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Effects of Social Determinants on Access to Care Among Patients With Diabetes in Florida

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Walden University

College of Management and Human Potential

This is to certify that the doctoral study by

Nekeisha Walker

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University
2023

Abstract

Effects of Social Determinants on Access to Care Among Patients With Diabetes in Florida

by

Nekeisha L. Walker

MBA, Webster University at Orlando, 2015

MHA, Webster University at San Antonio, 2013

BA, University of Texas at San Antonio, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Healthcare Administration

Walden University

May 2023

Abstract

Diabetes imposes a major burden on society, especially in the state of Florida, in the form of increased medical costs, lost productivity, early mortality, and intangible costs in the form of diminished quality of life. Access to diabetic care affects health administration in Florida by impacting the overall cost of treating the condition. Limited access to care can lead to an increased risk of complications resulting in a higher cost of treatment. The purpose of this quantitative study was to determine whether access to care dependent variables (access to doctors and length of time since last routine checkup) were associated with Social Determinants of Health (SDOH) independent variables (race, education level, economic stability, and location) among patients with diabetes in Florida. Using the social–ecological model as the framework, the study examined the extent to which SDOHs were associated with delayed access to doctors and length of time since last routine checkup among Floridians. The participants (n=2014) consisted of adult men and women ages 18 and older residing in the state of Florida who have been diagnosed and treated for diabetes using the 2019 Behavioral Risk Factor Surveillance System survey. A logistic regression analysis revealed collectively that the SDOH race, education level, economic stability, and location were not significantly associated with length of time since last routine checkup. Significant associations were found between SDOH and access to doctors. This research has positive social change implications for key stakeholders (i.e., policy makers and healthcare administrators) concerned about access to diabetes care. Findings could have implications for positive social change and could be used to better understand the needs of Floridians' with little or no access to care.

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Dedication

This dissertation is dedicated to my mother, my ever-present inspiration Norma Bartley; Roger Harris, my life partner and biggest cheerleader, who urged me to take this journey step by step and overcome my fear with the richest love, support, and understanding; and my brother Oliver Harris who is currently battling complications of uncontrolled diabetes.

To my children, Samantha and Kymali, who have grown into independent young adults while I was on this journey: Always understand that life has its challenges. Still, you move forward in faith, believing you have the power to succeed if you only trust and believe God will provide a way.

"For with God nothing shall be impossible." —Luke 1:37

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"I can do all things through Christ that strengthens me." — Philippians 4:13

I would like to express my sincere gratitude to those who have helped me along my dissertation journey.

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I am grateful for my mother and lovely children, who believed in me and told me I could do this. Thank you for your ongoing support and for inspiring me to be more.

Finally, let me offer my heartfelt appreciation to those silent souls still here and those no longer with us, who always pushed me, believed in me, and supported me—my brother, Kenyatta Walker (may he rest in peace), along with countless others.

My sincerest appreciation to all who have walked with me, encouraged me to keep stepping, and believed in me.

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Section 1: Foundation of the Study and Literature Review

Introduction

In the United States, social status, which refers to a blend of race, income, occupation, education, ethnicity, home ownership, and family size, an individual holds in society is a determinant of the individual's health, living conditions, and quality of life (U.S. Bureau of Labor Statistics [BLS], 2018). Often, the lower in society individuals are, the more likely they are to suffer from disease and premature death (World Health Organization [WHO], 2019). Social determinants of health (SDOH) are defined as the conditions and situations people of a given culture must live and work in (WHO, 2019). The better the status of an individual, the better the individual's health, living conditions, and quality of life (BLS, 2018).

Higher income is related to better health outcomes, including a lower prevalence of chronic diseases such as diabetes as well as lower age-adjusted mortality (Kim & Delen, 2018). Diabetes is a chronic disease considered the seventh leading cause of death in the United States by the Centers for Disease Control and Prevention (CDC, 2020b). Numerous studies have been conducted on geographic disparities and predictors of both prediabetes and diabetes (Lord et al., 2020; Lu et al., 2018); however, none have been conducted to examine the association between SDOH, access to doctors, and the length of time since last routine checkup for diabetic patients, specifically in the state of Florida. The following SDOH categories were chosen as independent variables to be examined in this study: race, education level, economic stability, and location. In contrast, as

dependent variables were access to doctors and the amount of time since last routine checkup.

Race was chosen as a variable because research has shown that Black and Hispanic populations have more prevalent negative outcomes associated with glycemic control, number of acute complications, and access to care when compared to Whites and Asians (Lu et al., 2018). The barriers to care for Black and Hispanic populations may be influenced by language or cultural differences, lack of financial resources, or distances to access care. Over the years, Florida's population increase has been the result of migration from neighboring states and international migration, particularly in the state's southern regions. About 21% of Florida's diversified population is the result of immigration, as evidenced by southeast Florida's 72.7% Hispanic population and 24.4% Black population (U.S. Census Bureau, 2019). Blacks and Hispanics are more prone than Whites to develop prediabetes and Type 2 diabetes (T2D) due to their cultural lifestyle and genetics (Haw et al., 2021). Martinez-Cardoso et al. (2020) researched social determinants of diabetes management and control among immigrants in the United States and found that while the diabetes literature is full of research on individual risk factors and health behaviors, there is a dearth of empirical evidence linking SDOH to diabetes management among immigrants. However, housing and food insecurity, poverty, uninsurance and underinsurance, and limited support for immigrants in healthcare systems have been consistently demonstrated to deter diabetes management and care (Martinez-Cardoso et al., 2020).

Education level and economic stability were selected as variables for this study because the higher the education level a person has the more likely they are to secure a well-paying job, leading to better economic stability (Adler et al., 2016). These individuals are also more likely to have healthcare coverage through an employer or private insurance or the financial means to pay for healthcare. Kim and Delen (2018) conducted a study on health disparities and social determinants of health and found that patients of higher socioeconomic status (SES) are much less likely to have medical events (about 24 events per year) as compared with their counterparts (about 27 events per year). Researchers used *medical events* to refer to the multiple doctor visits they assumed diabetic patients with comorbidities would have. When accounting for race, Whites have more medical events (incidents) than Blacks and other races. Kim and Delen also found systematic disparities of diabetes-related events and procedures across subgroups, which have been overlooked in health disparity research. Health status improves at each step up the income and social hierarchy. High income determines living conditions, such as safe housing, access to healthcare, and the ability to buy sufficient nutritious food (Kim & Delen, 2018).

The final independent variable is location. The location variable is preferred because Healthy People 2030 listed *neighborhood and built environment* as one of the five domains of SDOH, along with *safe housing and transportation*, as contributing factors (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion [ODPHP], 2021). The state of Florida is made up of both rural and

nonrural areas, and research suggests that individuals located in rural communities may find it exceedingly difficult to make the trip to see a doctor (Thomas et al., 2018). This can be due to several factors such as distance, lack of transportation, and economic instability (Thomas et al., 2018). Lord et al. (2020) also found that inadequate or lack of public transportation and long distances to healthcare facilities in rural areas may limit access to healthcare services.

In this study, the definition and significance of access to care are crucial. Various studies have defined access to health services in different ways. Donabedian (1972) defined access to care as "the use of services, not simply the presence of a facility" (p. 166). Gulliford et al. (2002) defined access to care as "the availability of an adequate supply of health care services and the ability of individuals to obtain healthcare when it is desired or required" (p. 127). Parker (1974) defined it as "the ability to reach, afford, and obtain access to services" (p. 53). Access to health services is defined by the ODPHP (2019) as "the timely use of personal health services to achieve the best health outcomes" (p. 2). The ODPHP (2019) stated that access to care is crucial and entails:

> the act of gaining access to the health care system through either insurance coverage or private pay as well as accessing a geographic location for delivery/availability of health services, and healthcare provider whom patients trust and are able to communicate with. (p. 2)

In this study, I adopted Parker's (1974) concept of access to care "the ability to reach, afford, and gain access to services" (p. 53). The dependent variable access to care

is described by the ability to see a doctor for an appointment within the last 12 months, ability to see a doctor in the past 12 months regardless of cost, and the length of time since last routine checkup (Parker, 1974; Thomas et al., 2018). These were selected from the 2019 Behavioral Risk Factor Surveillance System (BRFSS) survey category listing the data for diabetic respondents in the state of Florida. These definitions were chosen because access to health care services entails utilizing personal health services on a timely basis to achieve the best possible health outcomes. This is especially important for individuals diagnosed with diabetes because access to health care influences overall physical, social, and mental health status; disease and disability prevention; early detection and treatment of health problems; quality of life; preventable death; and life expectancy (ODPHP, 2019).

Understanding the influence of SDOH, including race, education level, economic stability, and location, on access to doctors and length of time between checkups for this patient population may help improve their health outcomes and promote positive social change. This knowledge can help health care administrators address delays in access to care for diabetic patients in Florida and improve patient experiences, patient health outcomes, and operation inefficiencies. The results of this study may also provide healthcare administrators and policymakers with valuable information needed to analyze the impact on revenues and access to this specific type of care. Study results may also provide information to healthcare administrators to help with the strategic and fiscal management of their respective organizations.

In Section 1, I present an introduction to SDOH and Floridians' access to diabetic care. Section 1 also includes the purpose of the study. Section 1 also covers the problem statement, research questions/hypotheses, theoretical foundation, nature of the study, literature review, definitions, assumptions, limitations, scope, and delimitations.

Problem Statement

The social problem in this study is access to care and length of time to access care for Floridians' suffering from diabetes mellitus. Diabetes was the nation's seventh leading cause of death in 2019, accounting for 87,647 deaths, and is most prevalent in adults 65 years or older (Diabetes Advisory Council, 2019). With many older individuals in Florida, estimates indicate that over 2.4 million people have diabetes and over 5.9 million have prediabetes in the state (Dall et al., 2019). Diabetes imposes a major burden on society, especially in the state of Florida in the form of increased medical costs, lost productivity, early mortality, and intangible costs in the form of diminished quality of life (Dall et al., 2019; Kang et al., 2018). Approximately 2,164,009 people in Florida, or 12.5% of the adult population, have diagnosed diabetes. Florida is third at $25 billion among the top four states in terms of total annual cost for diabetes expenditure (Dall et al., 2019; Kang et al., 2018). An additional 546,000 people in Florida have diabetes but do not know it, greatly increasing their health risk. Every year an estimated 128,509 people in Florida are diagnosed with diabetes. On average, health care costs of people with diabetes are 2.3 times those of people without diabetes (Dall et al., 2019; Kang et al., 2018). Total direct medical expenses for diagnosed diabetes in Florida were estimated

at $19.3 billion in 2017. In addition, another $5.5 billion was spent on indirect costs from lost productivity due to diabetes.

Timely access to diabetic care is critical because complications and death are frequently the result of undiagnosed, poorly managed, or unmanaged diabetes (Dall et al., 2019; Kang et al., 2018). Poorly managed or unmanaged diabetes may also be influenced by SDOH such as “economic stability, education access and quality, healthcare access and quality, neighborhood and build environment, social and community context” (ODPHP, 2020, p.1). SDOH can have a huge impact on quality of life and overall well-being. While some studies have concentrated on the absence of insurance coverage as a barrier to accessing diabetes care, data suggest that a lack of mobility can also be a significant hurdle to receiving optimal diabetic care (Thomas et al., 2018). According to an estimate of non-emergency medical care, at least 3.6 million persons in the United States are unable to access non-emergency or timely medical treatment each year, and diabetes is 2.5 times more prevalent in this population (Thomas et al., 2018). Kenya et al. (2015) examined 300 diverse Latino adults in Miami, Florida, and discovered poorly controlled diabetes, high rates of depression, obesity, medication non-adherence, low self-efficacy, and poor provider communication among this population. As a result, this population necessitates a thorough evaluation of health care access and use (Kenya et al., 2015).

There is a noteworthy gap in the literature on how SDOH have affected access to doctors and length of time since last routine checkup for diabetic patients in the state of

Florida. This study was designed to determine whether race, education level, economic stability, and location are associated with access to doctors and length of time since last routine checkup for Floridians with diabetes (Cuschieri & Grech, 2020; Kim & Delen, 2018; Lord & Roberson, 2020). Although there have been studies on SDOH and their effects related to the care of diabetic patients, there is little to no evidence of a study targeting the diabetic population in Florida. Hence, this study was focused on addressing the knowledge gap in the literature on the extent to which SDOH (race, education level, economic stability, and location) are associated with access to doctors and length of time since last routine checkup for Floridians with diabetes.

Purpose of the Study

The purpose of this quantitative study was to determine whether Floridians' access to care (access to doctors and length of time since last routine checkup) among patients with diabetes is associated with SDOH (race, education level, economic stability, and location). The data used in this study included access to doctors, ability to see a doctor in the past 12 months, and length of time since last routine checkup for diabetic patients in the state of Florida. In this study, I sought to determine if the SDOH of race, education level, economic stability, and location (independent variables) affect access to doctors and length of time since last routine checkup (dependent variables) among diabetic Floridians. The findings could help healthcare administrators understand the underlying SDOH issues that delay access to care, specifically among patients with diabetes in the state of Florida. Findings from this research could be used to improve

access to care for diabetic Floridians and aid hospital administrators in optimizing patient access, while executing processes and procedures for those in need.

Research Questions and Hypotheses

For this research study, there were two research questions with hypotheses based on the 2019 BRFSS survey from the CDC database selected variables and codes.

RQ1: To what extent, if any, are SDOH (race, education level, economic stability, and location) associated with access to doctors among Floridians with diabetes?

$H_0$1: SDOH (race, education level, economic stability, and location) are not associated with access to doctors among Floridians with diabetes.

H_a1: SDOH (race, education level, economic stability, and location) are associated with access to doctors among Floridians with diabetes.

RQ2: To what extent, if any, are SDOH (race, education level, economic stability, and location) associated with the length of time since last routine checkup among Floridians with diabetes?

$H_0$2: SDOH (race, education level, economic stability, and location) are not associated with the length of time since last routine checkup among Floridians with diabetes.

H_a2: SDOH (race, education level, economic stability, and location) are associated with the length of time since last routine checkup among Floridians with diabetes.

The independent variables for this study were the SDOH of race, education level, economic stability, and location. The dependent variables in this study were access to doctors and length of time since last routine checkup for diabetic Floridians. The independent variables race, education level, economic stability, and location as well as the dependent variables, were retrieved from the published reports from the 2019 BRFSS then analyzed using Statistic Package of Social Science (SPSS) software.

