a quantitative, correlational research method to evaluate data from the Resilient, Empowered, Active Living (REAL) Assessment dataset. Correlational research is a form of nonexperimental research where two variables are being measured to evaluate their statistical relationship (Price et al., 2015.) These studies involve no effort to manipulate or control inessential variables. In this study, I used quantitative methods to quantify experiences of stigma in a way that allows for better understanding of the relationship between variables. For this research, I used binary logistic regression to predict the probability of an observation falling into one of two categories of each dichotomous dependent variable. I also used chi squared analysis to evaluate the existence of a relationship between the variables. The quantitative data for this research was collected to analyze whether the prevalence of T1DM-related social stigma differs across racial and ethnic background.

Social stigma targeting self-management behaviors was the dependent variable that was tested. This variable was analyzed by evaluating the prevalence of some of the main themes exhibited by individuals who encountered social stigma. These themes included anxiety/fear of negative judgement, feeling blamed/rejected/bad about oneself, and feeling depressed. Fear of negative judgment/anxiety was evaluated using a survey that evaluated the prevalence of the variable where 0 = no anxiety and 1= yes anxiety. The remaining two variables were evaluated by looking at whether the participant had experienced such feelings and how often, where 0 = not at all, 1 = several days, 2 = more than half the days, and 3 = every day.

Race and ethnicity were the two independent variables that were evaluated in this study. The race category separated participants into the following categories: 1 = Native American or Alaska Native, 2 = Asian, 3 = Native Hawaiian or Pacific Islander, 4 = Black or African American, 5 = White or European American, and 6 = Some other race. Ethnicity, on the other hand, separated participants into categories of 1 = Hispanic/Latino and 2 = Not Hispanic/Latino.

Definitions

Type 1 diabetes: A chronic metabolic condition involving the autoimmune destruction of insulin producing pancreatic β-cells.

Health-related social stigma: Negative connotations placed on a disease or those who possess the disease by peers in society.

Health-related social stigma themes: A means of measuring the impact of health-related social stigma by evaluating the feelings that those experiences evoke.

Race: Grouping of individuals based on physical characteristics in society (i.e., skin color).

Ethnicity: Grouping of individuals based on a common language, culture, or ancestry

Assumptions

Race and ethnicity play a major role in health equity and health outcomes in T1DM populations (Spanakis & Golden, 2013). This study focused on evaluating this role as it pertains to its influence on the prevalence of health-related social stigma themes in people with T1DM. When conducting such evaluations, several assumptions were made regarding the study and design. One assumption made was that people with T1DM who have experienced social stigma exhibit one or more of the identified themes. This is essential because it provides a means for measuring stigma in this population. Another assumption was that the original participants provided honest and accurate responses to the survey questions, which ensures that the results are free of bias and other errors.

Scope and Delimitations

The goal of this study was to evaluate the prevalence of social stigma themes in populations of people with T1DM. Because of the impact that race and ethnicity have on health and health outcomes, the study examined how race and ethnicity influenced the prevalence of these themes within T1DM populations. The cognitive and social construction of reality theories were applied for a more thorough understanding of the association between race/ethnicity and themes of social stigma.

The research plan included secondary data obtained from the REAL dataset. Inclusion criteria included participants diagnosed with T1DM that reported feelings associated with health-related social stigma. Exclusion criteria included participants diagnosed with T2DM.

Limitations

While secondary data collection tends to be more ideal due to its less time consuming and cost-effective nature, there are limitations that can arise when using such methods. For instance, the individuals evaluating the secondary data normally were not involved in the initial data collection process. Therefore, they may be unaware of any nuances and anomalies in the data collection that significantly affect how certain variables are interpreted (Cheng & Phillips, 2014). To ensure this does not occur when using secondary data, it is important that the researcher is familiar with all documentation provided for the dataset they intend to use. This documentation should help to ensure the validity of the data provided and accuracy of the results.

Significance

This study can impact social change through the knowledge and understanding it will bring about the influences that different races and ethnicities have on the prevalence of health-related social stigma themes in these communities. This can aid in creating interventions geared toward decreasing stigma and increasing knowledge and adherence to self-management behaviors. Increased knowledge and understanding will decrease the stereotypes and discrimination that exist toward individuals with T1DM, creating a safer environment where they can perform self-management activities without fear, shame or judgement.

Summary

In summary, health-related social stigma is a major contributor to poor health disparities in people with T1DM. The phenomenon is believed to be due to the lack of knowledge and understanding on the diagnosis, treatment, and prevention strategies for T1DM. This results in people with T1DM suffering from the effects of T1DM- and T2DM-related social stigma. By utilizing the REAL assessment dataset, I was able to better understand the prevalence of social stigma in different racial/ethnic groups of people with T1DM. In addition, quantification of this association was provided using binary logistic regression analysis and chi-square analysis. The findings aid in creating positive social change by informing public health officials of the high-risk populations that are influenced by T1DM-related social stigma, and by creating interventions that stimulate knowledge and understanding of the disease.

Chapter 2: Literature Review

Introduction

Social stigma is a major contributor to the burden of illness due to its influences on treatment practices and disease control. Certain racial/ethnic communities tend to suffer disproportionately from social stigma leaving them vulnerable to adverse health problems. This remains true for T1DM populations where self-management practices are the main method used for treatment and prevention. Social stigma in these populations acts as a barrier for conducting self-management practices due to the judgement and discrimination experienced from society; this in turn creates feelings of anxiety, depression, and shame in those with the disease.

Race/ethnicity serves as a predictor of poor health outcomes and poor adherence to self-management practices in people with T1DM. Minority groups such as African Americans and Hispanics tend to suffer from more adverse health conditions when compared to other racial/ethnic groups in this population (American Diabetes Association, n.d.). This was thought to be due to various health inequities such as discrimination within the health care system and lack of access to adequate health care.

This research evaluated the influence that race/ethnicity has on the prevalence of social stigma themes in T1DM populations to provide understanding of the type of association that exists. Having this knowledge will aid in targeting interventions geared toward reducing T1DM related social stigma in high risk racial/ethnic groups.

Literature Search Strategy

I found previous literature by using various databases from Walden University's online library. In the library, I looked for health sciences resources, and I selected the following databases as search engines to find research articles: PubMed, ProQuest, Medline with full text, and ScienceDirect. I also used Google Scholar to find additional research articles with more recent publication dates. In addition, I searched the Inter-university Consortium for Political and Social Research (ICPSR) to find a secondary dataset that could be used to evaluate the research question.

I used various key search terms in this literature search strategy, *including social stigma* AND *health*, *Type 1 diabetes mellitus* OR *Type 1 diabetes* OR *juvenile diabetes, social stigma* AND *diabetes mellitus*, *race* OR *ethnicity* AND *diabetes mellitus, culture* AND *social stigma, juvenile diabetes* AND *social stigma, race* OR *ethnicity* AND *social stigma, juvenile diabetes* AND *discrimination*.

All viable literature had to meet two criteria to be considered usable. The first criterion involved the age of the research; all articles published before 2015 were removed from the search results. The second criterion required that the article be peer-reviewed, meaning articles that have been reviewed by other experts besides those conducting the research to ensure validity. However, because of the limited amount of research on T1DM and social stigma, dissertations were also a utilized form of literature. All research that met these two criteria were analyzed to evaluate whether the information provided was directly or indirectly related to the research questions.

Theoretical Foundation

The social construction of reality is a social theory created by Berger and Luckmann in 1966. These sociologists believed that society is composed of humans and human interactions that they called *habitualization* (Lumen Learning, n.d.). According to Berger and Luckmann (1966), habitualization is defined as any frequently repeated action that becomes a pattern that can be performed in the future with the same outcome. Society becomes a “habit” that is constructed by the aspects of our everyday lives.

The roles individuals play in their day-to-day life is an example of the habitualization described by the social construction of reality theory. Roles are defined as behavior patterns that individuals possess that represent their social status (Lumen Learning, n.d.). These roles can include daughter, neighbor, or student; each with a different set of behaviors set by society that defines how the role should be conducted.

Sui (2009) utilized the social construction of reality theory to evaluate media’s portrayal of tobacco use in the United States over time. The researcher argued that the news media’s portrayal of tobacco use reflects the dominant ideology within society at any specific time in hopes of maintaining the status quo (Sui, 2009). Therefore, as the beliefs on tobacco changed so did the media’s coverage of it. Sui (2009) noted that *The New York Times* coverage became less supportive of tobacco use as the ideology in society shifted to a less supportive one forcing the researcher to conclude that ideology plays a role in the construction of reality.

The social construction of reality theory was utilized for this research to understand how society’s portrayal of certain self-management behaviors for T1DM can reduce adherence and create and perpetuate stigma in people with T1DM. Because self-management behaviors are not considered normal patterns of behavior, those individuals who practice such behaviors may tend to face criticism and discrimination when in society. Understanding this reality is important to consider when creating health interventions geared toward increasing adherence to self-management behaviors.

The social cognitive theory is social theory that can be utilized to evaluate the research. The theory suggests that individuals learn behaviors through reciprocal interactions between a person, their environment, and behavior (Thojampa & Sarnkhaowkhom, 2019). Bandura developed the theory in the 1960s, and it has become one of the most widely used and evaluated theories over the years. It suggests that an individual’s social environment and their past experiences can be used to shape whether they will engage in specific behaviors. Bandura posited that self-efficacy, which refers to an individual’s belief that they can perform a task, is the main determining factor of behavior that is task-oriented (as cited in Beauchamp et al., 2019). Therefore, the fewer barriers that exist within a social environment and the fewer negative past experiences, the higher the self-efficacy will be for performing behaviors.

Lin and Chang (2018) proposed the use of the social cognitive theory to evaluate the antecedents of health information exchange in social media. The researchers collected information from Facebook users who have experience with health information exchange. I utilized aspects of the social cognitive theory to evaluate outcome expectations on health self-management competence and social relationships of the study participants through human-to-human interaction and human to information interaction.

Social cognitive theory posits that outcome expectations consist of three forms: physical effects (e.g., pleasure and discomfort), social effects (e.g., social recognition and applause), and self-evaluation effects (e.g., self-satisfaction; Lin & Chang, 2018). The researchers found that outcome expectations of health self-management competence have a positive influence on human to information interaction, while health self-management competence and social relationships play a large role in health information exchange and have a positive influence on human-to-human interaction.

Understanding the influences that reciprocal interactions between individual, environment, and behaviors regarding T1DM can provide insight on the ideals and culture surrounding health within the population. This information can utilized in tailoring community health interventions to the experiences or environmental challenges that reduce adherence to self-management behaviors. This will be done by increasing the health self-management competence in T1DM populations.

Literature Review

Previous research evaluating the influence of race on the association between social stigma and T1DM outcomes has focused on various aspects of the hypothesized association. Researchers have identified differences in health outcomes across races/ethnicities, established social stigma as a predictor of quality of life in people with DM, created scales to qualify and identify the prevalence of social stigma amongst people with T1DM and T2DM, and identified themes that are commonly associated with social stigma experiences. These studies have provided in-depth insight on the association between these specific variables; however, further research and understanding may still be required.

Cross-Sectional Studies

Various articles used a cross sectional study approach to evaluate whether associations exist between social stigma and DM outcomes. Cross-sectional studies are observational studies used to collect data from a population at a specific point in time. These types of studies provide information on odds ratio, absolute risk or relative risk, of an association or event occurring. These are important when evaluating social stigma and DM outcomes because it provides a snapshot of the environment that can be used to evaluate the existence of an association.

Gredig and Bartelson-Raemy (2017) used a cross sectional study design to evaluate the effects of experienced and perceived stigma on the quality of life for people with DM in Switzerland. The researchers developed and disseminated a self-administered questionnaire to the readers of a Swiss journal geared toward people with DM. The questionnaire provided a qualitative approach to gathering information on stigma experiences that participants may have encountered. The collected data was then analyzed using descriptive statistics and structural equation modelling. A total of 3347 individuals with both Type 1 and Type 2 DM provided responses to the questionnaire, with ages ranging 16 to 96 years old.

