2018

Diabetic Adult Access to Medical Care and Race and Ethnicity in Connecticut

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Walden University
2018

Abstract

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Natacha B. Jerome

MS, University of New Haven, 2003

BS, University of New Haven, 2001

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

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Abstract

Diabetes is among the leading causes of death in Connecticut. An approximate of 330,000 adults in Connecticut have diabetes (diagnosed and undiagnosed). Those with diabetes have almost twice the risk of premature death throughout various age groups. The purpose of this cross sectional study was to investigate whether disparities exist in access to medical care due to race and ethnicity; among adults with diabetes in the state of Connecticut. Furthermore, this study used the Andersen's behavioral model framework. Survey data from the behavioral risk factor surveillance system (BRFSS) were also analyzed. The research study covered 3 years (2013 to 2015) of data collection in the BRFSS ($N = 3{,}091$). Race and ethnicity were the primary independent variables. The 3 dependent variables were: source of care, length of time since routine check-up, and doctor's visit during the past 12 months. The overall data suggest that the disparity is significant in household income. Those who had healthcare coverage, higher income, and older age were significantly different from their counterparts in terms of length of time since the last routine checkup. In the regression analysis, healthcare coverage, income level and educational were the significant predictors of log length of time since the last routine checkup. Those who are Black, single, higher annual household income, and higher educational level, were significantly different from their counterparts in terms of doctors' visits during the past 12 months. The implication for social change is that policymakers must act both to eliminate barriers and challenge structures that encourage disproportionate income advantages for White households.

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Dedication

To my late father, Bayard Jerome, for speaking words of greatness over me from early childhood. May he rest in eternal peace. My mother, Marie Jerome, for her personal sacrifices for me to be all that I can be. My sister, Carline, for not allowing me the option to quit. Your support and encouragement was my driving force throughout this long process. My husband, Guy Noisette, for his financial support. Finally, my two children Landon Noisette (9) and Nissi Noisette (4).

Acknowledgments

In all that I do, I must first acknowledge God and my savior Jesus Christ. I would like to express my upmost appreciation to my doctoral committee chair, James Rohrer. Thank you for your guidance and patience. I appreciate your responsiveness and constructive feedback. You have been an advocate in pushing my work forward and ensuring success through the many phases of this dissertation. I would also like to express my appreciation to Dr. Roland Thorpe and Dr. Vasileios Margaritis for accepting to serve as committee members.

I am forever grateful for my dear husband for believing in me and for his financial support; My children for being my source of strength when I needed it the most. I could only imagine my father's overwhelming contentment for this accomplishment had he been alive. He told me to shoot for the stars and so I did and I find myself completing this PHD program- Dad this one is for you. I am thankful for my mother, Marie Jerome and my siblings Marlange Dutton, Dayard Jerome, Darlene Auguste, Carline Augustin and Sheila Jeudi. Carline and Darlene, thank you for showing me the sisterly love during times of discouragement. I feel blessed with amazing fellow classmates, particularly Laura Ojukwu and Tanya Fergurson. A special thanks to my editors Karen Mckeithen and Mosi Moses. Finally, I would also like to express my heart-felt gratitude to all of my friends and extended family members who supported me in many ways, big or small. I share this accomplishment with you all.

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Chapter 1: Introduction to the Study

In 2010, approximately 18.8 million individuals in the United States were diagnosed with diabetes mellitus and another 7 million had undiagnosed diabetes (Centers for Disease Control and Prevention, 2012b). Since the 90s, the prevalence of diagnosed diabetes in the United States has climbed sharply among all various age groups, both genders, and racial/ethnic groups for which data are available (Centers for Disease Control and Prevention, 2012b). While this increase may be due to a myriad of factors, directly or indirectly, I explored whether health disparity existed in access to medical care due to race and ethnicity among adults with diabetes in the state of Connecticut. The three variables I used to measure access to medical care were: having a regular source of care (American Diabetes Association, 2011); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in the last 12 months(American Diabetes Association, 2011). The term *health disparity* has been defined as a health difference that is closely linked with the economic, social, or environmental disadvantage (Office of Disease Prevention and Health Promotion, 2014). Health disparities adversely have affected groups of people who have systematically experienced greater social or economic obstacles to health services. These disparities were based on their racial or ethnic group, religion, socioeconomic status, gender, age, or other characteristics historically linked to discrimination or exclusion (Office of Disease Prevention and Health Promotion, 2014). Unfortunately, these characteristics have contributed the ability to achieve good health (Office of Disease Prevention and Health

Promotion, 2014). Additionally, social determinants have had an impact on health outcomes of specific populations (Office of Disease Prevention and Health Promotion, 2014). Ultimately, the intention of the study was to underscore the aforementioned. While diabetes disparities have been widely studied, to date, no research studies have simultaneously explored the following variables to measure access to medical care: having a regular source of care (Committee & Classification, 2010); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in the last 12 months (Committee & Classification, 2010). Study of these data could foster new conversations and attention to health care disparity in the diabetes community. There is a need for more data to be collected on racial or ethnicity disparity to affect change at the government level. In this study I intended to promote positive social change through encouraging intervention policies that may reduce racial/ethnic disparities in access to medical care among diabetic adults.

This chapter includes an overview of the study topic; the problem statement and purpose of the study. Discussion of the research questions, the hypotheses, the conceptual framework and definitions of terms that were specific to this topic, assumptions, limitations, and significance of the study. In addition, an in-depth discussion is included in the literature review in Chapter 2.

Background of the Study

In a recent research study conducted in Denmark Sortsø, Green, Jensen, and Emneus, (2016) found that patients with diabetes consumed approximately twice the healthcare resources; compared to nondiabetics. Researchers also noted when patients with diabetes developed complications, the healthcare and nursing costs increased markedly (Sortsø, Green, Jensen, & Emneus, 2016). Another recent retrospective observational study was done to understand the use of emergency department and urgent care services by diabetic patients (Bryar, 2017). Bryar (2017) concluded that patients with diabetes utilized the emergency department and urgent care services 1.25 and 1.92 times more often than the two control populations, consistent with that observed in other studies. These patients sought treatment for cellulitis, wounds, abscesses, and infections more often than the control populations (Bryar, 2017). Racial and ethnic disparities in access to medical care have reflected negatively on the entire country and its health care system (Breu, Guggenbichler, & Wollmann, 2013). When health in the United States was compared to health in other developed countries, the picture was disappointing. Since 2000, the World Health Organization (WHO) has rated the U.S. health care system 37th out of 131 nations in the world (Breu et al., 2013). In areas such as survival and life expectancy, the United States was rated very poorly among high-income countries (Breu et al., 2013). While the United States has spent the most on healthcare, it did not translate into better care for its citizens. Health inequities were estimated to contribute to $1.2 trillion in lost wages and productivity between 2003 and 2006 (Roehr, 2009). Statistically, minorities represent about one-third of the entire U.S. population and, based on the projections of the latest U.S. Census; minorities will become the majority of the population by 2042 (United States Census Bureau, 2010). As a result, health inequities may increase in the future if racial and ethnic disparities are not effectively addressed promptly.

Health care disparity can be complex. It is important to not only identify the most targeted populations but to also share intervention ideas or approaches that would help to decrease racial and social class health care disparities. In other words, discussion on elements that may be key when designing, implementing, and evaluating such interventions must occur (Cooper, Hill, & Powe, 2002). Cooper et al. (2002) also provided recommendations and insights on how to conduct effective studies that will, in turn, impact disparity (Cooper et al., 2002). They discussed topics such as identifying target groups and types of study designs that were most optimal. Target groups might have included those at a higher risk for adverse outcomes. Interventions to address the most important contributing factors identified for a particular disease condition or population are key (Cooper et al., 2002). Health services interventions, whether used alone or in collaboration with social and economic interventions, are likely to play a significant role in reducing racial health disparities (Cooper et al., 2002). The Institute of Medicine (IOM; 2001) highlighted equity as one of the six fundamental items to providing high-quality care. IOM noted that the lack of equity as one of the main insufficiencies of the U.S. health care system.

Nelson (2002) stated that racial disparities in health care exist even when significant indicators such as insurance status, income, and age have been controlled. Furthermore, death rates from cancer, heart disease, and diabetes are significantly higher in non-Hispanic Blacks than in non-Hispanic Whites (Nelson, 2002).

Health disparities that are unexplained by differences in sociodemographic characteristics may be due to factors that are not well-studied which, in turn, affect health care (Langellier, Chen, Vargas-Bustamante, Inkelas, & Ortega, 2014). Factors such as access to medical care are important to explore. This has directly affected the state of Connecticut, which has had a history of having very little information available on the physician practice environment (Aseltine, Katz, & Geragosian, 2010). While some studies have been performed on this topic, further research is vital to address the overall gap in literature. Racial disparity in diabetes is interconnected with a myriad of other issues. Therefore, addressing these issues can be the best approach to reducing race disparity. To address race disparities in diabetes, policymakers should address problems created by concentrated poverty (Gaskin et al., 2014). Poverty within neighborhoods contributed to worse diabetes health outcomes (Gary et al., 2008). Researchers suggested that the United States lagged behind other developed nations in the provision of timely, patient-centered, and efficient care for its poor population (Sandy, Bodenheimer, Pawlson, & Starfield, 2009).

Peek, Cargill, and Huang, (2007) found that racial and ethnic minorities bore a disproportionate burden of the diabetes epidemic; they experienced higher prevalence rates, worse diabetes control, and higher rates of complications (Peek, Cargill, & Huang, 2007). While there were multifactorial reasons for the disparities in diabetes prevalence, evidence that the provision of a lower quality of care may be an important contributor to the current state of diabetes disparities (Harris, 1999). Future research is needed to fully understand and effectively address racial/ethnic diabetes disparities. This may include rigorous evaluation of federal policy initiatives (Peek et al., 2007).

Health status, access to care, and utilization of medical services in the United States and Canada compared disparities according to race, income, and immigrant status (Lasser, Himmelstein, & Woolhandler, 2006a). The researchers concluded that Canadian residents have more access to health care than residents in the United States (Lasser et al., 2006a). Universal coverage reduces most disparities in access to care (Lasser et al., 2006a). A research study that examined the association between health care access and diabetes control concluded that lack of health care access was connected to diabetes control (Zhang et al., 2012). Researchers further concluded that the diabetes control profile was related to health insurance coverage and number of health care visits (Zhang et al., 2012). Those who did not own healthcare insurance reported fewer health care visits and were more likely not to have a usual source of care compared to those who owned healthcare insurance. In addition, those who were uninsured were more likely to have worse diabetes control profiles (Zhang et al., 2012).

This is a quantitative study using secondary data collected from the behavioral risk factor surveillance system, (BRFSS) database. There is a need for more data to be collected on racial or ethnicity disparity to affect change at the government level. More findings on this topic may bring about intervention policies to reduce racial or ethnicity disparities in access to medical care among diabetic adults.

Problem Statement

Diabetes is a chronic illness that necessitates continuing medical care. It also involves patient self-management education, support to prevent acute complications and to decrease the risk of long-term complications (American Diabetes Association, 2011).

Patients with diabetes utilized the emergency department and urgent care services 1.25 and 1.92 times more often than the two control populations. These findings were consistent with that observed in other studies (Bryar, 2017). As a result, access to medical care directly affects the health status of persons with diabetes (Zhang et al., 2012). Additionally, racial and ethnic variables are known to be risk factors for impaired access to health services (National Center for Health Statistics, 2016).

Health disparities adversely affect groups of people who have systematically experienced greater social or economic obstacles to health based on their racial or ethnic group, religion, socioeconomic status, gender, age or other characteristics historically linked to discrimination or exclusion (Office of Disease Prevention and Health Promotion, 2014). There are some differences by race and ethnicity in health care access and utilization and in health status and outcomes for adults with type 2 diabetes (Harris, Eastman, Cowie, Flegal, & Eberhardt, 1999). In the United States, despite steady improvements in overall health, minorities continue to experience a lower quality of health services, are less likely to receive routine medical procedures and have higher rates of morbidity and mortality than nonminorities (Green et al., 2003). Continued efforts are needed to reduce inequities (Asada, 2005). Actions such as bringing more awareness to this issue through additional research, identifying specific disparities and creating effective policies will aid in closing the gaps.

Health disparities that are unexplained by differences in socio-demographic characteristics may be due to factors that are not observed that affect health care (Langellier et al., 2014). Factors such as access to medical care are important to explore.

Particularly, within the state of Connecticut, which has a history of having very little information available on the physician practice environment (Aseltine et al., 2010). While researchers have provided some insights into this topic, the existing gap pointed to the need for further research studies to be performed.

