

**PREVALENCE OF DIABETES AMONG PATIENTS ATTENDING
KAMPALA INTERNATIONAL UNIVERSITY**

TEACHING HOSPITAL

By

RUJARA SMITH JUNIOR

DCM /0093/143/DU

**A RESEARCH REPORT SUBMITTED TO THE SCHOOL OF
ALLIED HEALTH SCIENCES IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE AWARD OF A DIPLOMA
IN CLINICAL MEDICINE AND COMMUNITY HEALTH
AT KAMPALA INTERNATIONAL
UNIVERSITY, UGANDA**

JULY, 2017

DECLARATION

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

Name.....

Signature.....

Date.....

APPROVAL

This research report on PREVALENCE OF DIABETES AMONG PATIENTS ATTENDING KAMPALA INTERNATIONAL UNIVERSITY TEACHING HOSPITAL has been submitted with my approval as the supervisor.

Mr. Mburugu Martin

Signature.....

Date.....

ACKNOWLEDGEMENT

My sincere appreciation goes to KIU faculty of Allied health sciences, my lecturers, my supervisor Mr. Mburugu Martin for modelling me, mentorship and exposing me to knowledge and skills during the course of this study. To my classmates, this far I have reached through the daily interaction and a healthy competition.

DEDICATION

To God for having brought me this far, my father Mr. Kimara Patrick, my mother Mrs. Kimara Sharon, my wife Serena Sylvia and two sons Keith Tusiime and Gabriel Murungi, my sisters Kobusingye Lillian and Komuhendo Majory who guided me, supported me and encouraged me when things looked tough and not forgetting my lovely friends.

Table of Contents

DECLARATION	i
APPROVAL	ii
ACKNOWLEDGEMENT	iii
DEDICATION	iv
LIST OF TABLE(S) AND FIGURE(S).....	viii
LIST OF ABBREVIATIONS /ACRONYM	ix
ABSTRACT	x
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background information.....	1
1.2 Problem statement.....	3
1.3 Justification.....	4
1.4 Research questions	4
1.5 Objectives	4
1.5.1 General objective	4
1.5.2 Specific objectives.....	5
1.6 Scope of study	5
1.6.1 Time Scope.....	5
1.6.2 Content Scope.....	5
1.6.3 Geographical Scope	5
1.6.4 CONCEPTUAL FRAMEWORK	6
CHAPTER TWO: LITERATURE REVIEW.....	7
2.1 Introduction.....	7
2.2 Scope and impact of diabetes.....	8
2.3 Causes of Diabetes Mellitus	8
2.4 At Risk Groups.....	9
2.5 Signs and symptoms of diabetes mellitus.....	10
2.6 Diagnosis	11
2.7 Management of diabetes mellitus.....	12
2.8 Complications of diabetes mellitus	13
Diabetic neuropathy.....	14

Autonomic neuropathy	14
The cardiovascular system.	14
2.9 Prevention of diabetes mellitus	14
CHAPTER THREE: METHODOLOGY	15
3.1 Introduction.....	15
3.2 Study design.....	15
3.3 Study Area	15
3.4 Study population and Target population.	15
3.5 Sample size and sample technique	15
3.6 Inclusions and Exclusion Criteria	16
3.6.1 Inclusion criteria	16
3.6.2 Exclusion criteria	16
3.7 Data collection technique	16
3.8 Data Analysis	16
3.9 Data quality control.....	16
3.10 Ethical considerations.....	16
3.11 Limitations	16
CHAPTER FOUR: RESULTS	17
4.1 Prevalence of Diabetes	17
4.2 DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION	17
4.2 RISK FACTORS ASSOCIATED WITH DIABETES MELLITUS IN PATIENTS ATTENDED TO IN THE DEPARTMENT.....	18
4.3 COMPLICATIONS OF DIABETES MELLITUS	19
CHAPTER FIVE	21
DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS.....	21
5.1 PREVALANCE	21
5.2 RISK FACTORS TO DIABETES MELLITUS	21
5.2.1 AGE DISTRIBUTION.....	21
5.2.2 SEX DISTRIBUTION.....	21
5.2.3 RELIGION.....	21
5.2.4 EDUCATION LEVEL	22