The researchers found that participants reporting higher levels of perceived stigma reported higher levels of psychological distress ($b = 0.37$), more pronounced depressive symptoms ($b = 0.33$) and less social support ($b = 0.22$) (Gredig & Bartelson-Raemy, 2017). In addition, those who reported increased psychological distress (*b* = 0.29) and more pronounced depressive symptoms (*b* = 0.28) also predicted a lower quality of life (Gredig & Bartelson-Raemy, 2017). These findings proposed that stigma should be considered as a factor that can be used to predict the quality of life in people with DM. Consequently, healthcare providers and other health officials can increase the quality of life for people with DM by creating interventions geared toward the fight against social stigma and the negative DM stereotypes within communities.

Although the article provided a strong framework for identifying the relationship between social stigma and quality of life, certain limitations arise due to the use of self-reporting tactics to gather information. Gredig and Bartelson-Raemy (2017) identified this as self-reporting bias which occurs due to the under reporting of certain past experiences that may have been forgotten or have been less obvious. This can result in a false negative conclusion or type II error.

Like the cross-sectional study conducted by Gredig and Bartelson-Raemy, Brazeau et al. (2018) sought to evaluate the prevalence of stigma and its influence on the quality of life for people with T1DM. Specifically, the researchers evaluated its relationship with glycemic control in youth with T1DM between the ages of 14-24. Social media was utilized to recruit 380 participants. Each participant completed a web-based survey and provided blood samples to evaluate their HbA1c. Researchers defined the prevalence of social stigma as identifying with one or more of three specific elements of the Barriers to Diabetes Adherence questionnaire (Brazeau et al., 2018). On the other hand, poor glycemic control was defined as having a HbA1c of > 9%. Brazeau et al.

(2018) also found that the multivariate logistic regression showed that social stigma prevalence within the research population was 65.5% (95% *CI* = 60.7-70.3) and associated with 2-fold higher odds of poor glycemic control overall (odds ratio [*OR*] = 2.25, 95% *CI* = 1.33-3.80; adjusted for age, sex, and type of treatment). There were specific associations with both $\text{HbA}_{1c} > 9\%$ (75 mmol/mol; *OR* = 3.05, 95% *CI* = 1.36-6.86) and severe hypoglycemia in the previous year (*OR* = 1.86, 95% *CI* = 1.05-3.31). These results forced the researchers to conclude that a high prevalence of social stigma in youth with Type 1 diabetes is associated with both elevated HbA1c levels and severe hypoglycemia.

Sürücü et al. (2020) conducted a cross-sectional correlational study that sought to identify predictors of the negative perception of insulin treatment in adolescents with T1DM in Turkey. This was accomplished by evaluating stigma, socio-demographic/diabetes-related characteristics, and parents related characteristics. 80 adolescents with T1DM who had previously been hospitalized at the Pediatric Endocrinology and Metabolism clinic volunteered to participate in the study. Data was collected using a personal information form administered to adolescents and their parents, and results were measured using the Appraisal of Insulin Therapy Scale (ITAS) and the Barriers to Insulin Treatment Scale (BIT). Results displayed a positive perception of insulin treatment ($\beta = -.38$, $p < .001$), stigmatization ($\beta = -.24$, $p = .013$), informing others about one's type 1 diabetes ($\beta = .24$, $p = .017$) and only using insulin in when alone in public places ($\beta = .19$, $p = .042$) were significant predictors of a negative perception of insulin treatment, and these variables explained 35% of the common variance (Sʊ̈rʊ̈cʊ̈ et al., 2020). The researchers believed that this knowledge aids in understanding the importance of acknowledging stigma when caring for people with T1DM; however further research is needed to understand how to effectively decrease the negative influence that stigma has on insulin perception for people with T1DM. Furthermore, although this research shows a significant association, the results may not be applicable to the entire population of people with T1DM due to all participants being in Turkey. Additional research including a more geographically diverse sample population is required.

Social Stigma

When researchers begin studying social stigma, it is important to define and establish a valid means of measuring the complex variable within the sample population. Over the years various scales have been developed to identify social stigma quantitatively and qualitatively within health populations. For instance, Beach et al. (2018) developed and tested the Comprehensive Diabetes Stigma Scale (CDSS) to quantify the association between stigma and DM health outcomes. Because poor medication adherence is commonly linked to health-related stigma, the researchers hypothesized that higher rates of stigma in people with Diabetes would be associated with worse medication adherence, insulin use, higher HbA1c values, and younger age groups. The scale included 15 questions that measured perceived DM stigma from family members and the psychological and behavioral consequences that developed as a result (Beach et al, 2018). Beach et al. (2018) tested the CDSS in a population of individuals living with DM and take one or more medications to control the disease. Using Spearman correlations and multiple linear regression to assess the association between variables, they found that higher accounts of DM stigma were associated with less or worse adherence to medication even after adjusting for confounding factors such as age, sex, race, diabetes duration, insulin use, marital status, insurance status, and employment status.

Additionally, utilizing a Danish adaptation of the Australian T1DM stigma assessment scale (DSAS-1 DK), Hanson et al. (2020) sought to determine whether a relationship exists between diabetes stigma and diabetes outcomes in people with T1DM. The study included 1594 participants from a specialist diabetes clinic in Denmark. Each participant was administered a questionnaire that provided information on their socio-economic factors, psychosocial health and diabetes stigma. Three scales for diabetes stigma were identified from the responses to the questionnaire: identity concerns, blame and judgement, and treated differently. Using bivariate and multivariate linear regressions to analyze the relationships between these scales, patient characteristics, and diabetes outcomes. The researchers found that higher levels of diabetes distress and HbA1c levels were associated with higher levels of perceived stigma. The following demographic and health information was associated with higher stigma scores; being female, younger age, low diabetes duration, and having one or more complications. These results forced the researchers to conclude that diabetes related stigma negatively impacts diabetes distress and glycemic control.

Although the use of a large population, validated scales, and a combination of self-report and clinical data provide a solid foundation for this research, there are limitations that must be noted (Hanson et al, 2020). One limitation arises due to the use of a cross-sectional study design. This observational design provides data on the population at a specific point in time which inhibits the researchers' ability to predict causality. Further research will need to be conducted to investigate the causal relationship between the variables.

Carlton et al. (2017) developed a tool for measuring the impact that self-management, or lack thereof, has on DM outcomes. This tool was in the form of a five-step questionnaire that sought to identify the key attributes of self-management. Each step was utilized as a topic guide for conducting semistructured interviews on self-management techniques and DM outcomes. Attributes extracted from these interviews were then measured using four response levels that identified the extent to which self-management techniques impact DM outcomes. Additionally, Dehghani-Tafti et al. (2015) utilized the health belief model (HBM) to identify self-management predictors for DM patients. By using the constructs of the HBM, the researchers were able to predict adherence to various self-care behaviors which they believed would be beneficial for future intervention efforts.

Knowing the disproportional distribution of DM across different races/ethnicities poses the question of how the culture in these different racial/ethnic groups contribute to the social stigma affecting health outcomes. Limited research has been identified that serves to unravel the social construct of stigma amongst various cultures. Culture is an important aspect of stigma because it contributes to how individuals display alternative methods of thinking, feeling, and behaving (Abdoli et al., 2018). According to Weiss et al. (2006), these methods differ across cultural groups and may aid in how individuals within these groups define and manifest social stigma. Understanding these differences is important for improving health outcomes and implementing informed policies in DM communities.

Lui et al. (2017) conducted a study to quantitatively measure diabetes stigma and the psychosocial impact that is associated with it in people with T1DM and T2DM in the United States. Data collection consisted of an online survey administered to 12,000 people with DM. Data analysis revealed that 76% of people with T1DM and 52% of people with T2DM experienced stigma due to their disease. In addition, perceptions of stigma were reported higher in people with T1DM and those who use insulin therapy compared to people with T2DM and those who do not require insulin therapy. These results suggest that most people with DM experience some stigma due to their disease. In addition, stigma disproportionately affects individuals with high A1C and BMI and poor reported blood glucose control.

While social stigma is an important factor in predicting quality of life, other factors have been identified that indirectly predict quality of life in people with DM. Hallgren et al. (2015) acknowledged various factors that influence adherence to DM self-management practices such as eating differently, transportation, cost, lack of access to health care, and cultural barriers including lack of trust in health care. Self-management of DM is the most common means of treatment and prevention of the disease. However, the researchers stated that further knowledge and acceptance of self-management behaviors as a prominent means of prevention and treatment required additional methods for measuring and understanding its impact on the quality of life for those with the disease.

Jeong et al. (2018) sought to evaluate the influence that health related stigma may have on self-management behaviors of people with T1DM. The study utilized qualitative descriptive methods to collect data from two focus groups of 14 people with T1DM aged 20 to 34 years old. Data analysis identified five main themes that were common amongst the focus groups where stigma was prevalent: (a) *Desire to be Seen as a Person, not a Disease*; (b) *Wanting to be "Normal"*; (c) *Feeling Ashamed Managing Diabetes in Public*; (d) *Struggling to Overcome Anger and Distress*; and (e) *Feeling Distrusted by Others to Manage Their Condition* (Jeong et al, 2018). The researchers reported that those participants who experienced increased daily stigma allowed it to negatively influence their adherence to self-management behaviors and mental health. This negative influence commonly led to delaying blood glucose monitoring and insulin dosing and feelings of anger and distress. With this knowledge, health care officials can develop strategies geared toward helping people with T1DM cope with stigma and the mental health issues that it causes.

While this qualitative approach allowed the researchers to identify an association, it cannot determine the causal relationship between stigma and DM self-management behaviors. Additionally, due to the small age range of participants, the results cannot be generalized to all individuals with T1DM. Further research is required to develop strategies addressing health related stigma in all people with T1DM.

Vishwanath (2014) provided much needed in-depth knowledge on public stigma surrounding juvenile diabetes (T1DM) by utilizing the attribution theoretical framework. According to the researchers, attribution theory focuses on the inferential process involving how, when, and why individuals assign blame for a specific event or source (Vishwanath, 2014). Data was collected intercepting shoppers in three different Tops Friendly Markets in western New York. The researchers collected a total of 301 usable responses from shoppers. While this served as an efficient method for collecting data, it did not allow for lengthy responses from shoppers. Each response was short and telegraphic which provided only a small amount of insight on each shopper's beliefs on the disease. However, from the responses, the researchers found that a large portion of participants misunderstand the causes of disease, feel that it is relatively rare, and that the patient is responsible for contracting the disease. They found that people use primarily judgmental terms and phrases to describe the people with juvenile diabetes such as: afflicting children who are lazy, unhealthy, fat, obese, lacking exercise, and having eating disorders.

This research is important to mention because it provides insight on the thoughts and perspective of society on T1DM instead of from the perspective of an individual with the disease. Increasing understanding of this perspective will allow health care officials the opportunity to target interventions to not only those who have experienced stigma, but also to those who perpetuate stigmatization.

In contrast to the various cross-sectional studies evaluating the associations between social stigma and DM, Nyblade et al. (2019) conducted a literature review of articles published within the last five years that assess the development of interventions geared toward reducing stigma within healthcare facilities. This article is important to the current research on social stigma because it identifies the evolution of interventions developed and the areas where more development is needed. The researchers collected 42 articles from the following databases: PubMed, PsychInfo, Web of Science, and the United States Agency for International Development’s Development Experience Clearinghouse. The included articles addressed interventions that were developed to reduce stigma toward HIV, mental illness, and substance abuse. The researchers noted that during their search they found limited information on stigma-reducing interventions within healthcare facilities for tuberculosis, diabetes, leprosy, and cancer. While these diseases have been around for some time, stigma toward diabetes and cancer within healthcare facilities is a new idea. Additionally, leprosy and tuberculosis have low prevalence rates within the United States which reduces the need for interventions targeting these diseases within healthcare facilities.

Health-related stigma in health-care facilities play a major role in the prevention and treatment of diseases. Creating interventions that promote understanding and acceptance of all aspects of diseases can provide patients with the confidence needed to identify and seek help for health issues such as DM and perform prevention and treatment self-care behaviors.

