

**PREVALENCE OF COMPLICATIONS AND RISK FACTORS AMONG
DIABETIC PATIENTS IN MEDICAL WARD OF ISHAKA ADVENTIST
HOSPITAL-BUSHENYI**

By

WYCLIFFE KIBOKO OBAO

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**A RESEARCH PROJECT REPORT SUBMITTED TO THE FACULTY OF CLINICAL
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KAMPALA INTERNATIONAL UNIVERSITY

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DECLARATION AND RECOMMENDATION

Declaration

I declare that this research report is my original work and has not been submitted for any award in an institution of higher learning that I'm aware of.

Name: Wycliffe Kiboko Obao.

Reg No. BMS/0070/72/DF

Signature.....

Date.....

Supervisor

This research report has been submitted for examination with my approval as the project supervisor.

Mr. Kiplagat Magoi David (BSc., MSc., (Egerton))

Signature.....

Date.....

DEDICATION

I dedicate this research to my beloved parents, brothers, sisters and friends.

ACKNOWLEDGEMENT

First and foremost to the Almighty God for giving me life, grace, strength and love through this tiresome work.

Much regards to my supervisor, for his relentless, endearing and positive mentorship on this research project.

ABSTRACT

Diabetes Mellitus affects more than 30 million people worldwide. It is said to be the fourth or fifth leading cause of death in most developed countries, newly industrialized nations and is epidemic in many developing countries. The objective of the study was to determine the prevalence risk factors and complication among patients with diabetes mellitus seen in medical ward department at Ishaka Adventist Hospital

A cross sectional study descriptive in nature was employed. A cluster sampling method was used to select participants into the study. A total of 20 patients were interviewed using a structured self administered questionnaire and data from the Hospital records.

Results obtained showed the prevalence of DM is higher in people 40 years of age and above compared with its prevalence in people below 40years of age. Obesity and overweight are threats to health of majority of people especially women and they are more affected than their men. Type II diabetes mellitus is more common among patients than type I. Hypertension is more common among patients with diabetes mellitus than other complications

It was concluded that government and other health agencies should make health policy to include non-communicable diseases among the priority diseases in Uganda.

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LIST OF ABBREVIATIONS /ACRONYM

ADA	American Diabetes Association
BMI	Body Mass Index
DKA	Diabetic Ketoacidosis
DM	Diabetes Mellitus
GTT	Glucose Tolerance Test
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
IDDM	Insulin Dependent Diabetes Mellitus
NIDDM	Non Insulin Dependent Diabetes Mellitu
UTI	Urinary Tract Infection
WHO	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information

Diabetes is defined as a disorder of metabolism characterized by chronic high blood sugar, resulting either from defect in insulin secretion, insulin action or both (NIDDK, 1995). It is a non-communicable disease attracting the attention of the whole world (Otim, et al, 1998).

Globally, it affected more than 30 million people worldwide (WHO, 1985). It is said to be the fourth or fifth leading cause of death in most developed countries, newly industrialized nations and is epidemic in many developing countries. It was first thought to be disease of the western world. A decade later, the global burden of diabetes was estimated to be 135 million people and two thirds of them live in developing countries. In many countries, it is now the leading cause of death, disability and high health care costs. It is noted that approximately 177 million people are now diagnosed with diabetes worldwide and around 4 million deaths every year are attributable to its complications (WHO, 2000). This figure is set to climb to 370 million by the year 2050 if diabetes mellitus is not granted the attention it deserves' (Ogwang, 2009).

Global Prevalence of Diabetes Estimate was done to estimate the prevalence of diabetes and the number of people of all ages with diabetes for years 2000 and projections for 2030. Data on diabetes prevalence by age and sex from a limited number of countries were extrapolated to all 191 World Health Organization member states and applied to United Nations' population estimates for 2000 and 2030 (International diabetes federation Atlas, 2000).

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 171 million in 2000 to 366 million in 2030. The prevalence of diabetes is higher in men than women, but there are more women with diabetes than men. The urban population in developing countries is projected to double between 2000 and 2030 (WHO 2001). The most important demographic change to diabetes prevalence across the world appears to be the increase in the proportion of

people 65 years of age. These findings indicate that the “diabetes epidemic” will continue even if levels of obesity remain constant. Given the increasing prevalence of obesity, it is likely that these figures provide an underestimate of future diabetes prevalence (Diabetes Care, 2004).

Regionally, Africans are increasingly being diagnosed with diabetes mellitus and was growing at the rate of 93% up to 2010. Eighteen (18) million people suffer from diabetes mellitus in Africa (WHO, 2002)

Uganda. During political instability in 1970s, only 254 people who had access to health services were diagnosed in Uganda. They all sought treatment and counseling from Mulago Hospital. The number had risen to eighty (80) thousand people by year 2000; about 300,000 by year 2001 and then rose to 560,000 people by year 2006, while another 560,000 people did not know they were diabetics. Currently, there are 1.5million diabetic Ugandans in a population of 28 million people (WHO, 2000). Consequently, the number of centers handling diabetic cases countrywide has risen from one to ten (Okware, 2006). The disease is particularly acute among the cattle-keeping people of the southwestern part of the country, where 20 hospitals have been chosen to handle the growing number of patients. Three hospitals in major towns in the region handle between them 2400 patients with diabetes (Okware, 2006))

Complications from diabetes, such as coronary artery and peripheral vascular disease, stroke, diabetic neuropathy, amputations, renal failure and blindness are resulting in increasing disability, reduced life expectancy and enormous health costs affect virtually every society. Diabetes is regarded as one of the most challenging health problems in the 21st century (IDF, 2003).

Of the conditions that are associated with diabetes, cardiovascular complications especially heart attack and stroke are among the most serious problems facing people with diabetes. People with diabetes are two or four times more likely to develop heart and blood related diseases than those without (IDF, 2003)

Diabetes Mellitus is described as a chronic metabolic disorder that is characterized by elevation of blood glucose concentration and caused by relative or absolute deficiency of insulin. Insulin is a body substance (a hormone) produced by the pancreas that is necessary for cells to be able to

use blood sugar (glucose). In addition, there is disordered use of both fats and proteins in the body.

1.2 Types of diabetes mellitus

The latest classification of diabetes reflects the two main types, I or Insulin Dependent Diabetes Mellitus (IDDM) or juvenile diabetes and type II diabetes or Non Insulin-Dependent Diabetes Mellitus (NIDDM) or adult onset diabetes. However, gestational and other uncommon diabetes has also been recognized. Type I diabetes, is primarily a disease of the pancreas. It results when the pancreas produces insufficient amounts of insulin to meet the body's needs. A Type I diabetic patient needs daily injections of insulin to live, hence the name IDDM. It develops most often in children and young adults, but the disorder can appear at any age (WHO, 1998).

Type II diabetes, is a disease of insulin function and it is the most common form. Subjects with this type present with measurable quantities of insulin in the blood, and sometimes, as in obesity, the insulin levels are relatively high. This insulin is however ineffective because of the insensitivity of target tissues to its action. About 90 to 95 percent of people with diabetes have Type II. About 70% of those who suffer from type II diabetes are either over weighed or obese (Ogwang, 2009). This form of diabetes usually develops in adults over the age of 40 and is most common among adults over age 55. Type II diabetes is often part of a metabolic syndrome that includes obesity, elevated blood pressure, and high levels of blood lipids. Unfortunately, as more children and adolescents become overweight, Type II diabetes is becoming more common in young people (IDF, 2001). Obesity is a major component of the metabolic syndrome increasing mortality and morbidity from type II diabetes mellitus. The number of diabetes cases is expected to double by the year 2025 (WHO, 1997).

1.3 Problem statement

In Uganda, the number of diabetics has been increasing over the years since it attained independence (UDA, 1993). What is already known on this topic is that, Diabetes mellitus is a growing public health problem, from 30 million people affected 10 years ago to over 130 million now (Amos et al, 1997), and an estimated 300 million by 2025 (WHO, 1997). During political instability in 1970s, only 254 people who had access to health services were diagnosed in Uganda. They all sought treatment and counseling from Mulago Hospital. The number had risen to eighty (80) thousand people by year 2000. It then rose to 560,000 people by year 2006, while

another 560,000 people did not know they were diabetics. Currently, there are 1.5million diabetic Ugandans in a population of 28 million people (WHO, 2000). Consequently, the number of centers handling diabetic cases countrywide has risen from one to ten (Okware, 2006). The disease is particularly acute among the cattle-keeping people of the southwestern part of the country, where 20 hospitals have been chosen to handle the growing number of patients. Three hospitals in major towns in the region handle between them 2400 patients with diabetes (Okware, 2006). Despite this alarming increase, no sufficient scientific studies have been carried out especially in western Uganda to know the current prevalence, although increasing numbers are being treated in hospitals including Kampala international university teaching hospital, Ishaka Advantest hospital and Mbarara regional referral hospital. This study was to address this issue.