5.2.5 FAMILY HISTORY	22
5.2.6 EXERCISE	22
5.2.7 SMOKING AND ALCOHOL	22
5.2.8 DIET	22
5.3 COMPLICATIONS	23
5.4 CONCLUSION	23
5.5 RECOMMENDATIONS.....	24
REFERENCES	25
ANNEX 1: LETTER FOR DATA COLLECTION.....	28
ANNEX II: Data collection tools.....	29
ANNEX III: Table for Determining Sample Size from a Given Population	31
ANNEX IV: MAP OF BUSHENYI	32
ANNEX V: MAP OF UGANDA	33

LIST OF TABLE(S) AND FIGURE(S)

Figure1. The number of DM cases as per 66 patients in records.....20

Table 1. Demographic characteristics of of the study population21

Table 2. Risk factors associated with diabetes mellitus22

Table 3. Complications of diabetes mellitus23

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 Mellitus
NIDDK	Non insulin Dependent Diabetes Known
UTI	Urinary Tract Infection
WHO	World Health Organization

ABSTRACT

Background: In Uganda, the number of diabetics has been increasing over the years since it attained independence. 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, 2007), and an estimated 300 million by 2025 (WHO, 2010).

Study Objective: To determine the prevalence of diabetes mellitus among patients seen in medical ward at Kampala International University Teaching Hospital.

Methodology: The study design used was retrospective type.

Results: The prevalence among 66 patients in the records 14(21.21%) had type I and 52 (78.79%) had type II associated majorly with 40 (60.61) positive family history and 26 (39.39%) of them had negative family history of DM. Also the few patients whose weights were taken and recorded had higher BMI (72.34%)

Recommendations: Administration of KIUTH should if possible establish a diabetes clinic and employ diabetes specialists to handle these vulnerable patients. It would be appreciated if KIU could offer a course in diabetes as one of the specialties. This would attract some interested researchers/students to enrol so that diabetes specialists are produced to handle this “silent killer.”

Conclusion: Type II diabetes was more prevalent with associated factors such as Obesity and overweight which were threats to health of majority of people especially women as compared to their male counterpart which led to complications like Neuropathy, hypertension, blurring of vision, gastritis, cataracts, heart failure, renal failure, and urinary tract infections.

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

CHAPTER ONE: INTRODUCTION

This chapter consists of the background information, problem statement, and objectives of the study, study research questions and the significance of the study.

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, 2009). It is a non-communicable disease attracting the attention of the whole world (Otim, 2008).

Globally, it affected more than 30 million people worldwide (WHO, 2012). 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 (Atlas, 2009).

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. There are more women with diabetes than men. The urban population in developing countries is projected to double between 2000 and 2030 (WHO, 2011). 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, 2014).

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, 2011).

Uganda. During political instability in 1970s, only 254 people who had access to health services were diagnosed in Uganda. They all sought treatment and counselling 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 centres handling diabetic cases countrywide has risen from one to ten (Boston, 2010). The disease is particularly acute among the cattle-keeping people of the south-western 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, 2008).

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, 2008).

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. 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, 2008).

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 % 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, 2008).

1.2 Problem statement

In Uganda, the number of diabetics has been increasing over the years since it attained independence (UDA, 2016). 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, 2007), and an estimated 300 million by 2025 (WHO, 2010). During political instability in 1970s, only 254 people who had access to health services were diagnosed in Uganda. They all sought treatment and counselling 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 centres handling diabetic cases countrywide has risen from one to ten.

The disease is particularly acute among the cattle-keeping people of the western part of the country Bushenyi inclusive 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 (Boston, 2010).

Despite this alarming increase, no sufficient scientific studies have been carried out in Bushenyi found in western Uganda to know the current prevalence, although increasing numbers are being treated in hospitals such as Kampala international university teaching hospital, Ishaka Advantest hospital and Comboni Hospital. This study was to address the issue.

1.3 Justification

There is no scientific study that has been carried out to establish the prevalence of diabetic complications in this institution (to the researcher's best knowledge), the study would therefore help the institution to budget whether to open a diabetes clinic. This would then provide job opportunities to the diabetes specialists. In addition an optimal method to handle diabetic cases would be established and thus help the society and 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.

1.4 Research questions

1. What is the prevalence of diabetes mellitus among patients in medical ward department at Kampala International University Teaching Hospital?
2. What are the factors associated with diabetes mellitus in patients being attended to in the department?
3. What are the complications of diabetes mellitus on the patients attended to in the department?

1.5 Objectives

1.5.1 General objective

To determine the prevalence of diabetes mellitus among patients seen in medical ward at Kampala International University Teaching Hospital from January 2017 to April 2017.

