FACTORS AFFECTING TYPE 2 DIABETES MANAGEMENT AMONGST OUT-PATIENT DIABETIC WOMEN AGED 50 YEARS AND ABOVE AT KENYATTA NATIONAL HOSPITAL, KENYA

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Factors affecting Type 2 Diabetes management amongst out-patient diabetic women aged 50 years and above at Kenyatta National Hospital, Kenya

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A thesis submitted in partial fulfillment for a degree of master of science in public health at Jomo Kenyatta University of Agriculture and Technology

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DECLARATION

This thesis is my original work and has not been presented for a degree or a diploma in any other University.

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DEDICATION

I dedicate this thesis to my wonderful family. I appreciate their support, understanding and patience through the many years of study.

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ABBREVIATIONS AND ACRONYMS

AADE	American Association of Diabetes Educators
ADA	American Diabetes Association
BMI	Body Mass Index
DLF	Diabetes Leadership Forum
FPG	Fasting Plasma Glucose
HIV	Human Immunodeficiency Virus
IDF	International Diabetes Federation
IIF	International Insulin Foundation
KEHHEUS	Kenya Household Health Expenditure and Utilization Survey
KEMRI	Kenya Medical Research Institute
KNH	Kenyatta National Hospital
KNCHR `	Kenya National Commission on Human Rights
KSPA	Kenya Service Provision Assessment
MDGs	Millennium Development Goals
MIPAA	Madrid International Plan of Action on Ageing
MOMS	Ministry of Medical Services
NHSSP	National Health Sector Strategic Plan
NCDs	Non Communicable Diseases
NGOs	Non Governmental Organizations
OGTT	Oral Glucose Tolerance Test

SSA	Sub Saharan Africa
T2DM	Type 2 Diabetes Mellitus
UN	United Nations
USD	United States of America Dollars
WHO	World Health Organization

DEFINITION OF TERMS

Blood glucose - This is the amount of glucose (sugar) present in the blood of a human. Normally, in mammals the body maintains the fasting blood glucose level at a reference range between about 3.9 and 5.6 mM (mmol/L). .

BMI - This is a measure of body fat that is the ratio of the weight of the body in kilograms to the square of its height in meters.

Diabetes management - This is dealing with short term events such as high or low blood sugar to controlling it over the long term by understanding the condition.

Glucose - This is sugar that can be linked to form carbohydrates and that serves as a primary source of energy in the body.

Glycaemic Control - This is a medical term referring to the typical levels of blood sugar (glucose) in a person with diabetes mellitus.

Hyperglycaemia - This is the excess of sugar in the blood.

Hypertension - This is abnormally high arterial blood pressure that is usually indicated by an adult systolic blood pressure of 140 mm Hg or greater or a diastolic blood pressure of 90 mm Hg or greater.

Socioeconomic status – In this study socioeconomic status is the social standing of an individual in terms of their income, education and occupation.

ABSTRACT

Diabetes Mellitus has emerged as one of the most challenging public health problems currently. It affects over 366 million people worldwide and this figure is likely to double by 2030. The greatest burden of this condition is felt in low and middle-income countries which account for about 80% of all cases of diabetes. Diabetes prevalence increases sharply with age, and it is projected that by the year 2025, the majority of persons with diabetes will be aged 65years or older with 55% of diabetes deaths occurring in women. The limited availability of high quality data on health disaggregated by sex and age has been a major obstacle to gender responsive planning and policy-making therefore it is urgent to collect, analyze and publish data disaggregated by sex and age. The study therefore aimed to address the gap in knowledge by focusing on the factors that affected diabetic women over 50 years of age which included awareness levels, self management practices and socio economic factors. The study adopted a cross sectional, descriptive study design. Structured questionnaires were used to collect data. 105 women were selected for the study. Most of the patients were in the 65 - 69 age group (22%) with 82.7% of the respondents having moderate awareness levels, 16.3%. 54.87% of the respondents had a moderate score of self-management practices, 38.5% had a high score of self-management practices and 6.7% had a low score of self-management practices. It was concluded from the study that decisions to seek care were influenced by a number of factors which included signs and symptoms, support from the community, availability of resources to seek care and services available at the health care facilities. Majority of the respondents had moderate awareness about diabetic management however this awareness has not led to any changes in the disease management because patients are not sufficiently equipped with knowledge to comprehensively manage their disease. This study recommends that the hospital management should offer diabetes education at no cost to the patients and provide additional training of the health care providers working in the diabetes clinic with skills for delivering adequate health education message tailored to knowledge needs of Type 2 diabetic patients.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Diabetes Mellitus is a chronic condition that arises when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin produced. Insulin is a hormone made by the pancreas that helps 'sugar' (glucose) to leave the blood and enter the cells of the body to be used as 'fuel'. When a person has diabetes, either their pancreas does not produce the insulin they need (Type 1 diabetes) or their body cannot make effective use of the insulin they produce (Type 2 diabetes) (Alberti K. *et al.,* 1998)

