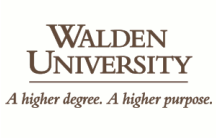

2015

Knowledge of Diabetes Mellitus and Health-Preventive Behaviors Among African American Adults

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This is to certify that the doctoral dissertation by

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

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Abstract

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by

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

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Abstract

The purpose of this study was to gain insight into the risk within the African American population of developing diabetes, its complications, and the benefits associated with timely management and treatment of diabetes. The study also looked at how such knowledge may be related to preventive health behaviors. The Risk Perception Survey-Developing Diabetes and the Behavioral Risk Factor Surveillance System questionnaires were employed in this study. The theoretical basis of this study was the health belief model. This was a cross sectional, quantitative study with 126 participants. Descriptive analysis was employed to calculate the mean scores and frequencies across each sub-scale of the scoring tool. Among the participants, only 28.57% were found to be knowledgeable of the risk factors of diabetes, and 74.60% were found to be knowledgeable of the benefits of treating diabetes. Although 75.40%, 61.11%, and 64.29% of participants were found to be knowledgeable of healthy dieting, physical exercise, and body weight control, respectively, fewer than 10% in each group indicated they had implemented any of such behaviors. These data suggest a lack of knowledge of the risk factors of diabetes amongst this population. These results remained unchanged even when considering those with diabetes and their counterparts without the disease separately and also across the different socio-economic groups of the sample. The outcomes of this study may enhance understanding of diabetes among the African American population. Similarly, the above findings might be able to facilitate interventions that promote diabetes management within this population.

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Chapter 1: Introduction to the Study

Introduction

Diabetes is defined as a group of chronic diseases that usually manifest as high blood glucose levels, due to the pancreas inability to produce insulin and/or the body's inability to use insulin (American Diabetes Association [ADA], 2012); World Health organization [WHO], 2012). Such a lack of insulin can either be absolute, in which case no insulin is produce due to the fact that the pancreas are completely destroyed or relative, where the pancreas are only partially destroyed and as a results are unable to produce enough insulin for the body. The above classification of absolute or relative, which is based on the amount of insulin produced by the islet of Langerhans (insulin producing cells) of the pancreas, has contributed in giving birth to the different types of diabetes namely Type 1 diabetes, Type 2 diabetes and gestational diabetes. Genetic and environmental factors combined have been attributed to both the insulin resistance and the loss of cells of islets of Langerhans seen with diabetic patients (McPhee, Papadakis, & Rabow, 2012). The Centers for Disease Control and Prevention (CDC; 2012) listed diabetes as one of the most serious medical conditions the United States faces today.

Clinically, diabetes will manifest as glucose intolerance and also as alteration in lipid and protein metabolism. These metabolic abnormalities over long periods will lead to complications such cardiovascular diseases, retinopathy, nephropathy, and neuropathy (Koda-Kimble et al., 2004). Diabetes remains the only single disease that affects virtually every system of the human body and to date, there remains no effective treatment. Thus,

it is considered a serious medical condition that places many diabetics at risk for greater morbidity and mortality when compared to any non-diabetic population.

Types of Diabetes

The International Diabetes Federation (IDF) has recognized three main types of diabetes: Type 1 diabetes, Type 2 diabetes, and gestational diabetes (IDF, 2011). Type 2 diabetes is the most prevalent of all types of diabetes. Less common types of diabetes include diabetic insipidus, neonatal diabetes mellitus (NDM), and maturity-onset diabetes of the young (MODY; McPhee et al., 2012).

Type 1 Diabetes or Immune Mediated Diabetes

Type 1 diabetes, which is also called insulin dependent, immune mediated or juvenile-onset diabetes, results from an autoimmune disorder whereby the body's defense system destroys the insulin-producing cells (Islets of Langerhans) within the pancreas. Individuals with Type 1 diabetes produce very little or no insulin and account for approximately 10% of all cases of diabetes in the United States (IDF, 2011). The rate of pancreatic cell destruction is variable, being rapid in some individuals and slow in others. The highest incidences of Type 1 diabetes have been noted within the Scandinavian and Northern European countries, where the annual incidence may be as high as 40 per 100,000 children usually aged 14 years or younger. In the United States, the annual incidence of Type 1diabetes is just below 16 per 100,000 children, with higher rates seen in states that are more densely populated with persons of Scandinavian descent such as in Minnesota (McPhee et al., 2012). This higher incidence observed in Scandinavian and

Northern European countries has been attributed to changes in environmental factors like obesity (McPhee et al., 2012).

Type 2 or Noninsulin-Dependent Diabetes

Type 2, or noninsulin-dependent or adult-onset, diabetes accounts for more than 90% of all diabetic cases in the United States (IDF, 2011). Type 2 diabetes is characterized by insulin resistance and/or relative insulin deficiency from the pancreas, either of which may be present at the time Type 2 diabetes actually becomes clinically manifest. Type 2 diabetes usually manifests after the age of 40 years, thus the name adult-onset diabetes, though recent findings from the National Institutes of Health have revealed that Type 2 diabetes can occur earlier especially in populations with high diabetes prevalence like African Americans (National Diabetes Information Clearinghouse [NDIC], 2007; McPhee et al., 2012).

Obesity is considered the most important environmental factor causing insulin resistance, although the degree and prevalence of obesity varies among the different racial groups with Type 2 diabetes in the United States (McPhee et al., 2012). African Americans are afflicted with obesity more than other racial groups in the United States, which may explain the high prevalence of Type 2 diabetes amongst this ethnic group (ADA, 2012; CDC 2012). Type 2 diabetes can and often does go undetected for many years, and in most cases, the diagnosis is only made after associated complications or through an abnormal or blood glucose test (IDF, 2011).

Despite the strong influence of environmental factors like obesity in the development of diabetes, present data suggest that genetic factors may also be involved (McPhee et al., 2012). There is emerging evidence that more than 20 regions of the genome may be involved in genetic susceptibility to Type 1diabetes. First degree relatives have been found with a higher risk of developing Type 1 diabetes than unrelated individuals from the general population (Dorman & Bunker, 2000). Similarly, studies have shown that first degree relatives of individuals with Type 2 diabetes are about 3 times more likely to develop Type 2 diabetes when compared with individuals without a positive family history of diabetes ((Florez, Hirschhorn, & Altshuler, 2003; Gloyn, 2003). Thus, it is an indication that Type 1 and 2 diabetes has a strong genetic component.

Gestational Diabetes Mellitus (GDM)

Gestational diabetes mellitus refers to abnormal high blood glucose levels that occur during pregnancy. According to the CDC, GDM affects between 2% and 10% of pregnancies in the United States and 5% and 10% of women in this category eventually are diagnosed with Type 2 diabetes after giving birth (CDC, 2012). More than 90% of the time, GDM affects women's health postpartum, and such women are at increased risk for future episodes of GDM, Type 2 diabetes or prediabetes resulting from impaired glucose tolerance and impaired fasting glucose (Kim et al., 2007).

Other Types of Diabetes

Less common types of diabetes include diabetes insipidus, NDM, and MODY. Diabetes insipidus is an uncommon disease characterized by an increase in thirst and the

passage of large quantities of urine, usually caused by a deficiency in the hormone vasopressin or resistance produced by the body in taking up the hormone (McPhee et al., 2012). NDM, on the other hand, is a monogenic form of diabetes usually seen in neonates within the first 6 months of life. This is a rare condition affecting approximately one in 100,000 to 500,000 live births (National Diabetes Information Clearinghouse, 2007). Infants with NDM usually are not able to produce enough insulin, which leads to an increase in blood glucose. MODY usually occurs in adolescence or early adulthood and results from a gene mutation that limits the ability of the pancreas to produce insulin. MODY accounts for approximately 1 % of all cases of diabetes in the United States, and just as for other types of diabetes, family members are at greatly increased risk for the condition.

The Purpose of the Study

The purpose of this study was to measure the level of understanding or awareness of diabetes within the African American adult population. The focus of the study was on the main types of diabetes, namely Type 1 diabetes, Type 2 diabetes, and gestational diabetes as long as the criteria for inclusion is met as discussed in Chapter 3. Knowledge of diabetes was evaluated in this study by considering the following variables: knowledge of risk factors, knowledge of diabetes complications, knowledge of benefits associated with timely management and treatment of diabetes, and knowledge of preventive health behaviors. The focus of this study was on the mean values of these variables. Estimation of parameters and testing of hypothesis was never employed in this study. This was due

to the fact that the study does not seek to examine and extrapolate about any relationships between these variables.

Diabetes Risk Factors

An understanding of disposing factors or associated risk factors for developing diabetes is important in determining a population's perception of the disease. Individuals who are more prone to developing diabetes later in life have the following characteristics. They are over 45 years of age, have impaired glucose tolerance (IGT) and/or impaired fasting glucose (IFG), are overweight, have a family history of disease, are inactive, have a low amount of high density triglycerides, have high blood pressure, and are members of ethnic groups such as African Americans and Hispanics, (Brunton & Gilman, 2011). Further, women who have had gestational diabetes or had a baby weighing 9 pounds or more at birth are more likely to experience the disease in the future than their counterparts who had not experienced such situations or conditions (ADA, 2012).

Management of Diabetes

Due to the complexity of diabetes, the management of the disease has always been three fold: diet, medications, and exercise. These components interact with each other to the extent that no assessment and modification can be made on one without taking the others into consideration (Koda-Kimble et al., 2004). Diabetes is a chronic disease that requires continuous medical care and self-management to reduce morbidity and mortality associated with long-term complications (Calvin et al., 2011). Assessing an individual's risk perception of the disease is important, but this by itself may be

insufficient due to the fact that such an assessment must take into considerations factors like diet, medications and physical activity. Therefore it is imperative to gain a full understanding of the perception of diabetes by specifically considering the following: (a) risks factors and complications, (b) benefits of effective and timely management, and (c) maintaining healthy lifestyles.

Problem Statement

Many researchers have shown that healthier behaviors can prevent diabetes and resulting complications among populations that are at high risk of the disease (Brewer, Weinstein, Cuite, & Herrington, 2004; Hivert, Warner, Shrader, Grant, & Meigs, 2009).Therefore, developing an understanding of the risk factors of a disease can be an important determinant of behavioral change (Kim et al., 2007). A more accurate perception of diabetic risk might imply a higher degree of prevention of the disease. According to this school of thought, which is the theoretical basis of the health belief model (HBM), higher perception of risk would result in healthier behaviors especially in the area of diet, smoking and physical inactivity (Janz & Becker, 1984; Kim et al., 2007)

This ideal relationship of higher perception of risk of a disease leading to a higher degree of prevention does not hold true in all populations (Knowler et al., 2002; Lindström et al., 2003). Knowler et al. (2002) and Lindström et al. (2003) carried out separate interventions on a mixed ethnic population, including African Americans, to determine the effects of lifestyle modifications on the incidence of diabetes mellitus. They concluded that intensive lifestyle interventions were able to produce long-term

beneficial changes in diet and physical activity, which eventually reduced the risk of diabetes mellitus. However, the validity of generalizing such results to the general public was uncertain because the interventions worked with some societies or ethnic groups but not with others due to influences in economic, social, and cultural factors.

In the United States, ethnic minorities are disproportionately burdened by most chronic diseases including diabetes (Calvin et al., 2011). African Americans are twice as likely to develop Type 2 diabetes when compared with their European American counterparts, and diabetes affects about 25% of all African American women over the age of 55 years and 25% of all African Americans between the ages of 65 and 74 years (Calvin et al., 2011), double the rate of their European American counterparts. The incidence of this disease has tripled within the past 3 decades within the African American population (Shaw-perry, 2006). According to the American Diabetes Association, diabetes is the fifth leading cause of death in the United States. However, diabetes is the third leading cause of death among the African American population (ADA, 2012). Thus, this study is an attempt to fill a gap in knowledge by evaluating the knowledge of African American adults on diabetes risk factors, diabetes complications, treatment benefits and health preventive behaviors. Socio-economic status has been identified as an important factor in the management and coping with diabetes (Calvin et al., 2011). Thus, the knowledge of African American adults on diabetes risk factors, diabetes complications, treatment benefits and health preventive behaviors will also be evaluated across the different Socio-economic groups within this population. Finally, the

relationship between these diabetes risk factors and its complications and specific health behaviors will be examined. The analysis will be compared with those with the disease and their counterparts without the disease.

Significance

The purpose of this cross sectional study is to evaluate diabetes knowledge of African Americans within the different socioeconomic groups while considering the following main variables:

1. Knowledge of risk factors. Some of the risk factors of diabetes to be evaluated include knowledge of age, race, family history of diabetes, gestational diabetes etc.
2. Knowledge of Diabetes complications. Some of these complications include blindness, foot amputation, arthritis, heart disease, cancer, high blood pressure, stroke etc.
3. Knowledge of benefits associated with timely management and treatment of diabetes.
4. Knowledge of Preventive health behaviors. These include healthy eating plan, physical activity, quitting smoking and controlling weight.

Measuring the level of awareness of the above variables will be the focus of this study. Quantifying knowledge of risk factors, diabetes complications, treatment benefit of the population within the different socioeconomic groups and how such knowledge has or has not been translated to healthier preventive behaviors is the expected outcome of this

study. Multi-component interventions that target knowledge on race, social, emotional and family processes which facilitate diabetes management have been found to be more potent than interventions that have targeted only one behavioral process (Wagner, 2011; Walker, Mertz, Kalten, & Flynn, 2003). An important issue at this point is being able to identify these multi elements needed for such interventions. Thus, the results of this study should be able to provide some of that knowledge that might facilitate researchers in developing future interventions especially in the area of behavioral interventions that promote diabetes self-management. These interventions will assist in improving the health status of this population.

Understanding outcomes is of prime importance because diabetes is a chronic disease in which patient self-management is paramount in its control and reduction of risk of long term complications (Calvin et al., 2011, Becker & Janz, 1984). Patient adherence to treatment is influenced by understanding of its benefits and associated risk (Nair, Levine, Lohfeld, & Gerstein, 2007). Thus, the implications for positive social change will be that the outcomes of this study will potentially enhance understanding of diabetes among the African-American population. Knowledge can only be most valuable when put to use for the greater good of the population (Walden, 2012).

Rational of the Study

The purpose of this study was to expand on the concept that health disparities still exist among the different ethnic groups in the United States and minority groups including African Americans are more adversely affected. A better understanding of the

factors influencing the existence of such disparities and also, an understanding of the extent to which the population understand their present predicament is very important in reducing or eliminating such gap. Research has shown that general knowledge and awareness of a health hazard in most cases, is the first step in taking action to reduce the disease (Olden & White, 2005). Documenting the knowledge or awareness level of this population will put healthcare professionals at a better position in the treatment, management and prevention of future complications for this ethnic group. Many factors have been documented in recent years as having considerable influence in the racial disparity of health in the United States. These include poverty, education, access to healthcare and preventive health behaviors.

African Americans have continued to maintain higher rates of most chronic diseases. The development of diabetes within this population has been attributed to socioeconomic factors that lead to suboptimal health care (Calvin et al., 2011). Environmental conditions and unhealthy lifestyles seem to account only for a fraction of the excess risk. Calvin et al., (2011) in their recent study, noted that research within this population has not yet explored population personal issues such as illness perception, treatment perception and their beliefs in their chances of acquiring diabetes and its complications (disease risk perception).

Thus, it is hoped this study will identify the above areas and may facilitate the developing of interventions that will be able to aid in reducing the burden of this disease. Specifically, the data collected on the area of risk knowledge, personal risk, treatment

benefits and preventive health behaviors should be able to pinpoint the focus of such an intervention(s). Ideally, a patient is more likely to adhere to diabetic management if there is a higher perceived risk for the disease and its complications which is the theoretical basis of the HBM (Janz & Becker, 1984; Kim et al., 2007. That is, patient's perception of an illness will have the potential to influences adherence to their diabetic regimen.

The above mentioned study by Calvin et al., (2011) adapted a similar approach to this research work but was focus only on African American who was of low socioeconomic status. As such, the results could not be generalized to the general African American population. This study cuts across all SES and this not only improve generalizability but it also offers the opportunity to diabetic educators to be able to provide tailored intervention programs.

Framework

The theoretical basis of this study will be the HBM. This is a conceptual formulation for understanding why individuals did or did not engage in a wide variety of health related behaviors (Janz & Becker, 1984). This model is based on the belief that behavior is influenced by two main factors namely:

(a) the value the individual gives to a particular behavior and

(b) The individual's belief that a given action will achieve a set goal.

In other words, the HBM explores or explains the perceived susceptibility to a health problem which is the feeling of vulnerability to a condition, re-susceptibility and the belief in diagnosis i.e. one's perception of the risk of having the disease. The HBM

also explains perceived severity, which is the feeling of the individual of the seriousness upon contracting the disease and the Perceived benefits of treatment of the disease and Perceived barriers to undertaking the recommended behavior. The construct of this model has been expanded in recent years to include cues of action, motivating factors and self-efficacy.

The HBM tends to provide a framework that can be used to motivate people towards a positive health outcome by using the desire to avoid a negative health outcome as the major motivating factor (Recapp, 2012). Thus avoiding a negative health consequence remains the key element in the application of this model.

Until recently, the HBM has been far the most commonly used theory in health education and promotion (Turner et al., 2004). This model tends to relates only to cognitive factors that predispose an individual to a health behavior that ends up with a belief in self-efficacy for that behavior (Cengage, 2002). Factors modifying or reinforcing behaviors are not well handled with this model and these become even more important when predicting complex lifestyle behaviors that need to be maintained over a long period of time. Thus it is slowly been replaced by other theories with more predictive power.

Research Questions and Hypothesis

The following research questions will be addressed by this study:

1. What proportion of the African American adult population, are aware of the risk factors and complications associated with diabetes mellitus?

Null Hypothesis 1: There is no relationship between the African American adult population and their knowledge of risk factors and complications associated with diabetes mellitus.

Alternative Hypothesis 1: There exists a relationship between the African American adult population and their knowledge of risk factors and complications associated with diabetes mellitus.

2. What proportion of the African American adult population, are aware of the benefits associated with effective treatment and management of diabetes mellitus?

   Null Hypothesis 2: There is no relationship between the African American adult population and their knowledge of benefits associated with effective treatment and management of diabetes mellitus.