Even with this plethora of knowledge on social stigma and DM, the research may still be lacking in some areas. Most of the research controls for confounding variables such as gender, age, sex, and race. These variables can play an important role in increased risk of developing chronic diseases. Understanding the role these confounding variables play in predicting social stigma can be beneficial for reducing its impact within high-risk communities.

Race and Ethnicity

Research has shown that the prevalence of disease for many chronic illnesses varies across racial/ethnic groups. Minority groups, such as African Americans and Hispanics, generally suffer disproportionally from disease when compared to other races/ethnicities. For example, Walker et al. (2016) utilized previous literature to examine this racial/ethnic differences amongst people with T2DM. From the literature, the researchers found that prevalence was highest in American Indians/Alaska natives at 15.9% and lowest in White Americans at (7.6%). The remaining minority groups were ranked as follows: African Americans (13.2%), Hispanics (12.8%), and Asian Americans (9.0%). It was also noted in the literature that, when compared to White Americans, minority groups have poorer glycemic control, blood pressure control, and lipid control (Walker et al., 2016). These factors are directly associated with poor health outcomes in people with T2DM. Identifying the trends in these poor outcomes across different racial/ethnic groups can aid in indirectly predicting health outcomes within these populations at high risk.

Gupta et al. (2020) identified race/ethnicity as a predictor of circulating natriuretic peptide levels and their response after preventative interventions in people with T2DM. These peptides are hormones that the body creates to increase insulin sensitivity and decrease fat build-up which puts a person at risk for developing T2DM. By evaluating serum samples collected from the Diabetes Prevention Program at baseline and after 2 years, N-terminus pro-B-type (NT-proBNP) natriuretic peptide levels were measured. These measurements showed that African Americans had the lowest NT-proBNP levels at baseline and after 2 years. Hispanics have lower levels when compared to Whites at baseline, while Whites, Asians, and American Indians had similar baseline measurements. At 2 years after baseline, all other races/ethnicities reported higher or stable NT-proBNP levels. These findings forced researchers to conclude that race may play a role in the relationship between NT-proBNP levels and response to interventions, strengthening the exhaustive research showing the impact of race on disease outcomes.

The abundance of research evaluating the influence that race has on health outcomes in people with T2DM far outweighs that of people with T1DM. This is thought to be due to 90-95% of all DM cases being T2DM and the remaining 5-10% being T1DM. However, the research that could be found describing racial/ethnic influences on T1DM outcomes seem to follow the trends described for T2DM. Butler et al. (2017) hypothesized that race/ethnicity serves a moderator for the association between diabetes stress/general life stressors and diabetes outcomes in people with T1DM. Secondary data on 3,440 patients with T1DM was collected from the Type 1 Diabetes Exchange Registry. All patients included in the research identified as Hispanic, African American, or non-Hispanic White. Using multiple group analyses, the researchers found that stress and diabetic ketoacidosis did not differ significantly across races/ethnicities, and the relationship between glycemic control and diabetes specific stress did not differ between African Americans and non-Hispanic Whites (Butler et al., 2017). However, a strong association did exist between poor glycemic control and higher diabetes specific stress in Hispanics when compared to non-Hispanic Whites. While this research provided a large sample population (*n* = 3,440), the lack of significance that was found amongst African Americans could be due to their low representation within the study population, 5%, when compared to non-Hispanic Whites (85%) and Hispanics (10%). Future research would require a larger African American presence to accurately evaluate the differences across racial/ethnic groups.

Like the previous article, other recent research evaluating T1DM and race has found a large gap in the African American presence compared to older research. Chalew et al. (2020) noted this in their study of the relationship between glycemic control, insulin dose, and race with hypoglycemia in youth with T1DM. These researchers found that previous data showed that black youth with T1DM experienced more hypoglycemic episodes compared to White youth. They hypothesized that this disparity was due to physicians prescribing higher insulin doses to Black youth because of stigma within healthcare facilities. Participant data was collected from a previous study for patients with T1DM who visited the Pediatric Diabetes Center at Children’s Hospital of New Orleans. The study included only patients identifying as White or Black with clinical records that could be obtained from the hospital. Statistical analysis showed that Black youth experienced higher HbA1Cs and mean glucose levels compared to Whites, but also experienced more hypoglycemic episodes.

No racial difference was identified for insulin dose or the inverse relationship between hypoglycemia and HbA1C and mean blood glucose forcing the researchers to accept their null hypothesis (Chalew et al., 2020). While they noted that this was different from the previous research on the subject, they believed that the difference was due to the low average number of Black youths included in the study. These differences in the disproportional representation of Blacks/African Americans in the recent research poses the question of whether individuals of this race/ethnicity comprise the majority or minority of all T1DM cases. Although racial statistics on the incidence and prevalence of T2DM are readily available, T1DM racial statistics are more difficult to find due to the small percentage of T1DM cases compared to T2DM.

Previous research has identified alternative frameworks for studying the effects of race/ethnicity on health outcomes. This is important to mention because older research focused on identifying an association without providing insight into causation. Glymour and Spiegelman (2017) sought to close this gap in the research by examining the relationships that sex, race, and biological factors have on health outcomes using the counterfactual framework for causal inference. The framework involves drawing causal inferences from observed outcomes amongst individuals who completed an intervention, and those same individuals had they not completed the intervention (Glymour & Spiegelman, 2017). For instance, if examining the effects of high school completion on the development of mental health issues, the effect is approached as the difference between the occurrence of mental health issues among individuals who have completed high school and the occurrence of those same individuals had they not completed high school.

When utilizing his framework to evaluate race as a cause, the researchers explained that one must consider changes in the race of an individual's family members, and the physical, social, and cultural inheritance of generations of racial inequality (Glymour & Spiegelman, 2017). Additionally, to circumvent the "no manipulation, no causation" rule implemented by previous researchers, it was suggested that race be evaluated by examining the potential effects of various interventions created to reduce racial inequalities in health. This means that instead of evaluating the causal inference of race directly, it will be indirectly measured by measuring the impact that interventions geared toward race have on reducing inequalities. Evaluating race as a causal factor can be beneficial for understanding its association to health outcomes and for creating successful health interventions.

The theory of intersectionality is another framework that has been utilized by researchers to explain the relationship between race and health outcomes. This investigative framework involves examining how characteristics of a person's social and political identities combine to create different methods of discrimination and privilege. Lopez et al. (2020) sought to utilize this concept to explore the prevalence of depression, substance use, and self-reported health amongst sexual minority women (SMW) of color, White SMW, heterosexual women of color, and White heterosexual women. The researchers in this study did not examine for transgender or non-binary identities, they assumed that cis-gender status was the foundation for gender identity throughout the study. Data was retrieved on 4878 women from 2011-2016 National Health and Nutritional Examination Survey. Binary and multiple logistic regression models were utilized to predict the influence that the independent variable (race) has on fair/poor self-reported health status, depression, cigarette smoking, alcohol, cannabis, and drug use.

The results showed that SMW and heterosexual women of color reported lower odds of smoking, drinking, and using alcohol and higher odds of self-reported fair/poor health compared to White heterosexual women. White SMW reported greater odds of smoking, depression, and drug us compared to all other groups of women. Researchers concluded that SMW and heterosexual women of color have similar observed outcomes but differ significantly from their White SMW and heterosexual counterparts (Lopez et al. 2020). This research is important to note because it provides insight on how intersections between sex and race influence poor health behaviors. When evaluating T1DM, and other types of DM, engagement in such poor behaviors can play a major role in health outcomes of the disease. Identifying these poor health behaviors by race/ethnicity can aid in creating interventions the risk of T1DM complications.

Like many other articles that evaluate the intersections of race/ethnicity in health care, these studies evaluate the two personal identifiers interchangeably rather than as two separate entities. While similar, it is important to mention the differences between the two. Race is a concept developed by philosophers that allow the grouping of individuals in society by their physical traits (Bryce, 2020). Whereas ethnicity involves grouping individuals by their language, geography and cultural backgrounds. This study will evaluate the effects of these two variables separately to understand the influence that each has on T1DM related social stigma.

Summary

In summary, previous research has touched on important factors that aid in predicting the quality of life in people with T1DM. Social stigma is a major predictor of adherence to self-management activities such as glycemic control and insulin therapy. In addition, increased stigma in T1DM populations can lead to feelings of anger and distress, feeling ashamed, wanting to be normal, and feeling distrusted. Despite the vast knowledge on these associations, little research has been done to evaluate the impact that confounding variables such as race and ethnicity may have on social stigma in people with T1DM, and how this association may influence quality of life.

Chapter 3: Research Method

Introduction

This quantitative, correlational study evaluated data obtained from the REAL dataset. I utilized the data to understand the nature of the relationship between race and ethnicity and the following social stigma related themes: anxiety/fear of negative judgement, feeling blamed/rejected/bad about oneself, and feeling depressed. This chapter provides further insight on the dataset being utilized, the research design, statistical methods that I used to analyze the data, and ethical procedures.

Research Design and Rationale

I utilized the REAL dataset to obtain the required data needed to evaluate the research questions from the target population. The dependent variable analyzed was social stigma targeting self-management behaviors. Analysis of this type of social stigma was measured by identifying in the REAL dataset self-reported anxiety/fear of negative judgement, feeling blamed/rejected/bad about yourself, and feeling depressed for people with T1DM. Previous research identified these variables as key emotional themes experienced by individuals who have been subject to social stigma. In the dataset, anxiety/fear of negative judgement was measured using the variable “anxiety” where 0 = no anxiety and 1= yes anxiety. The variable “feeling bad about yourself” was recoded as feeling blamed/rejected/bad about yourself and the responses were defined as 1 = not at all and 2 = several days, more than half the days, or every day. Lastly, the variable “feeling depressed or hopeless” was recoded as feeling depressed and the responses were defined as 1 = not at all and 2 = several days, more than half the days, or every day.

The independent variable analyzed for the purposes of this research were race and ethnicity. In the dataset, people with T1DM were placed in one of the following categories according to their self-identified race: Black, White, Other, Native American, Asian, Native Hawaiian/Pacific Islander. The race category “Biracial” was coded for participants who chose more than one racial group. Similarly, for ethnicity, the participants self-identified as one of the following: 1 = Hispanic/Latino and 2 = Not Hispanic/Latino.

A correlational study design was the best option for analyzing this research. Correlational research studies involve nonexperimental research techniques where two variables are being measured to determine their statistical relationship (Price et al., 2015). These studies involved no effort to manipulate or control nonessential variables. Nonessential variables are those that will not affect the strength or direction of the statistical relationship. Some common confounding variables such as age and gender can play a role in the increased incidence of T1DM and should be controlled for. In this study, age was not a hinderance to the validity of the research because the secondary dataset restricted the age of included individuals to those between the ages of 18-30 years old. Additionally, the sample population was randomized to ensure that gender did not impact the validity of the research data.

Methodology

Population

In this study, I requested authorization for the REAL dataset which was conducted by Pyatak et al (2017). This activity-based intervention was developed to evaluate the needs of young adults currently living with T1DM or T2DM of low socioeconomic status or racial/ethnic minority backgrounds (Pyatak et al, 2017). The dataset included a total of 163 participants actively living with DM in Los Angeles County. Participants were considered eligible if they met the following criteria: (a) 18–30 years old, (b) a diagnosis of either T1DM or T2DM for at least 12 months, (c) a hemoglobin A1C of ≥ 8.0% at the time of study enrollment, (d) were fluent in English or/and Spanish, (e) were reachable by phone or text message, and (f) lived in Los Angeles County with no plans to relocate. Recruitment of eligible participants involved various community and clinical outlets where researchers conducted in-person recruitment of patients, posted fliers and brochures, and conducted mass mailing of fliers to patients of diabetes clinics. In addition, advertising was conducted at health fairs, on social media, and put in community college newspapers. The original research sought to identify the medical and psychosocial needs of individuals living with DM.

The researchers began recruitment activities in October, 2014, where they conducted mainly in person contact with potential candidates at a children's hospital and a public hospital in Los Angeles County. A second round of recruitment activities was conducted in April, 2015, as a response to recruitment challenges faced at the two hospitals. The second round consisted of mass mailings and advertising on social media to recruit potential candidates. Once recruitment officially ceased in December, 2015, participants completed initial testing where they were provided with information on the 6-month REAL Diabetes Intervention program. All follow up testing was completed by August 23, 2016. To ensure the validity of the data, once data collection ceased, the researchers removed any participants with missing data leaving a total of 81 (T1DM = 61, T2DM = 20) participants remaining.