1.5.2 Specific objectives.

1. To assess the prevalence of diabetes mellitus among patients in medical ward department at Kampala International University Teaching Hospital
2. To establish risk factors associated with diabetes mellitus in patients being attended to in the department.
3. To assess the complications of diabetes mellitus on the patients attended to in the department.

1.6 Scope of study

1.6.1 Time Scope

The study was conducted during June, 2017.

1.6.2 Content Scope

The study involved determining the prevalence of diabetes mellitus among patients seen on medical ward at Kampala International University Teaching Hospital.

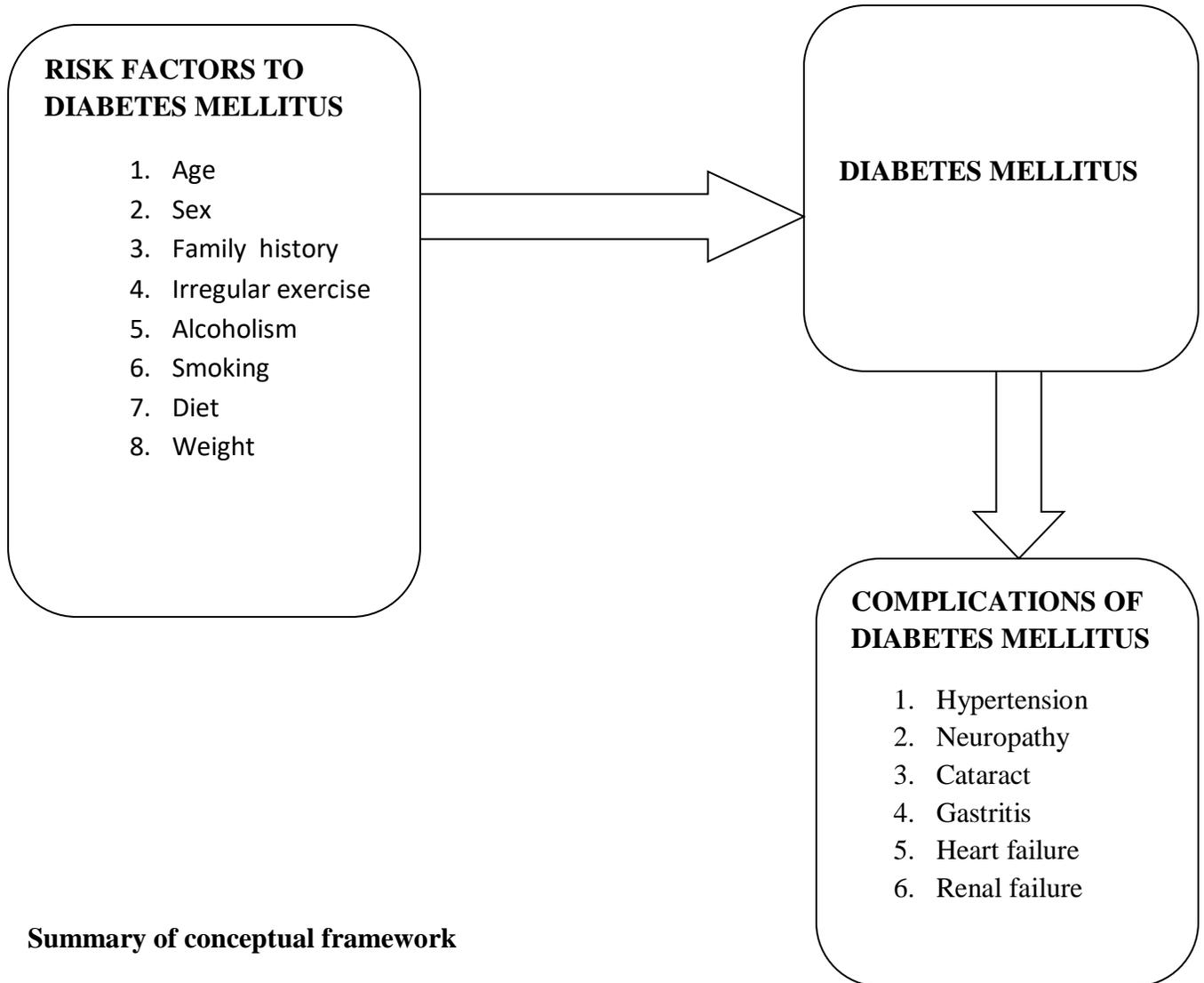
1.6.3 Geographical Scope

The study was conducted at Kampala International University Teaching Hospital, (KIU-TH) in Ishaka-Bushenyi Municipality, Bushenyi District, western Uganda.