   Alternative Hypothesis 2: There is a relationship between the African American adult population and their knowledge of benefits associated with effective treatment and management of diabetes mellitus.

3. What is the relationship between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease?

   Null Hypothesis 3: There is no significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease.

Alternative Hypothesis 3: There is a significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease.

4. What is the relationship between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the diabetes mellitus when measured across the various socio-economic groups?

   Null Hypothesis 4: There is no significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of diabetes mellitus when measured across the various socio-economic groups.

   Alternative Hypothesis 4: There is a significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of diabetes mellitus when measured across the various socio-economic groups.

5. What is the relationship between knowledge of diabetes risk factors and knowledge of health preventive behaviors and as such translated into any lifestyle modifications within this ethnic group?

Null Hypothesis 5: There is no relationship between knowledge of diabetes risk factors and knowledge of health preventive behaviors and as such no lifestyle modifications were seen within the African American adults' population.

Alternative Hypothesis 5: There exist a relationship between knowledge of diabetes risk factors and knowledge of health preventive behaviors and this has been translated into healthy lifestyle modifications within the African American adults' population.

Nature of the Study

Quantitative analysis will be the method utilized for this study. Quantitative studies are capable of producing objectively, quantifying variables which is the focus of this study (Creswell, 2008). The few studies that have been engaged in similar studies as such have in most cases been qualitative and have looked at this problem by comparing different subgroups or ethnic groups. Thus, this study is focused on quantifying the magnitude of how African Americans are aware of the risk involved with having diabetes, the benefits of timely treating the diseases in order to avoid complications and the associated health preventive behaviors. These variables will be compared between those already having the disease and those without the disease. Socioeconomic status across both groups will also be examined.

Data Source for the Study

The Risk Perception Survey for Developing Diabetes (RPS-DD) was used to collect data for the study. The RPS-DD questionnaire has been the primary source for

data collection in similar studies (Choi et al., 2012; Pinelli et al., 2009; Walker et al., 2003)**.** The RPS-DD is a validated instrument aimed at capturing multiple dimensions of perceived risk for developing diabetes within any population. The RPS-DD has been used in many quantitative studies due to the fact that internal reliability is well documented. This instrument was developed by Elizabeth Walker at the Diabetes Research institute at Albert Einstein College of Medicine of Yeshiva University (Walker & Wylie-Rosett, 1998).

Research Delimitations and Limitations

Delimitations

Lack of external validity may be the major delimitation noted in this study due to a small sample size. This study had only 98 participants, which may not be a true representation of the African American population. Because all the participants were aware this was a research study, there was a chance that they were dishonest in their responses to some of the questions.

Limitations

The questionnaire comprises closed-ended questions. This indicates that participants who may have had in-depth knowledge about diabetes were not given the opportunity to include it on the questionnaire. Participants' understanding or interpretation of the questions on the questionnaire may have also been a limiting factor. This is a quantitative study, which may limit an understanding of why there was a low or

high perception of risk of diabetes and its complications within this population when compared to exploratory or qualitative methodology.

Definition of Terms

Terms as they applied to this study are defined below.

African American: In this study, the term will be used for any individuals having an origin in ancestry of the African tribes in the Sub-Saharan region or individuals that can be identified with any of the Black cultures.

Perception: According to the Oxford English Dictionary, perception is the ability to hear, see or to be aware of the existence of something (Oxford University press, 2013). This study is focus on awareness or knowledge of the existence of risk factors, treatment benefits, complications and preventive health behaviors.

Risk factors: Any condition, characteristic, or even behaviors that have the possibility of increasing diabetes mellitus within the African American adults' population.

Treatment benefits: Refers to the timely administration of any diabetic drug as prescribed by the physician (medication compliance)

Preventive health behaviors: Refers to any activity undertaken by an individual mainly for the purpose of disease prevention. The most common preventive behaviors: include healthy dieting, smoking cessation and physical activity.

Socioeconomic status: The American Psychological Association conceptualized this term as the social standing or class of an individual or group which is measured as a combination of education, income and occupation (APA, 2012).

Summary

The focus of this study is to gain insight into diabetes risk knowledge, awareness of diabetes complications, and benefits of timely management and treatment amongst African American adults. This study also looked at how such knowledge or awareness may be related to healthy behaviors within the African American population. The results of these variables will be compared between those already having the disease and their counterparts without the disease. Also, how the above knowledge of risk factors, diabetes complications, treatment benefits and health preventive behaviors are distributed across the different socioeconomic classes will be evaluated.

Chapter 2 will focus on the incidence of diabetes in the United States. Precisely, this will look at the distribution of the disease within the different ethnic groups and this will be tailored down to the African American population in an effort to pin-point the need of some urgent interventions for this population. This will be followed by a review of the important studies in this area. Finally, the HBM will be evaluated and as an applicable model for this ethnic group. Chapter 3 will focus on the methodology that used in the study. This is a quantitative study that applies a survey in which data will be collected through a questionnaire. A modified version of the RPS-DD, in which some items have been added to be able to measure socioeconomic status and health behaviors,

was adapted for use in this study. The final sections of this study include Chapter 4, where the results and the analyses of the study research questions are presented, and Chapter 5, which summarizes the findings, draws conclusions from the data, and suggests recommendations for action and for further research. Chapter 5 also presents implications for social change and explains the limitations of the study.

Chapter 2: Literature Review

Introduction

Ethnic minorities in the United States are disproportionately affected by most chronic diseases with African Americans twice as likely to develop Type 2 diabetes compared with their White counterparts (Calvin et al., 2011). In fact, the incidence of diabetes has tripled within the past 3 decades within the Black population (Shaw-Perry, 2006). Diabetes is the fifth leading cause of death in the United States meanwhile within the African American population; diabetes is the third leading cause of death (ADA, 2012). The purpose of this study is to attempt to fill a gap in knowledge by evaluating the knowledge of African American adults on diabetes risk factors, diabetes complications, treatment benefits and health preventive behaviors.

In Chapter 2, the diabetic epidemic in the United States is reviewed, with specific emphasis on the African American adult population as an ethnic group and the prevalence and incidence of the disease and its associated complications in the United States. The incidence and prevalence of diabetes within the African American adult population will be analyzed with careful consideration of national figures. The HBM is the theoretical model underlying this study. Careful consideration was given to review how the HBM can be applied to alleviate health disparity among the African American population. The concept of perception of risk of diabetes, treatment benefit, socio-economic status and preventive health behaviors which are the variable of focus for this study were also discussed and how these can relates to the African American population.

Finally, just as Calvin et al. (2011) mentioned in a recent study in which the authors explored the perception of risks of diabetes complications among African Americans, there is scarcity of published research that actually focuses on perception of risk factors for diabetes patients in the United States. This paucity of research studies on knowledge of risk factors of diabetes becomes even more apparent when dealing with a single ethnic group like the African American adults population (Allen, Purcell, Szanton, & Dennison, 2010; Cullen & Buzek, 2009; Edmonds-Myles, Tamborlane and Grey, 2010; Lipman et al., 2012); McKenzie & Skelly, 2010; Vivian, Becker, & Carrel, 2012). Based on this assertion, the final section of this chapter was focused on reviewing specifically, some of these recent research works that have highlighted this problem within this ethnic group and the country at large, with the aim of defining the problem and scope of this study.

Literature Search Strategies

A cross-section of the literature was analyzed for this study. Articles that focused on perception or knowledge of diabetes risk factors, complications, treatment benefits and preventive health behaviors were selected using the EBSCO host database (Research Starter-Education, Academic Search Premier, CINAHL Plus, Medline, Cochrane and Thoreau,), the American Journal of Public Health‘s search engine, the Journal of the American Medical Association’s search engine, Health and Human Services, or CDC, The United States National library of Medicine (PubMed), The ADA and text books on diabetes mellitus and associated complications, treatment/management, health perception

and research design. Internet searches were focused primarily on Google and Google Scholar.

Keywords and phrases, including the search methods were identified. Keywords used for perception included perception, understanding, awareness and knowledge while the search terms for Socioeconomic status included socioeconomic status, social class, income, education and occupation. Health behavior was searched using the following terms: smoking, cigarette, exercise, physical activity, alcohol, nutrition and diet. Other terms or phrases used included risk factors, African American, diabetes, diabetes complications, incidence of diabetes and prevalence of diabetes. These words were used singularly and also in combination during each search. The keywords were first combined to gather information on the general public and this was next tailored to the African American population. A search was also made on the reference lists of several articles especially those retrieved through the Google scholar website.

All the articles retained for this study were saved using the reference manager Zotero. Zotero is a free, easy-to-use research tool that can assist in the collection, organization and citation of research sources (references). Articles available in full text PDF were downloaded immediately while articles that were downloaded prior to completion of the literature review were retrieved again in order to ensure accessibility. Additional references that were not fully accessible online were requested through the university of Maryland library system or through librarians at the Walden University‘s Library system.

Most of the articles that were retained for the study extended back approximately 6 years to the year 2007. A few older articles were retained because of their originality and also due to their value to the present study.

The Prevalence and Incidence of Diabetes

The prevalence of diabetes mellitus has reached epidemic levels worldwide (Zimmet, Alberti, & Shaw, 2001). Estimates from the World Health Organization (WHO) are that by 2030, 366 million people will have diabetes; an increase from 171 million people since 2000 (Wong &Toh, 2009), representing more than a two-fold increase within 3 decades. Similar estimates have been documented by the United Nations population division as shown in Table 1 (Wild, Roglic, Green, Sicree, & King, 2004).

Table 1

Estimated Numbers of People With Diabetes by Region for 2000 and 2030 and Summary of Population Changes

	2000	2030		2000 - 2030		
Region (All ages)	Number of people with diabetes	Number of people with diabetes	Percentage of change in number of people with diabetes*	Percentage of change in total population*	Percentage of change in population >65 years of age*	Percentage of change in urban population
Established market economies	44,268	68,156	54	9	80	N/A
Former socialist economies	11,665	13,960	20	-14	42	N/A
India	31,705	79,441	151	40	168	101
China	20,757	42,321	104	16	168	115
Other Asia and Islands	22,328	58,109	148	42	198	91

Sub-Saharan Africa	7,146	18,645	161	97	147	192
Latin America	13,307	32959	148	40	194	56
Middle Eastern Crescent	20,051	52,794	163	67	194	94
world	171,228	366,212	114	37	134	61

*A positive value indicates an increase; a negative value indicates a decrease.

As a result of the publication by the United Nations population division, diabetes is now considered by the WHO as a major threat to human health in the present century. In a comprehensive review of the literature that explored the incidence and prevalence of the disease across the different continents of the world, the authors were able to show that the number of people with diabetes just within a single decade from 2000 to 2010 was almost doubled in most continents (Zimmet et al., 2001).This indicates that diabetes, which was once considered a disease of the Western world, is an epidemic worldwide today. This has been attributed to lifestyle changes especially in the less developed nations.

The global situation of diabetes is a true reflection of what is seen with the United States population today. According to statistics released by the CDC (CDC, 2012a) and the ADA (ADA,2012a),, as of January 2011, 25.8 million children and adults in the

United States (18.8 million diagnosed and 7.0 million undiagnosed cases) had diabetes, representing about 8.3% of the general population.

Prediabetes or borderline diabetic cases were estimated at about 79 million people. Most individual who develop Type 2 diabetes, they almost always have pre-diabetes. This is a state in which blood glucose levels are higher than normal but not yet high enough to be diagnosed as diabetes, as seen in Table 2. Prediabetes is sometimes referred to as either impaired glucose tolerance (IGT) or impaired fasting glucose (IFG), depending on which test was performed in diagnosing the disease (ADA, 2012). Individuals diagnosed with prediabetes are at a higher risk for developing Type 2 diabetes and associated cardiovascular diseases when compared with the general population.

Table 2

Blood Sugar Levels in a Fasting State

Blood sugar levels	Description
Below 100mg/dl	Nondiabetic individuals
100 – 130mg/dl	Prediabetic individuals
Above 130mg/dl	Diabetic individuals (patients)

The diagnosis of prediabetes or diabetes is usually based on an arbitrary cut-off point for a normal blood sugar level. It must be noted that blood sugar levels are never

constant but fluctuates during the course of the day depending on the type and quantity of meal consumed and also on the amount of circulating sugar lowering hormone, insulin.

Though childhood diabetes is also growing at an alarming rate due to increasing environmental factors like obesity, the CDC has noted that only 215,000, or 0.26%, of all people with diabetes actually fall under the age of 20 years (CDC, 2011).

In 2010 1.9 million new cases of diabetes patients aged 20 years and older were reported over the figures from the 2007- 2009 National Health Interview Survey (CDC, 2011). The number of people aged 20 years and older diagnosed as new cases of diabetes in 2010 were grouped as follows: age group 20 – 44 years had 465, 000 people (25%), age group 45 – 64 years had 1,052,000 people (55.0%) and individuals above 65 years old had 390,000 (20.0%) increase over 2007-2009.

In 2007, the total costs of diagnosed diabetes in the United States amounted to $174 billion with $116 billion reflecting direct medical cost and $58 billion reflecting indirect medical cost. Most importantly, the CDC noted that the medical expenditure for those with diabetes, when compared with those without diabetes, was 2.3 times higher (ADA, 2012b; CDC, 2011). According to the 2007 – 2009 National Health Interview Survey, direct medical cost was mostly directed towards insulin and oral medications usage. Among adults with diabetes, 12.0% were receiving insulin only, 14.0% were receiving insulin and oral medications, 58% received oral medications only, and 16.0% didn’t take either insulin or oral medications.

The CDC (2011) has classified diabetes as the seventh cause of death in the United States. This classification was based on death certificates where diabetes was listed as the underlying cause of death. This differentiation is important because diabetes continues to be a major contributing cause of death in many diabetic patients but unfortunately, the CDC has noted that such cases were never taken into consideration when documenting deaths from diabetes. This implies that a more realistic picture of deaths from diabetes must include both situations instead of one as is the present situation with the CDC and other disease surveillance groups and programs. In addition to the above drawback, the CDC also noted that underreporting of diabetes as a cause of death was a common problem within the United States adult population in virtually all the states.

According to the 2007–2009 National Health Interview Survey, individuals in the United States with diabetes aged 20 years and above showed great disparity in the prevalence of the disease when classified according to racial and ethnic groups (ADA, 2012). According to the ADA, the 2007 – 2009 national survey the breakdown of individuals with diabetes in the United States was as follows: 7.1% non-Hispanic Whites, 8.4% Asian Americans, 12.6% non-Hispanic Blacks, and 11.8% Hispanics.

Further analysis of this survey by the CDC revealed that after adjusting for population age differences within these groups, the risk of diagnosed diabetes was 18.0% higher among Asian Americans, 66.0% higher among Hispanics and 77.0% higher

among non-Hispanic-Blacks when compared to their non-Hispanic White adult counterparts (CDC, 2011).

The development of diabetic complications as noted within the African American community also surpasses all other races or ethnic groups in the United States. This is the only ethnic group in the country with an increased prevalence of diabetes complications within the past decade (Calvin et al., 2011). About 72.0% of African Americans with Type 2 diabetes have hypertension (United States Department of Health & Human Services, 2012). Similar leading trends in the other complications associated with diabetes were also observed within this ethnic group. Diabetic complications among African American have been attributed to a couple of factors. These included poor socio-economic status, suboptimal health care, unhealthy lifestyles and suboptimal environmental conditions(Calvin et al., 2011). Thus, it is the aim of this study to determine the level of understanding or awareness of some of these factors within this population.

Diabetes Prevalence by Sex and Age

As previously mentioned, though childhood diabetes is also growing at an alarming rate in the United States and other developed nations due to increasing environmental factors like obesity, diabetes appears to concentrate only within the adult population aged 20 years and older. Estimates of relative risk of all cause-mortality noted among individuals with diabetes classified by age and sex is shown in the diagram below. These estimates provided by the United Nations Population division was derived from a

limited number of cohort studies carried out in 119 countries of the world (Wild et al., 2004). The aim of this study was to estimate the global prevalence of diabetes among individuals of all ages.

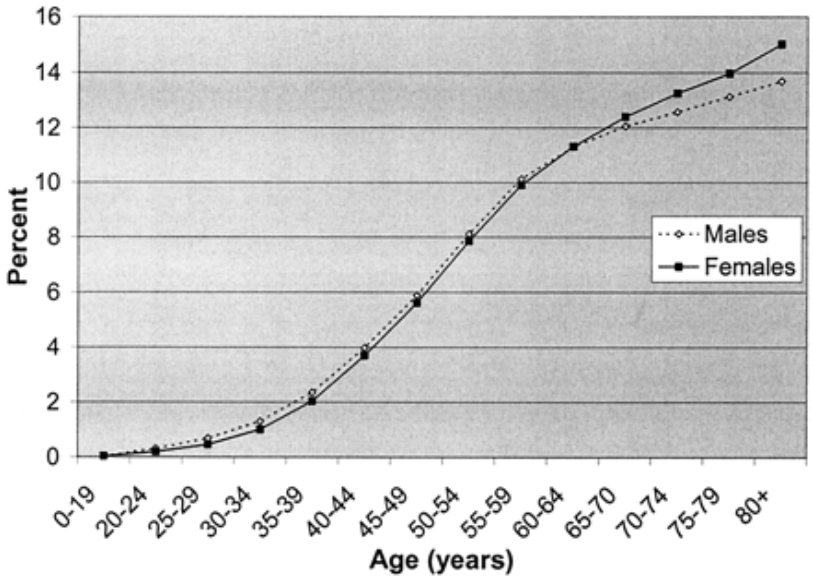

Figure 1. Global diabetes prevalence by age and sex, showing that diabetes affects mostly adults above 20 years with males and females equally affected.

Figure 2 indicates that the global picture of diabetes is similar to that in the United States, with diabetes affecting mostly adults above the age of 20 years with little differences noted between the male and female sexes (CDC, 2011). Thus, the purpose of the study like most studies on diabetes was going to focus on the African American adult population 20 years and older.