Purpose of the Study

The purpose of this quantitative study was to investigate whether disparities exist in access to medical care due to race and ethnicity among adults with diabetes in Connecticut. The three variables, I used to measure access to medical care were: having a regular source of care (Committee & Classification, 2010); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (Committee & Classification, 2010). Race and ethnicity were the primary independent variables. Odds ratios were adjusted for age, gender, income, insurance coverage, marital status, and interview years. A significant difference in medical care access for the different race or ethnic groups would demonstrate disparity.

Americans experienced a remarkable decline in deaths and a parallel increase in average life expectancy during the twentieth century (WHO, 2014). Advances in medical technology and health care during this period have enabled people with serious disability and chronic illnesses to live longer (WHO, 2014). Chronic diseases such as diabetes are among the leading causes of death in Connecticut, and they encompass many conditions that can be prevented or minimized (Connecticut Department of Public Health, 2014). Approximately 79 million Americans (or 35% of U.S. adults aged 20 years and older) have prediabetes (Facts & Diabetes, 2011). With the growing public health issue of diabetes, state legislatures throughout the country are actively exploring policy options to deal with this growing problem at the state's level (Centers for Disease Control and Prevention, 2012a). Some of the policy and program changes to increase access need to be implemented at the state level. Many state legislatures considered diabetes related legislation; Connecticut enacted the Biomedical Research Trust Fund Research Grants in 2010 (Centers for Disease Control and Prevention, 2012a). While diabetes disparities have been widely studied no research studies have explored the following variables simultaneously in order to measure access to medical care having a regular source of care (American Diabetes Association, 2011); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (Committee & Classification, 2010).

Research Question(s) and Hypotheses

Research Question:

Is access to medical care associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type health insurance, age, gender, income, education marital status and interview years?

Hypotheses:

$H_{0}1$: Having a regular source of care is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income, education, marital status and interview years.

$H_{a}1$: Having a regular source of care is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income, education, marital status and interview years.

$H_{0}2$: Having a medical checkup is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years

$H_{a}2$: Having a medical checkup is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years.

H03: Number of medical care visits is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income, education, marital status and interview years

Ha3: Number of medical care visits is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income and education marital status and interview years.

The hypotheses were tested as follows: First, I calculated descriptive statistics for the measured variables to provide report summary data. These data included measures of central tendency including the min/max mean, standard deviation, and variance. Second, I used bivariate analysis (chi-square test) to test the strength of associations between independent (race and ethnicity) and dependent (having a regular source of care; time since receiving a medical checkup and number of doctor visits in last twelve months) variables. Lastly, I conducted multivariable analysis to test the hypotheses. I used multiple regression analysis for the last dependent variable to describe its relationship with the independent variables.

Conceptual Framework

When it comes to understanding health care disparity, one of the most comprehensive and widely used frameworks is the Andersen's Behavioral Model (Andersen & Newman, 1973). The framework considers an individual's use of health services to be a function of three types of factors: predisposing factors, such as demographics; enabling factors, such as health insurance; and illness level or need factors, such as health (R. M. Andersen, 1995).

Andersen's behavioral model is relevant in the discussion of the three measures of access to medical care that correlates with this study; having a regular source of care; time since receiving a medical checkup and number of doctor visits in last twelve months. These measures provide information about perceived needs and access with a regular provider. The dependent variables in the study are measures of access and utilization.

Furthermore, two of the factors which the model is based upon are reflected in the independent variables used in the study: These predisposing factors which described demographics include age, education, marital status (R. M. Andersen, 1995). The key individual measure of enabling is health insurance (Holden, Chen, & Dagher, 2015). In a research study, the racial/ethnic gap between the uninsured was twice the size of the gap between those with insurance (Holden et al., 2015).

Lastly, the need factor; Diabetes is a chronic illness that necessitates continuing medical care and involves patient self-management education and support to prevent acute complications and to decrease the risk of long-term complications (Committee & Classification, 2010). Access to medical care is a dire need with those diagnosed with diabetes.

Ultimately, the Andersen's behavioral model considers an individual’s use of health services with the three factors: predisposing, enabling and need. This framework provided the impetus to explore the trends, particularly race/ethnicity, that may or may not impact health services and utilization. The use of the Andersen’s behavioral model framework was implemented to conceptualize health care disparity.

Nature of the Study

The nature of this study is quantitative, using cross-sectional study design. Survey data from the behavioral risk factor surveillance System (BRFSS) were analyzed. A cross-sectional study is designed to determine the frequency of a particular attribute, such as a particular exposure, disease or any other health-related event, in a distinct targeted population at a particular point in time (Cooper, Hill, & Powe, 2002). Cross-sectional surveys offer the opportunity to assess relations between variables and differences between subgroups in a population at one specific point in time (Visser, Krosnick, & Lavrakas, 2000). This would allow one to study independent variables such as; race and ethnicity, age, gender, income, insurance coverage, education, marital status and interview years; against the three dependent variables ; having regular source of care; routine medical check-up and doctor visits in last twelve months. The study focused across the span of three years (2013-2015) when the respondents were interviewed. The analysis of cross-sectional data provides a mean to describe racial healthcare disparity and the measurement of access to medical care.

Definitions

Black: A person with African ancestral origins, who self identifies, or is identified, as Black, African or Afro-Caribbean (see, African and Afro-Caribbean). In some circumstances the word Black signifies all non-White minority populations, and in this use serves political purposes (Bhopal, 2004).

Behavioral risk factor surveillance system (BRFSS): The BRFSS is a United States health survey that looks at behavioral risk factors.

Ethnicity: The social group a person belongs to, and either identifies with or is identified with by others, as a result of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race (Bhopal, 2004).

Healthcare disparity: The differences between groups in health insurance coverage, access to and use of care, and quality of care (Hoffman & Paradise, 2008).

Minority: Usually, it is not always the case; this phrase is used to make reference to a non-White population. Alternatively, it may be used to define a specific identifiable group (Bhopal, 2004). In this study, the term is mainly used to refer to the Blacks.

Race: a person belongs to as a result of a mix of physical features such as skin color and hair texture, which reflect ancestry and geographical origins, as identified by others or, increasingly, as self –identified (Bhopal, 2004).

Race/ethnicity: Race and ethnicity are increasingly used as synonyms causing some confusion and leading to the hybrid terms race/ethnicity (Bhopal, 2004).

White: The term typically used to describe people with European ancestral origins who identify as White (sometimes called European, or in terms of racial classifications, the group known as Caucasian or Caucasoid) (Bhopal, 2004). The term has served to distinguish these groups from those groups with skin of other colors, and hence springs from the concept of race but is used as an indicator of ethnicity (Bhopal, 2004).

Assumptions and Limitations

The BRFSS was used in this study. The BRFSS is a cross-sectional, ongoing, state-based, random-digit–dialed telephone survey of adults residing in the United States

(Pierannunzi, Hu, & Balluz, 2013). The assumption was that the survey was conducted according to guidelines put forth by the Centers for Disease Control (CDC). It can also be assumed that the BRFSS data are reliable and valid and that each state adequately monitor the survey (Pierannunzi et al., 2013). Furthermore, cross-sectional surveys offer the opportunity to assess relations between variables and differences between subgroups in a population (Visser et al., 2000).

Potential weaknesses and limitations in this study included that surveys based on self-reported information may be inaccurate and may introduce bias. For example, respondents are notorious to underreport body weight (Wharton, Adams, & Hampl, 2008). Thus it is important that data users take into consideration the potential for under-reporting. The potential to threat to external validity may also be concerning with the use of secondary data. It is not guaranteed that the data is valid after a period of time.

Telephone surveys may have higher levels of no coverage than face-to-face interviews because interviewers may not be able to reach some US households by telephone. In addition, other sources of error may include sampling error, measurement error, and nonresponse error. While procedures to minimize these sources of errors are found in the BRFSS protocol, data users should take into consideration these types of errors when analyzing self-reported data.

Significance of the Study

Health care disparities represent a lack of efficiency within the health care system and subsequently account for unnecessary and avoidable expenses (Diggs, 2012). Findings of this study could be useful to design and target new programs intended to reduce or eliminate health care disparities. This, in turn, could reduce medical care expenditures. The elimination of racial disparities in health care is a very complex problem (Walker, Mays, & Warren, 2004).

Reducing health care disparities for diabetics who are members of racial and ethnic minority groups would be a significant social change and therefore is an important goal. While this study alone may not eliminate all health disparities, the study results may add to the body of knowledge on this topic and we hope that it will provide compelling information. The results of this study may address the gap in research and contribute to a more thorough understanding of health disparity in this population.

Summary

While the areas of disparity and diabetes are well researched, there exists a gap in the literature which afforded this study to explore the disparities in access to medical care among diabetic adults in the state of Connecticut. This current chapter provides the background of the study. In the United States, despite steady improvements in overall health, minorities continue to experience a lower quality of health services, are less likely to receive routine medical procedures and have higher rates of morbidity and mortality than non-minorities (Green et al., 2003). This chapter discusses the main objective of the study which explores the three variable that measure access to medical care: having a regular source of care (American Diabetes Association, 2011); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (American Diabetes Association, 2011). While diabetes disparities have been widely studied, no research studies have explored the following variables simultaneously to measure access to medical care: having a regular source of care (American Diabetes Association, 2011); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (American Diabetes Association, 2011). A history of the Andersen's behavioral model is provided and how this study is reliant on this conceptual framework as a guide. The BRFSS was used in this study. The BRFSS is a cross-sectional, ongoing, state-based, random-digit–dialed telephone survey of adults residing in the United States. (Pierannunzi et al., 2013). The many limitations associated with the BRFSS were discussed in this chapter. The significance of this study is that the findings may address the gap in research and contribute to a more thorough understanding of health disparity in this population.

Chapter 2 provides an in-depth discussion including literature review of prior research studies. This chapter reviews and explores studies surrounding the areas of health disparity and diabetes. The chapter concludes with implications of the past research studies on this topic and its influence on this study. Chapter 3 describes the methodology used to study the research questions. Chapter 4 describes the collected data, reports the study findings related to each research question and hypothesis, and analyzes the results by conducting statistical analyses. Chapter 5 interprets the study findings, discusses the implications for positive social change, and describes the recommendations for further study.

Chapter 2: Literature Review

Introduction

Diabetes is a chronic illness that necessitates continuing medical care and involves patient self-management education and support to prevent acute complications and to decrease the risk of long-term complications (American Diabetes Association, 2011). Access to medical care directly affects the health status of persons with diabetes (Zhang et al., 2012). By the year of 2012, nearly 10% of Americans had diabetes mellitus (Ferdinand & Nasser, 2015). Those with diabetes have almost twice the risk of premature death in comparison to those in the same age groups without the condition (Ferdinand & Nasser, 2015). It is evident that the prevalence of diabetes has increased across all racial/ethnic groups over the past 30 years. However, this condition is at a higher rate in minority populations (Ferdinand & Nasser, 2015). Nelson (2002) stated that racial disparities in health care exist even when significant indicators such as insurance status, income, age have been controlled. Furthermore, death rates from cancer, heart disease, and diabetes are significantly higher in non-Hispanic Blacks than in non-Hispanic Whites (Nelson, 2002).

Race disparity in diabetes is interconnected with a myriad of other issues. Addressing these issues can be the best approach to reducing race disparity. To address race disparities in diabetes, policymakers should address problems created by concentrated poverty (Gaskin et al., 2014). Poverty within neighborhoods contributes to worse diabetes health outcomes (Gary et al., 2008). Evidence suggests that the United

States lags behind other developed nations in the provision of timely, patient-centered, and efficient care for its poor population (Sandy et al., 2009).

Racial and ethnic variables are known to be risk factors for impaired access to health services (National Center for Health Statistics, 2016). Health care disparity has been defined as the differences between groups in health insurance coverage, access to and use of care, and quality of care (Hoffman & Paradise, 2008).

There are differences by race and ethnicity in health care access and utilization and in health status and outcomes for adults with type 2 diabetes (Harris, 1999). In the United States, despite steady improvements in overall health, minorities continue to experience a lower quality of health services, are less likely to receive routine medical procedures and have higher rates of morbidity and mortality than non-minorities (Green et al., 2003). For example, Blacks have higher death rates than Whites for most of the 15 leading causes of death in the United States such as heart disease, cancer, stroke, diabetes, kidney disease, hypertension, liver cirrhosis, and homicide (Firebaugh, Acciai, Noah, Prather, & Nau, 2014). Continued efforts are needed to reduce inequities (Asada, 2005). Even with improvements in the overall health of the United States, racial and ethnic minorities experience a lower quality of health services (National Center for Health Statistics, 2016). Although socio-economic status alone cannot explain the disparity in health care, the American Academy of Pediatrics recognizes that race/ethnicity, gender, and socioeconomic status can influence child health through social mechanisms (Cheng & Goodman, 2015). They also believe these variables are likely to emerge as important mediators of childhood health, as well as predictors of adult health status (Cheng & Goodman, 2015). Health inequities were estimated to contribute $1.2 trillion in lost wages and productivity between 2003 and 2006 (Roehr, 2009). Minorities represent about one-third of the entire U.S. population and, based on the projections of the latest Census Bureau; minorities will become the majority of the population by 2042 (Bureau Of Cencus, 2010). This means these lost wages will very well increase in the future if racial and ethnic disparities are not addressed promptly. Another study concluded that In the United States, Hispanic children are less likely than Whites to visit a doctor, and are more likely to have delayed care (Langellier et al., 2014). They too believe that the finding that so much of these Hispanic-Black disparities are unexplained by differences in socio-demographic characteristics suggests that due to factors that are not observed that affect health care (Langellier et al., 2014). Factors such as primary care visits for different ethnic with diabetes; this speaks to the importance of this study.

