

**RISK PERCEPTION, ATTITUDE AND LIFESTYLES RELATING TO  
DIABETES MELLITUS PREVENTION AMONG NURSES IN IBADAN  
SOUTH-WEST LOCAL GOVERNMENT AREA OF OYO STATE**

BY

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## **DEDICATION**

I dedicate this project work to the Almighty God who granted me grace to fulfill this vision. To Him alone be the glory.

I also want to dedicate this project to my parents, spouse and children for their support and understanding through it all.

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## **ABSTRACT**

Diabetes Mellitus (DM) is a major public health challenge. Perception of risk, attitude and lifestyles relating to DM has not been fully investigated among health care providers, especially nurses who play important clinical roles in prevention and control of the disease. The study was therefore designed to determine the risk perception, attitude and lifestyle relating to prevention of DM among nurses in Ibadan South West Local Government Area (LGA), Oyo State, Nigeria.

The study was a descriptive cross-sectional survey. A four-stage random sampling technique was used to select 417 nurses from 8 government and 3 private hospitals in the LGA. The combination of Risk Perception Survey for Developing Diabetes (RPS-DD) questionnaire and William Kiberenge questionnaire on knowledge, attitude and practices related to diabetes were used for data collection. Risk perception was measured on an 11-point scale of High perception ( $>7$ ), Medium Perception (5-7), Low perception (2-4) and No perception (0-1). Knowledge was measured on a 25-point scale of Good (scores  $\geq 19$ ), fair (12-18) and Poor (scores  $\leq 11$ ). Attitude to DM prevention was measured on a 20-point scale of positive (14-20), negative ( $<14$ ) and lifestyle relating to DM prevention on a 23-point scale of healthy (18-23) and unhealthy ( $<18$ ). Body Mass Index (BMI) was calculated from measured weights and heights of respondents; it was classified as underweight ( $\leq 18.5 \text{ kg/m}^2$ ), normal weight ( $18.5-24.99 \text{ kg/m}^2$ ), overweight ( $25-30 \text{ kg/m}^2$ ) and obesity ( $>30 \text{ kg/m}^2$ ). The data were analyzed using descriptive statistics and Chi-square at 5% level of significance.

Respondents' mean age was  $39.1 \pm 11.2$  years and 85.1% were females. Respondents' mean year of practice was  $13.5 \pm 9.3$  years. Majority (62.8%) of the respondents knew two types of diabetes and that lack or malfunctioning of insulin was the major cause of DM. Half (50%) of male respondents had poor knowledge of DM compared to 36.9% of females. Less than half (46.6%) of respondents from government hospital had fair knowledge of DM while most (36.6%) of the respondents from private hospitals had poor knowledge. Nearly half (49.9%) of the respondents had a "High risk perception" of DM (67.7% males; 46.8% females). Majority (77.5%) of the respondents had positive attitude towards lifestyle characteristics relating to DM prevention. Most (62.6%) of the respondents did not exhibit some healthy lifestyle characteristics such as eating vegetables and fruits daily, regular exercise, and blood sugar check. Respondents' mean BMI was  $26.7 \pm 6.0 \text{ kg/m}^2$ . Some (32.6%) of the respondents were overweight. There was

a significant positive association between level of knowledge of DM and their risk perception, lifestyle characteristics, BMI. Nurses with normal BMI had positive attitude and healthy lifestyle characteristics, but poor knowledge of DM and low risk perception.

Clinical knowledge of diabetes has no significant influence on attitude and lifestyle characteristics associated with Diabetes prevention, positive reflection on their attitude and lifestyle could be attributed to their cultural beliefs and myths. Thus a need for regular appraisal of nurses' knowledge requirement followed by educational training tailored to improve nurses' knowledge about Diabetes.

Key words: diabetes, knowledge, risk perception, attitude, lifestyle practices.

Word count = 492

## **CERTIFICATION**

I hereby certify that this research work was carried out by Adeyinka Margaret ABE in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan.

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## **GLOSSARY OF ABBREVIATIONS**

- IDF- International Diabetes Federation
- WHO- World Health Organisation
- IBSWLGA- Ibadan South West Local Government Area
- LGA-Local Government Area
- HBM- Health Belief Model
- DM- Diabetes Mellitus
- BMI- Body Mass Index
- NCDs- Non-Communicable Diseases
- CVD- Cardiovascular Disease

## **OPERATIONAL DEFINITION OF TERMS**

**Knowledge:** Knowledge of nurses about types, causes, management and complications of diabetes mellitus.

**Attitude:** Nurses predisposition to respond positively or negatively to preventive measures of diabetes mellitus.

**Risk Perception:** Is the subjective judgement that nurses make about the characteristics and severity of diabetes mellitus.

**Lifestyle:** Habits that constitute nurses mode of living in order to prevent the onset of diabetes mellitus.

**Body mass index:** Weight-height measure of nurses.

**Diabetes Mellitus:** A group of metabolic disorder as a result of lack of insulin or inability of the body to use insulin

**HbA1c:** Glycated Hemoglobin and it refers to the average amount of sugar in the body.

**Practicing nurses:** Trained nurses within the age group 25-55 years and have spent at least 3 years in practice.

## CHAPTER ONE

### INTRODUCTION

#### *1.1 Background Information*

Diabetes Mellitus (DM) is a group of metabolic diseases characterized by increase in blood sugar (glucose) levels that result from defects in insulin secretion or action or both (Guan-Hua, Mari, Catherine, Tamara and Donn, 2004). Diabetes is a growing public health problem in sub-Saharan Africa.

There are two forms of diabetes, Type 1 diabetes and Type 2 diabetes; Type 1A or autoimmune type 1 and type 1B or idiopathic or alternatively ketosis-prone type 2 diabetes usually develops in childhood or adolescence and accounts for 5 to 10% of diabetes cases (Levitt and Bradshaw, 2008). It occurs when certain pancreatic cells are destroyed by the body immune system and as a result are no longer able to produce insulin. There is no known prevention or cure for Type 1 diabetes but Type 2 diabetes can be prevented. Type 2 diabetes or non-insulin dependent diabetes mellitus, is a disease in which either the pancreas does not produce enough insulin or the body does not properly utilize the insulin it produces. Type 2 diabetes is the predominant form of diabetes in sub-Saharan Africa, accounting for over 90% of cases (Levitt and Bradshaw, 2008). People with Type 2 diabetes (previously called Adult Onset Diabetes) have problems storing and converting food to energy.

Diabetes may lead to complications and a number of health problems including heart disease, high blood pressure, kidney disease, blindness and premature death (Mohammad, Torabi, Bilesha, Priyam, Stephane and Kaigang, 2008). The vascular complications of type 2 diabetes accounts for majority of the social and economic burden among patients and society at large (Susan, Joline, Beulens, Yvonne, Diederick and Bruce, 2010).

Diabetes, an important component of the non-communicable diseases, is undoubtedly a rising problem globally. The emerging pandemic is driven by the combined effects of population ageing, rising levels of obesity, and inactivity (Susan et al, 2010). Sub-Saharan Africa is not immune to the process, and is experiencing a triple and in many instances, a quadruple burden of disease, as the traditional infectious diseases such as malaria and

tuberculosis have been joined by non-communicable diseases in addition to HIV (Levitt and Bradshaw, 2008).

The prevalence and incidence of diabetes have increased steadily over the past decades. The prevalence of diabetes for all age groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is projected to rise from 171million in 2000 to 366million in 2030. The prevalence of diabetes is higher in men than women, but there are more women with diabetes than men (Wild, Roglic, Sicree and King,2004).

In 2005, 7% of the United State population was estimated to have diabetes, 14.6million diagnosed and 6.2million undiagnosed people. It is predicted that by the year 2010, there will be approximately 29million diagnosed cases of diabetes in the United State which is a two-fold increase compared to that in 2005 (National Demographic Health Survey, 2008). The greatest increase in prevalence is however expected to occur in Asia and Africa where most patients will probably be found by 2030 (Wild et al, 2004).

According to WHO country and regional data on diabetes, 1.71million people are living with diabetes in 2000 and 4.8million by 2030.The prevalence in Sub-Sahara Africa is expected possibly to triple by 2030 making it a cause for concern of not only the health professionals but also policy makers as they initiate strategies to tackle it (NDHS, 2008).

### ***1.2 Statement of the Problem***

Diabetes mellitus is now a major public health problem in Nigeria. There has been a progressive increase in the prevalence of DM in Nigeria and the burden is expected to increase even further (Adeleye, Agada, Balogun, Adetunji and Onyegbutulem, 2006). DM significantly contributes to medical morbidity and mortality worldwide in developing countries like Nigeria. For example, studies in Nigeria have reported that the prevalence of DM varies across different zones of the country but ranges from 2.2-9.8% (Alphonsus and Patrick, 2015).

In a retrospective study (1990-2000) aimed at determining mortality patterns and case fatality rates of people with DM in a Nigerian hospital, out of a total of 13,797 medical admissions made over the period, 1,423 (10.3%) were DM related and documented case fatality rate was 22.6% (Ogbera, 2007).



The increase in incidence of diabetes in developing countries such as Nigeria follows the trend of urbanization and lifestyle changes, perhaps most importantly a “western-style” diet. Diabetes imposes a high economic burden in terms of health care expenditure, lost productivity and foregone economic growth (William, Zachary, Eva Wangechi and Eva Wangui, 2010).

Roy et al (2014) reported that amongst diabetics and high risk individuals, diabetes was perceived to be a very severe disease but did not reflect in their perception of risk factors and lifestyle associated with it. Good knowledge about a disease and adoption of healthy behaviours such as maintaining healthy weight, regular medical check and abstinence from alcohol are important in preventing the onset of the disease, it also facilitates an increase in awareness of the disease, reduce the incidence of the disease and its management. Health care workers have an important role to play in prevention and treatment of diabetes. For example, a study by William et al (2010) in Kenya revealed a low level of knowledge of diabetes among health care workers who were expected to deliver health education to the community. Low level of knowledge may result in poor attitude and consequently poor behavioural change which further causes poor health care system. A study by Unyime, Babatunde, Macmillan, Olayinka, Edna and Aishatu (2014) showed that more knowledgeable diabetics had better attitude towards the disease if adequate education by health workers is incorporated with structured diabetes care programme.

This study was designed to assess the risk perception, attitude and lifestyle relating to diabetes mellitus prevention among Nurses as they play an important role in prevention and management of DM. However, previous studies on DM have focused on other health care professionals such as doctors; few have targeted nurses, hence, the need for this study.

### ***1.3 Justification of the Study***

This study is significant for these reasons. Firstly, diabetes is now emerging as an epidemic of the 21<sup>st</sup> century and it threatens to overwhelm the healthcare system in the future. Sadly, majority of the people living with diabetes in developing countries are within the productive age range 45-64 years. They are the individuals expected to drive the economic development of these countries in order to achieve the agreed international development goals. Secondly, data obtained from this study will help facilitate changes in

education and clinical practice to strengthen nurses' capacity to help prevent, screen and detect NCDs (diabetes) and then treat and rehabilitate those suffering from the disease. Lastly, as diabetes further imposes a high economic burden in terms of health care expenditure, loss of productivity and foregone economic growth.

Data from this study could be used as a tool to design models for efficient management and delivery of quality care that will emphasize prevention, health information technology, care coordination and shared decision making among patients and their providers. Therefore, it is important to assess the risk perception, attitude and lifestyle relating to prevention of diabetes mellitus among nurses. This study will help in identifying level of perception of DM as an emerging epidemic and health workers' (Nurses) attitude towards diabetes which will guide the development of good education and prevention programmes. Thus diabetes education with consequent improvement in attitudes and skills will lead to better control of the disease.

#### ***1.4 Research Questions***

The study was designed to provide answers to five research questions as listed below:

1. What is the level of knowledge about Diabetes Mellitus among nurses?
2. What is the level of risk perception of developing Diabetes mellitus among nurses?
3. What is the attitude of nurses towards lifestyle modification associated with diabetes mellitus?
4. What are the healthy lifestyles of nurses that prevent Diabetes Mellitus?
5. Which category of BMI classification do nurses belong?

#### ***1.5 Broad Objective***

To investigate risk perception, attitude and lifestyle relating to the prevention of Diabetes Mellitus among Nurses.

#### ***1.6 Specific Objectives***

The specific objectives are to:

1. Assess the knowledge of nurses on diabetes mellitus.
2. Determine the level of risk perception of developing Diabetes Mellitus among nurses.

3. Determine the attitude of nurses towards lifestyle characteristics associated with Diabetes Mellitus.
4. Identify the lifestyles (diet, exercise, avoidance of alcohol and tobacco, regular medical check-up) relating to prevention of Diabetes Mellitus among Nurses.
5. Determine the Body mass indices of Nurses in Ibadan South West Local government area.

### **1.7 Research Hypotheses**

1.  $H_0$  - There is no association between the demographic characteristics of nurses and knowledge about diabetes mellitus.
2.  $H_0$  - There is no association between the demographic characteristics of nurses and their risk perception towards diabetes mellitus.
3.  $H_0$  - There is no association between demographic characteristics of nurses and their attitude to lifestyle modification related to diabetes mellitus.
4.  $H_0$  - There is no association between demographic characteristics of nurses and lifestyles relating to the prevention of diabetes mellitus.
5.  $H_0$  - There is no association between demographic characteristics of nurses and their body mass indices.
6.  $H_0$  - There is no association between level of knowledge and nurses' risk perception, attitude to lifestyle modification relating to prevention of diabetes mellitus, BMI and lifestyle.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Nature of Diabetes Mellitus

##### 2.1.1. Type 1 Diabetes

This form of diabetes accounts for only 5-10% of those with diabetes, previously encompassed by the terms insulin-dependent diabetes, type 1 diabetes or juvenile-onset diabetes, results from a cellular-mediated autoimmune destruction of the  $\beta$ -cells of pancreas. In this form of diabetes, the rate of  $\beta$ -cell destruction is quite variable, being rapid in some individuals (mainly infants and children) and slow in others (mainly adults). This immune-mediated diabetes commonly occurs in childhood and adolescence, but it can occur in any age, even in the 8<sup>th</sup> and 9<sup>th</sup> decades of life (Diabetes care, 2010).

Globally, the number of people with type 1 diabetes is unknown, although it is estimated that about 80,000 children develop the disease each year (Chiang, Kirkman, Laffel and Peters, 2014). Within the United States, the number of affected persons is estimated at 1-3million. The development of new cases vary by country and region, the lowest rates appear to be in Japan and China with approximately 1person per 100,000 per year, the highest rates are found in Scandavania where it is closer to 35 new cases per 100,000 per year (Kasper, Braunwald and Fauci, 2005). Two studies, one from Sudan and the other from Nigeria, both reported a low prevalence in populations of schoolchildren. Elamin, Omer and Zein (1989) reported a 0.95/10 000 prevalence after screening 42 981 schoolchildren aged 7–14 years from Khartoum, Sudan. Afoke, Ejeh and Nwonu (1992) found a prevalence of 0.33/100 000 when they screened 77 862 Igbo schoolchildren aged 5–17 years from Eastern Nigeria.

Two further studies have documented incidence rates, but these show marked differences. Elamin *et al* (1989) reported an incidence of 10.1/100 000/year in 1990 in children aged <15 years, which was higher than that found in the Middle East at that time. In contrast, Swai, Lutale, and McClarty(1993) found a lower incidence of 1.5/100 000/year in children/young adults aged <19 years in Dar es Salaam, similar to the incidence in some African heritage populations in the Caribbean.

### **2.1.2. Type 2 Diabetes**

This form of diabetes, which accounts for 90-95% of those with diabetes, previously referred to as non-insulin dependent diabetes, type 2 diabetes (adult-onset diabetes) encompasses individuals who have insulin resistance and usually have relative insulin deficiency. Often throughout their lifetime, these individuals do not need insulin treatment to survive. This form of diabetes frequently goes undiagnosed for many years because the hyperglycaemia develops gradually and at earlier stages is often not severe enough for the patient to notice any of the classic symptoms of diabetes. The risk of developing this form of diabetes increases with age, obesity and lack of physical activity (Diabetes care, 2010).

Type 2 diabetes is a global burden and its etiology is a complex interaction of genetic and environmental factors. Individuals genetically predisposed to type 2 diabetes are thus important targets for preventive strategies. Genetic understanding of diabetes has drastically progressed through the use of exhaustive methods for searching candidate genes, such as the genome-wide assay (Sladek, Rocheleau, and Rung, 2007). Many investigators have found candidate genes for type 2 diabetes, and most of them show a 1.4-fold increase in individual risk of type 2 diabetes (Grant, Moore, and Florez, 2009). So, genetic screening using information on individual genetic variants will become technically possible in future, but its usefulness as a predictive factor is still insufficient (Scheuner, Sieverding, and Shekelle, 2008; Khoury, Gwinn, Yoon, Dowling, Moore, and Bradley, 2007)

Relatives of type 2 diabetic patients show a higher risk of developing type 2 diabetes epidemiologically since they are likely to share genetic predispositions and have lifestyle habits similar to those of their parents (Kuzuya and Matsuda, 1982). In particular, individuals with an affected first-degree relative display a 2.3–5.5-fold higher risk of type 2 diabetes, independent of sex, age, race/ethnicity, body mass index (BMI), and other demographic characteristics (Valdez, Yoon, Liu and Khoury, 2007). Therefore, family history has been used to screen high-risk populations (Harrison, Hindorff, and Kim, 2003; Hariri, Yoon, Qureshi, Valdez, Scheuner, and Khoury, 2006). Thus, family history is still an important tool for identification of high-risk populations (Khoury, Valdez, and Albright, 2008; Stolerman and Florez, 2009).