1.4 General objective

To determine the prevalence of diabetes mellitus in relation to other conditions among patients seen in medical ward department at Ishaka Adventist Hospital from April 2013 to June 2013.

1.5 Specific objectives.

- ✓ To assess the prevalence of diabetes mellitus among patients in medical outpatient department at Ishaka Adventist Hospital
- ✓ To establish risk factors associated with diabetes mellitus in patients being attended to in the department.
- ✓ To assess the complications of diabetes mellitus on the patients attended to in the department.

1.6 Justification

Since no scientific study has been carried out to establish the prevalence of diabetes in this institution, the study would help the institution to budget whether to open diabetes clinic basing on the prevalence. Hence, provides job opportunity to the diabetes specialists. This would provide an optimal method to handle diabetic cases, which would help the society and the government at large to reduce on the strain and costs.

The information of the research would be used by institution, health care providers and local authorities to health educate the local people to change their life styles.

The information would help the government and health agencies in policy making to include non-communicable diseases among the priority diseases in Uganda.

CHAPTER TWO

2.0. Literature review

2.1 Introduction

Diabetes constitutes a global public health problem. Today about 135 million people are affected (Amos et al, 1997), and it is estimated that the number in 2025 will be 300 million (WHO, 1997). This global epidemic involves not only the industrialized world but also less developed countries where urbanization and industrialization are proceeding rapidly (Amos et al, 1997). The populations of developing countries, minority groups and disadvantaged communities in industrialized countries now face the greatest risk.

The prevalence of diabetes mellitus globally was estimated to be 170 million persons and estimated to affect 366 million people by the year 2030, with the most rapid growth in low and middle income countries, among population of working age (WHO, 2001). More than 75% of the patients who have diabetes mellitus for more than 20 years will have some forms of diabetes retinopathy (WHO, 2005). An estimated 314 million people have impaired glucose tolerance and that will increase to 472 million by year 2040 (IDF, 2003).

In the United States of America for instance, as much as 6.3% of the population had diabetes mellitus in 2002 and the prevalence and incidence are increasing. Thirteen (13) million people in the United States have diagnosed diabetes mellitus and additional 5.2 million have the disease but not yet diagnosed (USDCCP, 2002). The prevalence in other countries is comparable, even in those with newly developing economics like China and India. It was estimated that 26million people in China had the diabetes mellitus by year 2001 and the prevalence has increased markedly due to population ageing and rapid increase in incidence (WHO, 1995). Diabetes mellitus is also in the rise in the third world countries due to the factors like poor educational awareness, fewer numbers of endocrinologists to handle the case, rapid urbanization, poor dietary habits and lack of exercise. It was considered to be rare in Africa.

2.2. Scope and impact of diabetes

The extent of diabetes in Uganda is hard to measure because there is no diabetes screening programs (Lorna, 2007). But most of the cases are thought to be Type 1 diabetes, a form of the disease which usually develops in childhood and is not caused by an unhealthy diet. Uganda's medical system is not set up to handle chronic conditions like diabetes (Moran et al, 2007). Instead Uganda is much more concerned with acute crises like malaria and the spread of other infectious diseases. This makes it hard to determine its prevalence countrywide. Most diabetic children in the country die without anyone really knowing why they were sick. If anyone presents with dehydration and shock and maybe some mental confusion, they are diagnosed without any tests, they are just given an empiric diagnosis of cerebral malaria or maybe something infectious, shock from infection (Moran, 2007)

Resources to treat patients living with diabetes in Uganda pale in comparison to HIV/AIDS resources, (Boston et al, 2010). Although the World Health Organization has warned that diabetes, obesity, hypertension, and other diseases of development are well on their way to becoming entrenched worldwide, stark difference exist between HIV-AIDS clinics, and most of the local diabetes clinics.

Glucose is a simple sugar, which is the body's prime source of energy. The digestive process turns the carbohydrates of a meal eaten into this glucose which is then distributed throughout the body via the bloodstream, thus, "blood sugar".

The brain and other cells in the body that need immediate energy use some of the blood sugar. The rest is stored in the liver and muscles as starch called "glycogen", or in adipose tissue as "fat" to be used later. The glycogen turns back its glucose when the body needs it. The normal body maintains an even balance of sugar in the blood so as to satisfy the body's energy needs. Any disruption in this delicate balance creates a chemical imbalance either hypoglycemia – too low blood sugar level; or hyperglycemia-too high blood sugar level. Insulin, the hormone secreted by the pancreas, is what maintains the proper levels of blood sugar. However, when the pancreas fails to produce enough insulin to create a proper release of glycogen from the liver to the bloodstream the result is high blood sugar, or diabetes mellitus. Subjects with diabetes mellitus have blood glucose level of greater than or equal to 180mg/100ml (10mmol/l) of blood.

2.3. Causes of Diabetes Mellitus

The main factors which lead to diabetes mellitus, are hereditary (genetics) and environmental. Type I diabetes which develops most frequently in children and adolescents can be caused by viruses that have injured the pancreas and destruction of insulin making cells by the body's immune system. Also a family history of diabetes is a risk factor of Type I diabetes mellitus (Boulton et al, 1989).

Type II is a common and serious global health problem which is associated with rapid cultural and social changes, ageing populations, increasing urbanization, dietary changes, reduced physical activity and other unhealthy, lifestyle and behavioral patterns. Genetic and environmental factors in the etiology of type 2 diabetes mellitus (IDF, 2003)

Type II Diabetes Mellitus generally is a lifestyle disorder, most prevalent in populations with heightened genetic susceptibility. Environmental factors associated with lifestyle unmask the disease (Zimmet, 1995). Type II Diabetes arises from the collision of our old hunter-gatherer genes with our new 20th century way of living (Diamond, 1992). Type II DM is unmasked by social, behavioral and environmental risk factors. The epidemic, particularly in developing and newly industrialized nations, appears to be the result of a change in lifestyle from traditional to 'modern', a process labeled 'coca-colonization'.(Zimmet et al, 1995 1997).

A family history of diabetes is also a risk factor. Eating an unbalanced diet, unhealthy food, lack of physical exercise and stress predispose to diabetes mellitus. Another prognostic factor that is associated with increased risk of Type II diabetes is smoking (WHO, 2000).

Diabetes is widely recognized as one of the leading cause of death and disability in the United States. It contributed to more than 169,000 people (Death certificate data, 1992). Diabetes is associated with long-term complications that affect almost every major parts of the body. It contributes to blindness, heart disease, strokes, kidney failure, amputation and nerve damage. Uncontrolled diabetes can complicate pregnancy, and birth defects are more common in babies born to women with diabetes. The Diabetes cost United States 92 billion dollar in 1992 (WHO, 1995)

2.4 At Risk Groups

Diabetes is not contagious. However, certain factors can increase one's risk of developing diabetes. People who have family members with diabetes (especially type II), who are overweight, or who are African-American, Hispanic, or Native Americans are all at greater risk of developing diabetes (NIDDK, 1995). Type I DM occurs equally among males and females, but is more common in whites than in nonwhites (National institutes of health, 1995). Type1 is rare in Asian, Africans, and Native American populations, but Finland and Sweden have high risk of type I diabetes. Type II diabetes is more common in older people especially women who are overweight (Diabetes care, 1997).

Doctors and government officials in Uganda are becoming increasingly concerned at the country's growing incidence of diabetes, which they attribute to changes in lifestyle and rising obesity. The number of people with diabetes is now thought to have passed a million, in a population of 28 million (Ogwang, 2009).

The Ministry of Health is embarking on an exercise to assess the problem, including the ability of the existing facilities to handle the growing number of patients. "We are carrying out an assessment of the seriousness of the disease, the mechanisms available to handle it, and the facilities in place but there is a new thrust of non-communicable diseases in the country, and among these is diabetes" (WHO, 2000).

It is a very serious problem. People are changing their lifestyles. Many no longer get exercise: they do not work, and instead of walking they are driven in cars (Okware, 2006).

In 1972, only 254 people who had access to health services were diagnosed in Uganda. They attended the country's only diabetes clinic, at Mulago Hospital. Now Uganda has 560 000 registered people with diabetes. But it is thought an additional 560 000 patients may have the disease but are unaware of it (Okwera, 2006).