The Prevalence of Obesity in the United States

Obesity is the most important risk factor for diabetes, although the degree and prevalence of obesity varies among the different racial groups with Type 2 diabetes in the

United States (McPhee, Papadakis, & Rabow, 2011). According to the CDC (2011), more than one third of the U.S. adult population are obese, with non-Hispanic Blacks having the highest age-adjusted rates of obesity. Non-Hispanic Blacks and Mexican-American men with higher incomes tended to be more obese than non-Hispanic Blacks and Mexican-American men with lower incomes, while the reverse situation was noted among women (Ogden, Lamb, Carroll, & Flegal, 2010)

Culture, Disease and Treatment

Culture is an important component of every ethnic group. In general terms culture refers to the ways of living of any ethnic group. This includes things like language, customs, geographical locations, economic status etc. (Noël, 2010). In fact, just as the values of each ethnic group differs, research has revealed that interventions that work in some societies or groups may not necessarily work in others due to the fact that these cultural forces influences basic daily activities and decisions like diet and exercise (Knowler et al., 2002). Just as the many cultures, in the United States are very diverse, so too is the perception of disease, illness presentation and treatment. This implies we must understand the cultural values of any group, society or race if we have to understand their perception of any disease, its treatment and complications. This then becomes a major concern in the United States due to two primary reasons:

1. There is much diversity in lifestyle patterns noted amongst the different regions in the United States and also amongst ethnic groups.

2. Secondly, diabetes is much of a frequent problem in some of the ethnic groups than others as seen above.

In a study by Noël (2010), where comparison of ethnic differences in causal beliefs and treatment preferences for symptoms of depression among diabetic patients, it was observed that across African American, Hispanics and non-Hispanic Whites adult with Type 2 diabetes, there was significance differences in causal beliefs with respect to depressive symptoms. Also Noel noted that culture had an association with treatment preferences but not with provider preferences. Similarly, in a study aimed at evaluating the need and efficacy of community-based culturally specific eye disease screening for African Americans with diabetes, the researchers were able to demonstrate that culturally specific technique approach was able to identify a significant number of patients with diabetes that actually needed eye screening and treatment (Anderson et al., 2002).

In fact, there is always an associated cultural component whenever dealing with disease diagnoses, management or treatment (Anderson et al., 2002). This implies different ethnic groups are most likely going to perceive illness presentation and treatment differently and as such, the explanation of illness varies from culture to culture. Based on this assertion, some researchers believe illness can be explained as being either personalistic or naturalistic (Westerlund, 2006).

Naturalistic Approach

The naturalistic approach looks at illness as a natural process occurring as a result of deterioration of some body function through the influence of both internal and external forces. That is to say, illness is a result of impersonal, mechanistic causes in nature that can be understood and treated through some scientific methods (O'Neil, 2006). In this case, an explanation can be offered for the origin of the disease (disease etiology). Impersonal or mechanistic causes of illness acceptable in the naturalistic medical system include procedures like some organ breakdown or deterioration. Such organ deterioration can be in the form of heart failure, tooth decay etc. Other forms of impersonal or mechanistic causes of illness include parasite infections from bacteria, worms, fungi or viruses; malnutrition, injury resulting in broken bones or bullet wounds etc. The western world today relies mostly on the naturalistic approach in the explanation of disease and illness. The naturalistic approach began in the 4th and 5th centuries BC. but only took the modern form of medical practice in the 16th century AD (O'Neil, 2006).

Personalistic Approach

The personalistic approach, on the other hand, is grounded in some form of supernatural or mystical explanation. Illness is seen as been due to supernatural beings or forces which may manifest in one of the following ways: Foreign objects being introduced in to the body through some supernatural forces or procedure; some form of spiritual possession of the individual or bewitching of the individual. In the past,

personalistic approach was mostly accepted by most non-Western nations but today it is mostly seen in small-scale societies and subcultures of larger nations. Many of these subcultures exist in the United States today.

The Relationship between Naturalistic and personalistic Approaches

As is the case with naturalistic approach, personalistic approach cannot be explained in the light of modern medicine. Personalistic approach can be further broken down into susto, evil eye, or aire. Personalistic approach is well rooted within cultural groups in the United States. For example, within the African American and Latino groups, aire is a well-grounded cultural belief which deals with bewitching or supernatural forces as the etiology of illness and as such requires supernatural treatment also. The above goes to buster the need of incorporating specific cultural beliefs when dealing with any ethnic group.

Most people who believe in the naturalistic approach may find it difficult to accept the personalistic approach. This is due to the fact the naturalistic explanation of illness, disease and treatment is based on some scientific method meanwhile the personalistic explanation relies on the idea of introducing objects into the body through supernatural means. Whatever the situation, both approaches believe in the intrusion of some unseen substance into the body. The germ theory adapted by modern medicine, by which germs get into the body system, is very similar to the personalistic view of disease or illness.

Disease and Illness

The terms disease and illness have always been used in the western world interchangeable but researchers believe it is important to separate these two words especially when dealing with non-western cultural traditions (O'Neil, 2006). Disease refers to some objective measurable pathological condition exhibited by the human body. This includes conditions like a broken bone or bacterial infection. Illness, on the contrast refers to any feeling of not being healthy. This can include a disease but may also involve psychological and spiritual conditions (O'Neil, 2006). Thus it can be seen that perception of illness can be culturally related meanwhile the notion of disease is usually not.

Beliefs in Health Communication

Cultural factors and beliefs in health communication is also an important issue that has been emphasizes for decades (Landrine and Klonoff, 1992; Thomas, Fine, & Ibrahim, 2004). Thomas et al. (2000) in a review has noted that marked health disparity continue to exist even with well elaborated systems like the VA health care system in which access to care wasn't an issue. This led the authors to conclude that other factors like culture and health communication have to play a role. Scott, Mannion, Marshall, and Davies, (2003) in a similar study questioned the role of culture of a population or organization on healthcare performance. The authors concluded that culture is a relevant factor in healthcare performance though the nature of such a relationship couldn't be defined. One of the major drawbacks noted was the difficulty and/or inconsistency in defining and operationalizing the term culture.

Cultural norms embedded within the different groups in the United States have contributed to lifestyles and associated behaviors that have influenced risk factors for most chronic diseases including diabetes. This means any efforts deemed at eliminating the present health disparities must also be able to influence culture on altitudes, beliefs and behaviors especially of minority groups (Thomas et al., 2004). We must consider the fact that culture act as a powerful filter through which information can be received. This even becomes more apparent for healthcare professionals who handle people from other cultures because understanding what they believe in and what kind of treatment is considered effective and acceptable is important.

Due to the existence of these cultural differences, perception and treatment would be better evaluated when considering a single ethnic group. Unfortunate, there are very few studies that have focuses on African Americans as a single ethnic group to better understands their perception of most of the chronic diseases plaguing the group with their treatment and preventive health behavior patterns (Calvin et al., 2011).

Socioeconomic Status and Diabetic Control

Prior studies have noted socioeconomic differences with regards to outcome expectations for diabetes. In a study by Figaro, Elasy, BeLue, Speroff, and Dittus, (2009) in which they explore health behaviors of adults with Type 2 diabetes of different socioeconomic status, it was observed that individuals classified as belonging to the higher socioeconomic class exhibited more positive outcomes than subjects of lower

socioeconomic status. Perception of control of related health behaviors was suggested as the reason behind such a socio-economic disparity. This means that programs aimed at increasing compliance must take into account class- disease perception as suggested by the authors. The drawback noted with this study was that it was a qualitative study in which participants household income was limited to less than or equal to $40,000 annually and most important was the fact that the study examines differences between African Americans and their White counterparts but wasn't capable of quantifying any of the health behaviors.

Similarly, studies have documented the association between smoking and socioeconomic status. In terms of smoking rate, most of the studies have associated greater smoking rate with low socioeconomic status (Pampel, Krueger, & Denney, 2010; Willemsen, Hoogenveen and Van Der Lucht, 2002). In a recent study, in which Tjora, Hetland, Aarø, Wold, & Øverland, (2012) compared smoking cessation across the different socioeconomic classes, it was noted that those of higher socioeconomic status are more likely to quit than their counterparts of lower socioeconomic status. The reason advance in the above conclusion is the fact that those of higher socioeconomic status have more understanding about smoking and more resources that can enable them to quite. This still reflects the idea of perception of control as seen above.

Hanson and Chen (2007) in a similar study also noted poorer diets, less physical activity and greater smoking amongst individuals with lower socioeconomic status. Thus there seem to be a traditional association of greater negative health outcomes being

related to low socioeconomic status. Though these studies were able to establish the relationship between socioeconomic status and health behaviors, these studies were not focused on African Americans and were not capable of measuring level of awareness of these health behaviors.

An important question at this point will be why do individuals of low–socioeconomic status groups in most situations act in ways that tend to be harmful to their health than their counterparts within the higher socioeconomic status? This was the locus of a recent study by Pampel et al., 2010. The authors noted that the present literature has done little to compare or contrast the mechanisms involved in this. As a result, they try to offer some suggestions which include:

- There is a possibility that socioeconomic status can affect any incentives or motivations for healthy behavior. Individuals within the low socioeconomic status may have less reason than high- socioeconomic status groups to want to forego the short-term pleasures of unhealthy behavior for long-term gain in longevity. Individuals within the high-socioeconomic status group may face less stress that might encourage coping through unhealthy behavior and may gain more longevity benefits from healthy behaviors. The idea of greater knowledge of risks that tend to motivate healthy behavior amongst high socioeconomic status is still unclear.

- Motives and means may be two important factors of consideration. This is because socioeconomic status can affect the means to reach certain health goals. Individuals within all socioeconomic status groups may have similar desires towards healthy behaviors. Despite this, low-socioeconomic status groups may have more difficulties in achieving their goals. The above relationship between motives and means may not be that linear as may appear. That is, this may tend to blur at some extreme points as strong motive increases, there is the likely event that there is going to be increased effort to find effective means. Also, factors like social support will also affect the connection between motives and means. Even with these drawbacks, some researchers still believe, these are distinct factors, and distinguishing among them may be very helpful in designing studies dealing with disparities in health behaviors.

The above traditional association of low socioeconomic status being related to greater negative health behaviors is consistent across many studies. However, the association noted between socioeconomic status and health behaviors may not be equally apparent across the lifespan of an individual (Chen & Killeya-Jones, 2006; Hanson & Chen, 2007) . In a detailed review by Hanson and Chen (2007) to determine the direction of association between socioeconomic status and preventive health behaviors, they concluded that though there may be some association between these variables during adolescent, such an association may not be as robust as in adulthood. Adolescence is a

period characterized by social and biological changes and most important is the fact that many health behaviors are actually been established at this point in life. Physical inactivity, unhealthy diets and smoking were associated with low socioeconomic status in adolescent meanwhile alcoholism and marijuana abuse was noted across the socioeconomic status spectrum.

The above studies by Chen and Killeya-Jones (2006); Hanson and Chen (2007) is an indication that the relationship between socioeconomic status and health behaviors may exhibits a complex association. Similarly, introducing race/ethnicity, it appears another different picture emerges. Edmonds-Myles et al.(2010) in a study aimed at understanding the perception of the impact of Type 1 diabetes mainly on lower socioeconomic status families of various ethnic backgrounds, noted that the impact on African American, Latino and White families were all different. At moment very few studies have actually determine the relationship between preventive health behaviors and socioeconomic status varied by race though the role of ethnicity in any socioeconomic-preventive health association seem to be very important. Even most important here is the fact that to my best understanding, there is no study on a single race/ethnic group in which such health preventive behaviors have been compared across the socioeconomic status ladder of the group which is one of the aspects the present study intends to focus on.

Perception

Definition

Perception in the broad sense refers to an individual's ability to be aware of, to understand or to realize the existence of something. According to the Oxford English dictionary, this includes the ability to see, hear or be aware of something using human senses (Oxford University Press, 2012). The focus of this definition is on the idea of knowledge of the existence of something within an individuals' vicinity. In the case of diabetes, such knowledge can take many ramifications, considering the fact that it is a complex chronic disease. Based on the above assertion, this study is going to evaluate only the following knowledge base areas of the African American adults' population: Knowledge of risk factors and complications of diabetes, knowledge of treatments benefits and knowledge of preventive health behaviors.

Due to the fact that the prevalence of diabetes mellitus is eventually reaching epidemic levels worldwide, many studies have emerged that try to determine or measure the level of understanding of their respective population of this disease. Such an understanding is very important today because:

1. Patients must be fully involved in the management of the disease. This implies, a general understanding and awareness is considered a first and most important step in taking action aimed at reducing the threat of the disease (Allen et al., 2010).

2. Targeted interventions aimed at curtailing this epidemic can only be well crafted if we can get a better understanding of the population involve. Interventions of

this nature have been proven to reduce diabetic risk (Diabetes Prevention Program Research Group et al., 2009; Lindström et al., 2003).

In a large population-based study focused at understanding the risk of diabetes amongst Singaporean's and related health preventive behaviors, the authors were able to conclude that better understanding of the disease was associated with favorable behaviors (Wong and Toh, 2009). Unfortunate, this was never found to have translated to healthier lifestyles. In another study aimed at evaluating the knowledge of kidney disease as a complication of diabetes, in a mixed population at risk in rural North Carolina, it was discovered that the community has some basic knowledge of the disease but the risk of having the disease was never attributed to diabetes but more to lifestyle behaviors (Jennette et al., 2010).

Similar research by (Lipman et al., 2012; Vivian et al., 2012)) focused at understanding the level of awareness of parents living with diabetic children of the risk factors associated with the disease, it was discovered that there is general lack of understanding both within the African American and White communities. Also important in these studies was the fact there was a paucity of research at moment that actually address this parent-children perception of the disease.

So far the few studies that have dealt with perception of diabetes with/ without health preventive behaviors have noted either a general lack of knowledge of the disease or even where there is some understanding of the disease, such in most cases has always been a wrong conception as was clearly shown by Cullen and Buzek (2009); Jennette et al.

(2010); Wong and Toh (2009). It is along this thought that Choi et al. (2012 in trying to determine the perception of clinicians and patients with regards to the disease management and the present status of diabetic education offered, were able to conclude that current educational programs haven't been able to meet the needs of the population. They noted a marginal gap between awareness or understanding of the disease by the patients and what was taught.

There are very few studies at moment that have actually looked at the perception of risk for the disease amongst the general population (Calvin et al., 2011) . As concern African Americans, there is even less information that describe their perceive risk of developing diabetes, importance of diabetes management or healthy behaviors. Calvin et al., (2011) have noted that the present published research that details the relationships among diabetes, well-being and illness perception cannot be generalized to African American adults. Most important is the fact that ethnicity was never addressed. Culture influences illness representations (Scollan-Koliopoulos, Rapp and Bleich 2012).

Based on the above studies by Scollan-Koliopoulos et al. (2012); Calvin et al. (2011) and other similar studies, the authors have been able to carry out exploratory studies in which they focused on the perceived risk of diabetes complications. The results obtained from these studies could not be generalized to the entire African American adult population due to the fact that the authors failed to use a sample that covered all the different levels of the socioeconomic ladder. The study by Calvin et al. (2011), was focused only on urban African Americans of low socioeconomic status aged 18-75. Thus,

considering such drawbacks, a similar study of this nature cutting through all the different socioeconomic status is warranted.

In an exploratory study McKenzie and Skelly (2010) aimed at exploring the understanding of coronary heart disease amongst women with Type 2 diabetes, it was noted that these women do not see themselves as being at risk for the disease. Most importantly, their main reason for not identifying with the disease was associated to their faith believes. Thus an important question here will be if the same situation or concept holds for diabetes in the African American adult population. As mentioned in chapter one, diabetes mellitus remains a major risk factor for most cardiovascular diseases including coronary heart disease.

The authors Cullen and Buzek (2009) in another studying aimed at accessing the diabetic knowledge and risk factors awareness among African American and Hispanic families, also noted that there was a lack of such knowledge within both communities. Most importantly, the authors discovered that among the individuals with diabetic risk factors, there has been very little research on the influence of perceived risk on preventive behaviors. In a similar study, the authors Kim et al. (2007) have also looked at the risk perception among women who had had some history of gestational diabetes. Despite the fact that the relationship between gestational diabetes and postpartum diabetes are well understood, most of the women in the study consider themselves not to be at risk when compared with the general population.

Studies have also been carried out to assess the knowledge of diabetic risk factors and personal control among healthcare providers. Walker, Mertz, Kalten and Flynn (2003) carried out an earlier study which was focused on physician's perception of risk factors for developing diabetes. The aim of this study was to gain information on expert personal risk of having the disease. Such information was to be used in a future comparison with perception of risk by lay groups. Thus, based on this a similar study on pharmacist was later designed which assesses risk perception, optimistic bias and personal control of diabetes. It was discovered that health care experts exhibited more knowledge of risk perception, optimistic bias and personal control than the lay population (Pinelli, Berlie, Slaughter and Jaber, 2009).

Effective risk communication between healthcare experts and the at-risk lay population remains one of the primary prevention tools for this disease. Thus, studies of this nature need to define comprehensive measures that can be used to frame or craft appropriate messages for such at risk communities.

Preventive Health Behaviors

Health behaviors have been documented as a leading cause of morbidity and mortality in the United States and public health efforts to improve the situation will require basic epidemiological information like prevalence and level of awareness of the disease (Mokdad and Remington, 2010). Risk perception and protective health behaviors exhibits a complex relation (Brewer, Weinstein, Cuite, & Herrington, 2004). In most studies, this has offered inconsistent results with some studies demonstrating the

existence of such an association but others do not. Theoretically, higher perception of risk may be an important trigger towards a healthier lifestyle. This relationship has resulted in three categories of results:

1. Some studies have noted that though the population was aware of their risk associated with the disease, no knowledge of protective behavior accompanied this risk. I e the higher the risk involve, less protective behavior (Brewer et al., 2004; Cullen and Buzek, 2009)
2. On the other hand, understanding or awareness has been found to be associated with positive health behaviors but this was never found to have been translated to healthy lifestyles (Economos et al., 2012; Mathieu et al., 2012; Pawlak and Colby, 2009; Wong and Toh, 2009).
3. The third category here is those who understand the risk of the disease and its associated preventive health behaviors, and have taken an extra step in translating such into some healthy lifestyles. This remains an ideal situation yet to arrive at.