Inclusion and Exclusion Criteria

The population for this study consisted of people with T1DM living in Los Angeles County in the United States. Those individuals who were included had been diagnosed with the disease at least 12 months prior to the start of the study. The total population that was evaluated consisted of 61 people with T1DM between the ages of 18 to 30 years old. I excluded individuals from the dataset who were diagnosed with T2DM.

Sample Size

The study sample size was determined using priori analysis on G*Power version 3.1.9.2 statistical software. The following parameters were incorporated to determine sample size using power analysis: the *t* test, linear multiple regression, binomial distribution, a power of 0.80, α of 0.05, and an effect size of 0.15. Based on the results of the analysis, 43 participants were the minimum number of subjects needed for this study to yield significant results.

Data Access and Collection Process

I retrieved the dataset that I used to evaluate the research questions from the ICPSR. The ICPSR is a global research database geared toward enhancing research in social and behavioral fields by providing extensive data resources and open educational prospects for present and future research generations. Access to the database was achieved by creating an account with ICPSR, which provided the required permissions to use the dataset. Once the dataset was downloaded, I used IBM SPSS statistic version 25 software for analysis of the data.

Data Analysis Plan

The secondary data obtained from the REAL with diabetes dataset included participants who met the inclusion criteria. All data in this quantitative study was evaluated using the IBM SPSS Statistic version 25 software. I evaluated data using binary logistic regression and chi-square analysis to examine both the existence of an association, its strength, and the odds of the described social stigma themes occurring in different racial and ethnic groups. All participants with missing data were removed before statistical analysis.

Research Questions

RQ1: What is the difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across racial groups in T1DM populations?

> $H_0$1: There is no difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across racial groups in T1DM populations.
>
> H_a1: There is a difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across racial groups in T1DM populations.

RQ2: What is the difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across ethnic groups in T1DM populations?

$H_0$2: There is no difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across ethnic groups in T1DM populations.

H_a2: There is a difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across ethnic groups in T1DM populations.

RQ3: What is the difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across racial groups in T1DM populations?

$H_0$3: There is no difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across racial groups in T1DM populations.

H_a3: There is a difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across racial groups in T1DM populations.

RQ4: What is the difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across ethnic groups in T1DM populations?

$H_0$4: There is no difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across ethnic groups in T1DM populations.

H_a4: There is a difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across ethnic groups in T1DM populations.

RQ5: What is the difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across racial groups in T1DM populations?

$H_0$5: There is no difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across racial groups in T1DM populations.

H_a5: There is a difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across racial groups in T1DM populations.

RQ6: What is the difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across ethnic groups in T1DM populations?

$H_0$6: There is no difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across ethnic groups in T1DM populations.

H_a6: There is a difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across ethnic groups in T1DM populations.

Statistical Tests and Results Interpretation

Quantitative methods can be used to quantify these risks in a way that allows for better understanding of the relationship between variables. For the purposes of this research, binary logistic regression and chi square analysis will be used to evaluate the associations between race, ethnicity, and the social stigma themes within the target population. Binary logistic regression is a statistical method used to predict the probability of an observation falling into one of two dichotomous categories of a dependent variable. When using binary logistic regression, the following should be assumed: (a) the dependent variable is dichotomous, (b) the independent variable is continuous, (c) all variables are mutually exclusive and exhaustive, (d) no significant outliers, (e) multicollinearity, (f) there is a linear relationship between variables, and (g) there is adequate sample size (at least 15 participants). Additionally, chi-square is a statistical method used to measure the relationship between categorical variables in a population of interest. The quantitative data for this research was collected to identify a relationship and direction of the relationship between themes of social stigma and the independent variables race and ethnicity.

Research Question 1 Data Analysis

Binary logistic regression analysis was conducted to predict the probability of an association between the independent variable race and the dependent variable anxiety/fear of negative judgement in people with T1DM. Chi square was used to compare whether the observed frequencies are different from the expected values in the study.

Research Question 2 Data Analysis

Binary logistic regression analysis was conducted to predict the probability of an association between the independent variable ethnicity and the dependent variable anxiety/fear of negative judgement in people with T1DM. Chi square was used to compare if the observed frequencies are different from the expected values in the study.

Research Question 3 Data Analysis

Binary logistic regression analysis was conducted to predict the probability of an association between the independent variable race and the dependent variable, feeling blamed/rejected/bad about oneself, in people with T1DM. Chi square was used to compare if the observed frequencies are different from the expected values in the study.

Research Question 4 Data Analysis

Binary logistic regression analysis was conducted to predict the probability of an association between the independent variable ethnicity and the dependent variable, feeling blamed/rejected/bad about oneself, in people with T1DM. Chi square was used to compare if the observed frequencies are different from the expected values in the study.

Research Question 5 Data Analysis

Binary logistic regression analysis was conducted to predict the probability of an association between the independent variable race and the dependent variable, feeling depressed, in people with T1DM. Chi square was used to compare if the observed frequencies are different from the expected values in the study.

Research Question 6 Data Analysis

Binary logistic regression analysis was conducted to predict the probability of an association between the independent variable ethnicity and the dependent variable, feeling depressed, in people with T1DM. Chi square was used to compare if the observed frequencies are different from the expected values in the study.

Ethical Procedures

For ethical purposes, Institutional Review Board (IRB) approval was obtained from Walden University prior to the analysis of all research data. Free access to the data was obtained through ICPSR and downloaded to a secure storage disk accessible by the primary investigator only. No personal identifiers were included in the dataset which was provided in an excel format with each participant being assigned a number. Excel file was imported into SPSS where analyses were conducted. Analyses and supplemental information were reported in table format ensuring confidentiality.

In the original study, IRB approval was obtained to conduct preliminary chart reviews to pre-screen for provisional eligibility criteria. Patients who were deemed eligible by the pre-screen process were then provided the relevant IRB consent forms to utilize their information for the original research. Upon completion of the research and once it was deposited into ICPSR database, additional procedures were conducted by their staff to ensure patient confidentiality within the data before allowing it to be freely accessible. Additionally, ICPSR creates codebooks of data along with data files in common statistical software formats to ensure the data is presented honestly to all recipients.

Summary

In summary, the REAL dataset, extracted from the ICPSR, was utilized to answer the following research questions: (1) does T1DM related social stigma, measured by “anxiety/fear of negative judgement” differ by race in T1DM populations? (2) does T1DM related social stigma, measured by “anxiety/fear of negative judgement” differ by ethnicity in T1DM populations? (3) does T1DM related social stigma, measured by "feeling blamed/rejected/bad about oneself" differ by race in T1DM populations? (4) does T1DM related social stigma, measured by "feeling blamed/rejected/bad about oneself" (5) does T1DM related social stigma, measured by "feeling depressed" differ by race in T1DM populations? (6) does T1DM related social stigma, measured by "feeling depressed" differ by ethnicity in T1DM populations? Quantitative analysis of the research involved binary logistic regression and chi-square analysis to determine if a relationship exists between the variables and the strength of the correlation, respectively. All statistical analysis was done using IBM SPSS version 25 statistical software, and data was organized into tables to be included in the research.

Chapter 4: Results

Introduction

Chapter 4 defines the quantitative results from the statistical analysis of the secondary data obtained from the REAL dataset. The purpose of this study was to evaluate the influence that race and ethnicity have on the prevalence of the following health-related social stigma themes in people with T1DM: anxiety/fear of negative judgement, feeling blamed/rejected/bad about oneself, and feeling depressed. Evaluating the prevalence of these themes in different racial and ethnic groups allowed for better understanding of the distribution of health-related social stigma in these populations, thus aiding in the ability of public health officials to adequately target interventions in these areas.

The study was directed by six research questions:

RQ1: What is the difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across racial groups in T1DM populations?

RQ2: What is the difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across ethnic groups in T1DM populations?

RQ3: What is the difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across racial groups in T1DM populations?

RQ4: What is the difference in the prevalence of T1DM related social stigma, measured by “feeling blamed/rejected/bad about oneself” across ethnic groups in T1DM populations?

RQ5: What is the difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across racial groups in T1DM populations?

RQ6: What is the difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across ethnic groups in T1DM populations?

In this chapter, I provide insight on the data analysis process including sections on how access was gained to the secondary data, differential and inferential statistics were used to describe the populations and variables, and the results of the analytical methods used to answer each research question.

Binary logistic regression models and chi-square analysis were the analytical methods I used to evaluate the research questions. In addition, I added cross-tabulations to evaluate the distribution of the categorical data. This helped me better understand the relationships between independent and dependent variables. Overall, the results provided insight on the impact of health-related social stigma on people of different racial and ethnic backgrounds in T1DM populations.

Data Access

Access and analysis of the REAL secondary dataset was gained following approval from Walden University’s IRB. The IRB approval number issued for this study was 06-08-21-0544035. Only after approval was the dataset downloaded from the ICPSR website database and analyzed using IBM SPSS version 25. To ensure that there was consistency with the variables and data, some variables were recoded as described in Chapter 3.

Missing Data and Data Cleaning

Missing data in a dataset can produce various problems in the results of a study. This can include reducing the statistical power, introducing bias in the estimation of parameters, limiting the representativeness of the study sample, or simply complicating and invalidating the analysis of the study (Kang, 2013). For this study, I excluded data for any subject with missing values for the variables being analyzed. These were identified by empty spaces that coded as missing values in the analysis. They were deleted using list-wise deletion in the SPSS software.

In addition, the dataset included participants with T1DM and T2DM; however, for the purposes of this study, all participants that identified as having T2DM were removed.

Study Results

After list-wise deletion of seven subjects with missing values and the removal of 40 subjects that identified as having T2DM from the original data set (n = 162), the final study sample was n = 115 people with T1DM between 18–31 years of age. This represented approximately 71% of the original sample.

Table 1

Population Demographics (Ethnicity and Race)

Ethnicity	Frequency	Percent
Hispanic/Latino	87	75.7
Not Hispanic/Latino	28	24.3
Total	115	100.0

Race	Frequency	Percent
Asian	0	0
Black	12	10.4
Mixed	4	3.5
Native American	2	1.7
Native Hawaiian	0	0
Other	61	53.0
White	36	31.3
Total	115	100.0

Table 1 provides the demographic statistics for race and ethnicity among T1DM participants in the population. These statistics showed that 87 of 115 participants (75.7%) listed their ethnicity as Hispanic/Latino with the remaining 28 (24.3%) indicating “Not Hispanic/Latino.” In addition, more than half of the sample population (53%, *n* = 61) identified their race as “Other,” which refers to any race other than those listed in the survey—that is, they did not identify as Black, Mixed, Native American, White, Asian, or Native Hawaiian. The remaining 54 participants identified as either Native American (1.7%, *n* = 2), Black (10.4%, *n* = 12), White (31.3%, *n* = 36) or Biracial (3.5%, *n* = 4). No participants included in the sample population identified as Asian or Native Hawaiian.

In this section, the results suggest that the majority of the participants identified as Hispanic/Latino. However, the variable race that was utilized did not include a category that reflected Hispanic/Latino decent. The secondary data retrieved included participants who resided in Los Angeles County, which has the highest Hispanic/Latino population in the Unites States at 4.8 million. Although it was not clearly defined by the dataset and codebook, I assume that a large portion of the respondents who indicated “Other” as their race could be of Hispanic/Latino decent. Further research and analysis would be required to examine whether this assumption is true.

Additionally, the races “Other” and “White” provide the highest percentages for the prevalence of T1DM in the sample population. This can be a direct reflection of the population as a whole. According to the statistics provided by the Centers for Disease Control and Prevention (CDC, n.d.), non-Hispanic Whites have the highest rate of incidence of T1DM amongst people under the age of 20. The statistics also showed that between 2002–2015, the incidence of T1DM increased among non-Hispanic Blacks (2.7% per year), Hispanics (4.0% per year), and Asians/Pacific Islanders (4.4% per year), whereas the increase among non-Hispanic Whites was much lower (0.7% per year; CDC, n.d.). If the previous assumption proves to be true, that those participants who indicated “Other” as their race were of Hispanic/Latino decent, then it would align with the increase in incidence amongst minority communities between 2002–2015.