### **2.1.3. Gestational Diabetes**

This is hyperglycaemia with blood glucose values above normal but below those diagnosed of diabetes occurring during pregnancy. Women with gestational diabetes are at an increased risk of complications during pregnancy and at delivery. They are also at increased risk of type 2 diabetes in the future (Diabetes Care, 2010).

### **2.1.4. Impaired Glucose Tolerance (IGT) and Impaired Fasting glycaemia (IFG)**

They are intermediate conditions in the transition between normality and diabetes. People with IGT or IFG are at high risk of progressing to type 2 diabetes although this is not inevitable (Diabetes care, 2010).

### **2.1.5. Other Types of Diabetes** (Diabetes care, 2010)

- Genetic defects of the  $\beta$ -cell function frequently characterized by onset of hyperglycaemia at an early age (before age 25years). They are referred to as Maturity-Onset Diabetes of the Young (MODY).
- Endocrinopathies- several hormones such as growth hormone, cortisol, glucagon, and epinephrine antagonize insulin action.
- Genetic defects in insulin action.
- Diseases of exocrine pancreas- any process that diffusely injure the pancreas can cause diabetes such as pancreatitis, trauma, infection, pancreatectomy and pancreatic carcinoma.
- Drug or chemical-induced diabetes- many drugs can impair insulin secretion such as nicotinic acid and glucocorticoids.

Malnutrition or fibrocalculous diabetes was frequently reported from tropical areas in Africa, Asia and South America in the 1960s and 1970, but seems to be almost unheard of today. It was recognised by a history of poor nutrition and chronic pancreatitis, with pancreatic calcification in the vast majority in addition to diabetes and exocrine pancreatic dysfunction (McLarty, Pollitt and Swai, 1990a; Motala, Omar and Pirie, 2003)

## **2.2 Burden of Diabetes Mellitus**

### **2.2.1. Global Burden**

Diabetes is increasingly becoming a major chronic disease burden all over the world. This requires a shift in healthcare priorities and updated data on the epidemiology and impact of diabetes in all regions of the world to help plan and prioritize health programs (Manouk and Charles, 2013).

According to WHO estimates, about 60% of deaths in the world are now caused by non-communicable diseases (WHO, 2002). The WHO estimated that there were 135 million people in the world with diabetes in 1995 and that this would rise to 154 million in 2000 (King, Aubert and Herman, 1998). The most recent International Diabetes Federation Atlas (2006) pointed to an even greater current and future problem by calculating that, at present, diabetes affects 246 million people worldwide, with a projected rise to 380 million by 2025. Each report has highlighted the fact that low- and middle-income countries will bear the brunt of the increase and that Africa will contribute significantly to this rise.

Global prevalence of DM in adults (20-79 years) according to a report published in 2013 by the IDF was 8.3% (382 million people) with 14 million more men than women (198 million men versus 184 million women). The majority between the ages 40-59 years and the number is expected to rise beyond 592 million by 2035 with 10.1% global prevalence. Some numbers of global studies have attempted to ascertain the true extent of mortality due to diabetes. This is a difficult task because most mortality statistics are based on the recorded underlying cause of death on death certificates and in the case of diabetes, the associated renal or cardiovascular diseases are commonly documented, rather than diabetes itself. In 2014, the global prevalence of diabetes was estimated to be 9% among adults aged 18+ years, but in 2012, an estimated 1.5 million deaths were directly caused by diabetes. More than 80% of diabetes deaths were directly caused by diabetes (WHO, 2014).

The cost of DM care is borne in most instances by individuals and often payment is “out of pocket”, this being a sequel of a poorly functional national health insurance scheme in developing countries. An insulin requiring individual on a minimum wage would spend 29% of his monthly income on insulin (World Journal of diabetes, 2014).

### **2.2.2. Burden of DM in Sub-Saharan Africa**

Recently, the burden of Non-Communicable Diseases (NCDs) was thought to be a problem afflicting only affluent countries. However, emerging evidence has indicated that the problem affects the developing nations more than the developed. With the decline in prevalence of many infectious diseases and a steady increment of NCDs as major causes of death, Nigeria and other sub-Saharan countries are undergoing epidemiological transition, globalization, changing demographic dynamics, affluence and pattern of food consumption are responsible for this trend (Musa and Musa, 2014).

The IDF Atlas estimated that 10.8 million people have diabetes in sub-Saharan Africa in 2006 and that this would rise to 18.7 million by 2025, an increase of 80%, as such exceeding the predicted worldwide increase of 55%. The estimated prevalence of diabetes in Africa is 1% in rural areas, and ranges from 5% to 7% in urban Sub-Saharan Africa. Indeed, while the HIV epidemic has captured the world's attention, recent data indicates that the global mortality due to diabetes and HIV are similar (Roglic, Unwin and Bennett, 2005)

Historically, studies on the epidemiology of diabetes in sub-Saharan Africa have been restricted to a small number of countries, although the WHO STEPwise Chronic Disease Risk Factor Surveillance Programme is beginning to rectify this. Much of the information is not yet in the public domain, but when available, will provide a much clearer picture of the true extent of diabetes in the region. Until about 40 years ago, diabetes was considered rare in sub-Saharan Africa.



Table 2.1: The reported prevalence, using predominantly urine analysis between 1960 and mid 1985 (McLarty et al, 1990a; Motala et al, 2003)

<b>Countries</b>	<b>Prevalence (%)</b>	<b>Source</b>
Ghana	6%	Danquah et al., 2012
South Africa	8-13%	Chinenye and Young, 2011
Ivory coast	5.7%	Motala et al., 2003
Nigeria	3.25%	Kyari et al., 2014
Ethiopia	2%	Nigatu, 2012

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Low prevalence was still evident in rural and urban Eastern and Western Africa when standardized WHO criteria for the diagnosis of diabetes were applied to cross-sectional studies from ~1985 to 1995 (McLarty *et al.*, 1990; McLarty, Swai and Kitange, 1989; Mbanya, Ngogang and Salah, 1997; Abubakari and Bhopal, 2008). In contrast, moderate prevalence were reported from South African studies undertaken in different cities and one peri-urban area (4–8%) (Levitt, Katzenellenbogen and Bradshaw, 1993; Mollentze, Moore and Steyn, 1995; Omar, Seedat and Motala, 1993). These differences could be largely ascribed to considerably higher rates of obesity in the South African population compared with other countries in the region. More recently, there has been a clear demonstration that the prevalence of diabetes is rising in the region.

The overall access to health care has been documented to contribute to the high diabetes related mortality. Due to economic, demographic, epidemiological and nutritional transitions in sub-Saharan Africa, the growing prevalence of diabetes appears to be obesogenic lifestyles and the intergenerational impact of malnutrition in women of childbearing age.

### **2.2.3. Burden of DM in Nigeria**

Diabetes mellitus is the commonest endocrine-metabolic disorder in Nigeria. The prevalence varies from 0.65 in rural Mangu village to 11.0% in urban Lagos. The WHO suggests that Nigeria has the greatest number of people living with diabetes in Africa with an estimated burden of about 1.7million which will increase to 4.8million by 2030 (International Diabetes Federation, 2006). DM is becoming more prevalent owing to increasing rates of obesity, physical inactivity and urbanization. This double burden of communicable and chronic non-communicable diseases has long term public health impact as it undermines health care system (Rhonda Be Lue, Titilayo, Iwelumor, Taylor, Degboe, Agyemang and Ogedengbe, 2009).

Diabetes imposes a high economic burden in terms of health care expenditure, lost productivity and foregone economic growth (William *et al.*, 2010). In Nigeria, crude prevalence estimates for diabetes are about 7% with an estimated 10million people suffering from the disease (NDHS, 2008). The cost of diabetes care in Nigeria is borne in most instances by individuals and often payment is ‘out of pocket’- this being a sequel of a poorly functional national health insurance scheme.

In a retrospective Study (1990-2000) that was set out to determine mortality patterns and case fatality rates of people with DM in a Nigerian Hospital, out of a total of 13,797 medical admissions made over the period, 1,423 were DM related and documented case fatality rate was 22.6% (Ogbera.O, 2007). It is projected by year 2025; there will be 380 million people with type2 diabetes and 418 million people with impaired glucose tolerance in the world (Susan et al, 2010).

### **2.3 Impact of Diabetes Mellitus**

Diabetes is the leading cause of non-traumatic lower limb amputation and end-stage kidney disease, and it is also associated with eye disease, particularly diabetic retinopathy. In people with diabetes, cardiovascular disease is the most common cause of death. Furthermore, majority of people are in the midst of an epidemic of lack of exercise, of obesity, of insulin resistance syndrome (IRS) and of diabetes in young people. The diabetogenic process begins in fetal life, with low birth weight and poor nutrition combining with sedentary lifestyle and dietary factors to produce an insulin-resistant phenotype that may accelerate the development of renal pathology and cardiovascular disease. Worldwide, the number of persons with diabetes is said to have tripled since 1985 (<http://care.diabetesjournal.org/content>)

- **Foot complications**

Diabetes is associated with nerve damage (peripheral neuropathy) and poor circulation (peripheral arterial disease) in the lower limb, either of which may lead to foot ulcers and infections, and eventually to amputations. Risk factors for these forms of nerve damage and poor circulation include duration of diabetes, age, blood pressure, blood glucose level and smoking.

- **Eye Diseases**

Individuals with diabetes are at increased risk of eye disease. Diabetic retinopathy (a condition affecting the blood vessels at the back of the eye) only occurs in people with diabetes. The prevalence is almost 4 times higher in those with diagnosed type 2 diabetes (21.9%) than in those with undiagnosed diabetes (6.2%). Risk factors for diabetic retinopathy include age, gender, duration of diabetes, cholesterol and blood glucose

levels. Other eye conditions, though not specific to people with diabetes but associated with diabetes include glaucoma and cataract.

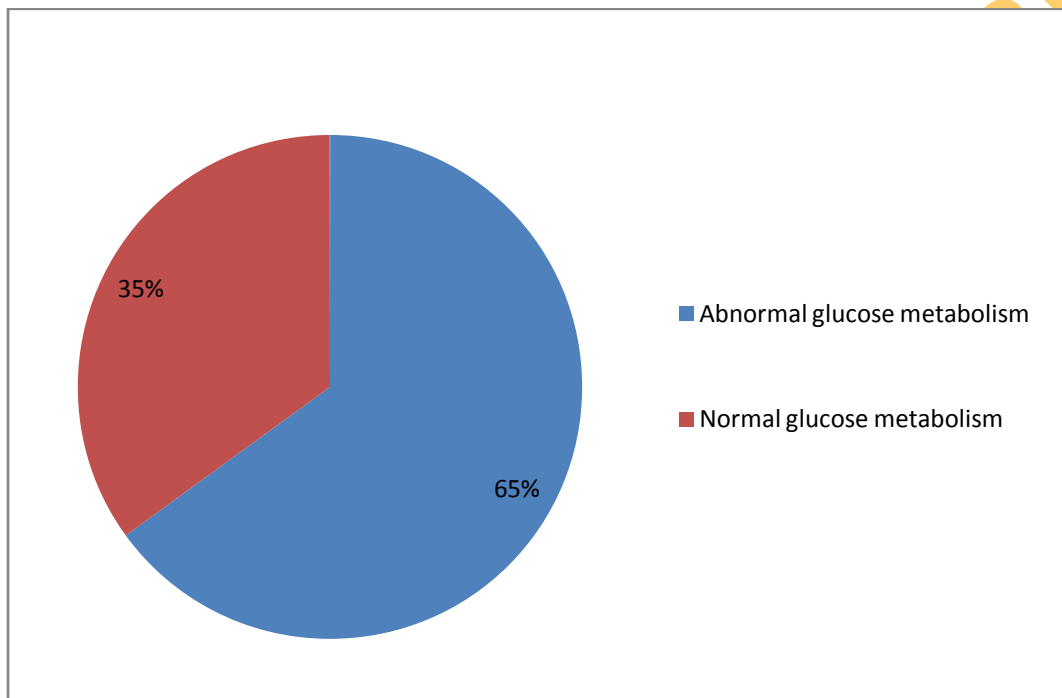
- **Kidney Disease**

Diabetes is commonly associated with kidney diseases, as the high levels of blood glucose damage the blood filtering capillaries in the kidney, resulting in diabetic nephropathy. Risk factors from micro or macro albuminuria include age, duration of diabetes, smoking, body mass index, blood pressure, and blood glucose levels.

- **Cardiovascular Disease**

This is the leading cause of death in those with diabetes. Hypertension has been reported in 70% of people with known or undiagnosed diabetes, and in 43%-53% of people with pre-diabetes.

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**Fig 2.1.: Percentage of all cardiovascular disease deaths associated with diabetes and pre-diabetes.**

- **Hypoglycaemia**

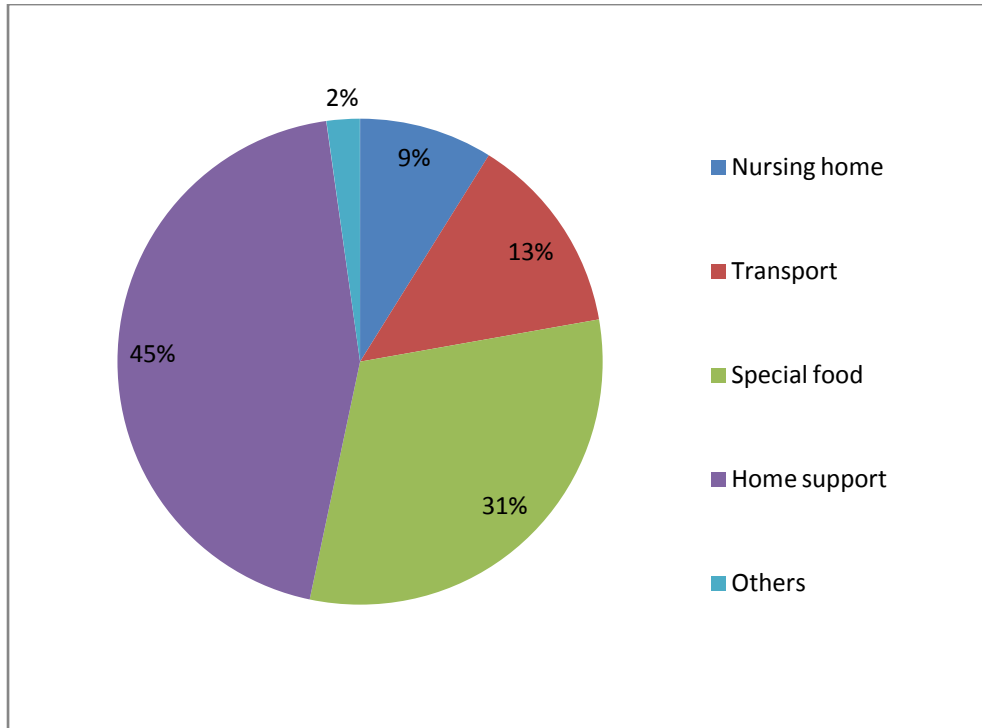
This is a state of a blood glucose level below the normal range. If not treated quickly (usually by eating something sweet), it can progress to confusion, loss of consciousness and in very rare circumstances to death. Hypoglycaemia is not directly caused by diabetes; but is a consequence of treatment with insulin or with sulphonylurea tablets. If occurring frequently or without good warnings, it can have a major impact on the life of a person with diabetes and can be significant barrier to achieving good glycaemic control.

- **Diabetic Ketoacidosis**

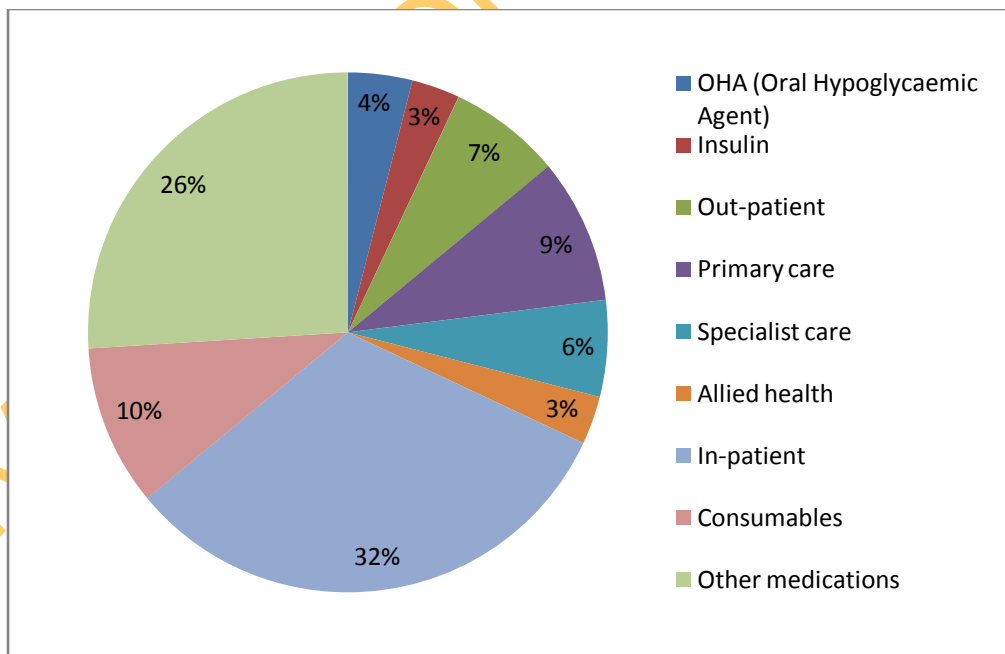
If a patient, with type 1 diabetes, has sustained high blood glucose readings it is an indication that they either don't have enough insulin in their system, or that the insulin that they have is not working properly. When this happens it is possible that their body will start breaking down protein in order to get some energy. In these circumstances ketone testing is crucial. The body finds a way to keep going where it has no other way to gain energy. Ketones are made when the body breaks down proteins. As the ketones build up in the body, this can be damaging, and is referred to as a state of ketoacidosis, or in diabetes, Diabetic Ketoacidosis (DKA). Most people with type 2 diabetes will not develop ketonuria but people with type 1 diabetes are at risk of DKA.