Theoretical Framework

The theoretical framework for this study was the social–ecological model (SEM). The SEM of health is broad in scope and focuses on various factors that may influence health. Scholars established the SEM framework in the 1970s. The approach has been used for public health initiatives, including the WHO (Blas & Kurup, 2010) and Healthy People 2020 (ODPHP, 2019). The concept behind the SEM framework is that all an individual's traits have a bidirectional impact on health (Kilanowski, 2017; Soderlund, 2017). According to the SEM, health is influenced by the interaction of the individual, the group/community, and the physical, social, and political environments (Sallis et al., 2015). This conceptual framework demonstrates how social, economic, and political factors, such as income, education, occupation, gender, race, and ethnicity, influence an individual's SES, which influences health outcomes. These factors can impact an individual's ability to live a healthy lifestyle by affecting factors such as housing quality, opportunities for physical activity in the built environment, and access to healthcare services (Blas & Kurup, 2010; Chagin et al., 2021).

SDOH are classified in this framework into four levels that work in unison to influence health and well-being. The first level of the model starts with individual biology and other personal characteristics such as age, education, income, and health history (Sallis et al., 2015). The second level, relationship, encompasses a person's immediate social circle, including friends, partners, and family members, all of whom influence a person's behavior and shape their experiences. According to Tehrani et al. (2016), a researcher can examine individual-level factors such as knowledge, attitudes, beliefs, age, and gender. At this level, interventions should focus on the individual's capacity to change behavior through increased awareness and development of personal skills. On the other hand, the social environment encompasses an individual's cultural and social norms, as well as interpersonal relationships that can affect the individual (Tehrani et al., 2016). Whether positive or negative, these influences may come from family members, coworkers, or friends. When family members and peers encourage healthy behaviors, this can have a beneficial effect on the individual's health behavior in terms of seeking diabetes care (Tehrani et al., 2016).

The third level of SEM is community. This level examines the environments in which people interact socially, such as schools, workplaces, and neighborhoods, with the goal of identifying the characteristics of these environments that influence health. Finally, the fourth level considers broad societal factors that contribute to or detract from health. Cultural and social norms, as well as health, economic, educational, and social policies, all contribute to the creation, maintenance, or reduction of socioeconomic inequalities

between groups (Sallis et al., 2015). According to Dendup et al. (2018), the physical environment can either protect against or increase the risk of diabetes. The physical environment can either reinforce or promote unhealthy behaviors.

Additionally, Dendup et al. stated that the safety and physical characteristics of a neighborhood could influence health choices. As a result, the risk for diabetes can be impacted positively or negatively (Dendup et al., 2018). Each of these variables affects an individual's health status. These theoretical components were used to examine the following throughout this study: the structural element will take into account the individual (e.g., age, education, income), relationship (e.g., friends, partners, and family members), community (e.g., neighborhoods), societal (e.g., healthcare access and policies).

The individual level examined whether age, education, and income play a role in seeking and accessing diabetic care. For example, disparities in health outcomes can be because of beliefs, economic factors such as income, and health literacy, which all have the potential to limit access to care. As one of the most studied topics in psychology, self-efficacy is an individual's belief in their outcome on succeeding in any given situation based on their belief system of thinking and feeling and their response or behavior (Mailey et al., 2016). Self-efficacy is a cognitive belief that changes according to the task at hand. Self-efficacy is not a stable personal trait but rather is affected by experiences and past successes while performing the specific task. Self-efficacy is also influenced by

perceiving others such as family and friends performing the task, verbal persuasion, encouragement, and physical and mental state.

The relationship level examined whether friends, partners, and family members play a positive or negative role in access to diabetic care. According to Lee et al. (2017), poor social support can be a psychosocial barrier for individuals with diabetes. The community and societal level will examine whether rural or urban neighborhoods allow residents to conveniently and confidently access healthcare services. According to Mueller et al. (2011), access to healthcare services is critical to good health, yet rural residents face various access barriers. Rural residents frequently face barriers to healthcare, limiting their ability to obtain necessary care. To ensure adequate access for rural residents, necessary and appropriate healthcare services must be available and accessible in a timely manner. Even when a community has an adequate supply of healthcare services, there are additional factors to consider in terms of healthcare access. For example, to have sufficient access to healthcare, a rural resident must also possess the following: financial means to pay for services, such as health insurance accepted by the provider; means to get to and use services, such as transportation to potentially distant services and the ability to take paid time off work to use such services; confidence in their ability to communicate with healthcare providers, especially if they are not fluent in English or have low health literacy; trust in their ability to access services without jeopardizing their privacy; and belief that they will receive quality care (Rutledge et al., 2017).

The SEM will help explain how SDOH, including race, education, economic stability, and location, relate to access to healthcare among diabetic patients in Florida. Thus, this study was guided by the SEM to determine whether SDOH are associated with access to doctors and length of time since last routine checkup among Floridians. Different human emotions or beliefs at play were also considered when addressing public health issues in the case of diabetic patients, specifically in the state of Florida.

Nature of Study

A nonexperimental quantitative correlational research design was employed to determine the association of SDOH and access to doctors and length of time since last routine checkup among Floridians. The quantitative method is appropriate for this research because this study involved race, education level, economic stability, location, access to doctors, and length of time since last routine checkup, which can be coded numerically and analyzed for statistical significance (Camm, 2012; Hancock & Mueller, 2010; Laerd, 2018; Wisniewski, 2016). The primary concerns for this research are access to healthcare for Floridians with diabetes and how SDOH affects their access to care. A correlational design supported the examination of the relationship of SDOHs and access to doctors and length of time since last routine checkup among diabetic patients in Florida because correlational designs allow for the determination of relationships among variables. The dependent variables (DV), access to doctors and length of time since last routine checkup for diabetic Floridians, and the independent variables (IV), which are the SDOH of race, education level, economic stability, and location, were considered in the

regression analysis. This analysis can demonstrate the experienced access to doctors and length of time since last routine checkup in the above-mentioned variables.

A logistic regression analysis of existing data was used to address the objectives of the study. The independent and dependent variables were gathered from a pre-existing data set in which they are numerically coded. Therefore, based on all the considerations mentioned above, a quantitative method considering a correlational design using regression analysis was appropriate for the study. Correlational designs are appropriate when the purpose of a study is to examine potential relationships between identified variables (Allen, 2017). A nonexperimental design was considered because there would be no manipulation of variables. Archival data were used, and there would be no random assignment to control and treatment groups (Babbie, 2010; Trochim & Donnelly, 2008). Specifically, the independent variables include the demographic characteristics of individuals. Thus, individuals have pre-existing demographic characteristics and were not assigned based on this study.

The objective of this study was to determine whether Floridians' access to doctors and length of time since last routine checkup is associated with SDOH (race, education level, economic stability and location; Hoe & Hoare, 2012; Ingham-Broomfield, 2014). A logistic regression analysis was conducted to determine whether there is a relationship between SDOH variables and the dependent variables. Dummy variables were used to represent categorical independent variables.

Literature Review

Search Strategy

The literature reviewed for this study came from the Walden University library and other online federal and medical healthcare websites; the literature reviewed was published between 2015 and the present. The federal government conducts numerous large national studies, which allows researchers to identify trends and changes of phenomena over time. For this reason, the following were selected as sources of literature for review: National Institutes of Health (NIH), WHO, CDC, BRFSS, Agency for Healthcare Research and Quality (AHRQ), the U.S. Census Bureau, and the American Diabetes Association. To located peer-reviewed journal articles, the following databases and search tools were used: the Walden University Library, Google Scholar, ScienceDirect, Health & Medicine, CINAHL Plus, EBSCOhost-Academic Search Premier, Medline, PsycINFO, Embase, ProQuest, and Allied Health Literature. The following keywords were used to search for relevant material: *diabetes*, *access to care*, *social determinants of health*, *demography*, *wait-time*, *socioeconomic*, *race/ethnicity*, *statistics*, *health disparities*, *social cognitive theory*, *Florida population*, *Medicare Affordable Care Act*, and *rural America*.

Literature Review Related to Key Variables/Concepts

This section contains a discussion of research on the variables (dependent and independent) that may play an essential part in the examination of diabetic Floridians being able to have access to a doctor and length of time between checkups. The study

was designed to determine whether the SDOH of race, education level, economic stability, and location. (i.e., independent variables) delay or reduce access to doctors and length of time since last routine checkup (dependent variables) among diabetic patients in Florida.

The findings of this study might provide critical information to healthcare administrators by identifying whether SDOH affect access to doctors and length of time since last routine checkup for diabetic patients in Florida. Identifying and closing this gap could result in improved quality of life for the Floridians in this study who have not been able to schedule a doctor's appointment, could not see a doctor when needed because of cost, or had extended wait times between checkups due to any of the SDOH factors. This study's findings also provide healthcare administrative professionals insights to analyze, revamp, or develop new interventions that could help determine how to improve patient access to care and considering SDOH in making programmatic decisions. The knowledge gained from the findings of this study may strengthen healthcare administrators' and policymakers' decision-making and strategic deployment action plans aimed to improve diabetic care cost and access. This may also help improve health outcomes and quality of life and foster positive social change.

Diabetes in Florida

Diabetes is a chronic disease that occurs when the pancreas is no longer able to make insulin or when the body cannot make good use of the insulin it produces (American Diabetes Association, 2020). CDC has labeled diabetes the seventh leading

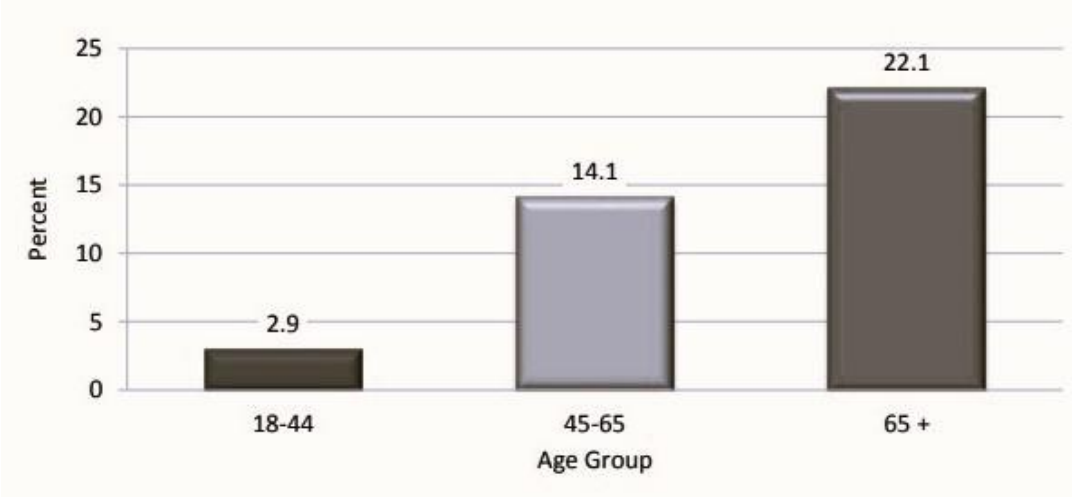
cause of death in the United States. Diabetes is a global epidemic that has affected approximately 34.1 million individuals ages 18 or older and is projected to rise to 700 million adults by the year 2045 (International Diabetes Foundation, 2019). According to the 2020 National Diabetes Statistics report, 1 in 10 Americans have diabetes and approximately 1 in 3 have prediabetes. For adults diagnosed with diabetes, the percentage of existing cases was "highest among non-Hispanic Blacks and people of Hispanic origin than non-Hispanic Asians and non-Hispanic Whites" (CDC, 2020, p.4). According to the CDC, 15% of diabetics are smokers, 38% are not physically active, and 89% are overweight (CDC, 2020). Walker et al. (2015) studied the SDOH in adults with T2D and found that SDOH are critical to address in patients with T2D. Walker et al. also found that factors such as self-efficacy, social support, comorbidity, and medication adherence, among other factors, play a major role in both healthcare utilization and satisfaction.

In Florida, approximately 2.4 million people have diabetes and over 5.9 million have prediabetes (Dall et al., 2019). For those who have this disorder, the medical costs and loss of employment and wages add up to $327 billion yearly (Dall et al., 2019). Additionally, in 2012, the estimated direct medical expenses for diagnosed and undiagnosed diabetes, prediabetes, and gestational diabetes in Florida was $19.3 billion. During this same time, an additional $5 billion was spent on indirect costs from lost productivity due to diabetes (Dall et al., 2019). The American Diabetes Association (2020) estimated annual diabetes costs in Florida to be $25 billion. Moreover, the prevalence of prediabetes and diabetes in Florida has been consistently higher than the

national average for years. For instance, age-adjusted prevalence estimates for prediabetes and diabetes in Florida were 8.7% and 9.8%, respectively, compared to 7.4% for prediabetes and 9.2% for diabetes nationally in 2016 (Lord et al., 2020). The following data from the BRFSS reflect the prevalence of diabetes in Florida over the past 20 years. The prevalence of diabetes among Florida adults (11.2%) was higher than the national average of 10.1% in 2014. Diabetes prevalence has also shown an increase statistically with age. In 2014, only 2.9% of Florida adults ages 18 to 44 reported having ever been diagnosed with diabetes compared to 14.1% of adults ages 45 to 64 and 22.1% of adults ages 65 and older (Figure 1).

Figure 1

Florida Prevalence of Diabetes by Age Group, BRFSS 2014

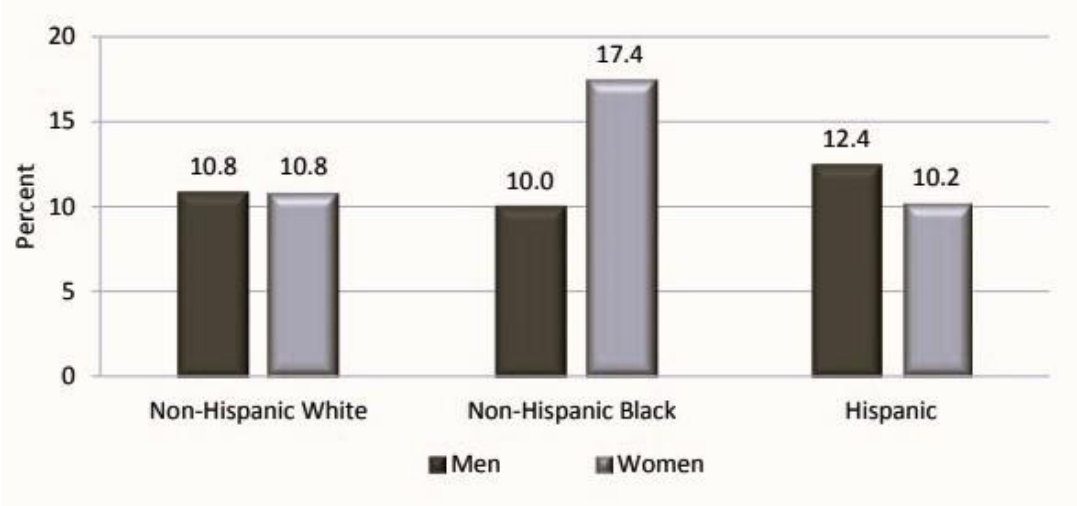


Note. Adapted from "*Florida Diabetes Advisory Council 2017 Legislative Report*, by Florida Department of health, 2017 (https://www.floridahealth.gov/provider-and-partner-resources/dac/_documents/dac-report-january2017). In the public domain.