Ethnic minorities including African Americans have reported less physical activity, poorer diets when compared with the general population (Mathieu et al., 2012). Also, the authors in this study noted that involvement in physical activity differs by race/ethnicity. This is similar to results obtained in earlier studies by (Pawlak and Colby, 2009; Wong and Toh, 2009).

Perception of Disease Treatment

The non-compliance to diabetic drug regimen and the difficulties in improving adherence in such patients are well documented (Chin, Polonsky, Thomas, and Nerney, 2000; Harris, Linn, Skyler and Sandifer, 1987). The American Public Health Association (APHA), American Psychological Association (APA) along with the other health organizations have proposed possible steps that must be implemented if the patient must adhere to their treatment regimen. The most important factor identified by the American Public Health Association is the need to identify barriers to adherence. Similarly, the American Psychological Association has noted that patient adherence is influence by knowledge of the drug, confidence or ability to take the regimen, ability to remember to take the drug, the medication must be part of their daily routine and finally, they must be able to adhere to their medication with changes in daily routines (Chisholm-Burns and Spivey, 2008). Due to the importance of the patient's behavior in the control of diabetes, many studies have been carried out aimed at evaluating patients understanding of the above factors. The HBM has been an important tool here in understanding drug regimen compliance behaviors. Some of these studies have been presented in the next section.

Barriers to Diabetes Self-Management

Diabetes self-management remains the cornerstone in the overall management of diabetes mellitus and as such identifying barriers to self-management is an important step in achieving optimal health outcome. An understanding of the patient's perception of these barriers can possibly assist in explaining the present poor health outcomes among

minority patients in the united states (Onwudiwe et al., 2011). Limited health literacy or lack of knowledge of the disease has been identified in a couple of studies as a major drawback in diabetes self-management (Onwudiwe et al., 2011; Quinn et al., 2011). In a cross-sectional study, Quinn et al., 2011 noted that patient specific information is needed to address important issues related to diabetic self-management like foot care, food choices and hemoglobin A1c monitoring.

Some patient and provider factors have been identified as a hindrance to patient diabetic self- management (Nam, Chesla, Stotts, Kroon and Janson, 2011). Culture and language capabilities have an influence on health beliefs, health literacy and attitudes thereby affecting diabetic self-management. Clinicians on the other hand can influence self-management through effective communication and maintaining a well-integrated healthcare system. Some studies have identified the lack of support groups as an important barrier in diabetes self-management (Fukunaga, Uehara and Tom, 2011; Nam et al., 2011). Stigmatization amongst south Asians living in the United Kingdom has recent been identified as an important barrier in diabetes self-management (Singh, Cinnirella and Bradley, 2012)

In an earlier study by Glasgow, Toobert and Gillette (2001),they have demonstrated that more information is required today on which barriers present the greatest obstacles for which types of patients and this should be able to lead to practical and cost effective interventions. For this to be effectively done, the present knowledge level of such a population need to be determine which is the focus of the present study.

Designing such effective behavioral interventions aimed at combating the associated barriers to diabetic self-management raises many questions. First, researchers need to determine which theories and respective interventions provide reasonable answers to the issue of diabetic self-management. Second, a single intervention may be relatively easy to demonstrate when considering usual care but this has failed to provide a step ahead on the issue of diabetic self-management. A recent meta-analysis has shown that multicomponent interventions focusing on multiple behavioral, emotional, social and family processes that facilitate diabetic self-management may be more potent than interventions targeting a single direct behavioral process (Wagner, 2011).

Framework

The basic elements of the HBM model are presented in Figure 2.

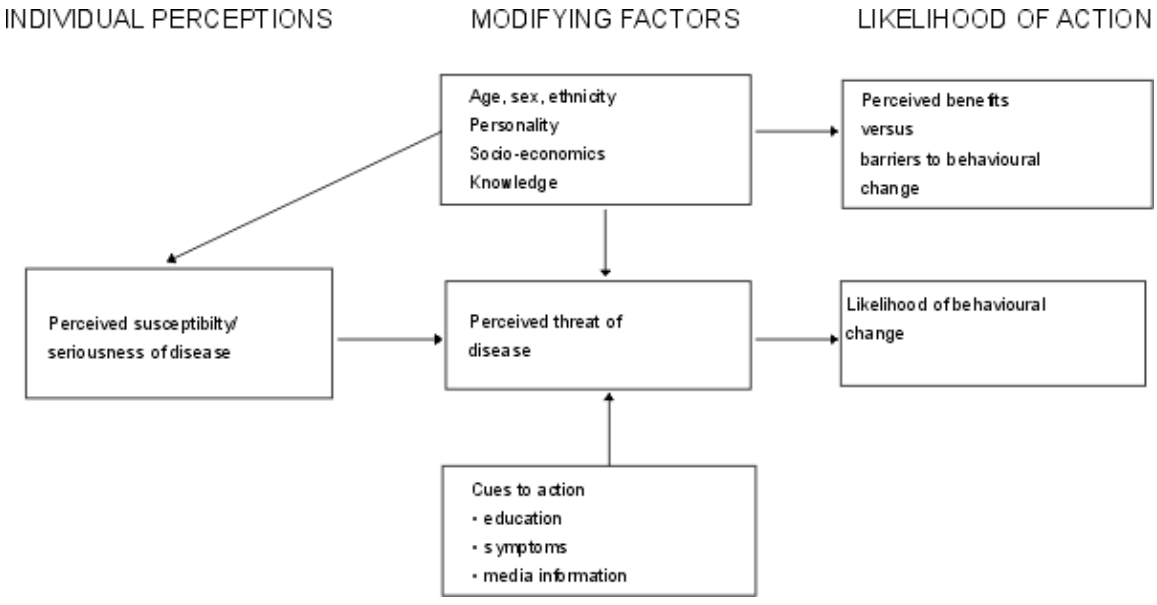

Figure 2. Basic elements of the health belief model.

The element of perceived threat serves as the motivating factor towards any behavioral modifications in this model. There are various health belief theories that have been developed within the past decades of which the HBM remains the most applicable. This model has identified five basic dimensions that influence behavior. These include perceived severity, perceived susceptibility, perceived benefits, barriers/cost, and cues to action (Harvey & Lawson, 2009).

The original model was primarily designed to predict behaviors related to treatment received by acutely or chronically ill patients (Janz & Becker, 1984). It is commonly used today to predict or explain general health behaviors which can either be in the form of preventive or drug therapy compliance (Becker & Janz, 1985). Since the inception of this model in 1966, considerable modifications or amendments have been made either to accommodate evolving evidence, to take care of items or elements dealing with validity and reliability of the model or to fit some special research situations(Hurley, 1990).

Among these amendments has been the development of the Diabetes Health Belief Scale (DHBS; Harris et al., 1987). This scale has undergone numerous evaluations to ascertain acceptable levels of validity and reliability (Hurley, 1990). The scale was instituted to measure attitudes in the area of diabetic care hoping that this could lead to some explanation of compliance of diabetic drug regimens. The original version of diabetes health belief scale which had 71 items has undergone a couple of modifications with the goal of creating a valid and reliable instrument that could be used as a self-report

measure and it should be able to be completed in less than 20-minutes. This scale has been able to raise specific issues that pertain to diabetes especially in the areas of treatment benefits, psychological barriers, severity and susceptibility to diabetes, cues of action and general health motivation.

As mentioned above, many authors have applied the HBM with the hope of understanding compliance behaviors with diabetic drug regimen. Becker and Janz (1985) while applying the HBM to understanding diabetes drug compliance, has noted that this model can serve as a useful tool in providing information for designing drug compliance enhancing interventions for diabetic patients. This is due to the fact that adherence to treatment plans remains the most serious obstacle in achieving any successful therapeutic outcome in diabetic patients today. This observation was later supported by the study carried out by of Turner, Kivlahan, Sloan, and Haselkorn (2007) while evaluating drug adherence to disease modifying therapies in the case of multiple sclerosis. Similarly, Gillibrand and Stevenson (2006) while investigating the experience of diabetes in young children concluded that this model can be very useful in understanding socio-psychological factors in such a population that can influences diabetic drug regimen compliance.

The HBM has also been a very useful tool in predicting behaviors in other chronic disease conditions other than diabetes. A recent study by Turner et al. (2007), focused on evaluating ongoing therapy in patients with multiple sclerosis concluded that the HBM was able to provide an understanding into the psychosocial mechanisms that actually

maintain adherence behaviors and focusing upon the perceived benefits of such an ongoing therapy should be able to provide a focus for future interventions. Similarly, Zhao et al. (2012) while working on a cross-sectional study aimed at predicting condom use behaviors based on the HBM, concluded that this model is a framework capable of providing useful information for predicting condom use behaviors.

The development of the Diabetes Health Belief Scale has enabled the application of the HBM to diabetic patients. This has made possible for some issues that are specific to the nature of the disease to be raised (Harris et al., 1987). Diabetic patients are responsible for their daily care. Such daily care usually involves tremendous changes in life-style which may include things like diets, medication and exercise. Diabetes is a chronic disease with many complications requiring again tremendous changes or adjustments to the patient's life-style. This implies that any instrument designed to measure health beliefs for these patients must be tailored to these specific needs or realities.

Summary

The past decades have witnessed a surge in the prevalence and incidence of diabetes mellitus. The developed countries have been affected mostly due to the increasing situation of obesity, lifestyle changes and physical inactivity (Brunton and Gilman, 2011). Obesity is considered the most important environmental factor causing insulin resistance though it has been noted that the degree and prevalence of obesity varies among the different racial groups with Type 2 diabetes in the United States

(McPhee, Papadakis, & Rabow, 2011). Data from the American Diabetes Association and the Centers for Disease Control and Prevention reveals that African Americans are mostly afflicted with obesity in the United States which may explains the high prevalence rate of Type 2 diabetes amongst this ethnic group (Ogden et al., 2010).

The burden posed by diabetes has been shown to manifest differently within the different ethnic groups in the United States. Ethnic minorities are disproportionately burdened with this chronic disease. African Americans are as twice more likely to develop Type 2 diabetes when compared with their white counterparts. Diabetes affects about 25.0% of all African American women above the age of 55 years (Shaw-perry, 2006). According to the American Diabetes Association, diabetes has been recognized as the fifth deadliest disease in the united states, affecting about 2.7 million or 11.4% of African Americans aged 20 and older (CDC, 2011). The development of diabetic complications within the African American community also surpasses all other races or ethnic groups in the United States. About 72.0% of African Americans with Type 2 diabetes have hypertension (United States Department of Health and Human services, 2012). The rates of amputations, kidney disease, cardiovascular diseases and blindness are among African Americans having Type 2 diabetes (Calvin et al., 2011).

Despite the above situation, there are few studies at moment that have looked at the perception of risk factors for the disease amongst the general population. There is even less information that describe the perceive risk of developing diabetes, importance of diabetes management or healthy preventive behaviors amongst African Americans.

Calvin et al. (2011) have noted that present published research that details the relationships among diabetes, well-being and illness perception cannot be generalized to African American adult's population. Most important is the fact that ethnicity was never addressed in most of these studies.

Recent studies have shown that illness representations are greatly influenced by individual cultures. Thus, the above relationship dealing with illness or disease representation must be analyzed differently when dealing with different ethnic groups (Lipman et al., 2012; Scollan-Koliopoulos et al., 2012; Vivian et al., 2012). The concept of perception or knowledge of risks factors for diabetes has been shown to vary by race even when controlling for socioeconomic factors (Ford, Havstad, Brooks and Tilley, 2002). This implies that cultural factors must be factored in when identifying risk factors for diabetes and when designing educational programs.

Some researchers are of the opinion that present educational programs designed for diabetes patients are not well formulated due to the lack of understanding of the concept of disease perception (Choi et al., 2012). This has led to the existence of a gap between this concept and what is taught in such educational programs. This then calls for more exploration in the area of the patients' understanding of the disease state.

This is an indication that, in other to reduce the present burden of the disease, a better understanding of perceived risk factors for diabetes, benefits associated with timely management and treatment and maintaining health preventive behaviors within the

African American community is still warranted. This will provide possible ways for much better educational programs to be formulated.

Also, more information is required to determine if African Americans' perceptions or understanding of diabetes has a bearing on health preventive behaviors. This chapter has indicated that there is an ever increasing prevalence of diabetes amongst the African American adult community in the United States more than any other ethnic group. However, there are no studies available to ascertain why such an increase primarily in the African American population. Thus, this study is also aimed at examining the perception or understanding of risk factors, its complications and benefits of treatments of diabetes and how this is related to health behaviors across the different socioeconomic groups within the African American population. Such a relationship may be able to offer an explanation for the ever rising prevalence of the diabetes within this ethnic group and thus offers possible ways of curtailing the disease.

Chapter 3 will present the study design needed for this study. This will also look at the sample size required for this study. The sample size will be determined with the aid of statistical data and. Chapter three also goes further to define the population and the participants (sample) for the study, role of the researcher, instrumentation, confidentiality, and the power of the analysis.

Chapter 3: Research Method

Introduction

The past 3decades have witnessed a surge in the incidence and prevalence of diabetes within the African American adult population (Brunton &Gilman, 2011). A review of present literature reveals that the burden posed by diabetes manifest differently within the different ethnic groups in the United (McPhee, Papadakis, &Rabow, 2012). Despite the above situation, there are few studies at moment that have looked at the perception of risk factors for developing diabetes (Calvin et al., 2011). There is even less information that describe the perceive risk of developing diabetes within the African American adult population. This is an indication that studies focused on better understanding of perceived risk factors for developing diabetes, benefits associated with timely management and health preventive behaviors within the African American community are still warranted.

In Chapter 3, a description of the research design will be presented. The rational for choosing this specific design, instrumentation used and data analyses are will also be presented in this chapter. This chapter will also provide a description of the participants, the setting of the study and all possible measures undertaken to protect the participants in this study. Finally the role of the researcher will be outlined here alongside a tentative timeline for the collection of the required data. Thus, this chapter is focused on further enhancing the reader's knowledge of the research, methodology, and conceptual framework presented earlier.

Research Design

A cross-sectional research design was used in this study. The few studies that have been carried out on the perception of diabetes risk factors, complications, benefits of timely treatment and management of diabetes have either been descriptive or exploratory in nature and have evaluated this problem by comparing different subgroups or ethnic groups. Exploratory designs, as any other type of qualitative study, have the advantage in that such studies can produce an in-depth understanding of the present subject matter. On the other hand, they can be time consuming and most importantly, such results can be subjective. Coupled with the fact that qualitative studies usually have very small sample sizes, generalization of such results has always been questionable (Creswell, 2009).

A study by Calvin et al. (2011) that focused on African American perception of risk factors for diabetes and its complications could not be generalized to a general population. This was due to the fact that as an exploratory study, the authors could only focused on a few low in-come urban residents. As such, the authors recommended a replication of a similar study among African American adult population with different socioeconomic status which is part of the focus of the present study. Similar trends have also been observed with other exploratory studies (Jennette et al., 2010; McKenzie and Skelly, 2010).

Cross-sectional studies generally maintain some unique characteristics. They are able to provide a snapshot of a health related characteristic of a population and as such, they are less time consuming. Many epidemiological studies today have adopted this

design because of such a unique characteristic. The focus of the present study was to measure the level of understanding of risk factors, complications, associated treatment benefits of diabetes and how this may be related to health preventive behaviors within this population. The results compared those with the disease and their counterparts without the disease. A cross-sectional study has the feature of comparing different population groups at a single point in time. Thus, this design also allowed for the analyses of the above relationship across the different socioeconomic groups within this population from a single point in time. The cross-sectional design also allowed for the construction of a frame from which findings could be easily drawn.

Instrumentation

Risk Perception Survey for Developing Diabetes (RPS-DD)

Data was collected in this study via a survey in the form of a questionnaire. The instrument adapted in this cross-sectional study was the validated Risk Perception Survey for Developing Diabetes (RPS-DD) as outlined in similar studies by (Choi et al., 2012; Pinelli, Berlie, Slaughter, & Jaber, 2009; Walker, Mertz, Kalten, & Flynn, 2003a)**.**

This instrument was originally developed by Elizabeth Walker at the Diabetes Research Institute at Albert Einstein College of Medicine, of Yeshiva University (Walker & Wylie-Rosett, 1998). The surveys development phase was originally witness by a panel of clinical diabetes experts, health psychologists and risk perception experts who had the opportunity to review all the questions. This was followed by a pilot test, which gave the experts additional information that aided in enhancing the validity, reliability,

and ease of use of the instrument (Walker et al. , 2003b). Thus, due to the fact that this instrument has undergone vigorous revisions over the years, it has been used in many studies due to the fact that validity and reliability has been well documented.

The original RPS-DD is a 43 item questionnaire which is appropriate for gathering information on people who are at high risk for developing Type 2diabetes. This instrument is also able to assess the comparative risk, complications and the environmental perceived risk of the population for developing diabetes. For the purpose of this study, the RPS-DD instrument has been updated with additional sections so as to be able to measure actual behaviors, socioeconomic status and demographic characteristic like age and sex of the population.

The RPS-DD questionnaire is made up of four main subscales that are aimed at capturing multiple dimensions of perceived risk factor for diabetes. A copy of this instrument is presented in Appendix A. These subscales include:

- General attitudes: This subscale measures the general attitudes of individuals that are at risk of getting diabetes. It looks at the overall feelings of the participants of the disease. The questions on this subscale are scored on the following scale of 1 to 4: 1 (*almost no risk*), 2 (*slight risk*), 3 (*moderate risk*), and 4 (*high risk*). The scoring guide for each of the items is presented in Appendix B.
- Attitudes about health risks: This is the second subscale which focuses on how participants perceive or aware of the complications of diabetes. Some of the

complications of diabetes assessed within this subscale include arthritis, heart disease, high blood pressure, foot amputation, blindness, infections and kidney failure. This subscale also attempts to classify each participant with respect to their diabetes state (i.e., those with the disease, or any family member with the disease, and those without the disease). Similar to the first subscale on general attitudes, this subscale is also scored as 1 (*almost no risk*), 2 (*slight risk*), 3 (*moderate risk*), and 4 (*high risk*).