- **Economic Impact**

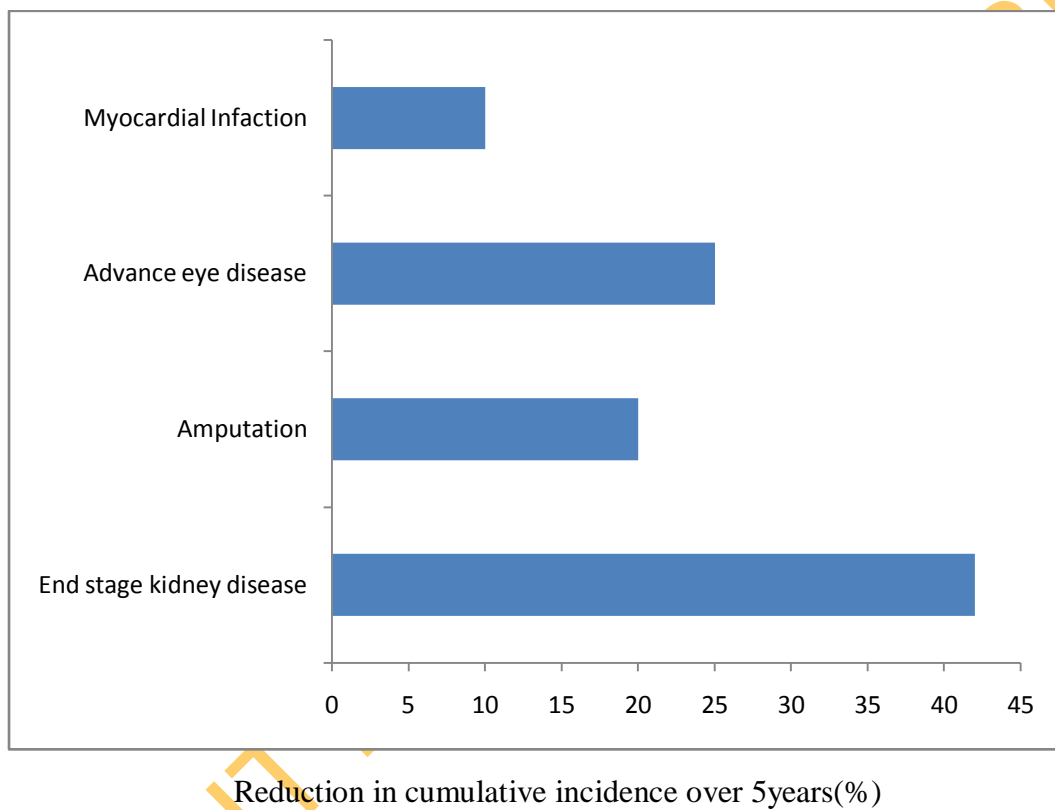
Individuals with diabetes were three times more likely to have been hospitalized at least once during the year than those without diabetes, and had a longer hospital stay. Annual per capita health care costs have been estimated to be three to four times greater in a population with diabetes compared to a population without the disease. DM comes along with the added cost of care disability from its complication and loss of productivity to the nation. Although data is scanty on the actual economic burden of DM in Nigeria, but a study in Jos, Nigeria found 75% prevalence of peripheral neuropathy in DM, whereas a study in Kano, Nigeria found 36% prevalence of diabetic retinopathy. An IDF estimate reports the ratio of cost of care of diabetics in Nigeria (20-70years) compared with non-diabetic as approximately double making it one of the countries with the most expensive costs of diabetes care in sub-Saharan Africa. Another form of cost is Indirect costs refer to the present and future impact of opportunities that may be lost to an individual due to diabetes, which may include morbidity, disability and premature mortality.



**Fig.2.2:Direct non-healthcare cost for people with DM( Colagiuri et al,2009)**



**Fig. 2.3.: Direct healthcare cost for people with type 2 diabetes (Colagiuri et al, 2009).**



**Fig. 2.4.: Impact of diabetes complications of reducing HbA1c by 1% (Palmer et al, 2004).**



- **Mortality**

Direct assessment of mortality due to diabetes in sub-Saharan Africa has not been well documented. Similar 20-year survival rates in type 1 diabetic patients were found in Soweto, South Africa (57%) and Addis Ababa, Ethiopia (63%) as well as in African-American type 1 diabetic patients from Pennsylvania USA (60%) (McLarty *et al.*, 1990a; Lester, 1984; Lester, 1992). These mortality figures remain unacceptably high, although an even higher mortality (60% at 5 years) was found in a large group of insulin-requiring, presumably type 1 diabetic patients from Dar es Salaam, Tanzania about 16 years ago (McLarty, Kinabo and Swai, 1990b). The major cause of death in the Soweto study was renal failure, highlighting the lack of access to renal replacement treatment for people with diabetes in this region (Gill, Huddle and Monkoe.,2005). Yet, acute metabolic emergencies, entirely preventable with good medical care, not requiring sophisticated or expensive equipment, were the major cause of death in the other two studies. Beran, Yudkin and de Courten,(2005) estimated that life expectancy varied from less than a year for a child with type 1 diabetes in rural Mozambique to 27 years for an adult in Lusaka, Zambia. Mortality rates in type 2 diabetic patients have received little attention.

A number of global studies have attempted to ascertain the true extent of mortality due to diabetes. This is a difficult task because most mortality statistics are based on the recorded underlying cause of death on death certificates and in the case of diabetes, the associated renal or cardiovascular diseases are commonly documented, rather than diabetes itself. Additionally, many countries have a poor collection of even this information. When Roglic *et al* (2005) took this into consideration, diabetes rose from the eighth to the fifth leading cause of death globally for the year 2000 with an excess mortality of 2.9 million deaths which accounted for 5.2% of all deaths. The estimates for sub-Saharan Africa were amongst the lowest for all regions; diabetes accounting for 2.2% of all male deaths and 2.5% of all female deaths—that is, 142 500 men and 152 100 women. An analysis for South Africa, however, estimated that 4.3% of all deaths for that country in 2000 could be attributed to diabetes, probably reflecting the fact that South Africa is further along the epidemiological transition than many other sub-Saharan Africa countries (Bradshaw, Pieterse and Norman, 2007).

## 2.4 Risk factors of Diabetes Mellitus

Risk factors are behaviors or conditions that increase an individual's chances of developing a disease. They are controllable (modifiable) and non-controllable (non-modifiable) risk factors. Some diabetes risk factors are non-controllable, such as family history of diabetes, age, or ethnicity, most diabetes risk factors are controllable such as overweight, unhealthy diet, smoking, high blood pressure.

Risk factors for type 1 diabetes are still being researched. However, having a family member with type 1 diabetes slightly increases the risk of developing the disease. Environmental factors and exposure to some viral infections have been linked to the risk of developing type 1 diabetes (IDF, 2014).

- **Overweight/ Obesity:** Abdominal Obesity (defined as waist circumference  $> 97\text{cm}$  for men and  $> 89\text{cm}$  for women) and Body Mass Index  $> 28\text{kg/m}^2$  as being overweight. The National Center for Health statistics states that 30% of adults are obese, greater weight means a higher risk of insulin resistance; because fats interfere with the body's ability to use insulin.
- **Sedentary Lifestyle:** Physical inactivity and being overweight go hand in hand towards a diagnosis of type 2. Muscle cells have more insulin receptors than fat cells. So a person can decrease insulin resistance by exercising. Being more active also lowers blood sugar levels by helping insulin to be more effective and reducing the risk of cardiovascular diseases in DM.
- **Unhealthy Diet:** this contributes largely to obesity. Too much fat, not enough fibre and too many simple carbohydrates all contribute to a diagnosis of DM.
- **Smoking** has also been associated with an increased risk of type 2 diabetes and its complications.
- **Family History and Genetics:** Having a first degree relative who have been diagnosed with type 2 diabetes are at greater risk for developing DM.

- Lower socio-economic status, belonging to certain ethnic groups, and living in rural areas are associated with higher rates of type 2 diabetes, more prevalent risk factors for type 2 diabetes, and higher levels of morbidity and mortality.
- Increased Age/ Ethnicity: The risk of developing diabetes increases with age with adults over age 45 years at the greatest risk. For reasons not well understood, certain ethnic groups are also at increased risk of developing diabetes. These groups include non-Hispanic Blacks, Hispanic/Latino Americans, Asian Americans, Native Hawaiians and Pacific Islanders, American Indians, and Alaska Natives.
- High Blood pressure: This can increase the risk of diabetes complications such as diabetic neuropathy and nephropathy. Diabetes on the other hand increases the risk of developing high blood pressure because it can cause narrowing of blood vessels leading to high blood pressure. range of normal blood pressure is  $\leq 120$ -139mmHg for systolic and  $< 80$ -89mmHg for diastolic.
- Impaired Glucose Tolerance (IGT): Is a category of higher than normal blood glucose, but below the threshold for diagnosing DM.
- History of gestational diabetes: Women who develop gestational diabetes have a 35%-60% chance of getting diabetes in the next 10-20years.
- Diagnosis of cardiovascular diseases(Strokes, myocardial infarction, narrow or blocked arteries).(Abdulfatai, Olusegun and Lateef, 2012; Diabetes Care, 2007)

The major risk factors for diabetes in sub-Saharan Africa are similar to those in other regions of the world, whether this refers to the modifiable risk factors, such as urbanization, obesity, physical inactivity, or those that are not mutable, such as increasing age and ethnicity. The rising prevalence of diabetes in the region (sub-Saharan) has largely been ascribed to changes in lifestyle and urbanization, resulting in greater levels of obesity and physical inactivity. However, obesity has traditionally been uncommon in many parts of the region, largely owing to scarcity of food and high levels of energy

expenditure (Monteiro, Moura and Conde, 2004a; Monteiro, Conde and Lu B, 2004b). As at 1995 only 1–7.1% of women aged 15–45 years of age in 18 sub-Saharan Africa countries were obese (body mass index (BMI) >30 kg/m<sup>2</sup>); Namibia and Zimbabwe alone had a prevalence of more than 5% (Martorell, Khan and Hughes, 2000). Yet at the same time, 31% of South African women were obese, even exceeding the 20.7% reported in US women (Monteiro *et al.*, 2004a; Martorell *et al.*, 2000). Given the marked fourfold difference in obesity between rural and urban areas, the strong relationship between level of education as a marker of socioeconomic status and obesity within countries with low gross national product (although this seems to fall away in countries with higher gross national product (Monteiro *et al.*, 2004a; Martorell *et al.*, 2000). The extent of urbanization projected by 2025 suggests that 70% of Africans will reside in cities at that time; increasing rates of obesity can be expected in the region. This in turn will fuel the rise in diabetes prevalence as obesity, expressed by BMI or centrally by waist circumference or waist-hip ratio, has been consistently an independent risk factor for diabetes in the region (Levitt *et al.*, 1993; Aspray, Mugusi and Rashid, 2000).

Consequently, few reports have been able to identify physical inactivity as a risk factor for diabetes in sub-Saharan Africa. Despite this, Sobngwi, Mbanya and Unwin(2002) were able to show an inverse relationship between fasting glucose concentrations and energy expenditure. Thus physical inactivity, a consequence of urbanisation, due to changes in modes of work and transport from rural areas (Sobngwi *et al.*, 2004) is also expected to play a role in the increasing diabetes prevalence.

### **2.5 Role of nurses in prevention and management of Diabetes Mellitus**

Health care professionals help their patients understand the importance of good diabetes management and make the lifestyle changes that make good management possible (Diabetes Educator, 2002). Health care team involved in the prevention and management of DM are Podiatrist (provide comprehensive foot care and examination, manage patients with neuropathies.), Pharmacist (administer drugs for the management of DM), Eye care professionals, psychologist/social worker, Nurses, Dentists and doctors (facilitate the implementation of screening and early detection programmes, diabetes prevention, self management, counseling and therapeutic management);(Ramachandura,2015).

Nurses have important roles and clear responsibilities when treating patients with diabetes or who are having tests to diagnose diabetes. This role and associated responsibilities will be specified in local workplace guidance and policies and by each member of the nursing team's level of competence. A study by Megha, Elizabeth and Michele, 2013 on role of community health workers in diabetes revealed that community health workers' interventions have been found to be a promising strategy for improving diabetes outcome as they not only address individual-level but often community-level factors. Community health workers typically work in their own communities, share cultural, economic, linguistics and other characteristics with the patient they work with. Their roles include patient care, education, support for care delivery provided by other health professionals, care coordination and social support in terms of empowerment, theory-based self management, healthy lifestyle training, and support through continually tailored group classes, one on one behavioural goal setting and accompaniment to patient's clinic visit.

However, Nurses major roles include identification of modifiable risk factors, such as obesity, abnormal waist circumference (WC) or body mass index (BMI), physical inactivity, smoking, and unhealthy eating habits. Likewise, screening for diabetes through Fasting Plasma Glucose (FPG) test, an A1C, or an Oral Glucose Tolerance Test (OGTT). They are to educate clients/ patients on risk factors for diabetes, the importance of prevention, or delay of onset of type 2 diabetes in individuals at risk, the role of exercise, the importance of weight control and the role that diet plays in the prevention of, or delay in progression to, type 2 diabetes. In order to support the patient to self-care their diabetes, the nurse will support the patient and help them develop their own self-care and encourage patients to use their personalised care plans. Nurses must have an understanding and awareness of how mental health issues, such as depression and anxiety, can affect people with diabetes, any changes that are noticed in the patient's normal mental health should be reported to a mental health specialist. This could include changes in medications adherence, mood and appearance and also anxiety.

Nurses are involved in urine and glucose monitoring, to report if getting out of normal range. They are to educate clients or patients on the effect of their therapies on blood glucose levels, and also ensure safe administration and use of oral antihyperglycaemic medications and injectables such as insulin. Nurses can promote appropriate healthy

behavior to policy makers and advocate for the promotion of increased physical activity at governmental level.

## **2.6 Intervention for prevention and management of Diabetes Mellitus**

Preventing disease potentially avoids and certainly postpones suffering and may have many benefits that are difficult to quantify, which may make it preferable to treatment (William et al, 2010). There are 3 levels of Prevention as follows:

- Programs to reduce risk factors for diabetes (primary prevention) such as health education
- Programs to improve identification of individuals with a disease (secondary prevention) such as screening for diabetes
- Programs to improve the quality of care (tertiary prevention) which involves community-based approaches

### **Primary Prevention**

These are measures taken to provide individuals with knowledge to prevent the onset of a targeted condition. In this type of prevention, nurses educate by offering information and counseling to communities and populations that encourage positive health behavior such as regular medical checks (blood sugar level and blood pressure), regular physical exercise, healthy eating habits and maintaining healthy weight. Programs are designed to avoid suffering and illness in patients, as well as avoid any type of cost supplementary to disease treatment.

### **Secondary Prevention**

This is a form of early detection of disease, identifies individuals with high risk factors of preclinical disease through screenings and regular care to prevent the onset of disease. Once diabetes is identified in a patient, nurses work with these patients to reduce and manage controllable risks (overweight, hypertension, high cholesterol level, smoking, and alcohol consumption), modifying the patient's lifestyle choices and using early detection methods to pick the disease in its early stage when treatment may be more effective. Regular screenings are conducted by the nurse so as to diminish the development of other illnesses.

### **Tertiary Prevention**

This involves the management/ treatment of diagnosed diabetic. Here, the nurses are tasked with helping patients execute a care plan and make any additional behavior modifications necessary to improve condition. As the primary and secondary methods have been unsuccessful, this stage encompasses methods of minimizing negative effects such as foot ulcers and preventing future complication like amputation.

For high-risk individuals to become actively involved in prevention, recognition of the risk for the disease is crucial (Leventhal, Weeinman, Leventhal E, and Allison, 2008; Rosenstock, 1966). In some diseases with known genetic susceptibility, affected relatives can play effective roles in promoting adoption of preventive behavior to other unaffected family members (Weil, 2000; Wilson, Forrest and Van Teijlingen, 2003). But for diabetes, previous studies have shown that although patients recognize the necessity of advising their offspring to adopt preventive behavior, they do not necessarily advise their offspring due to underestimated risk perception (Nishigaki, Kobayashi and Kato, 2009). Moreover, preventive behavior in offspring may not be necessarily facilitated even if their parents advise them. This ineffectiveness is mainly due to unmet needs for information source: offspring of type 2 diabetic patients want information about disease susceptibility and prevention directly from medical professionals (Nishigaki, Kobayashi and Abe Y, 2008). From these perspectives, tool development which enables patients to deliver information on diabetes genetic susceptibility and prevention made by medical professional to their offspring is necessary.