The total number of sufferers is 4% of the total population or 1 120 000 patients. There are 10 centers handling diabetic patients countrywide. Three types of diabetes affected Uganda. Type I accounts for about 8% of the total number of patients with diabetes. Type II, or adult onset diabetes, particularly affects overweight people. Tropical diabetes also affects adults

and is caused by poor nutrition. The number of members of the Uganda Diabetic Association, currently 20,000, has doubled since 2001 (Okwera, 2006).

Due to urbanization most children spend a lot of time on computers and do less exercise. People eat sweets and processed foods and drink sodas. The disease is particularly acute among the cattle-keeping peoples of the southwestern part of the country, where 20 hospitals have been chosen to handle the growing number of patients. Three hospitals in major towns in the region handle between them 2400 patients with diabetes (Otim et al, 1998).

One hundred (100) doctors and nurses from twenty (20) clinics in Uganda recently converged to deliberate on growing diabetes cases, its social and economic impact, treatment options and behavioral changes patients need to understand. The clinical diabetes conference that took place at Mukono zonal agricultural research and development institute attracted local as well as international health experts. It was found that diabetes mellitus was associated with severe and costly acute and chronic complications. These complications are seen in both developed and developing countries (Ogwang, 2009).

2.5 Signs and symptoms of diabetes mellitus.

Patients may be **asymptomatic**

Acute symptoms: few weeks of weight loss, ***polyuria, polydypsia and polyphagia***. Some patients will present with ketoacidosis = unwell, hyperventilation, ketones on breath.

Subacute = history as above but longer and in addition lethargy, infection (pururitis vulvae, boils).

Complications may be the presenting feature: infections, neuropathy, retinopathy, arterial disease eg MI or claudication and skin manifestations like necrobiosis lipoidica (shiny areas on shins with yellowish skin and telangiectasia), fat necrosis, granuloma annulare.

2.6 Diagnosis

Diagnosis depends on the above signs and symptoms, and laboratory investigations that detect the presence of persistently high glucose in urine and blood. Based on the fasting plasma glucose concentration, a value above 7mmol/L indicates diabetes; whereas above

6mmol/L defines impaired fasting glucose. A single very high value > 15mmol/L in a symptomatic patient is diagnostic and >7mmol/L but < 11.1mmol/L indicates impaired glucose tolerance.

Diagnosis of DM

1. Fasting venous plasma glucose >7.8mmol/l on two occasions.
2. Glucose tolerance test (GTT): fasting glucose > 7.8mmol/l and /or 2h glucose $\geq$ 11.1mmol/l.
3. Glycosuria: should prompt further investigation even if symptomless (sensitivity 32%, specificity 99%). 1% of general population has low renal threshold for glucose.

• WHO diagnostic criteria for diabetes mellitus

Two fasting glucose estimations	
<6mmol/l	DM Excluded
>6mmol/l but <7.8mmol/l	Impaired glucose tolerance (IGT)
>7.8mmol/l	Diabetes mellitus
Oral glucose tolerance test	
Fast patient overnight and give 75g of glucose in 300ml water to drink. Venous plasma glucose measured before and 2h after drink. DM diagnosed if fasting glucose >7.8mmol/l and /or 2h glucose >11.1mmol/l Impaired glucose tolerance diagnosed if fasting glucose $\geq$6 but <7.8mmol/l and/or 2h glucose >7.8mmol/l and >11.1mmol/l.	

(American Diabetes Association criteria) & (WHO Diabetes criteria, 2006)

2.7 Management of diabetes mellitus.

Prevention of related complications is the need to understand how people feel about having this disease and its impact on their lifestyle (Sutton et al. 2000). Different authors urge a holistic approach to diabetes care where the whole patient, including all his emotions, fears and worries is the centre of attention (Wikblad 1991). In the empowerment process, the involvement of social support from family, friends and employers is important in reducing stress (Anderson et al. 2000), improving coping capability (Lazarus, 1984) and enhancing the perceived self-efficacy of patients to manage their DM (Bandura 1995).

Resources to treat patients living with diabetes in Uganda pale in comparison to HIV/AIDS resources (Boaton et al, 2010). It is important that people with diabetes understand their condition and learn to handle all aspects of their management as comprehensively and quickly as possible. This can be achieved by a multidisciplinary team including doctor, dietitian, and specialist nurse and podiatrist in the outpatient setting. The treatments or interventions for diabetes mellitus are grouped into three major categories namely, diet and exercise, oral medication and insulin.

Oral medication is also grouped into two major categories, that is, Sulphonylureas and Biguanides. (Diabetes UK, 2004) and (Otim et al, 1998).

Diet and Exercise

Diet and exercise is the 'first- line' treatment for diabetes mellitus. Prevention of diabetes mellitus: reality or dream? Today, there is lack of knowledge about how to prevent Type 1 DM and what the presence of one or more auto antibodies implies for its later incidence. There are several experimental investigations of treatment on an immunological basis, but more knowledge is still needed about the importance of different auto antibodies and their roles in the development of Type 1 DM (Groop & Melander, 2001).

Based on knowledge from previous studies, there is consensus on the value of physical activity and exercise in Type II DM. Most patients with Type II DM are obese and have disturbances in lipid metabolism; many are also affected by hypertension (Scherste'n, 1997). Physical activity and dietary adjustments can favorably influence these conditions (Tuomilehto et al, 1992) and (Tuomilehto et al, 2001).

A healthy diet and exercise resulting in reduced energy intake and increased energy expenditure provide the logical means of prevention (Zimmet, 1995). Thus, prevention of Type II DM is a reality and not a dream. A diabetic person has to eat a diet low in fat, high in fiber, and with plenty of starchy foods, fruits and vegetables and should exercise regularly. This reduces the weight, which will help reduce the blood glucose/sugar and risk of having heart attack or stroke (Tuomilehto et al, 2001).

Metformin (Glucophage)

Metformin is a 'biguanide' medicine. It lowers blood glucose mainly by decreasing the amount of glucose that the liver releases into the bloodstream. It also increases the sensitivity of the body's cells to insulin (so more glucose is taken into cells for a given level of insulin in the bloodstream.). Metformin is the first tablet advised if the blood glucose level is not controlled by diet and exercise alone. It is particularly useful if the person is overweight because it is less likely to cause weight gain. It does not also cause hypoglycaemia (low blood glucose level).

Sulphonylurea

There are several types of sulphonylurea medicines and include: Glibenclamide, Gliclazide, Glimepiride, and Glipizide. They work by increasing the amount of insulin the pancreas produces. A sulphonylurea is used if someone cannot take metformin (because of side effects or other reasons), or if the person is not overweight (textbook of medicine, 2002).

Insulin

There are different types of insulin, which include among others, lente, soluble and mixtard, which is a mixture of the first two. Insulin injections lower blood sugar. Only some people with Type II diabetes need insulin, this is when the blood glucose is not well controlled by tablets oral medications (Sulphonylureas and Biguanides). Insulin is sometimes used alone or with oral medications (WHO, 1998).

2.8 Complications of diabetes mellitus

Complications of DM can be classified into acute and chronic complications. Acute complications include Diabetic Ketoacidosis (DKA), Hyperglycemic Hyperosmolar Non ketotic

coma (HONK), Hypoglycemic coma and Lactic acidosis. Chronic complications can be grouped into vascular (micro vascular and macro vascular) and non vascular.

Insulin-treated patients still have a considerably reduced life expectancy. The major cause of death in treated patients is due to cardiovascular problems (70%) followed by renal failure (10%) and infections (6%). There is no doubt that the duration and degree of hyperglycemia play a major role in the production of complications. Better diabetic control can reduce the rate of progression of both nephropathy and retinopathy (Frank RN, 2004)

Diabetic neuropathy.

Diabetes can damage peripheral nervous tissue in a number of ways. The vascular hypothesis postulates occlusion of the vasa nervorum as the prime cause. This seems likely in isolated mononeuropathies, but the diffuse symmetrical nature of the common forms of neuropathy implies a metabolic cause. Since hyperglycaemia leads to increased formation of sorbitol and fructose in Schwann cells, accumulation of these sugars may disrupt function and structure (Mitch, 2004).

Autonomic neuropathy

Asymptomatic autonomic disturbances can be demonstrated on laboratory testing in many patients, but symptomatic autonomic neuropathy is rare. It affects both the sympathetic and parasympathetic nervous systems and can be disabling (Diabetes Control and Complications Trial Research Group, 1993).

