DIABETES RISK PERCEPTION AMONG ADULTS IN IBADAN NORTH LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA.

BY

AKADRI ADEDOLAPO FATIMAT

MATRIC NUMBER: 174212

B.Sc. Anatomy (OOU)

A DISSERTATION SUBMITTED TO THE

DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS,

FACULTY OF PUBLIC HEALTH

COLLEGE OF MEDICINE,

UNIVERSITY OF IBADAN

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE (M.Sc) EPIDEMIOLOGY AND MEDICAL STATISTICS

FEBRUARY, 2015

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DEDICATION.

ect work is dedicated to Almighty God, the Architect and Builder of my life.

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Many thanks to God Almighty for His provision, protection and guidance throughout the course of my M.Sc. programme. I deeply appreciate my Supervisor, Dr M. D. Dairo and Dr O.M. Akpa for his time, assistance and constructive criticisms that lead to the success of this project.

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Thanks to you all and I pray that God will crown all your good works with success.

ABSTRACT

Knowledge of diabetes, its risk factors, complications and management are important factor in an individual's perception of the disease. An individual's perceived risk of the disease is based upon a multitude of factors including health beliefs, past experiences, culture and interactions with healthcare professional. Increasing awareness of the populace on diabetes risk factors will motivate them to seek proper healthier lifestyle and participate in preventive and control activities of the disease. This study was aimed at determining the diabetes risk perception among adults in Ibadan North Local Government Area of Oyo State.

A cross sectional community-based survey used a multi-stage sampling technique to select 5 wards out of 12 wards in Ibadan North Local Government Area, 850 respondents were administered with questionnaire to elicit information on knowledge of diabetes, risk perception for developing diabetes and behavioural practises. Knowledge of diabetes was assessed on a scale, in which scores <6 was categorised as poor and >6 as good. Risk perception was assessed on a point scale in which score of >17 was categorized as high. Data were analysed using descriptive statistics, Chi-square and binary logistic regression tests at 0.05 level of significance.

Mean age of respondents was 33.6 ± 11 years, 66.9% were Female while 33.1% were male. About 63.4% were married, seven hundred and thirty four were Yoruba's, and majority were Christians (66.7%). Most of the respondents (59.4%) had good knowledge of diabetes. Similarly, majority of the respondents (67.2%) had high risk perception. Also a greater proportion of respondents in the high risk perceived group had good knowledge of diabetes (OR=1.724, CI=1.239-2.399). There was a significant association between diabetes risk perception and Islamic religion (OR=1.477, CI=1.001-2.09), occupation [self-employed (OR=0.151, CI=0.031-0.743), non-paid (OR=0.071, CI=0.006-0.817), student (OR=0.118, CI=0.023-0.601)], more than three serving of fruit in a week (OR=0.498, CI=0.351-0.707), light physical activity (OR=0.930, CI=1.277-2.981).

Risk perception of diabetes was high among respondents with good knowledge therefore there is need for the development of comprehensive health education for the management of diabetes and its related risk factors.

Keyword: diabetes, risk perception, knowledge, health beliefs and lifestyle.

Word count: 328

CERTIFICATION

This is to certify that the research proposal on the "**Diabetes risk perception among adults in Ibadan North Local Government Area of Oyo State**" was written by AKADRI, Adedolapo Fatimat who is currently a postgraduate student in the department of Epidemiology and Medical Statistics, under my supervision.

Dr. M. D. Dairo

(Senior Lecturer/Consultant Epidemiologist)

Dept. of Epidemiology and Medical Statistics,

Faculty of Public Health,

College of Medicine, University of Ibadan.

13/03/2015

Dr. O. M. Akpa

B. Sc, M. Sc, PhD, Statistics (Ilorin)

Dept. of Epidemiology and Medical Statistics,

Faculty of Public Health,

College of Medicine, University of Ibadan.

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ACRONYMS

ACE-I Angiotensin Converting Enzyme Inhibitors

ADA: American Diabetes Association

DM: Diabetes mellitus

ARBs: Angiotensin Receptor Blockers

GDM: Gestational Diabetes Mellitus

IDDM: Insulin-Dependent Diabetes Mellitus

IDF: International Diabetes Foundation

LADA: Latent Autoimmune Diabetes of Adults

NCD: Non Communicable Disease

NIDDM: Non Insulin-Dependent Diabetes Mellitus

WHO: World Health Organization

CHAPTER ONE

INTRODUTION

1.0 Background

The number of diabetic cases worldwide has increase significantly in the last decade and it is the fifth leading cause of death worldwide (Wild et al., 2004). It has been noted that one in twenty adult deaths in developing countries is diabetic related (Gojka et al., 2005). The World Health Organisation in 2010 reported an incidence rate of 300 million people with diabetes in the world and is projected to increase to 366 million by 2030. There is an increase in the incidence of Diabetes Mellitus in the African population. In 2006, International Diabetes Federation estimates that over 5 million people suffer from diabetes in Africa and the number is expected to increase to 15 million by 2025. Oguntola in 2011 submitted that the Africa region experience the incidence rate of 3.8 per cent of diabetes mellitus which amount to a total of 13.1 million people. Diabetes has been increasing steadily in Nigeria over the past three decades. In 2008, Nigeria had an incidence rate of over 12 million diabetic patients (PRB, 2008), while the incidence rate was 4.7 per cent of the population in 2011 (Oguntola, 2011). The prevalence in Nigeria varies from 0.65% in rural Mangu to 11% in urban Lagos (Akinkugbe, 1997). In absolute terms, Nigeria has the largest number of people with diabetes in Africa and it is one of the countries with the highest mortality rate due to diabetes (IDF, 2011).

Diabetes is a metabolic disorder of multiple aetiologies characterized by chronic hyper-glycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion or insulin action or both. Diabetes causes diseases in many organs, the severity of which may be related to how long the disease has been present and how well it has been controlled (IDF, 2011). The effects of diabetes mellitus include long-term damage, dysfunction, and failure of various organs. Diabetes is a major public health problem as it causes considerable amount of other medical comorbidities, disabilities, premature mortality as well as demands on health care facilities. It could also cause cascading other medical complications. Among its acute complications are diabetic ketoacidosis, hyper-osmolar non-ketotic coma and hypoglycaemia (Gupta, 2003). Chronic complications include macro-vascular and microvascular diseases. The macro-vascular diseases are cardiovascular disease, cerebrovascular disease and peripheral vascular disease. The microvascular diseases are diabetic retinopathy, nephropathy and neuropathy. Diabetic patients are at risk of ischemic heart disease, cardiomyopathy and heart failure (Chiasson et al., 1998).

Perceived risk, an integral factor in the decision to adopt preventive behaviours, is part of an individual's beliefs or "mental model" which, in turn, may be based in part on misconceptions and not necessarily scientific evidence. An individual's perceived risk with regard to a specific health condition, such as diabetes, is based upon a multitude of factors including individual health beliefs, past experiences, culture, and interactions with healthcare professionals. Adoption of health-protective behaviours, such as diabetes self-management, has been associated with recognition of significant health risk (DPPRG, 2000). An accurate perception of one's risk for, or susceptibility to, a condition is necessary to motivate one to take protective action (Hivert et al., 2009).

Inadequate awareness on diabetes symptoms and their risk factors may also limit access to health care. Many researches have shown that healthier lifestyles leading to modest weight loss can prevent diabetes in population at risk, but changing behaviour in real-life patients remains a challenge (DPPRG, 2000). This study evaluated two distinct but intertwined concepts: an individual's assessment of their risk of currently having or developing diabetes, and his or her risk-score determined likelihood of having or developing the disease. Identifying areas with a lack of concordance between actual and perceived risk may help improve health promotion by enabling educational efforts to focus on areas with less concordance. Improving identification and subsequent care for these conditions in the population may help decrease health challenges arising from diabetes.

1.1 PROBLEM STATEMENT

The World Health Organisation in 2010 reported an incidence rate of 300 million people with diabetes in the world and is projected to increase to 366 million by 2030. The prevalence is increasing rapidly, partly through case ascertainment and diagnostic criteria, but mainly through lifestyle changes in developing countries like Nigeria (King et al., 1998). Diabetes is also associated with an increased risk of premature death due to cardiovascular disease, stroke, and renal diseases (Genuth 1995). Diabetes causes diseases in many organs, the severity of which may be related to how long the disease has been present and how well it has been controlled. An individual's perceived risk with regard to a specific health condition, such as diabetes, is based upon a multitude of factors including individual health beliefs, past experiences, culture, and interactions with healthcare professionals. An accurate perception of one's risk for, or susceptibility to diabetes is necessary to motivate one to take protective

action. A lack of awareness regarding diabetes symptoms and their risk factors may also limit access to health care (Olaitan, 2012).

1.2 JUSTIFICATION

The global health burden of diabetes is of epidemic proportions with the worldwide prevalence projected to reach 366 million in 2030 (WHO, 2010). Diabetes has emerged as a major medical and public health issue worldwide and is important risk factors for coronary artery disease, heart failure, and cerebrovascular disease. Data on diabetes risk perception among adults in Ibadan North Local Government Area of Oyo State are very limited. Risk perception is a major component of most health behaviour theories. An individual's perceived risk with regard to a specific health condition, such as diabetes, is based upon a multitude of factors including individual health beliefs, past experiences, culture, and interactions with healthcare professionals. An accurate perception of one's risk for, or susceptibility to, diabetes is necessary to motivate one to take protective action. Many researches have shown that healthier lifestyles leading to modest weight loss can prevent diabetes in population at risk, but changing behaviour in real-life patients remains a challenge. Adoption of health-protective behaviours, such as diabetes self-management, is also associated with recognition of significant health risk (Knowler, et al., 2002). These data is an invaluable resource for advocacy, program evaluation, planning resource allocation, and improving health care services thus reduction in the diabetes incidence.

1.3 OBJECTIVE

Broad objective

The main objective of this study was to determine diabetes risk perception among adults in Ibadan North local government area of Oyo State.

Specific objective

The objectives are to:

1. Assess knowledge of diabetes and its causes among adults in the local government.
2. Determine the prevalence of known risk factors of diabetes among adults in the local government.
3. Determine the factors affecting diabetes risk perception.

1.4 RESEARCH QUESTIONS

1. What is the level of knowledge of diabetes and its causes among adults in the local government?
2. What is diabetes self-risk perception of adults in Ibadan North local government?
3. What is the prevalence of known risk factors of diabetes among adults in the local government?
4. What factors affect diabetes risk perception?

CHAPTER TWO

LITERATURE REVIEW

2.0 WHAT IS DIABETES MELLITUS

Diabetes mellitus also known as simply ***diabetes***, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. This high blood sugar produces the symptoms of frequent urination, increased thirst, and increased hunger. Untreated, diabetes can cause many complications. Acute complications include diabetic ketoacidosis and non ketotic hyperosmolar coma. Serious long-term complications include heart disease, stroke, kidney failure, foot ulcers and damage to the eyes (WHO, 2013).

Diabetes is due to either the pancreas not producing enough insulin, or the cells of the body not responding properly to the insulin produced (WHO, 2014).