- Environmental health risks: This subscale looks at the possible hazards or dangerous environmental health conditions around the participant that predisposes the individual to some risk of developing diabetes. Some of these environmental conditions include radiation from medical X-rays, pesticides, air pollution, extreme weather, street drugs and cigarette smoke from people around you. The scoring is similar to the other subscales: 1 (*almost no risk*), 2 (*slight risk*), 3 (*moderate risk*), and 4 (*high risk*).
- Risk of getting diabetes for people in the general public: This subscales asses the participants' knowledge of the risk factors of diabetes by looking at the general public. This is an attempt to gather vital information on virtual all the areas associated with risk factors for developing diabetes. Some of the risk factors measured in this subscale include preventive health behaviors, ethnicity, age, history of gestational diabetes, and history of diabetes complication. This subscale is measured on a scale of 1 to 4 similar to the

other subscales. This subscale is used as a descriptor of level of knowledge of diabetes risk factors.

Limitations of the Risk Perception Survey for Developing Diabetes

The RPS-DD questionnaire can only allow the researcher to determine the knowledge level of risk factors for diabetes, complications, treatment benefits, and preventive health behaviors. This questionnaire is unable to measure actual behaviors. As such, a section of the Behavioral Risk Factor Surveillance System (BRFSS) questionnaire from the CDC will be adapted to measure socioeconomic status, demographic characteristics and actual health behaviors.

The Behavioral Risk Factor Surveillance System

The BRFSS was established in 1984 and by 1993; it was already a nationwide surveillance system. The main idea behind this system was to collect data on actual health behaviors rather than on knowledge or attitudes. The BRFSS has been updated continually by a team of survey statisticians, methodologists, and operational experts and as such the reliability and validity of the system has been well documented. Standardized sets of questions are covered on topics like smoking, physical inactivity, diet, alcohol use, street drugs usage, and hypertension.

Validity and Reliability of Risk Perception Survey for Developing Diabetes

The RPS-DD has shown adequate consistency in virtually all the subscales of the instrument. The Chronbach's alpha coefficients for all the subscales range from 0.50 – 0.84 as shown in Table 3.

Table 3

Alpha Coefficient of the Risk Perception Survey for Developing Diabetes

Subscale	Alpha coefficient
Personal control	0.68
Worry	0.50
Optimistic bias	0.71
Personal Disease Risk	0.80
Comparative Environmental Risk	0.81
Composite Risk Score	0.84

Lower than usual scores were noted on the personal control and worry subscales. The decision to maintain this instrument in this study was based on the fact that none of the scores were below 0.50 and this is a new research tool that is still undergoing many refinements. The Chronbach's alpha coefficient is a test of the quality of data that will be generated by the survey instrument. Values above 0.5 are generally accepted because this is an indication that the items in a group are closely related to each other thus high internal consistency.

Validity and Reliability of the Behavioral Risk Factor Surveillance System

Many separate studies have examined issues related to the reliability and validity of the BRFSS and its ability in providing valid and reliable national estimates and comparisons across the different states (CDC, 2010). According to the CDC (2012), the

study by Nelson, Holtzman, Bolen, Stanwyck, and Mack (2001) remains the most comprehensive to date ever carried out to determine the validity and reliability of the BRFSS. Nelson et al. (2001) after summarizing more than 200 studies on the reliability and validity of the BRFSS concluded that most of the questions were at least moderately valid and reliable with many being highly reliable and valid.

Similarly, Nelson, Powell-Griner, Town and Kovar (2003) carried out a study aimed at comparing national estimates obtained from the National Health Interview Survey and the Behavioral Risk Factor Surveillance System. The authors compared data obtained by using 14 measures from the two surveys. These 14 sections included smoking, height, weight, BMI, diabetes, hypertension, immunization, lack of insurance coverage, cost as a barrier to medical care, and health status. They noted that national estimates obtained from both survey systems were similar for 13 of the 14 measures examined. Thus, they concluded that the BRFSS was able to provide valid and reliable information that can be used to guide national policy and program decisions. A similar study was also documented by Mokdad, Stroup, and Giles (2003).

Sampling and Setting

Sampling

African Americans constitute only 13.6% of the United States population, but the African American population in the District of Columbia is 52.2% of the total population of that city (United States Census Bureau, 2011). This will provide for a large African American adult population that will be suitable for the study. All participants in this study

will be African Americans (men and women) and who at the time of the study must reside in Washington, District of Columbia. Participants recruited for this study will be those with a clinical diagnosis of diabetes and those who do not have a clinical diagnosis of diabetes. The age range for inclusion was18-75 years and must have had health insurance coverage for at least 12months. This will help to eliminate the barrier of inaccessibility to adequate diabetic treatment and healthcare management. All of the above information will be self-reported. The age range reflects the present trends in the development of diabetes and its complications. Though diabetes is increasingly seen in earlier ages today, it remains a disease for the aging afflicting both African American men and women (Shaw-Perry, 2006).

Setting

A two stage random cluster sampling was implemented in this study. First, four clusters were identified following the geographical break-up of the city of Washington, DC, namely northwest, southwest, southeast, and northeast in an effort to improve generalization of the results. The sample was obtained by random sampling of the four clusters as discussed below. This allowed for a uniform distribution of the sample within the population while minimizing time and cost of the study.

All participants in this study will be recruited from one of the four public libraries selected within the city. The District of Columbia houses 26 public libraries which are uniformly distributed within the city. Thus, a public library will be selected from each of the four geographical regions of the town. The mission of all these libraries is very

similar. These are public facilities used for many different functions like job fairs and town meetings apart from the usual library visits to use the computers and /or books in the library.

All participants were randomly selected for this study. Each participant received a copy of the consent form and this form had clear information of their right to refuse to participate in the study. Prior to initiation of the study, the researcher conducted key sessions with the library staff aimed at introducing the purpose of the study, inclusion criteria and the study protocol. These key sessions also attempted to sort for support from the library staff in carrying out this project. Part of the support from the library staff was to coordinate with the librarian's office to have a station placed in the lobby or entrance of each of these libraries over the next 1 to 2 weeks so that individuals can ask questions and fill out the survey during their regular visits of the library.

Data Collection

This study is focused on measuring knowledge level of risk factors, treatment benefits, and preventive health behaviors of diabetes mellitus within the African American adult population. The main exclusion criteria for study participants were non-African American origin and under 18 years of age. Based on the fact that the District of Columbia is largely populated by individuals of African American origin, the researcher thought it wise to handout the survey to whoever will be willing to participate and any individual that will be later identified not meeting the criteria of inclusion will then be

declared invalid. This will serve much time from trying to figure out which of the participants actually meets the inclusion criteria or not.

I handed out the survey to each of the participants willing to participate in the study from the station at the lobby of each of the four libraries after the informed consent must have been obtained. All the participants were encouraged to read each question on the survey carefully and to ask questions whenever there was need for clarification. The researcher at period intervals also have to move around the library to either offer assistance in completing the survey or to pick up surveys that were already completed. This task went on for a couple of days until the required sample size was obtained. The total burden to complete the survey was less than 15 minutes.

Power of the Study

This is a descriptive, cross sectional study that was designed to measure characteristics of the population in terms of proportions. Thus, the appropriate formula required to calculate the sample size for the study was:

$$N = 4(Z)\,(Z)\,[P(1-P)] / (D)(D)$$

Where N is the sample size, D width of the confidence interval, Z is a constant factor corresponding to the desired confidence interval and P is a pre-study estimate of the variable to be measured. The above formula depends on both the width of the confidence interval (D) and also on the magnitude of the proportion (Eng, 2003).

Based on the above formula, at a 95% Confidence limit, confidence interval (CI) of 5%, corresponding Z value of 1.96 and setting the estimated accuracy rate of response

at 50%, the number of cases required will be 384. If the margin of error (CI) is increased to 10%, the sample size required drops to 96.

The above sample size requirements were further verified by the use of the epidemiological software – Epi info v7. Thus, every attempt will be made to assure that at least 96 cases will be evaluated for this study. This is a trade off in an attempt to meet up with the time requirement for this study.

Data Analysis

Study Variables

The primary outcome variables in this study include knowledge of risk factors and complications, treatment benefit and preventive health behaviors. The fourth main variable in this study is actual preventive health behaviors exhibited by the study participants. The instruments/methods that will be used in measuring each of these variables is shown on Table 4.

Table 4

Study variables and instruments

Variable	**Instrument**
Knowledge of risk factors/complications	Risk Perception Survey-Developing Diabetes (RPS-DD)
Knowledge of treatment benefits	Risk Perception Survey-Developing Diabetes (RPS-DD)
Knowledge of preventive health behaviors	Risk Perception Survey-Developing Diabetes (RPS-DD)
Actual preventive health behaviors	Behavioral Risk Factor Surveillance System(BRFSS)

Knowledge on risk factors for diabetes and its complications will be measured using the Risk Perception Survey-Developing Diabetes (RPS-DD). This instrument consist of 43 items and it measure risk factors for developing diabetes and its complications by using 5 subscales namely personal control, worry, optimistic bias, personal disease risk and comparative environmental risk. Each item or question is measured by using a 4-point likert format. Some of the items (questions 1 – 8) were recoded because they were negatively phrased requiring scoring to be reversed so as to conform to the conceptual direction of the subscales. There is also a descriptive risk index included which is not included in the composite risk score that describes one's

overall risk for developing diabetes based on the assessment of the participant's overall knowledge of the risk factors for the disease.

Analysis

The analysis in this study will include both descriptive and inferential statistics. The statistical package Epi-Info v7 which is a specialized soft-ware developed by the Centers for Disease Control and Prevention (CDC) for the analysis and interpretation of epidemiological data will be used in this study. The analysis will begin with a descriptive statistics of the socio-demographic characteristics of the respondents. The variables of age, gender, educational level, occupation and income level are going to be included in this table. Age will maintained as a continuous variable meanwhile all the others as categorical variables. All these variables will be described with frequency tables (counts and percentages). These tables will also goes further to give the measures of central tendency which included the mean, median, mode, and standard deviation of each variable.

Next, a similar table of socio-demographic characteristics will be constructed but at this point, breaking the respondents into two categories: respondents with diabetes and those without the disease.

The risk perception survey for developing diabetes (RPS-DD) scoring tool will be used to calculate the risk perception of those with diabetes and those without diabetes. According to the RPS-DD, risk perception is measured by the used of seven subscales. These subscales include personal control, worry, optimistic bias, personal disease risk

(complications), comparative environmental risk, composite risk score and level of knowledge. Each of these subscales was calculated for each questionnaire following the scoring chart that accompanies the Risk Perception Survey-Developing Diabetes (RPS-DD) instrument. A copy of the scoring chart is presented in appendix two.

Personal control will be calculated by considering the average score of the first four items on the questionnaire which are Questions 1, 2, 3 and 4. This subscale measures the level of knowledge of diabetes risks factors by looking at the respondents' general attitudes in controlling or preventing the disease. This subscale was design with the assumption that individuals with more knowledge of the risks factors of diabetes should have a more positive attitude and behavior in controlling the risk of getting the disease.

Worry is will be determined by considering the average score of questions 5 and 8. This subscale is based on the premise that respondents who are disturbed by the thought of acquiring the disease may likely put in some effort in controlling their present disease state or some preventive efforts in acquiring the disease in the future.

Optimistic bias is will be determined by the average scores of questions 6 and 7. This is generally the mistaken belief that one's chance of acquiring diabetes is lower than that of one's peers and the chances of maintaining good health (free from diabetes) in the future is higher than that of one's peer. Optimistic bias is more likely to be seen in disease states that are controllable and as such people tend to stereotype typical individuals that can acquire the disease (klein and Helweg-larsen, 2002).

Personal Disease Risk will be calculated by considering the likert score for each of questions 9 - 23 plus 1 for either myself or/and any family member having the disease; then the average scores across questions 9 – 23. The Personal Disease Risk subscale is mostly focused on determining the knowledge level of the complications associated with diabetes

Comparative Environmental Risk will be determined by considering the average scores of questions 24 – 32. This subscale is aimed at measuring knowledge of risk factors for diabetes that are associated with possible hazards or dangerous conditions in the respondents' environment like pollution, pesticides etc.

Composite Risk Score will be measured for each of the respondents by considering the average scores of questions 1 – 32.

The last subscale in this questionnaire is the Diabetic Risk Knowledge. Though included as a subscale, is actually an overall measure of the respondent's knowledge of risk of developing diabetes and has been used as a descriptor of the level of knowledge of diabetes risk factors within a population. This subscale will be determined for each of the respondents by considering the sum of correct responses to questions 33 – 43. All correct responses are scored 1 and incorrect responses or 'don't know' will be scored zero.

Analysis of Research Questions.

Five research questions were raised in this study. These research questions will be approached as follows:

Research question 1: Are African American adult population knowledgeable of the risk factors associated with DM?

Null Hypothesis 1: There is no relationship between the African American adult population and their knowledge of risk factors and complications associated with diabetes mellitus.

Alternative Hypothesis 1: There exists a relationship between the African American adult population and their knowledge of risk factors and complications associated with diabetes mellitus.

This question will be evaluated by first considering the scores obtained from each of the first six subscales above. A higher score in each subscale implies a higher perception or knowledge of that subscale and vice-versa. The last subscale which is used as a descriptor of the general level of knowledge or perception of diabetes is scored differently. Sum of correct responses of questions 33 – 43 are considered. A high score implies the respondent is knowledgeable of the risk factors for diabetes. A detailed interpretation and the results obtained from all the subscales reflecting the degree of knowledge of diabetes risk factors will be discussed in chapter four.

Research question 2: Are African American adult population aware of the benefits associated with treatment of diabetes?

Null Hypothesis 2: There is no relationship between the African American adult population and their knowledge of benefits associated with effective treatment and management of diabetes mellitus.

Alternative Hypothesis 2: There is a relationship between the African American adult population and their knowledge of benefits associated with effective treatment and management of diabetes mellitus.

This question will be evaluated by considering question 44. This question carries four choices: 1 (strongly agree) implies the respondent is very knowledgeable of the benefits associated with adequate treatment of diabetes. 2 (agree) implies decreasing knowledge and 3 (disagree) and 4 (strongly disagree) implies the respondent has no knowledge of treatment benefit for the disease.

Research question 3: do African American adult population with diabetes more knowledgeable of the risk factors and treatment benefits of the disease, than their counterparts without the disease?

Null Hypothesis 3: There is no significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease.

Alternative Hypothesis 3: There is a significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease.

This question will be evaluated by considering the previous two research questions. The above will be repeated while placing the respondents into two classes: those with the disease and those without the disease.

Question 4: How is knowledge of risk factors and treatment benefits distributed across the African American population amongst those with the disease and those without the disease when considering the different socioeconomic classes?

Null Hypothesis 4: There is no significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of diabetes mellitus when measured across the various socio-economic groups.

Alternative Hypothesis 4: There is a significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of diabetes mellitus when measured across the various socio-economic groups.

The respondents in the two classes of those with the disease and those without the disease will be classified according to their response to the question on the fifth subscale. This subscale consists of 11 items. Each item though with four responses is scored only with 1

and 0. Correct score=1, incorrect/don't know=0. A categorical variable: Risk knowledge was created for each respondent on the bases that six or more correct answers=1 and 0 for five or less questions. Similarly, another categorical variable was created: SES which places each respondent as either High SES (1), mid SES (2) and low SES (3). Using the epidemiological software Epi info v7 a cross tabulation of these variables will be performed.

A similar procedure will be carried out with the above three questions that measured treatment benefits.

Question 5: What is the relationship between risk perception and health preventive behaviors and does such translate into a healthier lifestyle within this ethnic group?

Null Hypothesis 5: There is no relationship between knowledge of diabetes risk factors and knowledge of health preventive behaviors and as such no lifestyle modifications were seen within the African American adults' population.

Alternative Hypothesis 5: There exist a relationship between knowledge of diabetes risk factors and knowledge of health preventive behaviors and this has been translated into healthy lifestyle modifications within the African American adults' population.

Knowledge of risk perception was already determined above. Knowledge of preventive health behaviors will be measured by considering responses to items 35, 41 and 43. Similarly, healthier lifestyle will be determined by considering responses to questions on

the BRFSS. Thus, comparison will be made to determine if knowledge of preventive health behaviors did translate into actual behaviors within this population or not

Protection and Confidentiality of Participants

Informed consent (Appendix C) will be obtained from each participants. There will be an option for each respondent to decline participation on the consent form. This will be a highlighted and bolded statement placed at the top of the consent form. Also the consent form will clearly indicated that participants can leave the study at any time the wish to do so even after they have consented to be a participant without penalty. Before the initiation of the study, the Walden University Institutional Review Board (IRB) will have to approve the study protocol for data collection and analysis as part of it commitment towards the protection of human subjects and also in response to Federal mandate that calls for increased emphasis on protection of human subjects in research. Walden University's approval number for this study was **06-03-14-0099017.** Participants' names or any other personal identifiers were not used in any part of the study. All the surveys received will be kept under lock and key, and I will be the only one that has access. These data will be held for 5 years after the study has been conducted after which it will be destroyed. .

Agenda for Survey Completion

Data collection for this study was expected to take about 6 weeks. This includes the time required for the pilot surveys, review of pilot surveys, and the questionnaires. A detailed time frame is shown on Table 5.

Table 5

Time Frame for Survey Instrument Distribution and Collection

Timeframe	Activity
Week 1	Pilot surveys and consent letter at library A and B
Week 2	Pilot surveys and consent letter at library C and D
Week3	Review of pilot surveys and make any possible adjustments
Week4	Collecting of data from library A and B
Week5	Collecting of data from library C and D
Week5	Review of all surveys collected

Limitations of the study

External validity may be an issue in this study. The sample size of 96 was maintained for this study which may be small to detect any trends within this population. There is the possibility of bias on the part of the researcher as a result of direct interaction between the researcher and respondents in an attempt to clarify issues raised in the process of completing the survey. There are numerous factors that affect ones perception

or understanding that were not included in this study. These may have posed a limitation in this study. These include finances, geographical location etc.

Summary

The present chapter has provided a brief description of the research design required for this study. The rational for choosing this specific design, instrumentation used and data analyses required were also discussed in this chapter. A detailed description of the participants, the setting of the study and all possible measures undertaken to protect the participants in this study was also discussed. Finally the role of the researcher was outlined alongside a tentative timeline for the collection of the required data. Thus, it is hoped that this chapter will further enhanced the reader's knowledge of the research, associated methodology and conceptual framework presented earlier chapters of this study.