Table 2

Descriptive Statistics

Anxiety	Frequency	Percent
No	113	98.3
Yes	2	1.7
Total	115	100.0

Feeling Depressed	Frequency	Percent
No	55	47.8
Yes	60	52.2
Total	115	100.0

Feeling blamed/rejected/bad about oneself	Frequency	Percent
No	62	53.9
Yes	53	46.1
Total	115	100.0

Table 2 provides the descriptive statistics for each social stigma theme under analysis: anxiety, feeling depressed, and feeling blamed/rejected/bad about oneself. In the dataset, anxiety was reported as a comorbidity where participants were required to indicate yes or no, with yes meaning that they self-identified as having anxiety and no meaning that they did not. Researchers sought to determine if the participants had experienced feelings of depression and feeling blame/rejection/bad about oneself and how often these feelings occurred. This was achieved by asking participants to self-report these feelings by choosing the response “not at all” if they had not experienced them, or by choosing one of the following responses if they had to indicate how often: “several days,” “more than half the days,” and “everyday.”

The table shows that the majority of the participants (*n* = 113; 98.3%) reported that they did not have anxiety, with only two participants (1.7%) reporting that they did. Sixty of 115 participants (*n* = 60; 52.2%) reported feeling depressed while 53 (46.1%) reported feeling blamed/rejected/bad about themselves. The latter statistics vary slightly from the number of respondents who reported they did not experience feeling depressed (*n* = 55; 47.8%) or blamed/rejected/bad about themselves (*n* = 62; 53.9%).

In the next section, independent and dependent variables will be evaluated using cross-tabulations and binary logistic regression analysis with chi-square statistic. Cross-tabulations were utilized to evaluate the distribution of the dependent variables, anxiety, feeling depressed, and feeling blame/rejected/bad about yourself, across the independent variables, race and ethnicity. Using this type of analysis, I was able to evaluate the frequency of the dependent variables in each category for race and ethnicity. In addition, binary logistic regression was utilized to evaluate the likelihood of an observation falling into one of the two categories of the dependent variables based on the race and ethnicity of the participants.

Cross-Tabulations

The cross-tabulations between the dependent variable, anxiety, and the independent variables, race and ethnicity are presented in Table 3.

Table 3

Anxiety Cross-Tabulation (Ethnicity and Race)

		Ethnicity		
		Hispanic/Latino	Not Hispanic/Latino	Total
Anxiety	No	85	28	113
	Yes	2	0	2
Total		87	28	115

		Race combined					
		Black	Mixed	Native American	Other	White	Total
Anxiety	No	12	4	2	59	36	113
	Yes	0	0	0	2	0	2
Total		12	4	2	61	36	115

Anxiety was self-reported as a comorbidity in the dataset where participants indicated “Yes” if they have anxiety and “No” if they do not. A comorbidity is a medical condition that occurs simultaneously with other condition(s) in an individual. These conditions when coupled with a chronic disease such as T1DM can increase poor health outcomes. In examining the association between these variables, the results show that only two of the 87 participants (2.3 %) who identified as Hispanic/Latino ethnicity reported having anxiety. while none of the 28 participants who identified as Not Hispanic/Latino reported having anxiety. Additionally, the two participants who indicated that they experienced anxiety chose “Other” as their race in the survey. Anxiety was not reported by the remaining 113 participants who identified as any of the other race categories listed (Black = 12; Mixed = 4; Native American = 2; Other = 59; White = 36).

In transition, these findings suggest that anxiety was not prevalent within the sample population. This lack of prevalence can be due to sampling error when cleaning the data and removing subjects who did not meet the inclusion criteria. A total of 47 participants with missing data and/or who identified as having T2DM were excluded from the final dataset. Future research should evaluate whether including the excluded participants would increase the prevalence of anxiety within the population, as well as, whether people with T2DM are more prone to anxiety than those with T1DM.

Table 4

Feeling Blamed/Rejected/Bad About Oneself Cross-Tabulation (Ethnicity and Race)

		ethnicity		
		Hispanic/Latino	Not Hispanic/Latino	Total
Feeling blamed/rejected/ bad about oneself	No	54	8	62
	Yes	33	20	53
Total		87	28	115

		Race combined					Total
		Black	Mixed	Native American	Other	White	
Feeling blamed/rejected/ bad about oneself	No	8	0	1	38	15	62
	Yes	4	4	1	23	21	53
Total		12	4	2	61	36	115

The cross-tabulations between the dependent variable, feeling blamed/rejected/bad about oneself, and the independent variables, race and ethnicity, are presented in Table 4. Each participant was asked to indicate how often they experienced feeling blamed/rejected/bad about themselves using one of the follow choices: not at all, some days, more than half the days, and every day. These responses where then recoded in SPSS to reflect “No” if not at all was chosen and “Yes” if some days, more than half the days or every day was chosen. In examining the correlation between these variables, the results show that 53 participants (46 %) indicated that they experienced feeling blamed/rejected/bad about themselves. Of the 53 participants, 33 identified as the ethnicity Hispanic/Latino while the remaining 20 identified as Not Hispanic/Latino. The remaining 62 participants (Hispanic/Latino = 54; Not Hispanic/Latino = 8) indicated that they did not experience feelings of blame/rejection/bad about themselves. Similarly, 23 of the 53 participants identified as a race other than those listed, while the remaining identified as White (*n* = 21), Black (*n* = 4), Mixed (*n* = 4), and Native American (*n* = 1). 62 participants (54%) indicated that they did not experience these feelings with 38 of those identifying as a race other than those listed. The remaining participants who reported that they did not experience these feelings identified as White (*n* = 15), Black (*n* = 8), and Native American (*n* = 1).

In transition, the majority of participants reporting that they have experienced feeling blamed/rejected/bad about themselves identify “Other” or “White” as their race at 43% (*n* = 23) and 40% (*n* = 21), respectively. The number of participants identifying as Hispanic/Latino was also significantly higher in this category (62%; *n* = 33) when compared to those who identified as Not Hispanic/Latino. However, out of the 87 participants who identified as Hispanic/Latino, the majority reported that they did not experience feeling blamed/rejected/bad about themselves (62%; *n* = 54). This same trend can be seen amongst the Black, Native American, and Other race categories. In contrast, the inverse is seen amongst individuals who identified as Not Hispanic/Latino, White, or Biracial. When compared to the number of people who indicated not experiencing feeling blamed/rejected/bad about themselves, more individuals reported having these feelings. This suggests that minority races are less likely to report feeling blamed, rejected or bad about themselves. It is also important to mention that the majority of participants identified as a race other than those listed. Because of this, it would be beneficial to know what other races may have been included to understand how they may influence the distribution.

Table 5

*Feeling Depressed * Ethnicity * Race Cross Tabulation*

		Ethnicity		
		Hispanic/Latino	Not Hispanic/Latino	Total
Feeling depressed	No	46	9	55
	Yes	41	19	60
Total		87	28	115

		Race combined					Total
		Black	Mixed	Native American	Other	White	
Feeling depressed	No	8	1	0	34	12	55
	Yes	4	3	2	27	24	60
Total		12	4	2	61	36	115

The cross-tabulations between the dependent variable, feeling depressed, and the independent variables, race and ethnicity, are presented in Table 5. Each participant was asked to indicate how often they experienced feelings of depression using one of the following choices: not at all, some days, more than half the days, and every day. These responses where then recoded in SPSS to reflect “no” if not at all was chosen and “yes” if some days, more than half the days, or every day was chosen. In examining the association between these variables, the results show that 60 of the 115 participants (52 %) indicated that they experienced feelings of depression while the remaining 55 participants indicated they did not experience these feelings. Of the 60 participants, 41 identified as the ethnicity Hispanic/Latino while the remaining 19 identified as Not Hispanic/Latino. The remaining 55 participants indicating that they did not experience feelings of depression consisted of 46 Hispanic/Latino and nine Not Hispanic/Latino. In addition, 27 of the 60 participants identified as a race other than those listed, while the remaining identified as White (*n* = 24), Black (*n* = 4), Mixed (*n* = 3), and Native American (*n* = 2). The 55 participants indicating that they did not experience these feelings identified as a race other than those listed (*n* = 34), White (*n* = 12), Black (*n* = 8), and Mixed (*n* = 1).

Similar to the cross-tabulation results for the dependent variable feeling blamed/rejected/bad about oneself, the majority of participants that reported experiencing feelings of depression identify “Other” or “White” as their race at 45% (*n* = 27) and 40% (*n* = 24), respectively. The participants identifying as Hispanic/Latino was also significantly higher in this category (68%; *n* = 41) when compared to those who identified as Not Hispanic/Latino. However, with the exception of those individuals identifying as “White” and “Mixed”, the participants within these different racial and ethnic categories were more likely to report not having experienced feelings of depression. These findings suggest that, while there is a positive difference between participants reporting depression compared to not reporting depression, minority communities tend to report these feelings less than their White and Mixed counterparts. Although it was not specified in this research, further research should evaluate how different combinations of mixed race individuals impact the prevalence of depression in the sample population.

Binary Logistic Regression

Binary logistic regression is a type of regression analysis that is used to predict the relationship between a predictor (independent variable) and a predicted dichotomous dependent variable. When using binary logistic regression, the following assumptions of the data must be met:

- the dependent variable must be dichotomous,
- the independent variable must be continuous or categorical,
- all variables are mutually exclusive and exhaustive, and
- there is a linear relationship between the independent variable and the dependent variable.

Independent Variable Coding

Table 6

Categorical Variables Codings[a]

		Frequency	Parameter coding (1)	(2)	(3)	(4)
Race combined	Black	12	1.000	.000	.000	.000
	Mixed	4	.000	1.000	.000	.000
	NAM[b]	2	.000	.000	1.000	.000
	Other	61	.000	.000	.000	1.000
	White	36	.000	.000	.000	.000

		Frequency	Parameter coding (1)
ethnicity	Hispanic	87	1.000
	NOT Hispanic	28	.000

a. This coding results in indicator coefficients.

b. NAM = Native American

Table 6 provides coding for the categorical independent variable that was used in the binary logistic regression analysis. For the race variable, the last coded group is identified as the “target” group which refers to the group that all other categories are compared. In this case, the target group is the race category “White”. The remaining parameter codings are as follows:

- 1st parameter compared Black and White (race combined (1))
- 2nd parameter compared Mixed and White (race combined (2))
- 3rd parameter compared Native American and White (race combined (3))
- 4th parameter compared Other and White (race combined (4))

Similarly, for the ethnicity variable, the last coded group “Not Hispanic/Latino” was identified as the “target” group. Therefore, the first and only parameter coding is Hispanic/Latino compared to Not Hispanic/Latino.

In the next section, the results of the binary logistic regression analysis and chi-square statistic was evaluated and interpreted to answer each research question previously established.

RQ1: What is the difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across racial groups in T1DM populations?

Table 7

Anxiety Binary Logistic Regression (Race)

								95% C.I. for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Race combined			.000	4	1.000			
	Race combined 1	.000	13397.657	.000	1	1.000	1.000	.000	.
	Race combined 2	.000	21183.555	.000	1	1.000	1.000	.000	.
	Race combined 3	.000	29199.516	.000	1	1.000	1.000	.000	.
	Race combined 4	17.819	6698.828	.000	1	.998	54761858.113	.000	.
	Constant	-21.203	6698.828	.000	1	.997	.000		

a. Variable(s) entered on step 1: Race Combined.

Table 7 provides the binary logistic regression analysis generated from SPSS to evaluate the relationship between anxiety and race. The target group utilized for comparison is the race category “White”. When evaluating binary logistic regression tables, it is important to examine the significance value (*p*-value). *P*-values greater than 0.05 reflect no statistical significance between the independent and dependent variables. When a statistically significant relationship exists, the Exp(B) value (Odds ratio) and the B coefficient should be evaluated as well. The Exp(B) value provides the odds of the dependent variable occurring for each category of the independent variable. The B coefficient does not have a simple interpretation; however, when evaluating significant *p*-values, this value provides insight on the direction of the association. However, because the *p*-values in this table reflect no statistical significance, evaluating the odds ratio and B coefficient is not necessary.