2.1 TYPES OF DIABETES MELLITUS

There are three main types of diabetes mellitus:

i. Type 1 diabetes mellitus results from the body's failure to produce enough insulin. This form was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes". The cause is unknown.

ii. Type 2 diabetes mellitus begins with insulin resistance, a condition in which cells fail to respond to insulin properly. As the disease progresses a lack of insulin may also develop. This form was previously referred to as non insulin-dependent diabetes mellitus (NIDDM) or "adult-onset diabetes". The primary cause is excessive body weight and not enough exercise.

iii. Gestational diabetes, is the third main form and occurs when pregnant women without a previous history of diabetes develop a high blood glucose level (WHO, 2013).

Globally, as of 2013, an estimated 382 million people have diabetes worldwide, with type 2 diabetes making up about 90% of the cases. This is equal to 8.3% of the adults population, with equal rates in both women and men. Worldwide in 2012 and 2013 diabetes resulted in 1.5 to 5.1 million deaths per year, making it the 8th leading cause of death. Diabetes overall at least doubles the risk of death. The number of people with diabetes is expected to rise to 592

million by 2035. The economic costs of diabetes globally was estimated in 2013 at $548 billion and in the United States in 2012 $245 billion (IDF, 2013).

Prevention and treatment involves a healthy diet, physical exercise, not using tobacco, and being a normal body weight. Blood pressure control and proper foot care are also important for people with the disease. Type 1 diabetes must be managed with insulin injections. Type 2 diabetes may be treated with medications with or without insulin. Insulin and some oral medications can cause low blood sugar. Weight loss surgery in those with obesity is an effective measure in those with type 2 diabetes mellitus (Picot, 2009) Gestational diabetes usually resolves after the birth of the baby.

2.2 SIGNS AND SYMPTOMS OF DIABETES MELLITUS

The classic symptoms of untreated diabetes are weight loss, polyuria (frequent urination), polydipsia (increased thirst), and polyphagia (increased hunger). Symptoms may develop rapidly (weeks or months) in type 1 diabetes, while they usually develop much more slowly and may be subtle or absent in type 2 diabetes.

Several other signs and symptoms can mark the onset of diabetes, although they are not specific to the disease. In addition to the when known ones above, they include blurry vision, headache, fatigue, slow healing of cuts, and itchy skin. Prolonged high blood glucose can cause glucose absorption in the lens of the eye, which leads to changes in its shape, resulting in vision changes. A number of skin rashes that can occur in diabetes are collectively known as diabetic dermadromes (Cooke and Plotnick, 2008).

2.3 CAUSES OF DIABETES MELLITUS

Type 1

Type 1 diabetes mellitus is characterized by loss of the insulin-producing beta cells of the islets of Langerhans in the pancreas, leading to insulin deficiency. This type can be further classified as immune-mediated or idiopathic. The majority of type 1 diabetes is of the immune-mediated nature, in which a T-cell-mediated autoimmune attack leads to the loss of beta cells and thus insulin. It causes approximately 10% of diabetes mellitus cases in North America and Europe. Most affected people are otherwise healthy and of a healthy weight

when onset occurs. Sensitivity and responsiveness to insulin are usually normal, especially in the early stages. Type 1 diabetes can affect children or adults, but was traditionally termed "juvenile diabetes" because a majority of these diabetes cases were in children (Chiolero et al., 2013).

"Brittle" diabetes, also known as unstable diabetes or labile diabetes, is a term that was traditionally used to describe the dramatic and recurrent swings in glucose levels, often occurring for no apparent reason in insulin-dependent diabetes. This term, however, has no biologic basis and should not be used. Still, type 1 diabetes can be accompanied by irregular and unpredictable hyperglycemia, frequently with ketosis, and sometimes with serious hypoglycemia. Other complications include an impaired counter regulatory response to hypoglycemia, infection, gastroparesis (which leads to erratic absorption of dietary carbohydrates), and endocrinopathies (e.g., Addison's disease). These phenomena are believed to occur no more frequently than in 1% to 2% of persons with type 1 diabetes.

Type 1 diabetes is partly inherited, with multiple genes, including certain HLA genotypes, known to influence the risk of diabetes. In genetically susceptible people, the onset of diabetes can be triggered by one or more environmental factors, such as a viral infection or diet. There are some evidence that suggests an association between type 1 diabetes and Coxsackie B4 virus (Dorner, 1977). Unlike type 2 diabetes, the onset of type 1 diabetes is unrelated to lifestyle.

Type 2

Type 2 diabetes mellitus is characterized by insulin resistance, which may be combined with relatively reduced insulin secretion. The defective responsiveness of body tissues to insulin is believed to involve the insulin receptor. However, the specific defects are not known. Diabetes mellitus cases due to a known defect are classified separately. Type 2 diabetes is the most common type.

In the early stage of type 2, the predominant abnormality is reduced insulin sensitivity. At this stage, hyperglycemia can be reversed by a variety of measures and medications that improve insulin sensitivity or reduce glucose production by the liver.

Type 2 diabetes is due primarily to lifestyle factors and genetics. A number of lifestyle factors are known to be important to the development of type 2 diabetes, including obesity (defined by a body mass index of greater than thirty), lack of physical activity, poor diet, stress, and urbanization. Excess body fat is associated with 30% of cases

in those of Chinese and Japanese descent, 60-80% of cases in those of European and African descent, and 100% of Pima Indians and Pacific Islanders. Those who are not obese often have a high waist–hip ratio.

Dietary factors also influence the risk of developing type 2 diabetes. Consumption of sugar-sweetened drinks in excess is associated with an increased risk. The type of fats in the diet is also important, with saturated fats and trans fatty acids increasing the risk and polyunsaturated and monounsaturated fat decreasing the risk. Eating lots of white rice appears to also play a role in increasing risk. A lack of exercise is believed to cause 7% of cases (Malik et al., 2010).

2.4 GESTATIONAL DIABETES

Gestational diabetes mellitus (GDM) resembles type 2 diabetes in several respects, involving a combination of relatively inadequate insulin secretion and responsiveness. It occurs in about 2-10% of all pregnancies and may improve or disappear after delivery. However, after pregnancy approximately 5-10% of women with gestational diabetes are found to have diabetes mellitus, most commonly type 2. Gestational diabetes is fully treatable, but requires careful medical supervision throughout the pregnancy. Management may include dietary changes, blood glucose monitoring, and in some cases insulin may be required (Hu et al., 2001).

Though it may be transient, untreated gestational diabetes can damage the health of the fetus or mother. Risks to the baby include macrosomia (high birth weight), congenital cardiac and central nervous system anomalies, and skeletal muscle malformations. Increased fetal insulin may inhibit fetal surfactant production and cause respiratory distress syndrome. Hyperbilirubinemia may result from red blood cell destruction. In severe cases, perinatal death may occur, most commonly as a result of poor placental perfusion due to vascular impairment. Labor induction may be indicated with decreased placental function. A Caesarean section may be performed if there is marked fetal distress or an increased risk of injury associated with macrosomia, such as shoulder dystocia (NDIC, 2011).

2.5 OTHER TYPES

Prediabetes indicates a condition that occurs when a person's blood glucose levels are higher than normal but not high enough for a diagnosis of type 2 diabetes mellitus. Many people destined to develop type 2 diabetes mellitus spend many years in a state of prediabetes.

Latent autoimmune diabetes of adults (LADA) is a condition in which type 1 diabetes mellitus develops in adults. Adults with LADA are frequently initially misdiagnosed as having type 2 diabetes mellitus, based on age rather than etiology (Leonid, 2009).

Some cases of diabetes are caused by the body's tissue receptors not responding to insulin (even when insulin levels are normal, which is what separates it from type 2 diabetes); this form is very uncommon. Genetic mutations (autosomal or mitochondrial) can lead to defects in beta cell function. Abnormal insulin action may also have been genetically determined in some cases. Any disease that causes extensive damage to the pancreas may lead to diabetes (for example, chronic pancreatitis and cystic fibrosis). Diseases associated with excessive secretion of insulin-antagonistic hormones can cause diabetes (which is typically resolved once the hormone excess is removed). Many drugs impair insulin secretion and some toxins damage pancreatic beta cells. The ICD-10 (1992) diagnostic entity, *malnutrition-related diabetes mellitus* (MRDM or MMDM, ICD-10 code E12), was deprecated by the World Health Organization when the current taxonomy was introduced in 1999.

Other forms of diabetes mellitus include congenital diabetes, which is due to genetic defects of insulin secretion, cystic fibrosis-related diabetes, steroid diabetes induced by high doses of glucocorticoids, and several forms of monogenic diabetes (Leonid, 2009).

2.6 PATHOPHYSIOLOGY

Insulin is the principal hormone that regulates the uptake of glucose from the blood into most cells of the body, especially liver, muscle, and adipose tissue. Therefore, deficiency of insulin or the insensitivity of its receptors plays a central role in all forms of diabetes mellitus.

The body obtains glucose from three main places: the intestinal absorption of food, the breakdown of glycogen, the storage form of glucose found in the liver, and gluconeogenesis, the generation of glucose from non-carbohydrate substrates in the body. Insulin plays a critical role in balancing glucose levels in the body. Insulin can inhibit the breakdown

CHAPTER THREE

METHODOLOGY

.1 STUDY AREA

badan North is one of the thirty three Local Government Areas in Oyo state which was reated in 1991 with its Head Quarters at Agodi-Gate where the office of the Executive iovemor of the Oyo state Government is located.It is located approximately on longitude 8° 5' ast of the Greenwich meridian and latitude 7° 23' North of the equator.It is bounded in the Vest by Ido and Ibadan North-West Local Governments, bounded in the East by Lagelu, gbeda and Ibadan South East Local Governments respectively and also bounded in the Jorth by Akinyele Local Government Area. It is located at the heart of the city Ibadan, with land mass of about 420KM^2 and made up of twelve political wards having an approximated rea population of 856,988 according to the 2006 population census (NPC, 2008).

badan North Local Government Area consist of multi-ethnic nationalities, predominantly dominated by the Yorubas, then the Igbos, Edos, Urhobos, Itsekiris, Ijaws, Ibibios, Hausas, Fulanis and foreigners from Europe, Asia, and other parts of the world. The inhabitants are mostly traders (majority of women), university and polytechnic lecturers, civil servants of the Government who work at both the State and Federal Secretariats, out of school eenagers/adolescents and students.

Also, it accommodates important and highly placed educational institutions including the University College Hospital (College of Medicine), the University of Ibadan, The Polytechnic Ibadan, several private and public Secondary and Primary schools and hence this puts the area at an advantage with regards to educational facilities. It also houses commercial, Government administration areas and health institutions like the Bodija market, the Oyo State Government House, the State house of Assembly and various health-care facilities notably he University College Hospital (which houses the unit of the President's Emergency Plan for AIDS Relief-PEPFAR in Nigeria) and the Adeoyo Maternity Hospital among others.

According to the Oyo State Independent Electoral Commission (OYSIEC) from 2011-2014, Ibadan North Local Government is delineated into 12 political wards.