The cardiovascular system.

Vagal neuropathy results in tachycardia at rest and loss of sinus arrhythmia. At a later stage, the heart may become denervated (resembling a transplanted heart). Cardiovascular reflexes such as the Valsalva maneuver are impaired. Postural hypotension occurs owing to loss of sympathetic

tone to peripheral arterioles. A warm foot with a bounding pulse is sometimes seen in a polyneuropathy as a result of peripheral vasodilatation (Colhoun et al, 2004).

2.9 Prevention of diabetes mellitus

Today, there is a lack of knowledge about how to prevent, type 1 DM and what the presence of one or more auto antibodies implies for its later incidence. There are several experimental investigations of treatment on an immunological basis, but more knowledge is still needed about the importance of different auto antibodies and their roles in the development of Type 1 DM (Atkinson et al, Maclaren 1994

Type II DM is obviously heterogeneous and probably multigenetic, with a complex aetiology (Scherste'n, 1997). Based on knowledge from previous studies, there is consensus on the value of physical activity and exercise in Type II DM. Most patients with Type II DM are obese and have disturbances in lipid metabolism; many are also affected by hypertension (Scherste'n, 1997). Physical activity and dietary adjustments can favorably influence these conditions (Tuomilehto et al, 2001).

It was recently shown that the risk of DM was reduced by 58% in an intervention group of patients with impaired glucose tolerance (Tuomilehto et al, 2001). Reduction in the incidence of DM was directly associated with changes in lifestyle. A healthy diet and exercise resulting in reduced energy intake and increased energy expenditure provide the logical means of prevention. Thus, prevention of Type II DM is a reality and not a dream (Tuomilehto et al, 2001).

Health promotion

The original meaning of the concept of prevention is to stop the development of a disease before it occurs, but it has now come to include measures aimed at preventing or slowing down the progression of an established disease .(Leininger, 1991).

Primary prevention includes both general prevention directed towards a population (health promotion) and more specific protective measures including immunization, environmental health and control of exposure to ailments. The concept of health promotion also includes the need to change lifestyle, as well as the prerequisites of life in order to promote or favour health. Thus, health promotion should be seen as a transmitting strategy between people and their

environment. It synthesizes personal choice and social responsibility for health. Basic resources for health, according to this concept, are income, housing and food (Mackintosh, 1996).

Preventive activities must be directed at the entire society and the entire population via community intervention programmes, and need to be integrated with measures directed against other diseases such as hypertension and cardiovascular disease (Eriksson et al, 2001). The projected dramatic increase in incidence and prevalence of DM requires population-based activities directed at the society as a whole, as well as international co-operation (Zimmet et al, 2001).

Primary preventive measures in a high-risk strategy are directed at individuals with increased risk of developing Type II DM, such as those with impaired glucose tolerance, obesity, insulin resistance, established coronary heart disease, dyslipidaemia, hypertension, familial DM and gestational diabetes mellitus. Intervention may be directed entirely towards behavior and lifestyle changes, or combined with pharmacological agents (Scherstén, 1997).

Early detection of DM and early treatment of the disease can further reduce the societal loading of Type II DM and its complications. Recommendations have been made for assessing blood glucose in all individuals over 45 years of age at intervals of 3 years, and earlier or more frequently in risk groups (ADA, 1997). Also, early detection and aggressive management of the metabolic syndrome should be stressed; this might have a significant impact both on the prevention of Type II DM and on cardiovascular disease globally (Zimmet et al, 2001).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter describes how the research was carried out and including study design, study population, sampling techniques, research tools, data collection, ethical considerations, and study limitations.

3.2 Study design

The study was a descriptive cross sectional approach involving extraction of information from the record using data collection tools and some patients were asked to establish risk factors and complications associated with diabetes mellitus.

3.3 Study Area

The study was carried out at Ishaka Adventist Hospital, which is located along Bushenyi-Ishaka Town, Ishaka Municipality. It is found in Bushenyi district-South West of Uganda in Igara County. The hospital is about 350km from the main City Kampala and about 70km from Mbarara. It has the departments of internal medicine, paediatric, surgical, reproductive health, and the special clinics including ENT, ophthalmology, Dental, orthopedics and HIV. However, it does not have clinics handling diabetes or hypertension. The hospital receives averagely above 30000 patients per year. It received 23773 patients from July 2012-June 2013. 14277 adult patients were seen as outpatient cases, 1089 patients were admitted, out of which 208 patients were in medical ward, 175patients were in surgical ward, 268patients were in paediatric ward, 278 patients were in obstetrics and gynecological ward, 59 patients in accident and emergence unit, and 101 patients in private wing.

3.4 Study population.

The study targeted patients of all age groups attended the clinic and made use of monthly records of non diabetic and diabetic patients held in medical registers in the department.

3.5 sample size and sample technique

The sampling technique was by counting the number of patients who visited the hospital from November 2012 to June 2013, out of which all diabetic patients found in the study period formed sample size and fraction of the DM patients was calculated.

3.6 Inclusions and Exclusion Criteria

All age groups of patients seen in medical outpatient during the study period were considered in the study.

Exclusion.

Patients admitted before November 2012 and after June 2013 were not included because;

- They were not in the study period.

- Of difficulty in tracing the files.

Also excluded were complication admitted in the other wards eg. Diabetic foot cases in the surgical ward.

3.7 Data collections

Study subjects were obtained by counting all patients seen in the study period and calculating the fraction of the DM patients. This was collected by extracting the information from the patients' records and the information was filled in the data collection tools prepared for that purpose. The types of the data included socio demographic, treatment offered, types of diabetes, the complications of diabetes and risk factors for DM. therefore, some questionnaires were prepared to interview DM patients who were attended to during study period to establish the risk factors. All patients in medical outpatient were included until the desired sample was obtained.

3.8 Data Analysis

This was done by checking the completeness of the data collection, sorting data collection tools and frequencies were calculated using calculator and represented in statistical manner, using Pie charts, graphs, and tables. Manual analysis was used and the baseline outcomes were summarized using descriptive summary.

3.9 Ethical considerations

Permission to do this research was obtained from institutional review board (IRB) of Ishaka Adventist Hospital, and the department of internal medicine for the access of the records and interviewing some patients being attended to. Informed consent was obtained from every patient before interviewing. The information obtained was confidential, and only used for research purpose. No patient's name was therefore mentioned.

3.10 Limitations

Limitations to this study included improper record keeping, and incomplete information about patients in the record.

CHAPTER FOUR

PRESENTATION OF THE DATA COLLECTED

In order to establish the prevalence, risk factors and complications of DM, the data was collected basing on the objectives. This chapter is a **representation** of the data collected from records and 50 patients interviewed.

PRESENTATION

PREVALENCE Medical outpatient department (MOPD) received about 325 patients from December 2012 to July 2013. Out of which, 65 (19.8%) were diabetes patients and were treated. Basing on working diagnosis and the mode of treatment offered, 59 (90.7%) of the patients had type II DM and 6 (9.3%) patients had type I DM, but there was no proved. Also among 20 patients interviewed for risk factors, 2(10%) had type I and 18 (90%) had type II, according to their medical forms.

Majority of them were treated as outpatient cases but 44 patients were admitted out of which one died. However, the admission could not be proved whether it was due to DM, or its complications. The study found out that age group with DM was from 13-96 years old.

Table 1: Shows the number of Dm cases as per the records and per 20 patients interviewed.

Total No. of patient counted in records December 2012-July 2013	No. of DM patient	Type I DM	Type II DM	No. of DM patient interviewed in June 2013.	type I	type II
325	65	6	59	20	2	18

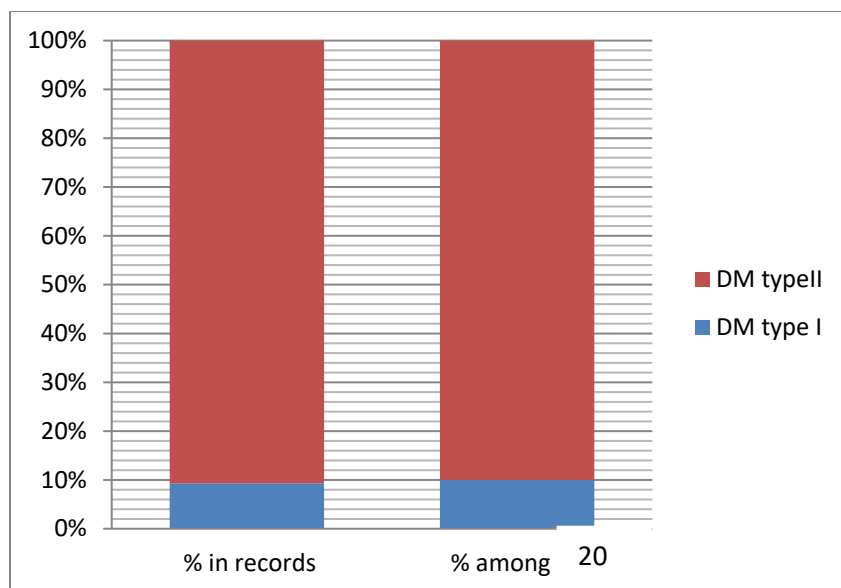


Figure 1: the percentages of type I and II DM in records and among 20 patients interviewed.