The correlation between anxiety and the different race categories, race combined (1), race combined (2), race combined (3), and race combined (4), produced *p*-values greater than 0.05. This translates to no statistically significant correlations observed between the independent and dependent variables. Therefore, the alternative hypothesis was rejected and the null hypothesis accepted. The null hypothesis stated that there is no difference in the prevalence of T1DM related social stigma, measured by “anxiety/fear of negative judgement,” across racial groups in T1DM populations.

Table 8

*Omnibus Tests of Model Coefficients (Anxiety * Race)*

		Chi-square	*df*	Sig.
Step 1	Step	2.568	4	.633
	Block	2.568	4	.633
	Model	2.568	4	.633

Table 8 provides the Omnibus Tests of Model Coefficients which includes the Chi-square statistic, the degrees of freedom (*df*), and *p*-values for significance giving consideration to the overall effect of the variable. Similar to the results in Table 7, the *p*-values in Table 8 did not reflect a statistically significant correlation at 0.633. A *p*-value greater than the significance level of 0.05 suggests that the chi-square statistic for Race (x = 2.568) is not statistically significant; therefore, the previously stated null hypothesis was accepted.

In the next section, the binary logistic regression and chi-square statistic was used to analyze RQ2. RQ2 evaluated the difference in the prevalence of T1DM related social stigma, measured by “anxiety/fear of negative judgement,” across ethnic groups in T1DM populations.

RQ2: What is the difference in the prevalence of T1DM related social stigma measured by “anxiety/fear of negative judgement” across ethnic groups in T1DM populations?

Table 9

Anxiety Binary Logistic Regression (Ethnicity)

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	ethnicity 1	17.453	7595.757	.000	1	.998	38011171.144	.000	.
	Constant	-21.203	7595.757	.000	1	.998	.000		

a. Variable(s) entered on step 1: ethnicity.

Table 9 provides the binary logistic regression analysis generated from SPSS to evaluate the relationship between anxiety and ethnicity. The target group utilized for comparison is the ethnicity category Not Hispanic/Latino; therefore, the parameter coding ethnicity (1) is comparing the prevalence of anxiety amongst individuals who identified as the ethnicity Hispanic/Latino to Not Hispanic/Latino. Similar to Table 7, the correlation between anxiety and ethnicity (1) produced a *p*-value greater than 0.05. This suggests that no statistically significant correlation was observed between the variables. Therefore, the alternative hypothesis was rejected and the null hypothesis accepted. The null hypothesis stated that there is no difference in the prevalence of T1DM related social stigma, measured by “anxiety/fear of negative judgement,” across ethnic groups in T1DM populations.

Table 10

*Omnibus Tests of Model Coefficients (Anxiety * Ethnicity)*

		Chi-square	df	Sig.
Step 1	Step	1.127	1	.288
	Block	1.127	1	.288
	Model	1.127	1	.288

Table 10 provides the Omnibus Tests of Model Coefficients which includes the chi-square statistic, *df*, and *p*-values for evaluation of significance giving consideration to the overall effect of the variables in the model. The *p*-values in this table do not reflect a statistically significant correlation at 0.288. With a *p*-value greater than the significance level of 0.05, the chi-square statistic for ethnicity (x = 1.127) is not statistically significant, meaning that the new model with explanatory variables included is not a significant improvement when compared to the baseline model. Consequently, the previously stated null hypothesis was accepted.

In the next section, the binary logistic regression and chi-square statistic was used to analyze RQ3. RQ3 evaluated the prevalence of T1DM related social stigma, measured by “feeling blamed/rejected/bad about oneself,” across racial groups in T1DM populations?

RQ3: What is the difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across racial groups in T1DM populations?

Table 11

Feeling Blamed/Rejected/Bad About Oneself Binary Logistic Regression (Race)

								95% C.I.for EXP(B)	
		B	S.E.	Wald	*df*	Sig.	Exp(*B*)	Lower	Upper
Step 1[a]	Race combined			4.467	4	.346			
	Race combined 1	-1.030	.699	2.167	1	.141	.357	.091	1.407
	Race combined 2	20.866	20096.485	.000	1	.999	1153910602.037	.000	.
	Race combined 3	-.336	1.454	.054	1	.817	.714	.041	12.347
	Race combined 4	-.839	.429	3.820	1	.051	.432	.186	1.002
	Constant	.336	.338	.991	1	.320	1.400		

a. Variable(s) entered on step 1: Race combined.

Table 11 provides the binary logistic regression analysis generated from SPSS with the target group set to the race category White. Similar to RQ1 and RQ2, the correlation between the dependent variable, feeling blamed/rejected/bad about oneself, and the different race categories produced *p*-values greater than 0.05. Race combined (1) compared Black and White participants and produced a *p*-value of 0.141, race combined (2) compared Mixed and White with a *p*-value of 0.999, race combined (3) compared Native American and White with a *p*-value of 0.817, and race combined (4) compared Other and White with a *p*-value of 0.051. While race combined (4) had a *p*-value close to 0.05, it is still too high (p = 0.051) to be considered statistically significant. This translates to no statistically significant correlations observed between the independent and dependent variables, race and feeling blamed/rejected/bad about oneself, respectively. Therefore, the alternative hypothesis was rejected and the null hypothesis accepted. The null hypothesis stated that there is no difference in the prevalence of T1DM related social stigma, measured by "feeling blamed/rejected/bad about oneself," across racial groups in T1DM populations.

Table 12

*Omnibus Tests of Model Coefficients (Blame * Race)*

		Chi-square	*df*	Sig.
Step 1	Step	10.931	4	.027
	Block	10.931	4	.027
	Model	10.931	4	.027

Table 12 provides the Omnibus Tests of Model Coefficients which includes Chi-square, *df*, and *p*-values for significance giving consideration to the overall effect of the variable. The *p*-values in this table reflect a statistically significant correlation at 0.027. With a *p*-value less than the significance level of 0.05, the chi-square statistic for race (x = 10.931; df = 4) is statistically significant, meaning that the new model with explanatory variables included is a significant improvement when compared to the baseline model. This is the opposite of the results found in Table 11; therefore, further examination of these variables may be beneficial.

In the next section, the binary logistic regression and chi-square statistic was used to analyze RQ4. RQ4 evaluated the prevalence of T1DM related social stigma, measured by "feeling blamed/rejected/bad about oneself," across ethnic groups in T1DM populations?

RQ4: What is the difference in the prevalence of T1DM related social stigma measured by “feeling blamed/rejected/bad about oneself” across ethnic groups in T1DM populations?

Table 13

Feeling Blamed/Rejected/Bad About Oneself Binary Logistic Regression (Ethnicity)

								95% C.I. for EXP(B)	
		B	S.E.	Wald	df	Sig.	ExpB	Lower	Upper
Step 1[a]	ethnicity(1)	-1.409	.473	8.867	1	.003	.244	.097	.618
	Constant	.916	.418	4.798	1	.028	2.500		

a. Variable(s) entered on step 1: ethnicity.

Table 13 provides the binary logistic regression analysis generated from SPSS with the target group set to ethnicity category Not Hispanic/Latino. Ethnicity (1) evaluated the comparison between Hispanic/Latino and Not Hispanic/Latino. The correlation between the dependent variable, feeling blamed/rejected/bad about oneself, and the independent variable, ethnicity produced a p-value less than 0.05 at $p = 0.003$. This suggested that a statistically significant correlation exists between the variables feeling blamed/rejected/bad about oneself and Hispanic/Latino when compared to Not Hispanic/Latino. In addition, evaluation of the Exp B (odds ratio) and B coefficient values provided further insight on the relationship between these variables. The B coefficient of -1.409 reflected a negative relationship between the variables. That is, the individuals were less likely to report having experienced feeling blamed, rejected, or bad about themselves. With an odds ratio of 0.244, the individuals who identified as

Hispanic/Latino are 0.244 times less likely to report experiencing these feelings when compared to those who identified as Not Hispanic/Latino. Because of this statistically significant relationship, the null hypothesis was rejected and the alternative hypothesis accepted. The alternative hypothesis stated that there is a difference in the prevalence of T1DM related social stigma, measured by "feeling blamed/rejected/bad about oneself," across ethnic groups in T1DM populations.

Table 14

*Omnibus Tests of Model Coefficients (Blame * Ethnicity)*

		Chi-square	df	Sig.
Step 1	Step	9.727	1	.002
	Block	9.727	1	.002
	Model	9.727	1	.002

Table 14 provides the Omnibus Tests of Model Coefficients which includes Chi-square, *df*, and *p*-values for significance giving consideration to the overall effect of the variable. The *p*-values in this table reflected a statistically significant correlation at 0.002. With a *p*-value less than the significance level of 0.05, the chi-square statistic for ethnicity (x = 9.727; df = 1) was statistically significant, meaning that the new model with explanatory variables included is a significant improvement when compared to the baseline model. Therefore, the null hypothesis was rejected, and the alternative hypothesis, that stated there is a difference in the prevalence of T1DM related social stigma, measured by "feeling blamed/rejected/bad about oneself," across ethnic groups in T1DM populations, was accepted.

In the next section, the binary logistic regression and chi-square statistic was used to analyze RQ5. RQ5 evaluated the prevalence of T1DM related social stigma, measured by “feeling depressed,” across racial groups in T1DM populations?

RQ5: What is the difference in the prevalence of T1DM related social stigma measured by “feeling depressed” across racial groups in T1DM populations?

Table 15

Feeling Depressed Binary Logistic Regression (Race)

								95% C.I. for EXP(B)	
		B	S.E.	Wald	*df*	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Race Combined			6.788	4	.148			
	Race Combined 1	-1.386	.707	3.844	1	.050	.250	.063	1.000
	Race Combined 2	.405	1.208	.113	1	.737	1.500	.141	15.996
	Race Combined 3	20.510	28420.721	.000	1	.999	807737421.426	.000	.
	Race Combined 4	-.924	.438	4.456	1	.035	.397	.168	.936
	Constant	.693	.354	3.844	1	.050	2.000		

a. Variable(s) entered on step 1: Race Combined.

Table 15 provides the binary logistic regression analysis generated from SPSS with the target group set to race category White. The *p*-values for race combined (2) and race combined (3) reflect relationships that are not statistically significant at 0.737 and 0.999, respectively. These two parameters evaluated the comparisons between the races

Mixed and White and Native American and White, respectively. In contrast, the *p*-values for race combined (1) and race combined (4) reflect relationships that are statistically significant at 0.05 and 0.035. This suggested that a statistically significant correlation exists between the dependent variable, feeling depressed, and the independent variable, race.

In addition, evaluation of the Exp B (odds ratio) and B coefficient values provided further insight on the statistically significant relationship between the independent and dependent variables, race and feeling depressed. For race combined (1), the B coefficient of -1.386 reflected a negative relationship between the variables. That is, the individuals were less likely to report having experienced feelings of depression. With an odds ratio of 0.250, the individuals who identified as Black are 0.250 times less likely to report experiencing these feelings when compared to those who identified as White. In addition, for race combined (4), the B coefficient of -0.924 reflects a negative relationship between the variables. Therefore, with an odds ratio of 0.397, the individuals who identified as Other are 0.397 times less likely to report experiencing these feelings when compared to those who identified as White. Because of this statistically significant relationship, the null hypothesis was rejected and the alternative hypothesis was accepted. The alternative hypothesis stated that there is a difference in the prevalence of T1DM related social stigma, measured by “feeling depressed,” across racial groups in T1DM populations.