#### ***2.6.1. Interventions to prevent and manage Diabetes Mellitus***

Early intervention to prevent diabetes is considered as part of an integral package of local measures to promote health and prevent a range of non-communicable diseases (including cardiovascular diseases and some cancers).

- Lifestyle intervention aimed at changing an individual's diet and increasing the amount of physical activity they do can reduce the number of individuals with impaired glucose tolerance who do on to develop type 2 diabetes by 50% (Gillies, Abrams and Lambert, 2007).

- Supporting behavior change:- changing individual's health related behavior involves educating them to understand the short, medium and long term consequences of health related behavior, helping them to feel positive about the benefits and value of health-enhancing behaviours and changing their behaviours; recognizing how people's social contexts and relationship may affect their behavior, helping them plan changes in terms of easy sustainable steps over time and then identifying and planning for situations that might undermine the changes people are trying to make and planning coping strategies to maintain behavior change (National Institute for Health Care Excellence - NICE, 2007).
- Achieving and maintaining a healthy weight;- Individuals are expected to aim at maintaining or achieving a healthy weight, to improve their health and reduce the risk of disease associated with overweight and obesity such as diabetes. It is easy to maintain healthy weight by balancing calorie intake (from food and drinks) and calories expended (from being physically active). Consumption of fibre rich foods such as oats, beans, peas, fruits, vegetables, brown rice etc.; consumption of at least five portions of a variety of fruit and vegetables daily in place of food high in fat and calories, adopting a low fat diet and minimize calorie intake from alcohol.
- Physical activity: - The NICE recommends that 30minutes of at least moderate intensity physical activity on 5 or more days of the week is adequate to achieve general health benefits; to lose weight requires 45-60minutes moderate intensity physical activity a day especially if energy intake is not reduced. Furthermore, obese individuals or those who have lost weight may require 60-90minutes of exercise daily to avoid regaining weight (Netto, Bhopal and Leaderle, 2010). Exercise is known not only to impart glycaemic control positively but also to reduce the risk of developing cardiovascular disease in DM.
- Cultural appropriateness:-culturally appropriate interventions take account of the community's cultural or religious beliefs and language and literacy skills by:
  - Using community resources to improve awareness of, and increase access to, interventions. For example, they involve community organisations and leaders early on in the development stage, use media, plan events or make use of festivals specific to black and ethnic minority groups.
  - Understanding the target community and the messages that resonate with them.



- Identifying and addressing barriers to access and participation, for example, by keeping costs low to ensure affordability, and by taking account of different working patterns and education levels.
- Developing communication strategies which are sensitive to language use and information requirements. For example, they involve staff who can speak the languages used by the community. In addition, they may provide information in different languages and for varying levels of literacy (for example, by using colour-coded visual aids and the spoken rather than the written word).
- Taking account of cultural or religious values, for example, the need for separate physical activity sessions for men and women, or in relation to body image, or beliefs and practices about hospitality and food. They also take account of religious and cultural practices that may mean certain times of the year, days of the week, settings, or timings are not suitable for community events or interventions. In addition, they provide opportunities to discuss how interventions would work in the context of people's lives.
- Considering how closely aligned people are to their ethnic group or religion and whether they are exposed to influences from both the mainstream and their community in relation to diet and physical activity.

The WHO (2005) approach aimed at preventing risk factors of diabetes were grouped into five (5) categories described as population-level initiatives.

1. Laws and regulations:- the law can be used to provide taxation and price incentives in order to regulate marketing of products like alcohol and tobacco that affects risk factors.
2. Tax and price interventions:- taxation and price policies can provide disincentives for people to start or continue unhealthy habits that affects risk factors as well as provide incentives for the uptake of healthy habits. Tax increases as part of the wider tobacco control laws have been shown to contribute to the reduction of tobacco use while subsidies on fruits and vegetables in schools and workplaces have been shown to increase consumption.
3. Improving the built environment to accommodate healthy lifestyle practice.
4. Public awareness and campaign such as celebration of World Diabetes Day on November 14 every year
5. Community based interventions

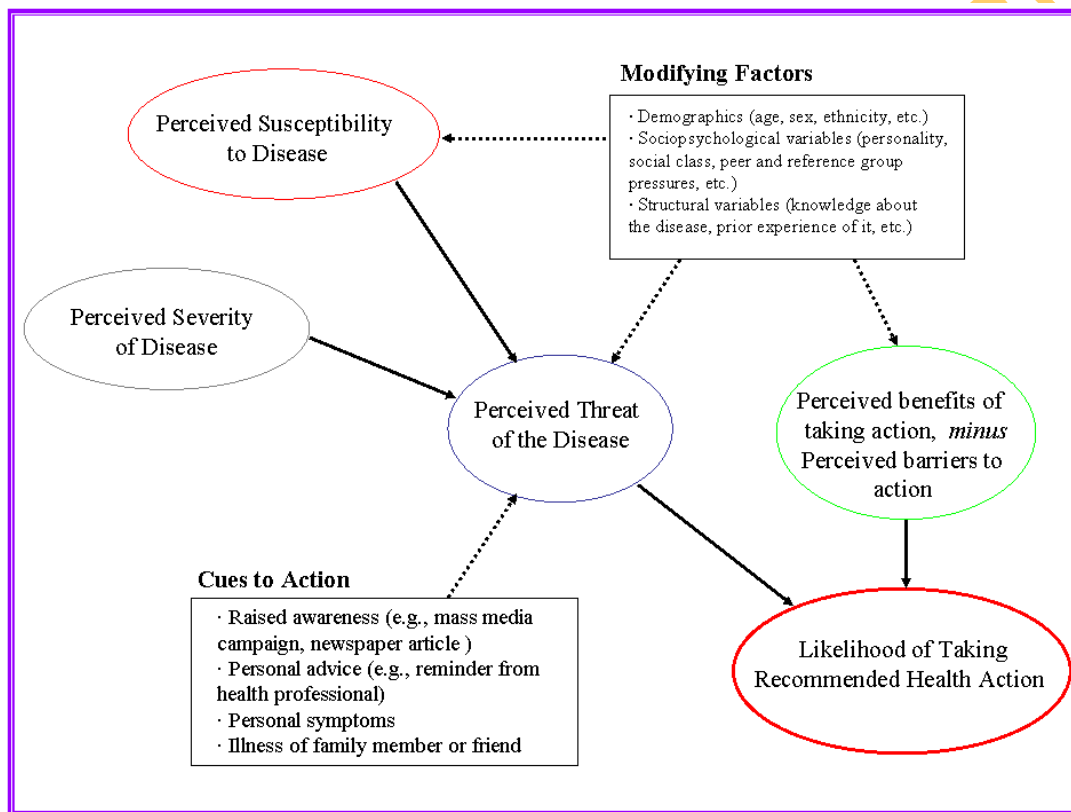
## 2.7. Conceptual framework

The Health Belief Model (HBM) would be the suitable framework for this study as it addresses individual's perceptions of threat posed by a health problem (susceptibility, severity), the benefits of avoiding the threats, and factors influencing the decision to act (barriers, cues to action, and self efficacy). It has six main constructs:

- Perceived Severity: This refers to subjective assessment of the severity of a health problem and its potential consequences.
- Perceived Susceptibility: this is the subjective assessment of the risk of developing a health problem.
- Perceived Benefits: refers to an individual's assessment of the value or efficacy of engaging in a health promoting behavior to reduce the risk of disease.
- Perceived Barriers: refers to individual's assessment of obstacles to behavior change. Perceived benefits must outweigh perceived barrier in order for behavior change to occur.
- Cue to Action: HBM posits that a cue or trigger is necessary for prompting engagement in health-promoting behavior. It can be internal (e.g pain symptoms) or external (information from others or media). Cues needed to prompt action vary in individuals by perceived susceptibility, benefit and barrier.
- Self Efficacy: this construct was added in 1988. It refers to individual's perception of his/her competence to successfully perform a behavior.

HBM is a psychological health behavior change model developed to explain and predict health related behavior particularly in regard to the uptake of health services.

The health belief model was developed in the 1950s by social psychologists Irwin M. Rosenstock, Godfrey M. Hochbaum, S. Stephen Kegeles, and Howard Leventhal at the U.S Public Health Service to better understand the widespread failure of screening programs for tuberculosis. More recently, the model has been applied to understand patient's responses to symptoms of diseases, compliance with medical regimens, lifestyle behaviours (e.g. sexual risk behavior), and behavior related to chronic illnesses which may require long term behavior maintenance in addition to initial behavior change.



**Fig 2.5: A diagrammatic representation of the Health Belief Model (HBM)**

## **Application of Health Belief Model to the study (Fig 2.6)**

Three major aspects were considered in this study, they are:

### **1. Individual Perceptions**

**Perceived Susceptibility-** Are the target population ready to take preventive measures if they believe they are susceptible to the condition (Diabetes Mellitus)? (Questions 22&23 of section C of appendix A assessed this). Nurses would like to take preventive measures if they perceive that having a relative that had diabetes puts them at risk of developing it.

**Perceived Severity-** Do the target population believes diabetes has serious consequences?(Question 24 of section C in appendix A) assesses this construct.

**Perceived Benefits-** Would nurses engage in health promoting behaviour such as regular exercise of at least 30minutes a day, eating healthy diet rich in vegetables and fruits, abstinence from cigarette smoking and alcohol consumption reduce their susceptibility and severity?(Question 17 of section B and question 21 of sectionC of appendix A).

### **2. Modifying Factors**

**Demographic variables-** socio-demographic characteristics of nurses will influence nurses' knowledge, perceived risk, and attitude towards lifestyle characteristics that prevent developing diabetes (section A of appendix A).

**Perceived threat-** nurses' awareness of the complications (threats) of diabetes will influence their likelihood of taking up preventive measures for DM (Question 19, section B of appendix A).

**Cues to Action-**Increased awareness of diabetes through social media and emphasizing the roles of nurses in prevention, care and management of diabetes could facilitate a positive attitude by nurses towards prevention of DM.

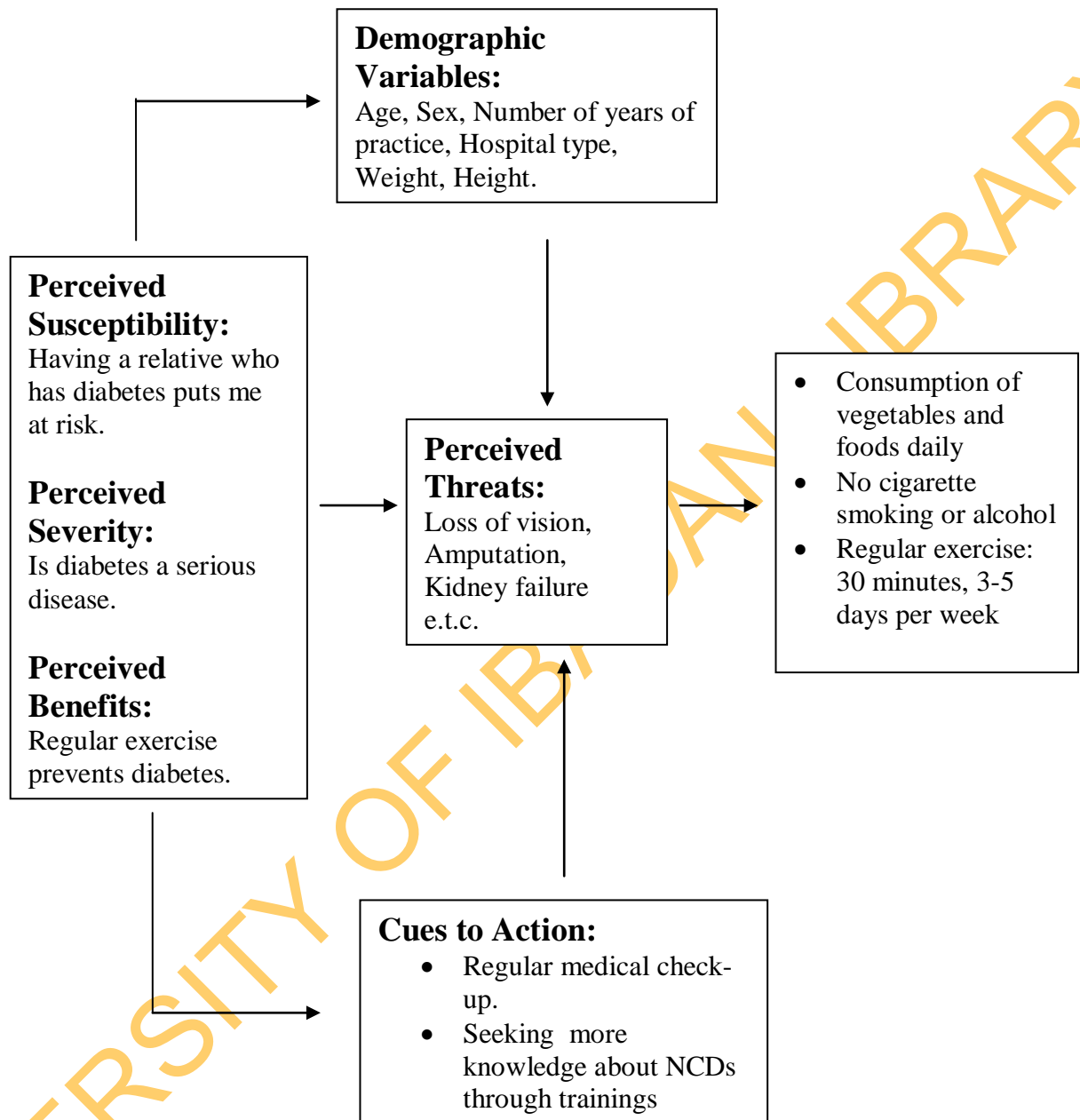
### **3. Likelihood of taking action**

**Self efficacy-** Nurses are likely to adopt health promoting behavior effectively when these factors are in place thus influencing patient's management and care.

**Individual  
Perception**

**Modifying  
Factors**

**Likelihood  
of Action**



**Fig. 2.6: Application of the Health Belief Model**

## CHAPTER THREE

### METHODOLOGY

#### 3.1 Scope of Study

The study design was a descriptive cross-sectional survey. It explored the risk perception, attitude and lifestyle relating to diabetes mellitus prevention among nurses.

#### 3.2 Description of Study Area

The site of the study is Ibadan South West Local Government Area. It was carved out of the defunct Ibadan Municipal Government (IMG) in 1991. It has its administrative headquarters at Oluyole Estate in Ibadan. It covers a land mass of 133,500 square kilometers with a population density of 2,401 persons per sq.km. It is bounded by Ibadan northwest and Ido local government areas to the north, Oluyole local government in the South, Ido local government area in the west, Ibadan north and Ibadan Southeast in the East. It has a population of 283,098 people as at 21<sup>st</sup> March 2006. The projected population for the area was 335,560 people using a growth rate of 3.2% from 2006 census. IBSWLGA is sub-divided into 12 wards (see Table 3.1) governed by an elected chairman and 12 councilors. The LGA can be divided into "inner core" which is made up of the indigenous Ibadan areas like Itamaya, Foko, Agbeni, Bere, Oja-Oba etc. "Transitory core" made up of Oke-Bola, Oke-Ado, Molete, Felele, Odo-ona Elewe, Elewura and new areas like Oluyole estate, Iyaganku-GRA, Alalubosa GRA, Aleshinloye, NIHORT Idi-Ishin.

The people of IBSWLG are predominantly Yorubas, though there are pockets of other tribes like Ibos, Hausas, Efiks, Urhobos etc. Foreign nationals like Lebanese and Koreans also abound in the LGA. The LGA has many investment opportunities with companies like Sumal Foods Nigeria Ltd, Vital Foods Nig. Ltd., Steel Works, Niger Hygiene, Gas Lands, Procter and Gamble etc. Residents in the inner core are predominantly into buying and selling of agricultural produce and other commodities.

There are 20 primary health care centres, 4 state-owned health facilities and 15 registered private health institutions in the local government area. The study was conducted in selected government and privately-owned hospitals in the local government.

**Table 3.1: Wards and Areas in Ibadan South West Local Government Area**

<b>Wards</b>	<b>Areas</b>
1	Oritamerin
2	Isale- Osi
3	Itaaregbeomo
4	Popoyemoja
5	Foko,Ologede
6	Amole, Atere
7	Agbokojo
8	Aleshinloye
9	Molete, Oke Ado
10	Oke Ado, Liberty
11	Challenge, Ring-Road
12	Apata, Odo-ona

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### **3.3 Study Population**

The study focused on trained nurses working in selected health facilities within Ibadan South west local government area of Oyo state.