1.6.4 CONCEPTUAL FRAMEWORK

INDEPENDENT VARIABLE

DEPENDENT VARIABLES



Summary of conceptual framework

In this study the independent variables were risk factors such as age, sex, family history, irregular exercise, alcohol, smoking, diet, and weight and the dependent variable being Diabetes mellitus. Complications emerged from the condition such as neuropathy, hypertension, heart attack, cataracts, and renal failure. However the major risk factors were family history, weight and irregular exercises. Among the complications hypertension and neuropathy was more dominant among the patients.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Diabetes constitutes a global public health problem. Today about 135 million people are affected (Amos, 2007), and it is estimated that the number in 2025 will be 300 million (WHO, 2008). This global epidemic involves not only the industrialized world but also less developed countries where urbanization and industrialization are proceeding rapidly (Amos, 2007). 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, 2008). More than 75% of the patients who have diabetes mellitus for more than 20 years will have some forms of diabetes retinopathy (WHO, 2012). 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, 2001). The prevalence in other countries is comparable, even in those with newly developing economics like China and India. It was estimated that 26 million 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, 2008). 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 mass 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, 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 are limited in comparison to HIV/AIDS resources (Boston, 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.

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".

Any disruption in this delicate balance creates a chemical imbalance either hypoglycaemia – too low blood sugar level; or hyperglycaemia-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 (Boston, 2010).

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 behavioural patterns. Genetic and environmental factors in the aetiology of type 2 diabetes mellitus (IDF, 2008).

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 (Data, 2009). 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, 2008).

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, 2009). Type I DM occurs equally among males and females, but is more common in whites than in non-whites (Health, 2010). Type 1 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 (Diabetescare, 2014).

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).

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, 2008).

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 (Okware, 2008).

The total number of sufferers is 4% of the total population or 1 120 000 patients. There are 10 centres 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.

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 south-western 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, 2008).

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 behavioural changes patients need to understand. The clinical diabetes conference that took place at Mukono zones 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*, some patients will present with ketoacidosis

Sub-acute = history as above but longer and in addition lethargy, infection (pruritus vulvae, boils).

Complications may be the presenting feature: infections, neuropathy, retinopathy, arterial disease for example Myocardial infarction and skin manifestations like necrobiosislipoidica (shiny areas on shins with yellowish skin and telangiectasia), fat necrosis, granuloma.

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 ≥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 $>7.8\text{mmol/l}$ and /or 2h glucose $>11.1\text{mmol/l}$

Impaired glucose tolerance diagnosed if fasting glucose ≥ 6 but $<7.8\text{mmol/l}$ and/or 2h glucose $>7.8\text{mmol/l}$ and $>11.1\text{mmol/l}$.

(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, 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, 2000) improving coping capability (Lazarus, 2004) Resources to treat patients living with diabetes in Uganda pale in comparison to HIV/AIDS resources (Boaton, 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, dietician, 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 (Otim, 2008).

Diet and Exercise

Diet and exercise is the 'first- line' treatment for diabetes mellitus. (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, 1997). Physical activity and dietary adjustments can favourably influence these conditions (Tuomilehto, 2001).

A healthy diet and exercise resulting in reduced energy intake and increased energy expenditure provide the logical means of prevention (Zimmet, 2015). 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 fibre, and with plenty of starchy foods, fruits and vegetables and should exercise regularly.

Metformin (Gluophage)

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. Metformin is the first tablet advised if the blood glucose level is not controlled by diet and exercise alone.

Sulphonylurea

There are several types of sulphonylurea medicines and include: Glibenclamide, Glimpiride, and. They work by increasing the amount of insulin the pancreas produces. (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. Insulin is sometimes used alone or with oral medications (WHO, 2007).

2.8 Complications of diabetes mellitus

Complications of DM can be classified into acute and chronic complications. Acute complications include Diabetic Ketoacidosis (DKA), Hyperglycaemic Hyperosmolar Non ketotic coma (HONK), hypoglycaemic coma and lactic acidosis. Chronic complications can be grouped into vascular (micro vascular and macro vascular) and non-vascular.

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. The diffuse symmetrical nature of the common forms of neuropathy implies a metabolic cause.

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.

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).(Colhoun, 2014).

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.

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, 1997).

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 by change of lifestyle, strategy between people and their environment.(Zimmet, 2015). 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 (ADA, 2007).