Table 16

*Omnibus Tests of Model Coefficients (Depression * Race)*

		Chi-square	*df*	Sig.
Step 1	Step	9.843	4	.043
	Block	9.843	4	.043
	Model	9.843	4	.043

Table 16 provides the Omnibus Tests of Model Coefficients which includes Chi-square, *df*, and *p*-values for significance. The *p*-values in this table reflected a statistically significant correlation at 0.043. With a *p*-value less than the significance level of 0.05, the chi-square statistic for ethnicity (x = 9.843; df = 4) is statistically significant, meaning that the new model, with explanatory variables included, is a significant improvement when compared to the baseline model. Therefore, as previously suggested the null hypothesis was rejected, and the alternative hypothesis, that stated there is a difference in the prevalence of T1DM related social stigma, measured by “feeling depressed,” across racial groups in T1DM populations, was accepted.

In the next section, the binary logistic regression and chi-square statistic were used to analyze RQ6. RQ6 evaluated the prevalence of T1DM related social stigma, measured by “feeling depressed,” across ethnic groups in T1DM populations?

Research Question 6 (RQ6): What is the difference in the prevalence of T1DM related social stigma, measured by “feeling depressed,” across ethnic groups in T1DM populations?

Table 17

Feeling Depressed Binary Logistic Regression (Ethnicity)

								95% C.I. for EXP(B)	
		B	S.E.	Wald	*df*	Sig.	Exp(B)	Lower	Upper
Step 1[a]	ethnicity(1)	-.862	.458	3.543	1	.060	.422	.172	1.036
	Constant	.747	.405	3.410	1	.065	2.111		

a. Variable(s) entered on step 1: ethnicity.

Table 17 provides the binary logistic regression analysis generated from SPSS with the target group set to ethnicity category Not Hispanic/Latino. Ethnicity (1) evaluated the comparison between Hispanic/Latino and Not Hispanic/Latino. The correlation between the dependent variable, feeling depressed, and the independent variable, ethnicity produced a *p*-value greater than 0.05 at $p = 0.060$. This suggested that there is no statistically significant correlation that exists between the variables. Therefore, the alternative hypothesis was rejected and the null hypothesis was accepted. The null hypothesis stated that there is no difference in the prevalence of T1DM related social stigma, measured by “feeling depressed,” across ethnic groups in T1DM populations.

Table 18

*Omnibus Tests of Model Coefficients (Depression * Ethnicity)*

		Chi-square	*df*	Sig.
Step 1	Step	3.722	1	.054
	Block	3.722	1	.054
	Model	3.722	1	.054

Table 18 provides the Omnibus Tests of Model Coefficients which includes Chi-square, degrees of freedom, and *p*-values for significance. The *p*-values in this table did not reflect a statistically significant correlation at 0.054. With a *p*-value greater than the significance level of 0.05, the chi-square statistic for ethnicity (x = 3.722; df = 1) was not statistically significant. This means that the new model, with explanatory variables included, is not a significant improvement when compared to the baseline model. Therefore, as previously suggested the alternative hypothesis was rejected, and the null hypothesis, that stated there is no difference in the prevalence of T1DM related social stigma, measured by “feeling depressed,” across ethnic groups in T1DM populations, was accepted.

Summary

In summary, upon IRB approval, data from the REAL dataset was obtained and analyzed. Before analysis, any missing data and all participants who identified as having T2DM were removed from the working dataset. The data was evaluated using descriptive statistics and cross-tabulations, then analyzed to answer each research question using binary logistic regression analysis and chi-square statistic. The results showed that the social stigma theme “anxiety” was less prevalent in the sample population with only 1.7% of the population reporting that they experienced anxiety. Statistical significance was found for the associations between the dependent variable feeling blamed/rejected/bad about oneself and the independent variable ethnicity, as well as, the dependent variable feeling depressed and the independent variable race.

From these results, the alternative hypotheses were accepted for RQ4 and RQ5, which stated that there are statistically significant relationships between dependent variables, feeling depressed and feeling blamed/rejected/bad about yourself, and the independent variables, race and ethnicity, respectively. The B coefficients generated for the SPSS output for these research questions were negative, meaning that the individuals in these categories were less likely to report feeling depressed or feeling blamed/rejected/bad about yourself. Contrastingly, due to the lack of a statistically significant relationship, the null hypothesis was accepted for RQ1, RQ2, RQ3, and RQ6 which stated that there is no correlation between the following variables:

- Anxiety and race
- Anxiety and ethnicity
- Feeling blamed/rejected/bad about oneself and race
- Feeling depressed and ethnicity

Chapter 5: Discussion

Introduction

In this study I utilized data from the REAL intervention dataset to evaluate and understand whether race and ethnicity influenced the prevalence of health-related social stigma in people with T1DM. Health related social stigma was measured by evaluating the prevalence of the following themes in the secondary data: anxiety/fear of negative judgement, feeling blamed/rejected/bad about oneself, and feeling depressed. IRB approval was obtained on June 8, 2021, after which all data was obtained and analyzed using IBM SPSS 25. I evaluated the data using descriptive statistics to obtain population frequencies and percentages for each variable. I then conducted cross-tabulation analyses to evaluate the interactions between dependent and independent categorical variables. Lastly, I used binary logistic regression and chi-square analysis to evaluate the associations between the variables.

Results of these analyses showed that statistically significant correlations existed between the dependent variable feeling blamed/rejected/bad about oneself and ethnicity. I used binary logistic regression analysis to evaluate the prevalence of this theme amongst individuals who identified as Hispanic/Latino compared to those who identified as Not Hispanic/Latino. The comparison produced a *p*-value of 0.003 which is less than the threshold value 0.05 and reflected a statistically significant relationship. Statistically significant correlations were also identified between the dependent variable feeling depressed and race. For race, the category White was used as the target group. The target group refers to the category of the independent variable that is used for comparison to all other categories. I made four comparisons for the binary logistic regression analysis: race combined (1) compared the races Black and White, race combined (2) compared Mixed and White, race combined (3) compared Native American and White, and race combined (4) compared Other and White. Race combined (1) and race combined (4) produced statistically significant associations with *p*-values of 0.050 and 0.035, respectively. Additionally, the *b* coefficients for the variables in Tables 13 and 15 were negative. This means that individuals in these categories were less likely to report that they have felt depressed or blamed/rejected/bad about themselves.

No statistical significance was found between the social stigma theme anxiety/fear of negative judgement and the independent variables race and ethnicity. With only 1.7% of the population reporting that they experienced anxiety, the limited prevalence of this theme in the sample population may have negatively impacted the results. Evaluation of these results suggested that the alternative hypothesis, stating that there is an association between the dependent and independent variables, is true when evaluating RQ4 and RQ5. However, the null hypothesis, which stated that no statistically significant association exists, should be accepted for RQ1, RQ2, RQ3, and RQ6.

Interpretation of Findings

This study's purpose was to evaluate the influence of race and ethnicity on the prevalence of the health-related social stigma themes anxiety/fear of negative judgement, depression, and feeling blamed/rejected/bad about yourself in people with T1DM. The findings from the descriptive statistics and population demographics generated using the REAL intervention dataset showed that 75.7% (*n* = 87) of the sample population identified as the ethnicity Hispanic/Latino while the remaining 24.3% (n = 28). identified as Not Hispanic/Latino. More than half of the sample population identified as the race Other (*n* = 61, 53%) with the remaining participants identifying as Black (*n* = 12), Mixed (*n* = 4), Native American (*n* = 2), and White (*n* = 36). Additionally, 52.2 % of the total study population reported experiencing feelings of depression, 46.1% reported feeling blamed/rejected/bad about themselves, and only 1.7% reported having feelings of anxiety due to their disease.

Evaluation of the cross-tabulation analyses between independent and dependent variables showed that individuals who identified as Not Hispanic/Latino were more likely to experience feelings of depression (68%) and blame/rejection/bad about themselves (71%) compared to individuals who identified as Hispanic/Latino. In comparison, the majority of individuals who identified as the race White reported having feelings of depression (67%) and blame/rejection/bad about themselves (58%). More than half of the individuals who identified as the other listed races, Black, Native American, Other, and Mixed, reported that they did not experience one of these two social stigma themes.

Moreover, the prevalence of anxiety in the population was not large enough to produce significant results. Only two participants (1.7 %; *n* = 2) in the study sample reported experiencing feelings of anxiety, both of which identified as the race Other and the ethnicity Not Hispanic/Latino. Therefore, further evaluation and a larger sample population may be needed to adequately evaluate the research question analyzing anxiety in the study population.

Anxiety

Evaluation of the results from the binomial logistic regression analysis for RQ1 suggested that the null hypothesis was true. The null hypothesis stated that there was no difference in the prevalence of T2DM-related social stigma measured by “anxiety/fear of negative judgement” across racial groups in T1DM populations. The following races were included in the analysis and compared to the target group White, Black, Mixed, Native American, and Other. *P*-values for each comparison group were over the threshold value of 0.05, which can be interpreted that no statistically significant relationship exists between the variables anxiety and race.

The binomial logistic regression analysis for RQ2 produced similar results as those evaluated for RQ1. With *p*-values exceeding the threshold value of 0.05, no statistically significant relationships were found between the variables anxiety and ethnicity. Ethnicity was broken down into two categories, Hispanic/Latino and the target group, Not Hispanic/Latino. The lack of statistical significance between these variables resulted in the acceptance of the null hypothesis which stated that there is no difference in the prevalence of T1DM-related social stigma measured by “anxiety/fear of negative judgement” across ethnic groups in T1DM populations.

Various factors of the study could have attributed to this reduced prevalence of anxiety in the sample population. One factor that is important to mention was the use of self-reporting to evaluate the experiences of participants. Self-reporting was used to evaluate anxiety in the sample population. However, only 1.7% (n = 2) of participants reported experiencing anxiety, and those two participants identified as the race Other and ethnicity Hispanic/Latino.

While self-reporting is a low cost, efficient method of reporting participant experiences, with this method of data collection, biases and limitations may arise. For instance, individuals are normally influenced by social desirability when reporting on past experiences. This means that they tend to report socially acceptable experiences even if they differ from their actual experience. Therefore, if anxiety is considered undesirable, the participants may be more reluctant to report experiencing these feelings, which could have impacted the reduced prevalence in the sample population. This relates to the social construction of reality concept that posits a person's reality or real world help shape their thoughts and feelings on a particular issue or idea. When society stigmatizes these specific illnesses as undesirable, it makes it more difficult for individuals to openly identify as having these feelings or being diagnosed with the illness.

Another factor that could have caused the reduced prevalence in the research is the removal of subjects. In Chapter 4, I mentioned that individuals with missing data and those who identified as having T2DM were removed from the dataset. While 71% of the original sample population remained, it may be beneficial to know if the prevalence of anxiety was high in the 47 excluded participants and if the removal of these subjects could have made an impact on the prevalence of anxiety in the sample population. This would also be important to understand the differences in prevalence of anxiety between people with T1DM and people with T2DM.

Contradictory to my research, other studies reported increased prevalence of anxiety amongst individuals living with T1DM. Rechenberg et al. (2017) conducted a review of literature that analyzed 20 studies from a total of 338 papers evaluating anxiety symptoms in youth between the ages of 3-25 years with T1DM. In one sample of 150 youth, the researchers found that 21.3% tested positive for anxiety, which was double the rate of those who tested positive for depression (11.3%). In another sample of 92 youth, 19.6% developed anxiety and 26.1% developed major depressive disorders. However, unlike the data from the REAL dataset, the mental health conditions were clinically diagnosed by health professionals and the researchers did not rely on self-reporting questionnaires. In addition, the age group being accessed in the research conducted by Rechenberg et al. used much wider age range than that used by the REAL diabetes intervention. This wider age range may increase the prevalence of anxiety within the target population as well as provide insight on how age influences the prevalence of anxiety in people with T1DM.