Literature Search Strategy

Google Scholar search engine along with Highwire search engine and the Walden University Database were used as tools in identifying the appropriate article during the literature review. Among the key words used in conducting the study were: *health care disparity, racial and socioeconomic health disparity, Blacks and healthcare disparity, Primary care visits, Black healthcare in America and healthcare insurance for Blacks and minorities.* Many articles were reviewed, particularly, those published within the past six years. Nonetheless, there were interests in earlier published articles that were useful and provided supportive evidence in this study. Therefore, the publication range of these articles was from 1999 to 2017.

Theoretical Foundation

Andersen’s model of health behavior

When it comes to understanding health care disparity, one of the most comprehensive and widely used frameworks is the Andersen's behavioral model. The Andersen’s behavioral model is dated back since 1968 developed by Ronald Andersen and, it is still being used (Derose, Gresenz, & Ringel, 2011, p. 1845). The framework considers an individual’s use of health services to be a function of three types of factors: predisposing factors, such as demographics; enabling factors, such as health insurance and illness level or need factors, such as health status (Derose et al., 2011). This framework was used to conceptualize health care disparity as it is presented currently in Connecticut.

Rationale for Choice of the Theory

The definition of race goes beyond biological or genetic category and is a means through which people’s differences are interpreted to create or reinforce inequalities among them (Bonilla-Silva, 2006). Racial inequality takes many forms in almost every facet of society (Bonilla-Silva, 2006). For example, in the area of health , racial minorities bear a disproportionate burden of morbidity and mortality (Gee & Ford, 2011). The Andersen’s Behavioral Model framework is based on the predisposing, enabling, illness level or need factors (R. M. Andersen, 1995). It is the most common framework used to understand individuals’ access to health care (Derose, Gresenz, & Ringel, 2011). It is also used broadly as a theoretical model that analyzes predictors of health services utilization (Kim & Lee, 2015). Therefore, the Andersen’s behavioral model framework may also be a suitable model in exploring access to medical care highlighting race/ethnicity as a key variable.

This study is quantitative, using cross-sectional study design. Survey data from the behavioral risk factor surveillance system (BRFSS) were analyzed. I used three variables to measure access to medical care: having a regular source of care (American Diabetes Association, 2011); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (American Diabetes Association, 2011). Race and ethnicity were the primary independent variables. Odds ratios were adjusted for age, gender, income, insurance coverage, marital status and interview years. A significant difference in medical care access for the different race or ethnic groups may demonstrate disparity. Reducing health care disparities for diabetics who are members of racial and ethnic minority groups would be a significant social change and therefore is an important goal. While this study alone cannot eliminate all health disparities, the study results may add to the body of knowledge on this topic. The findings from this study can serve as useful data to effect positive social change by guiding changes in health policy and targeting efforts to improve access to medical care in underserved racial and ethnic groups.

Conceptual Framework

This study examines the predisposing, enabling, and need factors that control the overall health-services-utilization experiences of minorities with diabetes. Andersen's model framework is depicted in Figure 1 below:

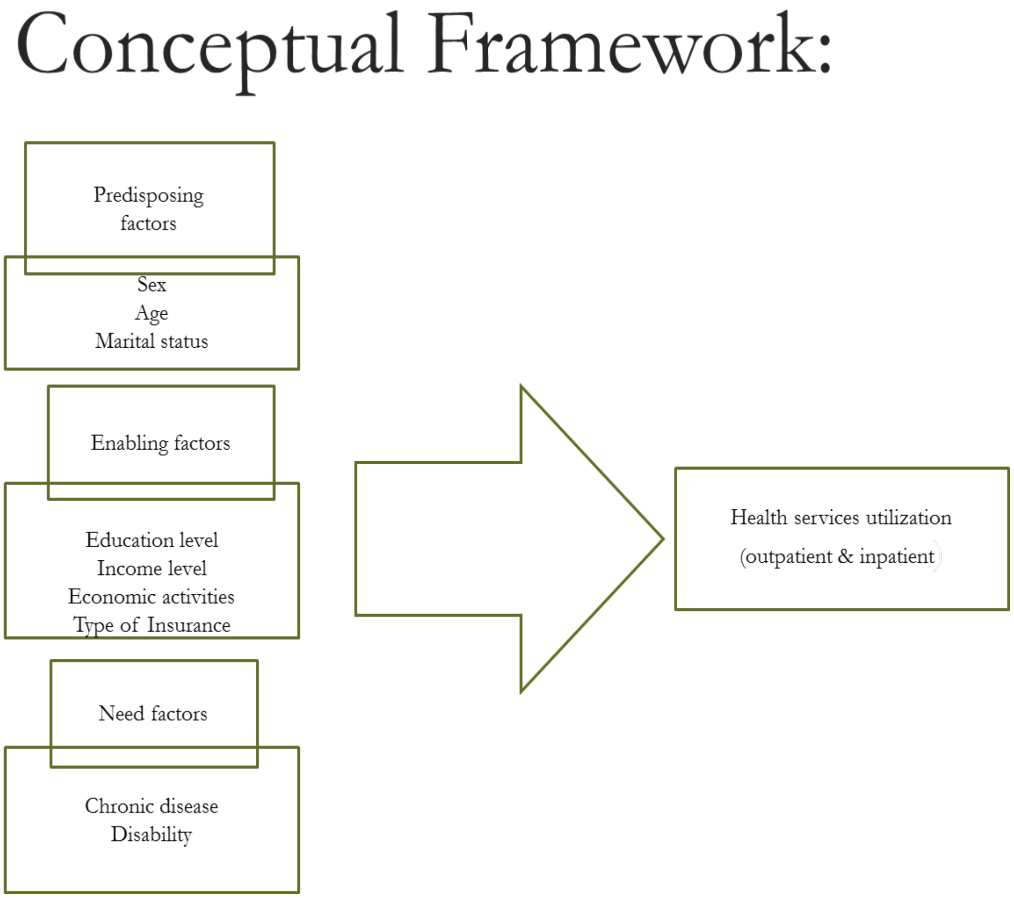

*Figure 1***.** Andersen's model framework (R. M. Andersen, 1995). The Andersen's behavioral model is dated back since 1968 (Derose et al., 2011). While it was not the first or only model at the time, it did attempt to incorporate ideas health services' use

(RM Andersen, 1995). Historically, Andersen’s behavioral model has been utilized widely in various studies to investigate the use of health services (Babitsch, Gohl, & Von Lengerke, 2012). Similarly, the Andersen’s behavioral model framework , (predisposing, enabling, illness level or need factors) was used in this study to conceptualize health care disparity within the selected targeted population as it is presented currently in Connecticut.

In 2012 study, the Andersen behavioral model was used to predict prevalence and awareness of hepatitis B (HBV) or hepatitis C (HCV) infection, as well as health services utilization (HSU) among homeless (Stein, Andersen, Robertson, 2012). This study and a multitude of others have used the Andersen Behavioral Model as guide line.

Key Variables and Concepts

The intertwining web of health care disparity can be complex; it is extremely important to not only identify the most targeted population but also share intervention ideas or approaches that would help to decrease racial and social class health care disparities. The discussion on elements that are key when designing, implementing and evaluating such interventions must occur (Cooper et al., 2002). The authors provided recommendations and insights on how to conduct effective studies that will impact disparity (Cooper et al., 2002). They discussed those topics such as identifying target groups and types of study designs that are most optimal. Target groups might include those at highest risk for adverse outcomes and interventions should try to address the most important contributing factors identified for a particular disease condition or population (Cooper et al., 2002). Health services interventions, whether used alone or in collaboration with social and economic interventions, are likely to play a significant role in reducing racial health disparities (Cooper et al., 2002).

For this study, race and ethnicity were the primary independent variables. Odds ratios were adjusted for age, gender, income, insurance coverage, education marital status and interview years. A significant difference in medical care access for the different race or ethnic groups may demonstrate disparity.

A recent research study conducted in Denmark found that patients with diabetes consumed approximately twice the healthcare resources; compared to non-diabetics (Sortsø et al., 2016). Researchers had also noted when patients with diabetes developed complications, the healthcare and nursing costs increased markedly (Sortsø et al., 2016).

Another recent retrospective observational study was done to understand the use of emergency department and urgent care services by diabetic patients (Bryar, 2017). Bryar (2017) concluded that patients with diabetes utilized the emergency department and urgent care services 1.25 and 1.92 times more often than the two control populations, consistent with that observed in other studies. These patients sought treatment for cellulitis, wounds, abscesses, and infections more often than the control populations (Bryar, 2017).

Using multivariable regression to adjust for important confounders such as unemployment and income, researchers examined the changes in trends over time for the uninsured rate, measures of access to care, and self-reported health status under the Affordable care Act (Sommers, Gunja, Finegold, & Musco, 2015). This was possible by way of the analysis of the 2012-2015 Gallup-Healthways Well-Being Index, a daily national telephone survey. One of the findings was that Low-income adults in states that expanded Medicaid reported remarkable gains in insurance coverage and access when compared with adults in states that did not expand Medicaid (Sommers et al., 2015).

Race and Ethnicity

Racial and ethnic disparities in access to medical care reflect negatively on the entire country and its health care system. When health in the United States is compared to health in other developed countries, the picture is disappointing. From 2000, the World Health Organization rated the US health care system thirty-seventh out of one hundred and ninety-one nation in the worlds (Breu et al., 2013). On almost all indicators of mortality, survival, and life expectancy, the United States is rated very poorly among high-income countries (Breu et al., 2013). While the United States spends the most on healthcare, it does not translate into better care for its citizens. Health care disparities are partly to blame for this contradiction.

The United States has struggled with the health care disparity. A study was done to compare US and Canada on health care disparity according to race, income and immigrant status. The result was that health care disparity was evident in both countries, however, was more extreme in the US (Lasser, Himmelstein, & Woolhandler, 2006b). Canadians residents are more able to access care than are residents in the U.S (Lasser et al., 2006b).

In a study conducted in 2010, Blacks and Hispanics were less likely to report difficulties in accessing medical care, dental care, and prescriptions as compared to

Whites. They concluded that Racial/ethnic disparities in access to care continues, and cannot be solely explained by socioeconomic differences (Shi, Lebrun, & Tsai, 2010).

While the term disparities is frequently understood to mean racial or ethnic disparities, many dimensions of disparity exist in the United States, particularly in health (Adler & Rehkopf, 2008). Disparities including, not limited to: age, gender, income, insurance coverage, education, marital status and interview years.

In a retrospective cohort study in 2009, Black children were less likely to receive an antibiotic prescription from the same clinician per acute visit (Gerber et al., 2013). Some may even argue that can be related to the patient-physician relationship.

While further research is needed to fully illuminate the contribution of the patient–physician relationship to disparities in health care, it can very well be a significant factor. If the ultimate goal is to provide all Americans equitable access to health care, then it is incumbent to improve cross-cultural patient–physician interactions.

In a recent study, the finding was that women have fewer hospital admissions than men. This finding was consistent with other studies based on national probability samples; These studies show that women are less likely to use hospital services and, among those hospitalized, tend to have shorter hospital stays (Cameron, Song, Manheim, & Dunlop, 2010).

Along with demographics, diabetes may have also played a role in health care disparity. In a meta-analysis conducted to review health care interventions at improving health outcomes and reducing diabetes health disparities among minorities, the finding was that knowledge and many resources are available; hence the significant strides toward the goal of equity in diabetes care and health outcomes can be achievable (Peek et al., 2007).

Education, income and marital status are all elements of one's socio-economic status (SES). SES is often measured as a combination of education, income, and occupation (American Psychological Association, 2013). A study was done to compare US and Canada on health care disparity according to race, income and immigrant status. The result was that health care disparity was evident in both countries, however, was more extreme in the United States (Lasser, Himmelstein, & Woolhandler, 2006).