### **3.4 Variables**

#### ***3.4.1 Independent variables***

- Age
- Sex
- Years of Practice
- Religion

#### ***3.4.2 Dependent Variables***

- Knowledge: the knowledge of diabetes mellitus with regards to types, aetiology, risk factors, prevention and complications.
- Risk perception: it entails the level of perceived risk of developing diabetes among nurses
- Attitude: It is a reflection of nurses' feelings about lifestyle characteristics associated with prevention of diabetes such as participation in screening exercise for diabetes, managing diabetics, seeking more knowledge about DM, healthful living etc.
- Lifestyle: This can be described as the way of living among nurses in relation with prevention of the development of diabetes mellitus such as engaging in regular physical exercise, alcohol consumption etc.
- Body Mass Index ( $\text{kg}/\text{m}^2$ ): This is a simple index of body weight for height; it is applicable to adults above the age of 20 years. It is a person's weight in kilograms divided by the square of height in metres. It is used to classify body weight (underweight, normal weight, overweight, and obese). It was used to deduce if nurses are at a healthy weight.

### **3.5 Inclusion Criteria**

All practicing nurses willing to participate in the study were included in the study.



### 3.6 Exclusion Criteria

Student Nurses (Nurses undergoing basic nursing training) were not allowed to participate in the study.

### 3.7 Instrument for Data Collection

The combination of Risk Perception Survey for Developing Diabetes (RPS-DD) questionnaire (Catherine et al, 2007) and William Kiberenge Questionnaire (William et al, 2010) on knowledge, attitude and practices related to diabetes were adapted to assess the risk perception, attitude and lifestyle for preventing diabetes.

The Questionnaire has 5 parts as listed below:

Section A addressed respondent's demographic information which include age, number of years of qualification, number of years of practice, type of hospital, sex, marital status, religion, weight and height.

Section B assessed knowledge about diabetes with regards to the causes, signs and symptoms and complications.

Section C assessed the risk of developing diabetes on the scale of whether certain factors increase the risk, has no effect on the risk, decreases the risk or don't know considering lifestyle factors such as eating healthy diet, exercising regularly, alcohol consumption and cigarette smoking, controlling weight gain, having had diabetes during pregnancy, being aged and having a relative with diabetes.

Section D assessed the attitude towards preventive lifestyles related to developing diabetes and managing diabetics.

Section E assessed respondent's lifestyle that prevents diabetes and promote health such as eating vegetables and fruits daily as part of his/her diet, daily physical activities of about 30minutes, regular medical check-up, body mass index, alcohol consumption and smoking habit.

### 3.8 Sample Size Determination

Using the sample size formula for cross sectional studies:

$$N = \frac{Z^2 pq}{d^2} \text{ (Leshie Kish Formula)}$$

Where Z is the standard normal deviate= 1.96,

P =0.5(prevalence of DM is 0.50% (Roman, Tonio, Thomas and Walter, 2010)).

$$q= 1-p; 1-0.5= 0.5$$

d is the degree of accuracy desired= 0.05

n= minimum sample size

$$\frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2} = 384$$

### **3.9. Validity of the instrument**

In order to ensure validity and reliability of the study instrument for data collection, four steps were considered. Firstly, relevant research literatures were consulted in developing the instrument. Secondly, the instrument was reviewed by the supervisor, a specialist in diabetes care and management, public health professional and medical doctor. Thirdly, necessary corrections were made. The questionnaire (draft) did not reflect the type of hospital initially so as to allow for comparison between nurses in government hospitals and private hospital. Lastly, a pre-test was done using a private hospital in Ibadan South west local government area and a government hospital in Ibarapa East local government which served as a pilot study for the data collection procedures.

### **3.10. Reliability of the Instrument**

The reliability was determined using the Cronbach's alpha statistics. This was done by administering the questionnaire to 10% (trained nurses from one government health facility in Ibarapa East local government area and one private health facility in Ibadan south west local government area) of the study size for the pre-test after which the coefficient reliability was calculated using SPSS computer software. A reliability coefficient of 0.69 was obtained. The result showed that the instrument was reliable.

### **3.11 Sampling Technique**

A multi-stage (4) sampling technique was used to select respondents for the study as follows:

**Stage 1:** Ibadan south west local government area (IBSWLGA) was selected for this study using purposive sampling method. IBSWLGA has 12wards with 39 registered and functional health facilities both private and government owned in each ward (Appendix B).

**Stage 2:** Random sampling was done to pick 6 wards for this study.

**Stage 3:** Proportionate sampling was done to calculate the number of health facilities used.

$$\frac{\text{Sample size}}{\text{Total number of health facilities}} = \frac{417}{39} = 10.7$$

Therefore, eleven health facilities were used for the study.

**Stage 4:** Proportionate sampling was used to select the number of respondents to be interviewed from each hospital (see Table 3.2)

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**Table 3.2: Distribution of number of respondents from each health facility**

Wards	Selected hospitals	Population of Nurses	Proportion of respondents to be selected in each health facility	Government/Private
3	Kososi PHC	11	$\frac{11 \times 417}{500} = 9$	Government
4	Bode CHC	16	$\frac{16 \times 417}{500} = 13$	“
6	Foko PHC	13	$\frac{13 \times 417}{500} = 11$	“
8	Oke- Ado hospital	26	$\frac{26 \times 417}{500} = 22$	Private
	Jericho Specialist Hospital	74	$\frac{74 \times 417}{500} = 62$	Government
11	The Vine hospital	17	$\frac{17 \times 417}{500} = 14$	Private
	Teju Specialist hospital	22	$\frac{22 \times 417}{500} = 18$	“
	Oni Memorial Children's hospital	82	$\frac{82 \times 417}{500} = 68$	Government
	Ring Road State Hospital	183	$\frac{183 \times 417}{500} = 153$	“
12	Adeniji Memorial hospital	13	$\frac{13 \times 417}{500} = 11$	Private
	Maternal and Child Health Centre	43	$\frac{43 \times 417}{500} = 36$	Government
	TOTAL	*500	**417	

\*Sampling frame = 500

\*\* Sample size (N) = 417

### 3.12 Data Collection Method

Four research assistants were trained on how to administer the tool.

- The research assistants were involved in pre-test, and this prepared them adequately well for the main data collection.
- Mode of approach: Research assistants inform the head of the nurses of the hospitals/health facilities of their mission to foster cooperation of the nurses. The study was explained to each respondent and confidentiality of their responses was ascertained as their names are not requested on the tool before administration. Nurses who gave their consent to participate were involved in the study.
- Weights and heights of respondents were measured prior to filling of the questionnaire by the respondents.
- Research assistants ensured proper filling of the tool.

### 3.13 Data Management and Analysis

The following steps were taken to ensure adequate data management

1. Questionnaires were serially numbered after its completion
2. Each administered questionnaire was edited and carefully cleaned each day to ensure completeness
3. A coding guide was developed and used for coding the answered questionnaire
4. Data were imputed into the computer using the Statistical Package for Social Sciences (SPSS) software
5. Data were analyzed using descriptive statistics, chi-square at level of significance set at 5%
6. The information obtained were presented in charts and tables
7. Risk perception was measured on an 11-point scale of High risk (9-11), Low risk (7-9) and No risk (<7). 2 points were allotted to each correct answer except for question 20 which was allotted 3 points (see appendix A).

Knowledge of diabetes mellitus with regards to types, aetiology, prevention and complications was measured on a 25-point knowledge scale of Good (scores  $\geq 19$ ), fair (12-18) and Poor (scores  $\leq 11$ ). Three points were allotted to correct choices in questions 10, 11, 12, 17 and 19 while two points were allotted to other questions. Attitude towards lifestyle relating to DM were measured on a 20-point scale (positive 14-20 and negative <14). Two points were allotted to correct answers.

Lifestyle associated with prevention of diabetes was measured on a 23-point scale (healthy 18-23 and unhealthy <18). Two points were allotted to healthy behaviour except question 41 which was allotted three points. Body Mass Index (BMI) was deduced using weight-height measure. BMI was classified as underweight ( $\leq 18.5 \text{ kg/m}^2$ ), normal weight ( $18.5 \text{ kg/m}^2$ - $25 \text{ kg/m}^2$ ), overweight ( $25 \text{ kg/m}^2$ - $29.5 \text{ kg/m}^2$ ) and obesity ( $>30 \text{ kg/m}^2$ ).

### **3.14 Ethical Considerations**

The UI/UCH Ethical Review committee approved the study prior to its implementation (see Appendix C). Permission was also sought from the head and matron of the hospitals selected to participate in the study. The procedure was explained to the participants and their informed consent was sought and obtained before participating in the study. Participation of the nurses was voluntary and those who decided to withdraw during the study were permitted to do so. The research did not cause any form of harm to the nurses. Confidentiality of the information given from the nurses was ensured. Serial numbers were written on each questionnaire and no names were required from the participants.

## CHAPTER FOUR

### RESULTS

#### 4.1 Respondents' Socio-demographic Characteristics

Socio-demographic characteristics of the respondents are presented in Table 4.1. Most (85.1%) of the respondents were females and 14.9% were males. Respondents' mean age was  $39.1 \pm 11.2$  years. Few respondents (29.0%) were within the age bracket 46-54 years. Most (43.6%) of the respondents' number of years of practice were within 4-10 years, their mean number of years of practice was  $13.5 \pm 9.3$  years. More than half (66.9%) of the respondents were married, and majority (70%) were Christians. Respondents' mean Body Mass Index (BMI) was  $26.7 \pm 6$  kg/m<sup>2</sup> and 33.3% of them were overweight. Majority (60.7%) of the respondents were working in a government-owned hospital.

**Table 4.1 Respondents' Socio-demographic Characteristics (N= 417)**

<b>Characteristics</b>	<b>No. (%)</b>	
<b>Sex</b>		
Male	62	14.9
Female	355	85.1
<b>Age of Respondents</b>		
28-36	165	39.6
37-45	131	31.4
46-54	121	29.0
*Range- 18-59		
*Mean- 39.1±11.2		
<b>Number of years of practice</b>		
4-10	182	43.6
11-17	136	32.6
18-24	72	17.3
>24	27	6.5
*Range- 1-33		
*Mean-13.5±9.3		
<b>Marital Status</b>		
Single	120	28.8
Married	279	66.9
Divorced	9	2.2
Widowed	9	2.2
<b>Religion</b>		
Christianity	292	70.0
Islam	125	30.0
<b>Health Facility Type</b>		
Government	253	60.7
Private	164	39.3



## 4.2 Respondents' knowledge about Diabetes Mellitus

Respondents' knowledge about types, causes, signs and symptoms, risk factors, preventive measures and complications were assessed.

Majority (62.8%) of respondents knew only two types of diabetes mellitus, and that lack of insulin or failure of the body to use insulin are some of the causes of diabetes. Majority (86.1%) of the respondents attest to the fact that frequent urination and excessive thirst (64.7%) were signs and symptoms of diabetes. More than half (67.6%) of the respondents do not see excessive hunger as a sign and symptom of diabetes.

More than half (63.1%) do not agree that being black or African has effect on the risk of developing diabetes. Majority (72.7%) knew that having a blood relative with diabetes increases the risk of developing diabetes.

Majority (62.4%) of the respondents know that regular exercise of at least 30 minutes a day for 3-5 times a week is a measure that can prevent an individual from developing diabetes. Most (77.9%) of the respondents knew that eating healthy diet rich in vegetables and fruits prevent development of diabetes. Half (50.6%) of the respondents disagree with the consumption of bitter leaf extract as a measure to prevent diabetes. Almost all (90.6%) of the respondents knew that diabetes and hypertension sometimes occur together in individuals. Majority (74.6%) of the respondents knew that loss of vision is one of the complications of diabetes.

21.3% of the respondents' overall knowledge about diabetes was rated as good (see Fig. 4.1)

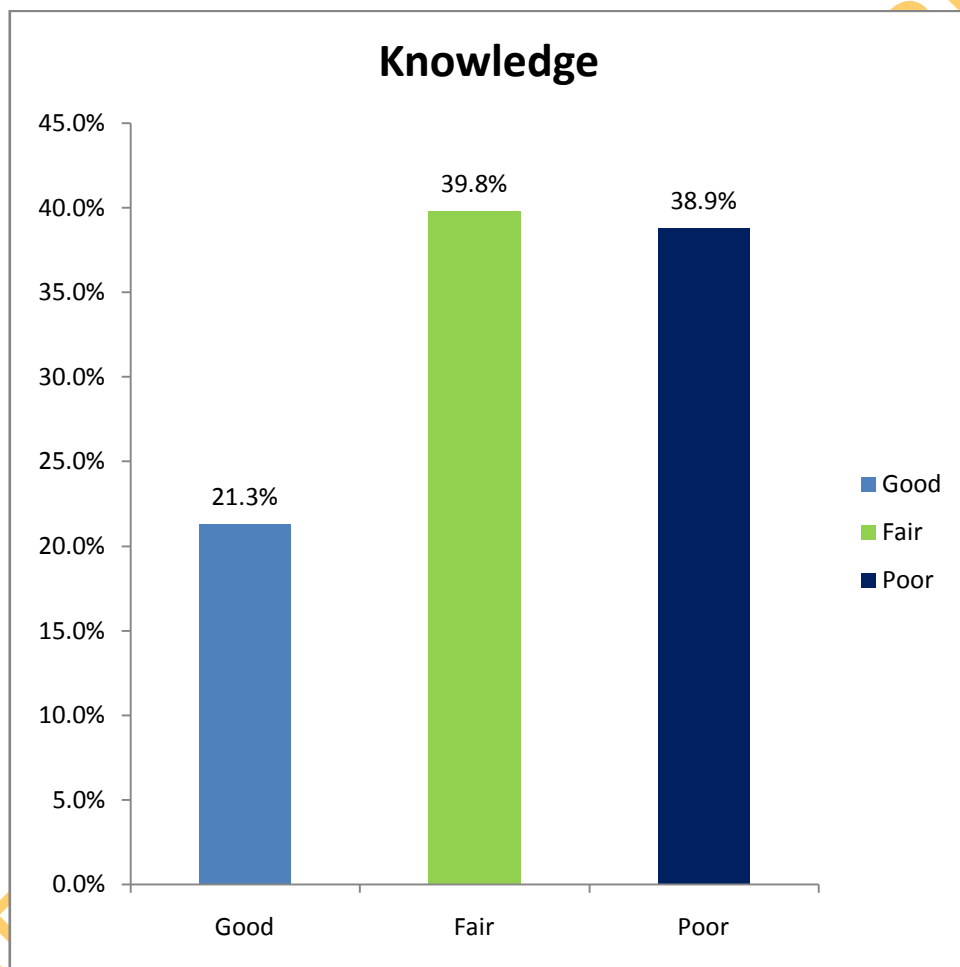
**Table 4.2a Respondents' knowledge about Diabetes Mellitus (N= 417)**

<b>Variables</b>	<b>No.</b>	<b>Percentage (%)</b>
<b>Knowledge about types of diabetes mellitus?</b>		
2(Yes/No)	262	62.8
<b>3(Yes/No)*</b>	<b>115</b>	27.6
4(Yes/No)	31	7.4
None	9	2.2
<b>Causes of diabetes mellitus</b>		
Lack of Insulin		
<b>Yes*</b>	<b>262</b>	62.8
No	155	37.2
Failure of the body to use Insulin		
<b>Yes*</b>	<b>251</b>	60.2
No	164	39.3
Consumption of lots of sugar		
Yes	126	30.2
<b>No*</b>	<b>164</b>	69.8
Too much of carbohydrates		
Yes	154	36.9
<b>No*</b>	<b>263</b>	63.1
I don't know	56	13.4
<b>Signs and Symptoms of diabetes mellitus</b>		
Frequent Urination		
<b>Yes*</b>	<b>359</b>	86.1
No	58	13.9
Excessive thirst		
<b>Yes*</b>	<b>270</b>	64.7
No	147	35.3
Excessive hunger		
<b>Yes*</b>	<b>135</b>	32.4
No	282	67.6
High blood pressure		
Yes	69	16.5
<b>No*</b>	<b>348</b>	83.5
Weight gain		
Yes	94	22.5
<b>No*</b>	<b>323</b>	77.5
<b>Being black or African have effect on the risk of developing diabetes?</b>		
<b>Yes*</b>	<b>154</b>	36.9
No	263	63.1
<b>Having a blood relative with diabetes increases the risk of developing diabetes</b>		
<b>Yes*</b>	<b>303</b>	72.7
No	114	27.3

**Table 4.2b Respondents' knowledge about Diabetes Mellitus (N= 417)**

<b>Variables</b>	<b>No.</b>	<b>Percentage (%)</b>
<b>Diabetes during pregnancy has effect on the risk of developing diabetes</b>		
<b>Yes*</b>	<b>163</b>	39.1
No	254	60.9
<b>Being 45years of age or older decreases the risk of developing diabetes</b>		
Yes	88	21.1
<b>No*</b>	<b>329</b>	78.9
<b>Measures that can prevent an individual from developing diabetes</b>		
Regular exercise of at least 30minutes a day		
<b>Yes*</b>	<b>260</b>	62.4
No	157	37.6
Weight gain		
Yes	57	13.7
<b>No*</b>	<b>360</b>	86.3
Eating healthy diet rich in vegetables and fruits		
<b>Yes*</b>	<b>325</b>	77.9
No	92	22.1
Cigarette smoking and alcohol consumption		
Yes	46	11.0
<b>No*</b>	<b>371</b>	89.0
Consumption of bitter leaf extracts		
Yes	206	49.4
<b>No*</b>	<b>211</b>	50.6
<b>Diabetes and hypertension sometimes occur together in individuals</b>		
<b>Yes*</b>	<b>378</b>	90.6
No	39	9.4
<b>Complications of diabetes mellitus</b>		
Loss of vision		
<b>Yes*</b>	<b>311</b>	74.6
No	106	25.4
Amputation		
<b>Yes*</b>	<b>258</b>	61.9
No	159	38.1
Stroke		
Yes	174	41.7
<b>No*</b>	<b>243</b>	58.3
Kidney failure		
<b>Yes*</b>	<b>241</b>	57.8
No	176	42.2
Poor wound healing		
<b>Yes*</b>	<b>323</b>	77.5
No	94	22.5