CHAPTER THREE: 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 design used was retrospective study.

3.3 Study Area

The study was carried out at Kampala international University teaching hospital, which is located along Bushenyi-Ishaka Town, Ishaka Municipality. It is found in Bushenyi district-South West of Uganda in Igara County. Kampala International University western campus is about 350km from the main City Kampala and about 70km from Mbarara. It became fully operational in 2009, it has the departments of internal medicine, paediatrics, surgical, reproductive health, psychiatry, and the special clinics including ENT, ophthalmology, Dental, orthopaedics and HIV. However, it does not have clinics handling diabetes or hypertension exclusively.

3.4 Study population and Target population.

The study comprised of Diabetic patients who attended medical ward.

The target population comprised of the diabetic patients presenting to the fore mentioned department with various complications.

3.5 Sample size and sample technique

Medical ward received about 300 patients from January 2017 to April 2017. On average the sum of Diabetic patients seen in medical wards was 20 per month. $20 \times 4 = 80$ Therefore in four months the number was estimated to be 80. Basing on this, the sample size for participation in this study was 66 as estimated from the Robert V. Krejce table for determining sample size for research activities. The full table is represented in the Appendices.

3.6 Inclusions and Exclusion Criteria

3.6.1 Inclusion criteria

Age groups (10-96) of patients seen in medical ward records during the study period of January to April 2017 were considered.

3.6.2 Exclusion criteria

Diabetic patients with complications but admitted in other wards for example Diabetic foot cases in the surgical ward.

3.7 Data collection technique

The researcher got data from the patients' record register and patient files who were admitted in the months of January to April 2017 using a check list in Annex III

3.8 Data Analysis

The data was analysed manually using scientific calculators in predesigned tables. Relevant frequencies were obtained by tallying the number and then the figures converted to the right percentages which were represented in the form of tables and graph.

3.9 Data quality control

To ensure validity and reliability of the data and names on the patient files were cross checked with that in the patient register.

3.10 Ethical considerations

Permission to do this research was obtained from the executive director KIU-TH and the department of internal medicine for the access of the records. The information obtained was confidential and only used for research purpose. No patient's name was therefore mentioned.

3.11 Limitations

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

CHAPTER FOUR: RESULTS

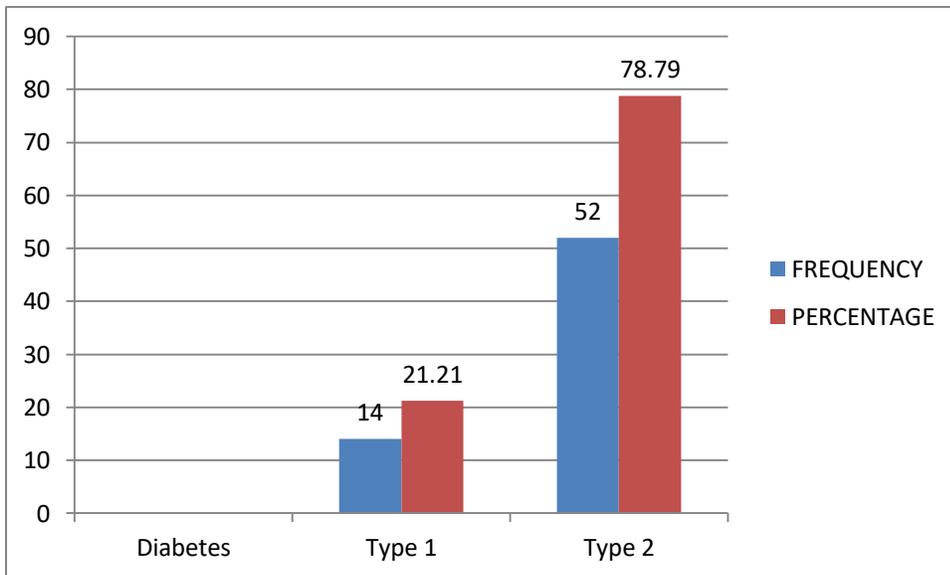
This chapter is a representation of the data collected from records of 66 patients during the study.

4.1 Prevalence of Diabetes

Medical ward received about 300 patients from January 2017 to April 2017 out of which, 80 (29.1%) were diabetes patients and were admitted basing on working diagnosis and treatment offered accordingly but there was no proof. Among 66 patients in the records 14(21.21%) had type I and 52 (78.79%) had type II.