A positive result, in the absence of unequivocal hyperglycemia, should be confirmed by a repeat of any of the above methods on a different day. It is preferable to measure a fasting glucose level because of the ease of measurement and the considerable time commitment of formal glucose tolerance testing, which takes two hours to complete and offers no prognostic advantage over the fasting test. According to the current definition, two fasting glucose measurements above 126 mg/dl (7.0 mmol/l) is considered diagnostic for diabetes mellitus.

Per the World Health Organization people with fasting glucose levels from 6.1 to 6.9 mmol/l (110 to 125 mg/dl) are considered to have impaired fasting glucose. People with plasma glucose at or above 7.8 mmol/L (140 mg/dL), but not over 11.1 mmol/L (200 mg/dL), two hours after a 75 g oral glucose load are considered to have impaired glucose tolerance. Of these two prediabetic states, the latter in particular is a major risk factor for progression to full-blown diabetes mellitus, as well as cardiovascular disease. The American Diabetes Association since 2003 uses a slightly different range for impaired fasting glucose of 5.6 to 6.9 mmol/l (100 to 125 mg/dl) (ADA, 2008).

Glycated hemoglobin is better than fasting glucose for determining risks of cardiovascular disease and death from any cause.

The rare disease diabetes insipidus has similar symptoms to diabetes mellitus, but without disturbances in the sugar metabolism (*insipidus* means "without taste" in Latin) and does not involve the same disease mechanisms (WHO, 2006).

2.8 PREVENTION

There is no known preventive measure for type 1 diabetes. Type 2 diabetes can often be prevented by a person being anormal body weight, physical exercise, and following a healthy diet. Dietary changes known to be effective in helping to prevent diabetes include a diet rich in whole grains and fiber, and choosing good fats, such as polyunsaturated fats found in nuts, vegetable oils, and fish (Hiltunen, 1999). Limiting sugary beverages and eating less red meat and other sources of saturated fat can also help in the prevention of diabetes. Active smoking is also associated with an increased risk of diabetes, so smoking cessation can be an important preventive measure as well (DPPRG, 2000).

2.9 MANAGEMENT

Diabetes mellitus is a chronic disease, for which there is no known cure except in very specific situations. Management concentrates on keeping blood sugar levels as close to normal ("euglycemia") as possible, without causing hypoglycemia. This can usually be accomplished with diet, exercise, and use of appropriate medications (insulin in the case of type 1 diabetes; oral medications, as well as possibly insulin, in type 2 diabetes) (NHBPEP, 2011).

Learning about the disease and actively participating in the treatment is vital for people with diabetes, since the complications of diabetes are far less common and less severe in people who have well-managed blood sugar levels. The goal of treatment is an HbA1C level of 6.5%, but should not be lower than that, and may be set higher. Attention is also paid to other health problems that may accelerate the deleterious effects of diabetes. These include smoking, elevated cholesterol levels, obesity, high blood pressure, and lack of regular exercise. Specialised footwear is widely used to reduce the risk of ulceration, or re-ulceration, in at-risk diabetic feet. Evidence for the efficacy of this remains equivocal, however (NHBPEP, 2011).

2.10 LIFESTYLE

People with diabetes can benefit from education about the disease and treatment, good nutrition to achieve a normal body weight, and sensible exercise, with the goal of keeping both short-term and long-term blood glucose levels within acceptable bounds. In addition, given the associated higher risks of cardiovascular disease, lifestyle modifications are recommended to control blood pressure (Hiltunen, 1999).

2.11 MEDICATIONS

Metformin is generally recommended as a first line treatment for type 2 diabetes, as there is good evidence that it decreases mortality.Routine use of aspirin, however, has not been found to improve outcomes in uncomplicated diabetes. Angiotensin converting enzyme inhibitors (ACEIs) improve outcomes in those with diabetes mellitus while the similar medications angiotensin receptor blockers (ARBs) do not (ADA, 2008).

Type 1 diabetes is typically treated with a combination of regular and NPH insulin, or synthetic insulin analogs. When insulin is used in type 2 diabetes, a long-acting formulation is usually added initially, while continuing oral medications. Doses of insulin are then increased to effect. In those with diabetes some recommend levels blood pressure levels below 120/80 mmHg; however, evidence only supports less than or equal to somewhere between 140/90 mmHg to 160/100 mmHg (ADA, 2008).

2.12 PANCREATIC TRANSPLANTATION

A pancreas transplant is occasionally considered for people with type 1 diabetes who have severe complications of their disease, including end stage renal disease requiring kidney transplantation (ADA, 2008).

2.13 SUPPORT

In countries using a general practitioner system, such as the United Kingdom, care may take place mainly outside hospitals, with hospital-based specialist care used only in case of complications, difficult blood sugar control, or research projects. In other circumstances, general practitioners and specialists share care in a team approach. Home telehealth support can be an effective management technique.

As at 2013, 382 million people have diabetes worldwide. Type 2 makes up about 90% of the cases. This is equal to 8.3% of the adult population with equal rates in both women and men.

In 2012 it resulted in 1.5 million deaths worldwide making it the 8th leading cause of death. More than 80% of diabetic deaths occurring in low and middle-income countries.

Its rate has increased, and by 2030, this number is estimated to almost double. Diabetes mellitus occurs throughout the world, but is more common (especially type 2) in more developed countries. The greatest increase in rates is, however, expected to occur in Asia and Africa, where most people with diabetes will probably be found by 2030. The increase in rates in developing countries follows the trend of urbanization and lifestyle changes, perhaps most importantly a "Western-style" diet. This has suggested an environmental (i.e., dietary) effect, but there is little understanding of the mechanism(s) at present, though there is much speculation, some of it most compellingly presented (Wild et al., 2004).

2.14 HISTORY

Diabetes was one of the first diseases described, with an Egyptian manuscript from c. 1500 BCE mentioning "too great emptying of the urine". The first described cases are believed to be of type 1 diabetes. Indian physicians around the same time identified the disease and classified it as *madhumeha* or "honey urine", noting the urine would attract ants. The term "diabetes" or "to pass through" was first used in 230 BCE by the Greek Appollonius of Memphis. The disease was considered rare during the time of the Roman empire, with Galencommenting he had only seen two cases during his career (Leonid, 2009). This is possibly due the diet and life-style of the ancient people, or because the clinical symptoms were observed during the advanced stage of the disease. Galen named the disease "diarrhea of the urine" (diarrhea urinosa). The earliest surviving work with a detailed reference to diabetes is that of Aretaeus of Cappadocia (2nd or early 3rd century CE). He described the symptoms and the course of the disease, which he attributed to the moisture and coldness, reflecting the beliefs of the "Pneumatic School". He hypothesized a correlation of diabetes with other diseases and he discussed differential diagnosis from the snakebite which also provokes excessive thirst. His work remained unknown in the West until the middle of the 16th century when, in 1552, the first Latin edition was published in Venice (Laious, 2012).

Type 1 and type 2 diabetes were identified as separate conditions for the first time by the Indian physicians Sushruta and Charaka in 400-500 CE with type 1 associated with youth and type 2 with being overweight. The term "mellitus" or "from honey" was added by the Briton John Rolle in the late 1700s to separate the condition from diabetes insipidus, which is also associated with frequent urination. Effective treatment was not developed until the early part of the 20th century, when Canadians Frederick Banting and Charles Herbert Best isolated and purified insulin in 1921 and 1922. This was followed by the development of the long-acting insulin NPH in the 1940s (Leonid, 2009).

2.15 ETYMOLOGY

The word *diabetes* comes from Latin *diabētēs*, which in turn comes from Ancient Greek (*diabētēs*) which literally means "a passer through; a siphon." Ancient

reek physician Aretaeus of Cappadocia(fl. 1st century CE) used that word, with the ntended meaning "excessive discharge of urine", as the name for the disease. Ultimately, the ord comes from Greek (*diabainein*), meaning "to pass through," which is composed of *dia-*), meaning "through" and (*bainein*), meaning "to go". The word "diabetes" is first ecorded in English, in the form *diabete*, in a medical text written around 1425 (Dallas, 011).

he word *mellitus* comes from the classical Latin word *mellītus*, meaning "mellite"[1] (i.e. weetened with honey, honey-sweet). The Latin word comes from *mell-*, which comes rom *mel*, meaning "honey"; sweetness; pleasant thing, and the suffix *-ītus*, whose meaning is he same as that of the English suffix "-ite". It was Thomas Willis who in 1675 added mellitus" to the word "diabetes" as a designation for the disease, when he noticed the urine f a diabetic had a sweet taste (glycosuria). This sweet taste had been noticed in urine by the ncient Greeks, Chinese, Egyptians, Indians, and Persians (Laios et al., 2012).

2.16 ASSOCIATED FACTORS FOR DIABETES

Rapid demographic and nutritional changes with increased life expectancy and more elderly population is occuring globally. Most importantly, globalization of diets and consumption of non-traditional fast foods is taking place at a very rapid pace especially in urban areas (Yeni-Komshian et al., 2000). A progression of these transitions and changes in populations of many countries is resulting in high prevalence of non-communicable diseases such as diabetes. In developing countries such as Nigeria, rapid increase in western fast food outlets and increased consumption of fried snacks is taking place (Gupta et al., 2003). Furthermore, migration from villages to cities is increasing in these countries resulting in nutritional imbalance, physical inactivity, stress, and increased consumption of alcohol and tobacco (Misra et al., 2001).

It is important to remember that modifiable risk factors such as overweight and obesity, sedentary lifestyle, unhealthy diet, glucose intolerance, alcohol consumption, and tobacco smoking can be targeted for prevention of disease, and by controlling these risk factors through population based prevention programs we can reduce the disease burden (Alberti et al., 2007).

a) Socio-demographic Factors

These include factors such as age, sex, family history of type 2 diabetes, genetic predisposition, history of gestational diabetes, and ethnicity etc. All of these belong to the non-modifiable risk factors for type 2 diabetes but are mentioned here because they are important. The risk of type 2 diabetes increases markedly with age and unfortunately the age of onset of type 2 diabetes has steadily decreased down into younger adults and even adolescents in recent decades (Alberti et al., 2007).

b) **Overweight and Obesity**

Obesity has been identified as the single most important risk factor for Type 2 diabetes. The WHO estimates that there are currently 1.1 billion people who are overweight with estimations of over 1.5 billion by 2015. Longitudinal studies have shown obesity to be a powerful predictor for type 2 diabetes (WHO, 2006). This is further strenghten by the fact that interventions aimed at reducing obesity also reduce the incidence of Type 2 diabetes (Picot et al., 2009).

c) Nutritional transition

Work pattern is changing from heavy labour to sedentary due to increase in computerization and mechanization, and improved transport have made an impact on human health (Yeni-Komshian et. Al., 2000). These sedentary changes along with easy access to fast foods and empty calories have resulted in increased rates of obesity and type 2 diabetes globally. Although it is difficult to collect accurate dietary data, epidemiological studies indicate that a high calorie and low dietary fibre intake with a high glycaemic load and low polyunsaturated to saturated fat ratio contribute towards developing chronic diseases such as type 2 diabetes. Thus diet is a crucial aspect of lifestyle changes (Zimmet et al., 2001).

d) Physical Activity and Sedentary Lifestyle

Physical activity has decreased over recent decades in many populations, and this is a major contributor to the current global rise of obesity. Physical inactivity has been found to be an independent predictor of Type 2 diabetes in both cross-sectional and longitudinal studies (Alberti et al., 2007).