In 2014, the prevalence of diabetes was highest among non-Hispanic Blacks (14.1%), compared to non-Hispanic Whites (10.8%) and Hispanics (11.3%). However, when looking at diabetes prevalence among race/ethnicity and gender, a different picture emerges. The prevalence of diabetes among non-Hispanic Black men (10.0%) was slightly lower than non-Hispanic White men (10.8%) and Hispanic men (12.4%). On the other hand, the prevalence of diabetes among non-Hispanic Black women (17.4%) was statistically higher than non-Hispanic White women (10.8%) and Hispanic women (10.2%). See Figure 2.

Figure 2

Florida Prevalence of Diabetes by Gender by Race/Ethnicity, BRFSS 2014



Note. Adapted from "*Florida Diabetes Advisory Council 2017 Legislative Report*, by Florida Department of health, 2017 (https://www.floridahealth.gov/provider-and-partner-resources/dac/_documents/dac-report-january2017). In the public domain.

Demographically, Florida has seen a change in population dynamics. Migration from other states continues to be the prime contributor to population growth in the state, but international migration plays an important role, particularly in the southern parts of the state. According to the American Immigration Council (2018), Florida has the nation's highest net domestic migration rate and ranks third in terms of international migration. Immigrants come primarily from Latin American and Caribbean nations like Cuba, Haiti, Jamaica, Nicaragua, and Colombia. As a result, the Hispanic population has grown tremendously in Florida to 26% of the state's overall population (American Immigration Council, 2018; Flood et al., 2018). Southeast Florida represents the main magnet for Hispanics immigrants with a 72.7% Hispanic population and a 24.4% Black population (U.S. Census Bureau, 2019). Tampa, Florida, has a 15% Hispanic population and West Palm Beach, Florida, has 14.2%. Central Florida rural counties have a 32.64% Hispanic population and up to a 16% Black population (U.S. Census Bureau, 2019). However, in the northern parts of Florida, such as Jacksonville, Hispanics only account for 2.6% of the population and 1.6% in the Pensacola region.

These groups help to make up Florida's diverse population. Research has shown that immigrants are more likely to be uninsured and less likely to seek medical attention; they are also more likely to use natural home remedies or traditional medicines instead (Haw et al., 2021). Haw et al. (2021) reported Blacks and Hispanics are more likely to develop prediabetes and T2D due to their cultural lifestyle and genetics than Whites. Some of the foods Blacks and Hispanics eat can be high in fat and calories, which

contribute to higher rates of obesity (Martinez-Cardoso et al., 2020). However, some in these ethnic groups see being overweight as a sign of health. Family celebrations usually have a large variety of foods, unhealthy drinks, and desserts (Martinez-Cardoso et al., 2020). Individuals in these ethnic groups may feel social pressure to overeat because turning down food could be seen as being rude or impolite (CDC, 2019). These groups also tend to be less physically active than Whites, further increasing the risk of disease (Martinez-Cardoso et al., 2020).

There are different types of diabetes, and while the risk factors and health outcomes vary based on the specific type, all types must be managed carefully. Patient education, self-management of diabetes, and access to care are critical components in reducing poor health outcomes that can potentially occur among the diabetic population. Access to care is critical to managing diabetic conditions. Diabetic patients should be monitored to ensure their sugar levels are not too high or too low. Therefore, diabetic patients require continuous consultation and monitoring by healthcare providers. SDOH may be affecting access to care among diabetic patients in the state of Florida.

Race

Health disparities (differences in health status across varied population groupings) exist among the racial and ethnic populations of the United States and within its healthcare system, and issues of racial discrimination play a central role in the process of gaining access to care (Dickman et al., 2017). This is evident among the diabetic population within minority groups. The prevalence of glucose intolerance, prediabetes,

and T2D is higher among geographically varied Blacks than Whites (Berge et al., 2018; Osei & Gaillard, 2017). There are mounting indications of a T2D epidemic in minority populations (Berge et al., 2018; Osei & Gaillard, 2017). In this context, the prevalence of T2D among Blacks in the United States is estimated to be 1.5–2 times that of Whites (Berge et al., 2018; Osei & Gaillard, 2017). In addition, significant racial differences in T2D have been identified among Blacks in the United Kingdom and South Africa (Berge et al., 2018; Osei & Gaillard, 2017). Unknown factors, including genetic inheritance and environmental factors (physical inactivity, diet, obesity, lower SES, smoking, etc.) appear to contribute to the racial discrepancy in diabetes prevalence between Blacks and Whites (Berge et al., 2018; Osei & Gaillard, 2017).

Howard et al. (2017) discovered substantial racial inequalities in incident hypertension, diabetes, and dyslipidemia among individuals of the oldest age levels in their research. Howard et al. also observed a relatively constant impact on the Black–White disparity across the age spectrum. The incidence of diabetes reduced with age; however, above age 75, 15% of Black men and 11% of Black women were diagnosed with diabetes throughout a 10-year follow-up period (compared to 10% and 8% in White men and women). Consequently, even at the oldest ages, there is a high chance of developing diabetes, especially among Blacks (Howard et al., 2017). Table 1 reflects the prevalence of diagnosed diabetes. According to estimates by the CDC, among people ages 18 years of age or older in the United States, 9.2% of Asian Americans, 12.2% of Hispanics, 11.7% of non-Hispanic Blacks, and 14.7% of American Indians/Alaska

Natives have been diagnosed with diabetes compared to 7.5% of non-Hispanic Whites (CDC, 2020).

Table 1

Prevalence of Diagnosed Diabetes from the Centers for Disease Control and Prevention

Characteristic	Total Percentage (95% CI)	Men Percentage (95% CI)	Women Percentage (95% CI)
Race/ethnicity			
American Indian/Alaska Native	14.7 (14.6–14.7)	14.5 (14.4–14.6)	14.8 (14.7–14.9)
Asian, non-Hispanic, overall	9.2 (8.0–10.5)	10.0 (8.3–12.0)	8.5 (7.0–10.5)
Asian Indian	12.6 (9.3–16.7)	13.9 (10.3–18.6)	11.1 (6.6–18.0)
Chinese	5.6 (3.9–8.1)	5.9 (3.5–9.8)	5.3 (3.2–8.8)
Filipino	10.4 (8.1–13.4)	10.9 (7.6–15.4)	10.0 (6.8–14.6)
Other Asian	9.9 (8.1–12.2)	11.5 (8.5–15.3)	8.7 (6.2–11.9)
Black, non-Hispanic	11.7 (10.8–12.7)	11.4 (10.0–12.9)	12.0 (10.9–13.1)
Hispanic, overall	12.5 (11.5–13.5)	13.7 (12.3–15.2)	11.6 (10.2–13.0)
Central/South American	8.3 (8.0–8.6)	9.2 (8.8–9.6)	7.6 (7.2–8.0)
Cuban	6.5 (4.6–9.2)	7.3 (4.2–12.5)	6.0 (3.6–9.8)
Mexican	14.4 (13.1–15.8)	16.2 (14.2–18.3)	12.8 (11.1–14.8)
Puerto Rican	12.4 (10.1–15.1)	13.0 (9.5–17.6)	11.9 (9.0–15.5)
White, non-Hispanic	7.5 (7.2–7.8)	8.6 (8.1–9.0)	6.6 (6.2–7.0)
Education			
Less than high school	13.3 (12.4–14.2)	13.0 (11.8–14.4)	13.6 (12.3–15.1)
High school	9.7 (9.1–10.4)	11.2 (10.4–12.1)	8.6 (7.9–9.4)
More than high school	7.5 (7.2–7.9)	8.3 (7.8–8.8)	6.8 (6.4–7.3)

Note. Adapted from "*National diabetes statistics report 2020: Estimates of diabetes and its burden in the United States*, by Centers for Disease Control and Prevention. U.S. Department of Health and Human Services, (2020b). In the public domain.

Walker et al. (2016) discussed the impact race/ethnicity and SDOH on outcomes for diabetes patients. The age-standardized prevalence of diabetes in the South increased significantly from 7.1% to 8.8%, a relative difference of 25.2% and the highest prevalence of any U.S. Census region (Walker et al., 2016). Members within minority populations (Blacks, Hispanic, and Asian Americans) were found to have significantly

higher hemoglobin A1c (HbA1c) levels compared to non-Hispanic Whites (Walker et al., 2016).

Additionally, regardless of the study population and the measured outcome (i.e., HbA1c threshold of < 7% vs. < 9%), differences in glycemic control by race and ethnicity were observed, and these differences were clinically significant indicated by a difference in HbA1c by a minimum of 0.5 between groups. A racial gap in glycemic control between Blacks and non-Hispanic Whites was continually observed in the populations assessed during the systematic review. After conducting a literature search combining *race, diabetes, social determinants of health, access to care,* and *Florida,* I retrieved no studies, which presented an information gap that this study then aimed to fill. Race has also been identified in this study as one of the independent variables used for statistical analysis.

Education Level

According to the U.S. Census Bureau (2019), education was found to be strongly associated with lifestyle choices. The more educated individuals are the more likely they are to engage in behaviors that benefit their health. In the June 2017 Gallup Poll, 40% of adults with a high-school education or less said there were times in the past year when they did not have enough money to pay for healthcare, compared with 19% of adults with a bachelor's degree. This indicated that lower levels of education and household income are related to an increased likelihood of having trouble paying for healthcare. The prevalence of diagnosed diabetes in the United States is 12.6% among those with less

than a high school education, 9.5% among those with a high school education, and 7.2% among those with more than a high school education (Marciano et al., 2019). A college degree or higher is associated with the lowest diabetes risk (Marciano et al., 2019). Similar to findings regarding income, temporal trends in diabetes prevalence at different levels of education reveal widening disparities in diabetes prevalence in relation to educational attainment (Marciano et al., 2019; Saydah & Lochner, 2010). The United States healthcare system is exposed to health disparities that often benefit the wealthy and exclude the poor (Dickman et al., 2017). The health disparities do not reduce income-based inequities and instead make it more difficult for poor persons to obtain care (Dickman et al., 2017). Researchers have also found that lower income is accompanied by lower educational level, thus increasing risk among individuals in low SES (Stormacq et al., 2019).

SES is one of the most enduring contributors to disparities in health care and health care access. Traditionally measured by educational attainment, income levels, and occupation, each component provides different resources and affects access to care differently (Huang et al., 2018; Lee et al., 2015; Stormacq et al.,2019). For example, higher levels of education could facilitate access to information and lead to a better understanding of how to navigate the health care system, compared with individuals with lower levels of education. People with lower levels of education were found to have lower levels of health literacy than those with higher levels of education (Lee et al., 2015; Stormacq et al., 2019). Health literacy is viewed as an asset for maintaining or improving

one's health. Low health literacy skills, for example, may be a barrier to access health information and care, medication use, and disease prevention (Njeru et al., 2016). As a result, it is not surprising that low health literacy has been linked to a variety of negative health outcomes (Shiyanbola et al., 2017). People with low health literacy were found to be not only less healthy, but also less able to deal with chronic diseases, have less knowledge about health, and have difficulty reading and understanding information on medicine packages or hospital forms (Njeru et al., 2016; Shiyanbola et al., 2017).

According to Stormacq et al. (2019), disadvantaged social and socioeconomic conditions contribute to low health literacy levels, with low SES, particularly educational attainment, being the most important determinant of health literacy; health literacy also mediates the relationship between SES and health status, quality of life, specific health-related outcomes, health behaviors, and use of preventive services. Much of the early research on the social determinants of health concentrated on socioeconomic factors. However, Walker et al. (2016) found that individuals in the United States with less than a high school education have a twofold higher diabetes-related mortality than those with a college degree or higher education. Similarly, people without a college education were more likely to have poor diabetes control than those with some college education (Walker et al., 2016).

It has also been discovered that less-educated people have a higher prevalence of diabetes than their more-educated counterparts, according to studies focusing on education (Dickman et al., 2017; Marciano et al., 2019). These studies indicate that

educational attainment may encourage the adoption of healthy behaviors such as proper nutrition and medication adherence. Therefore, educational attainment may be a fundamental cause of disease by utilizing resources such as knowledge that strongly influence people's ability to reduce risks that may prevent or delay diabetes or to better control the disease once it has occurred (Dickman et al., 2017; Marciano et al., 2019).

This suggests that there has been interest in exploring the relationship between education level and diabetes. However, few studies are available that focus on these key issues amongst diabetic Floridians.

Economic Stability

Measured by educational attainment, income levels, and occupation, SES is one of the most enduring causes to inequities in health care. Each contributing factor provides various resources, influencing access to care differently (Adler, et al., 2016). Higher levels of education increases understanding of how to navigate the health care system; and higher income levels facilitate the purchase of health insurance either through self-purchase or through employer-sponsored insurance plans that guarantees entrance into the system. Individuals with lower income levels might not qualify for government-assisted programs (Medicaid) as they may not fall under the required income threshold and might not have access to insurance through their employer. Therefore, these individuals may be unable to see a physician.

In the United States, the life expectancy for a 40-year-old man in the poorest 1% of income distribution is 14.6 years less than men in the richest 1% and 10.1 years for

women (Adler, et al., 2016). According to research, “higher income is related to better health outcomes, including lower prevalence of cardiovascular disease, diabetes, and depression as well as lower age-adjusted mortality” (Adler, et al., 2016). Although health improves as income increases at all income levels, the benefits of additional income are greatest at the bottom (Adler, et al., 2016).

Yan et al. (2020) examined how the expansion of Medicaid influenced care, self-maintenance, and treatment in low-income adults with diabetes. Using data from the 2008-2018 BRFSS, Yan et al. conducted a quasi-experimental difference-in-differences method study to compare residents in states (Florida being one of them) who took part in Medicaid expansion with residents in states that did not. Yan et al. found that the majority of resident participants were low-income adults with diabetes, ages 48- 49 years across all states. Some of the main factors that contributed to these findings were education and SES (Yan et al., 2020).

In this study, economic stability is identified as one of the independent variables used for statistical analysis. Combining *economic stability, diabetes, social determinants of health, access to care, and Florida* in a literature search yielded no research that revealed an information gap that this study aims to fill. Furthermore, I observed that no research had been undertaken in Florida, which has a significant diabetic patient population. The total diabetic population in the state of Florida is estimated at 2.4 million people, or 13.1% of the adult population (Diabetes Advisory Council, 2019). This current study therefore aims to address the knowledge gap by incorporating variables such as

education level, location, and race to try to explain any association in access to doctors and length of time since last routine checkup for Floridians with diabetes.