Diabetes Mellitus has emerged as one of the most challenging public health problems in the 21st century. It currently affects over 366 million people worldwide and this figure is likely to double by 2030. The greatest burden of this condition is felt in low and middle-income countries, and these nations account for about 80% of all cases of diabetes. The African continent counts approximately 13.6 million people with diabetes. The Africa Region of the International Diabetes Federation (IDF), which mainly includes sub-Saharan Africa, counts approximately 7 million people with diabetes. Estimates for the region for 2025 are likely to double and reach 15 million. In Kenya for instance the World Health Organization (WHO) estimates that the prevalence of diabetes in Kenya is at 3.3% and predicts a rise to 4.5% by 2025 (WHO 2011).

Africa is often referred to as the youngest continent in terms of age structure. This may contribute to the current relatively low prioritization of ageing issues in national policies (Naidoo *et al.,* 2010). Yet the annual growth rate of older persons in Africa has been estimated at 3.1% between 2007 and 2015, and 3.3% between 2015 and 2050, greater than the global average. In this context, it is concerning that there will be approximately 64.5 million Africans aged ≥55 years in 2015, and more than 103 million and 205

million in 2030 and 2050, respectively (Guariguata *et al*., 2011). Indeed it has been predicted that the diabetes peak in Africa is expected to be in the oldest individual by 2035 (Guariguata *et al*., 2013).

The population of sub-Saharan Africa is set to grow from around 860 million in 2010 to more than 1.3 billion by 2030. For age groups above 40 years, the increases will double the size of the population. People aged 45-59 years are 8.5 times more likely to develop diabetes than those aged 15-29 years; and those above the age of 60 are 12.5 times more likely to develop diabetes. Based on the present prevalence rates in sub-Saharan Africa, the demographic changes alone will account for an increase of 9.5 million people with diabetes between 2010 and 2030 (DLF, 2010). In 2013, the majority of individuals with diabetes in Africa were reported to be under 60 years of age with the highest proportion (43.2%) in people aged 40–59 years (Guariguata et al. 2013).

In many settings, ageing women do not have the same access to health care as men or younger women. The barriers to primary health care faced by older people are often worse for older women. These barriers include lack of transportation, low literacy levels and a lack of money to pay for services and medications. Because women live longer than men and are more likely to be alone in old age, policymakers and practitioners must pay special attention to the gender implications of long term care policies and programmes (WHO, 2007).

Treatment of diabetes in Kenya, as in other parts of sub-Saharan Africa, is fraught with problems. Besides challenges related to diagnosis, care, and treatment, there is a lack of understanding and knowledge about the disease among healthcare professionals and the general population (McFerran,
2008). Because it is a chronic disease that lasts for many years, people diagnosed with diabetes need continuing access to proper medical care. That includes medication (insulin and other medicines), equipment (such as glucose measuring strips), and, most

importantly, healthcare professionals who have had adequate training in the diagnosis and treatment of diabetes and its complications (DLF, 2010).

Information is a vital tool enabling the pursuit of gender equity in all areas including in health. The limited availability of high quality data on health disaggregated by sex and age has been a major obstacle to gender responsive planning and policy-making. Without knowing whether and in what dimensions of health, and in which population subgroups disadvantages exist, there is no way to begin redressing gender or other inequities in health. The urgency of collection, analysis and publication of data disaggregated by sex and age cannot be overemphasized (WHO, 2010).