AGE DISTRIBUTION

The prevalence was distributed according to age found in records and among 20 patients interviewed for risk factors, as seen below in tables 2a and 2b respectively. .

Table 2: Shows DM frequencies found in records according to age groups

Age range(yr)	Frequency
10-19	5
20-29	3
30-39	4
40-49	9
50-59	20
60 and above	24

Table 3: The Frequency in 20 Patients in various age groups

Range of age (yr)	Frequency
10-20	2
21-30	3
31-40	4
41-50	5
>50	6

The cumulative frequency of the DM is illustrated in figure1 below.

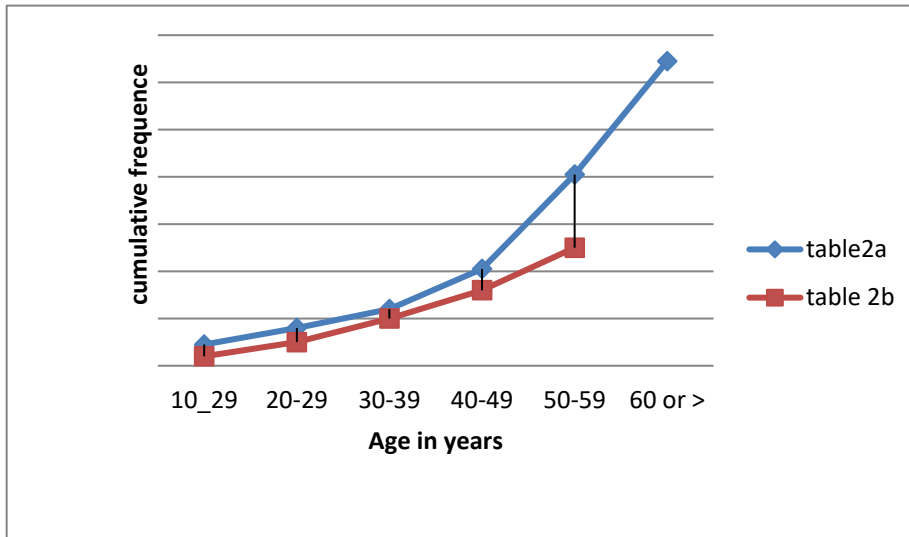


Figure 2: cumulative frequency against age of patients with DM in records and those interviewed

SEX DISTRIBUTION

There was variation in the distribution of DM according to sex among the 20 patients interviewed during the study and those in the records, as illustrated in table 3a and 3b respectively.

Table 4: DM among the 20 patients studied according to sex

No. of DM patient	Male	Female
20	8	12
% of DM patients	40	60

Table 5: distribution of DM in the records according to sex

Total No. of DM patients	Male	Female
65	22	43
% of DM patients	33.8	66.2

RELIGION

7 of the DM patients belonged to Islamic, 13 of them were Christians, of which 8 patients had positive history of alcohol consumption especially local brews before the diagnosis of DM. Others took for 5 to 10 years. 5 patients reported no history of alcohol consumption. 8 of the patients reported history of cigarette smoking for at least two years. Out of 7 Muslim patients, 3 reported alcohol intake and 4 had no history of alcohol, 4 had history of cigarette smoking.

Table 6: religion in relation to alcohol consumption and cigarette smoking

Religion	No. of patient	Alcohol intake	No alcohol	Smoking
Christian	13	8	5	8
Islam	7	3	4	4
Total	20	11	9	12
%ages		55	45	60

OCCUPATION

It was found that out of 20 patients interviewed, 16 of them were peasant farmers, 2 were civil servants and 2 were labeled as others which included businessmen and women (shopkeepers), the aged, and the disabled

EDUCATIONAL LEVEL

The patients attained different educational levels, 2 patients did not have access to education, 14 of them attained primary, 3 attained secondary and 1 attained tertiary level. Out of 14 patients who stopped in primary, including those who never had access to education, 12 of them reported their drugs usually get finished and sometimes they had no enough money to refill.

Table 7: education level attained by patients interviewed

Level of education	Number of patient
Non	2
Primary	14
Secondary	3
Tertiary	1

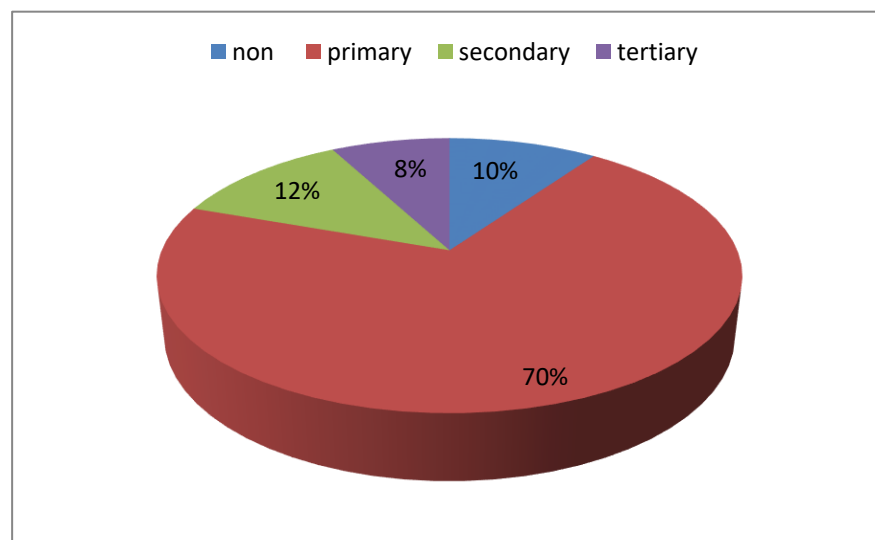


Figure 3 - level of education attained by the 20 patients under the study.

RISK FACTORS

MARITAL STATUS

16 of the DM patients interviewed were married with average number of children of 8. Most patients aged 50 and above had their children either completed their studies or dropped out at various levels due either to tuition fee or other reasons. Those below 50 years had their children either still studying or dropped out at various levels due to the same reasons above.

FAMILY HISTORY OF DM

The study shows that there were 12 DM patients (60%) with positive family and 8(40%) of them had negative family history of DM.

EXERCISE

Majority (14) reported no any spotting activity before, although they used to do physical activities, like digging, doing other domestic works and most of them were footing. 4 of them reported that they were doing regular exercise. 2 reported neither physical activities nor exercise and all of them were either obese or overweighted. Hence, it is consistence with Okware (2006) who said people are changing their lifestyles. Many no longer get enough exercise: they do not work, and instead of walking they are driven in cars.

WEIGHT

All the 20 patients involved in the study did not know their weights. Therefore, they were weighed during the study period, their heights were measured and body mass indices were calculated using formula $BMI = \text{weight (kg)} / \text{height (m)}^2$. It was found that 2 males and 2 females had normal weight. 2 males and 6 females were overweighted. 3 males and 5 females were obese. The body mass indices were found to vary among the sexes. These are illustrated graphically in figure4 below.