Healthcare Access

Access to health care services entails utilizing personal health services on a timely basis to achieve the best possible health outcomes. There are numerous access barriers some of which result in unmet health care needs, delays in receiving appropriate care, inability to obtain preventive services, and avoidable hospitalizations (ODPHP, 2019). Essentially, societal progress and individual productivity are contingent upon population health. Thus, health care is a necessary condition for individuals to reach their full potential and for all to have equal opportunity.

The expansion of Medicaid and other key provisions of the Affordable Care Act (ACA) has increased access to care in terms of insurance coverage and utilization of health care services (Choi & Mortensen, 2020). In 2010, the Patient Protection and Affordable Care Act (ACA) was introduced and implemented in 2014 to expand the right of more than 20 million Americans to health insurance coverage and guaranteed access to health care (Machikanti et al., 2017). The primary objective of the ACA program is to improve access to the traditional health care system by expanding opportunities for affordable health insurance coverage. The Affordable Care Act (ACA) offered Medicaid coverage for people earning up to 138% of the federal poverty level (FPL) and marketplace coverage for those earning more than 138% of the FPL; those earning between 138 and 400% of the FPL were also subsidized (Sen & DeLeire, 2018). Through

the ACA, the number of individuals who were uninsured or ineligible for health coverage decreased. Medicaid expansion opened access to health care for low-income uninsured patients to gain coverage and reduced the proportion of patients without coverage in underserved communities (Choi & Mortensen, 2020). However, Florida is one of the 12 states that have not implemented Medicaid Expansion (Choi & Mortensen, 2020).

In America, the differences in social class and economic standards limit the availability of low-income individuals to health care (Dickman et al., 2017). Despite the increase of the Affordable Care Act's insurance coverage, poor Americans have less access to health care than their wealthier counterparts (Dickman et al., 2017). Many uninsured low-income Americans opt to remain uninsured and have no intention of obtaining care coverage (Dickman et al., 2017). According to the American Community Survey (ACS), in 2019, 73.7% of uninsured nonelderly individuals stated they were uninsured because coverage was too expensive, making it the most commonly given reason for being uninsured (U.S. Census Bureau, 2019). In 2018, there were 2,690,698 uninsured nonelderly people in Florida; the uninsured rate was 16.3%, which was higher than the national uninsured rate (U.S. Census Bureau, 2019). Private insurance premiums increase over time, resulting in substantial cost-sharing between insurers and payees. This issue hampered the wage growth of low-income Americans and put 15% of them into debt, posing an additional barrier to care (Dickman et al., 2017).

In population-based research, the biggest predictor of whether persons with diabetes have access to diabetes tests and care is having health insurance (Kazemian et

al., 2019). Uninsured adults in the U.S. population are more likely to have undiagnosed diabetes than insured adults (Kazemian et al., 2019; Liese et al., 2019). Uninsured adults with diabetes have 60% fewer office visits with a physician, are prescribed 52% fewer prescriptions, and have 168% more emergency room visits than insured persons with diabetes (Kazemian et al., 2019). Liese et al. (2019) discovered that among adolescents and young adults with Type 1 diabetes (T1D) or T2D, having state or federal health insurance was related with higher HbA1c levels by 0.68%, while having no insurance was associated with higher HbA1c values by 1.34%. It has also been discovered that insurance mitigates the connection between financial constraints and higher HbA1c levels (Kazemian et al., 2019; Liese et al., 2019).

According to Liese et al. (2019), affordability and geographic accessibility are critical drivers of health care consumption and key characteristics of access to health care (Liese et al., 2019). A rising number of research have found that health care access, as defined by economic access (e.g., health insurance coverage), and geographic availability, is highly associated with positive health outcomes. Consequently, geographic accessibility can be an impediment to obtaining and receiving needed care. Unfortunately, geographic availability alone does not ensure access to a provider in the United States, where the kind of health insurance is also a predictor of access to care (Liese et al., 2019). A significant indicator of an individual's access to healthcare is whether they have health insurance coverage or the financial means to pay for it. However, people who live in isolated places, have fewer economic resources, and

individuals who lack of understanding about health care may encounter difficulties to receiving care. This creates a vicious circle and makes these people more vulnerable (Shi & Stevens, 2010; Thomas et al., 2018).

In this study, *access to doctors* is a dependent variable used for statistical analysis. When conducting a literature search combining *economic stability, race, education level, diabetes, social determinants of health, access to care,* and *Florida,* I retrieved no studies, which presented an information gap that this study is designed to fill. This current study therefore aimed to address the knowledge gap by incorporating variables including education level, economic stability, location, and race to explain associations with access to doctors, and length of time since last routine checkup for Floridians with diabetes.

Location (Neighborhood and Environment)

Non-metropolitan areas might be more spatially spread out, with lower levels of education, lower levels of income, and potentially may not be as developed as urban neighborhoods in terms of infrastructure. For individuals in these areas, seeking medical care is a challenge because they might not have a hospital or health clinic in their communities. In addition to poor health status and increased health care needs, non-metropolitan communities usually experience the greatest barriers to access (Haggerty et al., 2014). Examples of barriers include longer travel distances to access health care, reduced service availability, and limited choices of providers and/or services (Haggerty et al., 2014; Thomas et al., 2018). Being in a vulnerable position (e.g., living in a

neighborhood with concentrated poverty) and living in a non-metropolitan area increase the burden on populations seeking medical care. Populations in non-metropolitan areas encounter greater spatial limitations for supporting adequate health due to mostly nonexistent public transportation and the relative distance to health care providers. Rural residents and Blacks populations experience greater travel burdens than urban residents or Whites, respectively, when seeking medical care (Syed et al., 2013).

Additionally, neighborhoods with concentrated poverty, lower educational attainment, fewer jobs, and limited income are usually unsafe neighborhoods with higher levels of criminality and violence that can create obstacles to future investors and to upward mobility (Shi & Stevens, 2010). Underdeveloped infrastructure (e.g., lack of public transportation) can lead to cost-related issues while seeking care and lower quality community amenities that might also discourage physicians from settling in minority neighborhoods (Gaskin et al., 2012; Thomas et al.,2018). However, residential segregation does not only affect access to care. Gaskin et al. (2012) highlighted the negative impact of residential segregation on public safety, access to quality jobs, education, and housing (Gaskin et al., 2011, 2012). Moreover, poor and segregated areas affect the social networks that could determine an individual's opportunity to use health care services.

Lord et al. (2020) examined geographic disparities of diabetes in Florida and found that Florida is part of the Diabetes Belt, a group of southeastern states in the United States, in which the prevalence of diabetes is 11.7% compared to the national average at

8.5%. These States were recognized as having a greater risk for diabetes and pre-diabetes. Lord et al. found that the high prevalence of diabetes in certain parts of Florida was attributed to various risk factors such as obesity/overweight, dietary composition, SES, and comorbidities including hypertension and hypercholesterolemia. Lord et al. also found that inadequate or lack of public transportation and long distance to healthcare facilities in rural areas may limit access to healthcare services. The complications of diabetes represent a significant public health burden and understanding geographic disparities is critical for helping public health officials identify priority areas for intervention, so that areas at high risk may be targeted for implementation of health programs aimed at reducing disease burden (Lord et al., 2020). Location has been identified in this study as one of the independent variables used for statistical analysis.

A gap in literature was identified in terms of examining whether social determinants (race, education level, economic stability, and location) are associated with access to doctors, and length of time since last routine checkup, specifically for diabetics in Florida. Thus, this study is designed to determine whether access to care for diabetic patients in Florida have been affected by SDOH. Further research in this area will benefit the overall diabetic population in terms of accessing a doctor for routine or urgent appointments when needed in the state of Florida.

Definitions

The following terms are defined for use in this study.

Access to care/doctors: The ability to see a doctor for a routine or urgent care appointment within the last 12 months, ability to see a doctor in the past 12 months, ability to see a doctor in the past 12 months regardless of cost, and length of time since last routine checkup for diabetic care (Parker, 1974; Thomas et al., 2018). It is desirable for diabetic patients in Florida to be able to see a doctor for a routine or urgent care appointment wherever needed throughout the year. This will provide for the best possible health outcomes for diabetic patients in Florida (Thomas et al., 2018). Access to doctors is a dependent variable in this study.

Economic stability: An individual's ability to access resources, such as income, food, adequate transportation, housing, and necessary healthcare (Yan et al., 2020; Adler, Glymour & Fielding, 2016). Economic stability is an independent variable in this study.

Education level: The highest level of education an individual has achieved. Educational attainment was assessed as: did not graduate high school, graduate high school, attended/graduate high school or technical college (CDC, 2019). Education is an independent variable in this study.

Health disparity: The disparities in illness incidence, prevalence, mortality, and burden of disease that occur between distinct demographic groupings (National Institutes of Health, 2015).

Length of time since last routine check-up: The ability to see a doctor for a routine check-up within the last year, two years, or five years is defined as the length of time since last routine check-up. Also, defining the length of time since last routine check-up

is the reference category five or more years ago or never (CDC, 2019). In this study, the length of time since last routine check-up is a dependent variable that refers to the ability to access care when needed. Length of time since last routine checkup is a dependent variable in this study.

Location: The area (urban, rural, or suburban) in which patients live or work, which influences their inability to get to the appointment location due to transportation issues (i.e., patient does not have a car or does not have money for a bus, train or taxi and cannot get a ride to his or her appointment; MacKinney et al., 2014). Location is a SDOH and an independent variable in this study.

Number of healthcare visits: Two or more routine or urgent care visits, when the patient requested an appointment, or a doctor thought it was necessary.

Race: Self-reported demographic variable that the participants identified in the 2019 BRFSS database. Blacks, Whites, Hispanics, non-Hispanic Blacks, non-Hispanic Whites (CDC, 2019). Race is a SDOH and an independent variable in this study.

Routine appointment: General physical exam; does not include exams conducted for a specific injury, illness, or condition (CDC, 2019). For this study routine appointments are the regularly scheduled doctor's appointments for diabetic patients in Florida. Routine appointment is a dependent variable in this study.

Satisfaction of care: Evaluated based on the timeliness of routine or urgent care appointments, being able to get appointments on or around the desired date and not on the performance of the health service providers ability to treat the patient's ailment or their

ability to create an interpersonal relationship through professional practice. Patient satisfaction is a dependent variable used in this study.

Social determinants of health (SDOH): Conditions and situations that people of a given culture must live and work in (WHO, 2019). SDOH in this study include race, education level, economic stability, and location, which are the independent variables in this study.

Urgent care appointment: Emergency doctor's appointments for urgent diabetes related medical problems that cannot wait for routine visits or an inability to access routine diabetic care for patients in Florida (CDC,2019). Urgent care appointment is a dependent variable in this study.

Assumptions

Given the quantitative nature of the present research, the following assumptions were made. It was assumed the secondary data used for the study was free of errors and omissions, and the data was collected in ways that were reliable for ensuring quality data. The federal government conducts numerous studies on a large national scale that allows researchers to look at trends and changes of phenomena over time. It was, for this reason, the CDC and the BRFSS were selected as my sources for secondary data. It is also assumed the participants completing these surveys provided accurate information free of bias, thus allowing the research design to yield the data needed to answer the research questions, as well as improve the reliability and validity of this study.

Scope and Delimitations

The research problem is critical to understanding how access to doctors, and length of time since last routine checkup was affected for Floridians' suffering from diabetes. The study was designed to examine whether race, education level, economic stability, and location are associated with access to doctors, and length of time since last routine checkup for Floridians with diabetes. The data for the study was extracted from the CDC and the 2019 BRFSS database.

The study was delimited to the overview of access to diabetic care in the healthcare delivery systems in Florida. The discussion of preventive medicine, education, medication, and health insurance for diabetic conditions, and other related materials were excluded from the study. The study also did not cover the effectiveness of the Florida healthcare system, nor did it evaluate administrative procedures.

Limitations, Challenges, or Barriers

A key limitation of this study was the reliability of the secondary data, which included variables that may not be part of the data set analyzed. Additional limitation was the limited data available on diabetic Floridians. This data is dependent on public access and is historically latent.

Reports published by the CDC were accessed. It was assumed that the diabetes health data published are accurate and valid. This study was delimited to determining the effects of the SDOH of race, education level, economic stability, and location on access to doctors, and length of time since last routine checkup for Floridians with diabetes only.

The absence of data on potential confounding variables was another limitation of a retrospective design affecting the internal validity. Confounding variables are factors other than the predictor variable that may affect the outcome variable (Field, 2017). There was also an internal treat to validity due to the one-group design lacking a control group. A selection bias was present in this study since a diabetes diagnosis and need for service has already occurred at the time the research was initiated. In addition, the MEDCOST variable included in this analysis has an inherent bias. Other factors that could have been affected by the implementation, such as quality of care, was not included. This study was cross-sectional in nature, so causal relationships could not be determined.

Significance

The results of the study could be significant in providing insights to health care administrative professionals to help determine how to improve patient access to care services based on social determinants. Academic institutions and specifically those in research and development for healthcare services for healthcare disparities and diabetes will benefit from having findings from a study that examined the relationship of SDOH on access to care during a world-wide crisis.

The study addressed the literature gap on whether SDOH are associated access to doctors, and length of time since last routine checkup for diabetic patients in Florida, thus contributing to a greater understanding of how SDOH contribute to the delay in access to care for diabetic Floridians. In so doing, this study will add to the literature and

contribute to positive social change among this population. Gaining deeper insight into the perspectives and experiences of Florida residents who struggle with socioeconomic issues regarding access to healthcare services can provide information important to the development of effective programs to promote better access to health services and overall well-being, thus leading to positive social change.

Summary and Conclusion

This section included key components of the study based the relationships between social determinants of health, diabetes, and healthcare access for Florida residents. The topic of this research project was to identify any significant changes in access to care, whether they reduced or delayed routine or urgent appointments for diabetic patients in Florida. The SEM was discussed as the theoretical framework used to examine the association of SDOH with delayed access to doctors, and length of time since last routine checkup among diabetic Floridians.

A quantitative methodology with a pre-experimental design, involving a one group pretest-posttest research design was adopted for this study. The section also included a review of the literature that was used to develop the study, as well as the literature search strategy. Sections on definitions, assumptions, scope and delimitations, and limitations were also presented.

Currently, there is a gap in the literature surrounding the SDOH and their relationship to seeking diabetic care in Florida. This study will help to expand the literature and contribute to positive social change among this population. Obtaining

deeper insight into the perspectives and experiences of Florida residence who struggle with socioeconomic issues regarding access to healthcare services can provide information for the development of effective programs to promote better access to health services and overall well-being, thus leading to positive social change.

Section 2 follows with a description of the research design and design rationale, participants, and procedures used to examine the relationships between SDOH, access to doctors, and length of time since last routine checkup for a high-risk population such as this. The threats to validity in this study will also be discussed.