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 10-96 years old.

Figure1: The number of DM cases as per 66 patients in records



4.2 DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

A total of 66 patients from the record registry were checked. The records showed that majority of the patients 28(42.42%) were above 50 years of age and a greater proportion 38(57.8%) were females.

Table. 1 Demographic characteristics of the study population

VARIABLE	FREQUENCY	PERCENTAGE
Age		
10-20	6	9.10
21-30	8	12.12
31-40	10	15.15
41-50	14	21.21
>50	28	42.42
Sex		
Male	28	42.2
Female	38	57.8
Religion		
Christian	40	60.61
Islam	26	39.39
Occupation		
Peasant farmers	52	78.79
Civil servants	4	6.06
Others	10	15.15
Education level		
Non	5	7.58
Primary	40	60.61
Secondary	15	22.72
Tertiary	6	9.09

4.2 RISK FACTORS ASSOCIATED WITH DIABETES MELLITUS IN PATIENTS ATTENDED TO IN THE DEPARTMENT.

The records showed that there were 40(60.61%) DM patients with positive family history and 26(39.39%) of them had negative family history of DM. Majority 40(60.61%) showed no anysporting activity history. Also according to the records, a high proportion of the patients 36(54.54%) took alcohol and a few of them 24(36.36%) smoked.

Table 2. Risk factors associated with diabetes mellitus in patient records.

VARIABLE	FREQUENCY	PERCENTAGE
Family history of DM		
Yes	40	60.61
No	26	39.39
Exercise		
Regular	16	24.24
Irregular	40	60.61
None	10	15.15
Alcohol		
Yes	36	54.54
No	30	45.45
Smoking		
Yes	24	36.36
No	42	63.64
Weight(BMI)		
Normal	13	27.66
Overweight	34	72.34

4.3 COMPLICATIONS OF DIABETES MELLITUS

In the study, most of the patients were found to have other conditions reflected in the records among the 66 patients. These include Neuropathy, hypertension, blurring of vision, gastritis, cataracts, heart failure, renal failure, and urinary tract infections.

Table 3. Complications of diabetes mellitus

VARIABLE	FREQUENCY	PERCENTAGE
Complications		
Neuropathy	13	19.70
Hypertension	22	33.33
Blurring of vision	9	13.64
Gastritis	4	6.10
Heart failure	1	1.52
Renal failure	1	1.52
Urinary tract infection (UTI)	9	13.64
Cataracts	7	10.61

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS.

5.0 DISCUSSION

As seen in the research findings, Medical ward received 300 patients from January to April 2017. However, some of them might have been re-admissions with the same conditions. Out of these patients, 80 were found to have diabetes mellitus. This represented 26.67 % of the attendance. All the re-admissions among DM patients were controlled hence not recounting them. Therefore, if re-admissions due to other conditions were not controlled, the percentage of diabetes would be more.

5.1 PREVALANCE

The records showed that among 66 patients 14 (21.21%) had type I and 52 (78.79%) had type II making it a public concern as mentioned by amos,2007

5.2 RISK FACTORS TO DIABETES MELLITUS

5.2.1 AGE DISTRIBUTION

The records also showed that patients aged 50 years and above were more affected than those aged 40-49 years and so on. Therefore, the prevalence of DM increased with increase in age as seen in table1. American Diabetes care (2007) noted that type II diabetes is more common in older people especially women who are overweight. This trend was also consistent with findings among 66 patients from records, which is illustrated in table2.

5.2.2 SEX DISTRIBUTION

The results among 66 patients in records showed 57.58% and 42.42% females and males respectively. This could be due to body fat distribution between the two sexes which may lead to insulin resistance in females with more body fats than males. Besides males are more involved in physical activities than females which helps in the utilization of body fats.

5.2.3 RELIGION

It was found that out of the 66 patients, 26 of them were Muslims and 40 were Christians. 10 out of those belonging to Islamic religion had history of alcohol intake and 10 had history of

cigarette smoking. Among Christians, 26 took alcohol and 14 had history of cigarette smoking. Therefore, Christians were more affected than Muslims. This means about 2 times as many Christians as Muslims had history of cigarette smoking and alcohol consumption.

5.2.4 EDUCATION LEVEL

Out of the 66 patients, 5(7.58%) did not have access to education, 40 (60.61%) attained primary level of education, 15 (22.73%) attained secondary level and 6 (9.09%) attained tertiary level. This in a way affected them because educated people understand the condition and stand better chances of life style modification, like what to eat to remain healthy, importance of exercise, and weight loss.