I analyzed the survey data from the BRFSS from 3 years, 2013-2015. In the year of 2013, approximately 833 people with diabetes were interviewed; in 2014, 880 and in the year of 2015, 1378 totaling 3,091.

Uninsured Blacks experience more difficulty than uninsured Whites in obtaining access to care (Holden et al., 2015). For example, Black Americans are most at risk of being uninsured (Collins et al., 2002). Of those uninsured 38% of Blacks said they had very little or no choice in their source of health care. In contrast, 25 percent Whites report very little or no choice in source of care (Holden et al., 2015). This may play a significant role as to why minority adults are less likely than White adults to have a regular doctor (Holden et al., 2015). Nonetheless, the racial/ethnic gap between the uninsured was twice the size of the gap between those with insurance (Holden et al., 2015).

In a study that examined the association between health care access and diabetes control, concluded that lack of health care coverage is connected to poor glycemic control in the diabetes population (Zhang et al., 2012). Using a national health and nutrition examination survey, study was done to evaluate health care access and utilization and health status and outcomes for type 2 diabetic patients according to race and ethnicity. This study also determined health status is influenced by health care access and utilization (Harris, 1999). The finding was that there are differences by race and ethnicity in health care access and utilization and in health status and outcomes for adults with type 2 diabetes (Harris, 1999).

A recent study explains that the prevalence of diabetes are found to be at a higher rate among the minority group, especially Blacks (Ferdinand & Nasser, 2015).

Table 1

Disparities in Access to Medical Care Among Diabetic Adults in Connecticut

Reference Author/ Date – (APA Style)	Study Objectives, Research Question(s)/ Hypotheses	Methodology (Type of Study)/ Intervention Design (if applicable)	Analysis, Results & Major Findings	Conclusions	Implications for Future Research
Langellier B., A., Chen J., Vargas-Bustamante A., Inkelas M., and Ortega A. N. (2014)	Examine the elements that are associated with disparities in the access and utilization of health-care services among Hispanic, White, and Black children	Data from the 2006–2011 National Health Interview Survey (NHIS) was used	For children 0–17-years-old who participate Hispanic- were less likely than Whites to have a usual source of care, doctor visit, or preventive care visit, and more likely to have delayed care (p < .001 for all factors).	In the United States, Hispanic children are less likely than Whites to visit a doctor, and are more likely to have delayed care.	1. Hispanic-Black disparities cannot be explained solely on the differences in sociodemographicharacteristics. 2. Unobserved factors that impact health care may differ between the two groups, should be investigated in future studies.

Continued

Continued

Zhang et al., (2012)	Examines the relationship between access to health care and diabetes control.	Analyses data from the National Health and Nutrition Examination Survey	An estimated 16.0% of known diabetic adults were uninsured.	Lack of health care coverage is associated with poor glycemic control in the diabetes population. In addition, low use of health care service is associated with poor glucose and blood pressure control.	There is a need to improve access to health care among persons with diabetes
(Ferdinand & Nasser, 2015).	Evaluates the prevalence of diabetes and disease-related comorbidities as well as the primary endpoints of clinical studies assessing glucose-lowering treatments in Blacks, Hispanics, and Asians.	Literature Review-	In a separate NHANE Survey from 1999 to 2010, Blacks have experienced the most exaggerated increase in the prevalence of diabetes was seen among Blacks.	Clinical data are needed for guiding diabetes treatment among racial minority populations	Educational programs that integrate culturally relevant approaches should highlight the importance of risk-factor control in minority patients.
Shi, L., Lebrun L. A, and JTsai J. (2010)	Examines disparities in access to Care.	Used nationally representative data on 34,403 individuals from the 2004 Medical Expenditure Panel Survey (MEPS)	Blacks and Hispanics were less likely to report difficulties in accessing medical care, dental care, and prescriptions as compared to Whites.	Racial/ethnic disparities in access to care persist, and cannot be entirely explained by socioeconomic differences.	Policymakers seeking to reduce health care disparities should identify objective measures of access to care.

Continued

Continued

Peek, Cargill, & Huang (2007)	This article reviews the effectiveness of health care interventions at improving health outcomes and/or reducing diabetes health disparities among racial/ethnic minorities with diabetes.	Multiple electronic databases (MEDLINE, Cochrane Register of Controlled Trials, PsycINFO, Cochrane Database of Systematic Reviews, ACP Journal Club, and CINAHL) were reviewed for evaluation studies of interventions published from 1985 to 2006	meta-analysis	The findings supports that each of these targets can serve as a potentially meaningful lever of change. We currently have the collective knowledge and skills to make significant strides toward the goal of equity in diabetes care and health outcomes.	More research required
Harris, 1999	evaluates health care access and utilization and health status and outcomes for type 2 diabetic patients according to race and ethnicity. This study also determines if health status is influenced by health care access and utilization.	National Health and Nutrition Examination Survey	There are some differences among Whites, Blacks, and Mexican-Americans in health care access and utilization and in health status and outcome measures that are influenced by recent medical care However, many of the differences are small or are not statistically significant	There are differences by race and ethnicity in health care access and utilization and in health status and outcomes for adults with type 2 diabetes.	
Continued				**Continued**	
Gerber J.S., Prasad P. A., Localio A.R.,	Determines whether racial differences exist in	Retrospective cohort study	1. Black children were less likely to receive an antibiotic	Black children received fewer	

Fiks A. G., Grundmeier R. W., Bell L. M., Wasserman R. C., Rubin D. M., Keren R., Zaoutis T., E (2013)	antibiotic prescribing among children treated by the same clinician		prescription from the same clinician 2. Black children were also less likely to receive diagnoses that justified antibiotic treatment.	antibiotic prescriptions, fewer acute respiratory tract infection diagnoses, and a lower proportion of broad-spectrum antibiotic prescriptions than non-Blacks	
(Lasser et al., 2006b)	Disparities according to race, income, and immigrant status; US and Canada comparison	Joint Canada/US Survey of Health	1. US was more likely to have unmet health needs, and forgo needed medicines and less likely to have a regular physician. 2. Disparities on the basis of race, income, and immigrant status were present in both countries but were more extreme in the United States. 3. US respondents were more likely to report that they were somewhat or very dissatisfied with health care services	Canadians residents are more able to access care than are residents in the U.S . Universal coverage appears to reduce most disparities in access to care.	policies to address disapproving social conditions that effect health are deeply needed.
(Sortsø, Green, Jensen, & Emneus, 2016).	Study aims to provide comprehensive real-world evidence on societal diabetes-attributable costs in Denmark	National register data are connected on an individual level through unique central personal registration numbers in Denmark.	Societal costs attributable to diabetes were estimated to be at least 4.27 billion EUR in 2011.	Nearly half of the total costs of patients with diabetes can be attributed directly to their diabetes.	Evidence of cost distributions within diabetes can guide Future efforts.
Continued					**Continued**
(Bryar, 2017)	To understand the use of Emergency Department and Urgent Care Services by Diabetic Patients.	A Retrospective Observational Study	Diabetic patients sought treatment for cellulitis, wounds, abscesses, and infections more often than the control populations	Diabetic patients used the emergency department and urgent care services 1.25 and	

				1.92 times more often than the two control populations, consistent with that observed in other studies
(Sommers, Gunja, Finegold, & Musco, 2015)	To assess the differences between low-income adults in states that expanded Medicaid and in states that did not expand Medicaid.	Analysis of the 2012-2015 Gallup-Healthways Well-Being Index, a daily national telephone survey	Medicaid expansion was associated with significant reductions among low-income adults in the uninsured rate.	Low-income adults in states that expanded Medicaid reported remarkable gains in insurance coverage and access when compared with adults in states that did not expand Medicaid

Critique of Method

The most commonly used method in the literature review is surveys. Surveys are probably the most commonly-used research method worldwide (Kitchenham & Pfleeger, 2001). Social science methodology fundamentally depends upon survey methods in its research endeavor because it has the advantage of collecting great deal of data from a larger population (Mathiyazhagan & Nandan, 2010). In addition, it is also capable to obtain personal and social facts, beliefs and attitudes (Mathiyazhagan & Nandan, 2010). However, there are some limitations in survey methodology that should not be ignored. One particular is that surveys are usually self-reported. The information is subject to recall bias (Xu et al., 2014). In addition, with all surveys, potential for bias exists from question wording or order (Xu et al., 2014). The below literatures are referenced in Table 1 above.

In the article, understanding health-care access and utilization disparities among Hispanic children in the United States (Langellier et al., 2014), using data from the 2006–2011 from the national health interview survey (NHIS), the authors sought out to examine elements that are linked with disparities in the access and utilization of health-care services among Hispanic, White, and Black children (Langellier et al., 2014). Some of the limitations they confronted were: NHIS data used are cross-sectional and the relationships observed may be subject to confounding due to unmeasured factors in the NHIS data (Langellier et al., 2014). Another limitation, that is common in surveys, was that the NHIS data are self-reported and subject to measurement error (Langellier et al., 2014).

These lead to the implications that Hispanic-Black disparities cannot be explained solely by the differences in socio-demographic characteristics (Langellier et al., 2014). Furthermore, unobserved factors that impact health care may differ between the two groups (Langellier et al., 2014). This has created a gap in the literature that can be explored in future studies.

Zhang et al. (2012) examined the association between health care access and diabetes control. Data were abstracted from the national health and nutrition examination survey. While the study was well demonstrated, it is important to note the limitations. Access to health care is better considered as a multidimensional concept with five domains: availability, organization, financing, use, and satisfaction (Zhang et al., 2012). Nonetheless, the data source used only addressed two of these five domains. The analyses of poor glycemic control were restricted to NHANES 1999–2006 (N = 889) (Zhang et al., 2012). The decrease in sample size (from N = 1,221 to N = 889) might have affected the association of poor glycemic control with access to health care (Zhang et al., 2012).

A comprehensive literature search of clinical trials that evaluated glucose-lowering drugs in racial minority populations was performed to evaluate the prevalence of diabetes and disease-related comorbidities as well as the primary endpoints of clinical studies assessing glucose-lowering treatments in Blacks, Hispanics, and Asians (Ferdinand & Nasser, 2015). The authors’ finding were that the literature on certain agent such as GLP-1 receptor agonists exenatide extended-release and lixisenatide; the SGLT2 inhibitors canagliflozin and empagliflozin; the glinides nateglinide and repaglinide, as well as other agents were limited among non-Whites (Ferdinand & Nasser, 2015). In addition, Blacks and Hispanic patients are not well represented in clinical trials of glucose-lowering therapies (Ferdinand & Nasser, 2015). These factors may have invited biases and potentially skewed the findings. Nonetheless, it is evident that clinical data are needed for guiding diabetes treatment among racial minority populations (Ferdinand & Nasser, 2015).

The 2004 medical expenditure panel survey (MEPS) was used as a source of data to examine disparities in access to care. The finding was that racial/ethnic disparities in access to care is evident, and cannot be entirely explained by socioeconomic differences (Shi et al., 2010). Like the previous literature, one limitation was that the data were cross-sectional. Therefore, conclusions cannot be made about the causal effect of race/ethnicity on access to health care (Shi et al., 2010). As noted, racial disparity in access to care is complex and it may not always manifest themselves in the expected direction, and socioeconomic factors, such as insurance status (Shi et al., 2010). Hence it is important to study racial/ethnic disparity in access to care in all of its dimensions.

The researchers reviewed multiple electronic databases for evaluation studies of interventions published from 1985 to 2006 (Peek et al., 2007). While this review identified health care interventions that can potentially improve diabetes health outcomes, there are limitations to the current body of evidence and many remaining unanswered questions (Peek et al., 2007). For example, one key limitation to note is potential publication bias, meaning, studies with positive findings are published more than studies with negative findings (Peek et al., 2007).

National health and nutrition examination survey was used to evaluate health care access and utilization and health status and outcomes for type 2 diabetic patients according to race and ethnicity. This study also determined if health status is influenced by health care access and utilization (Harris, 1999). The data agreed that there are some differences among Whites, Blacks, and Mexican-Americans in health care access and utilization and in health status and outcome measures that are influenced by recent medical care (Harris, 1999). What is interesting is that while some measures were more severe in Blacks and Mexican-Americans, these differences were statistically insignificant. (Harris,1999). It is important to note that the researcher performed many logistic regressions and used wide CIs. Hence, the clinical and statistical significance of some measurements should be considered with reservation (Harris, 1999).