Increasing sedentary lifestyle is attributed to increased mechanization at workplaces and in household work. Leisure-time activities have also shifted from outdoor play to indoor entertainment such as television and computer games (Hu et al., 2001). Previously adolescents playing outdoor games regularly and doing household activities had lower prevalence of been overweight, compared to 3 times higher in those not participating in

outdoor games. Even for equivalent degrees of obesity, more physically active subjects have a lower incidence of diabetes (Laxmaiah et al., 2007).

2.17 DIABETES RISK PERCEPTION

Increasing the awareness of the people about the diabetes risk factors and the need for modest lifestyle changes or pharmacologic interventions can reduce the risk of progression from pre-diabetes to diabetes or increase the regression to normoglycemia (Omobuwa and Alebiosu, 2014). Modest lifestyle changes remain a significant challenge though diabetes can be delayed or prevented through it (DPPRG, 2000).

Adaptation to a healthier lifestyle requires the implementation of behavioral changes such as diet modification, increase physical exercise and promotion of weight loss (Pan et al., 1997). Perceived risk, an integral factor in the decision to adopt preventive behaviors, is part of an individual's beliefs or "mental model" which, in turn, may be based in part on misconceptions and not necessarily scientific evidence. An individual's perceived risk with regard to a specific health condition, such as diabetes, is based upon a multitude of factors including individual health beliefs, past experiences, culture, and interactions with healthcare professionals (DPPRG, 2000).

Healthcare professionals can also impact significantly on an individual's diabetes perceived risk. It is essential that professionals who educate on diabetes prevention strategies should be familiar with the gaps of knowledge that exist in the society. The enormous burden of diabetes management and its associated complications and disorders has placed diabetes prevention as a major therapeutic priority in high-risk individuals (Raimi et al., 2014).

A poorly controlled diabetes may lead to lifelong complications, which are generally associated with increased morbidity and mortality. For instance, poorly controlled diabetes can cause damage to eyes (leading to blindness), kidneys (leading to renal failure), and nerves (leading to impotence and foot disorders/ possibly amputation) as well as increased risk of heart disease, stroke, and poor blood supply to the limbs. Most of these complications are not only irreversible, but they are also costly to manage as they generally require management in specialized centers with sophisticated infrastructure and equipment, well trained staff and potent medications.

Since managing these complication is costly, community education become a central component in the prevention and control of this disease. Such education lead to diet

modification, increased physical exercise and lifestyle changes including the promotion of weight loss. These educational programs should help people assess their risks of diabetes, motivate them to seek proper treatment and care and inspire them to take charge of their disease (Raimi et al., 2014).

The importance of educational programs in the prevention and control of diabetes in the community cannot be over emphasis as it helps to increase the knowledge of the people on the disease (Olaitan, 2012).

Table 3.1: Code names of political wards in Ibadan North Local Government

Ward Number	Ward Code
WARD 1 N2	LG/01/OY
WARD II N3	LG/02/OY
WARD III N4	LG/03/OY
WARD IV N5A	LG/04/OY
WARD IX N6B PART I	LG/09/OY
WARD V N5B	LG/05/OY
WARD VI N6A PART I	LG/06/OY
WARD VII N6A PART II	LG/07/OY
WARD VIII N6A PART III	LG/08/OY
WARD X N6A PART II	LG/10/OY
WARD XI NWA	LG/11/OY
WARD XII NW	LG/12/OY

3.2 STUDY POPULATION

The study focused on adults 18 years and above in Ibadan North local government area of Oyo State.

3.3 STUDY DESIGN

This study was a cross sectional community-based descriptive study.

3.4 SAMPLE SIZE DETERMINATION

The sample size was calculated using Leslie Kish's formular (Kish, 1995)

Where:

$N=(Z\alpha^2Pq)/d^2$

N= minimum sample size

Z=1.96

P= 50% assumed

q=1-p

d=5% level of significant

$N= (1.96)^2(0.5)\ (0.5)/0.05^2$

Design effect = 2

N =384 * 2

N= 768

NR= 10% non-response rate.

$$NR= 10\% = \frac{n}{1-nr} = \frac{768}{1-0.1} = \frac{768}{0.9} = 850$$

3.5 SAMPLING TECHNIQUE

A three-stage sampling technique was used to select respondents for the study as follows:

Stage 1: 5 wards were randomly selected out of the 12 wards using a simple random sample (Balloting).

Stage 2: 25 communities were proportionately selected out of 114 communities in the 5 wards using balloting method.

Stage 3: Questionnaire was administered to 34 adults (18 years and above) in each community.

Table 3.2: Distribution of communities in the wards of Ibadan North Local Government Area

Wards	Number of Communities in the ward	Proportion of communities to be selected from each ward; $\frac{\text{No of communities in the ward x No of communities to be used in the study}}{\text{Total number of communities in the five (5) wards}}$
2	39	$\frac{39\times25}{114}=9$
3	22	$\frac{22\times25}{114}=5$
8	20	$\frac{20\times25}{114}=4$
11	15	$\frac{15\times25}{114}=3$
12	18	$\frac{18\times25}{114}=4$
Total	***114**	****25**

* Number of communitiesw in the five (5) wards =114

** Number of communities to be used in the study =25

3.6 INCLUSION CRITERIA.

The criteria were willingness to participate in the study, ability to comprehend relevant information and adults 18 years and above in Ibadan North local government area of Oyo State.

3.7 EXCLUSION CRITERIA

The study excluded persons with impaired mental function who were unable to comprehend relevant information and those not giving informed consent to participate in the study.

3.8 TRAINING OF RESEARCH ASSISTANTS

Four trained research assistants helped in the administration of the questionnaire in the Local Governments. The research assistants were experienced field data collectors and they were trained for two days on data collection for this study.

3.9 PRE-TEST OF SURVEY INSTRUMENT

A pre-test exercise was carried out among adults in Ibadan South West (Ring Road) Local Government area of Oyo State. This is because the local Government shares similar characteristics with Ibadan North Local Government in terms of it being an urban settlement and the possession of developmental structures as it houses the Adeoyo main Hospital (Ring Road State Hospital) among others. A total of 85 adults which makes 10% of the total sample size were interviewed.

The pre-test exercise served as a pilot for the data collection procedures. It helped in the validation of the instrument and determining problems which must be overcome during the main data collection process. The pre-test enabled the researcher to determine the trend in the responses of participants, their level of understanding of the research instruments and the duration of time it will take to administer the instrument.

3.10 DATA COLLECTION

Semi-structured questionnaires were used for data collection. The questionnaire was divided into five (5) sections.

Section A: Socio-demographic characteristic

Section B: Knowledge Evaluation

Section C: General Attitude to diabetes risk

Section D: Risk Perception

Section E: Behavioural Practices

3.11 STUDY VARIABLES

1) Dependent variable: The dependent variable in this study is diabetes risk perception.

2) Independent variables: The independent variables in this study include family history of diabetes, socio-demographic variables, diabetes knowledge and behavioural practices.

3.12 DATA MANAGEMENT AND ANALYSIS.

After administering the questionnaire, manual editing was carried out to ascertain the completeness, consistency and accuracy of information collected. Therefore each answer was immediately cleaned daily before leaving the school and the questionnaire was serially numbered. A coding guide was developed and used for coding the answered questionnaire. Data were fed into the computer using the Statistical Package for Social Sciences (SPSS) software. In order to determine the knowledge and risk perception of diabetes, a scoring mechanism was adopted.

All the 850 questionnaires administered were used for analysis. In respect to analysis, Respondents level of knowledge was graded from their responses, knowledge score of 6 and above were termed to be good, while less than 6 were poor. Diabetes risk perceptions of respondents were assessed by the use of Likert scale. Score of 17 and above was adjudged to be high risk perception while score less than 17 was low risk perception.

Data were analysed using descriptive statistics (such as frequency tables, mean and standard deviation). Chi-square and binary logistic regression tests at 0.05 level of significant.

3.13 ETHICAL CLEARANCE.

1. The study followed the ethical principles guiding the use of human participants in research, which include Respect for persons, Beneficence, Non-maleficence and Justice.

2. Ethical approval for the study was obtained from the Ethical Review Committee of the Ministry of Health, Oyo State.

3. With respect to confidentiality, no identifiers such as name of respondents was required or used during the course of the study.

4. All information provided was kept confidential during and after the research

5. All information was used for the purpose of the research only

CHAPTER FOUR

RESULTS

4.1 SURVEY

Eight hundred and fifty questionnaires were administered and the data collected was analysed. The survey results are arranged and presented as follows: socio-demographic characteristics of respondents; knowledge evaluation of diabetes; risk perception for developing diabetes; risk factors of diabetes; and factors affecting diabetes risk perception.

4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS

Results from Table 4:1 shows the distribution of age, gender, religion, ethnicity, level of education, occupation, marital status and duration of stay in the community. The total number of respondents studied was 850 adults.

4.2.1 Age and Sex- Distribution

The mean age of the respondents was 33.5 ± 11 years. Respondents within age group 18-25 years were 26.8%, and 34.7% of the total respondents were within 26-35 years. Majority of the respondents were females 66.9%, while 33.1% were males (Table 4:1).

4.2.2 Marital Status and Ethnicity - Distribution

Most of the respondents were married 63.4%, 35.6% were single, while 0.7% were widow/widower. Seven hundred and thirty four (734) of the respondents were Yoruba's, 9.9% were Igbo's, while only 0.2% were Hausa (Table 4:1).

4.2.3 Religion and Occupational Status - Distribution

Most of the respondents were Christians 66.7%, and 32.4% were Muslims. Also, most of them were self-employed (59.3%), Artisan (15.2%), Students (14.2%), Non-government (4.5%), Government employed (3.8%) (Table 4:1).

4.2.4 Level of Education, Duration of Stay in the Community and Family history of Diabetes - Distribution

There were 428 (50.4%) respondents with secondary school education, while 203 (23.9%) have Intermediary/Higher education, Primary school education 104 (12.2%), College 83 (9.8%), No formal education 20 (2.4%) and Post graduate 12 (1.4%). The mean number of years of living in the community was 9.93 ± 9.7 years, with 593 respondents (69.8%) having less than 10 years of duration, while those who had lived more than 10 years in the community were 29.6%. While majority of the respondents don't have family history of diabetes 748 (88%), only 102 (12%) had family history of diabetes (Table 4:1).