5.2.5 FAMILY HISTORY

40 (60.61%) of the 66 patients had positive history of DM. This is in line with it being one of the risk factors for DM especially type II. However, 26 (39.39%) of them had negative family history but other risk factors might have contributed.

5.2.6 EXERCISE

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

5.2.7 SMOKING AND ALCOHOL

36(54.55%) of the patients records showed positive history of alcohol (local brews) consumption and 24 (36.36%) of them had history of cigarette smoking. 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 behaviour has long been noted. Hence, variation in the risk factors.

5.2.8 DIET

From the records, patients who ate fatty foods were overweight. This, with other risk factors, could have resulted into the abnormalities of body mass indices observed when weights were taken.

5.3 COMPLICATIONS

Renal failure also known as diabetic kidney disease arises due to increased glomerular filtrate, inflammation and endothelial dysfunction.

Peripheral neuropathy and blurring of vision (cataract) probably due to deposition of sorbitol 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 atheroma 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 were 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 record

5.4 CONCLUSION

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 KIUTH. 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 was higher in people 50 years of age and above compared with its prevalence in people below 50years of age. Obesity and overweight were threats 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.

5.5 RECOMMENDATIONS.

Administration of KIUTH should if possible establish diabetes clinic and employ diabetes specialists to handle these vulnerable patients. It would be appreciated if KIU could offer a course in diabetes as one of the specialties. This would attract some interested students to enrol 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.

REFERENCES

- (ADA, 2016). Diabetes UK (2007), Website. www.diabetes.org.
- Amos. (2007). Adherence to oral diabetic therapy in a managed care organizations.. . *Clinical Therapy*, 24(3):460–467.
- Anderson. (2000). . vol. 57, No. *Journal of the International Biometric Society*, 57.
- Atlas, I. diabetes federation. (2009). *International Diabetes Federation: Belgium. Diabetes Atlas*. (1st ed.).
- Bandura. (1995). International Diabetes Federation. *Diabetes Voice*,50(2).
- Boaton. (2010). [Http//www. Diabetesnet.com/aade.html](http://www.Diabetesnet.com/aade.html) American Association of Diabetes Educators.(visited on 11/06/2017) <http://uaps2007.princeton.edu/download.aspx?submissionId=70642> Obesity and gender differences in the risk of type 2 diabetes mellitus in Uganda☆ (visit.
- Boston. (2010). Pharmacological therapy compliance in diabetes. *Salud Publica de Mexico*;;, 43:233–236.
- Colhoun. (2014). Davidson. 2006; principle and practice of medicine 20th edition, Elsevier publisher, Pg-804-847.
- Data, D. certificate. (2009). volume 21, Issues 1-5, pages. *Journal of Practical Diabetes International (2009)*, 21(1–5), 1–208.
- Diabetescare. (2014). International Diabetes Federation. Belgium. *Diabetes and Cardiovascular Diseases*:
- Health, N. institutes of. (2010). National Diabetes factsheet. atlas, Georgia.
- IDF. (2003). International Diabetes Federation (2003). . 2nd edition: Belgium. *Diabetes Atlas*.
- IDF. (2008). Diabetes care and research in Europe; the Saint-Vincent Declaration. *Diabetes Medicine* ., 7:360-364.
- Lazarus. (2004). Kalbfleisch, J. D. and Prentice, R. L. (2004).

- Lorna. (2007). Lorna Benson, 2007 Ugandan doctor takes home diabetes strategies honed in Minnesota. Minnesota Public Radio.
- Medicine, textbook of. (2002). Oxford Handbook of tropical medicine, 2002. Third edition, 500–514.
- Melander. (2001). From Henry J. 2009; Kaiser Family Foundation June 16.
- Moran. (2007). illness beliefs and adherence in diabetes mellitus: a comparison between Tongan and European patients.. *The New Zealand Medical Journal*, ; 1188(117):743–749.
- NIDDK. (2009). National institute of diabetes and digestive and kidney disease {NIDDK}, NIH Pub, 96–3873.
- Ogwang. (2009). A guide to effective care in pregnancy and childbirth. Oxford University Press; *Gestational Diabetes*;, 75–78.
- Okware. (2008). Sam Okwera commissioner in health ministry 2006 BMJ September, 30:333(7570):672.
- Otim. (2008). Poly-pharmacy and medication adherence in patients with type 2 diabetes. *Diabetes Care*; 26(5), .:1408–1412. [PubMed].
- Scherste. (1997). <http://www.jdfcure.com> . (Visited on 20/06/2017). *Juvenile Diabetes Foundation International*.
- Sutton. (2000). Schectman JM, Nadkarni MM, Voss JD. . 2000; the association between diabetes metabolic control and drug adherence in an indigent population. *Diabetes Care*25, (6):1015–1021. [PubMed].
- Tuomilehto. (2001). Naylor CD, Sermer M, Chen E, Sykora K. 2001; Caesarian delivery in relation to birth weight and glucose gestational tolerance. *JAMA.*, 300(15):1164–1170
- UDA. (2016). GDM screening in subsequent pregnancy of previously healthy patients. *Am J Obstet Gynaecol.*, 181(4):798–802.
- USDCCP. (n.d.). Report of the expert committee on the diagnosis and classification of Diabetes