Gerber and fellow researchers implemented a retrospective study to determine whether racial differences exist in antibiotic prescribing among children treated by the same clinician (Gerber et al., 2013). The authors concluded that when treated by the same clinician, Black children were less likely to receive an antibiotic prescription (Gerber et al., 2013). While the disparity was evident, this study, however, isolated individual clinician decision-making, by comparing antibiotic prescribing and ARTI diagnosis rates between Black and patients of other ethnic groups seen by the same clinician at the same practice in the same year, adjusted for patient-level factors that could be associated with the need for antibiotic use (Gerber et al., 2013). The difference in diagnosis rates of ARTIs and the associated need for antibiotics cannot be explained biologically (Gerber et al., 2013). In another study, researchers concluded that the Canadians residents are more able to access care than are residents in the U.S (Lasser et al., 2006b). The analyzed population-based data from the released joint Canada/US survey of health (JCUSH) during the time the study took place (Lasser et al., 2006b). Analyses of quality of care and satisfaction are limited, because JCUSH questions were not tested for validity and reliability (Lasser et al., 2006b). Furthermore, the JCUSH does not contained outcome data and is also limited by the different response rates in the 2 nations (Lasser et al., 2006b). Nonetheless, health disparities on the basis of race, income, and immigrant status are evident in both countries, however, appear to be more pronounced in the United States (Lasser et al., 2006b).

One noted limitation with the chosen approach with the Societal *costs of diabetes mellitus in Denmark* study, (Sortsø et al., 2016), was that a 1-year time window was used. Data from more years should have been used to facilitate analysis of trends over time. While the findings in Bryar's (2017) study were remarkable, one must take into account the limitations that accompany retrospective studies. It is evident that most sources of error due to confounding and bias are commonly found in retrospective studies (Geneletti, Richardson, & Best, 2009). For this reason, retrospective investigations are often criticized (Geneletti et al., 2009). In addition, in retrospective studies the odds ratio provided an estimate of relative risk (Geneletti et al., 2009). One should take special care to avoid sources of bias and confounding in retrospective studies

Gap Addressed by this Study

Health disparities that are unexplained by differences in socio-demographic characteristics may be due to factors that are not observed that affect health care (Langellier et al., 2014). Factors such as access to medical care are important to explore. Particularly in Connecticut which has a history of having very little information available on the physician practice environment (Aseltine et al., 2010). While studies have been performed, this gap in the literature pointed to the need for further research studies to be performed.

The various limitations previously discussed, displayed the need for more and improved research on the topic. While there are various studies conducted on f health disparity very little information is known to answer the question if there are indeed disparities in access to medical care among diabetic adults in Connecticut.

Summary and Conclusions

After extensive review of the past and current literature on this topic, it is apparent that disparities in access to medical care among diabetic adults are a more needed area to research. One stark observation is that survey research was commonly used. In this study, survey data from the BRFSS was used. Historically, the Andersen's behavioral model has been utilized widely in various studies to investigate the use of health services (Babitsch et al., 2012). Similarly, the Andersen's behavioral model framework, (predisposing, enabling, illness level or need factors) was used in this study to conceptualize health care disparity within the selected targeted population as it is presented currently in Connecticut. Chapter 3 will describe the methodology used to study the research questions.

Chapter 3: Research Method

The purpose of this research study was to investigate whether disparities exist in access to medical care due to race and ethnicity among adults with diabetes in Connecticut. Race and ethnicity were the primary independent variables. While the dependent variable to measure access to medical care were: having a regular source of care (American Diabetes Association, 2011); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (American Diabetes Association, 2011). Odds ratios were adjusted for age, gender, income, and insurance coverage, marital status and interview years. A significant difference in medical care access for the different race or ethnic groups may demonstrate disparity. The research study was set out to answer the question: Is access to medical care associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type health insurance, age, gender, income, education, marital status and interview years?

In this chapter, I used a quantitative approach to answer the above-mentioned question. An overview of the study design; a description of the collection method of the BRFSS; methodology; sampling procedures; study variables and data analysis were provided. The chapter concludes with a discussion on threats to validity.

Research Design and Rationale

This study is quantitative, using cross-sectional study design. Secondary data was collected from the BRFSS. The use of the Andersen’s Behavioral Model framework-predisposing, enabling, illness level or need factors was implemented to conceptualize health care disparity. A cross-sectional study is designed to determine the frequency of a particular attribute, such as a particular exposure, disease or any other health-related event, in a distinct targeted population at a particular point in time (Cooper et al., 2002). The analysis of cross-sectional data provides a mean to describe racial healthcare disparity and the measurement of access to medical care.

Race and ethnicity were used as the primary independent variables. The dependent variables were: having a regular source of care (Committee & Classification, 2010); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (Committee & Classification, 2010). An example of how data was collected was that respondents were asked a series of questions such as - How long has it been since you last visited a doctor for a routine checkup? The answer was categorized as follows: In the past year; within the past 2 years; within the past 5 years; 5 or more years ago and Never. However, all of the variables were recoded to make them appropriate for the analysis.

The BRFSS is a United States health survey that looks at behavioral risk factors. It is an ongoing, state-based, random-digit–dialed telephone survey of adults 18 years of age or older, residing in the United States (Pierannunzi et al., 2013). BRFSS has been established since 1984 and it is known as the nation's primary system of health-related telephone surveys that gather state data about U.S. residents on their health-related risk behaviors, chronic health conditions, and use of preventive services (Pierannunzi et al., 2013). Today, the BRFSS collects data nationwide, including three U.S. territories

(Pierannunzi et al., 2013). For this study, only data collected for the state of Connecticut were used.

Methodology

This study employed a cross-sectional research design approach. A target sample size was calculated for each dependent variable as described below. Secondary data was collected from the BRFSS. The BRFSS public-use data were collected by landline telephone and cellular telephone interviews to produce a single aggregate of data set (Pierannunzi et al., 2013). Data analysis plan mainly discussed the statistical procedures per research question and hypothesis.

Population

The selection criteria were 18 year old or older adults who have been diagnosed with diabetes. The subject must reside in the state of Connecticut. Approximately 250,000 Connecticut adults currently have diagnosed with diabetes (types 1 and 2) (Connecticut Department of Public Health, 2014). In addition, over 83,000 adults have undiagnosed diabetes; which increases the number to an approximate of 330,000 adults (diagnosed and undiagnosed) (Connecticut Department of Public Health, 2014).

Sampling and Sampling Procedures

The sample size has a profound impact on the outcome of a study and thus should be handled with great importance. The sample must be adequately large to address the main purposes of the study with sufficient precision, yet not excessively larger than required for obvious and multiple reasons (Lenth, 2008). In this section, the procedure to drawing the sample is discussed.

As noted earlier, access to medical care was measured in three ways: having a regular source of care (Committee & Classification, 2010); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (Committee & Classification, 2010). Table 2 below describes the sample size for each:

Table 2

Disparities in Access to Medical Care Among Diabetic Adults in Connecticut

Dependent Variables	Total sample size
Having regular source of care	443
Time since medical checkup	528
Doctor visits in last 12 months	615

To accommodate the number of the sample size, BRFSS data from 3 years were used; 2013-2015. In the year of 2013, approximately 833 people with diabetes were interviewed; in 2014, 880 and in the year of 2015, 1378, respectively (*N* = 3,091). This was adequate to represent the sample size. The study sample size for each dependent variable was set to determine statistical significance based on results calculated from Openepi.com.

OpenEpi is an Open Source effort to replace and extend the EpiTable and statical programs in Epi Info with web-compatible programs and links in JavaScript (Dean, Sullivan, & Soe, 2011). It uses an open source approach and provides up-to-date, documented, tested programs using a common interface (Dean et al., 2011). The module is presented in a table format with active fields allowing the researcher to enter required values such as confidence level, power, ratio of exposed to unexposed samples, and a hypothetical percentage of outcomes among the controls. In addition, an estimated value for the odds ratio was also required. To arrive at the total sample size depicted in the above table 2, the following estimated values were entered (for details on the explanation below of the generated OpenEpi results see Table 3)

Two-sided confidence level: 95% confidence interval was entered to indicate that 95% of the confidence intervals include the true population parameter.

Power: A power value of 80% was entered.

The ratio of unexposed to expose: The diabetes rates of non-Whites are double the diabetes rates of White adults; a ratio of 1:2 (Connecticut Department of Public Health, 2014). Hence, the ratio of unexposed to expose in sample entered was 0.5.

Percent of Unexposed with Outcome: An estimated value was entered for each dependent variable: Having regular source of care; routine medical check-up and doctor visits in last twelve months 70; 76 and 80 respectively.

An approximate of 70% of Whites has a usual source of care (DeVoe, Fryer, Phillips, & Green, 2003). Based on data collected from the BRFSS, an estimated 76% of Whites have had routine medical check- up in the past twelve years (Stone & Brackney, 2016). Data from the National Health Interview Survey, 2013 and 2014 finding was that 80 percent of Whites have been to a doctor visit in the past twelve month (Martinez , Ward , & Adams , 20015).

Table 3 *Generated OpenEpi result for each dependent variable. Disparities in Access to Medical Care Among Diabetic Adults in Connecticut*

Having regular source of care:

Sample Size: X-Sectional, Cohort, & Randomized Clinical Trials	
Two-sided significance level(1-alpha):	95
Power(1-beta, % chance of detecting):	80
Ratio of sample size, Unexposed/Exposed:	0.5
Percent of Unexposed with Outcome:	70
Percent of Exposed with Outcome:	82
Odds Ratio:	2
Risk/Prevalence Ratio:	1.2
Risk/Prevalence difference:	12

	Kelsey	**Fleiss**	**Fleiss with CC**
Sample Size – Exposed	263	272	295
Sample Size-Nonexposed	132	136	148
Total sample size:	395	408	443

Routine medical check-up

Sample Size:X-Sectional, Cohort, & Randomized Clinical Trials	
Two-sided significance level(1-alpha):	95
Power(1-beta, % chance of detecting):	80
Ratio of sample size, Unexposed/Exposed:	0.5
Percent of Unexposed with Outcome:	76
Percent of Exposed with Outcome:	86
Odds Ratio:	2
Risk/Prevalence Ratio:	1.1
Risk/Prevalence difference:	10

	Kelsey	**Fleiss**	**Fleiss with CC**
Sample Size – Exposed	311	323	352
Sample Size-Nonexposed	156	162	176
Total sample size:	467	485	528

Doctor visits in last twelve months

Sample Size:X-Sectional, Cohort, & Randomized Clinical Trials	
Two-sided significance level(1-alpha):	95
Power(1-beta, % chance of detecting):	80
Ratio of sample size, Unexposed/Exposed:	0.5

Percent of Unexposed with Outcome:	80
Percent of Exposed with Outcome:	89
Odds Ratio:	2
Risk/Prevalence Ratio:	1.1
Risk/Prevalence difference:	8.9

	Kelsey	**Fleiss**	**Fleiss with CC**
Sample Size - Exposed	361	377	410
Sample Size-Non-exposed	181	189	205
Total sample size:	542	566	615

Study Variables

Upon reviewing the literatures on this topic, the striking reality of the disparities in access to medical care among diabetic adults in Connecticut was evident. Key variables of interest were selected based on the problem statement described above. In addition, these variables were made available in the BRFSS dataset. Main independent variables are race/ethnicity. Other independent variables of interest; age, gender, income, insurance coverage, education, marital status and interview years, were included in the calculation. Three dependent variables, described, below were carefully selected to measure access to medical care. These variables were measured as target outcomes, expecting to change based on the independent variables.

Dependent Variables

1. *Having a regular source of care*: Respondents were asked "Do you have one person you think of as your personal doctor or health care provider?

   This was re-coded as two categories consisted of "Yes" and "No," such that "Yes" was coded as "1" and "No" was coded as "0."

2. *Time since receiving a medical checkup:* Respondents were asked "About how long has it been since you last visited a doctor for a routine checkup? (A routine checkup is a general)". The respondents were to select below:

   1 -Within past year (anytime less than 12 months ago)
   2 -Within past 2 years (1 year but less than 2 years ago)

3 -Within past 5 years (2 years but less than 5 years ago)

4 -5 or more years ago

7- Don’t know/Not sure

8 -Never

9 –Refused

3. *Number of doctor visits in last twelve months:* Respondents were asked “How many times have you been to a doctor, nurse, or other health professional in the past 12 months? The respondents were to select below:

1- 76 Number of times

88 -None

77 -Don’t know/Not Sure

The latter two dependent variables were not recoded since they are continuous.

Independent Variables

Race/ethnicity: The race/ethnicity variable within BRFSS was derived from the responses to the survey questions on race in the demographic module. This variable was recoded as two categories of White and non-White. The category of non-White was coded as “0” and the category of White was coded as “1.”

Other independent Variables

Odds ratios were adjusted for age, gender, income, insurance coverage, marital status and interview years.

Age: Age was recoded into a categorical variable, such that 18 to 38 years age group was coded as follow: “0” 39 to 48 age group was coded as “1”, 49 to 58 age group was coded as “2”, 59 to 68 age group was coded as “3”, 69 to 78 age group was coded as “4” and 79 to 88 age group was coded as “5.