Table 4.1a: Respondents by some socio-demography characteristics

Distribution of respondents by some demographic Characteristics (N = 850)		
Variable	**Frequency**	**Percentage (100%)**
Age		
<24	176	20.7
24-34	294	34.6
35-44	248	29.2
45 and above	132	15.5
Sex		
Male	281	33.1
Female	569	66.9
Ethnicity		
Igbo	84	9.9
Yoruba	734	86.4
Hausa	2	0.2
Others	30	3.5
Marital Status		
Single	303	35.6
Married	539	63.4
Widow/Widower	6	0.7
Other	2	0.2
Religion		
Christianity	567	66.6
Islam	275	32.4
Traditional	4	0.5
Others	4	0.5

Table 4.1b: Respondents by some socio-demography characteristics

Variable	Frequency	Percentage (100%)
Level of Education		
No formal schooling	20	2.4
Primary	104	12.2
Secondary	428	50.4
Intermediate or higher	203	23.9
College/University	83	9.8
Postgraduate	12	1.4
Occupation		
Government Employee	32	3.8
Non-Government	38	4.5
Self Employed	504	59.3
Non paid	6	0.7
Artisan	129	15.2
Students	121	14.2
Retired	20	2.4
Duration of stay in this community		
< 5 years	315	37.1
5-9 years	193	22.7
10 years and above	342	40.2
Family history of diabetes		
Yes	102	12.0
No	748	88.0

Mean age of respondents=33.6 ± 11 years

Mean number of years of living in the community= 9.93 ± 9.70

4.3 KNOWLEDGE OF DIABETES AMONG RESPONDENTS

Most of the respondents (94.6%) have heard of diabetes mainly from television (19.9%), newspaper (2.9%), seminars (2.7%), radio (43.9%), or through other medium (30.6%). Factors that contributes to developing diabetes according to the respondents includes obesity (12.3%), decreased physical activity (8.0%), family history of diabetes (15.2%), mental stress (0.7%), consuming more sweet (57.7%), and others (6.1%) (Table 4. 2b). Symptoms attributed to diabetes include of weight loss (31.7%), frequent urination (40.2%), increased hunger (3.6%), increased thirst (15.8%), and others (8.7%). Some respondents (39.6%) said diabetes causes complications in other organ of the body while 77.5% says diabetes is preventable (Table 4.2c).

Most of the respondents 505 (59.4%) were adjudged to have good knowledge, while 345 (40.6%) had poor knowledge (Table 4.3).

Table 4.2a: Respondents knowledge of diabetes

Variable	Yes
Ever heard of diabetes	**804 (94.6%)**
Definition is diabetes	
Caused by eating too much sugary things	46 (5.72%)
Deadly disease	233 (29.0%)
Body sugar level is high	146 (18.2%)
When the infected person urinate till he/she loses weight	93 (11.6%)
It is a curable disease	182 (22.6%)
I don't know/No idea	104 (12.9%)
***Sources of information**	
Television	184 (19.9%)
Newspaper	27 (2.9%)
Seminars	25 (2.7%)
Radio	405 (43.9%)
Others	282 (30.6%)
***Signs and symptom**	
Ants in urine	201 (19.2%)
Continuous/frequent urination	269 (25.7%)
Loss of weight	168 (16.1%)
Stomach upset	30 (2.87%)
Selection of food to be consumed	7 (0.67%)
Unhealed wound	73 (6.98%)
Sweet urine	23 (2.20%)
Too much fat	1 (0.10%)
Weakness of the body	7 (0.67%)
Coughing	8 (0.77%)
Excessive taste	47 (4.49%)
Dizziness	4 (0.38%)
Burning urination	19 (1.82%)
Frequent sickness	7 (0.67%)
Swollen leg	5 (0.48%)
I don't know/I can't remember	177 (16.9%)

Table 4.2b: Respondents knowledge of diabetes

Variable	Yes
***Factors that contribute to developing diabetes**	
Obesity	143 (12.3%)
Decreased physical activity	93 (8.0%)
Family history of diabetes	177 (15.2%)
Mental stress	8 (0.7%)
Consuming more sweet	672 (57.7%)
Others	71 (6.1%)
***Symptoms of diabetes**	
Weight loss	442 (31.7%)
Frequent urination	560 (40.2%)
Increased hunger	50 (3.6%)
Increased thirst	220 (15.8%)
Others	121 (8.7%)

Table 4.2c: Respondents' knowledge of diabetes complication

Variable	Yes	No	Don't know
Complications in other organs of the body	**337 (39.6%)**	**40 (4.7%)**	**473 (55.6%)**
If "yes" what are the complications?			
Malaria/Typhoid	15 (4.45%)		
Swelling in the body	58 (17.2%)		
Unhealed wound	72 (21.4%)		
Malfunctioning of organ	47 (13.9%)		
Affect the sight	26 (7.72%)		
Ill health	46 (13.7%)		
Hypertension	73 (21.7%)		
Preventing diabetes	**659 (77.5%)**	**20 (2.4%)**	**171 (20.1%)**
If yes ''how''			
Proper medication	205 (31.1%)		
Avoid sweet/Sugar consumption	198 (30.1%)		
Medical check-up	229 (34.8%)		
Lifestyle modification	27 (4.1%)		

Table 4.3: Respondents level of knowledge

Level of knowledge	Frequency	Percentage
Poor	345	40.6
Good	505	59.4
Total	**850**	**100**

4.4 RISK PERCEPTION FOR DEVELOPING DIABETES

Table 4.4 shows respondents' diabetes self-risk perception. About 57.1% of the respondents agree that they have little control over risk to their health while 2.8% strongly disagree. Similarly, 68.4% of the respondents disagree that there is nothing they can do to prevent having diabetes while 3.5% strongly agree. Also 57.8% of the respondents agree that their personal effort will help control their risk of getting diabetes while 1.4% strongly disagrees. However, 47.8% of the respondents agreed that a person that makes good effort to control their risks of getting diabetes are much less likely to get diabetes while 4.2% strongly disagree. Some of the respondents 4.6% strongly agreed that they worry about getting diabetes while 44.4% disagree. While 58.8% of the respondent disagree that worrying about diabetes is very upsetting.

Table 4.5 shows respondents' diabetes diet risk perception in Ibadan North local government. Majority of the respondents (81.9%) think that eating fruits and vegetables decreases the risk of having diabetes while 1.6% thinks it increases the risk. About 56.6% of the respondents don't know whether having diabetes during pregnancy increases or decreases the risk of having diabetes or not while 4.0% thinks it has no effects on the risk of having diabetes. Some of the respondents (39.2%) think being 65 years of age and above has no effect on risk of having diabetes while 5.1% thinks it decreases the risk of having diabetes. Majority of the respondents (62.1%) think physical activities decreases the risk of having diabetes while 0.9% thinks it increases the risk of having diabetes. Similarly, about 52.4% of respondent thinks that controlling weight gain decreases the risk of having diabetes while 1.6% thinks it increases the risk of having diabetes.

Out of the 850 respondents, majority had high risk perception (n= 571, 67.2%). However, 279 respondents (32.8%) had low risk perception (Table 4.6).

Table 4.4: Respondents' diabetes self-risk perception

Variable	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly Disagree n (%)
I feel that I have little control over risk to my health	87 (10.2)	485 (57.1)	254 (29.9)	24 (2.8)
If i am going to get diabetes, there is not much I can do about it	30 (3.5)	113 (13.3)	581 (68.4)	126 (14.8)
I think that my personal effort will help control my risk of getting diabetes	230 (27.1)	491 (57.8)	117 (13.8)	12 (1.4)
People who make a good effort to control the risks of getting diabetes are much less likely to get diabetes	150 (17.6)	406 (47.8)	258 (30.4)	36 (4.2)
I worry about getting diabetes	39 (4.6)	303 (35.6)	377 (44.4)	131 (15.4)
Worrying about diabetes is very upsetting	50 (5.9)	265 (31.2)	500 (58.8)	35 (4.1)

Table 4.5: Respondents' diabetes diet risk perception

Variable	Increases the risk n (%)	Decreases the risk n (%)	Has no effect on risk n (%)	Don't know n (%)
Eating fruit and vegetables	14 (1.6)	695 (81.8)	20 (2.4)	121 (14.2)
Having had diabetes during pregnancy	159 (18.7)	176 (20.7)	34 (4.0)	481 (56.6)
Having a family member suffering from diabetes	277 (32.6)	99 (11.6)	231 (27.2)	243 (28.6)
Being 65 years of age and above	274 (32.2)	43 (5.1)	333 (39.2)	200 (23.5)
Regular physical exercise	8(0.9)	528 (62.1)	117 (13.8)	197 (23.2)
Controlling weight gain	14 (1.6)	445 (52.4)	146 (17.2)	245 (28.8)

Table 4.6: Respondent diabetes risk perception

Risk perception	Frequency	Percent
Low	279	32.8
High	571	67.2
Total	**850**	**100**

4.5 RISK FACTORS FOR DIABETES AMONG RESPONDENTS

About 2.7% of the respondents currently smoke any tobacco product while 97.3% does not smoke tobacco product. Similarly, 18.9% of the respondents took alcohol within the past 30 days. More than 53.3% of the respondents ate fruit for 1-3 days in a week while 42.7% ate fruit for more than 3 days in a week. About 36.1% of respondents ate vegetable for 1-3 days in a week while 61.4% ate vegetable for more than 3 days in a week.

Majority of the respondents (62.6%) do vigorous physical activities for 1-3 days in a week while 37.4% do vigorous physical activities for more than 3 days in a week. Some of the respondents (26.4%) do moderate physical activities for 1-3 days in a week while 73.6% do moderate physical activities for more than 3 days in a week. A small percentage of respondents (16.6%) do light physical activities for 1-3 days in a week while 83.4% do light physical activities for more than 3 days in a week (Table 4.7).

Table 4.8 shows respondents' knowledge and diabetes risk perception. A greater proportion of respondents in the high risk perceived group had good knowledge of diabetes 367 (72.7%). There was a significant association between diabetes knowledge and risk perception ($p<0.05$).