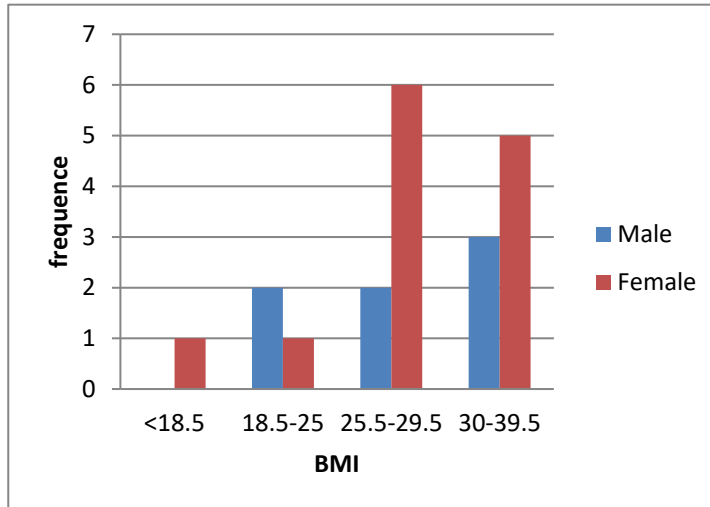


Figure 4 - frequencies against body mass indices in the two sexes

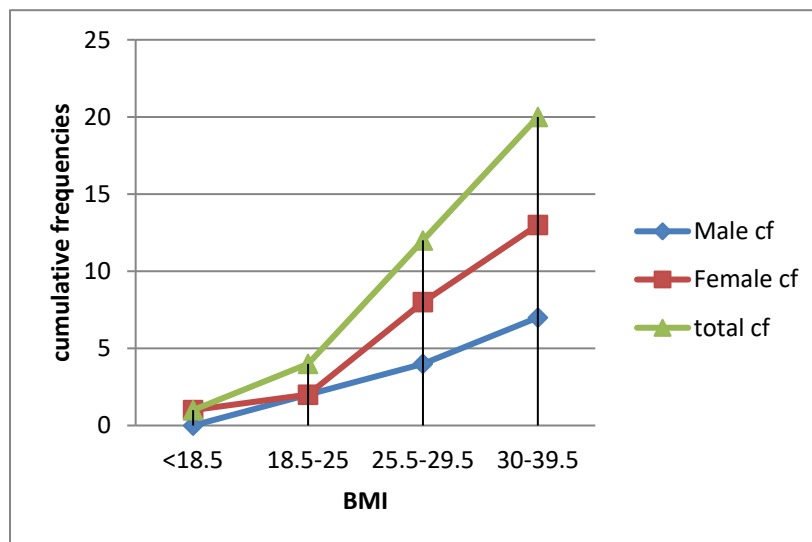


Figure 5 - Cumulative frequencies for both sexes and total cumulative frequencies with BMI

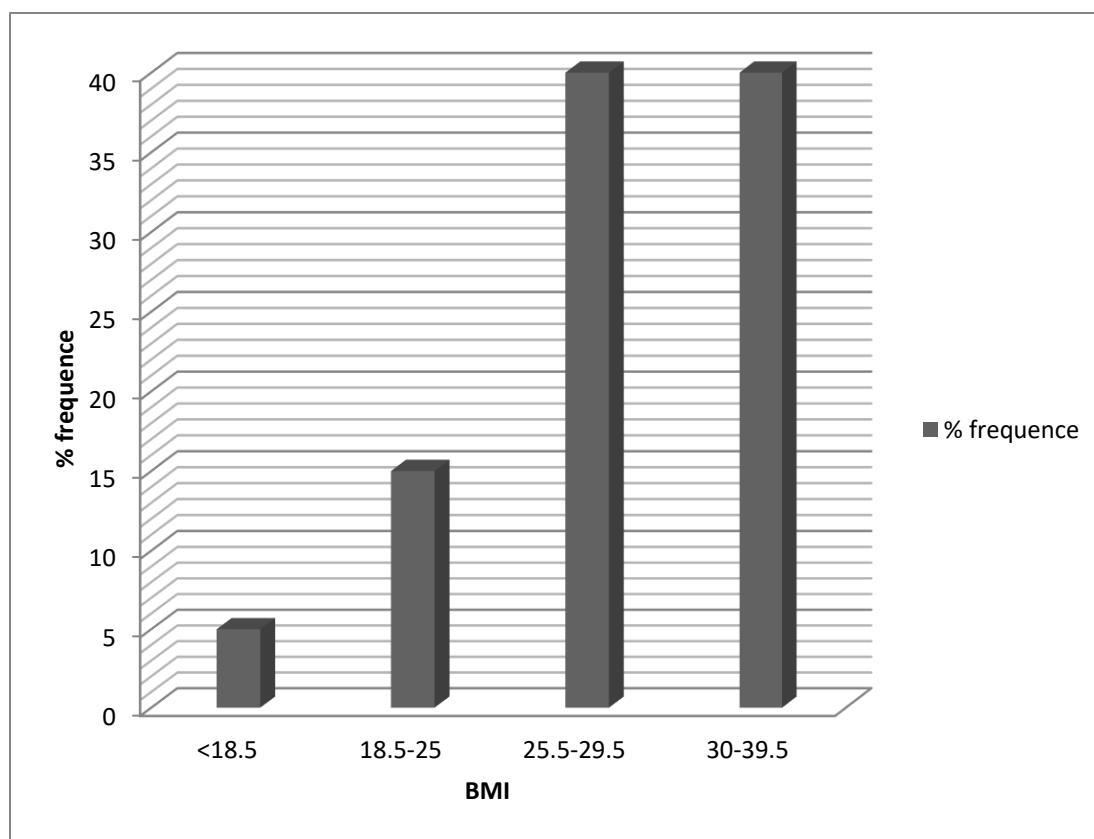


Figure 6 - % frequencies of DM with body mass indices

ALCOHOL AND SMOKING

Out of 20 patients, 13 of them had positive history of alcohol consumption especially local brews before the diagnosis of DM. Most took for 5-10years. 7 patients reported no history of alcohol consumption. 10 of the patients reported history of cigarette smoking for at least two years.

DIET

All kinds of foods available were eaten, including fats and all types of meat. Majority were not able to differentiate between red meat and other meats.

COMPLICATIONS

In the study, most of the patients were found to have other conditions reflected in the records and among the 20 patients interviewed. These include hypertension, blurring of vision, gastritis, heart

failure, renal failure, and urinary tract infections. The prevalence and the percentage prevalence are illustrated below.

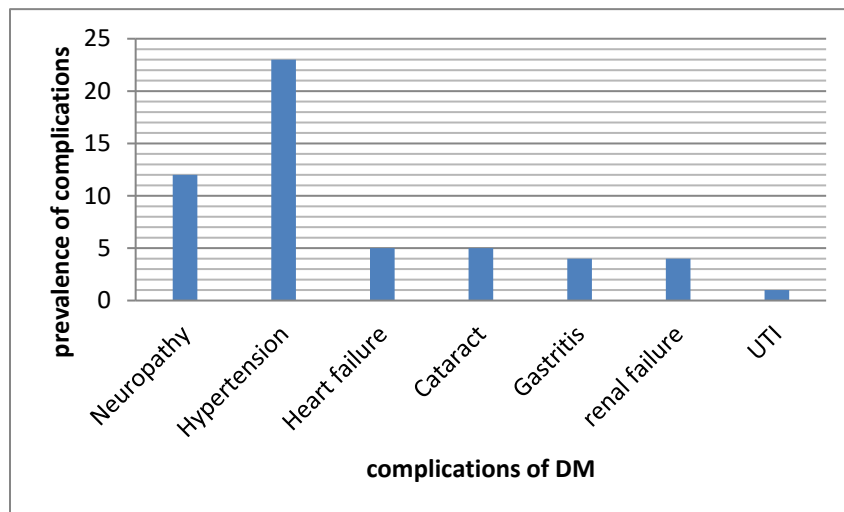


Figure 7 - complications of DM in the record

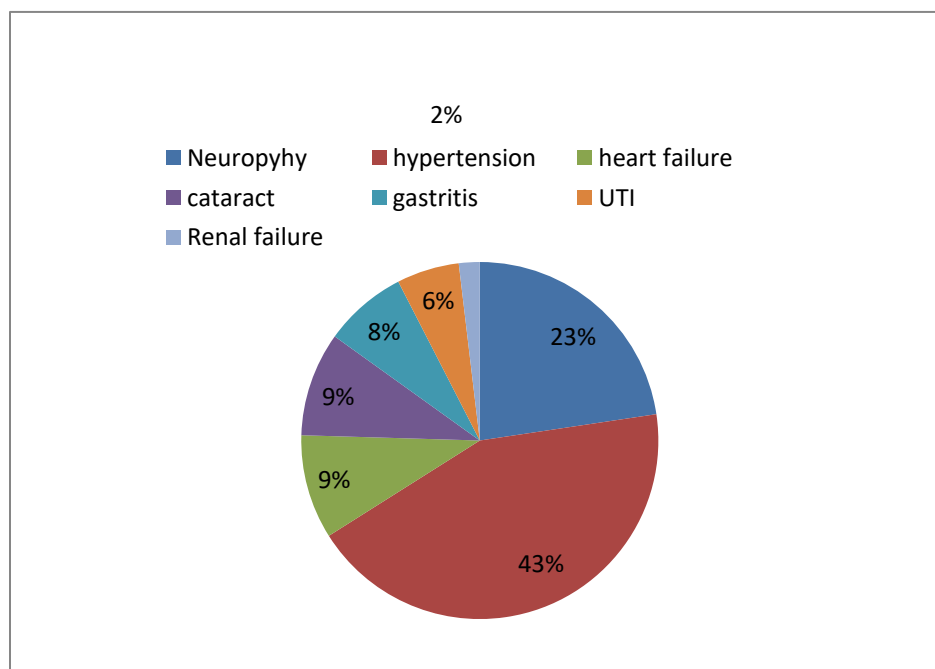


Figure 8 - percentage prevalence of co-morbidities/complications associated with DM in the record.