Gender: Gender had two categories of male and female, such that female coded as “0” and male coded as “1.”

Income: Respondents were asked “What is your annual household income from all sources?

The income variable was initially in the scale measurement form, which was recoded into a categorical variable. The income variable was re-coded as five categories, such as <$15000, which was coded as “0”, 1501 to 20,000 that was coded as “1”, 20,001 to 35,000 coded as “2”, 35,001 to 75,000 coded as “3” and 75,000 and above was coded as “4.”

Insurance coverage: Had two categories consisted of “Yes” and “No,” such that “Yes” was coded as “1” and “No” was coded as “0.”

Education: Based on the respondent’s answer, education was re-coded as below:

The scale variable of respondents’ educational level was also recoded into a categorical variable for the purpose of analysis. The variable of educational level had three categories, such as elementary level coded as “0”, high school level coded as “1” and college and above, which was coded as “2.”

Marital status: was captured as below:

Marital status had also two categories of single and married, such that single was assigned a code of “0” and married was coded as “1.”

Years data captured: Survey data from the BRFSS from 3 years, 2013-2015, were analyzed. In the year of 2013, approximately 833 people with diabetes were interviewed; in 2014, 880 and in the year of 2015, 1378; (N= 3,091)

Data Analysis Plan

I selected the BRFSS data of three time periods: 2013, 2014, and 2015 respectively were. The data were considered cleaned. Hence, further examination or scrutiny was unnecessary. I then identified the variables in the original datasets. I matched these variables with the codebooks to verify the name of variables, codes, categories, and value labels of each variable included in the study. After I identified the variables, I extracted each data file, which contained one time-period, from the original datasets. Hence, there were three data files for 2013, 2014, and 2015 surveys respectively. Next, I converted the BRFSS dataset, then imported from SAS version 93 to SPSS Statistics 24 for analyses. The main focus was only diabetes patients. Therefore, I filtered only those respondents who had diabetes from the data. Diabetes responders were a sample size of 3091. This sample size was adequate to the sample size calculated above. Since, the datasets were country representative data; I assigned the weight to the dataset. For this purpose, I created the csplan file based on the sampling The research study was set out to answer the question: Is access to medical care associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type health insurance, age, gender, income, education, marital status and interview years?

To answer this question, I took the following steps: First, I analyzed the frequency distribution of each variable to obtain the distribution of each variable and examined missing, not applicable, and unexpected cases. Next, I re-coded the variables for the purposes of the analysis. Then, I completed the descriptive statistic for the measured variables to provide a report summary data such as measures of central tendency including the min/ max mean, standard deviation, and variance.

Second, I ran the bivariate analysis (chi-square test) test with the categorical variable along with the percent distribution. The chi-square test was used to test the strength of associations between independent (Race and ethnicity) and dependent (having a regular source of care; time since receiving a medical checkup and number of doctor visits in last twelve months) variables. Lastly, I conducted the multivariable analysis to test the hypotheses. I used weighted binary logistic regression from the complex sample menu in the SPSS software for the dependent variable of healthcare coverage, which had two categories consisted of “Yes” and “No,” such that “Yes” was coded as “1” and “No” was coded as “0.” I assigned each variable a reference category. The first two dependent variables were categorical; I completed a logistic regression model to describe the relationship between independent and dependent variables; such as length of time since last routine check-up and doctor’s visits during the past 12 months. I used weighted multiple linear regression as they both were scale variables. Those variables, which had two categories were remained the same, while those variables which had more than two categories were again recoded. I created the dummy variables for each categorical variable. I coded the first category as a reference category for each categorical variable. I used the general linear modeling statistical technique under complex sample in SPSS software. I entered the binary variables into the "Covariates" box and the categorical variables into the "Factors" box. I entered all variables in the first model. I completed two separate analyses for each of the two scale dependent variables while I conducted the similar procedure for each analysis.

I compared all reported p-values to a significance level of 5%. A significant difference in the dependent variables for the different race or ethnic groups would demonstrate disparity. I calculated the odds ratio (OR) with 95% confidence interval (CI) to test the above-mentioned hypotheses. I adjusted the odds ratios for age, gender, income, insurance coverage, marital status and interview years.

Threats to Validity

This research study is a cross-sectional observational study. Observational studies are evaluated in terms of both internal and external validity (Carlson & Morrison, 2009). Internal validity refers to the strength of the inferences from the study and external refers to generalizability (Carlson & Morrison, 2009). Some argue that observational studies lack the ability to prove internal or causality (Carlson & Morrison, 2009). They are found to be stronger when considering external validity or generalizability (Carlson & Morrison, 2009). Observational studies test the ability of an intervention to produce an outcome under natural conditions and therefore are more likely to possess external validity (Carlson & Morrison, 2009).

External Validity

Threats to external validity are any factors within a study that reduce the generalizability (or generality) of the results (Ferguson, 2004). While the final result obtained in this research study is solely based on the sample of the patients with diabetes, which was analyzed, it can be stated that the conclusions made in this study can be generalized to the population. One of the advantages in this research study in using the BRFSS data is that the BRFSS has used a weighting methodology or raking to weight data (Pierannunzi et al., 2013). Raking allows incorporation of cellular telephone survey data, and it permits the introduction of additional demographic characteristics that more accurately match sample distributions to known demographic characteristics of populations at the state level (Pierannunzi et al., 2013). In the BRFSS, unweight data signify the actual responses of the respondents prior to any adjustment is made for variation in the respondents' probability of selection, disproportionate selection of population subgroups relative to the state's population distribution, or nonresponse (Pierannunzi et al., 2013). Meanwhile the weighted data signify results that have been adjusted to compensate for these issues (Pierannunzi et al., 2013). The use of the weight in analysis is necessary if generalizations are to be made from the sample to the population (Pierannunzi et al., 2013).

Ethical Procedures

The BRFSS data collection is done with technical and methodological assistance from CDC (Pierannunzi et al., 2013). The state health departments use in-house interviewers or contract with telephone call centers or universities to administer the BRFSS surveys continuously through the year (Pierannunzi et al., 2013). The states utilize a standardized core questionnaire, optional modules, and state-added questions. The survey is conducted using random digit dialing (RDD) techniques on both landlines and cell phones (Pierannunzi, Hu, & Balluz, 2013). The confidentiality of the collected information is assured by aggregating the data. The aggregate data contain no personal identifiers. I downloaded the BRFSS data from the CDC website. The current study was approved by Walden University Institutional Review Board with the approval number of 05-30-17-0198012.

Summary

This study employed a cross-sectional research design approach to answer the research question. A target sample size was calculated for each dependent. The data analysis plan discussed the statistical procedures per research question and hypothesis. Lastly, threats to validity concerning observational studies were addressed.

Chapter 4 will discuss results and findings.

Chapter 4: Results

Introduction

The purpose of this cross-sectional study is to investigate whether disparities exist in access to medical care due to race and ethnicity; among adults with diabetes in the state of Connecticut. The main independent variable used is race/ethnicity. Other independent variables of interest; age, gender, income, insurance coverage, education, marital status and interview years, are included in the calculation. Three dependent variables: having a regular source of care (American Diabetes Association, 2011); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (American Diabetes Association, 2011) are carefully selected to measure access to medical care. This chapter covers the study results which include the descriptive analysis; frequency distribution analysis; multivariate and univariate linear regression analysis. Bivariate analysis was not done.

Research Question and Hypothesis

Research Question: Is access to medical care associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type health insurance, age, gender, income, education, marital status, and interview years?

Hypotheses:

Hypotheses:

H01 : Having a regular source of care is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income, education, marital status and interview years.

Ha1: Having a regular source of care is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income, education, marital status and interview years.

*H*02: Having a medical checkup is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years

*H*a2: Having a medical checkup is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years.

*H*03: Number of medical care visits is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income, education, marital status and interview years

*H*a3: Number of medical care visits is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income and education marital status and interview years.

Study Results

The first hypothesis noted above; for having regular source of care was not available in the database and thus analyses on this dependent variable is not reported. The study results contain analyses on the remaining two dependent variables for time since receiving a medical checkup; and number of doctor visits in last twelve months.

Descriptive analysis

Hypotheses:

*H*02: Having a medical checkup is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years

*H*a2: Having a medical checkup is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years.

Table 4

Descriptive Statistics of Measured Variables

Variables	Range	Min	Max	*M*	*SD*	Variance
Length of time since last routine checkup	8	1	9	1.23	0.871	0.760
Doctors' visits during the past 12 months	98	1	99	13.76	21.699	470.85
Log of Length of time since last routine checkup	.95	0	.95	.05	.152	.023

Table 4 illustrates the descriptive statistics of the two measured dependent variables: Length of time since last routine check-up and doctor's visits during the past 12 months. The log of length of time since the last routine checkup was also analyzed. According to the table, the minimum length of time since last routine check-up that the respondents had is 1 month and the maximum time length is 9 months. The average time that each respondent had since last routine check-up, is 1.23. The standard deviation of this variable is at .87. This is evident that there is a sufficient variability in the respondents' length of time since the last routine check-up. With minimum time length of 1 month and a maximum time length of 9 months; a mean of 1.23 it is evident that the data is skewed. Consequently, the log of this dependent variable is measured as well. The third variable in the descriptive table is the log length of time since the last routine checkup. The minimum log length of time since the last routine checkup is 0 and the maximum log length of time since the last routine checkup is .95. The average log length of time since the last routine checkup is at .05 with the standard deviation of .152 and variance of .023. This shows that there was variability among the values of the variable of log length of time since the last routine checkup. The current dispersion makes the log length of time since the last routine checkup normality distributed.

Hypotheses

H03: Number of medical care visits is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income, education, marital status and interview years

*H*a3: Number of medical care visits is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income and education marital status and interview years.

The minimum doctor's visits during the past 12 months that the respondents had, is 1 month, and the maximum doctor's visits that the respondents had are 77 months. On average, each respondent has 13.76 doctor's visits during the past 12 months with a standard deviation of 21.70, which demonstrates the dispersion in the data.

Table 5 *Frequency Distributions of the Independent Variables*

Variables	Categories	N	%
Gender			
	Female	1656	53.6
	Male	1435	46.4
Race			
	Black	235	7.6
	White	1237	40
	Missing	1619	52.4
Marital status			
	Single	2328	75.3
	Married	763	24.7
Interview year			
	2013	833	26.9
	2014	880	28.5
	2015	1378	44.6
Healthcare coverage			
	No	536	17.3

	Yes	1058	34.2
	Missing	1497	48.4
Household income			
	<15000	196	6.3
	15001 to 20000	516	16.7
	20001 to 35000	575	18.6
	35001 to 75000	649	21
	75000 and above	622	20.1
	Missing	533	17.2
Age			
	18 to 38	89	2.9
	39 to 48	204	6.6
	49 to 58	576	18.6
	59 to 68	971	31.4
	69 to 78	797	25.8
	79 to 88	454	14.7
Educational level			
	Elementary	86	2.8
	High school	139	4.5
	College or above	1482	47.9
	Missing	1384	44.8

Table 5 above shows the frequency distributions of the independent variables included in the current study. According to the results, almost 53.6% of the respondents are female whereas 46.4% of the respondents are male in the current sample. Almost, 40% of the respondents are White and 7.6% of the respondents are Black, while the remaining 52.4% of the respondents did not identify their race. Most of the respondents are single as 75.3% and 24.7% of the respondents are single and married respectively. Those respondents who were interviewed in the year of 2015 were in majority in the current sample as they stand at 44.6% whereas 26.9% and 28.5% of the respondents were interviewed in the years of 2013 and 2014 respectively.

In addition, 34.2% of the respondents had healthcare coverage, and 17.3% of the respondents do not have healthcare coverage, while 48.4% of the respondents did not mention about the status of their healthcare coverage. Furthermore, 21% of the respondents have an annual household income ranged, from $35001 to $75000; and 1/5 of the respondents have an annual household income of $75000 and above, whereas 6.3% of the respondents have an annual income of less than $15000. Most of the respondents in the sample are 59 or above years old as 31.4% of the respondents are aged between 59 to 68 years, 25.8% of the respondents are aged between 69 to 78 years, and 14.7% of the respondents are aged between 79 to 88 years. Many respondents have a college or above educational level as they stand at 47.9% while 44.8% of the respondents did not mentioned about their education level. In conclusion, the majority of respondents in the current sample are White, who had higher annual household income and college or above educational level.