- Mellitus. *Diabetes Care*,(2007): 1183-97.
- WHO. (2007). Screening, diagnosis,; Up-to-date. *Treatment and Course of GDM, 10*.
- WHO. (2000). a randomized controlled pilot study for the management of gestational impaired glucose tolerance.; *BJOG*, 107:959–963. [PubMed].
- WHO. (2008). Brussels, Belgium 2003.International Federation: diabetes atlas, 2nd edition.
- WHO. (2010). Report of a world health organization consultation in Geneva, Switzerland 2010 /11/9.
- WHO. (2011). Influence of associated risk factors. (visited on 11/06/2017). *Acta Obstet Gynaecol.*, 79:991–998.
- WHO. (2012). Factors associated with therapy noncompliance in type 2 diabetes patients. *Salud Publica de Mexico.*, 45(3).
- Wikblad. (1991). R.L. Souhmani: 1991, text book of medicine, 4th edition, Elsevier publisher,; 984–1029.
- Zimmet. (2015). Chronic diseases management in the Jamaican setting.. *PNG Medical Journal*, 43(3–4):171–175.

ANNEX 1: LETTER FOR DATA COLLECTION



School of Allied Health Sciences (SAHS) Ishaka,
P.O. BOX 71 Bushenyi,
Tel: 0703786082/0773786082
Email: christinekyobuhaire@gmail.com

OFFICE OF THE ADMINISTRATOR –SAHS

IN CHARGE - MEDICAL WARD
Please allow the student to administer his questionnaire
The Executive Director KIUTH 28th April 2017



Dear Professor,

SUBJECT: DATA COLLECTION

Academic research project is an Academic requirement of every student pursuing a 3 year Diploma in Clinical Medicine & Community Health (DCM) of Kampala International University- Western Campus (KIU-WC). DCM program is housed in the School of Allied Health Sciences (SAHS).

The students have so far obtained skills in Proposal writing especially chapter one, Three & Questionnaire design. The student's topic has been approved by SAHS Research Unit and is therefore permitted to go for data collection alongside full proposal & dissertation writing. As you may discover the student is in the process of full proposal development. We as academic staff of Allied Health Sciences are extremely grateful for your support in training the young generation of Health Professionals. I therefore humbly request you to receive and allow the student **RUJARA SMITH JUNIOR** Reg. No. **DCM/0093/143/DU** in your hospital to carry out his research.

His topic is hereby attached. Again we are very grateful for your matchless support and cooperation.
Topic: **PREVALENCE OF DIABETES AMONG PATIENTS ATTENDING KKIUTH.**

Sincerely yours,



Christine Kyobuhaire, Administrator- SAHS

- CC: Dean SAHS
- CC: Associate Dean SAHS
- CC: Coordinator, Research Unit- SAHS
- CC: H.O.D Dept. Public Health
- CC: H.O.D Laboratory Sciences
- CC: Coordinators; TLC & DEC

"Exploring the Heights"

ANNEX II: Data collection tools.

No. of patient.	1	2	3	4	5	6	7	8	9	10
Demographic data										
Age										
Sex										
Occupation										
Religion										
Education										
Weight										
Type of DM.										
-I										
-II										
Others....										
Mode of Treatment.										
-Admitted										
-As OPD										
Outcome.										
-Alive										
- Died										
Complications										
- HTN										

- HF										
Others.....										
Risk factors to diabetes										
Family history										
Smoking										
Alcohol										
Others										

ANNEX III: Table for Determining Sample Size from a Given Population

<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

ANNEX V: MAP OF UGANDA