Section 2: Research Design and Data Collection

Introduction

The purpose of this quantitative study was to determine whether access to care (access to doctors and length of time since last routine checkup) is associated with SDOH (race, education level, economic stability, and location) for patients in Florida with diabetes. The data used in this study included access to doctors and length of time since last routine checkup for diabetic patients in Florida. This section contains the details of the quantitative research design and study methodology for the evaluation of diabetic Floridians' access to care and its association with SDOH. First, I present a discussion of the rationale for why this approach was selected. The details on the approach, including sampling, instrumentation, threats to validity in the research, study design, as well as data collection and analysis are presented. The section concludes with a discussion about ethical considerations and a summary.

Research Design and Rationale

A quantitative method with a nonexperimental, correlational research design was selected for this study. The quantitative method is a research methodology requiring the use of mathematical techniques to yield statistical inferences about the relationships or differences on numerically measured variables (Camm, 2012; Hancock & Mueller, 2010; Wisniewski, 2016). Floridians' access to doctors and length of time since last routine checkup and how SDOH affect these outcomes were the primary concerns for this research. A logistic regression analysis was conducted to support the examination of the

significance of variables associated with access to health services among diabetic patients in Florida struggling with SDOH.

The secondary data set analyzed in this study was the BRFSS. The dependent variables were access to doctors and length of time since last routine checkup for diabetic Floridians. The independent variables were the SDOH including race, education level, economic stability, and location. The two research questions designed to examine these selected variables were:

RQ1: To what extent, if any, are SDOH (race, education level, economic stability, and location) associated with access to doctors among Floridians with diabetes?

$H_0$1: SDOH (race, education level, economic stability, and location) are not associated with access to doctors among Floridians with diabetes.

H_a1: SDOH (race, education level, economic stability, and location) are associated with access to doctors among Floridians with diabetes.

RQ2: To what extent, if any, are SDOH (race, education level, economic stability, and location) associated with length of time since last routine checkup among Floridians with diabetes?

$H_0$2: SDOH (race, education level, economic stability, and location) are not associated with length of time since last routine checkup among Floridians with diabetes.

H_a2: SDOH (race, education level, economic stability, and location) are associated with length of time since last routine checkup among Floridians with diabetes.

The quantitative data were pulled from the BRFSS and analyzed using SPSS software. This analysis demonstrates whether the selected SDOH were associated with access to doctors and length of time since last routine checkup.

Methodology

Population

The target population comprised adult men and women ages 18 and older residing in the state of Florida who have been diagnosed and treated for diabetes. The total diabetic population in the state of Florida is estimated at 2.4 million people or 13.1% of the adult population (Diabetes Advisory Council, 2019). As of the 2019 population census, Florida had approximately 21.5 million residents, 75% of whom were White, 16% were Black, and 10% were of other races (U.S. Census Bureau, 2019). Florida has an even age distribution among adults, with 24% of the population comprising young adults 18–34 years old, 26% are 35–49 years old, 25% are 50–64 years old, and 22% are seniors (≥65 years of age). The state is made up of both urban and rural areas. Miami-Dade County, the southernmost county on the east coast, is the most urban and the most populated. Liberty County, located to the west of Tallahassee, is the most rural and least populated with a population of 8,365 (U.S. Census Bureau, 2019).

Sampling and Sampling Process

The sample analyzed in this study included respondents to the 2019 BRFSS. The participants surveyed by 2019 BRFSS were interviewed by landline and cell phones. The 2019 BRFSS used random digit dialing of landline and cell phone numbers in each state. The 2019 BRFSS data are a probability sample of all households with telephones in each state and commercially available lists of cell phone numbers of people residing in private residences or college housing. The target population for 2019 BRFSS included noninstitutionalized adults in the United States ages 18 and older who had access to a cell phone or landline telephone. State health department personnel and contractors administered the telephone surveys. The 2019 BRFSS data set is publicly available through the CDC's BRFSS website. These de-identified data are freely accessible because the data set owner authorizes others to use them. The only procedures required to access the data are to navigate to the CDC's BRFSS website and download the corresponding data file and documentation. The BRFSS has been widely used by researchers and is considered a reputable and valid data source (Pierannunzi et al., 2013)

The statistical sampling used for this study was purposive sampling within the 2019 BRFSS data set. In this study, I only included 2019 BRFSS participants that reside in the state of Florida and had an official diabetes diagnosis from a healthcare provider before the study. There were no exclusion criteria for this study. An a priori sample size calculation was conducted using G*Power v3.1.0 for a logistic regression analysis. For this study, a medium effect size, power of 80%, and significance level of .05 were

selected as parameters based on the recommendations of Cohen (1988). Additionally, Lipsy and Hurley (1998) suggested an odds ratio of 1.72 as an appropriate medium effect size in a logistic regression. The results of the power analysis showed that a total of 177 participants was required for this analysis.

Instrumentation

The BRFSS questionnaires have been developed as a collaboration among all states within the United States, participating U.S. territories, and the CDC beginning in 1984. The stated objective of the BRFSS (2019) is to "collect uniform state-specific data on health risk behaviors, chronic diseases and conditions, access to health care, and use of preventive health services related to the leading causes of death and disability in the United States" (p. 2). The objectives and data collected by the BRFSS directly align with the aims of this study, which was to determine if there are associations between SDOH and access to care among Floridians with diabetes. The population the BRFSS questionnaires are administered to includes all noninstitutionalized adults (ages 18 years or older) who reside in the United States.

Each year, state BRFSS coordinators and the CDC collaborate to determine the content of the questionnaire, which consists of core questions, optional modules, and state-added questions. The core questions are used by all states, and the use of the optional modules and state-added questions is determined individually for each state. Many of the BRFSS questions are derived from previously tested surveys including the National Health Interview Survey and National Health and Nutrition Examination

Survey. BRFSS requires cognitive testing, field testing, and majority agreement among state coordinators for any new questions before they are added to the questionnaire. Additionally, numerous studies have been conducted to establish the validity and reliability of the BRFSS. Pierannunzi et al. (2013) conducted a review of 32 BRFSS validity and reliability studies and concluded the data collected by the BRFSS are comparable to other nationally representative self-report surveys.

Operationalization

The independent (predictor) variables in this study include SDOH of race, education level, economic stability, and location. Race was operationalized using responses to the 2019 BRFSS questions about respondents' race and ethnicity. The BRFSS data set provides a calculated variable for race (RACE) based on these questions. The variable is nominal and consists of the following categories: White, Black, American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, other, multiracial, and Hispanic. Education level was operationalized using the responses to the 2019 BRFSS question that asks, "What is the highest grade or year of school you completed?" The BRFSS data set provides a calculated variable for education level (EDUCAG) based on this question. The variable is ordinal and consists of the following categories: did not graduate high school, graduated high school, attended college or technical school, and graduated from college or technical school. Economic stability was operationalized using the responses to the 2019 BRFSS question that asks respondents to report their annual household income from all sources. The BRFSS data set provides a

calculated variable for income (INCOMG) based on this question. The variable is ordinal and consists of the following categories: less than $15,000, $15,000 to less than $25,000, $25,000 to less than $35,000, $35,000 to less than $50,000, and $50,000 or more. Location was operationalized using the variable in the BRFSS data set that indicates whether the respondent resides in an urban or rural county (URBSTAT). The variable is nominal and consists of the following categories: urban and rural.

The dependent (criterion) variables in this study include access to doctors and length of time since the routine checkup. Access to doctors was operationalized using the variable in the BRFSS data set that indicates whether the respondent needed to see a doctor but could not because of cost within the past 12 months (MEDCOST). The variable is nominal and consists of the following categories: yes and no. The length of time since the routine checkup was operationalized using the responses to the 2019 BRFSS question that asks respondents how long it has been since they last visited a doctor for a routine checkup (CHECKUP1). The variable is ordinal and consists of the following categories: within the past year, within the past 2 years, within the past 5 years, 5 or more years ago, and never.

For this study, data were extracted from the 2019 BRFSS file. The process involves already established instrumentation through data extraction process. The BRFSS "health-related telephone surveys that collect state data about U.S. residents regarding their health-related risk behaviors, chronic health conditions, and use of preventive services" (CDC, 2019, p. 2). The BRFSS was conducted using random digit dialing

techniques through combined landline and cellular phone by means of open-ended text response questionnaires answered by participants as well as information retrieved from participants' location using the provided zip code.

Data Analysis Plan

The 2019 BRFSS data file obtained from the BRFSS website was converted to SPSS format and imported into SPSS for data analysis. The data was screened for eligibility and missing values. Specifically, only data for Florida respondents (as identified using the STATE variable) and respondents who had ever been told that they had diabetes (as identified using the DIABETE4 variable) was included. Additionally, any cases with missing values for the independent or dependent variables were excluded. Descriptive statistics were used to present the demographic characteristics of the sample. Frequencies and percentages were used to present categorical variables while measures of central tendencies such as the mean, standard deviation, and range values were fused to present the continuous variables.

To address the research questions posed in the study, two types of logistic regression analysis were conducted. When the dependent (criterion) variable represents a categorical level of measurement, logistic regression analysis is appropriate. Because access to doctors is a nominal variable, a binary logistic regression was performed. The length of time since the routine checkup is an ordered categorical (ordinal) variable; thus, an ordinal logistic regression is appropriate. The assumption of multicollinearity was tested by calculating variance inflation factors, and any variables exhibiting severe

multicollinearity (variance inflation factors greater than 10) was removed from the analysis (Laerd Statistics, 2018; Tabachnick & Fidell, 2013).

Table 2 summarizes the measurement and coding of the variables that were used in the analyses. In the regression analysis, the SDOH was analyzed as independent variables. The SDOH variables are categorical in nature; therefore, dummy-coded variables were constructed for each category. Each dummy variable was coded as 1 if the respondent is a member of the category and 0 if the respondent is not a member of the category. Dummy variables corresponding to the reference categories (as specified in Table 2) were omitted from the regression models.

Table 2

Summary of Independent and Dependent Variables

Variable	Type	Level of measurement	Categories
Race	Independent	Nominal	White (reference category) Black American Indian or Alaskan Native Native Hawaiian or other Pacific Islander Other Multiracial Hispanic
Education level	Independent	Ordinal	Did not graduate high school (reference category) Graduated high school Attended college or technical school Graduated from college or technical school
Economic stability	Independent	Ordinal	Less than $15,000 (reference category) $15,000 to less than $25,000 $25,000 to less than $35,000

			$35,000 to less than $50,000 $50,000 or more
Location	Independent	Nominal	Urban (reference category) Rural
Access to doctors (could not access doctor in the past 12 months due to cost)	Dependent	Nominal	No (reference category) Yes
Length of time since last routine checkup	Dependent	Ordinal	Within the past year (reference category) Within the past 2 years Within the past 5 years 5 or more years ago Never

The dependent variable for RQ1 is access to doctors, which was a nominal variable with a value of 1 indicating that the respondent could not see a doctor in the past 12 months because of cost and a value of 0 indicating that the respondent was not prevented from seeing a doctor in the past 12 months because of cost. The dependent variable for RQ2 is the length of time since the routine checkup, which was an ordinal variable. Because there are two dependent variables, two regressions were conducted. The first regression (corresponding to RQ1) included race, education level, economic stability, and location as independent variables with access to doctors as the dependent variable. The second regression (corresponding to RQ2) included race, education level, economic stability, and location as independent variables with length of time since the routine checkup as the dependent variable. The significance of the overall regression model for each research question was tested using the chi-square statistic. The researcher planned to reject the null hypothesis if the overall regression model is significant at an

alpha level of .05. If the overall model is significant, individual regression coefficients will be interpreted for statistical significance using an alpha level of .05. Odds ratios will be computed to determine how the independent variables affect the odds of membership in the categories of the dependent variables.

Threats to Validity

The integrity underlying data collection was subjected to both external and internal threats to validity. Threats to validity could result from the use of secondary data sets from the BRFSS, which is a national and comprehensive data sets, utilized by researchers. These data sets are collected through self-reporting questionnaires among non-institutionalized individuals. Those who are not institutionalized (i.e., hospitalized, in nursing homes, or in correctional facilities) are more representative of the broader population than those who are. Including non-institutionalized individuals in research studies can increase the external validity of the findings, enabling the application of the findings to a larger population.

To ensure that the validity of the data analysis was not jeopardized, the data set with missing data was excluded. The probability of vital information being missed is important in research because it can affect the validity and reliability of the research findings. If important information is missed or excluded from the study, it can lead to biased or inaccurate conclusions, which can have serious consequences for future research and policy decisions. One of the most common external threats to validity is selection bias, which occurs when participants are not selected randomly or

representatively from the target population. For example, if this study only included participants who were motivated to participate, the results may not be generalizable to other populations who were less motivated or who could not participate for some reason. Similarly, if this study only included participants from one geographic location, the results may not be generalizable to other geographic locations. These are all important components that could alter the results of external validity. Experimenter bias is another internal threat to validity that can affect the results of a study. This occurs when the experimenter unconsciously influences the results of the study through their behavior, attitudes, or expectations. To reduce experimenter bias, it is important for researchers to be aware of their own biases and to take steps to reduce their influence on the results, such as using blind or double-blind experimental designs and using objective measures of outcome.

Participant dropout is another type of treat to internal validity. If participants refuse to participate in the study or drop out before the study is complete, important information may be missed. Non-response bias can lead to a biased sample that does not accurately represent the population. However, this threat to validity was not applicable to this study since missing data was excluded. To minimize this probability in research, it is important to carefully design the study, use valid and reliable measurement tools, recruit a representative sample, and carefully monitor data collection and processing procedures. This can help ensure that the research findings are accurate, reliable, and applicable to the broader population.

External Threats to Validity

Threats to external validity are any factors within a study that reduce the generalizability of the results (Morris & Pickens, 2017). Data collection through participants self-reported questionnaires could have been bias, therefore influencing the reliability and credibility of the survey responses (CDC, 2019). The study population consisted of diabetics living in Florida, therefore the findings may not be applicable to those with diabetes living elsewhere in the United States. The process of transferring the 2019 BRFSS data to the SPSS editor could possibly omit some potential variables. However, technological advancement allows researchers sufficient time to eliminate any threats in the data validation process and permit research subjects to participate within the desired time frame (Morris & Pickens, 2017). The use of technology in research can offer several advantages, including improved data quality and efficiency, greater participant engagement and accessibility, and enhanced research outcomes. However, it is important for researchers to ensure that the use of technology does not compromise data security, privacy, or ethical considerations, and to carefully evaluate the validity and reliability of the data obtained through these methods.

Internal Threats to Validity

Threats to internal validity are any factors that influences the results of a study other than the independent variable (Morris & Pickens, 2017). The data set was obtained from the 2019 BRFSS, which was restricted to the year 2019. This data is reliant on public access and is historically latent. A possible threat to internal validity could be

instrumentation bias. When measurement tools are not valid or reliable, the results of the study may not accurately reflect the issue being studied. For example, if the measurement tool (2019 BRFSS questionnaire) used to assess the participant's response changes over time, it may be difficult to determine whether changes in the response are due to the measurement tool itself or some other factor. However, the 2019 BRFSS data has internal security that protects against any internal threat to validity or any form of data omission (CDC, 2019). Another possible internal threat to validity is the research design. A quantitative research design can help to address threats to validity by providing a structured and rigorous approach to data collection and analysis.