Multivariate and Univariate Linear regression analysis

To test the assumptions of multiple regressions, I examined the boxplots to identify the outliers for each variable. Then, I also examined the normality of the independent and dependent variables through histogram and the normal curve. Next, I analyzed the values of skewness and kurtosis were for each variable to examine the normality of the independent and dependent variables. I also analyzed the linearity assumption by the matrix scatter plot. The observations were set to be independent from each other, which also met the assumption of independence of observations necessary to run the multiple regression analysis. I also analyzed the assumption of homoscedasticity and the variance around the regression line was found similar for the values of independent variables. I analyzed the correlations between the independent and dependent variables; there were correlations found between the independent and dependent variables as well as among the independent variables. However, the correlations between the independent variables were low to moderate, which did not create any issues of multicollinearity. The multicollinearity was also analyzed through the values of tolerance and variance inflation factor or (VIF). The value of tolerance for each independent variable was closer to 1 while the VIF value was under 5, which also indicated that there was no multicollinearity among the predictors.

Hypotheses:H02: Having a medical checkup is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years.

Ha2: Having a medical checkup is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years.

Table 6 *Summary of Weighted Multiple Linear Regression and Univariate Linear regression Analysis for Variables Predicting Length of Time since Last Routine Checkup, (N=3,091)*

Variables	**B**	**SE**	**95% CI**		**Univariate**
			Lower	Upper	
(Intercept)	-0.629	1.811	-4.182	2.925	
Gender	-0.057	0.073	-0.086	0.2	-0.084
Race	0.065	0.147	-0.354	0.224	0.027
Marital status	0.146	0.101	-0.344	0.053	0.043
Year (**2013**)					
2014	-0.02	0.067	-0.152	0.112	0.008
2015	-0.07	0.091	-0.213	0.201	0.062
Healthcare coverage	0.048	0.123	-0.192	0.288	0.17*
Income (**<15000**)					
15001 to 20000	0.151	0.136	-0.117	0.418	0.344
20001 to 35000	0.045	0.158	-0.355	0.265	0.406*
35001 to 75000	0.007	0.171	-0.342	0.328	0.369*
75001 and above	0.098	0.257	-0.602	0.406	0.33
Age (**18 to 38**)					
39 to 48	0.272	0.529	-0.765	1.309	0.096
49 to 58	0.45	0.507	-0.544	1.444	0.394
59 to 68	0.572	0.531	-0.469	1.613	0.477*
69 to 78	0.61	0.557	-0.483	1.703	0.556*
79 to 88	0.487	0.543	-0.579	1.553	0.513*
Educational level (**Elementary**)					
High School	-0.12	0.232	-0.575	0.334	-0.147
College and above	-0.008	0.113	0.22	0.212	0.592

*p < .05, **p<.001

Table 6 shows the results of multiple linear regressions with the outcome variable of length of time since the last routine checkup. According to the findings, male respondents have more length of time since the last routine checkup than female respondents. The relationship between gender and length of time since the last routine checkup is not statistically significant (*β* = .06, *p* = .44). White respondents have shorter length of time since the last routine checkup than non-White respondents. The relationship between race and length of time since the last routine checkup is not statistically significant (*β* = -.07, *p* = .66). Those respondents who were married have shorter length of time since the last routine checkup than those respondents who were single but the relationship between respondents' marital status and length of time since the last routine checkup is not statistically significant (*β* = -.15, *p* = .15).

In addition, those respondents who were interviewed either in 2014 or 2015 had shorter length of time since the last routine checkup than those respondents who were interviewed in 2013. The relationship between interview year and length of time since the last routine checkup is not statistically significant. Those respondents who had healthcare coverage have more time since the last routine checkup than those who did not have healthcare coverage. The relationship between healthcare coverage and length of time since the last routine checkup is not statistically significant (*β* = -.15, *p* = .15). Those respondents who had higher annual household income, have shorter length of time since the last routine checkup than those respondents who had lower annual household income but none of the income groups is significantly associated with the length of time since the last routine checkup. Older people have more length of time since the last routine checkup than younger respondents but none of the age groups have a statistically significant relationship with length of time since the last routine checkup. Finally, there is a negative relationship between high school education and length of time since the last routine checkup but this relationship is not statistically significant (*β* = -0.12, *p* = .604). The relationship between college and above educational level with length of time since the last routine checkup is also negative but not statistically significant (*β* = -0.01, *p* =

.94). This indicates that respondents, who received higher educational level, have shorter length of time since the last routine checkup than those who had less educational level. This implies that none of the independent variables have a statistically significant relationship with the outcome variable and the current relationship occurred by chance. This suggests that the independent variables are not the significant predictors of the length of time since the last routine checkup. The values of standard errors for independent variables are under 1 and the difference between lower and upper bounds of confidence interval are shorter, which illustrated the precision of the estimates.

The results of univariate linear regression show that female respondents have fewer length of time since the last routine checkup than male respondents but the relationship between gender and length of time since the last routine checkup is not statistically significant (β = -.084, p = .12). Black respondents have more length of time since the last routine checkup than White respondents but this relationship is not statistically significant (β = .027, p = .80). There are no significant differences found among the respondents based on their marital status and interview year. In addition, those respondents who had healthcare coverage, have greater length of time since the last routine checkup than those who did not have healthcare coverage and this relationship is also statistically significant (β = .17, p = .02). Those respondents who had an annual household income between $20001 to $35000 have greater length of time since the last routine checkup than those respondents who had an annual household income of less than $15000 and this relationship is also statistically significant (β = .41, p = .02). Similarly, those respondents who had an annual household income between $35001 to $75000 have more length of time since the last routine checkup than those who had an annual household income of less than $15000 and this relationship is also statistically significant (*β* = .37, *p* = .047). The respondents are found significantly different based on the age groups for the length of time since the last routine checkup. However, there are no significant differences found among respondents based on their educational level. In conclusion, those respondents who had healthcare coverage, higher income, and older age are significantly different from their counterparts in terms of length of time since the last routine checkup.

Hypotheses:

$H_0$2: Having a medical checkup is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years

H_a2: Having a medical checkup is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income education, marital status and interview years.

Table 7 *Summary of Weighted Multiple Linear Regression and Univariate Linear regression Analysis for Variables Predicting Log Length of Time Since Last Routine Checkup, (N=3,091)*

Variables	**B**	**SE**	**95% CI**		**Univariate**
			Lower	Upper	Univariate

(Intercept)	-0.286	0.247	-0.770	0.197	
Gender	-0.010	0.011	-0.032	0.012	-.012
Race	0.004	0.018	-0.031	0.040	0.004
Marital status	0.008	0.019	-0.029	0.044	.013
Year (**2013**)	0.029	0.016	-0.004	0.061	
2014	-0.012	0.071	-0.143	0.012	-0.006
2015	-0.007	0.011	-0.028	0.014	0.002
Healthcare coverage	0.008	0.019	-0.029	0.044	.039**
Income (**<15000**)					
15001 to 20000	0.052	0.031	-0.009	0.114	.066*
20001 to 35000	0.013	0.036	-0.057	0.083	0.073*
35001 to 75000	0.013	0.041	-0.068	0.094	0.064*
75001 and above	0.008	0.052	-0.093	0.110	0.06*
Age (**18 to 38**)					
39 to 48	0.028	0.078	-0.124	0.181	0.028
49 to 58	0.055	0.075	-0.093	0.202	0.076
59 to 68	0.087	0.077	-0.064	0.237	0.096
69 to 78	0.086	0.081	-0.073	0.245	0.109
79 to 88	0.074	0.079	-0.080	0.229	0.107
Educational level (**Elementary**)					
High school	-0.011	0.034	-0.078	0.057	-0.022
College and above	0.011	0.031	-0.049	0.071	.086*

Note: Dependent variable = log length of time since last routine checkup *$p < .05$, **$p<.001$; Bold = reference category; *SE* = standard error; *CI* = confidence interval

Table 7 shows the results of multiple linear regression with the outcome variable of log length of time since the last routine checkup. According to the results, male respondents have fewer log length of time since the last routine checkup than female respondents. The relationship between gender and length of time since the last routine checkup is not statistically significant ($\beta = .01$, $p = .38$). Similarly, the relationship between gender and length of time since the last routine checkup is also not statistically significant in the univariate analysis. White respondents have more length of time since the last routine checkup but the relationship between race and length of time since the last routine checkup is not statistically significant ($\beta = .004$, $p = .81$).

In addition, those respondents who were married, have more length of time since the last routine checkup than those who were single and this relationship is not statistically significant ($\beta = .01$, $p = .08$). The relationship between marital status and log length of time since last routine checkup is also not statistically significant in the univariate analysis (($\beta = .01$, $p = .08$). The relationship between interview year and log length of time since the last routine checkup is not statistically significant, which implies there are no significant differences among respondents in terms of log length of time since the last routine checkup based on the interview year. The univariate analysis also shows nonsignificant results between these two variables. Moreover, those respondents who had healthcare coverage, also had more log length of time since the last routine checkup but the relationship was not statistically significant ($\beta = .01$, $p = .68$). However, the univariate analysis illuminated that there is a statistically significant relationship between healthcare coverage and log length of time since the last routine checkup (β = .04, $p < .001$).

Interestingly, there is no statistically significant relationship found between any of the respondents' groups based on their income levels and log length of time since the last routine checkup in the multivariate analysis but all income categories have a statistically significant relationship with log length of time since the last routine checkup in the univariate analysis. Furthermore, no significant relationship is found between any of the respondents' age groups and log length of time since the last routine checkup neither in the multivariate analysis, nor in the univariate analysis. Finally, those respondents who had college or above educational level, have more log length of time since last routine checkup than those respondents who had elementary educational level but this relationship is not statistically significant in the multivariate analysis (β = .01, p = .73). However, this relationship is found statistically significant in the univariate analysis (β = .09, p = .73). In conclusion, it is found that none of the covariate category has a significant relationship with log length of time since last routine checkup in the multivariate analysis. However, in the univariate analysis, healthcare coverage, income level and educational are the significant predictors of log length of time since the last routine checkup.

Hypotheses:

H_03: Number of medical care visits is not associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income, education, marital status and interview years

H_a3: Number of medical care visits is associated with race or ethnicity among adults with diabetes in Connecticut after adjusting for type of health insurance, age, gender, income and education marital status and interview years.

The minimum doctor’s visits during the past 12 months that the respondents had, is 1 month, and the maximum doctor’s visits that the respondents had are 77 months. On average, each respondent has 13.76 doctor’s visits during the past 12 months with a standard deviation of 21.70, which demonstrates the dispersion in the data.

Table 8 Summary of Weighted Multiple Linear Regression And Univariate Linear regression Analysis for Variables Predicting Doctors’ Visits During the Past 12 Months, (N=3,091)

Variables	**β**	**SE**	**95% CI**		**Univariate**
			Lower	Upper	

(Intercept)	-42.639	39.108	-119.369	34.092	
Gender	0.155	1.466	-2.721	3.031	1.53
Race	1.797	2.556	-3.217	6.812	0.83
Marital status	-3.124	1.712	-6.483	0.235	4.96**
Interview year (**2013**)					
2014	-1.352	1.382	-4.062	1.359	-2.393
2015	-1.52	1.416	-5.13	1.763	-1.96
Health coverage	-2.313	1.842	-1.302	5.927	-2.92*
Income (**<15000**)					
15001 to 20000	8.406	6.019	-3.404	20.215	-0.222
20001 to 35000	9.577	5.945	-2.087	21.242	8.44*
35001 to 75000	10.583	5.812	-0.82	21.987	9.06*
75001 and above	12.251*	5.798	0.875	23.626	11.49
Age (**18 to 38**)					
39 to 48	0.948	6.823	-12.44	14.335	-0.038
49 to 58	6.353	6.197	-5.806	18.512	4.36
59 to 68	6.364	6.117	-5.638	18.365	1.22
69 to 78	6.354	6.81	-7.007	19.716	3.19
79 to 88	8.695	6.828	-4.701	22.09	4.08
Educational level (**Elementary**)					
High School	3.355	2.9	-2.334	9.044	-1.947
College and above	6.836	8.487	-9.814	23.487	10.823*

*$p < .05$, **$p<.001$

Table 8 above illustrates the results of multiple linear regression with the outcome variable of doctors’ visits during the past 12 months. According to the findings, gender has a positive relationship with the doctor’s visits during the past 12 months. This implies that male respondents have more doctors’ visits during the past 12 months than female respondents. The relationship between gender of respondents and doctor’s visits during the past 12 months is not statistically significant ($\beta = .15$, $p = .92$). White respondents have more doctor’s visits during the past 12 months than non-White respondents but the relationship between race and doctor’s visits during the past 12 months is not statistically significant (β = 1.78, *p* = .48). There is a negative relationship between marital status and doctor’s visits during the past 12 months. This suggests that those respondents, who were married, have less doctor’s visits during the past 12 months than those who were single. The relationship between marital status and doctor’s visits during the past 12 months is not statistically significant (β = -3.12, *p* = .07).