**Note: Correct answers are bold and asterisked.**



**Fig 4.1: Respondents' level of knowledge about Diabetes Mellitus.**

### **4.3 Respondents' Perceived risk of developing diabetes mellitus**

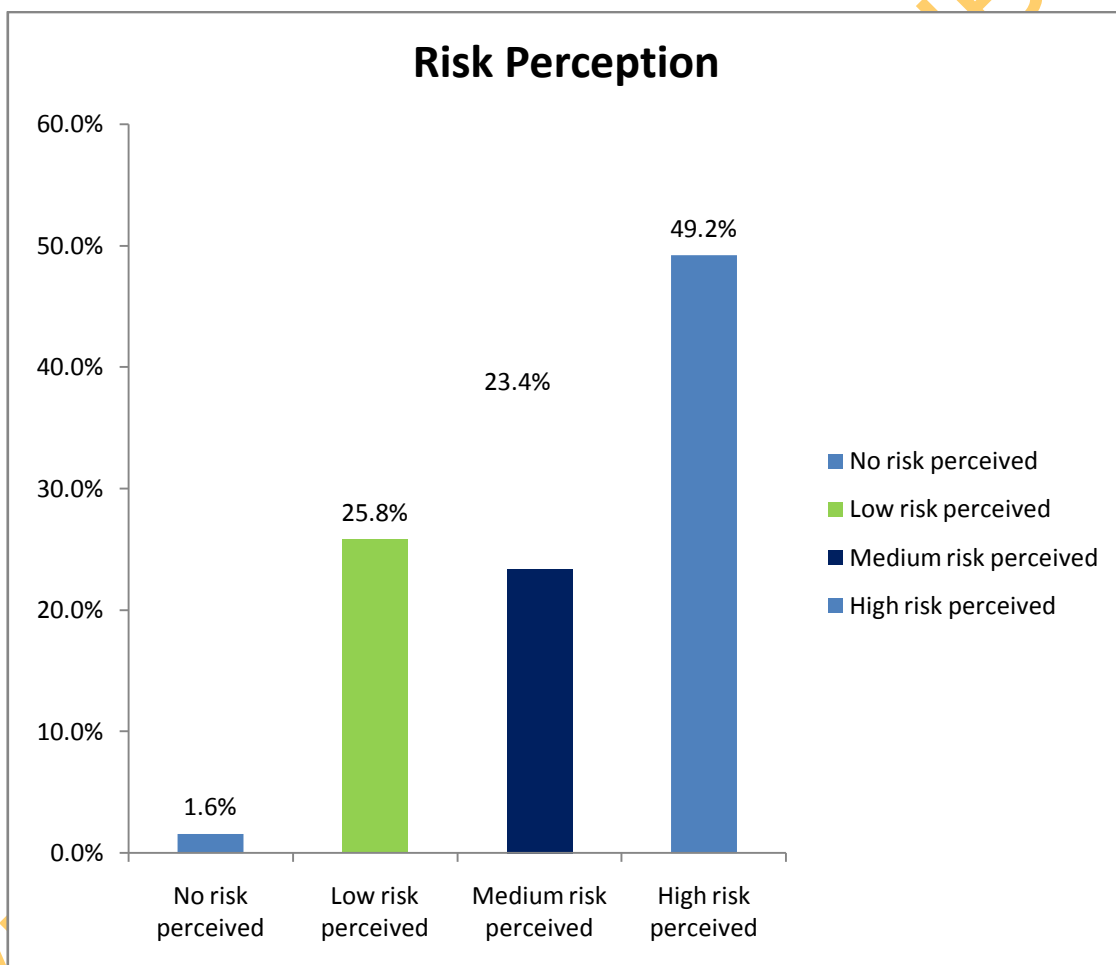
Table 4.3 presents details of respondents' risk perception of developing diabetes mellitus. Less than half(46.8%) of the respondents perceived they are at low risk of developing diabetes over the next 10years. Majority(93.3%) of them believe that DM can be prevented with diet and exercise program. Majority(74.3%) of the respondents compared to other people of their age and sex felt they are less likely to get diabetes. More than half(60.4%) of the respondents perceived they are at risk of developing DM if they have a blood relative that had diabetes. Majority(88.2%) perceived DM as a serious disease.

About half (49.2%) of the respondents have a high risk perception of developing DM in the overallwhile 1.6% do not know of any risk (see Fig4.2).

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**Table4.3 Respondents' Risk perception of diabetes mellitus (N- 417)**

<b>Variables</b>	<b>No.</b>	<b>Percentage (%)</b>
<b>How would you assess your likelihood of developing diabetes over the next 10years</b>		
Not likely	156	37.4
Less likely	195	46.8
Likely	22	5.3
Don't know	44	10.6
<b>Do you believe diabetes can be prevented with diet and exercise program</b>		
Yes	389	93.3
No	28	6.7
<b>Compared to other people of my age and sex, I am less likely than they are to get diabetes</b>		
Yes	310	74.3
No	107	25.7
<b>Having a relative that had diabetes puts me at risk of diabetes</b>		
Yes	252	60.4
No	165	39.6
<b>Diabetes mellitus is a serious disease</b>		
Yes	368	88.2
No	49	11.8



**Fig.4.2: Respondents' level of risk perception.**

#### **4.4 Respondents' Attitude towards lifestyle characteristics associated with DM prevention**

Table 4.4 reveals respondents' attitude towards lifestyle characteristics associated with DM prevention and its management.

Majority(87.8%) of the respondents believe that daily consumption of healthy diet rich in vegetables and fruits affect their risk of developing DM in future and prevent development of complications in DM. also, more than half(67.1%) believe that regular medical checks is not routine for only individuals at risk of developing a serious disease such as DM. Majority(87.5%) attest to participation in a screening exercise for diabetes as crucial for individuals below 65years as well.

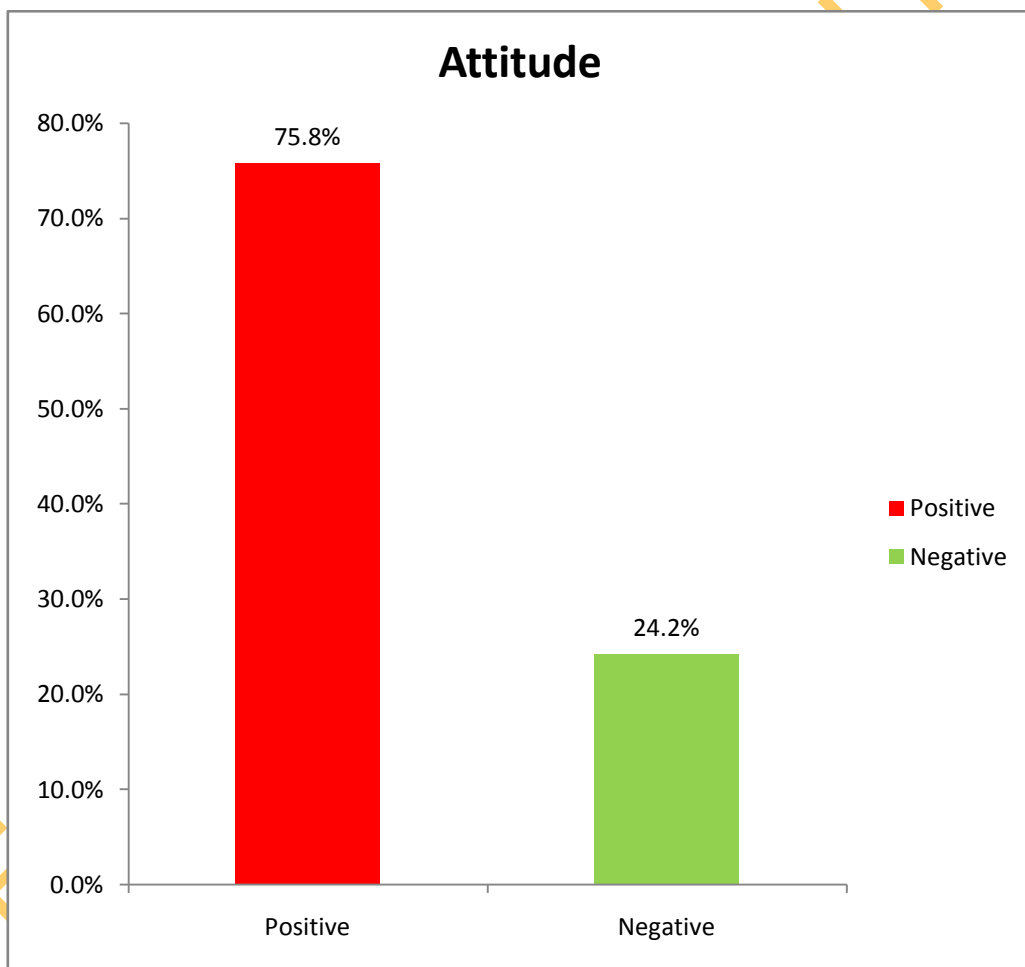
Managing DM does not bore a majority(80.1%) of the respondents. More than half(52.8%) believe being diabetic reduces patient's lifespan. Majority(80.1%) of the respondents would not mind being a diabetes educator if opportune. Majority(79.9%) affirms that seeking more knowledge about NCDs such as diabetes is a priority even though they are not at risk of developing DM. Most(79.1%) of the respondents feel NCDs are curable and preventable.

The overall respondents' (77.5%) attitude was rated Positive(see Fig.4.3).



**Table 4.4 Respondents' Attitude towards lifestyle characteristics associated with DM prevention (N- 417)**

<b>Variables</b>	<b>Positive (%)</b>	<b>Negative (%)</b>
Eating a healthy diet rich in vegetables and fruits daily, affect my risk of developing diabetes in the future	366 (87.8)	51(12.2)
Daily physical activity (exercise) for at least 30minutes, three times a week does not affect the risk of developing diabetes in the future and not prevent development of complications in diabetics	137 (32.9)	280 (67.1)
Regular medical check-up is a routine for only individuals at risk of developing a serious disease such as diabetes	142 (34.1%)	275 (65.9%)
Participating in a screening exercise for diabetes is not crucial for individuals below 65years	52 (12.5%)	365 (87.5%)
Managing patients with diabetes bores me	83 (19.9%)	334 (80.1%)
I don't like managing patients with diabetes because of their non-compliance with drug-use.	96 (23.0%)	321(77.0%)
Being diabetic reduces patient's lifespan	220 (52.8%)	197 (47.2%)
If given an opportunity, I would like to be a Diabetes Educator	334 (80.1%)	83 (19.9%)
Seeking more knowledge about non-communicable diseases such as diabetes is not a priority to me since I'm not at risk of developing them	84 (20.1%)	333 (79.9%)
Non-communicable disease are NOT curable and preventable	87 (20.9%)	330 (79.1%)



**Fig4.3: Respondents attitude towards DM prevention.**

#### **4.5 Respondents' lifestyle characteristics associated with diabetes mellitus**

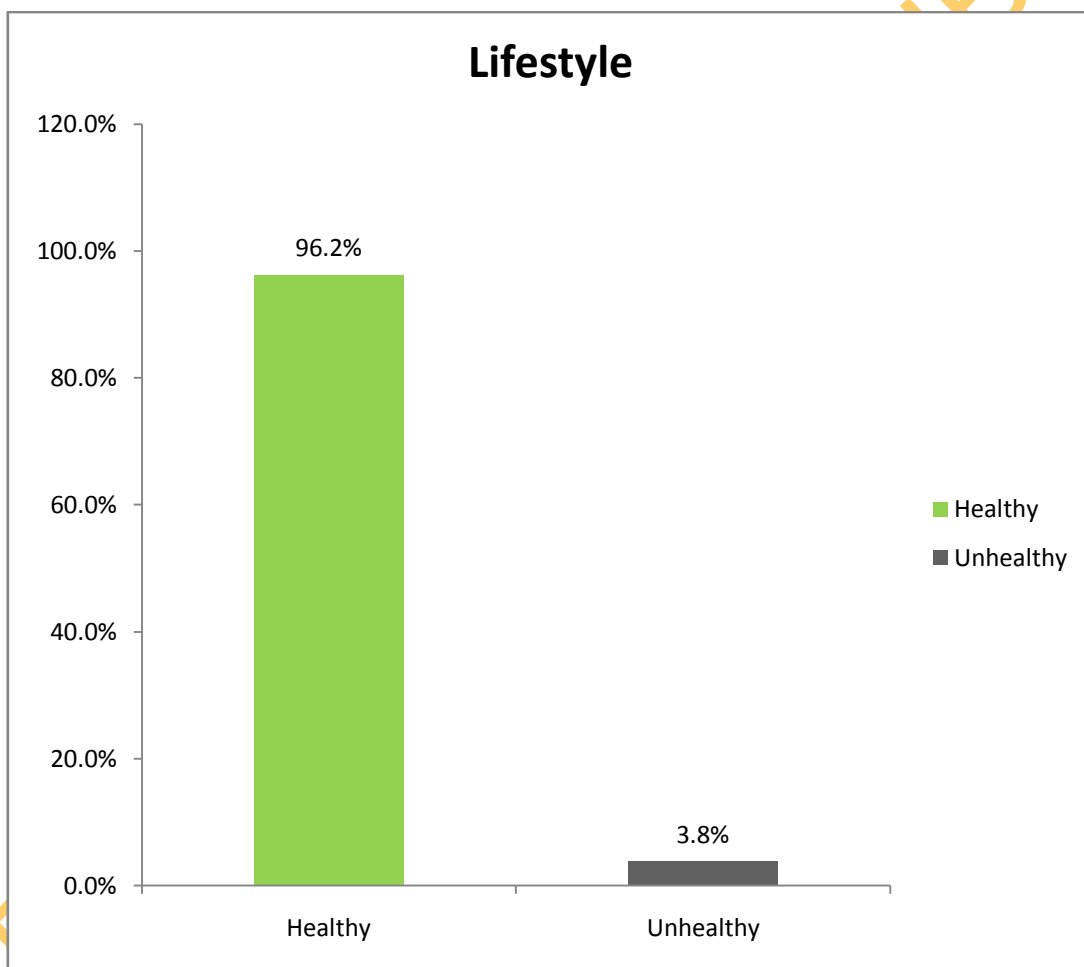
Table 4.5 presents details of respondents' lifestyle characteristics associated with DM prevention. More than half (53.5%) of the respondents eat vegetables and fruits (62.6%) daily. More than half (57.6%) of respondents do exercise 30minutes, 3 or more times in a week. Majority (98.6%) of the respondents do not smoke cigarette and consume alcohol (94.0%). About 57.1% of the respondents do not check their blood sugar level regularly while majority (70.5%) do regular blood pressure check and weight measure (69.1%). Majority (88.0%) of the respondents attest to the fact that lifestyle modification is a key factor to prevent diabetes.

In the overall, majority (90.0%) of the respondents exhibit healthy lifestyle characteristics (see Fig4.4).