The results obtained from the present study design are presented in Chapter 4. A concise analysis of the hypotheses and research questions raised in this study are presented using the statistical package Epi-Info v7, a specialized soft-ware developed by the CDC for the analysis and interpretation of epidemiological data. This statistical package was used both for descriptive and inferential analyses.

Chapter 4: Results

Introduction

Findings from this research study are presented in this chapter. This contains the results and the analyses of the hypotheses and addresses the five research questions posed in this study. The findings of this study are presented in three main sections: (a) selected socio-demographic characteristics of the participants (b) analysis of the five research questions and hypotheses for this study, and (c) a summary of the results. The statistical package Epi-Info v7, specialized software developed by the CDC for the analysis and interpretation of epidemiological data, was employed for both descriptive and inferential analysis. The RPS-DD scoring tool was used to determine the risk perception or level of knowledge of both those with diabetes and those without diabetes.

Survey Response

I handed out a total of 168 surveys and consent forms to potential participants at the four different public libraries in the city of Washington DC identified for this study. Each library received 42 copies. The goal was a return of 30 completed surveys from each location. Some of the returned surveys were incomplete and as a result were omitted from analysis. Other surveys (16%) were never returned to the researcher. These data are presented in Table 6.

Table 6

Survey Response of Participants

Location	Number of surveys distributed*	Number of surveys returned	Number of incomplete surveys
Library A	42	36	8
Library B	42	32	3
Library C	42	41	5
Library D	42	34	1

*A total of 168 surveys and consent forms were distributed.

A sample size of at least 96 participants was needed for this study as stated in Chapter 3. As shown in Table 6, 126 surveys were retained for analysis in this study.

Socio-Demographic Characteristics

The sample consisted mostly of middle-aged to elderly African American men and women. The average age for this sample was 52 years with ages ranging between 20 to 75 years. Of the 126 participants in this study, 61 (48.41%) were female, with, 11 (8.7%) having diabetes. Sixty-five (51.59%) were male, with only five (4.0%) reporting having diabetes at the time of this study. Thus a total of 16 (12.70%) participants reported as having the disease.

Two questions adapted from the BRFSS questionnaire were used to determine the socio-economic status of the participants. These questions focused on educational status and income level only. Educational status was original measured on a scale of 1 to 6

ranging from *never attended school or only attended kindergarten* to *attended 4 years college or graduate school*. For the ease of analysis, this question was recoded into a scale of 1 to 3: 1 = *below high school level*, 2 = *high school graduate*, and 3 = *some college and above*. Based on the above codings, the sample was distributed as shown in Table 7:

Table 7

Educational Status of all Participants

Educational level	Frequency	Percent	Cum. percent
1-Below high school	56	44.44%	44.44%
2-High school graduate	27	21.43%	65.87%
3- Some college and above	43	34.13%	100.00%
Total	126	100.00%	100.00%

When considering only participants with diabetes, the sample distribution noted in Table 7 changes to that shown in Table 8:

Table 8

Educational Status of Participants With Diabetes

Educational level	Frequency	Percent	Cum. percent
1-Below high school	7	43.75%	43.75%
2-High school graduate	3	18.75%	62.50%
3-Some college and above	6	37.50%	100.00%
Total	16	100.00%	100.00%

Similarly, the annual income of the participants was originally recorded on a scale of 1 to 8 ranging from *less than $10,000* to *$75,000 and above*. This variable was summarized into two broad categories: 1 = participants who earned less than $35,000 annually, and 2 = all participants who earned more than $35,000 annually, as shown in Table 9.

Table 9

Annual Income of All Participants

Income	Frequency	Percent	Cum. percent
1-(less than $35,000)*	96	76.19%	76.19%
2-($35,000 and above)*	30	23.81%	100.00%
Total	126	100.00%	100.00%

Note. *Annual income

When the data in Table 9 were compared with those having diabetes, the sample distribution changes as shown on Table 10 below:

Table 10

Annual Income of All Participants With Diabetes

Income	Frequency	Percent	Cum. percent
1-(less than $35,000)*	12	75.00%	75.00%
2-($35,000 and above)*	4	25.00%	100.00%
Total	16	100.00%	100.00%

*Annual income

The Risk Perception Survey for Developing Diabetes (RPS-DD) Scoring Tool

In an attempt to enhance the understanding of the results of this study using the risk perception survey for developing diabetes (RPS-DD) scoring tool, a description of the data for each of the six main survey subscales will be included in this section. This description will include the number of items considered in each subscale, the response format, mean scores of each subscale including the corresponding standard deviation (±SD) and the internal consistency reliability coefficients for the sample.

Reliability

Cronbach's coefficient alpha (α) was used to determine the internal consistency reliability coefficient of the six variable constructs derived from the RPS-DD with the data obtained in this study. Cronbach's alpha determined for each of the variable construct was as follows: (a) personal control = .84; (b) Worry = .75; (c) optimistic bias =

.93; (d) comparative disease risk = .92; (e) comparative environmental risk = 0.81 (f) composite risk score = 0.84. A Cronbach's alpha value of .70 or above is considered acceptable. All constructs were reliable for the dataset used in this study.

The personal control subscale (4 items; α = 0.84), a mean score of 2.36 ± 1.05 was obtained. On a scale of 1 (*strongly agree*) to 4 (*strongly disagree*); a higher score indicates greater perceived personal control over developing diabetes within the sample. Thus the above mean score indicates a modest tendency towards personal control of diabetes within this sample.

The next subscale has to deal with participants' worry of having the disease diabetes (2 items; α =0.75). A higher score in this subscale is an indication of a less perceived risk of developing diabetes. On a scale of 1 (*more worry*) to 4 (*less worry*), a mean score of 1.81±0.96 is an indication of a relatively slight perceived risk across this subscale.

For the optimistic bias subscale (α 0.93), two items were considered. A higher score in this subscale describes more perceived risk for developing diabetes, which corresponds with a responds of less optimistic bias and more realism or pessimism about developing diabetes. On a scale of 1 (more bias) to 4 (less bias), the mean score of 1.90 ±1.07 obtained in this study, on average indicates a more tendency towards optimistic bias.

The Comparative Disease Risk subscale (15 items; α = 0.92) measures perceived risk across 15 diseases states and conditions. On a scale of 1 ("almost no risk") to 4

("high risk"), a higher score indicates greater perceived risk. The mean subscale score of 2.21 ± 1.09 out of 4.0 indicates a relatively slight perceived risk across these diseases states and conditions.

The Comparative Environmental Risk subscale consisting of nine items ($\alpha = 0.81$) measures perceived environmental risks across the sample. This subscale utilizes the same response set as the Comparative Disease Risk subscale. A higher score indicates greater perceived environmental risk. The mean subscale score of 2.31 ± 1.07 indicated, on average, a more perceived personal risk from the environment than for the comparative diseases in this sample.

The composite risk score for the sample was determined by considering 32 items ($\alpha = 0.84$). On a scale of 1 to 4, a higher mean score indicates more perceived risk for diabetes. The mean score obtained for this sample was 2.21 ±1.05 indicating a slight tendency towards a more perceived risk.

The next subscale was the Diabetes Risk Knowledge section which is used as the overall descriptor of the level of knowledge of diabetes for the participants. This section included 11 items, which focused primarily on risk factors for Type 2 diabetes. This was section was evaluated by determining the average number of correct responses to all the questions. The average number of correct responses in this sample was 4.71 out of a possible score of 11. The frequencies of the number of correct responses in this subscale are presented on table 11 below.

Table 11

Frequency of number of correct responses

Number of correct responses*	Frequency	Percent	Cum. percent
0	2	1.59%	1.59%
1	4	3.17%	4.76%
2	6	4.76%	9.52%
3	15	11.90%	21.43%
4	28	22.22%	43.65%
5	35	27.78%	71.43%
6	20	15.87%	87.30%
7	9	7.14%	94.44%
8	5	3.97%	98.41%
9	2	1.59%	100.00%
Total	126	100.00%	100.00%

*A maximum of 11 correct responses was possible.

None of the 126 participants were able to get all the 11 questions correct. More than 90 (71.43%) of the participants fell below the 50% mark for the correct responses indicating a lack of knowledge of the risk factors of Type 2 diabetes.

Looking at individual questions on the Diabetes Risk Knowledge subscale, most participants tend to be more knowledgeable about lifestyle risk factors, such as exercising

regularly, diet control or sedentary lifestyle, and less knowledgeable about risks to specific ethnic groups. In particular, only about 30% of the participants knew that being of Asian or Indian origin increased one's risk of developing diabetes. Most of the participants in this study (61%) were knowledgeable of the fact that being Black or of African American origin greatly increases the risk of developing diabetes.

Table 12 below ranks by mean score the 15 diseases or conditions from the Comparative Disease Risk subscale. This table gives the proportion of subjects who responded that they were personally at high risk for each disease or condition. The combined proportion of those who responded either moderate or high risk is also given. It was noted that heart disease, infection needing treatment by a physician, high blood pressure, kidney failure and cancer had higher mean scores for perceived personal risk to health than did diabetes and other diseases and conditions, including several chronic complications of diabetes. With a mean subscale score of 2.20±0.26, the majority of respondents reported either "slight risk" or "moderate risk" of these 15 diseases or conditions.

A similar ranking for the 9 Comparative Environmental Risk subscale items is also presented on Table 12. Medical X-rays, driving/ riding in an automobile, Street drugs and Cigarette smoke from other people also had higher mean scores for perceived risk to health than the other environmental conditions. More than 50% of the participants also perceived each of these 4 environmental conditions a "moderate "or "high" environmental risk, in contrast to house hold chemicals and violent crime which was

described by only 19.05% and 18.55% of participants as a moderate or high risk respectively. With a mean subscale score of 2.31±0.49, the majority of respondents reported either “slight risk” or “moderate risk” from the nine environmental hazards.

Table 12

Comparative Disease Risk and Comparative EnvironmentalRrisk

	Mean score	Proportion responding *high risk*	Proportion responding *moderate* or *high risk*
Comparative disease or condition risk			
Arthritis	1.94	11.90	25.39
Heart disease	2.42	26.98	42.85
Cancer	2.61	23.81	55.56
High blood pressure	2.40	26.19	42.06
Hearing loss	2.03	8.73	32.54
Asthma	2.04	11.11	32.54
Diabetes	2.00	20.63	25.39
Osteoporosis	1.95	9.52	25.38
Stroke	2.20	22.22	40.47
Blindness	2.06	11.11	33.33
Foot amputation	1.97	12.70	25.40
Infection needing treatment	2.79	31.75	65.88
Impotence in men	2.17	21.43	39.78
Kidney failure	2.34	26.29	42.26

Aids	2.10	19.05	41.27
Comparative environmental health risk			
Medical X-rays	2.89	40.48	63.50
Violent crime	1.78	8.87	18.55
Extreme weather (hot/cold)	2.00	19.05	30.16
Driving/riding in an automobile	2.81	42.06	56.35
Street drugs	2.75	32.54	55.56
Air pollution	1.93	15.08	29.37
Pesticide	2.01	13.49	27.78
Household chemicals	1.76	10.32	19.05
Cigarette smoke from other people	2.81	32.54	65.87

*Mean scores are based on response scale ranging from 1 (*almost no risk*) to 4 (*high risk*).

Analysis of Research Questions

Inferential Analysis Related to Hypothesis 1

Null Hypothesis 1: There is no relationship between the African American adult population and their knowledge of risk factors and complications associated with diabetes mellitus.

Alternative Hypothesis 1: There exists a relationship between the African American adult population and their knowledge of risk factors and complications associated with diabetes mellitus.

This hypothesis was evaluated by considering the mean scores obtained from each of the six subscales above. A higher score in 4 of the subscales (personal control, comparative disease risk, comparative environmental risk and composite risk score) implies a higher perception or knowledge of that subscale and vice-versa. Meanwhile for the subscales dealing with worry and optimistic bias, a higher score is an indication of less knowledge and vice-versa. This is due to the fact that scoring within these 2 subscales was reversed to conform to conceptual direction of subscales. The last subscale which is used as a descriptor of the general level of knowledge or perception of diabetes was also determined. A high score implies the respondent is knowledgeable of the risk factors for diabetes. A summary of the means scores calculated across all the subscales is presented on Table 13 below.

Table 13

Summary of Mean Scores Across the Subscales

Subscale	Mean score	Std deviation	Alpha coefficient
Personal control	2.36	2.05	0.84
Worry	1.81	0.96	0.75
Optimistic Bias	1.90	1.07	0.93
Comparative Disease Risk	2.21	1.09	.092
Comparative	2.31	1.07	0.81

Environmental Risk			
Composite Risk score	2.21	1.05	0.84
Diabetic Risk	4.67	1.73	N/A
Knowledge			

Conclusion Related to Hypothesis 1

All the subscales indicated a slight tendency towards a more perceived risk of diabetes. However, the diabetic risk knowledge subscale which is used as a descriptor of level of knowledge for this scoring tool was determined to be only 4.71 out of a possible score of 11. Based on this later assertion, the null hypothesis was rejected.

Inferential Analysis Related to Hypothesis 2

Null Hypothesis 2: There is no relationship between the African American adult population and their knowledge of benefits associated with effective treatment and management of diabetes mellitus.

Alternative Hypothesis 2: There is a relationship between the African American adult population and their knowledge of benefits associated with effective treatment and management of diabetes mellitus.

This research question was evaluated by considering Question 8B on the survey: "I feel that taking my diabetes drugs as directed will help in controlling my illness". This question carries four possible choices ranging from: 1 (*strongly agree*) implies the respondent is very knowledgeable of the benefits associated with adequate treatment of

diabetes. 2 (*agree*) implies decreasing knowledge and 3 (*disagree*) and 4 (*strongly disagree)* implies the respondent has no knowledge of treatment benefit for the disease. Respondents in the first 2 categories (1 and 2) are generally considered to be knowledgeable of the benefits associated with the timely management and treatment of diabetes.

Table 14

Knowledge of benefits associated with diabetes treatment

Response to question 8B	Frequency	Percent	Cum. Percent
1 - Strongly agree	66	52.38%	52.38%
2 - Agree	28	22.22%	74.60%
3 - Disagree	15	11.90%	86.51%
4 - Strongly Disagree	17	13.49%	100.00%
Total	126	100.00%	100.00%

Conclusion Related to Hypothesis 2

Based on the data presented in Table 8, 74.60% of the participants were found to be knowledgeable on the benefits of treating diabetes within a timely manner. Thus the null hypothesis was rejected.

Inferential Analysis Related to Hypothesis 3

Null Hypothesis 3: There is no significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease.

Alternative Hypothesis 3: There is a significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease.

This question was evaluated by first considering the previous two hypotheses (research question 1 and 2). The above was repeated while placing the respondents into two classes: those with the disease and those without the disease. Respondent already having diabetes were coded (1) and those without the disease were coded (0). A stratified analysis was then carried out as shown on table 9 below.

Table 15

Knowledge of Rrisk Factors of Diabetes Stratified by Diabetes Status

Respondent without diabetes				Respondents with diabetes			
Knowledge level	Frequency	Percentage	Cum. percentage	Knowledge level	Frequency	Percentage	Cum. percentage
0	2	1.82	1.82	1	2	12.50	12.50
1	2	1.82	3.64	2	1	6.25	18.75

2	5	4.55	8.18	3	1	6.25	25.00
3	14	12.73	20.91	4	3	18.75	43.75
4	25	22.73	43.64	5	5	31.25	75.00
5	30	27.27	70.91	6	2	12.50	87.50
6	18	16.36	87.27	7	2	12.50	100.00
7	7	6.36	93.64				
8	5	4.55	98.18				
9	2	1.82	100.00				

Respondents with 5 or less of the correct responses to questions 33 – 43 are generally considered not knowledgeable of the risk factors for developing diabetes. Considering the results on table 9 above, 70.91% of those without diabetes were found not knowledgeable of the risk factors of diabetes. Comparing with those having diabetes, 75.0% also display a lack of knowledge of the risk factors for developing diabetes.

Table 16

Knowledge of Treatment Benefits of Diabetes Stratified by Diabetes Status

Respondent without diabetes				Respondents with diabetes			
Knowledge of treatment	Frequency	Percentage	Cum. percentage	Knowledge of treatment	Frequency	Percentage	Cum. percentage
1	56	50.91	50.91	1	10	62.50	62.50
2	25	22.73	73.64	2	3	18.75	81.25
3	13	11.82	85.45	3	2	12.50	93.75
416	16	14.55	100.00	4	1	6.25	100.00
Total	110	100.00	100.00	Total	16	100.00	100.00

Respondents in the first 2 categories (1 and 2) are generally considered to be knowledgeable of the benefits associated with the timely management and treatment of diabetes. Thus, considering the results on table 10 above, 73.64% of those without diabetes were found knowledgeable of the benefits of diabetes management. Comparing with those having diabetes, 81.25% was also found to be knowledgeable of the benefits associated with the timely management and treatment of diabetes.

Conclusion Related to Hypothesis 3

Based on the above analysis, a difference was noted within the African American adults' population with diabetes mellitus and their counterparts without the disease when

considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease. Thus the null hypothesis was rejected.

Inferential Analysis Related to Hypothesis 4

Null Hypothesis 4: There is no significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of diabetes mellitus when measured across the various socio-economic groups.

Alternative Hypothesis 4: There is a significant difference between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of diabetes mellitus when measured across the various socio-economic groups.

The socio-economic status of the participants was determined by the using the variables income and educational level. Educational level was coded as (1) -below high school level, (2) -high school graduate and (3) - some college and above. Similarly, income was coded as (1) - participants who earned less than $35,000 annually and (2) - all participants who earned more than $35,000 annually.

Participants with diabetes were first considered in the analysis of this section. A stratified analysis showed that among those with diabetes, all the individuals with annual income above $35,000 had no knowledge of risk factors of diabetes while those with a lower annual, only 33.33% were knowledgeable of such risk factors. Considering, educational level, individuals falling below high school level, only 14.29% were able to

identify the risk factors for diabetes. Those in the categories of high school and college level both scored 33.33% for those that could identify risk factors for diabetes.