In addition, those respondents who were interviewed in either 2014 or 2015 have less doctor’s visits during the past 12 months than those respondents who were interviewed in 2013 but the relationship between interview year and doctor’s visits during the past 12 months is not statistically significant. Those respondents, who had healthcare coverage, also have more doctor’s visits during the past 12 months than those respondents who did not have healthcare coverage. The relationship between healthcare coverage and doctor’s visits during the past 12 months is not statistically significant (β = 2.3, *p* = .21). Those respondents, who had annual household income more than $15000, have more doctor’s visits during the past 12 months than those respondents who had annual household income less than $15000. The relationship between the respondents’ group who had annual household income of $75001 and above with doctor’s visits during the past 12 months is statistically significant (β = 12.25, *p* = .035). In addition, older respondents have more doctor’s visits during the past 12 months than younger respondents but none of the age groups have a statistically significant relationship with doctor’s visits during the past 12 months. There is a positive relationship between high school education and doctor’s visits during the past 12 months but this relationship is not statistically significant (*β* = 3.36, *p* = .25). The relationship between college and above educational level with doctor’s visits during the past 12 months is also positive but not statistically significant (*β* = 6.84, *p* = .42). This suggests that respondents, who received higher educational level, have fever doctor’s visits during the past 12 months than their counterparts. The results of univariate linear regression, female respondents have more doctors’ visits during the past 12 months than male respondents but the relationship between gender and doctors’ visits during the past 12 months is not statistically significant (*β* = 1.53, *p* = .32). Black respondents had more doctors’ visits during the past 12 months than White respondents but the relationship between race and doctors’ visits during the past 12 months is also not statistically significant (*β* = .826, *p* = .73). Single respondents had more doctors’ visits than married respondents and this relationship is statistically significant (*β* = 4.96, *p* = .001). There are no significant differences among respondents who were interviewed in different years based on doctors’ visits during the past 12 months. Those respondents who had healthcare coverage hare fewer doctor’s visits during the past 12 months and the relationship between healthcare coverage and doctors’ visits during the past 12 months is statistically significant (*β* = -2.92, *p* = .046). Those respondents who had higher annual household income are more likely to have doctors’ visits during the past 12 months than those who had lower annual household income. For instance, those respondents who had an annual household income between $20001 to $35000 have more doctors’ visits during the past 12 months than those who had an annual household income less than $15000 and this relationship is also statistically significant (β = 8.44, *p* = .047). Those respondents who had an annual income of $350001 to $75000 and $75001 or above have significantly more doctors' visits during the past 12 months than those respondents who had an annual income of less than $15000. There were no significant differences found among respondents in terms of doctors' visits during the past 12 months based on their age groups. This implies that the respondents have quite similar doctors' visits during the past 12 months but it is important to remember that most of the respondents included in the current sample, were 59 or above years old. Finally, those respondents who had college or above educational level have more doctor's visits than those who had elementary educational level and this relationship is also statistically significant (β = 10.82, *p* = .03). In conclusion, those respondents who are Black, single, higher annual household income, and higher educational level, are significantly different from their counterparts in terms of doctors' visits during the past 12 months.

Summary

In this chapter, the result analyses are intended for the three hypothesis described throughout this current study. However, the hypothesis for having regular source of care was not available in the database and thus, analyses on this dependent variable was not reported. The study results contain analyses on the remaining two analyses for time since receiving a medical checkup; and number of doctor visits in last twelve months. The study results for these two hypotheses are provided by way of descriptive analysis; frequency distribution analysis; multivariate and univariate linear regression analysis.

Descriptive statistics of the two measured dependent variables: Length of time since last routine check-up and doctor's visits during the past 12 months. The log of length of time since the last routine checkup is also analyzed. The frequency distributions of the independent variables are analyzed. According to the analysis, the majority of respondents in the current sample are White, who had higher annual household income and college or above educational level. Multivariate and univariate linear regression analysis linear regression analyses are done for the two dependent variables and the log of length of time since the last routine checkup dependent variable. In summary the data suggest that the respondents who had higher annual household income, have shorter length of time since the last routine checkup than those respondents who had lower annual household income but none of the income groups is significantly associated with the length of time since the last routine checkup. The respondents who had a higher annual income have significantly more doctors' visits during the past 12 months.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

While this increase may be due to a myriad of factors, directly or indirectly, this study intended to explore whether health disparity exist in access to medical care due to race and ethnicity among adults with diabetes in the state of Connecticut. This study is quantitative, using cross-sectional study design to explore measures of access to medical care. It was originally intended to explore three variables to measure the access to medical care simultaneously: having a regular source of care (Committee & Classification, 2010); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (Committee & Classification, 2010). However, one of the variables, having a regular source of care was not available in the BRFSS for the targeted population during the years of 2013-2015. Subsequently, analyses on the remaining two dependent variables for time since receiving a medical checkup; and number of doctor visits in last twelve months are analyzed. There is a need for more data to be collected on racial or ethnicity disparity to affect change at the government level. This study intended to promote positive social change and ultimately bring about intervention policies, to reduce racial or ethnicity disparities in access to medical care among diabetic adults.

Interpretation of Findings

For the dependent variable of doctors' visits during the past 12 months, this dependent variable has statistically significant relationships with some of the predictors, such as marital status, healthcare coverage, income level, and educational level in the univariate analysis. However, only income level could retain its significant effects in the multivariate analysis and other independent are no more significant predictors of the doctors' visits during the past 12 months. This indicates that the relationship between respondents' annual income level and doctors' visits during the past 12 months is a significant relationship and it is not occurred by chance compared to the other predictors, which are significant in the univariate analysis but not in multivariate analysis. Another explanation could be that the variables of marital status, healthcare coverage, and educational level, which showed a significant effect on the doctor's visits during the past 12 months in the univariate analysis, partially show their effects due confounding variables. When these variables that are confounders for each other, were controlled in the multivariate analysis, they loses their significant effect on the doctors' visits during the past 12 months and only the income level show a unique effect independent of other variables in predicting the doctors' visits during the past 12 months.

Regarding the dependent variable of length of time since the last routine checkup, respondents' healthcare coverage, income level, and age are the significant predictors in the univariate analysis. However, these independent variables are no more significant in the multivariate analysis when the effect of one variable is controlled for the other variable. This implies that one predictor is a confounding variable for the other included in the regression model and when those variables are controlled for, that particular variable loses its significant effect.

For the log length of time since the last routine checkup, the univariate analysis shows statistically significant relationships of healthcare coverage, income level, and educational level with the log length of time since the last routine checkup. However, these relationships are not statistically significant in the multivariate analysis. This implies that these independent variables are associated with each other to some extent and could be potential confounders because when they are analyzed separately in a one-on-one relationship with the log length of time since the last routine checkup, they show significant effects on the log length of time since the last treatment. However, when these independent variables are controlled in the multivariate analysis to analyze the effect of each predictor on the log length of time since the routine checkup, each significant predictor loses its significant effect on the log length of time since the last routine checkup.

While the consensus of the current literature on the topic is that there is evidence of the correlation between race and health disparity, many other factors play a role and the two cannot be studied in isolation. In this case, the data suggest that the disparity is significant in household income. The driving factor is proven to be income inequality. The 2004 Medical Expenditure Panel Survey (MEPS) was used as a source of data to examine disparities in access to care. The finding was that racial/ethnic disparities in access to care is evident, and cannot be entirely explained by socioeconomic differences (Shi et al., 2010). Similarly, in this current study, in a logistical regression, non-White respondents are .53 times less likely to have healthcare coverage than White respondents and this relationship but shows no statistically significance (*OR* = .53, *p* = .12). Also, like this literature, one limitation was that the data are cross-sectional. Therefore, conclusions cannot be made about the causal effect of race/ethnicity on access to health care (Shi et al., 2010). Racial disparity in access to care is complex and it may not always manifest themselves in the expected direction, and socioeconomic factors, such as insurance status (Shi et al., 2010). Hence it is important to study racial/ethnic disparity in access to care in all of its dimensional.

Uninsured Blacks experience more difficulty than uninsured Whites in obtaining access to care (Holden et al., 2015). For example, Black Americans are most at risk of being uninsured (Collins et al., 2002). Of those uninsured, per a survey, 38 percent of Blacks said they had very little or no choice in their source of health care. In contrast, 25 percent Whites report very little or no choice in source of care (Holden et al., 2015). This may play a significant role as to why minority adults are less likely than White adults to have a regular doctor (Holden et al., 2015). Nonetheless, the racial/ethnic gap between the uninsured was twice the size of the gap between those with insurance (Holden et al., 2015). While the race variable seems to be significant, in actuality, health insurance was the significant indicator. While race is the variable of interest , the data in this study suggest that the disparity is significant in household income. Those with annual income between \$20001 to \$35000 had greater length of time since the last routine checkup than those respondents with annual income of less than \$15000 and this relationship was also statistically significant ($\beta = .41$, $p = .02$). The driving factor is proven to be income inequality.

The Andersen's Behavioral Model framework considers an individual’s use of health services to be a function of three types of factors: predisposing factors, such as demographics; enabling factors, such as health insurance; and illness level or need factors, such as health (R. M. Andersen, 1995). The following factors: predisposing; enabling and illness level are examined in this study. The finding in this study suggests that the disparity is significant in household income. Therefore the association between the factors examined and the utilization of health care was evident.

Limitations of the Study

The BRFSS survey used in this study is based on self-reported information. The assumption with self- reporting surveys still holds true; they may be inaccurate and may introduce bias. In addition, the BRFSS data used was a combination of three- cross sectional datasets, this means there were different respondent for each. Hence, one cannot claim the casual effect of the independent to the dependent variables; one can only claim the association between the significant variables. Another limitation is that the findings are not country represented; hence the findings are only reflective of Connecticut. Therefore the findings cannot be generalized for diverse group in the US. Continuous level of measurement is ideal for any study; however, in this current study the variables were recoded into categorical variables to accommodate this study. Therefore the data manipulation might have impacted the findings. Despite these limitations, this study substantially contributes to the current literature.

Implications for Social Change and Recommendations

This study is consistent with the existing literature that there is a need to improve access to health care among persons with diabetes. Nonetheless, disparities cannot be explained solely on the differences in socio-demographic characteristics or even when the data is viewed using the three measures of access to medical care: having a regular source of care (Committee & Classification, 2010); time since receiving a medical checkup (Mokdad et al., 2001); and number of doctor visits in last twelve months (Committee & Classification, 2010). Policymakers seeking to reduce health care disparities should identify objective measures of access to care.

What was particularly interesting in the study is that the initial intent was to explore the disparity due to race in accessing medical care among diabetic adults. However, this study suggests that the disparity is significant in household income.

There is a growing concern on wealth inequality and the expanding racial wealth gap have become central to the debate over whether our nation is on a sustainable economic path (Sugrue, Shapiro, & al., 2011). A portfolio shift in public investment is necessary in order to grow wealth for all, not just for White Americans. Otherwise the wealth gap between White and Black households will continue (Sugrue, Shapiro, & al., 2011). A healthy, fair, and equitable society cannot continue to follow such an economically unsustainable trajectory (Sugrue, Shapiro, & al., 2011).

The findings also illustrate that the programs and interventions should also consider respondents income level and target those respondents who have low socioeconomic status as they are more likely to threaten with the disease and less like to have insurance coverage. The implication for social change is that Policymakers must act both to eliminate barriers and challenge structures that encourage disproportionate income advantages for only White households. The findings make an important contribution in the current scholarly literature by offering important insights about the nature of relationships between the independent and dependent variables included in the study that may provide more research questions to study in future research. It also provides substantial guidelines for practitioners to develop more appropriate programs and interventions to improve the health and well-being of individuals in the State of Connecticut.

Conclusion

The current findings may be useful for future research that may focus on the examination of these variables. The study shows that it is important to account for the effect of confounding variables to analyze the effect of any predictor on the dependent variable because any confounding variable may partially affect the dependent variable. Hence, if the confounding variables are not controlled, the findings based only on the relationship between the independent and dependent variable may be misleading as shown with the difference between the findings of the univariate analysis and multivariate analysis in the present study. It is important to mention that the income level was the only variable, which could maintain its significant effect in the univariate analysis as well as in the multivariate analysis, thereby, is a significant predictor of doctors' visits during the past 12 months. Hence, respondents' income level play an important role in affecting their doctors' visits during the past 12 months.

The current findings also illustrates that the programs and interventions should also consider respondents income level and target those respondents who have low socioeconomic status as they were more likely to be threaten with diseases and less like to have insurance coverage. The findings made an important contribution in the current scholarly literature by offering important insights about the nature of relationships between the independent and dependent variables included in the study that may provide more research questions to study in future research. It also provides substantial guidelines for practitioners to develop more appropriate programs and interventions to improve the health and well-being of individuals in the State of Connecticut.

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