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**Table 4.5 Respondents' lifestyle characteristics associated with diabetes mellitus (N= 417)**

Variables	Yes	No
	No(%)	No(%)
Do you eat vegetables (cabbage, ewedu etc.) daily	194(46.5)	223(53.5)
Do you eat fruits (carrots, water melon etc.) daily	156(37.4)	261(62.6)
Do you usually have 30minutes of exercise three or more times in a week	240(57.6)	177(42.4)
Do you drink alcohols	25(6.0)	392(94.0)
Do you smoke cigarettes	6(1.4)	411(98.6)
Do you take other tobacco products e.g snuff	28(6.7)	389(93.3)
Which of these routine measures do you take?		
Regular medical check-up	229(54.9)	188(45.1)
Weight measure	288(69.1)	129(30.9)
Blood pressure check	294(70.5)	123(29.5)
Blood sugar check	179(42.9)	238(57.1)
Body mass index	166(39.8)	251(60.2)
Lifestyle modification is a key factor to prevent diabetes	367(88.0)	50(12.0)
Have you recently made changes in any lifestyle behaviour that you believe will lower your risk of developing DM.	316(75.8)	99(23.7)
Are you planning to make changes in any lifestyle behaviour in the near future that you believe will lower your risk of DM	364(87.3)	53(12.7)



**Fig 4.4: Respondents' lifestyle characteristics associated with DM.**

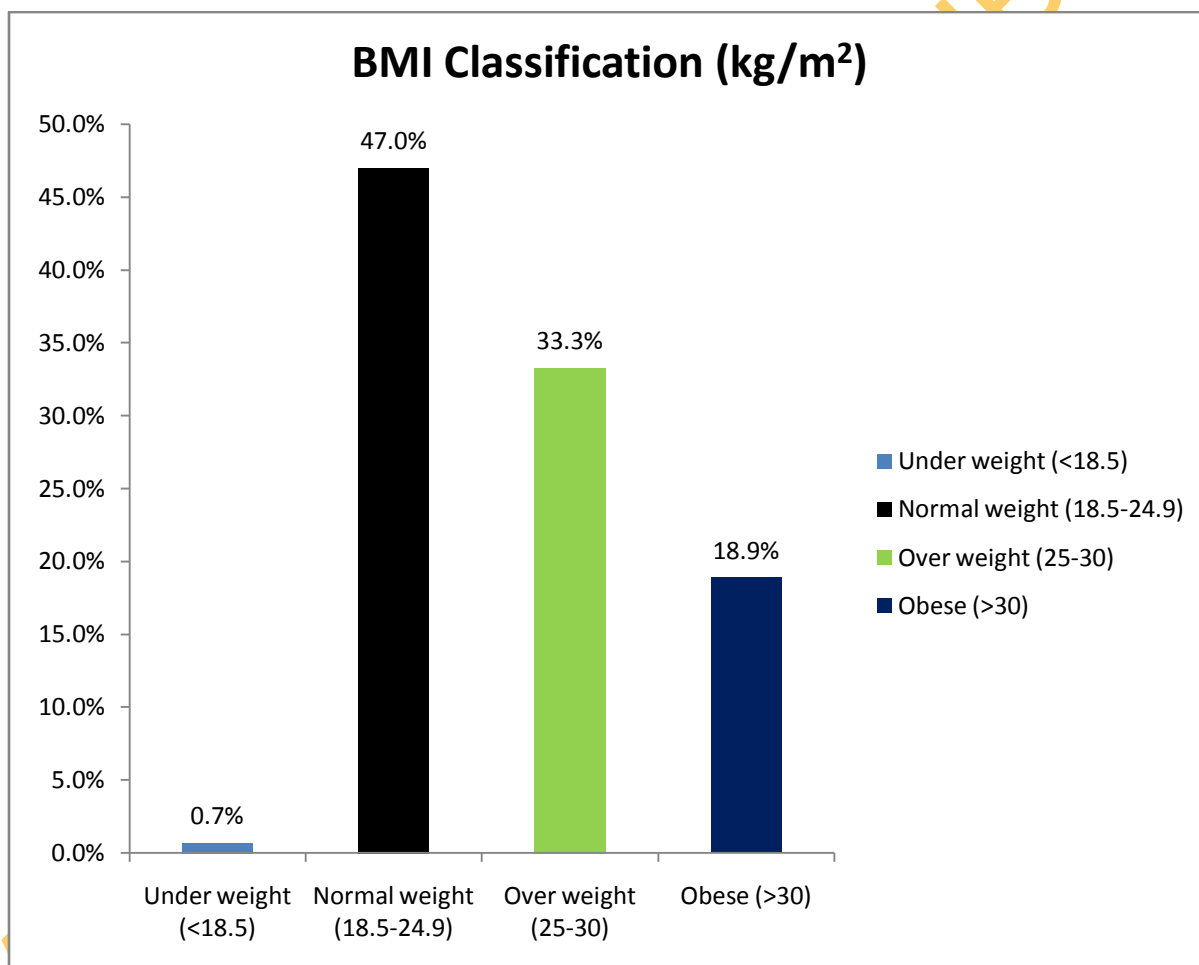
#### **4.6 Respondents Body Mass Indices using their weight-height measure.**

The BMI classification with respect to respondents is shown in Figure 4.5.

Majority (47.0%) of the respondents had normal weight (see Fig.4.5) even though quite a good number (33.3%), almost as that of those of normal weight were overweight.

Respondents mean Body Mass Index was  $26.7 \pm 6.0 \text{kg/m}^2$ .

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**Fig 4.5 Respondents' BMI classification**

## **4.7 Test of Hypotheses**

### **4.7.1 Hypothesis 1**

There is no association between the selected demographic characteristics (age, sex, number of years of practice, hospital type) of nurses and knowledge about diabetes mellitus.

Table 4.6 highlights respondents' knowledge of diabetes by socio-demographic characteristics. There was a significant association between knowledge of nurses about diabetes mellitus and selected demographic characteristics. Therefore, the null hypothesis is hereby rejected.

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**Table 4.6. Respondents' knowledge of diabetes mellitus by selected demographic characteristics**

Characteristics	Knowledge			X <sup>2</sup>	SD	P-value
	Good No(%)	Fair No (%)	Poor No (%)			
<b>Sex</b>						
Male	16 (25.8)	15 (24.2)	31 (50.0)	*7.471	0.741	0.024
Female	73 (20.6)	151 (42.5)	131 (36.9)		0.794	
<b>Age group</b>						
28-36	75 (45.5)	50 (30.3)	40 (24.2)	*6.258	0.545	0.000
37-45	14 (10.7)	46 (35.1)	71 (54.2)		0.893	
46-54	6 (5.0)	67 (55.3)	48 (39.7)		1.000	
<b>Number of years of practice</b>						
4-10	72 (39.6)	49 (26.9)	61 (33.5)	*4.068	86.04	0.000
11-17	17 (12.5)	76 (55.9)	43 (31.6)		0.875	
18-24	7 (9.7)	25 (34.7)	40 (55.6)		1.000	
>24	5 (18.5)	12 (44.4)	10 (37.1)		1.000	
<b>Health Facility type</b>						
Government	33 (13.0)	118 (46.6)	102 (40.3)	*5.587	0.869	0.000
Private	56 (34.1)	48 (29.3)	60 (36.6)		0.659	

\*Fishers exact

P<0.05 = statistically significant

#### 4.7.2 Hypothesis 2

There is no association between the socio-demographic characteristics of nurses and their level of risk perception of diabetes mellitus.

There was a significant association between gender, age, hospital type and their level of risk perception of diabetes mellitus. However, no significant association exists between their number of years of practice and level of risk perception.

Therefore, the null hypothesis will be rejected for association between genders, age; hospital type and level of risk perception while null hypothesis will be accepted for the association of number of years and level of risk perception (see Table 4.7).

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**Table 4.7. Respondents' level of risk perception by selected demographic characteristics**

Characteristics	Risk perception				X <sup>2</sup> value	P- value
	No risk No (%)	Low risk No (%)	Medium risk No (%)	High risk No (%)		
<b>Sex</b>						
Male	0(0.0)	12(19.4)	15(24.2)	35 (56.4)	*5.215	0.006
Female	5 (1.4)	155 (43.7)	61(17.2)	134(37.7)		
<b>Age group</b>						
28-36	5(3.0)	50(30.3)	38(23.0)	72(43.7)	*7.494	0.000
37-45	0(0.0)	73(45.9)	32(20.1)	54(34.0)		
46-54	2(1.3)	48(32.0)	29(19.3)	71(47.3)		
<b>Number of years of practice</b>						
4-10	9(4.9)	70(38.5)	43(23.6)	60(33.0)	*0.862	0.103
11-17	5(3.7)	45(33.1)	33(24.3)	53(40.0)		
18-24	0(0.0)	18(29.0)	18(29.0)	26(41.9)		
>24	0(0.0)	10(37.0)	5(18.5)	12(44.5)		
<b>Hospital type</b>						
Government	2(0.8)	90(35.6)	62(24.5)	99(39.1)	*6.496	0.001
Private	5(3.0)	50(30.5)	38(23.2)	71(43.3)		

\*Fishers exact

P<0.05 = statistically significant

### 4.7.3 Hypothesis 3

There is no association between the socio-demographic characteristics of nurses and their attitude towards prevention of diabetes mellitus.

There was a significant association between age, number of years of practice, hospital type, and attitude of nurses towards lifestyle characteristics relating to DM. The null hypothesis is hereby rejected. However, no significant association existed between gender and attitude of nurses, thus null hypothesis was accepted for the association (see details on table 4.8).

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**Table 4.8. Respondents' attitude towards lifestyle characteristics associated with diabetes by selected demographic characteristics**

Characteristics	Attitude		
	Positive (%)	Negative (%)	P- value
<b>Sex</b>			
Male	51 (82.3)	11(17.7)	0.197
Female	265 (74.6)	90 (25.4)	
<b>Age group</b>			
28-36	121 (73.3)	44(26.7)	0.012
37-45	111(83.8)	20(15.3)	
46-54	84(69.4)	37(30.6)	
<b>Number of years of practice</b>			
4-10			0.001
11-17	121(66.5)	61(33.5)	
18-24	114(83.8)	22(16.2)	
Else	57(79.2)	15(20.8)	
<b>Hospital type</b>			
Government	200(79.1)	53(20.9)	0.053
Private	116(70.7)	48(29.3)	

P<0.05 = statistically significant

#### **4.7.4 Hypothesis 4**

There is no association between the socio-demographic characteristics of nurses and lifestyle relating to prevention of diabetes mellitus.

There was no significant association between gender, number of years of practice, and lifestyle relating to DM prevention. Therefore, the null hypothesis will be accepted. However, a significant association existed between age, hospital type, and lifestyle relating to prevention of diabetes. The null hypothesis is hereby rejected (see table 4.9).

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**Table 4.9. Respondents' lifestyle relating to prevention of diabetes mellitus by selected demographic characteristics**

Characteristics	Lifestyle		P- value
	Healthy (%)	Unhealthy(%)	
<b>Sex</b>			
Male	57(91.9)	5(8.1%)	0.060
Female	344(96.9)	11(3.1)	
<b>Age group</b>			
28-36	155(93.9)	10(6.1)	0.020
37-45	121(92.4)	10(7.6)	
46-54	115(95.0)	6(5.0)	
Means score = 36.7 ( $\pm$ 2.89) years			
<b>Number of years of practice</b>			
4-10	172(94.5)	10(5.5)	0.167
11-17	129(94.9)	7(5.1)	
18-24	63(87.5)	9(12.5)	
>24	22(81.5)	5(18.5)	
Means score = 13.7 ( $\pm$ 1.98) years			
<b>Health Facility type</b>			
Government	247(97.6)	6(2.4)	0.053
Private	154(93.9)	10(6.1)	

Fisher exact

P<0.05 = statistically significant

#### **4.7.5 Hypothesis 5**

There is no association between socio-demographic characteristics of nurses and their Body Mass Index (BMI).

Table 4.10 shows the association between respondents' socio-demographic characteristics of nurses and their Body Mass Index (BMI). There was a significant association between age, number of years of practice, type of hospital and BMI of nurses, hence reject the null hypothesis while null hypothesis is accepted for the association between nurses' gender and their BMI.

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**Table 4.10. Respondents' Body mass Indices by selected demographic characteristics (N=417)**

Characteristics	Body Mass Index (kg/m <sup>2</sup> )				P-value
	Underweight ( $\leq 18.5$ )	Normal weight (18.5-24.9)	Overweight (25.0-30)	Obese ( $>30$ )	
	No. (%)	No. (%)	No. (%)	No. (%)	
<b>Sex</b>					
Male	0(0.0)	25(40.3)	28(45.2)	9(14.5)	0.170
Female	3(0.8)	171(48.2)	111(31.3)	70(19.7)	
<b>Age group</b>					
28-36	3(1.8)	112(67.9)	38(23.0)	12(7.3)	0.000
37-45	0(0.0)	39(29.8)	62(47.3)	30(22.9)	
46-54	0(0.0)	45(37.2)	39(32.2)	37(30.6)	
<b>Number of years of practice</b>					
4-10	3(1.6)	127(69.8)	39(21.4)	13(17.1)	0.000
11-17	0(0.0)	36(26.5)	66(48.5)	34(25.0)	
18-24	0(0.0)	19(26.4)	24(33.3)	29(40.3)	
>24	0(0.0)	14(51.9)	10(37.0)	3(11.1)	
<b>Hospital Type</b>					
Government	2(0.8)	92(36.4)	93(36.8)	66(26.1)	0.000
Private	1(0.6)	104(63.4)	46(28.0)	13(7.9)	

Fisher exact test

P<0.05 = statistically significant

#### 4.7.6 Hypothesis 6

There is no association between level of knowledge and nurses' risk perception, attitude, BMI, lifestyle relating to DM prevention

Table 4.11 shows the association between respondents' level of knowledge and their level of risk perception.

There was a significant association between nurses' level of knowledge of DM and their risk perception thus reject null hypothesis.

There was also a significant association between knowledge and lifestyle of nurses, their BMI (see Table 4.13), though a non-significant association exists between knowledge and attitude of nurses.

Furthermore, regression analysis was done for variables that were significant (see table 4.13) and this showed that the odd of knowledge for no risk (3.10) among the respondents was highly higher than those respondents who believed that they are at low risk (2.99) with an average population of between 1.01 and 4.43. The effect of knowledge on risk perception was statistically significant ( $P < 0.05$ ). So also the odds of knowledge in unhealthy lifestyle are 3.3 less than the healthy lifestyle even though the result was not statistically significant as shown in Table 4.13. Furthermore the odd of knowledge was statistically significant ( $P < 0.05$ ) in the BMI of underweight and obese respondents while overweight was not statistically significant ( $P > 0.05$ ). However, obese respondents (2.744) have more probability for repeatability than the overweight (1.874) and even the underweight (0.754).

**Table 4.11. Association between respondents' level of knowledge and their level of risk perception.**

Knowledge	Risk Perception				Total	P-value
	No Risk No (%)	Low Risk No (%)	Medium risk No (%)	High Risk No (%)		
Poor	0(0.0)	60(37.0)	40(24.7)	62(38.3)	162	
Fair	0(0.0)	60(36.1)	41(24.7)	65(39.2)	166	
Good	13(14.6)	38(42.7)	16(18.0)	22(24.7)	89	
<b>TOTAL</b>	13(3.1)	158(37.9)	97(23.3)	149(35.7)	417	<b>0.000</b>

F<sup>2</sup> value= 54.590

P<0.05 = statistically significant

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**Table 4.12. Association between respondents' level of knowledge, attitude, lifestyle characteristics, body mass index relating to diabetes mellitus prevention.**

Variables	Attitude		P-value
	Positive No (%)	Negative No (%)	
<b>Knowledge</b>			
Good	68(76.4)	21(23.6)	0.660
Fair	129(77.7)	37(22.3)	
Poor	119(73.5)	43(26.5)	
<b>Lifestyle</b>			
Healthy	307(76.6)	94(23.4)	0.000
Unhealthy	9(56.3)	7(43.8)	
<b>Body mass index</b>			
Under weight	1(33.3)	2(66.7)	0.001
Normal weight	129(65.8)	67(34.2)	
Overweight	114(82.0)	25(18.0)	
Obese	72(91.1)	7(8.9)	

P<0.05 = statistically significant

**Table 4.13. Multivariate Regression analysis of respondents' level of risk perception, lifestyle characteristics and body mass index.**

<b>Variables</b>	<b>P-value</b>	<b>Odds ratio (95%CI)</b>
<b>Risk perception</b>		
High risk perception*		
Low risk perception.	0.026	2.992 (1.000-3.879)
No risk perception	0.037	3.100 (1.111-4.987)
<b>Lifestyle</b>		
Healthy lifestyle*		
Unhealthy lifestyle	0.456	3.336 (0.984-5.234)
<b>Body mass index</b>		
Underweight	0.005	0.754 (0.373-1.321)
Normal weight*		
Overweight	0.100	1.874 (0.567-5.834)
Obese	0.013	2.744 (0.934-4.785)

\*Reference Category

P<0.05 = statistically significant

## CHAPTER FIVE

### DISCUSSION, RECOMMENDATION AND CONCLUSION

#### 5.1. Respondents' Socio-Demographic Characteristics

The mean age of respondents was  $39.1 \pm 11.2$  years. The percentage of female nurses (85.1%) was higher than males (14.9%) (Odili and Eke, 2010). Most of the respondents were working in government hospitals (60.7%) which may be due to better remuneration and development of their skill.

The number of years in practice had a significant relationship with respondents' level of knowledge; a study by Hughes that involved a convenience sample of professional nurse from both primary and secondary health centre confirms that nurses with more years of experience and practice scored higher in knowledge assessment compared to younger ones. Increased age was said to be associated with good knowledge of diabetes as respondents within the age group 41-50 years and above had good knowledge of DM compared to younger ones of 21-30 years according to a study by Uloma, Maurice, Godswill and Dennis, 2014 on socio-demographic determinants of the knowledge of DM in Onitsha-North local government area, Anambra state, Nigeria. However the overall knowledge score for nurses was rated fair (39.8%) though a thin line of difference existed between nurses with fair knowledge and nurses with poor (38.8%) knowledge.

#### 5.2. Respondents' Knowledge of Diabetes Mellitus

Nurses knew only two types of diabetes, do not know that having had diabetes during pregnancy has effect on the risk of developing DM, and that being African or black is a risk factor in DM. Most blacks and Africans have poor dietary habit of heavy consumption of high calorie foods (Ramatu Kallon, 2003). About 63% of nurses do not agree with heavy consumption of carbohydrates as one of the causes of DM.