Ethical Procedures

When conducting statistical research from the public there are various ethical procedures to be followed in throughout the process. First and foremost, approval from the Walden University Institutional Review Board (IRB) must be established prior to conducting any research that involved human beings to ensure ethical procedures. The Walden University IRB approved the study procedures before any data was analyzed. When the BRFSS data were originally collected, participants were given a brief introduction about the research, and the participants were able to terminate the phone interview at any point during the interview. According to the BRFSS, the data are in the public domain and can be used and reproduced without permission. All data was stored in a password-protected computer only accessible to the researcher. All data will be retained for five years after the completion of this doctoral study and will then be destroyed.

Summary

Section 3 covers research design and rationale, methodology, instrumentation, data analysis plan, research questions and hypotheses, ethical procedures, and threats to validity. The statistical design of this study supported the examination of the differences in access to health services among diabetic patients in Florida struggling with SDOH. The dependent variables of access to doctors, and the length of time since last routine checkup for diabetic Floridian and independent variables, which are the SDOH (race, education level, economic stability and location) were gathered from the BRFSS 2019 report. The research design and rationale were assessed in detail to reflect the importance of this study. The quantitative methodology was the designated tool for collection of secondary data information on over 16,959 participants of the BRFSS databank. The research design and data collection involved cell phone and combined landline information which was based on questionnaires from the counties and metropolitan areas in the state of Florida. A summary of ethical procedures that guided the research efforts included treatment of participants and their data, IRB requirements, handling of their personal information, and the use of a SPSS analysis software program concluded this section.

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Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative study was to determine whether access to care (access to doctors and length of time since last routine checkup) is associated with SDOH (race, education level, economic stability, and location) for Florida patients with diabetes. The research questions and hypotheses investigated in this study are as follows:

RQ1: To what extent, if any, are SDOH (race, education level, economic stability, and location) associated with access to doctors among Floridians with diabetes?

$H_0$1: SDOH (race, education level, economic stability, and location) are not associated with access to doctors among Floridians with diabetes.

H_a1: SDOH (race, education level, economic stability, and location) are associated with access to doctors among Floridians with diabetes.

RQ2: To what extent, if any, are SDOH (race, education level, economic stability, and location) associated with length of time since last routine checkup among Floridians with diabetes?

$H_0$2: SDOH (race, education level, economic stability, and location) are not associated with length of time since last routine checkup among Floridians with diabetes.

H_a2: SDOH (race, education level, economic stability, and location) are associated with length of time since last routine checkup among Floridians with diabetes.

This section contains the results of the analyses performed to answer the research questions. First, the secondary data are described, and demographic characteristics are reported. Next, the results of the analysis for each research question are presented. Finally, this section concludes with a summary of the results.

Data Collection

The 2019 BRFSS data set was downloaded from the CDC's BRFSS website in October 2022. The raw data set contained 418,268 cases. The data were screened to include only respondents residing in Florida who had diabetes. First, 401,309 respondents from states other than Florida were removed, leaving a total of 16,959 Florida respondents. Next, respondents who did not indicate they had ever been told they had diabetes were removed from the data. A total of 2,680 eligible cases remained in the data. Finally, the data were screened for missing values, and 666 cases were removed for having missing values for one or more study variables. A final total of 2,014 cases were included in the analysis.

Table 3 displays descriptive statistics for the sample characteristics. The majority of respondents in the sample identified their race as White (n = 1428, 70.9%). The largest proportion of respondents indicated that a high school diploma was their highest completed level of education (n = 654, 32.5%), the most common level of income was $50,000 or more ($n$ = 591, 29.3%), and most respondents lived in urban locations (n = 1557, 77.3%). Approximately 13.4% of respondents (n = 270) indicated that they needed to see a doctor within the past 12 months but could not because of cost. Most respondents

indicated that they had visited a doctor for a routine checkup within the past year (*n* = 1910, 94.8%).

Table 3

Sample Characteristics (N = 2,014)

Variable	Frequency	Percent
Race		
White	1,428	70.9
Black	290	14.4
American Indian/Alaskan Native	23	1.1
Asian	10	0.5
Native Hawaiian/Pacific Islander	4	0.2
Other	15	0.7
Multiracial	63	3.1
Hispanic	181	9.0
Education		
Less than high school	257	12.8
High school graduate	654	32.5
Attended college or technical school	587	29.1
Graduated college or technical school	516	25.6
Income		
Less than $15,000	310	15.4
$15,000 to less than $25,000	544	27.0
$25,000 to less than $35,000	288	14.3
$35,000 to less than $50,000	281	14.0
$50,000 or more	591	29.3
Location		
Urban	1,557	77.3
Rural	457	22.7
Could not see doctor due to cost		
Yes	270	13.4
No	1,744	86.6
Time since last routine checkup		
Within past year	1910	94.8
Within past 2 years	55	2.7
Within past 5 years	22	1.1
5 or more years ago	24	1.2
Never	3	0.1

Results

Research Question 1

A binary logistic regression analysis was performed to answer RQ1. The dependent variable was access to doctors, which was a nominal variable with a value of 1 indicating the respondent could not see a doctor in the past 12 months because of cost and a value of 0 indicating the respondent was not prevented from seeing a doctor in the past 12 months because of cost. The independent variables included race, education level, economic stability (income), and location. All independent variables were categorical, and dummy coded for the analysis. The reference category for race was White, the reference category for education level was less than high school, the reference category for economic stability was less than $15,000, and the reference category for location was urban.

The assumptions of binary logistic regression were assessed prior to the analysis. The assumption of a binary dependent variable was met as the dependent variable in this analysis had only two categories: the respondent could not see a doctor in the past 12 months because of cost or the respondent was not prevented from seeing a doctor in the past 12 months because of cost. The assumption of one or more independent variables was met, as there were four independent variables in this analysis: race, education level, economic stability (income), and location. The assumption of independence of observations was met as each observation in the BRFSS data set reflects a unique

participant. The assumption of linearity between the logit of the dependent variable and any continuous independent variables did not apply to this analysis because all the independent variables were categorical. The assumption of multicollinearity among the independent variables was checked by calculating variance inflation factors. All variance inflation factor values were below 10 (Max = 1.25), indicating that there was no severe multicollinearity among the variables.

The overall regression model was significant, $\chi^2(15) = 97.02$, $p < .001$, Nagelkerke $R^2 = .09$, indicating that collectively the SDOH of race, education level, economic stability, and location were significantly associated with access to doctors. The null hypothesis was rejected. Individual regression coefficients showed that race was significantly associated with access to doctors such that respondents identifying themselves as American Indian/Alaskan Native when compared to reference group White were 3.22 times more likely to report they could not see a doctor because of cost ($p = .014$), and respondents identifying themselves as Hispanic were 2.37 times more likely to report they could not see a doctor because of cost ($p < .001$) when compared to reference group White. Education was significantly associated with access to doctors such that respondents who graduated college or technical school when compared to reference group less than high school were 0.60 times as likely to report they could not see a doctor because of cost ($p = .038$). Economic stability was significantly associated with access to doctors such that respondents in the highest income brackets ($35,000 to less than $50,000, and $50,000 or more) when compared to reference group less than

$15,000 were less likely to report they could not see a doctor because of cost. Table 4 displays the results for all regression coefficients.

Table 4

Binary Logistic Regression Predicting No Access to Doctor (N = 2014)

Variable	B	S.E.	Wald	Sig.	Exp(B)	95% CI Exp(B)	
						Lower	Upper
Race [ref: White]							
Black	0.06	0.20	0.09	.760	1.06	0.73	1.55
American Indian/Alaskan Native	1.17	0.48	6.06	.014	3.22	1.27	8.16
Asian	0.06	1.07	0.00	.955	1.06	0.13	8.73
Native Hawaiian/Pacific Islander	0.60	1.17	0.27	.605	1.83	0.19	17.98
Other	0.58	0.66	0.77	.380	1.79	0.49	6.57
Multiracial	0.32	0.35	0.82	.366	1.37	0.69	2.72
Hispanic	0.86	0.20	18.21	< .001	2.37	1.59	3.52
Education [ref: Less than high school]							
High school graduate	-0.22	0.20	1.25	.263	0.80	0.54	1.18
Attended college or technical school	-0.09	0.21	0.17	.681	0.92	0.61	1.38
Graduated college or technical school	-0.52	0.25	4.29	.038	0.60	0.37	0.97
Economic stability [ref: Less than $15,000]							
$15,000 to less than $25,000	-0.14	0.18	0.63	.426	0.87	0.61	1.24
$25,000 to less than $35,000	-0.32	0.22	2.06	.152	0.73	0.47	1.13
$35,000 to less than $50,000	-0.84	0.26	10.32	.001	0.43	0.26	0.72
$50,000 or more	-1.21	0.24	25.43	< .001	0.30	0.19	0.48
Rural location [ref: Urban]	0.10	0.16	0.41	.521	1.11	0.81	1.52

Research Question 2

An ordinal logistic regression analysis was performed to answer RQ2. The dependent variable was length of time since last routine checkup, which was an ordinal variable. The independent variables included race, education level, economic stability (income), and location. All independent variables were categorical and dummy coded for

the analysis. The reference category for race was White, the reference category for education level was less than high school, the reference category for economic stability was less than $15,000, and the reference category for location was urban. Due to low frequencies for some categories of race, unreliable parameter estimates were produced in initial runs of the regression model. To alleviate this problem, the categories of American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander, other, and multiracial were combined into a single category for this analysis.

The assumptions of ordinal logistic regression were assessed prior to the analysis. The assumption of an ordinal dependent variable was met as the dependent variable in this analysis had ordered categories. The assumption of one or more independent variables was met, as there were four independent variables in this analysis: race, education level, economic stability (income), and location. The assumption of independence of observations was met as each observation in the BRFSS data set reflects a unique participant. The assumption of proportional odds was tested by computing the test of parallel lines in SPSS. The result of this test was significant, $\chi 2(33) = 347.91$, $p < .001$, suggesting that proportional odds between levels of the dependent variable could not be assumed. To determine the effect of this assumption on the analysis, a multinomial logistic regression was computed. The result of the multinomial logistic regression was the same as the ordinal logistic regression, suggesting that the violation of proportional odds did not affect the outcome of the overall regression model. The assumption of multicollinearity among the independent variables was checked by

calculating variance inflation factors. All variance inflation factor values were below 10 (Max = 1.02), indicating that there was no severe multicollinearity among the variables.

The overall regression model was not significant, $\chi^2(11) = 17.79$, $p = .087$, Nagelkerke $R^2 = .02$, indicating that collectively the SDOH of race, education level, economic stability, and location were not significantly associated with the length of time since the routine checkup. The null hypothesis was not rejected. Table 5 displays the results for all regression coefficients.

Table 5

Ordinal Logistic Regression Predicting Time Since Last Routine Checkup (N = 2014)

Variable	B	S.E.	Wald	Sig.	Exp(B)	95% CI Exp(B)	
						Lower	Upper
Race [ref: White]							
Black	-0.44	0.34	1.67	.196	0.65	0.33	1.25
Other/Multiracial	0.17	0.41	0.16	.686	1.18	0.53	2.63
Hispanic	0.32	0.32	1.02	.312	1.38	0.74	2.58
Education [ref: Less than high school]							
High school graduate	-0.71	0.30	5.83	.016	0.49	0.27	0.87
Attended college or technical school	-0.59	0.30	3.75	.053	0.55	0.31	1.01
Graduated college or technical school	-1.00	0.36	7.71	.005	0.37	0.18	0.74
Economic stability [ref: Less than $15,000]							
$15,000 to less than $25,000	-0.07	0.30	0.06	.813	0.93	0.52	1.68
$25,000 to less than $35,000	0.07	0.35	0.04	.838	1.07	0.54	2.13
$35,000 to less than $50,000	-0.41	0.41	1.00	.317	0.66	0.30	1.48
$50,000 or more	-0.09	0.34	0.06	.801	0.92	0.47	1.78
Rural location [ref: Urban]	0.14	0.24	0.36	.551	1.15	0.72	1.85

Summary

Data from the 2019 BRFSS were analyzed to answer the research questions. The analysis included data from 2014 BRFSS respondents who reside in Florida and have diabetes. A binary logistic regression analysis was conducted to answer RQ1. The results of the analysis showed that the SDOH of race, education level, economic stability, and location were collectively significantly associated with access to doctors. The null hypothesis ($H_0$1) was rejected. An ordinal logistic regression analysis was conducted to answer RQ2. The results of the analysis showed that the SDOH of race, education level, economic stability, and location were collectively not significantly associated with the length of time since the routine checkup. The null hypothesis ($H_0$2) was not rejected. The next section will contain a discussion of these findings in terms of their application to professional practice and their implications for social change.

Section 4. Application to Professional Practice and Implication for Social Change

Introduction

The purpose of this quantitative study was to determine whether access to care (access to doctors and length of time since last routine checkup) is associated with SDOH (race, education level, economic stability, and location) among Florida patients with diabetes. This study was conducted to address the gap in literature on how SDOH has affected access to doctors and length of time since last routine checkup for diabetic patients in Florida. Understanding the influence that SDOH, including race, education level, economic stability, and location, have on access to doctors and length of time between checkups for this patient group may help improve their health outcomes and quality of life. The findings of this study may increase the awareness, concerns, and options about the management of this disease and promote positive social change.

Interpretation of Findings

The following analyses were conducted to analyze the data: descriptive analyses and binary and ordinal logistic regression analysis. The 2019 BRFSS data file obtained from the BRFSS website was converted to SPSS format and imported into SPSS for data analysis. Frequencies and percentages were used to present categorical variables, while measures of central tendencies such as the mean, standard deviation, and range values were used to present the continuous variables.

Data from 2,014 Floridians with diabetes were used in this study to determine if there is an association between SDOH and access to care. I found that a significant

proportion of respondents (13.4%) were unable to see a doctor in the past 12 months due to cost. I also found that race was significantly associated with access to doctors, with American Indian/Alaskan Native respondents being three times more likely and Hispanic respondents being two times more likely to report they could not see a doctor due to cost, compared to White respondents who made up the majority of the sample. This suggests racial disparities in access to healthcare, with certain racial and ethnic groups experiencing greater barriers to accessing healthcare due to financial constraints. Berge et al. (2018) found that racial discrimination can impact healthcare access via SDOH such as income and education. These data further confirm the findings of this study. The findings of this study also highlight the need for actions to address healthcare access disparities and ensure that everyone has access to affordable healthcare. There should be a more extensive examination of the association between SDOH and access to care and the effect of improved access to healthcare on diabetic Floridians.