Higher income individuals who were found to be knowledgeable of treatment benefits of diabetes scored 75.0% meanwhile those with lower income was slightly higher with 83.33% of college graduates, 71.43% of those below high school level and 66.67% of those with high school diploma display knowledge on treatment benefits of diabetes respectively when considering educational level.

Similarly, among participants without diabetes, those with knowledge of the risk factors of diabetes were distributed across the different educational levels as follows: college graduates 35.14%, high school 25.00% and below high school level 26.53%. Meanwhile 30.77% of high income earners and 28.57% of those earning less than $35,000 annually did display such knowledge also.

86.49% of college graduates, 75.0% of those with high school diploma and 63.27% of participants below high school were found knowledgeable of the benefits of diabetes treatment. A similar high trend was noted across income levels with 80.77% and 71.43% with regards to those earning more than $35,000 and those below $35,000 annually respectively.

Conclusion Related to Hypothesis 4

There is a general lack of knowledge of the risk factors for diabetes among those with diabetes and their counterparts without the disease even when considering socioeconomic differences within the sample. On the other hand, knowledge of treatment

benefits of diabetes maintained a high score across both groups. Based on the observed differences, the null hypothesis was rejected.

Inferential Analysis Related to Hypothesis 5

Null Hypothesis 5: There is no relationship between knowledge of diabetes risk factors and knowledge of health preventive behaviors and as such no lifestyle modifications were seen within the African American adults' population.

Alternative Hypothesis 5: There exist a relationship between knowledge of diabetes risk factors and knowledge of health preventive behaviors and this has been translated into healthy lifestyle modifications within the African American adults' population.

The analysis of this question was slated into three sections: knowledge of risk factors of diabetes, knowledge of preventive health behaviors and actions or steps (if any) that have been put in place by the respondents in relationship to their knowledge levels of risk factors of diabetes and preventive health behaviors.

28.57% of the participants were found to be knowledgeable of the risk factors of diabetes. Three questions were used to measure the knowledge of preventive health behaviors. The focused of these questions were on healthy dieting, physical exercise and body weight control. The number of correct responses to these questions was 75.40%, 61.11% and 64.29% respectively.

From table 17, at least 24.60% of the participants do smoke cigarettes daily or some days while a much smaller number (7.14%) indicated they chew tobacco. Only

7.14% of these participants indicated that during the past 12 months, they have actually stopped smoking for at least one day or more because they were trying to quit smoking. A similar trend was noted with alcohol consumption, with very little action being put in place by the participants aimed at curtailing the number of drinks per day or per week.

33.33% of the participants indicated taking part in some physical activity or exercise within the past month. Of this number, only 7.14% have actually made it a daily event. Only a staggering number was noted to actually participate in maintaining a healthy eating habit. In all the classes of food considered healthy, only about 10.00% averagely, indicated it was their daily routine. Most importantly, 67.46% indicated they have never considered vegetable consumption. Similar high numbers were also noted across the other class of healthy foods as seen on table 17.

Table 17

*A tabulation of Healthy Habit Practices**

	Every day	Some days	Not at all	Never/Not sure
Smoking cigarettes	18.25	6.35	75.40	0
Chewing tobacco	1.59	5.56	92.86	0
	Per day	Per week	Per month	Never/not sure
Juice consumption	16.6	8.73	10.32	64.29

Fruit consumption	11.90	17.46	14.29	56.35
Vegetable consumption	8.73	16.67	7.14	67.46
Other healthy foods	12.7	23.81	16.67	46.83

*All numbers are Percentages of respondents.

Conclusion Related to Hypothesis 5

Knowledge of risk factors of diabetes seems to be generally lacking within the participants. Even though knowledge on health preventive behaviors was found to be high within this population, this was never translated in to a healthy lifestyle. Due to the fact that no relationship seems to exist between these three variables, the hypothesis was accepted while rejecting the null hypothesis.

Summary

This chapter began with a description of the socio-demographic characteristics of the participants involved in the study. This was followed by inferential analysis of the research questions and hypothesis and finally, a summary of the chapter was presented. Reliability information was also determined and reported for the variable constructs used for the inferential analysis. Five different hypotheses were raised in this study. The focused of these hypotheses were to determine the knowledge of risk factors for diabetes,

knowledge of benefits associated with timely management of diabetes, knowledge of preventive health behaviors of diabetes and how such knowledge has been translated (if any) into a healthy lifestyle.

Research question 1: Are African American adult population knowledgeable of the risk factors associated with DM? The results of the analysis of this question indicated that though all the subscales indicated a slight tendency towards a more perceived knowledge of risk factors of diabetes, the diabetic risk knowledge subscale which is used as a descriptor of level of knowledge was very low.

Research question 2: Are AA adult population aware of the benefits associated with treatment of diabetes? The results of the analysis of this question indicated that more than 74.60% of the participants are knowledgeable on the benefits of treating diabetes within a timely manner.

Research question 3: do AA adult population with diabetes more knowledgeable of the risk factors and treatment benefits of the disease, than their counterparts without the disease? The results of the analysis of this question indicated that a difference does exist within the African American adults' population with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease.

Research question 4: How is knowledge of risk factors and treatment benefits distributed across the African American population amongst those with the disease and those without the disease when considering the different socioeconomic classes? The

results showed a lack of knowledge of the risk factors for diabetes among those with diabetes and their counterparts without the disease even when considering socioeconomic differences within the sample. Knowledge of treatment benefits of diabetes maintained a high score across both groups.

Question 5: What is the relationship between risk perception and health preventive behaviors and does such translate into a healthier lifestyle within this ethnic group? Knowledge of risk factors of diabetes was determined to be lacking within the participants. Though knowledge on health preventive behaviors was found to be high within this population, this was never translated into any healthy lifestyle.

The next chapter will summarize the research findings and draw conclusions for the data presented in this chapter. Chapter 5 will also provide recommendations for further study. This will also answer the research questions to the corresponding hypothesis and compare the current study findings with data from past research reviewed earlier in this study in chapter 2.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

This chapter will present the summary of the findings, conclusions drawn from the data and will go ahead to slat recommendations needed for further action. This chapter also tries to compare the literature review carried out earlier in this study with the research findings. The implications for social change and limitations noted in this study are also explained.

The results of this study represent only a small portion of individuals who reside in the District of Columbia. There are over 800,000 inhabitants in the District of Columbia. This location was chosen for the study because though African Americans constitute only 13.6% of the United States population, the African American population in the District of Columbia is more than 52.2% (United States Census Bureau, 2011).

The purpose of this study was to evaluate the knowledge of African Americans on the risk factors of diabetes like age, race, family history of diabetes and gestational diabetes. It also looked at Knowledge of Diabetes complications, treatments benefits and Knowledge of Preventive health behaviors like healthy dieting, physical inactivity, smoking and weight control. Thus the quest of this study was to set a frame that should be able to facilitate the developing of interventions that will be able to aid in reducing the burden of this disease within the African American adults' population. Specifically, the data collected on the area of risk knowledge, personal risk, treatment benefits and

preventive health behaviors should be able to pinpoint the focus and type of such an intervention(s).

A two stage random cluster sampling was implemented in this study. Four clusters were identified following the geographical break-up of the city. A total of 168 surveys and consent forms were handed out to participants at these four locations. 143 surveys were completed and returned to the researcher but only126 were retained for the analysis of this study due to missing data records. The results of this study indicated that the African American adult population is not equipped with enough knowledge of the risk factors associated with diabetes. Though knowledge on treatment benefits of diabetes and health preventive behaviors was found to be high within this population, this was never translated into any healthy lifestyle.

Conclusions and Literature Review Comparisons

Five research questions were raised in this study. Each of these research questions tend to build on the knowledge gained from the previous questions. The main variables of interest within these questions include knowledge of risk factors of diabetes and its complications, benefits of timely management and treatment of diabetes, preventive health behaviors and socio-economic factors.

Research question 1: Are African American adult population knowledgeable of the risk factors associated with diabetes?

A critical look at past studies, has revealed that there are very few studies at moment that have actually looked at the perception of risk factors of diabetes amongst the

general population (Calvin et al., 2011) . As concern African Americans, there is even less information that describe such perceive risk of developing diabetes. Calvin et al., (2011) have noted that the present published research that details the relationships among diabetes, well-being and illness perception cannot be generalized to African American adults.

The few studies that have dealt with perception of diabetes with or without health preventive behaviors have noted either a general lack of knowledge of the disease or even where there is some understanding of the disease, such in most cases has always been a wrong conception as was clearly shown by Cullen and Buzek (2009), Jennette et al. (2010), and Wong and Toh (2009). Cullen and Buzek (2009) in another studying aimed at accessing the diabetic knowledge and risk factors awareness among African American and Hispanic families, also noted that there was a lack of such knowledge within both communities. In a similar study, the authors Kim et al. (2007) have also looked at the risk perception among women who had had some history of gestational diabetes. Despite the fact that the relationship between gestational diabetes and postpartum diabetes are well understood, most of the women in the study consider themselves not to be at risk when compared with the general population.

The outcome of data collected for this study seems to be consistent with already published studies. In this study, the RPS-DD was administered to a sample of representatives who are at risk for diabetes. The six main subscales used with this instrument to determine the knowledge of risk factor for diabetes had acceptable

reliability. The personal control subscale indicated a modest tendency towards personal control of diabetes within this sample. Individuals with more knowledge of the risks factors of diabetes should have a more positive attitude and behavior in controlling the risk of getting the disease. The calculated mean score for this subscale indicates, that such a positive attitude is absent in this sample.

The optimistic bias subscale on average indicated a more tendency towards optimistic bias. This is generally the mistaken belief that one's chance of acquiring diabetes is lower than that of one's peers. These results are consistent with past studies that have indicated it is more likely for individuals to stereotype others as being more prone to acquiring a chronic disease like diabetes than do themselves (klein and Helweg-larsen, 2002). Such a behavior was noted in this study by Kim et al. (2007). Bringing together women with history of gestational diabetes, it was noted that though more than 90% of these women acknowledged a history of gestational diabetes as a risk factor for future diabetes, less than 10% believe they themselves were at high risk for the disease.

Similarly, when considering the subscale dealing with worry, a relatively slight perceived risk across this subscale is an indication that respondents are not much disturbed by the thought of acquiring the disease. Individuals in this category may likely not put in much effort in controlling their present disease state in other to avoid acquiring the disease in the future.

The Comparative Disease Risk subscale indicates a relatively slight perceived risk across these diseases states and conditions meanwhile the Comparative Environmental

Risk subscale on the other hand indicated, a more perceived personal risk from the environment than for the comparative diseases in this sample. The Comparative Disease Risk subscale is mostly focused on determining the knowledge level of the complications associated with diabetes. It may be more obvious for participants to identify pollutants in the environment like pesticides, smoke when compared to complications of diabetes that may require some expert knowledge.

The last subscale in this questionnaire was the Diabetic Risk Knowledge. A very low mean score was obtain in this subscale and less than 30% of the participants were able to get 50% or more of the correct responses. Though included as a subscale, this is actually an overall measure of the respondent's knowledge of risk of developing diabetes and has been used as a descriptor of the level of knowledge of diabetes risk factors within a population.

Studies carried out so far on determining risk perception for diabetes within the general population have centered on comparing the different ethnic groups in the united states (Calvin et al., 2011). Results obtained from most of these studies have classified African Americans amongst those ethnic groups with low knowledge of risk factors for diabetes. The present study focused primarily on African American, has produced similar results.

Research question 2: Are African American adults aware of the benefits associated with treatment of diabetes?

Knowledge of diabetes management is paramount to the effective control of the disease. The non-compliance to diabetic drug regimen and the difficulties in improving adherence in such patients are well documented (Chin, Polanski, Thomas, and Nerney, 2000; Harris, Linn, Skyler and Sandifer, 1987). The American public health Association APHA, American Psychological Association (APA) along with the other health organizations have proposed possible steps that must be implemented if the patient must adhere to their treatment regimen. Barriers to adherence to treatment regimens have been identified as one of the most important factors. Lack of knowledge of the importance to adhere to treatment protocols has been identified to be at the top of such barriers.

Based on the data collected in this study, about 75% of the participants were found to be knowledgeable on the benefits of treating diabetes within a timely manner. A relatively high knowledge of timely management and treatment of diabetes as such, is a positive step in overcoming the non-compliance problem that has continued to plaque the entire medical field cutting across all the disease states and ethnicities.

Due to the importance of the patient's behavior in the control and management of diabetes, many studies have been carried out on this topic. Limited health literacy or lack of knowledge of the disease has been identified in a couple of studies as a major drawback to lack of knowledge of treatment benefits associated with the disease (Onwudiwe et al., 2011; Quinn et al., 2011). Though knowledge of the benefits of treatments of diabetes seems high in this study, an overall lack of knowledge of the

disease remains an important factor to be addressed within the African American community in the District of Washington DC and nationwide.

Research question 3: Do African American adult population with diabetes more knowledgeable of the risk factors and treatment benefits of the disease, than their counterparts without the disease?

It will be but logical to think that individuals with a chronic disease like diabetes should be more knowledgeable of the risk factors for the disease and benefits associated with timely management of the disease than their counterparts without the disease? The results of this study indicates a lack of knowledge of risk factors for the disease from both groups with only 25% of those with diabetes and about 30% of participants without the disease displaying some knowledge of risk factors for the disease respectively. An opposite picture was obtained when considering knowledge of the benefits of treatment of diabetes. Both groups appear to be very knowledgeable on this topic.

Low literacy rate on diabetes may be a major contributing factor to the low level of knowledge of the risk factors of the disease recorded in this study. Prior studies have noted socioeconomic differences with regards to outcome expectations for diabetes. In a study by Figaro, Elasy, BeLue, Speroff, and Dittus, (2009) in which they explore health behaviors of adults with Type 2 diabetes of different socioeconomic status, it was observed that individuals classified as belonging to the higher socioeconomic class exhibited more positive outcomes than subjects of lower socioeconomic status. The socio-economic distribution of the participants and how this has affected the distribution

of knowledge of risk factors of the disease and treatment benefits is the focus of the next research question.

Due to the fact that a difference was noted within the African American adults' population with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the disease, the null hypothesis was rejected while retaining the alternative hypothesis.

Research question 4: What is the relationship between African American adults with diabetes mellitus and their counterparts without the disease when considering knowledge or awareness of the risk factors, complications and treatment benefits of the diabetes mellitus when measured across the various socio-economic groups?

Socio-economic disparity within any group or society may lead to differences in knowledge. Thus the focus of this research question was to determine how such disparity within the African American population has affected their knowledge or awareness of the risk factors, complications and treatment benefits of the disease when controlling for diabetes status.

Data collected reveals that college graduates and participants with higher income were able to display more knowledge of the risk factors of diabetes when considering those without diabetes. Similar, knowledge of benefits of treatment of diabetes also had higher scores with college graduates and those of higher income within this group of participants without diabetes. This means that participants of educational level below

high school and those of lower annual income presented with a lesser level of knowledge of both risk factors and benefits of treatment of diabetes.

When the above paragraph was compared with individuals having diabetes, those with lower annual incomes and those of high school and college level also reported higher knowledge of the risk factors for diabetes. Similarly, considering the knowledge of benefits of treatment of diabetes within this group, those with lower annual incomes and college graduate level seem to be more knowledgeable. Thus participants with educational level below high school and those of higher annual income presented with a lower level of knowledge of both variables of risk factors and benefits of treatment of diabetes within this group of individuals already having diabetes.

Two indicators were used in this study to measure the socio-economic status of the participants namely education and income level. More than 62% of the participants fall below high school level meanwhile about 76% earn less than $35,000 annually. This is an indication that the population involved in this study is of a low socio-economic status. Thus the findings so far in this study fits into the findings of Figaro, Elasy, BeLue, Speroff, and Dittus, (2009) mentioned earlier in this chapter: socioeconomic differences within the study group tends to affect the outcome expectations of knowledge of diabetes. Thus at this point it can be speculated that the low level of knowledge of risk factors of diabetes noted across all the different classes and groupings is due to the fact that the population is mostly of a poorer or low socio-economic background.

The results documented on this research question confirm the fact that there seem to exist a direct proportionality between knowledge and socio-economic status. Generally, individuals with more income and higher education reported with more knowledge in this study. Such a traditional association between socioeconomic and knowledge of different disease states has been consistent across many studies. On the other hand, it has also been noted that this association may not be that robust in all situations. Such a situation is seen in this study where among individuals having diabetes, those with lower annual incomes reported higher knowledge of the risk factors for diabetes and knowledge of benefits of treatment of diabetes within this group instead.

Research question 5: What is the relationship between knowledge of diabetes risk factors and knowledge of health preventive behaviors and has such translated into any lifestyle modifications within this ethnic group?

Having an understanding of the risk factors of a disease like diabetes and understanding the necessary preventive behaviors may be important factors to influence the individual to adapt healthy behaviors like regular exercise, weight control and Smoking. Research question 5 is actually slated into 3 sections: knowledge of risk factors of diabetes, knowledge of preventive health behaviors and actions or steps (if any) that have been put in place by the respondents in relationship to their knowledge levels of risk factors of diabetes and preventive health behaviors.

In this study, only 28.57% of the participants were found to be knowledgeable of the risk factors of diabetes. Three questions were used to measure the knowledge of

preventive health behaviors. The focused of these questions were on healthy dieting, physical exercise and body weight control. The number of correct responses to these questions was 75.40%, 61.11% and 64.29% respectively indicating that the participants understand or have knowledge of the preventive health behaviors associated with diabetes.

Though the participants in this study seem to understand the importance of health preventive behaviors, only a staggering number actually put this into practice. Knowledge of risk factors of diabetes seems to be generally lacking within the participants. Even though knowledge on health preventive behaviors was found to be high within this population, this was never translated in to a healthy lifestyle. This is consistent with most of the studies that have evaluated this topic. In a large population based study focused at understanding the risk of diabetes amongst Singaporean's and related health preventive behaviors, the authors were able to conclude that better understanding of the disease was associated with favorable behaviors (Wong & Toh, 2009). These, researchers noted that though the participants in the study understood the importance of knowledge of risk factors of diabetes and healthy behaviors but it was never found to have been translated to healthier lifestyles. Ethnic minorities including African Americans have always reported less physical activity, poorer diets when compared with the general population (Mathieu et al., 2012).