Out of 23, 3 patients had both hypertension and heart failure as the complications of DM. 5 of the patients had only heart failure as complication. However, it was not possible to establish whether some of these came before DM diagnosis or after.

The results indicate that Hypertension, blurring of vision, gastritis and peripheral neuropathy are the most common complications associated with diabetes mellitus among the 20 patients interviewed. These are illustrated in figure5c.

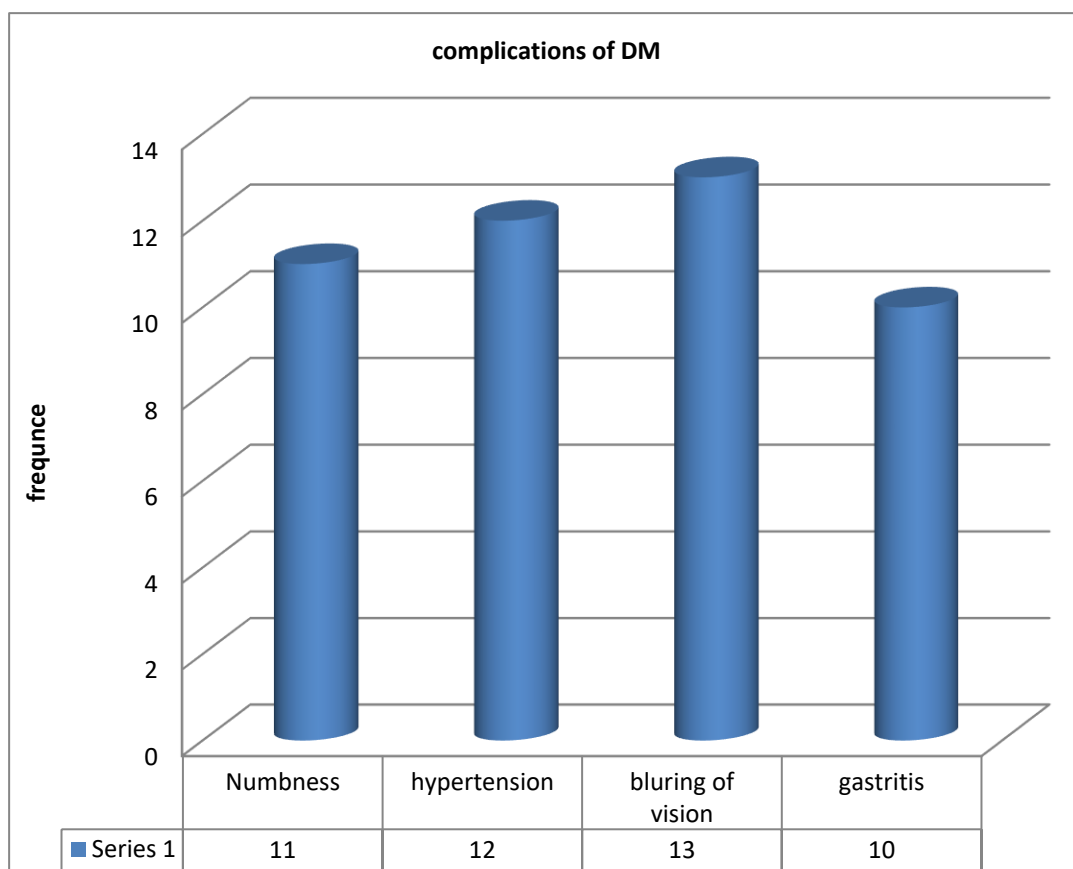


Figure 9 - frequency of DM patients with different complications among 20 patients interviewed.

CHAPTER FIVE

DISCUSSION OF THE RESULTS

As seen in the research findings, MOPD received 325 patients from November 2012- July 2013. However, some of them might have been re-attendance with the same condition. Out of these patients, 65 were found to have diabetes mellitus. This represented 20 % of the attendance. All the re-attendance and re-admissions among DM patients were controlled by not recounting them. Therefore, if re-attendance due to other conditions were also controlled, the percentage of diabetes would be more.

TYPE OF DM

The research found out that 90.7% of the patients had DM type II and 9.3% with type I DM in the records and among 20 patients interviewed, 90%(18) had type II and 10% (2) with type I. This was in line with International diabetes federation (2003), which states that type II is a common and serious global health problem which is associated with rapid cultural and social changes, ageing populations, increasing urbanization, dietary changes, reduced physical activity and other unhealthy, lifestyle and behavioral patterns.

AGE DISTRIBUTION

The records also showed that patients aged 60 years and above were more affected than those aged 50-59 years, which in turn more affected than those aged 40-49 years and so on. Therefore, the prevalence of DM increased with increase in age as seen in table2a. American Diabetes care (1997) noted that type II diabetes is more common in older people especially women who are overweight. This trend was also consistent with findings among 20 patients interviewed, which is illustrated in table2b. This is due to the fact that type II DM is more common in people above 40 years of age. As seen in the above paragraph, type II DM is more prevalent than type I which mostly affect people below 40 years of age.

SEX DISTRIBUTION

This showed that females were affected more than male with 60% and 40% in the records respectively. The same trend was noted among 20 patients interviewed with 65% and 35% females and males respectively. This could be due to body fat distribution between the two sexes. This may lead to insulin resistance in females with more body fats than males. Besides males are more involved in physical activities than females. This helps in the utilization of body fats.

RELIGION

It was found that out of the 20 patients, 7 of them were Muslims and 13 were Christians. 3 out of those belonging to Islamic religion had history of alcohol intake and 4 had history of cigarette smoking before diagnosis. Among Christians, 8 admitted taking alcohol and 8 had history of cigarette smoking before diagnosis of diabetes. Therefore, Christians were more affected than Muslims. This means about 3 times as many Christians as Muslims had history of cigarette smoking and alcohol consumption.

EDUCATION LEVEL

Out of the 20 patients, 2(10%) did not have access to education, 14 (70%) attained primary level of education, 3 (12%) attained secondary level and 1 (8%) attained tertiary level. This in a way affected them because educated people understand the condition and stand better changes of life style modification, like what to eat to remain healthy, importance of exercise, and weight loss. Besides, others reported that sometimes they could run short of medications. That meant adherence to medication was also poor. This might lead to serious complications as seen among those patients.

FAMILY HISTORY

12 (60%) of the 20 patients had positive history of DM. This is in line with it being one of the risk factors for DM especially type II. However, 8 (40%) of them reported negative family history but other risk factors might have contributed.

EXERCISE

Although most of these patients were peasant farmers and they mostly do physical work, majority reported that they did not have sporting activity. Lack of exercise can lead to obesity, predisposing a person to DM due to insulin resistance.

BODY WEIGHT

20 patients interviewed did not know their weights and were not taking their weights regularly. As a result, they were all weighed and it was found that, among them, 7 (35%) of them were obese with the body mass indices ranged from 30-39.5. 8 (40%) of them were overweighted with body mass indices ranged from 25.5 to 29.5. Out of these, number of obesity was found to be more in females (5) than males (3). Similarly, more females (6) were overweighted. This was consistence with Ogwang (2009) who said about 70% of those who suffer from type II diabetes are either over weighed or obese. This could partly explain why DM is more prevalent in females than males, seen above.

SMOKING AND ALCOHOL

13 (65%) of the patients gave positive history of alcohol (local brews) consumption for a period of between 5 to 10 years and 7 (35%) of them had positive history of cigarette smoking for at least 2years, as WHO, (2000) revealed that another prognostic factor that is associated with increased risk of Type II diabetes is smoking. The alcohol consumption and cigarette smoking were seen more common among Christians than Muslims. Therefore, it could either be religious influence or personal individual decision to either take alcohol or smoke cigarette or not. However, religious influence on a person's behavior has long been noted. Hence, variation in the risk factors.