However, nurses with fair knowledge of DM exhibited unhealthy lifestyle characteristics (non-regular routine medical checks such as blood sugar check, weight-height measure [BMI] and non-consumption of fruits regularly). On the contrary, majority of the nurses with poor knowledge showed high risk perception of developing diabetes which can be attributed to the fact that sometimes poor knowledge (inadequate knowledge) can result in

total abstinence or complete adherence to lifestyle modification changes from the causal effect resulting from fear. There are areas of knowledge that need to be improved if the care provided to people with diabetes is to be enhanced. Nurses in this study have been shown to possess insufficient knowledge in some areas to educate clients and patients about diabetes. Lack of knowledge or inadequate knowledge among nurses has contributed to diabetic patients receiving inadequate health care instructions (Odili and Eke, 2010). There is a need for regular appraisal of nurses' knowledge requirement followed by educational training tailored to improve nurses' knowledge. Knowledge is said to be the greatest weapon to fight diabetes, with health information given to the public will help them assess their risk of developing diabetes, motivate them to seek early and proper intervention.

### **5.3. Respondents' Risk Perception of Diabetes Mellitus**

A majority (46.8%) of the nurses perceived their level of risk perception as low since they believe that diabetes can be prevented with diet and exercise program. However, Compared to females, 67.7% of males perceived they are at high risk of developing diabetes, males seem to be more susceptible than women to the consequences of indolence and obesity; possibly due to differences in insulin sensitivity and regional fat deposition (Gale and Gillepsie, 2001) and so it reflected in their attitude towards lifestyle characteristics associated with diabetes. Nurses between the age group 46-54 had a high risk perception of diabetes which as stated in Diabetes care, 2010 that the perceived risk of developing type 2 diabetes increases with age. Nurses with normal weight exhibited a low risk perception which reflected in their positive attitude towards DM and healthy lifestyle characteristics. Most (51.8%) private hospital nurses have a high risk perception compared to public hospital nurses (48.6%).

Overall Risk perception was not in line with risk, as indicated by physiologic measures. About 50% of respondents had high risk perception while 5% of respondents agreed they are likely to develop diabetes (Calvin, Quinn and Dancy, 2011).

Lack of accurate risk perception may prevent adults from considering the need for early preventive behaviours. It is expected that individuals with a high risk perception of a disease are said to employ behavioural changes that will further reduce their risk or prevent them from getting the disease (Ali, Geri, Majd and Shafer, 2011).

#### **5.4. Respondents' Attitude towards Lifestyle Modification associated with Prevention of Diabetes Mellitus**

Females (25.4%) exhibited negative attitude compared to males (17.7%) which may be due to their level of risk perception. Males are said to have positive attitude towards preventive measure such as engaging in heavy leisure physical activity than females (Kassean, 2012). Most of the respondents' with positive attitude fall within the age 37-45 years which may be due to the fact that they exhibited healthy lifestyle though majority (58.8%) in the age group have a low perceived risk of developing DM.

Nurses in government hospitals have better attitude towards DM prevention than those in the private health facility which may be due to the rate of diabetic patients' influx in government hospitals than private. According to Green, Bazata, Fox and Grandy (2007), high risk individuals' attitude and knowledge are conducive to good health but they do not translate these positive traits into healthy behaviour. Nurses with a fair knowledge of diabetes exhibited a poor attitude to lifestyle characteristics as there was a significant association between nurses' knowledge and attitude to lifestyle characteristics associated with prevention of DM.

Attitude towards behaviour is believed to be determined by beliefs about the consequences of adopting that behaviour. In the overall, nurses have positive attitude towards DM prevention that translate to healthy lifestyle.

#### **5.5. Respondents' Lifestyle Relating to Prevention of Diabetes Mellitus**

More female (96.9%) than male (91.9%) nurses exhibited healthy lifestyle but translate to positive attitude in males than females. Most (45.2%) of the male nurses were overweight compared to females with majority having normal weight. Nurses within the age group 37-45 years exhibited healthy lifestyle which reflected on their attitude to DM prevention and perceived risk of developing DM but not reflective on their knowledge of DM.

Lifestyle modification engaged in by male nurses is not reflective on their BMI. This may be due to nurses' non-regular medical checks in which weight and height are inclusive. Nurses that are overweight still exhibited healthy lifestyle and have a high risk perception, though a fair knowledge of diabetes. Lifestyle modification programmes with weight loss or exercise goals have shown a reduction in the incidence of diabetes in



persons at high risk. Regular exercise and consumption of healthy foods are to be embraced to combat incidence of DM (William et al, 2010). A change in diet and lifestyle can bring about significant improvement in the incidence and prevalence of diabetes. Promotion of healthy lifestyle change like healthy food intake, weight control exercise of 150minutes in a week is said to be effective to prevent onset of diabetes mellitus (Kassean, 2012).

#### **5.6. Respondents' Body Mass Indices**

Majority (45.2%) of male nurses were overweight compared to females (33.3%) which may be due to the contribution of the muscular build of males. Most (67.9%) of nurses within the age group 28-36years and 37.2% of those within the age group 46-54years had normal weight even though they exhibited a poor knowledge of diabetes mellitus, low risk perception but possess positive attitude and healthy lifestyle characteristics. While there are about 37.2% of nurses in the age group 46-54years had normal weight, the remaining 62.8% in this group are either overweight or obese. This may be due to ageing as it is associated with considerable changes in body composition such as relative increase in intra-abdominal fat than subcutaneous or total body fat and subsequent reduction in physical activity because of reduced muscle mass and function. Majority (45.8%) of the Nurses with 11-17years of practice were overweight and though they had fair knowledge of diabetes. Nurses (36.8%) in government hospital are overweight compared to private though most private hospital nurses have poor knowledge of DM. Individuals with above-normal BMI are at high risk of developing DM; thus, emphasis on regular exercise, dietary intake and routine medical checks are essential to prevent its onset.

#### **5.7. Implications for Health Promotion and Education**

Knowledge of diabetes from this study shows that lifestyle modification is not a function of nurses' knowledge of diabetes. Furthermore, there was no risk perception among the nurses with poor knowledge. It could be inferred that the risk perception of nurses and their lifestyle modification are not determined by their level of knowledge of diabetes. However, their attitude towards diabetes is poor which also reflect in their body mass indices where majority are overweight but resultant fair knowledge.

If nurses are well informed about types, symptoms, risk factors, preventive measures and complications of diabetes, it will reflect on their perceived risk and therefore may facilitate a positive behavioural change.

Certain lifestyle modification strategies that can be employed (Nancy, Dariush and Linda, 2010):

- Goal setting- target goals not difficult to attain can be set to focus on a behaviour change because behaviour are under a person's direct control and observable by the individual.
- Self monitoring is done to increase awareness of physical cues and/or behaviour and to identify the barriers to behavioural change. This will facilitate recognition of progress made towards identified goal e.g. 30minutes exercise daily for at least 5days a week for weight control.
- Self efficacy enhancement- individuals are more likely to both initiate behaviour and continue their efforts until success is achieved if perceived self efficacy is higher. Intervention strategy to enhance self efficacy can be substituting fruits for a high calorie dessert or ability to walk a mile.
- Incentives- National health insurance scheme can be well packaged so that nurses can benefit. Also financial charges can be reduced for regular use of on-site fitness facilities.

Exercise is said to be a key component of diabetes prevention and management. Regular exercise is about more than just weight loss, it is important to maintain a healthy lifestyle by the uptake of regular, moderate exercise and a healthy diet.

Addressing NCDs in Nigeria is a multi-dimensional challenge with multi-faceted implications. Initially, there has to be lobbying at the legislative level and at the doorsteps of developmental partners for appropriate investments and policies. This is to facilitate a national discussion that will result in the incorporation of these policies in the development and health agendas of the nation.

Also, there is a need to develop cost-effective and evidence-based strategic models that are culturally appropriate and resource-sensitive.

## 5.8 Conclusion

This study investigated risk perception, attitude and lifestyle associated with prevention of diabetes among nurses in Ibadan south west local government area of Oyo state. Respondents risk perception was high, had positive attitude and healthy lifestyle characteristics. However, there is a gap in knowledge (fair) about the types, cause, symptoms, preventive measure and complications of diabetes mellitus.

Medical knowledge of diabetes has no significant influence on risk perception, attitude and lifestyle characteristics associated with DM prevention. However, little positive reflection on their risk perception, attitude and lifestyle could be attributed to their cultural beliefs and myths. There is a need for regular appraisal of nurses' knowledge requirement followed by educational training tailored to improve nurses' knowledge.

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### **5.9. Recommendations**

Burden of diabetes is increasing globally, particularly in developing countries such as Nigeria. Nurses comprise the largest group of healthcare professionals who have lengthy contact with patients and for the most part, are the first points of contact for patients seeking information on diabetes care. The recommendations made according to the findings of this are as follows:

1. Continuing professional education is essential for nurses because it enables them to keep abreast of diabetes knowledge as well as of the knowledge about the ever-changing treatment regimens.
2. A curriculum for standard in-service education should be developed and implemented to enable nurses to maintain a high level of knowledge for educating patients with diabetes.
3. Results from this study could be a tool used to design models for efficient management and delivery of quality care that will emphasize prevention, health information technology, care coordination and shared decision making among patients and their providers.
4. There is a need for the use of mass media (television, radio, and internet, prints, etc.), celebration of World Diabetes Day (November 14) to improve awareness of diabetes.

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**APPENDIX A**  
**QUESTIONNAIRE**

**RISK PERCEPTION, ATTITUDE AND LIFESTYLE RELATING TO DIABETES MELLITUS PREVENTION AMONG NURSES IN IBADAN SOUTHWEST LOCAL GOVERNMENT AREA OF OYO STATE**

Dear Respondent,

I am **ABE ADEYINKA**, a student of the Department of Health Promotion&Education, Faculty of Public Health, College of Medicine, University College hospital, Ibadan. The purpose of this study is to **determine the risk perception, attitude and lifestyle related to prevention of diabetes mellitus**. This research is self-sponsored and no monetary input from you. Please note, that there is no risk involved in you participating in this study but rather help us to discover the appropriate strategies/intervention that can be used to reach out to the populace to prevent diabetes or its early onset.

Ever information conveyed by you will be kept very confidential. Your name will not be required in the questionnaire.

However, you can withdraw from participating in the study without any risk involved.

Your honest answers to the questions in the questionnaire and will be greatly appreciated.

**Would you want to participate in the study? 1. YES ( ) 2. NO ( )**

**Thank you very much**

**Study Nos.....[PLEASE DO NOT FILL]**

The following questions concern your knowledge, perceived risk of developing diabetes mellitus and attitude towards prevention of diabetes mellitus. There are no right or wrong answers. Your responses will be treated with utmost confidentiality.

**SECTION A: Demographic Information**

Age of respondent (years) \_\_\_\_\_

No. of years since qualification \_\_\_\_\_

No. of years in practice \_\_\_\_\_

Hospital (government *or* private) \_\_\_\_\_

Sex: male ( ) female ( )

Marital Status: Single ( ) Married ( ) Divorced ( ) Widowed ( )

Religion: \_\_\_\_\_

Weight \_\_\_\_\_ Kg      Height \_\_\_\_\_ m

BMI \_\_\_\_\_ kg/m<sup>2</sup>

**SECTION B: Assessing knowledge about Diabetes Mellitus**

*(Please circle as many options as possible for questions 11, 12, 17 & 19)*

10. How many types of Diabetes mellitus do you know?

- a. 2    b. 3    c. 4    d. 5    e. none

11. What are the causes of Diabetes Mellitus?

- a. Lack of Insulin    b. Failure of the body to use insulin    c. Consumption of lots of sugar  
d. Too much of carbohydrate-rich foods    e. I don't know ( ).

12. What are the signs and symptoms of diabetes mellitus?

- a. Frequent urination    b. Excessive thirst    c. Excessive hunger  
d. High blood pressure    e. Weight gain

13. Being Black or African has effect on the risk of developing Diabetes.

- a. Yes    b. No

14. Having a blood relative with diabetes (parents, grandparents, nieces, nephews, uncle, aunt, cousin) increases the risk of developing Diabetes.

- a. Yes    b. No

15. Having had Diabetes during pregnancy has no effect on the risk of developing Diabetes.

- a. Yes    b. No

16. Being 45 years of age or older decreases the risk of developing Diabetes.

- a. Yes    b. No

17. The following measures can prevent an individual from developing Diabetes.

- a. Regular exercise of at least 30 minutes a day  
b. Weight gain  
c. Eating healthy diet rich in vegetables and fruits  
d. Cigarette smoking and alcohol consumption  
e. Consumption of bitter leaf (*ewuro*) extract

18. Diabetes and Hypertension sometimes occur together in an individual.

- a. Yes    b. No

19. The following are some of the complications of Diabetes Mellitus?

- a. Loss of vision,  
b. Amputation

- c. Stroke
- d. Kidney failure
- e. Poor wound healing

**SECTION C: Assessing the Perceived Risk of developing Diabetes.**

Please circle the option below each question that best describe your perception of risk of developing Diabetes.

20. How would you assess your risk of developing Diabetes over the next 10years?  
a. No risk    b. Low risk    c. High risk    d. Not sure/ don't know
21. Do you believe Diabetes can be prevented with diet and exercise programs  
a. Yes    b. No
22. Compared to other people of my age and sex (gender), I am less likely than they are to get Diabetes.  
a. Yes    b. No
23. Having a relative that had Diabetes puts me at risk of Diabetes.  
a. Yes    b. No
24. Diabetes Mellitus is a serious disease.  
a. Yes    b. No

**SECTION D: Assessing Attitude towards Lifestyle Characteristics Associated with Diabetes Mellitus.**

For each item, please circle the correct option that describes your attitude.

25. Eating a healthy diet rich in vegetables and fruits daily reduce my risk of developing Diabetes in the future.  
a. Yes    b. No
26. Daily physical activity (Exercise) for at least 30minutes daily, three times a week does not reduce the risk of developing diabetes in the future and does not prevent development of complications in diabetics.  
A. true    b False
27. Regular medical check-up is a routine for only individuals at risk of developing serious disease such as Diabetes.  
a. True    b. False



28. Participating in a screening exercise for Diabetes is NOT crucial for individuals below 65years.

a. True b. False

29. Managing Patients with Diabetes bores me.

a. Yes b. No

30. I don't like managing patients with diabetes because of their non-compliance with drug-use.

a. True b. False

31. Having diabetes reduces patient's life span.

a. True b. False

32. If given an opportunity, I would like to be a Diabetes Educator.

a. Yes b. No

33. Seeking more knowledge about non-communicable diseases such as Diabetes is not a priority to me since I am not at risk of developing them.

a. true b. false

34. Non-communicable Diseases are not curable and not curable and not preventable.

a. True b. False

## SECTION E

### Assessing Lifestyle Characteristics Associated with Diabetes Mellitus.

Please circle the options that best describes your lifestyle.

35. How often do you eat vegetables (cabbage, ewedu, green vegetable, uguwu etc.).

a. Everyday b. Not everyday

36. How often do you eat fruits (water melon, carrots, oranges, apples etc.)

a. Everyday b. Not everyday

37. Do you usually have 30minutes of exercise three or more times in a week?

a. Yes b. No

38. Do you drink alcohols?

a. Yes b. No

39. Do you smoke Cigarettes?

a. Yes b. No

40. Do you take other tobacco products e.g. snuff?

a. Yes b. No

41. Which of these routine checks do you do? (Please *circle as many options here*):

- a. Regular medical check-up
- b. Weight measure
- c. Blood pressure check
- d. Blood Sugar check
- e. Body mass index

42. Lifestyle modification is a key factor to prevent Diabetes.

- a. Yes
- b. No

43. Have you recently made changes in any lifestyle behavior that you believe will lower your risk of developing Diabetes?

- a. Yes
- b. No

44. Are you planning to make changes in any lifestyle behavior in the near future that you believe will lower your risk of getting Diabetes?

- a. Yes
- b. No

Thank you for participating.

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## APPENDIX B

### Wards and registered health facilities

Wards	Hospitals	Government/ Private
1	Akere health centre	Government
2	Isale-osi health centre	“
3	Kososi health centre	“
4	Bode Comprehensive Health Centre	“
	Bolutife health centre	“
5	Primary health centre, Akuro	“
6	Primary health centre, Foko	“
	Premiere Hospital	Private
7	Primary health centre, Agbokojo	Government
	St! Lucia hospital	Private
8	Primary health centre, Aleshinloye	Government
	Oke-Bola health centre	“
	Jericho specialists’ hospital	“
	Life way hospital	Private
	Oke-Ado Hospital	Private
9	Molete Primary health centre	Government
	Christ way hospital	Private
	Immaculate hospital	Private
	Horizon hospital	Private
10	Health centre, Sharp corner	
	Ibadan Central Hospital	Private
11	Awodife health centre	Government
	Oluyole primary health centre	“
	Oluyole Estate comprehensive health centre	“
	Primary health centre, Elewura	“
	Oni Memorial Children’s Hospital	“
	Ring-Road State Hospital	“
	The Vine hospital	Private

	Shiloh medical centre	Private
	Teju Specialist Hospital	Private
12	Maternal and Child Health centreapata	Government
	Primary Health Centre Adifase	“
	Government College Ibadan Health Centre	“
	Primary health centre, odo-ona	“
	Primary health centre, Oke-Ayo	“
	Adeniji Memorial Maternity hospital	Private
	Ogo-Oluwa medical centre	Private
	Jola-Oluwa hospital	Private
	Garden of Eden hospital	Private

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**APPENDIX C**  
**ETHICAL APPROVAL**

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