Table 4.7a: Known Risk factors for Diabetes among respondents

Variable	Frequency	Percentage
Do you currently smoke any tobacco products		
Yes	23	2.7
No	827	97.3
If yes,how often do you smoke tobacco products		
Daily	19	82.6
Weekly	2	8.7
Occassionally	2	8.7
On average how many of the following do you smoke each day		
Manufactured cigarettes		
1 -3 sticks	13	56.5
More than 3 sticks	10	43.5
Indian hemp		
1 -3 sticks	0	0.0
More than 3 sticks	2	100.0
Local cigarette (taba)		
1 – 3 sticks	2	100.0
Have you drank alcohol within the past 30 days, such as beer, wine or spirit		
Yes	161	18.9
No	689	81.1
In the past 30 days, how frequently have you drank at least a bottle of alcohol		
Daily	23	2.7
Weekly	54	6.4
Occasionally	84	9.9
On average how many bottles do you drink during one day		
1-3 bottles	129	80.1
More than 3 bottles	18	11.2
Don't know	14	8.7
In a typical week, how many days do you eat fruits?		
1-3	453	53.3
More than 3	363	42.7
Don't know	34	4.0
No of servings		
1-3	789	92.8
More than 3	27	3.2
Don't know	34	4.0
Diet (Vegetable)		
1-3	307	36.1
More than 3	522	61.4
Don't know	21	2.5
No of servings		
1-3	824	96.9
More than 3	5	0.6
Don't know	21	2.5

Table 4.7b: Known Risk factors for Diabetes among respondents

Variable	Frequency	Percentage
Physical activity(Vigorous)		
1-3 days in a week	166	62.6
More than 3 in a week	99	37.4
No of minutes		
60 mins or less	168	63.4
61 - 180 mins	59	22.3
More than 180	34	12.8
Don't know	4	1.5
Moderate activities		
1-3 days in a week	204	26.4
More than 3 in a week	569	73.6
No of Minutes		
60 mins or less	528	68.3
61 - 180 mins	174	22.5
More than 180	71	9.2
Light activities		
1-3 days in a week	137	16.6
More than 3 in a week	686	83.4
No of hours		
60 mins or less	695	84.4
61 - 180 mins	108	13.1
More than 180	20	2.4

Table 4.8: Distribution of respondent knowledge by diabetes risk Perception

Knowledge*	Risk Perception			
	High	Low	Chi square	P-value
	n (%)	n (%)		
Poor	204 (59.1)	141 (40.9)	17.049	0.00
Good	367 (72.7)	138 (27.3)		

*Indicates variables with significant associations

4.6 FACTORS AFFECTING DIABETES RISK PERCEPTION

Table 4.9 showed respondents diabetes risk perception and socio demographic characteristics such as sex, age, ethnic group, marital status, level of education, religion, occupation. There was a significant association between diabetes risk perception and sex ($p<0.05$), with the male respondents 205 (73.0%) having high diabetes risk perception than female 366 (64.3%). Similarly, there was a significant association between diabetes risk perception and religion ($p<0.05$), with 375 (66.1%) of the Christian respondents having high diabetes risk perception as compared to Muslim respondents 194 (70.5%) and 2 (50%) respondents that practise traditional religion. There was a significant association between diabetes risk perception and level of education ($p<0.05$), with secondary school certificate holder 264 (61.7%) having high diabetes risk perception. There was also a significant association between diabetes risk perception and occupation ($p<0.05$), with self-employed respondents 313(62.1%) having high diabetes risk perception.

Table 4.9a: Distribution of respondents' characteristics and diabetes risk perception

Variable	Risk Perception			
	High Risk	Low Risk	Total	p-value
	n (%)	n (%)	n (%)	
Sex*				
Male	205 (73.0)	77 (27.0)	281(100)	0.012
Female	366 (64.3)	203 (35.7)	569(100)	
Age				
<24	107 (60.8)	69 (39.2)	176(100)	0.235
24-34	204 (69.4)	90 (30.6)	294(100)	
35-44	171 (69.0)	77 (31.0)	248(100)	
45 and above	89 (67.4)	43 (32.6)	132(100)	
Ethnic Group				
Yoruba	485 (66.1)	249 (33.9)	734(100)	0.083
Igbo	58 (69.0)	26 (31.0)	84(100)	
Hausa	2 (100)	0 (0.00)	2 (100)	
Others	26 (86.7)	4 (13.3)	30(100)	
Marital Status				
Single	197 (65.0)	106 (35.0)	303(100)	0.154
Married	370 (68.6)	169 (31.4)	539(100)	
Widow/Widower	4 (66.7)	2 (33.3)	6 (100)	
Highest level of education completed*				
No formal Schooling	12 (60.0)	8 (40.0)	20(100)	0.006
Primary school	82 (78.8)	22 (21.2)	104(100)	
Secondary school	264 (61.7)	164 (38.3)	428(100)	
Intermediate / Higher school completed	142 (70.0)	61 (30.0)	203(100)	

Table 4.9b: Distribution of respondents' characteristics and diabetes risk perception

Variable	Risk Perception			
	High Risk n (%)	Low Risk n (%)	Total n (%)	p-value
College /University completed	63 (75.9)	20 (24.1)	83 (100)	
Postgraduate degree and above	8 (66.7)	4 (33.3)	12 (100)	
Religion*				
Christianity	375 (66.1)	192 (33.9)	567(100)	0.015
Islam	194 (70.5)	81 (29.5)	275(100)	
Traditional	2 (50.0)	2 (50.0)	4 (100)	
Others	0 (0.00)	4 (100)	4(100)	
Which of the following best describe your main occupation *				
Government	30 (93.8)	2 (6.2)	32(100)	0.000
Non-government	32 (84.2)	6 (15.8)	38(100)	
Self-employed	313 (62.1)	191 (37.9)	504(100)	
Retired	16 (80.0)	4 (20.0)	20 (100)	
Non-paid	2 (33.3)	4 (66.7)	6(100)	
Artisan	105 (81.4)	24 (18.6)	129(100)	
Student	73 (60.3)	48 (39.7)	121(100)	
Duration of stay in this community				
Less than 5 years	203 (64.4)	112 (35.6)	315 (100)	0.424
5- 9 years	132 (68.4)	61 (31.6)	193 (100)	
10 and above	236 (69.0)	106 (31.0)	342 (100)	
Do you have a family member suffering from diabetes				
Yes	65 (63.7)	37 (36.3)	102(100)	0.429
No	506 (67.6)	242 (32.4)	748(100)	

*Indicates variables with significant associations

Table 4.10 showed respondents diabetes risk perception and lifestyle such as tobacco smoking, alcohol drinking, diets and physical activity. There was a significant association between diabetes risk perception and number of fruits serving ($p<0.05$), with respondents with more than 3 serving (63.6%) having high diabetes risk perception. Similarly, there was a significant association between diabetes risk perception and light physical activities ($p<0.05$), with respondents with light physical activity (69.5%) having high diabetes risk perception.

Table 4.10a: Distribution of respondents' lifestyle and diabetes Risk Perception

Variable	Risk Perception			
	High Risk	Low Risk	Total	P value
	N (%)	N (%)		
Do you currently smoke any tobacco products				
Yes	19 (82.6)	4 (17.4)	23 (100)	0.110
No	552 (66.7)	275 (33.3)	827 (100)	
Have you drank alcohol within the past 30 days, such as beer, wine or spirit				
Yes	117 (72.7)	44 (27.3)	161(100)	0.099
No	454 (65.9)	235 (34.1)	689 (100)	
In a typical week, how many days do you eat fruits?				
1-3	299 (66.0)	154 (34.0)	453 (100)	0.654
More than 3	250 (68.9)	113 (31.1)	363 (100)	
Don't know	22 (64.7)	12 (35.3)	34 (100)	
No of servings*				
1-3	224 (73.0)	83 (27.0)	307 (100)	0.020
More than 3	332 (63.6)	190(36.4)	522 (100)	
Don't know	15 (71.4)	6 (28.6)	21 (100)	
Vigorous Physical activity				
1-3 days in a week	116 (69.9)	50 (30.1)	166 (100)	0.621
More than 3 in a week	72 (72.7)	27 (27.3)	99 (100)	

Table 4.10b: Distribution of respondents' lifestyle and diabetes Risk Perception

Variable	Risk Perception			
	High Risk n (%)	Low Risk n (%)	Total	P value
Moderate Physical activities				
1-3 days in a week	129 (63.2)	75 (36.8)	204 (100)	0.181
More than 3 in a week	389 (68.4)	180 (31.6)	569 (100)	
Light Physical activities*				
1-3 days in a week	77 (56.2)	60 (43.8)	137 (100)	0.002
More than 3 in a week	477 (69.5)	209 (30.5)	686 (100)	

*Indicates variables with significant associations

PREDICTORS OF RISK PERCEPTION FOR DEVELOPING DIABETES.

Respondents practising Islamic religion were more likely to have high risk perception for developing diabetes compare to those practising Christianity religion (OR = 1.477, 95 CI = 1.001-2.091).

Among the occupations, Respondents who were self-employed were 85 less likely to have high risk perception for developing diabetes compare to those who were working in government establishments (0R = 0.151,95 CI = 0.031-0.743). Respondents who were doing non-paid jobs are 93 less likely to have high risk perception for developing diabetes compare to those who were working in government establishments (OR = 0.071, 95 CI = 0.006-0.817). Respondents who were students are 88 less likely to have high risk perception for developing diabetes compare to those who were working in government establishments (OR=0.118, 95 CI = 0.023-0.601).

Respondents who have good knowledge of diabetes were 2 times more likely to have high risk perception for developing diabetes compare to those who had poor knowledge (OR = 1.724, 95 CI = 1.239-2.399).

Respondents who received more than three serving of fruits were 50 less likely to have high risk perception for developing diabetes compare to those who received one to three serving of fruits (OR = -0.498, 95 CI = 0.351-0.707).

Respondents who had more than three days of light physical activity in a week were 2 times more likely to have high risk perception for developing diabetes compare to those who had one to three days of light physical activity (0R=1.930, 95 CI = 1.277-2.918).

Table 4.11a: Binary logistic regression of risk perception and significant socio-demographic variables, lifestyle and knowledge

	B	Sig.	Exp (B) OR	95 C.I. for EXP (B) Lower	Upper
Sex					
Male**			1		
Female	-0.259	0.161	0.772	0.538	1.108
Highest level of education					
No formal schooling**			1		
Primary school	0.877	0.123	2.403	0.788	7.326
Secondary school	-0.163	0.753	0.850	0.308	2.344
Intermediate or higher secondary school	0.265	0.625	1.304	0.450	3.781
College/University completed	0.417	0.488	1.517	0.467	4.925
Postgraduate degree and above	-0.015	0.989	0.985	0.127	7.654
Religion					
Christianity**			1		
Islam	0.369	0.049*	1.447	1.001	2.091
Traditional	-1.785	0.117	0.168	0.018	1.560
Others	-22.589	0.999	0.000	0.000	0.000
Main occupation					
Government employee**			1		
Non-government	-1.019	0.270	0.361	0.059	2.208
Self-employed	-1.888	0.020*	0.151	0.031	0.743
Retired	-1.703	0.090	0.182	0.025	1.307
Non paid	-2.647	0.034*	0.071	0.006	0,817
Artisan	-0.823	0.333	0.439	0.083	2.327
Student	-2.137	0.010*	0.118	0.023	0.601

Table 4.11b: Binary logistic regression of risk perception and significant socio-demographic variables, lifestyle and knowledge

	B	Sig.	Exp (B) OR	95 C.I. for EXP (B) Lower	Upper
Knowledge group					
Poor**			1		
Good	0.545	0.001*	1.724	1.239	2.399
No of servings					
1-3**			1		
More than 3	-0.696	0.000*	0.498	0.351	0.707
Don't know	-0.433	0.431	0.649	0.221	1.902
Light activities					
1-3 days in a week			1		
More than 3 in a week	0.657	0.002*	1.930	1.277	2.918

**Indicates reference category

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Knowledge of diabetes among respondents

An important finding in this study was that respondents showed good knowledge of diabetes. This knowledge is better when compared to another study in which about 25% has heard about diabetes (William et al., 2010). This could probably be due to public awareness in the electronic media (radio and television) which has a wider outreach among the respondents. According to the respondents; ants in urine, continuous urination, loss of weight and unhealed wound are the major symptoms of diabetes. Similarly, consuming more sweets, family history of diabetes, obesity, decreased physical activities were the major factors that contribute to developing diabetes. This knowledge of diabetes was similar to what Omobuwa and Alebiosu reported in 2014. Most of the respondents were not aware that poorly controlled diabetes may lead to complications in other organs of the body. For instance, poorly controlled diabetes can cause damage to eyes (leading to blindness), kidneys (leading to renal failure), and nerves (leading to impotence and foot disorders/ possibly amputation) as well as increased risk of heart disease, stroke, and poor blood supply to the limbs. Knowledge of diabetes could be an indication of whether or not someone will come for diabetes screening or not. It may also determine whether or not one will adopt behavioural changes towards prevention of risk factors for diabetes and adoption of healthier lifestyle.