Most research carried out in Kenya has focused on those affected by diabetes as a whole regardless of their gender or age. The objective of this study therefore was to address this gap by focusing specifically on women over 50 years of age with an aim of generating findings that can be utilized to resolve some of the challenges they face in their diabetes management. The age of 50 years is thought to incorporate the chronological, functional and social definitions of "old" in Africa and has been adapted by the World Health Organization (WHO) for its minimum data set project. This age cut-off has also been used in other studies in Africa (WHO, 2006).

1.2 Problem statement

Diabetes is a chronic disease that requires patients to continue their treatment for the rest of their lives. The emphasis is usually on the management of the condition through a tight schedule of blood glucose and urine sugar monitoring, medication and adjustment to dietary modification. Such a chronic condition requires competent self-care, which can be developed from a thorough under-standing of the disease process by the patient and pre-supposes a need for some form of diabetes education and counseling for the patient. For people with diabetes, medical issues are not the only area that requires management; lifestyle, family, psychosocial, cultural, and economic issues also need

attention. Diabetes affects women in uniquely gendered ways, many of which are related to the underlying determinants of health and socioeconomic status.

The Kenyan constitution acknowledges that all age groups have the right of equal access to health services. However significant health disparities continue to exist in diabetes. Stopping the diabetes epidemic involves halting health disparities caused by age, sex and socioeconomic factors. This study therefore aimed to address the gaps in knowledge by focusing on the factors that affect outpatient Type 2 diabetic women over 50 years of age attending Kenyatta National Hospital in the management of diabetes. The findings will assist in generating policies that will ensure that there is prioritized allocation of resources.

1.3 Justification

This study, carried out at Kenyatta National Hospital, aimed at providing findings that will assist in diabetes management. Assessment of the women's awareness levels and self management practices about diabetes is important in developing educational material relevant to their age and sex. Assessing the socioeconomic and cultural factors that affect their management is also important as strategies can be localized for particular groups in terms of age and sex. Programs can be formulated specifically for older women thereby reducing morbidity associated with diabetes and therefore improve their quality of life. The findings will also assist in priority setting for management of diabetes in older women by the Ministry of Health, Health insurers and relevant Non Governmental Organizations.

1.4 Research questions

1. What is the level of awareness of diabetes management amongst Type 2 diabetic women over 50 years?

2. What are the self diabetic management practices amongst Type 2 diabetic women over 50 years?
3. What are socioeconomic factors that affect diabetes management amongst Type 2 diabetic women over 50 years?

1.5 Objectives

1.5.1 General Objective

To determine factors affecting diabetes management amongst Type 2 diabetic women aged 50 years and above at Kenyatta National Hospital

1.5.2 Specific Objectives

1. To determine the levels of awareness of diabetes management amongst Type 2 diabetic women over 50 years.
2. To determine the self diabetic management practices amongst Type 2 diabetic women over 50 years.
3. 3). To determine the socioeconomic factors that affect diabetes management amongst Type 2 diabetic women over 50 years.

CHAPTER TWO

LITERATURE REVIEW

2.1 Diabetes Mellitus

Diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar. There are three main types of diabetes; Type 1 diabetes, Type 2 diabetes and gestational diabetes. Type 1 diabetes once known as juvenile diabetes or insulin-dependent diabetes is a chronic condition in which the pancreas produces little or no insulin; Gestational diabetes is a type of diabetes that affects women during pregnancy. It is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. The definition applies whether insulin or only diet modification is used for treatment and whether the condition persists after pregnancy. It does not exclude the possibility that unrecognized glucose intolerance may have antedated or begun concomitantly with the pregnancy (WHO, 2006).

Type 2 diabetes mellitus (T2DM) is the most common type of diabetes. The body is able to produce insulin but either this is not sufficient or the body is unable to respond to its effects (also known as insulin resistance), leading to a build-up of glucose in the blood. Many people with T2DM remain unaware of their illness for a long time because symptoms may take years to appear or be recognized, during which time the body is being damaged by excess blood glucose. They are often diagnosed only when complications of diabetes have already developed (Malecki, 2004).