Researchers could also investigate approaches to bridge the access gap for diabetic Floridians who cannot afford medical treatment. Thomas et al. (2018) stated that a lack of mobility can be a substantial barrier to optimal diabetic care. In consideration of this, the SDOH location was examined: 77.3% (n = 1557) of respondents lived in urban areas; therefore, their access to care should not have been impacted by their location. According to the most recent data from the 2020 U.S. Census, approximately 94.4% of Florida's population is classified as urban, while 5.6% is classified as rural. This indicates that the vast majority of Florida's population reside in urban and heavily populated areas.

Table 3 displayed the overall sample characteristics, including the healthcare access variables, and Tables 4 and 5 showed the analysis of healthcare access of the sample of diabetic Floridians.

The statistical analyses further suggests a relationship between education and access to doctors such that respondents who graduated college or technical school were more likely to report they could not see a doctor because of cost (p = .038). Specifically, respondents with more than a high school education were less likely (or 40% less likely) to report they could not see a doctor because of cost compared to those who did not graduate from college or technical school. The p-value of .038 indicates this relationship is statistically significant at a 95% confidence level. In other words, the probability of observing such a relationship by chance is less than 5%. Overall, this finding suggests that education level may play a role in determining an individual's access to healthcare. Higher levels of education may be associated with higher income, better health literacy, and greater awareness of available healthcare services, which in turn may increase access to doctors and decrease financial barriers to care. According to a study conducted by Marciano et al. (2019), educational attainment is a strong predictor of health outcomes, with higher levels of education associated with better health outcomes and health behaviors. Marciano et al. (2019) also noted significant disparities in educational attainment and health behaviors based on factors such as race, ethnicity, and SES.

The economic stability variable also suggests a significant association with access to doctors, such that respondents in the highest income brackets ($35,000 to less than

$50,000 and $50,000 or more) were less likely to report they could not see a doctor because of cost. Specifically, respondents in the highest income brackets were less likely to report they could not see a doctor because of cost, compared to those in lower income brackets. This finding suggests that income level plays an important role in determining an individual's access to healthcare. Individuals with higher incomes may have greater financial resources to afford healthcare costs, including copays, deductibles, and out-of-pocket expenses. Individuals with higher incomes may also have access to better health insurance coverage, which can help to reduce financial barriers to care (Marciano et al., 2019). Overall, the relationship between income and access to healthcare underscores the importance of addressing socioeconomic disparities in healthcare. Policies and programs that aim to improve economic stability and reduce income inequality may help to increase access to healthcare and reduce healthcare disparities among different income groups. Additionally, the findings of this study suggest that collectively the SDOH race, education level, economic stability, and location were not significantly associated with the length of time since the routine checkup. This result indicates that routine checkups are not affected by SDOH. Although these SDOH factors may not play a significant role in determining how frequently individuals receive routine checkups, other factors, such as individual health behaviors, access to healthcare services, and personal health status, may be more influential in determining how frequently individuals seek routine checkups.

Nonetheless, the lack of a significant association in this study does not necessarily mean these SDOH factors are unimportant for healthcare access and utilization. In other studies, researchers have found significant associations between SDOH factors and healthcare utilization, and individual SDOH factors may have a stronger relationship with healthcare utilization than the collective effect of multiple factors. Overall, the findings suggest the need for further research to better understand the complex relationship between SDOH (race, education level, economic stability, and location) and healthcare utilization (length of time since the routine checkup) and to identify effective strategies for addressing healthcare disparities related to SDOH factors.

This study's theoretical approach was derived from the SEM, which considers social factors such as race, education, economic stability, and location to be significant health determinants (Kilanowski, 2017; Soderlund, 2017). This framework was applied to this research to understand how SDOH, including race, education, economic stability, and location, relate to access to healthcare among diabetic patients in Florida. Therefore, H_a1 was accepted, indicating an agreement with other findings in literature. Findings indicated SDOH race, education level, economic stability, and location are not associated with length of time since the routine checkup among Floridians with diabetes. Thus, H_02 was rejected, indicating a disagreement with other findings in literature (Kim & Delen, 2018; Lord & Roberson, 2020).

Limitations of the Study

A key drawback of this study was the use of secondary data from the CDC, which could not be substantiated. Secondary data can cause data and computational errors due to missing, incomplete, or manipulated variables. Another limitation was the limited availability of data regarding diabetic Floridians. In addition to generalizability, because the study population consisted of diabetics living in Florida, the findings may not be applicable to those with diabetes living elsewhere in the United States. The healthcare system and population characteristics in Florida may differ from those in other states or countries, which could impact the results of the study. Additionally, the sample size of the study may not be representative of the entire population of Florida, which could limit the statistical power and precision of the study's findings.

The data set was obtained from the 2019 BRFSS, which was restricted to the year 2019. A limitation of using data from a single year (2019) is that it may not capture the variability of the phenomenon over time. Access to healthcare may fluctuate from year to year due to changes in policies, economic conditions, and other factors. Therefore, the results of this study may not be generalizable to other years, and future research may be needed to assess trends over time. This data is also reliant on public access and is historically latent.

This study being limited to the diabetic population may not be representative of the broader population's experiences with healthcare access. Diabetes is a specific health condition that requires ongoing medical management, and individuals with diabetes may

have unique experiences with accessing healthcare. Furthermore, the study's findings may not be generalizable to individuals with other chronic health conditions or to individuals without any health conditions. The experience of accessing healthcare may vary depending on the type and severity of the health condition, and therefore, the study's findings may not be applicable to individuals with different health needs.

Recommendations

The results of this study indicated links between significant SDOH and access to care for diabetic Floridians; nevertheless, additional research is recommended to have a deeper understanding of the state's health disparities pertaining to the diabetic community. To promote effective involvement in acquiring health care benefits, protocols ensuring that diabetic Floridians are well-informed about eligibility for access to care must be developed. It is also recommended that researchers perform a national cause-and-effect study using the results of this Florida-based study to extend the research to other diseases for whom healthcare access is crucial.

Further research is also needed to understand the relationship between SDOH of race, education level, economic stability, and location in this diabetic population. Low frequencies for some categories of race, and unreliable parameter estimates were produced in initial runs of the regression model for this study. To alleviate this problem, the categories of American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander, other, and multiracial were combined into a single category to conduct the analysis.

Despite the lack of statistically significant relationships between SDOH and length of time since last routine checkup, a continuing lack of representation of some groups in research (such as Pacific Islanders and Native Americans in this study) may be due to a lack of awareness and disparities in recruiting these particular populations for research opportunities. A study by Vigil et al. (2021) on American Indian and Alaska Native enrollment in clinical studies in the National Institutes of Health's intramural research program focused on the underrepresentation of American Indian and Alaska Native (AI/AN) populations in clinical studies within the National Institutes of Health's (NIH) intramural research program. The authors conducted a review of clinical studies conducted within the NIH intramural research program from 2014 to 2017 to determine the extent of AI/AN enrollment in these studies.

The results of the review showed that AI/AN populations were underrepresented in clinical studies within the NIH intramural research program, accounting for only 1% of participants over the course of the study period. The authors suggest that this underrepresentation may be due to several factors, including a lack of outreach to AI/AN communities, cultural and linguistic barriers to participation, and historical distrust of the medical research establishment (Vigil et al., 2021). The authors conclude by calling for increased efforts to increase AI/AN enrollment in clinical studies, as well as arguing that increasing AI/AN enrollment in clinical studies is important for improving the health and well-being of AI/AN populations and for advancing our understanding of health disparities (Vigil et al., 2021). Future research focusing on these underrepresented

populations may reveal more about possible diabetes-related statistical associations. This may also provide administrators the opportunity to expand their outreach and engagement with the AI/AN communities, develop culturally appropriate recruitment materials, and form partnerships with AI/AN healthcare organizations.

The association between access to care (access to doctors and length of time since last routine checkup) and SDOH (race, education level, economic stability, and location), as well as the effect of improved access to healthcare on diabetic Floridians, should be the focus of a more extensive examination. Researchers could also investigate approaches to bridge the access gap for diabetic Floridians who cannot afford medical treatment. The utilization of vocational programs is recommended to enhance opportunities to secure long-term medical care, ensuring the well-being of this population and encouraging social change. Healthcare administration professionals use best practices, innovative strategies, and sound decision-making processes to achieve organizational goals, improve patient care and outcomes, and enhance the quality of healthcare delivery. Their knowledge of the healthcare industry, healthcare delivery systems, finance, and human resources management, as well as a deep understanding of the ethical and legal issues that arise in healthcare organizations, plays a significant role in the day-to-day operations of healthcare organizations. Therefore, having first-hand knowledge of the SDOH barriers that patients face when trying to access healthcare could play an important role in how the administrator handles the patient's concerns/issues. Nonetheless, additional research is required in areas such as Federal and state-regulated initiatives for universal health care

coverage for all diabetic Floridians. This would help those who have limited or no access to care.

Implications for Professional Practice and Social Change

This study has broad implications for health care professionals who deliver care for diabetic Floridians. Access to health care has been a political concern for past and present administrations. This research has positive social implications for key stakeholders (including policy makers, healthcare administrators, diabetic patients, caregivers, and clinicians) concerned about access to diabetes care, which could impact diabetes control, management, and complications. Hopefully, this enhanced understanding will result in improved programs for diabetic Floridians to access care.

Access to care is required to improve the social well-being of diabetic Floridians affected by SDOH conditions. The outcomes from the study of how the factors of SDOH (race, education level, economic stability, and location) impact the ability to sustain access to care can be used to promote positive social change among some diabetic Floridians. The findings indicated 13.4% of respondents ($n = 270$) revealed that they needed to see a doctor within the past 12 months but could not because of cost. Results showed that race was significantly associated with access to doctors such that respondents identifying themselves as American Indian/Alaskan Native were 3.22 times more likely to report that they could not see a doctor because of cost ($p = .014$), and respondents identifying themselves as Hispanic were 2.37 times more likely to report that they could not see a doctor because of cost ($p < .001$). Most respondents indicated that

they had visited a doctor for a routine checkup within the past year (n = 1910, 94.8%); however, most respondents in the sample identified their race as White (n = 1428, 70.9%).

There is a need to establish methods to eliminate the obstacles that SDOH has generated for diabetic Floridians experiencing access to healthcare challenges, as well as to ensure that diabetes healthcare initiatives are effectively implemented in the state of Florida. Improved income, education, and employment status can increase health coverage for Floridians with diabetes by restoring active social engagement and constructive contributions to societal obligations. Furthermore, effective improvement of health disparities and diabetes personal management through standard guidelines may promote diabetes education and healthy living in society.

As a result of improved access to care and ongoing medical treatment, Floridians with diabetes may become more active and productive members of society. The findings of this study can be used by federal lawmakers, state agencies, healthcare administrators, healthcare institutions, and the general public to better understand how factors such as SDOH of race, education level, economic stability, and location affect some diabetic Floridians' access to care. Implementing programs and policies that support diabetic Floridians' access to care and well-being may also increase appropriate actions to reduce long-term consequences and the disease's expense.

Conclusion

The purpose of this quantitative study is to determine whether Floridians' access to care (access to doctors and length of time since last routine checkup) among patients with diabetes is associated with SDOH (race, education level, economic stability, and location). The study was conducted to fill the scientific gap regarding Floridians' access to care (access to doctors and length of time since last routine checkup) among patients with diabetes association with SDOH (race, education level, economic stability, and location). Preventive healthcare interventions, such as doctor visits and diabetes education, have been shown in studies to improve diabetes outcomes.

Although the findings of this study revealed that collectively the SDOH of race, education level, economic stability, and location were not significantly associated with length of time since last routine checkup, the study did, however, show significant associations between SDOH of race, education level, economic stability, and location with access to doctors. Individual regression coefficients revealed that race was significantly associated with access to doctors such that respondents identifying themselves as American Indian/Alaskan Native were 3.22 times more likely to report that they could not see a doctor because of cost ($p = .014$), and respondents identifying themselves as Hispanic were 2.37 times more likely to report that they could not see a doctor because of cost ($p < .001$). Socioeconomic factors of income level, educational attainment, employment status, and other economic disparities may disadvantage individuals who are poor. Nevertheless, diabetes has long-term effects on people's

quality of life regardless of their race, education, or location; therefore, there needs to be greater alignment between lawmakers, state agencies, public health officials, healthcare administrators and healthcare institutions.

References

Adler, N. E., Glymour, M. M., & Fielding, J. (2016). Addressing social determinants of health and health inequalities. *JAMA*, *316*(16), 1641–1642. https://doi.org/10.1001/jama.2016.14058

American Diabetes Association. (2020). The burden of diabetes in Florida. https://floridadiabetesalliance.org/wp-content/uploads/2020/12/the-burden-of-diabetes-in-florida.pdf

American Immigration Council. (2018) Immigrants in Florida: Fact sheet. https://www.americanimmigrationcouncil.org/research/immigrants-florida

Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health Social Behavior, 36*(1), 1–10. https://doi.org/10.2307/2137284

Andersen, R. M., & Davidson, P. L. (2007). Improving access to care in America: Individual and contextual indicators. In R. M. Andersen, T. H. Rice, & G. F. Kominski (Eds.), *Changing the U.S. health care system: Key issues in health services policy and management* (3rd ed., pp. 3–31). Jossey-Bass.

Andersen, R. M. (2008). National health surveys and the behavioral model of health services use. *Medical Care, 46*(7), 647–653. https://doi.org/10.1097/mlr.0b013e31817a835d

Babbie, E. (2017). Basics of social research (7th ed.). Cengage Learning.

Babones, S. (2016). Interpretive quantitative methods for the social sciences. *Sociology,*

50(3), 453–469. https://doi.org/10.1177/0038038515583637

Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health*, *13*(4), 623–649. https://doi.org/10.1080/08870449808407422

Berge, J. M., Fertig, A., Tate, A., Trofholz, A., & Neumark-Sztainer, D. (2018). Who is meeting the Healthy People 2020 objectives? Comparisons between racially/ethnically diverse and immigrant children and adults. *Families, Systems, & Health*, *36*(4), 451–470. https://doi.org/10.1037/fsh0000376

Bommer, C., Heesemann, E., Sagalova, V., Manne-Goehler, J., Atun, R., Bärnighausen, T., & Vollmer, S. (2017). The global economic burden of diabetes in adults aged 20-79 years: A cost-of-illness study. *The Lancet Diabetes & Endocrinology*, *5*(6), 423–430. https://doi.org/10.1016/S2213-8587(17)30097-9

Burney, V. H. (2008). Applications of social cognitive theory to gifted education. *Roeper Review*, *30*(2), 130–139. https://doi.org/10.1080/02783190801955335

Burkholder, G. J., Cox, K. A., & Crawford, L. M. (2016). *The scholar-practitioner's guide to research design*. Laureate Publishing.