5.2 Risk perception for developing diabetes

Most of the respondents had high diabetes self-risk perception. Though, most of the respondents also feel that regular physical activities and controlling weight gain decreases the risk of having diabetes. Self-risk perception differs among groups; for example, wide gaps exist between experts' (scientists, health professionals) perceptions of risk and the lay public's perceptions (Walker and Mertz, 2003). This high diabetes self-risk among respondents may be due to their feeling that they have little control over risk to their health.

5.3 Risk factors for diabetes among respondents

In this study, most of the respondents have good knowledge of diabetes risk perception. Majority of the respondents (97.3%) don't smoke any tobacco products. Among the respondents that smoke tobacco products only two (8.70%) smoke local cigarettes while

others smoke manufactured cigarettes. More than half of the respondents that drank alcohol do so occasionally. More than half of the respondents ate fruits one to three days in a week. Most of the respondents ate vegetable more than three days in a week and this will help them to control the release of glucose into their blood streams. Similarly, most of the respondents participate in physical activities that help in the metabolism of stored sugar (glycogen) in the body.

5.4 Factors affecting diabetes risk perception

This study revealed that male respondents had high risk perception than female respondents in the Local Government. Primary school certificate holders had high risk perception compared to other level of education in the Local Government. Respondent practising Islamic religion had high risk perception as compared to the Christians. Respondents who are government employee also had high risk factor compared with other category.

5.5 Limitations of study.

1. The cost of carrying out the study in Ibadan North local government area.
2. Lack of information on family history of diabetes.

5.6 Conclusion

In this study, majority of the respondents in the study area had good knowledge of diabetes. This study reveals that male respondents have high risk perception than female respondents. Also, primary school certificate holders had high risk perception compared to other level of education. It was also deduced from the study that majority of the respondents had high self-risk perception of diabetes.

Furthermore, this study revealed that a greater proportion of respondents in the high risk perceived group had good knowledge of diabetes.

5.7 Recommendations

Based on the findings from this study, the following are recommended:

1. There is need for the development of a comprehensive health programme for the management of diabetes and its related risk factors.

2. There is also need for infrastructure for diabetic screening and identification of high risk group in the community.

3. Finally, there is need for adequate public awareness and knowledge on the risk factors and symptoms of diabetes.

REFERENCES

ADA, 2008. Standards of medical care in diabetes. American Diabetes Association. *Diabetes Care*; 31(Suppl 1): S 12 -S54.

Alberti KG, Zimmet P, Shaw J. 2007. International Diabetes Federation: a consensus on Type 2 diabetes prevention. Diabet Med.;24(5):451-463.

Arguedas J; Leiva V; Wright J., 2013. Blood pressure targets for hypertension in people with diabetes mellitus. The Cochrane database of systematic reviews 10:CD008277

Burt V; Cutler J; Higgins M., 1995. Trends in the prevalence, awareness, treatment and control of hypertension in the adulth US population. Data from the health examination surveys, 1960 to 1991. Hypertension 26(1): 60-9

Carretero OA and Oparil S., 2000. "Essential hypertension. Part I: definition and etiology".*Circulation* **101** (3): 329–35.

Cella D, Yount S, Rothrock N, Gershon R, Cook K, Reeve B. 2007. On behalf of the PROMIS cooperative group. The Patient Reported Outcomes Measurement Information System (PROMIS): Progress of an NIH Roadmap Cooperative Group during its first two years. Medical Care; 45(5):S3–S11.

Chen K., High L. 2009. Prevalence of impaired fasting glucose and type 2 diabetes mellitus in Benghu Islets, Taiwan: evidence of a rapidly emerging epidemic. *Diab Res CIinPract* 2009, 44(1) : 59-69.

Chiasson J. L., Gomis R., Hanefeld M., Josse R. G. Karasik A., Laakso M. 1998. The STOP NIDDM Trail: an international study on the efficacy of alpha-glucosidase inhibitor to prevent type 2 diabetes in a population with impaired glucose tolerance: rationale, design and preliminary screening data. Study to Prevent Non-Insulin Dependent Diabetes Mellitus. *DiabetesCare*;21(10):1720-1725.

Chiolero A; Bovet P; Paradis G., 2013. Screening for elevated blood pressure in children and adolescents: a critical appraisal JAMA Pediatrics 167 (3) 266-73

Cooke DW and Plotnick L., 2008. "Type 1 diabetes mellitus in pediatrics". *Pediatr Rev* **29** (11): 374–84;

Dallas, John (2011). "Royal College of Physicians of Edinburgh. Diabetes, Doctors and Dogs: An exhibition on Diabetes and Endocrinology by the College Library for the 43rd St. Andrew's Day Festival Symposium.

Diabetes Mellitus (DM): Diabetes Mellitus and Disorders of Carbohydrate Metabolism: Merck Manual Professional". Merck Publishing. April 2010. Retrieved 2010-07-30

Dorner M, Pinget M, Brogard JM (May 1977). "Essential labile diabetes". *MMW Munch Med Wochenschr* (in German) **119** (19): 671–4

DPPRG, 2000. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. Diabetes Prevention Programme Research Group *NEngl J. Med.* ; 346(6): 393 - 463.

Genuth S. 1995. A case for blood glucose control. Advances in internal medicine 40:573-623

Go A; Bauman M; King S; Fonarow G; Lawrence W; Williams K; Sanchez E., 2013. An Effective Approach to High Blood Pressure Control. A Science Advisory from the American Hearth Association, The American College of Cardiology and the centres for Disease Control and Prevention Hypertension 63(4): 878

Govindarajan G, Sowers J. R. and Stump C. 2006. Hypertension and diabetes mellitus, Available at: http://www.touchcardiology.com/articles/hypertension-and-diabetes-mellitus.none

Gupta A, Gupta R, Sarna M, Rastogi S, Gupta VP, Kothari K. 2003. Prevalence of diabetes, impaired fasting glucose and insulin resistance syndrome in an urban Indian population. Diabetes Res Clin Pract;61:69–76.

Healthy People, 2010. Health Related Quality of Life and Well-being. Foundation Health Measure Report. Healthy People 2020

Hiltunen L., Laara E., Keinane-Kuikaaniemi S., 1999. Changes in glucose tolerance during a three year's follow-up in an elderly population. *Public Health*,13(2):181-184.

Hivert MF; Warner AS; Shrader P; Grant RW; Meigs JB., 2009. Diabetes Risk Perception and Intention to Adopt Healthy lifestyles among Primary Care Patients.

Hu FB, Leitzmann MF, Stampfer MJ, Colditz GA, Willet WC, Rimm EB. 2001. Physical activity and television watching in relation to risk for type 2 diabetes mellitus in men. Arch Intern Med; 161: 1542–1548.

James P; Oparil S; Carter B; Cushman W; Dennison-Himmelfarb C; Handler J; Lackland D; Lefevre M., 2013. Evidence-Based Guideline for the Management of Highblood Pressure in Adults: Report from the Panel Members Appointed to the Eighth Joint National Committee (JNC 8) JAMA 311(5)507-20

IDF, 2013 International Diabetes Atlas International Diabetes Foundation p. 7. ISBN 2930229853.

King H, Aubert RE, Herman WH. 1998. Global burden of diabetes, 1995-2025: prevalence, numerical estimates, and projections. Diabetes Care;21(9): 1414-31

Kearney P; Whelton M; Reynolds K; Muntner P; Whelton P; He J., 2005. Global burden of hypertension; analysis of worldwide data. Lancet 365(9455) 217-23

Kish, Leslie. 1995. The hundred years' wars of survey sampling. *Statistics in Transition,* 2(5), 813-830.

Klarenbach S; McAlister F; Johasen H; Tu K; Hazel M; Walker R; Zarnke K; Campell N., 2010. Identification of Factors driving differences in cost effectiveness of first-line pharmacological therapy for uncomplicated hypertension. Canadian Hypertension Education Program. The Canadian journal of Cardiology 26(5):158-63.

Kotchen T. 2011. Historical trends and milestones in hypertension research a model of the process of translational research. Hypertension 58(4):522-38

Laios K, Karamanou M, Saridaki Z, Androutsos G (2012). "Aretaeus of Cappadocia and the first description of diabetes". *Hormones* **11** (1): 109–113. PMID 22450352

Law M; Wald N; Morris J., 2003. Lowering Blood Pressure to prevent Myocardial Infraction and Stroke: a new preventive strategy. Health Technol Assess 7(31):1-94

Laxmaiah A, Nagalla B, Vijayaraghavan K, Nair M. 2007. Factors affecting prevalence of overweight among 12- to 17-year-old urban adolescents in Hyderabad, India. Obesity (Silver Spring);15:1384–1390.

Leonid Poretsky, (2009). *Principles of diabetes mellitus* (2nd ed.). New York: Springer. p. 3.ISBN 978-0-387-09840-1.

Malik VS, Popkin BM, Bray GA, Després JP, Hu FB (2010). "Sugar Sweetened Beverages, Obesity, Type 2 Diabetes and Cardiovascular Disease risk".*Circulation* **121** (11): 1356–64.

Misra A, Pandey RM, Devi JR, Sharma R, Vikram NK, Khanna N. 2001. High prevalence of diabetes, obesity and dyslipidaemia in urban slum population in northern India. Int J Obes Relat Metab Disord;25:1722–1729.

NDIC, 2011. National Diabetes Clearinghouse (NDIC): National Diabetes Statistics 2011". U.S. Department of Health and Human Services. Retrieved 22 April 2014.

NICE, 2011. Initiating and Monitoring Antihypertensive drug treatment, including blood pressure targets. National Institute of Clinical Excellence. GC 127 Hypertension. Clinical Management of primary hypertension in adults.

NHBPEP, 2004. The fourth report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents. National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. Pediatrics 114 (2 suppl. 4th Report:555-76).

NPC, 2008. National Population Commission. 2008 Census Tables. Adopted from http://www.population.gov.ng/files/nationalfinal.pdf. Accessed 12 July 2014.

Olaitan, 2012. Patients'knowledge of causes, effects and complications of diabetes mellitus in Ilorin, Kwara State, Nigeria. Journal of Biotechnology and Pharmaceutical Research. Vol. 3(6), pp112-117.

Omobuwa O. and Alebiosu O. 2014. Awareness of diabetes amongst undergraduates in a Nigerian University, South West Nigeria. Sahel Medical Journal volume 17

Pan X. R., Li G. N., Hu Y. H., Wang J. X., Yang W. Y., A Z. X., *1997.* Effect of diet and exercise in preventing NIDDM in people with impaired glucose tolerance. The Da Quig IGT and Diabetes Study. *Diabetes Care* ; 29(4): 537 - 544.