As noted above, most of the individuals involved in this study are of the lower socio-economic group. Thus it may be worthwhile questioning at this point why do individuals

of low–socioeconomic status in most cases always act in ways that tend to be harmful to their health even when they are aware of the importance of maintaining healthy behaviors? This was the focus of a recent study by Pampel et al., 2010, where he authors noted that the present literature has done little to compare or contrast the mechanisms involved in this. As a result, they try to offer some suggestions which include:

1. There is a possibility that socioeconomic status can affect any incentives or motivations for healthy behavior. Individuals within the low socioeconomic status may have less reason than high socioeconomic status groups to want to forego the short-term pleasures of unhealthy behavior for long-term gain in longevity. Individuals within the high socioeconomic status group may face less stress that might encourage coping through unhealthy behavior and may probably gain more longevity benefits from healthy behaviors. The idea of greater knowledge of risks that tend to motivate healthy behavior amongst high socioeconomic status is still unclear.
2. Motives and means may be two important factors of consideration. This is because socioeconomic status can affect the means to reach certain health goals. Individuals within all socioeconomic status groups may have similar desires towards healthy behaviors. Despite this, low- socioeconomic status groups may have more difficulties in achieving their goals. The above relationship between motives and means may not be that linear as may appear. That is, this may tend to blur at some extreme points as strong motive

increases, there is the likely event that there is going to be increased effort to find effective means. Also, factors like social support will also affect the connection between motives and means. Even with these drawbacks, some researchers still believe, these are distinct factors, and distinguishing among them may be very helpful in designing studies dealing with disparities in health behaviors.

Concluding Statement

This study was designed to measure the knowledge of African Americans Adults' population in the District of Washington DC on the risk factors of diabetes and its complications, benefits of timely management and treatment of diabetes and preventive health behaviors. Based on the above, five research questions were raised in this study. Each of these research questions was tended to build on the knowledge gained from the previous questions. The main variables of interest within these research questions include knowledge of risk factors of diabetes and its complications, benefits of timely management and treatment of diabetes, preventive health behaviors and socio-economic factors of the population.

Data collected for this study reveals a lack of knowledge of the risk factors of diabetes amongst this population. The lack of knowledge of the risk factors of diabetes within this population was found to be consistent with previous studies. These results remained unchanged even when controlled for diabetes status and socioeconomic status. Knowledge on benefits of timely management and treatment of diabetes, preventive

health behaviors was noted to be prevalent within this population. Unfortunately, even where such knowledge exists, it was never translated to any healthy behaviors.

Recommendations for Action

Healthcare in the United States and worldwide today still hold strongly on the old paradigm of "prevention is better than cure". This is due to the fact that the cost of treating or managing a chronic disease like diabetes outweighs what it may take to prevent the disease. This not even including pain and suffering from the disease, time lost form work etc. Many programs offered by Medicare today have incorporated some form of a prevention program. The Medicare Diabetes Prevention Act (S. 452/H.R. 962), which is a legislation providing Medicare coverage for the National Diabetes Prevention Program (National DPP) to eligible beneficiaries determined to be at high risk for Type 2 diabetes, has the potential to slow or halt the diabetes epidemic which impacts millions of Americans and their families and which cost the united states government about $245 billion in 2012 (ADA, 2014).

The results of this study have shown that the African American population needs to be educated on the risk factors of diabetes. Hispanics and non-Hispanic blacks continue to maintain the highest prevalence rate of diabetes in the Unites states when compared to their Non – Hispanic White adult counterparts (CDC, 2012f). Due to the heightened level of prevalence of diabetes mellitus today, many studies have emerged that try to determine or measure the level of understanding of their respective population of this disease. Such an understanding is very important today because: (1) Patients must

be fully involved in the management of the disease. This implies, a general understanding and awareness is considered a first and most important step in taking action aimed at reducing the threat of the disease (Allen, Purcell, Szanton, & Dennison, 2010). This can only happen if that awareness is enacted within the patient. (2) Targeted interventions aimed at curtailing this epidemic can only be well crafted if we can get a better understanding of the population involve. Interventions of this nature have been proven to reduce diabetic risk (Diabetes Prevention Program Research Group et al., 2009; Lindström et al., 2003).

The above analysis indicates the need for interventions tailored at empowering the African American community to be involved in the prevention of this disease. Such interventions must be focused on educating this community on the risk factors of diabetes. Understanding the risk factors is the paramount and most important step in reducing the incidence within any community.

Recommendations for Further Study

The present study was a cross-sectional study with only 126 participants. Reciprocating this study with a larger sample size may be needed so as to be able to yield better data and outcome related to the studied variables and characteristics of the population. Further investigation on a longitudinal study is also needed to determine if intentions to improve behavior within the African American population is associated with actual behavioral changes. Such a study should also be able to determine whether risk

perception is responsive to these changes and whether interventions that modify risk perception can translate to actual improvement in individual behavior.

It may also be necessary to explore the role of healthcare providers with respects to education regarding the risk factors of diabetes. The focus of such an intervention would be mainly to determine what the patients are being told and also to determine if they are actually assimilating the intended message. This was a quantitative study. Thus future research that is capable of exploring participants'' perception of risk for diabetes with qualitative methodology may be able to improve understanding by answering why there was a low perception of risk for diabetes complications. This may also facilitate the drafting of interventions that are capable of assist in correcting these incorrect perceptions.

Implications for Social Change

The purpose of this study was to evaluate the knowledge of African Americans within the different socioeconomic groups with regards to diabetes while considering the following main variables: Knowledge of risk factors, Knowledge of Diabetes complications, Knowledge of treatments benefits and Knowledge of Preventive health behaviors of diabetes. This study has expanded on the concept that baseline knowledge is needed so as to be able to craft effective educational programs or interventions focused at curtailing the prevalence and incidence of diabetes in the United States. Thus, the results of this study should be able to provide some of that knowledge which might facilitate researchers in developing future interventions especially in the

area of behavioral interventions that promote diabetes management especially within the African American population. Thus, the implications for positive social change will be that the outcomes of this study will potentially enhance understanding of diabetes among the African-American population. Knowledge can only be most valuable when put to use for the greater good of the population (Walden, 2012). The morbidity and mortality of diabetes is ever on the rise with Hispanics and non-Hispanic blacks affected the most.

Study Limitations

The first limitation noted in this study is the participation size. The sample size for this study was 126. Though this population gave some statistical power, more participants may have yielded better data and outcomes.

.Another limitation of this study was the fact that all participants self-reported the information on the survey. Some of the questions were subjective in nature and may not have reflected honest answers from the participants. It may be likely that If the same questionnaires were issued out to the same participants at different times, the answers may be different based on the day, emotional state or how the individual generally felt. This is recall bias which can lead to Type I error in the study.

Another limitation identified in the study could have come from the survey tool. Some of the questions the researcher did receive from individual participants indicated that this tool may need to be at a much lower reading level. Participants seem not to clearly comprehend some of the questions requiring the researcher to explain the survey, which on the other hand could have influenced the participants' responses. The results

obtained from this study indicate most of the participants are below high school level which may go to explain the above drawback. The questionnaires were checked using the SMOG readability test which gave an average of a sixth grade reading level. Thus this drawback was minimized.

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Appendix A: Risk Perception Survey-Developing Diabetes

ATTITUDES ABOUT HEALTH

This survey will provide important information about how people feel about the risk of getting a chronic disease, like diabetes. There is no right or wrong answers. We are interested in *your* opinions and attitudes. Please answer each question as best as you can.

General Attitudes

For each item, please circle the number below the response That BEST DESCRIBES YOUR OPINION.

		Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
1.	I feel that I have little control over risks to my health.	1	2	3	4
2.	If I am going to get diabetes, there is not much I can do about it.	1	2	3	4
3.	I think that my personal efforts will	1	2	3	4

	help control my risks of getting diabetes.				
4.	People who make a good effort to control the risks of getting diabetes are much less likely to get diabetes.	1	2	3	4
5.	I worry about getting diabetes.	1	2	3	4
6.	Compared to other people of my same age and sex (gender), I am less likely than they are to get diabetes.	1	2	3	4
7.	Compared to other people of my same age and sex (gender), I am less likely than they are to get a	1	2	3	4

	serious disease.				
8.	Worrying about getting diabetes is very upsetting.	1	2	3	4
8B.	I feel that taking my diabetes drugs as directed will help in controlling my illness.	1	2	3	4

Your Attitudes about Health Risks

Below is a list of health problems and diseases. For each one, please circle the number below the words to tell us if you think **your own personal health** is at "almost no risk," "slight risk," "moderate risk" or "high risk" from these problems.

If you, or a family member, already have the disease (or had the disease in the past), please *also* check the appropriate line on the right.

Almost no risk	**Slight risk**	**Moderate risk**	**High risk**	**Have or had this disease:**

						Myself	**Family member**
9.	Arthritis	1	2	3	4	----------	----------
10.	Heart Disease	1	2	3	4	----------	----------
11.	Cancer	1	2	3	4	----------	----------
12.	High blood pressure	1	2	3	4	----------	----------
13.	Hearing loss	1	2	3	4	----------	----------
14.	Asthma	1	2	3	4	----------	----------
15.	Diabetes	1	2	3	4	----------	----------
16.	Osteoporosis (bone disease)	1	2	3	4	----------	----------
17.	Stroke	1	2	3	4	----------	----------
18.	Blindness	1	2	3	4	----------	----------
19.	Foot amputation	1	2	3	4	----------	----------
20.	Infection needing treatment by a doctor	1	2	3	4	----------	----------
21.	Impotence (only in men)	1	2	3	4	----------	----------
22.	Kidney failure	1	2	3	4	----------	----------
23.	AIDS	1	2	3	4	----------	----------

Environmental Health Risks

Below is a list of possible hazards or dangerous conditions in the environment around most of us.

For each one, please circle the number below the words to tell us if your **own personal health** is at "almost no risk," "slight risk," "moderate risk" or "high risk" from each of the following hazards or conditions.

		Almost no risk	**Slight risk**	**Moderate risk**	**High Risk**
24.	Medical X-rays (radiation)	1	2	3	4
25.	Violent crime	1	2	3	4
26.	Extreme weather (hot or cold)	1	2	3	4
27.	Driving/riding in an	1	2	3	4

	automobile				
28.	"Street drugs" (illegal drugs)	1	2	3	4
29.	Air pollution	1	2	3	4
30.	Pesticides	1	2	3	4
31.	Household chemicals	1	2	3	4
32.	Cigarette smoke from people smoking around you	1	2	3	4

Risks of Getting Diabetes for People in the General Public

We would like you to **think about people in the general public** and NOT about your own personal risk of getting diabetes.

Circle the number below the words that best describe your opinion about whether each item listed below *increases (or raises) the risk* of someone getting diabetes, *has no effect on the risk*, or *decreases (or lowers) the risk* of someone getting diabetes.

		Increases the risk	**Has NO effect on risk**	**Decreases the risk**	**Don't know**
33.	Being Asian American	1	2	3	0
34.	Being Caucasian (white)	1	2	3	0
35.	Eating a healthy diet	1	2	3	0
36.	Being black or African American	1	2	3	
37.	Being Hispanic	1	2	3	0
39.	Having a blood relative with diabetes	1	2	3	0
40.	Being 65 years of age or older	1	2	3	0
41.	Exercising regularly	1	2	3	0
42.	Being American	1	2	3	0

	Indian				
43.	Controlling weight gain	1	2	3	0

Thanks

Appendix B: Scoring Chart

SUBSCALE	**ITEMS**	**CODING**	ALPHA COEFFICIENT
Personal Control	Average Q1, Q2, **Q3R*, Q4R*** (4 items)	Higher score = more personal control	.68
Worry	Average **Q5R & Q8R** (2 items)	Higher score = more worry (better as individual items)	.50
Optimistic Bias	Average **Q6R & Q7R** (2 items)	Higher score = more optimistic bias	.71
Personal Disease Risk	Likert score plus 1 for either myself *or/and* family member having disease, then averaged across Q9-Q23 (15 items)	Higher score = higher perceived comparative personal disease risk	.80
Comparative Environmental Risk	Average Q24-Q32 (9 items)	Higher score = higher perceived comparative environmental risk	.81
COMPOSITE RISK SCORE	Average **Q1R, Q2R**, Q3, Q4, **Q5R,** Q6, Q7, **Q8R**, Q9-Q32 (32 items)	Higher score = more perceived risk (Some are reversed differently from individual scale scoring)	.84

***R and bolding on items means scoring is reversed to conform to conceptual direction of subscales.**

Appendix C: Consent Form

You are invited to take part in a research study of how you understand diabetes and what you think is important regarding preventing yourself from having diabetes in the future or effectively controlling the disease, if you already have it. You were chosen for the study because you are over the age of 18 and live in the District of Columbia. Please read this form and ask any questions you have before agreeing to be part of the study.

This study is being conducted by a researcher named Wanka Ndifor, who is a doctoral student at Walden University. Wanka is trying to understand the behavior of people who are at high risk of having diabetes and those already having diabetes, so as to identify if there are better ways to prevent or control the disease such that diabetics can lead more active lives.

Background Information:

The purpose of this study is to measure your understanding of any behaviors or factors around you that can cause you to have diabetes in the future. This study also looks at your understanding of the need to maintain continues treatment of diabetes as directed by your healthcare team. This is aimed at providing possible ways that will prevent people from having diabetes in the future or provide possible suggestions that individuals can take to better control diabetes, in case they are already having the disease.

Procedures:

If you agree to be in this study, you will be asked to:

- Answer the questions on the survey. This will take at most 15minutes.

- Return the survey and consent form (if you don't wish to keep it) to the researcher.

Voluntary Nature of the Study:

Your participation in this study is voluntary. This means that everyone will respect your decision of whether or not you want to be in the study. If you decide to join the study now, you can still change your mind later. If you feel stressed during the study you may stop at any time. You may skip any questions that you feel are too personal.

Risks and Benefits of Being in the Study:

There are no risks to participate in the study. The benefits of this study will provide information that may identify possible ways to help prevent individuals from having diabetes in the future.

Compensation:

There is no monetary compensation for returning the survey and consent form.

Confidentiality:

Any information you provide will be kept confidential. The researcher will not use your
information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in any reports of the study.

Contacts and Questions:

The researcher's name is Wanka Aloysius Ndifor. The researcher's faculty advisor is Dr. Eboni Green. You may ask any questions you have now. Or if you have questions later, you may contact the researcher via 240-535-3259 or via email at Wanka.ndifor@waldenu.edu or the advisor at Eboni.green@waldenu.edu or 1-800-925-3368. If you want to talk privately about your rights as a participant, you can call Dr.

Leilani Endicott. She is the Director of the Research Center at Walden University. Her phone number is 1-800-925-3368, extension 3121210. Walden University's approval number for this study is **06-03-14-0099017** and it expires on **June 2, 2015.**

The participants may keep this consent form if they wish to.

Further information

Further information on diabetes treatment, diagnosis, signs and symptoms, can be obtained from the American Diabetic Association website at http://www.diabetes.org/diabetes-basics/ or from the Center of Disease Control and prevention website at http://www.cdc.gov/obesity/data/adult.html or you can talk to your healthcare provider.

Statement of Consent:

In order to protect your privacy, no signatures will be collected. This means that your completion of the survey is an indication of your consent if you choose to participate.

Curriculum Vitae

Wanka, A. Ndifor, B. Pharm, MPH, CHES, R.ph

Wanka.ndifor@waldenu.edu

Wndifor1@jhmi.edu

ACADEMIC EXPERIENCE

2005 – 2015	Doctor of Public Health (Dr.ph) – Department of Epidemiology, Walden University**,** Minneapolis, Minnesota
2001 - 2002	Master of public Health (MPH) – School of public health, faculty of medicine, Universite Libre De Bruxelles, Bruxelles Belgium
1993 -1998	Doctor of pharmaceutical Sciences – School of pharmacy, Ahmadu Bello University, Zaria, Kaduna state, Nigeria.
1999 - 2000	Associate Degree: Data processing and computer programming, Soft Design computer institute Zaria Kaduna state, Nigeria

RELEVANT PROFESSIONAL EXPERIENCE

2013 – Present **clinical assistant professor,** (preceptor).

University of Maryland, school of pharmacy

As a preceptor, I do play a vital role in the educational process of pharmacy students while acting as a clinical resource through which the students apply the medical knowledge obtained during their training. This involves mostly teaching activities in a clinical setting that can be in the form of structured teaching rounds, chart review and discussions, reading assignments, or informal consultations between patient encounters and/or conferences. This is normally done in accordance with current practice guidelines and the accepted standards of care prescribed by the university and the institution.

2005 - Present ***Registered clinical staff pharmacist***

Clinical staff pharmacist - Sibley Memorial Hospital. My duties include: Evaluating and filling medication orders for

inpatients, outpatients, and employees and maintaining computerized medication profiles/prescription files. I am also involved in providing services in the centralized or decentralized pharmacy which includes communicating and consulting with physicians and other healthcare personnel as may be required and also monitor patient drug therapies for safety and appropriateness and provide drug information. I also supervise and direct support personnel, coordinating department activities to ensure the accurate, timely and cost-effective delivery of quality pharmacy services in a convenient manner.

2002– 2006 ***Health educator. Certified Health Education specialist.*** Interfit health consultants Houston Texas. we carryout screening exercises with different companies. As a health educator, I was responsible for placing each worker into whatever wellness program being offered by the company/community in which the worker lives after a careful review of the screening results. We also design education

and health programs that are tailored to the special needs of that community/group.

LICENSURE AND CERTIFICATIONS

Registered pharmacist, state of Maryland

Received November 17, 2007

License #19925

Registered pharmacist, District of Columbia

Received October 10, 2010,

License #PH00000904

Certified Health Education Specialist

Received June 15, 2004

License # 55004

PROFESSIONAL ORGANIZATIONS

-Member of the American public health association (APHA)

-Member of society of public health education (SOPHE)

-Member of the American Association of Pharmaceutical Scientists (AAPS).

SKILLS

Soft wares: word, power point, Excel, Epi-info, Spss, spreadsheet etc.-project design, implementation, evaluation and feedback.-Aseptic techniques, G.L.P. G.C.P. procedures-SDS-PAGE and agarose gel electrophoreses-Western, Northern & Southern blotting