DIET

Majority of the patients did not know how to differentiate fatty food which could contribute to obesity and the food required for healthy life. This, with other risk factors, could have resulted into the abnormalities of body mass indices observed when weights were taken.

COMPLICATIONS

Among 65 DM patients in the records 43% of them had hypertension, 22% had peripheral neuropathy. Heart failure, cataract, and gastritis accounted for 9% each and 7% urinary tract infection. Also among the 20 patients interviewed, 33% was found to have blurring of vision, 30% had hypertension, 28% with peripheral neuropath, and 26% had gastritis. This was consistence with the fact that DM leads to sodium retention and altered vascular reactivity (atheromas narrow the blood vessels' lumen), resulting into hypertension.

Peripheral neuropathy and blurring of vision (cataract) probably due to deposition of sarbitol in the peripheral nerves and the eye lens, resulting into destruction of the nerves and interfering with the integrity of the eye lens.

Heart failure could have resulted from myocardial ischemia due to autonomic damage or could be secondary to hypertension.

Gastritis could be a result of deposition of atheromas in the celiac trunk supplying the stomach or to the mesenteric blood vessels occluding them. This results into ischemia and sometimes necrosis. So patients may present with epigastric pain or angina-like abdominal pain.

DM also lowers down immune system and creating good ground for opportunistic infections to flare. Therefore, urinary tract infections and candidiasis are common.

All these could have been due to poor glycaemic control and was mostly reported among those with poor adherence. However, this is not a conclusion that any patient with one of these conditions must have DM. It was not possible to establish whether these co-morbidities came before the diagnosis of diabetes or after especially among patients in the records.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with conclusions derived from the research and recommendations made which, if put in place could benefit the community.

6.1 CONCLUSIONS

There are a lot of conclusions to draw from this study, among which are the following. Prevalence rate of DM being one of the non-communicable diseases is high at Ishaka adventist hospital. But no comparable research had been done before. Therefore, more research is needed to establish whether the prevalence rate is increasing or not.

The prevalence of DM is higher in people 40 years of age and above compared with its prevalence in people below 40years of age.

Obesity and overweight are threads to health of majority of people especially women and they are more affected than their men counterparts.

Type II diabetes mellitus is more common among patients than type I, probably due to lifestyle changes among these patients.

Hypertension is more common among patients with diabetes mellitus than other complications

About 3 times as many Christians as Muslims had history of cigarette smoking and alcohol consumption. Therefore, when other risk factors are also present, they are at higher risk of getting DM.

Majority of patients were poorly adhering to their diabetes medications.

6.2 RECOMMENDATIONS.

Administration of Ishaka Adventist Hospital should if possible establish diabetes clinic and employ diabetes specialists to handle these vulnerable patients.

It would be appreciated if Ishaka Adventist Hospital could offer a course in diabetes as one of the specialties. This would attract some interested students to enroll so that diabetes specialists are produced to handle this “silent killer.”

Local community should be health educated through community outreaches about the dangers of diabetes and modifiable risk factors as an initial management of diabetes mellitus.

Government and other health agencies should make health policy to include non-communicable diseases among the priority diseases in Uganda.

Researchers are invited to research in the following areas;

- Patients' adherence to diabetes medication.
- Knowledge and attitude of people about diabetes mellitus in this community.
- Prevalence of obesity among residents of this community.

Above all, diabetes is likely to reach epidemic proportion in the next decade or so unless attention it deserves is granted.

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ANNEX I

Data collection tool.

No. of patient.	1	2	3	4	5	6	7	8	9	10
Age										
Sex										
Type of DM. -I										
-II										
Others....										
Mode of Treatment. -Admitted										
-As OPD										
Outcome. -Alive										
- Died										
Co-morbidity - HTN										
- HF										
Others.....										

ANNEX II

Questionnaire

You are kindly requested to fill in the following spaces or answer by putting a tick in one of the alternative boxes provided for each of the questions below. The information is confidential, so no name should be written in the questionnaire.

1. Age of the patient.....

.....

2. Sex. Male ☐ female ☐

3. Religion i) Islam ☐ ii) Christian ☐

4. Occupation i) peasant farmer ☐ ii) civil servant ☐ iii) others specify.....

5. Education level i) primary ☐ ii) secondary ☐ iii) tertiary ☐

Exercise assessment

6.a) How far is your work place from home? I) <1km ☐ ii) 1km ☐ iii) >1km ☐

b.) What means of transport do you use? i) Footing ☐ ii) motorcycle ☐ iii) bicycle ☐

iv) Others specify.....

c.) What is the longest distance you usually cover footing per day?

.....

d) Is there any sporting activity you do? I) yes ☐ ii) no ☐ iii) not applicable ☐

e) Please list them if any

.....
.....
.....
.....
.....

Other than sporting activity, are there any other physical works you do regularly? I) yes ☐

No ☐

Please name

them.....

Nutritional assessment

7. a) What were the commonest foods you were eating before diagnosis?

i) Protein (milk, red meat, leguminous) ☐

ii) Carbohydrate (sugar, cereals, potatoes, cassava matoke) ☐

iii) Vegetable (fruits, greens) ☐

b) How often were you taking milk and sugar? I) daily ☐ ii) weekly ☐ iii) monthly ☐

c) What type of drinks were you taking most? i) Soda ☐ ii) beer ☐ iii) local brews ☐

iv) others.....

d) How often were you taking the above drink? I) daily ☐ ii) weekly ☐ iii) occasionally ☐

e) Averagely, how much do you drink per sitting? I) 1-2 bottles ☐ ii) 3-5bottles ☐

iii) >5bottles ☐

f) For how long have you been drinking? I) 2months -1year ☐ ii) 2-5years ☐ iii) 6-10years ☐

iv) >10years ☐

g) Have you ever smoked cigarette? I) Yes ☐ ii) no ☐

h) if yes, for how long? I) 1yr ☐ ii) 2-5yrs ☐ iii) 6-10yrs ☐ iv) >10yrs ☐

STRESS ASSESSMENT

8. a) Are you a married person? I) yes ☐ ii) no ☐

b) If yes how many children do you have?

c) Are they all at school? I) yes ☐ ii) no ☐

d) If yes how do you get money for their fees?

e) If no why?

.....
.....

f) do you think what you get is enough to support your family?.....

h) How is your social relation with the people around you? I) good ☐ ii) poor ☐

i) Was there any life events that usually give you a lot of stress? I) yes ☐ ii) no ☐

j) if yes please list them

.....
.....
.....
.....
.....

j) How have you been managing these problems?

.....
.....
.....
.....

Family history

9. a) Do you have any relative with/who has died of diabetes ? I) Yes ☐ ii) No ☐

b) If yes, what is the exact relationship between you and the family member above?

i) brother ☐ ii) mother ☐ iii) Father ☐ iv) Sister ☐ v) uncle ☐ vi) others ☐

.....

c) When was he/ she diagnosed? i) Was still young ☐ ii) was an adult ☐

10. How often were you taking your weight? I) once a year ☐ ii) Twice a year ☐

Iii) Not at all ☐ IV) others, specify.....

Weigh (kg) Height (m)..... BMI= weight/height (m)².....

11 complications

- Have you ever had operation in the eye or problem of seeing after having been diagnosed with DM? Yes ☐ b) No ☐
- Did you get any wound /ulcer which took long to cure? A) Yes ☐ b) No ☐
- Have you ever been told that you have hypertension? a) Yes ☐ b) No ☐
- Did you at any one time get numbness in your limbs? a) Yes ☐ b) No ☐
- Have you ever experienced passing urine without your control? a) Yes ☐ b) No ☐
- Did you get amputation in any of your fingers/toes? a) Yes ☐ b) No ☐

ANNEX III

Work plan

Month	Dec. 2012	Jan. 2012	Feb. 2013	March. 2013	April 2013	Mayl. 2013	June. 2013	July. 2013
Proposal								
Data collection & analysis								
Report writing								
Submissio n								

ANNEX IV

Budget

ITEM	UNIT COST (Ugsh)	TOTAL COST (Ugsh)
10 pens	300	3000
1 reams of printing paper	16000	16000
1 stapling machine	10000	10000
2 packets of staples	4000	8000
Photocopying		30000
Printing		40000
Binding		20000
Internet charges		20000
Miscellaneous		14700
Total		161,700

MAP OF UGANDA