Picot, J; Jones, J; Colquitt, JL; Gospodarevskaya, E; Loveman, E; Baxter, L; Clegg, AJ 2009. "The clinical effectiveness and cost-effectiveness of bariatric (weight loss) surgery for obesity: a systematic review and economic evaluation". *Health technology assessment (Winchester, England)* **13** (41): 1–190, 215–357, iii–iv.doi:10.3310/hta13410. PMID 19726018

Raimi TH, Alebiosu OC, Adeleye JO, WO Balogun, Kolawole BA, Familoni OB, Ikem RT, Adesina OF, Odusan O, Oguntona SA, Olunuga T., 2014. Diabetes Education: Strategy for improving diabetes care in Nigeria. African Journal of Diabetes Medicine. Vpl. 22

Sever P, Messerl F., 2011. Hypertension Management. Optimal Combination Therapy. Eur Heart J. 32(20)2499-506

Shoback, 2011. *Greenspan's basic & clinical endocrinology* (9th ed. ed.). New York: McGraw-Hill Medical.ISBN 9780071622431.

Shrestha U. K., Singh D. L., Bhattarai M. D., 2006. The prevalence of hypertension and diabetes defined buy fasting and 2 hour plasma glucose criteria in urban Nepal. *DiabetesMedicine*; 23(10): 1130 - 1135.

Siebenhofer A; Jeitler K; Berghold A; Waltering A; Hemkens L; Semlitsch T; Pachler C; Strametz R; Horvath K., 2011. Long-term effects of weight-reducing diets in hypertensive patients. In Siebenhofer, Andrea Cochrane Database of Systematic Reviews 9(9)

Walker EA; Wylie-Rosett J. 1998 Evaluating risk perception of developing diabetes as a multi-dimensional construct. Diabetes 47:1

William KM; Zachary MN; Eva WN. 2010. Knowledge, attitude and practices related to diabetes among community members in four provinces in Kenya: a cross-sectional study. The Pan African Medical Journal. 7:2

WHO. 1995. The use and interpretation of anthropometry. World Health Organisation, Geneva, Switzerland.

WHO. 2004. Diabetes Action Now Booklet. Geneva, Switzerland. World Health Organisation

WHO 2004. WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A report from the WHOQOL Group.

WHO 2005. The World Health Organization Quality of Life assessment (WHOQOL): position paper from the World Health Organization. World Health Organization Soc Sci Med 2005; 41(10):1403–1409.

WHO, 2006. *Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia : report of a WHO/IDF consultation*. World Health Organisation

WHO. 2006. Obesity. Geneva: World Health Organization

WHO, 2013. Diabetes Fact sheet ". World Health Organization. . Retrieved 25 March 2014

WHO, 2014. "About diabetes". World Health Organization. Retrieved 4 April 2014

Wild S, Roglic G, Green A, Sicree R, King H (2004). "Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030". *Diabetes Care* 27 (5): 1047–53.

William J. Elliott 2003. The Economic Impact of Hypertension. The Journal of Clinical Hypertension 5(4):3-13

Yeni-Komshian H, Carantoni M, Abbasi F, Reaven GM. 2000. Relationship between several surrogate estimates of insulin resistance and quantification of insulin-mediated glucose disposal in 490 healthy non-diabetic volunteers. Diabetes Care; 23: 171-5.

Zimmet, P. Alberti, K. G. M. M. Shaw, J. 2001. Global and societal implications of the diabetes epidemic. Nature.;414(6865):782-7.

QUESTIONNAIRE

DIABETES RISK PERCEPTION AMONG ADULTS IN IBADAN NORTH LOCAL GOVERNMENT AREA OF OYO STATE

My name is Akadri, Fatimat Adedolapo. I am a second year student of the Department of Epidemiology & Medical Statistics, Faculty of Public health, University of Ibadan, Ibadan. Diabetes is rising in Nigeria. In this context, it's important that we recognize the risk factors and implement prevention programme against them. For the same purpose, we are conducting this survey. We need your support and cooperation. In the course of interview, we will ask you question and take physical measurement. We assure you that the information which you provide for the survey will be kept confidential and will be used for the purpose of survey only.

Consent: Now that the study has been well explained to me and I fully understand the content of the study procedure, I will be willing to take in the study.

....

Signature/Thumbprint of Participant Interview Date

Serial Number ……..

Section A: Demographic Information

1. Sex (1) Male (2) Female
2. Age in years……
3. Ethnic group (1) Yoruba (2) Igbo (3) Hausa (4) Others
4. Marital Status (1) Single (2) Married (3) Divorced/Separated (4) Widow/er (5) Others
5. What is the highest level of education you have completed?

   (1) No formal schooling (2) Primary School (3) Secondary School (4) Intermediate or higher secondary school (5) College/University completed (6)Postgraduate degree and above

6. Religion (1) Christianity (2) Islam (3) Traditional (4) No religion (5) Others

7. Which of the following best describes your main occupation?

(1) Government employee (2) Non-Government (3) Self-employed (4)Retired (5) Non-paid (6) Artisan (7) Student

8. How long have you been living in this community? ..... Don't know .....

9. Do you have a family member suffering from diabetes? (1) Yes (2) No (3) Don't know

Section B: Knowledge Evaluation

10. Have you ever heard of diabetes? (1) Yes (2) No

11a. What is diabetes?

b. How did you hear about diabetes for the first time? (1) Radio (2) Television (3) Newspapers

(4) Seminars (5) Others (specify) .....

c. What are the signs and symptoms of diabetes? .....

12. Do you think, in general, more and more people are getting affected with diabetes nowadays?

(1) Yes (2) No (3) Don't know

13. What are the factors you think contribute to developing diabetes?

(1) Obesity (2) Decreased physical activity (3) Family history of diabetes (4) Mental stress

(5) Consuming more sweet (6) Others (name) .....

14. Can diabetes cause complications in other organs of the body?

(1) Yes (2) No (3) Don't Know

If yes what are the complications it can cause? (list) .....

15. What are the symptoms of diabetes? (1) Weight loss (2) Frequent urination (3) Increased hunger

(4) Increased thirst (5) Others (specify) .....

16. Can diabetes be prevented? (1) Yes (2) No (3) Don't know

If yes, how can it be prevented? .....

Section C: General Attitude to Diabetes Risk

The following questions are about your general attitudes.

Kindly answer: strongly agree, agree, disagree or strongly disagree to each of the following questions.

S/N	Strongly Agree	Agree	Disagree	Strongly Disagree
17				

18				
19				
20				
21				
22				

17. I feel that I have little control over risk to my health.

18. If I am going to get diabetes, there is not much I can do about it.

19. I think that my personal effort will help control my risks of getting diabetes.

20. People who make a good effort to control the risks of getting diabetes are much less likely to get diabetes.

21. I worry about getting diabetes.

22. Worrying about getting diabetes is very upsetting.

Section D: Risk Perception

Complete the following statement with your perception if you think the item listed 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.

23. Eating fruits and vegetables ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

24. Having had diabetes during pregnancy ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

25. Having a family member suffering from diabetes ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

26. Being 65 years of age and above ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

27. Regular physical exercise ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

28. Controlling weight gain ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

Section E: Behavioural Practices

This section is all about various health behaviours. This includes things like smoking, drinking alcohol, eating fruits and vegetables and physical activity.

Tobacco Use

29. Do you currently smoke any tobacco products, Such as cigarettes, Indian hemp or pipes?

(1) Yes (2) No (If no, skip to Q.32)

30. If yes, how often do you smoke tobacco products?

(1) daily (2) weekly (3) occasionally

31. On average, how many of the following do you smoke each day?

a. Manufactured cigarettes b. Indian hemp c. pipes d. Others specify

....

Alcohol Consumption

32. Have you taken alcohol (such as beer, wine or spirit) within the past 30 days?

(1) Yes (2) No (If no, skip to Q.35)

33. In the past 30 days, how frequently have you taken at least a bottle of alcohol?

(1) Daily (2) weekly (3) occasionally

34. When you drink alcohol, on average, how many bottles do you have during one day?

..... Don't know

Diet

The next question ask about the fruits and vegetables that you usually eat.

35. In a typical week, on how many days do you eat fruits?

Examples: Apple, banana, orange, canned fruit, fruit juice (no artificial flavour), etc.

Number of days ..... Don't know ( )

36. How many servings of fruits do you eat on one of those days?

Number of servings ..... Don't know ( )

37. In a typical week, on how many days do you eat vegetables? Examples: Green leafy vegetables (spinach), tomatoes, carrots, pumpkin, cabbage, cooked beans, onions, etc.

Number of days ..... Don't know ( )

38. How many servings of vegetables do you eat on one of those days?

Number of servings ..... Don't know ( )

Physical Activity/Exercise

This includes activities that make you sweat, make your legs feel tired, or make you breathe hard.

Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think about those physical activities that you did for at least 10 minutes at a time.

39. During the last 7 days, on how many days did you do vigorous physical activities?

Examples: heavy lifting, jogging or running, vigorous dance, competitive sports (football, basketball, etc), strenuous occupation activity, digging, aerobics, or fast bicycling?

_____ days per week (If no vigorous physical activity skip to Q 41)

40. How much time did you usually spend doing vigorous physical activities on one of those days?
_____ hours per day _____ minutes per day ( ) Don't know/Not sure

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

41. During the last 7 days, on how many days did you do moderate physical activities? Examples: Carrying light loads, house walk that requires involves intense scrubbing/cleaning, competitive sport (tennis, volley ball), moderate dancing, gymnastics, and occupation that requires an extended amount of time standing or walking?

Do not include walking. _____ days per week (If no moderate physical activities skip to Q 43)

42. How much time did you usually spend doing moderate physical activities on one of those days?

_____ hours per day _____ minutes per day ( ) Don't know/Not sure

Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

43. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

_____ days per week (If no walking skip to Q 45)

44. How much time did you usually spend walking on one of those days?

_____ hours per day _____ minutes per day ( ) Don't know/Not sure

TELEGRAMS..... TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting

Our Ref. No. AD 13/ 479/ ४८०

February, 2015

The Principal Investigator,
Department of Epidemiology and Medical Statistics,
Faculty of Public Health,
University of Ibadan,
Ibadan.

Attention: Akadri Fatimat

Ethical Approval for the Implementation of your Research Proposal in Oyo State

This acknowledges the receipt of the corrected version of your Research Proposal titled: "Diabetes Risk Perception among Adults in Ibadan North Local Government Area of Oyo State."

2. The committee has noted your compliance with all the ethical concerns raised in the initial review of the proposal. In the light of this, I am pleased to convey to you the approval of committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as this will help in policy making in the health sector.

4. Wishing you all the best.

Sola Akande (Dr)
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee

ORAL POLIO VACCINE STATUS AND OCCURENCE OF WILD POLIO VIRUS AMONG REPORTED ACUTE FLACCID PARALYZED CHILDREN IN NIGERIA.

BolajokoOlufunmilayo AJUWON

D.V.M (Ibadan)

MATRICNO. 74229

PROJECT SUBMITTED IN PARTIAL FUFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF SCIENCE (EPIDEMIOLOGY), DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS (EMS), FACULTY OF PUBLIC HEALTH, UNIVERSITY OF IBADAN.

MAY 2014