Although the reasons for developing T2DM are still not known, there are several important risk factors. These include; obesity, poor diet, physical inactivity, advancing age, family history of diabetes and ethnicity The

majority of those with T2DM usually do not require daily doses of insulin to survive. Many people are able to manage their condition through a healthy diet and increased physical activity or oral medication. However, if they are unable to regulate their blood glucose levels, they may be prescribed insulin. The number of people with T2DM is growing rapidly worldwide. This rise is associated with economic development, ageing populations, increasing urbanization, dietary changes, reduced physical activity, and changes in other lifestyle patterns (Hu et al., 2001).

2.2 Regional and local situation of diabetes

In developing countries the number of people with diabetes will increase by 150% in the next 25 years. The global increase in diabetes will occur because of population ageing and growth, and because of increasing trends towards obesity, unhealthy diets and sedentary lifestyles. In developed countries most people with diabetes are above the age of retirement, whereas in developing countries those most frequently affected are aged between 35 and 64 (Wild *et al.*, 2004).

Regionally before the 1990s, diabetes was considered a rare medical condition. Epidemiological studies carried out in that decade, however, provided evidence of a trend toward increased incidence and prevalence of type 2 diabetes in African populations (Sobngwi *et al*., 2001). Indeed, Africa is experiencing the most rapid demographic and epidemiological transition in world history (Mosley *et al.*, 1993). It is characterized by a tremendous rise in the burden of non-communicable diseases underlined by the increasing life expectancy and lifestyle changes resulting from the reduction in infectious diseases and increased fertility, as well as Westernization

The prevalence of diabetes in Africa was approximately 3 million in 1994; but the region is due to experience a two-to threefold increase by the year 2010 *(*Amos *et l.,*1997). The highest prevalence is found in populations of Indian origin, followed by black populations and Caucasians. Among the population of Indian origin in South Africa and Tanzania, the prevalence is between 12 and 13 percent (Ramaiya *et a1.,*

1991). The prevalence in blacks follows a Westernization gradient, with that of rural Africa generally below 1 percent but that of urban Africa between 1 and 6 percent. In general the prevalence of type 2 diabetes is low in both rural and urban communities of West Africa except in urban Ghana, where a high rate of 6.3 percent was recently reported (Amoah, *et a1*., 2002). Moderate rates have been reported from South Africa: 4.8 percent in a semi-urban community in the Orange Free State, 6.0 percent in an urban community of the Orange Free State, 5.5 percent in Durban (mostly occupied by the Zulu tribe), and 8 percent in Cape Town (mostly occupied by the Xhosa tribe). Also, moderate rates have been reported in studies from Tanzania.

Locally the International Diabetes Federation (IDF) estimated the prevalence of diabetes to be about 3.3% in 2013. However, local studies have shown a prevalence of 4.2% in the general population with a prevalence rate of 2.2% in the rural areas and as high as 12.2% in urban areas. Sadly, the majority of the people with diabetes are within the productive age range of 45–64 years. These are the same individuals who are expected to drive the economic engines of their countries in order to achieve the agreed international development goals (Maina *et al.*, 2011). In Kenya, Type 2 Diabetes Mellitus is the more prevalent, and Kenyans are developing it younger than those in developed countries. The age of onset of T2DM in Kenya is between 45 and 55, compared with 64 years in developed countries. Kenyans are also at higher risk for crippling or life-threatening complications, because they report to health centers when the disease is advanced (Mwangi *et al.*, 2011).

As in other parts of the World, in African countries, there are more elderly females than males (UNSD, 2010). Indeed with increasing life expectancy, it should be expected that there would be even more elderly females surviving.

Hence, elderly females will bear the bigger share of constraints caused by lack of appropriate policies and plans aimed at improving the welfare of the population (Velkoff and Kowal, 2007).

2.3 Risk factors for type 2 diabetes

There are controllable risk factors associated with diabetes, including obesity and an inactive lifestyle. However, other uncontrollable risk factors, such as ethnicity and genetics, also play a dramatic role.