Castello-Guerrero et al. (2018) provided insight on the associations between age and gender and the health related social stigma themes of anxiety and depression. The researchers sought to evaluate gender and race differences in the prevalence of both depression and anxiety and their predictive factors. They analyzed data from 339 patients who participated in structured clinical interviews performed by clinical professionals. The research found that 19.5% of the participants had anxiety and 24% had depression. It was noted in this study that women reported having depression (33.5% vs 15.4%) and anxiety (26.2% vs 13.7%) more than men. This trend was also witnessed when evaluating the following different age groups: early adulthood (18-25 years old), anxiety = 12.9% for women versus 8.3% for men and depression = 16.1% versus 5.5%; mid-life (26-45 years old), anxiety = 34.5% versus 18.8% and depression = 36.9% versus 15.3%; and mature adulthood (46-65 years old), anxiety = 16.3% versus 7.8% and depression = 39.5% versus 21.6%. Like the study conducted by Rechenberg et al. (2018), this study had a much wider age range being evaluated than the REAL diabetes intervention. While the study did not evaluate race or ethnicity, it did provide insight on how increasing the age range in future studies may increase the prevalence of anxiety and depression in the sample population, which could aid in finding statistical significance between the variables.

Depression and Blame/Rejection/Bad About Oneself

Binary logistic regression analysis was utilized to evaluate RQ3 and RQ4 which examined whether there was a statistically significant relationship between the social stigma theme "feeling blamed/rejected/bad about oneself" and the independent variables race and ethnicity, respectively. The relationship between feeling blamed/rejected/bad about oneself and the different race categories did not produce statistical significance; however, a statistically significant association was found between this theme and the independent variable ethnicity. The logistic regression model evaluated the relationship between feeling blamed/rejected/bad about oneself and the ethnicity category Hispanic/Latino compared to the category Not Hispanic/Latino. With a *p*-value of 0.003, the results showed that individuals who were Hispanic/Latino were 0.244 times less likely to report feeling blamed/rejected/bad about oneself than those who identified as

Not Hispanic/Latino. Similar findings were observed amongst minority categories of race and the social stigma theme “feeling depressed.”

Binary logistic regression analysis was utilized to evaluate RQ5 and RQ6 which examined the whether there was a statistically significant relationship between the social stigma theme “feeling depressed” and the independent variables race and ethnicity, respectively. In contrast to the results seen for the theme “feeling blamed/rejected/bad about oneself,” no statistically significant relationship was found between feeling depressed and the independent variable ethnicity. However, statistical significance was found between feeling depressed and two race categories, “race combined (1)” and “race combined (4).” Race combined (1) evaluated the relationship between the prevalence of feeling depressed amongst individuals who identified as Black compared to those who identified as White. Race combined (4) evaluated the relationship between the prevalence of feeling depressed amongst individuals who identified as Other compared to those who identified as White. The remaining two categories, race combined (2) and race combined (3), evaluated individuals who identified as Mixed and Native American compared to those who identified as White, respectively. It was found that those who identified as Black were 0.250 times less likely to report depression compared to their White counterparts. In addition, individuals who identified as Other were 0.397 time less likely to report depression compared to their White counterparts.

While reporting feelings of blame/rejection/bad about oneself and depression were low in minority race and ethnicity groups, individuals who identified as White and Not Hispanic/Latino had higher rates of reporting experiencing these feelings. This could be because of the stigma placed on these feelings within minority communities reducing the willingness of minorities to admit to having them. As a Black woman, I have seen how mental illnesses such as depression and anxiety are treated within my community. It is not an issue that is regularly spoken about and treatments, such as therapy, are not commonly utilized. Therefore, lower reporting numbers within these populations is common. White individuals tend to have more access to mental health treatment services and are more open and honest about the mental health issues that they face. The following research studies found similar reporting incidences where minorities were less likely to report mental health issues such as depression, anxiety and low self-esteem when compared to White individuals.

Individuals who identified as White more frequently reported that they experience feelings of depression (67%) and feelings of blame/rejection/bad about themselves (58%). Hawkins et al. (2016) believed this difference in reporting is due to the underutilization of mental health services by racial/ethnic minorities compared to non-Hispanic Whites. In their research, Hawkins et al. examined the racial/ethnic differences in predictors of mental health service use among a national sample of African Americans, Hispanics, and non-Hispanic Whites with a self-reported diabetes and depression diagnosis. Data was collected using the 2012 National Health Intervention Survey. From the data, the researchers found that African Americans were least likely to have sought help from a mental health professional while non-Hispanic Whites were the most likely. This difference is thought to be due to barriers and biases that racial/ethnic minorities experience when seeking treatment for mental health issues. Additionally, this can make reporting mental health issues for these racial/ethnic groups more difficult because they are not being properly diagnosed by mental health professionals.

Narendorf and Palmer (2016) evaluated this same phenomenon by examining the perceived need for treatment across different racial groups with similar results. The researchers observed mental health service use among three groups of young adults with assessed psychological distress: no perceived need for treatment, reported unmet need, and received treatment. A total of 19,775 participants between the ages of 18-25 years old in the National Survey on Drug Use and Health (2008–2013) who met criteria for psychological distress where included in the study. Multiple logistic regression was used to analyze demographic data and access/need related predictors of perceived need. The researchers found that more than half the sample did not perceive a need for mental health treatment with only one-third of the sample actually receiving treatment. It was reported that White youth were more likely than any other racial/ethnic group to perceive a need for or receive treatment for mental health issues. This research suggests that the barriers that arise for seeking treatment for mental health issues may stem from cultural differences between the different racial/ethnic groups.

Limitations of the Study

Several limitations were noted in this study that may have affected the results. One limitation was that the initial study relied on self-reported information from participants to evaluate their feelings and experiences. This type of information can introduce bias into the results such as sampling bias and response bias. The resulting bias stems from participants' natural desire to, consciously or unconsciously, report experiences that are considered socially acceptable even if they differ from their actual experiences. This means that participants tend to report experiences that are considered favorable by peers instead of those experiences that may be considered negative. For instance, for a question that states do you regularly have depressive thoughts or thoughts about harming oneself? Response bias would occur if a participant who regularly has these thoughts states that they rarely do due to the negative attributes associated with depression and depressive thoughts within society.

Another limitation is the lack of prevalence of anxiety in the sample population. This lack of prevalence may have affected the results for RQ1 and RQ2 because there was no accurate representation of the social stigma theme within the sample population which could have resulted in a type II error. Type II error occurs when the researcher fails to reject the null hypothesis even though it is false. Previous research shows that anxiety is prevalent in T1DM populations; therefore, further research may require a larger sample population with a more adequate representation of anxiety to better answer these research questions. This limitation also poses the question of whether by removing the excluded subjects could we have introduced sampling bias that resulted in less representation for this social stigma theme within the population or would including individuals with T2DM increase the prevalence of anxiety in the current dataset.

Lastly, the cross sectional design of this study did not provide information on the causal relationship between the different variables being analyzed in the study. This type of research design only allowed for evaluation of whether or not an association exists without giving weigh to any causal inferences. Therefore, it is important to note that the statistically significant associations found in the results may not be due to a direct association between the independent and dependent variables. It would require further analysis to evaluate the causal relationships between the variables to further understand relationships between each variable in the study.

Recommendations

Evaluation of the results produced several significant findings while also uncovering areas where further research may be required. One area where further research is needed is to explore the prevalence of anxiety in people with T1DM. As previously stated, anxiety was not widespread in the sample population at 1.7%. A larger dataset, with increased prevalence of anxiety would need to be evaluated to analyze whether there is a statistically significant relationship between this dependent variable and race and ethnicity. Additionally, the studies by Rechenberg et al. (2017) and Castello-Guerrero et al. (2018) utilized wider age ranges for their sample population which produced an increase in the prevalence of anxiety. For this research, it may be beneficial to utilize a wider age range to increase the prevalence of anxiety in the sample population. Increasing this prevalence will increase the validity of the results and provide a better understanding of the relationship between the variables. Widening the age range can also aid in understanding how age influences the relationships between race and ethnicity and the prevalence of anxiety and other social stigma themes in people with T1DM.

Additionally, it may be beneficial to examine the cultural differences between racial/ethnic groups and how they influence the associations between race/ethnicity and the prevalence of health related social stigma themes anxiety, depression, and feeling blamed/rejected/bad about yourself. The results of this study and those studies conducted by Narendorf and Palmer and Hawkins et al. showed that minority groups are less likely to report or seek help for mental health issues such as anxiety and depression compared to non-Hispanic Whites. This is thought to be due to the barriers and biases that can arise in minority communities. These barriers and biases can range from discrimination in the health sector to cultural differences between the different racial/ethnic groups that influence perceived need for treatment. Identifying and understanding these barriers will aid in creating and targeting health intervention to the appropriate populations.

Lastly, further research is recommended is to explore the causal relationships between the independent and dependent variables showing statistically significant associations. In this study, use of a cross-sectional study design did not indicate the causal relationship between variables. Conducting a case study to explore and understand the causal relationships would be beneficial to evaluate whether these are direct associations and what other factors may be contributing to the associations seen.

Implications

This study's findings advance understanding of the distribution of health-related social stigma themes across different races and ethnicities of people with T1DM. However, care must be maintained when using this information due to the reduced prevalence of the social stigma theme "anxiety/fear of negative judgement" within the sample population which may not provide an accurate depiction of the entire population. Given the negative associations found between the dependent variables, feeling depressed and feeling blamed/rejected/bad about yourself, and the independent variables, race and ethnicity, these findings can be utilized to develop tailored public health interventions geared toward reducing the prevalence of these themes. It can also aid in targeting interventions toward communities suffering from poor outcomes of chronic diseases due to the high prevalence of depression and feelings of blame/rejection/bad about oneself.

The research showed that individuals identifying as non-Hispanic White reported experiencing these feelings more frequently than other races and ethnicities. Hawkins et al. (2016) explained that this is due to the barriers and bias experienced more by minorities compared to Whites. Bridging this gap can aid in better treatment for social stigma themes such as anxiety, depression, and other mental health disorders in minority communities. This will be accomplished by providing minority communities with access to resources to help self-identify these social stigma themes when they occur in order to better treat them. Identifying and treating these disorders will improve health outcomes in individuals within minority communities where knowledge is lacking.

Additionally, this research can be utilized to enact social change within the public health sector. Social change is defined as any act that influences positive change (Walden University, 2017). This research aided in enacting social change by providing insight on the differences in the prevalence of social stigma themes in different racial and ethnic communities. With this insight, public health officials will be able to provide the needed information to increase knowledge on these themes and how they can affect health in people with chronic diseases. The findings can also impact policy change in T1DM-related healthcare and how it can differ by race and ethnicity. Previous studies have shown that discrimination and lack of knowledge are important barriers to receipt of health care in minority communities. Increasing knowledge amongst health care professionals on these barriers and enforcing interventions in high risk populations will aid in improving how people with T1DM and other chronic diseases in these communities are treated within the health care field.

Conclusion

This research utilized the REAL dataset to evaluate whether associations exist between health-related social stigma themes, anxiety/fear of negative judgement, feeling blamed/rejected/bad about oneself, and feeling depressed, and the independent variables, race and ethnicity. Evaluation of the data using descriptive statistics, cross-tabulations, binary logistic regression analysis, and chi-square statistic showed that statistically significant associations exist between the dependent variables feeling blamed/rejected/bad about oneself and feeling depressed and the independent variables ethnicity ($p = 0.003$) and race (race combined (1) = 0.050; race combined (4) = 0.035), respectively. The statistical significance shown by the p-values were associated with negative coefficients, which means that the individuals in those categories are less likely to report experiencing feelings of depression and feelings of blame/rejection/bad about yourself. However, due to the lack of prevalence of anxiety within the sample population no statistical significance was observed.

After evaluating the results, further research is required to evaluate whether the above mentioned statistical insignificance is due to the lack of prevalence of anxiety in the community and if this lack of anxiety is an accurate reflection of the population as a whole. It would also be beneficial to evaluate a larger age range when exploring the statistical significance, or lack thereof, between anxiety and race and ethnicity. In addition, this study did not provide insight on causal relationships; therefore, future research should focus on understanding the causal relationships between the variables that were statistically significant. Although causal relationships were not identified, these results can be utilized to provide resources that may aid in targeting health interventions to minority communities to help them identify anxiety, depression, and other social stigma themes. Individuals in minority racial/ethnic communities tend to be less likely to report these issues due to their lack of knowledge on how to identify these feelings and decreased clinical diagnosis due to the barriers and bias experienced when utilizing mental health resources. This will aid in treatment of these social stigma themes as well as improve health outcomes that are commonly affected by their increased prevalence.

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