Butkus, R., Rapp, K., Cooney, T. G., & Engel, L. S. (2020). Envisioning a better US health care system for all: reducing barriers to care and addressing social determinants of health. *Annals of Internal Medicine*, *172*(2_Supplement), S50–S59. https://doi.org/10.7326/m19-2410

Camm, J. D. (2012). *Quantitative methods for business* (12th international ed.). South-

Western.

Centers for Disease Control and Prevention. (2019). *Behavioral Risk Factor Surveillance system survey data*. U.S. Department of Health and Human Services. https://www.cdc.gov/brfss/annual_data/2019/pdf/overview-2019-508.pdf

Centers for Disease Control and Prevention. (2020a). *Diabetes report card 2019*. U.S. Department of Health and Human Services.

Centers for Disease Control and Prevention. (2020b). *National diabetes statistics report 2020: Estimates of diabetes and its burden in the United States*. U.S. Department of Health and Human Services.

Chagin, K., Choate, F., Cook, K., Fuehrer, S., Misak, J. E., & Sehgal, A. R. (2021). A framework for evaluating social determinants of health screening and referrals for assistance. *Journal of Primary Care & Community Health*, *12*, 21501327211052204. https://doi.org/10.1177/21501327211052204

Cheng, K. J. G., Sun, Y., & Monnat, S. M. (2020). COVID-19 death rates are higher in rural counties with larger shares of Blacks and Hispanics. *The Journal of Rural Health*, *36*(4), 602–608. https://doi.org/10.1111/jrh.12511

Clark, M. L., & Utz, S. W. (2014). Social determinants of Type 2 diabetes and health in the United States. *World Journal of Diabetes*, *5*(3), 296–304. https://doi.org/10.4239/wjd.v5.i3.296

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). West Publishing Company.

Cuschieri, S., & Grech, S. (2020). COVID-19 and diabetes: The why, the what and the how. *Journal of Diabetes and its Complications*, *34*(9), 107637. https://doi.org/10.1016/j.jdiacomp.2020.107637

Dall, T. M., Yang, W., Gillespie, K., Mocarski, M., Byrne, E., Cintina, I., & Hogan, P. F. (2019). The economic burden of elevated blood glucose levels in 2017: diagnosed and undiagnosed diabetes, gestational diabetes mellitus, and pre-diabetes. *Diabetes care*, *42*(9), 1661-1668. https://doi.org/10.2337/dc18-1226

Della Porta, D., & Keating, M. (2008). Approaches and methodologies in the social sciences: A pluralist perspective. Cambridge: Cambridge University Press.

Dendup, T., Feng, X., Clingan, S., & Astell-Burt, T. (2018). Environmental risk factors for developing Type 2 diabetes mellitus: a systematic review. *International Journal of Environmental Research and Public Health*, *15*(1), 78. https://doi.org/10.3390/ijerph15010078

Diabetes Advisory Council | Florida Department of Health. (2019). *2019 DAC report* https://www.floridahealth.gov/diseases-and-conditions/diabetes/Diabetes-Resources/_documents/2019-dac-report.pdf.

Donabedian, A. (1972). Models for Organizing the Delivery of Personal Health Services and Criteria for Evaluating Them. *The Milbank Memorial Fund Quarterly*, 50(4), 103. https://doi.org/10.2307/3349436

Field, A. (2017). Discovering statistics using IBM SPSS statistics (5th ed.). London, England: Sage

Flood, S., King, M., Rodgers, R., Ruggles, S., & Warren, J. R. (2018). Integrated public use microdata series, current population survey: Version 6.0. Minneapolis, MN: IPUMS.

Gaskin, J. D., Dinwiddie, Y. G., Chan, S. K., & McCleary, R. R. (2011). Residential Segregation and Disparities in Health Care Services Utilization. Medical Care Research and Review, 69(2), 158-175.

Gaskin, J. D., Dinwiddie, Y. G., Chan, S. K., & McCleary, R. R. (2012). Residential Segregation and the Availability of Primary Care Physicians. Health Services Research, 47(6), 2353- 2376.

Gulliford, M., Figueroa-Munoz, J., Morgan, M., Hughes, D., Gibson, B., Beech, R., & Hudson, M. (2002). What does' access to health care mean? *Journal of health services research & policy*, *7*(3), 186-188. https://doi.org/10.1258/135581902760082517

Haggerty, L. J., Roberge, D., Levesque, J.-F., Gauthier, J., & Loignon, C. (2014). An exploration of rural-urban differences in healthcare-seeking trajectories: Implications for measures of accessibility. *Health & Place*, 28, 92-98. https://doi.org/10.1016/j.healthplace.2014.03.005

Hancock, G. R., & Mueller, R. O. (2010). The reviewer's guide to quantitative methods in the social sciences. Routledge. https://doi.org/10.4324/9780203861554

Haw, J. S., Shah, M., Turbow, S., Egeolu, M., & Umpierrez, G. (2021). Diabetes Complications in Racial and Ethnic Minority Populations in the USA. *Current*

diabetes reports, *21*(1), 1-8. https://doi.org/10.1007/s11892-020-01369-x

Hoe, J., & Hoare, Z. (2012). Understanding quantitative research. *Nursing Standard*, 27(15-17), 52. https://doi.org/10.7748/ns2012.12.27.15.52.c9485

Huang, Y. M., Shiyanbola, O. O., & Smith, P. D. (2018). Association of health literacy and medication self-efficacy with medication adherence and diabetes control. *Patient preference and adherence*, *12*, 793. https://doi.org/10.2147/ppa.s153312

International Diabetes Foundation. IDF Diabetes Atlas. https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/134-idf-diabetes-atlas-8thedition.html.

Kenya, S., Lebron, C. N., Chang, A. Y. H., Li, H., Alonzo, Y. A., & Carrasquillo, O. (2015). A profile of Latinos with poorly controlled diabetes in South Florida. *Journal of community hospital internal medicine perspectives*, *5*(2), 26586. https://doi.org/10.3402/jchimp.v5.26586

Kilanowski, J. F. (2017). Breadth of the socio-ecological model. *Journal of Agromedicine*, *22*(4), 295-297. https://doi.org/10.1080/1059924x.2017.1358971

Kim, Y. M., & Delen, D. (2018). Critical assessment of health disparities across subpopulation groups through a social determinants of health perspective: The case of type 2 diabetes patients. *Informatics for Health and Social Care*, *43*(2), 172-185. https://doi.org/10.1080/17538157.2017.1364244

Kolb, H., & Martin, S. (2017). Environmental/lifestyle factors in the pathogenesis and prevention of type 2 diabetes. *BMC Medicine*, *15*(1), 131.

https://doi.org/10.1186/s12916-017-0901-x

LaMorte, W.W. (2019). The Social Cognitive Theory. *Boston University School of Public Health.* https://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories5.html

Leavy, P. (2017). Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches. *Family and Consumer Sciences Research Journal, 47(1),* 101-102. https://doi.org/10.1111/fcsr.12276

Lee, L. T., Bowen, P. G., Mosley, M. K., & Turner, C. C. (2017). Theory of planned behavior: Social support and diabetes self-management. *Journal for Nurse Practitioners*, *13*(4), 265–270. https://doi-org/10.1016/j.nurpra.2016.07.013

Lee, Y.-M., Yu, H. Y, You, M.-A., & Son, Y. J. (2015). Impact of health literacy on medication adherence in older people with chronic disease. *Collegian, 24(1),* 11-18. https://doi.org/10.1016/j.colegn.2015.08.003

Lipsy, M. W., & Hurley, S. M. (1998). Design sensitivity: statistical power for applied experimental research. *Handbook of applied social research methods*. Sage Publications, 39-68.

Lord, J., Roberson, S. & Odoi, A. (2020). Investigation of geographic disparities of pre-diabetes and diabetes in Florida. *BMC Public Health* **20,** 1226. https://doi.org/10.1186/s12889-020-09311-2

Lu, J. B., Danko, K. J., Elfassy, M. D., Welch, V., Grimshaw, J. M., & Ivers, N. M. (2018). Do quality improvement initiatives for diabetes care address social

inequities? Secondary analysis of a systematic review. *BMJ open*, *8*(2), e018826.

MacKinney, A., Coburn, A., Lundblad, J., McBride, T., Mueller, K., & Watson, S. (2014). Access to rural health care–a literature review and new synthesis. *Policy Report. Rupri: Rural Policy Research Institute*.

Mailey, E. L., Phillips, S. M., Dlugonski, D., & Conroy, D. E. (2016). Overcoming barriers to exercise among parents: a social cognitive theory perspective. *Journal of behavioral medicine*, *39*(4), 599-609. https://doi.org/10.1007/s10865-016-9744-8

Martinez-Cardoso, A., Jang, W., & Baig, A. A. (2020). Moving diabetes upstream: The social determinants of diabetes management and control among immigrants in the US. *Current Diabetes Reports*, *20*(10). https://doi.org/10.1007/s11892-020-01332-w

Morris, N., & Pickens, J. D. C. (2017). "I'm not a gadget": A grounded theory on unplugging. *American Journal of Family Therapy, vol. 45* (5) (264-282). https://doi.org/10.1080/01926187.2017.1365665

Mueller, K. J., Coburn, A. F., Lundblad, J. P., MacKinney, A. C., McBride, T. D., and Watson, S. D. (2011). The High-Performance Rural Health Care System of the Future. Rural Policy Research Institute

National Institutes of Health. (2015). Racial and ethnic categories and definitions for NIH diversity programs and for other reporting purposes. https://grants.nih.gov/grants/guide/notice-files/NOT-OD-15-089.html

Njeru, J. W., Hagi-Salaad, M. F., Haji, H., Cha, S. S., & Wieland, M. L. (2016). Diabetes Health Literacy Among Somali Patients with Diabetes Mellitus in a US Primary Care Setting. *Journal of racial and ethnic health disparities*, *3*(2), 210-216. https://doi.org/10.1007/s40615-015-0129-4

Office of Disease Prevention and Health Promotion, Office of the Assistant Secretary for Health, Office of the Secretary, U.S. Department of Health and Human Services.

Office of Disease Prevention and Health Promotion. *Social determinants of health*. HealthyPeople.gov. https://www.healthypeople.gov/2020/topics-objectives/topic/socialdeterminantsof-health.

Parker, A. W. (1974). The dimensions of primary care: blueprints for change. In: Andreopoulos, S.(ed.), *Primary care: where medicine fails.* John Wiley and Sons, 15-80.

Parker, A. W., Walsh, J. M., & Coon, M. (1976). A Normative Approach to the Definition of Primary Health Care. The Milbank Memorial Fund Quarterly. *Health and Society*, 54(4), 415-438. https://doi.org/10.2307/3349676

Pierannunzi, C., Hu, S. S., & Balluz, L. (2013). A systematic review of publications assessing reliability and validity of the Behavioral Risk Factor Surveillance System (BRFSS), 2004–2011. *BMC Medical Research Methodology*, *13*(1), 1-14. https://doi.org/10.1186/1471-2288-13-49

Rutledge, S. A., Masalovich, S., Blacher, R. J., & Saunders, M. M. (2017). Diabetes self-management education programs in nonmetropolitan counties—United States,

2016. *MMWR Surveillance Summaries*, *66*(10), 1-6. https://doi.org/10.15585/mmwr.ss6610a1

Sallis, J. F., Owen, N., & Fisher, E. (2015). Ecological models of health behavior. *Health behavior: Theory, research, and practice*, *5*(43-64).

Shi, L., & Stevens, D. G. (2010). Vulnerable Populations in the United States (2nd ed.). Jossey-Bass.

Silva-Tinoco, R., Cuatecontzi-Xochitiotzi, T., De la Torre-Saldaña, V., León-García, E., Serna-Alvarado, J., Orea-Tejeda, A., Castillo-Martínez, L., Gay, J., Cantú de-León, D. & Prada, D. (2020). Influence of social determinants, diabetes knowledge, health behaviors, and glycemic control in type 2 diabetes: an analysis from real-world evidence. *BMC endocrine disorders*, *20*(1), 1-11. https://doi.org/10.1186/s12902-020-00604-6

Soderlund, P. D. (2017). The social ecological model and physical activity interventions for Hispanic women with type 2 diabetes: a review. *Journal of Transcultural Nursing*, *28*(3), 306-314. https://doi.org/10.1177/1043659616649671

Solar, O., & Irwin, A. (2010). *A conceptual framework for action on the social determinants of health*. WHO Document Production Services.

Stormacq, C., Van den Broucke, S., & Wosinski, J. (2019). Does health literacy mediate the relationship between socioeconomic status and health disparities? Integrative review. *Health promotion international*, *34*(5), e1-e17. https://doi.org/10.1093/heapro/day062

Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: transportation barriers to health care access. *Journal of community health*, *38*(5), 976-993. https://doi.org/10.1007/s10900-013-9681-1

Thomas, L. V., Wedel, K. R., & Christopher, J. E. (2018). Access to transportation and health care visits for Medicaid enrollees with diabetes. *The Journal of Rural Health*, *34*(2), 162-172. https://doi.org/10.1111/jrh.12239

Trochim, W. M. K., & Donnelly, J. P. (2007). Research methods knowledge base (3rd ed.). Thomson Custom Pub.

US Bureau of Labor Statistics (2018). Race, Economics, and Social Status. https://www.bls.gov.

U.S. Census Bureau. American community survey, profile of general population and housing characteristics: 2019 demographic profile data. United States Census Bureau, Suitland, Maryland, USA. 2019. http://factfinder.census.gov.

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2020). Healthy People 2030. https://health.gov/healthypeople/objectives-and-data/social-determinants-health.

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2019). Healthy People 2020. http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topici=1.

Vigil, D., Sinaii, N., & Karp, B. (2021). American Indian and Alaska native enrollment in

clinical studies in the National Institutes of Health's intramural research program. *Ethics & Human Research*, *43*(3), 2-9.

Walker, R. J., Smalls, B. L., & Egede, L. E. (2015). Social determinants of health in adults with type 2 diabetes—Contribution of mutable and immutable factors. *Diabetes research and clinical practice*, *110*(2), 193-201.

Walker, R. J., Williams, J. S., & Egede, L. E. (2016). Influence of race, ethnicity and social determinants of health on diabetes outcomes. *The American Journal of the Medical Sciences*, *351*(4), 366-373. https://doi.org/10.1016/j.amjms.2016.01.008

Wisniewski, M. (2016). Quantitative methods for decision makers (6th ed.). Harlow, Essex, England: Pearson.

World Health Organization. (2019a). Social determinants of health. Retrieved from https://www.who.int/social_determinants/sdh_definition/en/

World Health Organization. (2019b). *Healthy, prosperous lives for all: the European Health Equity Status Report: executive summary* (No. WHO/EURO: 2019-3536-43295-60680). World Health Organization. Regional Office for Europe.