Age and Ethnicity

Age and ethnicity are the two main non-modifiable risk factors of diabetes in Africa. Glucose intolerance in Sub-Saharan Africa, as in other regions of the world, increases with age in both men and women however, published studies lack uniformity on the age range in which the prevalence of diabetes is observed. According to King *et a1*.,(1998), in most developed communities the peak of occurrence falls in the age group of 65 years or older, whereas in developing countries it is in the age group 45 to 64, and in Sub-Saharan Africa it is in the age groups 20 to 44 and 45 to 64 years. Yet data from 12 other studies from Sub-Saharan Africa indicate two peak age ranges of 45 to 64 and older than 65 years

Family History of Diabetes

A significant proportion of the offspring of Cameroonians with type 2 diabetes have either type 2 diabetes (4 percent) or IGT (8 percent) (Mbanya *et al.,* 2000). A positive family history seems to be an independent risk

factor for diabetes, but this was not the case in the Cape Town study (Levitt *et al*., 1993), in which family history was not an independent risk factor.

Measure of Adiposity

Several studies from Sub-Saharan Africa have confirmed the association between the prevalence of diabetes and a surrogate of obesity, body mass index (BMI). Reports from

Mali (Fisch *et al*., 1987), Nigeria (Cooper *et al.,* 1997) and Tanzania (McLarty *et al.*, 1989) have shown that the prevalence of diabetes increases with increasing BMI. BMI and obesity seem to be independent risk factors for diabetes (Levitt *et al*., 1993).

Physical Activity

There seems to be a significant relationship between physical inactivity and diabetes and obesity (Sobngwi *et al.,* 2002). Physical activity is more common in rural than urban regions of Africa because rural populations rely on walking for transport and often have intense agricultural activities as their main occupation. In Sub-Saharan Africa, walking time and pace is drastically reduced in an urban community as compared with a rural community. The main difference in physical activity between the two types of community, however, is the use of walking in rural areas as a means of transportation.

The reduction in physical activity associated with life in a city partly explains the excess prevalence of obesity in urban areas. In a South African study, the prevalence of a sedentary lifestyle in Cape Town in subjects age 30 years and over was 39 percent for men and 44 percent for women (Omar *et al.,* 1993). Low physical activity was normal for 22 percent of men and 52 percent of women in urban Tanzania, whereas it was usual for only 10 percent of men and 15 percent of women living in rural areas (Edwards *et al*., 2000). Cross-sectional data from 1,417 women age 15 to 83 years in a rural community and an urban community in Cameroon showed that in all age groups, fasting blood glucose levels were inversely associated with energy expenditure from walking (Sobngwi, *et a1.*,2003). Rural dwellers' higher level of physical activity and related energy expenditure compared with urban subjects goes far to explain why obesity was

found to be at least four times higher in urban areas than rural (Aspray *et al.,* 2000). Thus, lack of physical activity appears to be a significant risk factor for diabetes in Sub-Saharan Africa

2.4 Clinical manifestations and diagnosis of diabetes

Diabetes mellitus may present with characteristic symptoms such as thirst, polyuria, blurring of vision, and weight loss. Often symptoms are not severe, or may be absent. The diagnosis of diabetes mellitus is easily established when a patient presents the classic symptoms of hyperglycaemia and has a random blood glucose value of 200 mg/dL (11.1 mmol/L) or higher, and confirmed on another occasion (Twillman, 2002).

The following tests are used for the basic diagnosis: fasting plasma glucose (FPG) test measures blood glucose in a person who has not eaten anything for at least 8 hours. This test is used to detect diabetes and prediabetes. An oral glucose tolerance test (OGTT) measures blood glucose after a person fasts at least 8 hours and 2 hours after the person drinks a glucose-containing beverage. This test can be used to diagnose diabetes and prediabetes. The FPG test is the preferred test for diagnosing diabetes because of its convenience and low cost. However, it may miss some diabetes or prediabetes that can be found with the OGTT. The FPG test is most reliable when done in the morning. Research has shown that the OGTT is more sensitive than the FPG test for diagnosing prediabetes, but it is less convenient to administer (WHO,1999).

2.5 Diabetes complications

Complications due to diabetes are a major cause of disability, reduced quality of life, and death. Diabetes complications can affect various parts of the body manifesting in different ways for different people. Diabetes complications are divided into two major categories: Acute complications such as hypoglycaemia and comas resulting either from diabetic ketoacidosis

or hyperosmolar hyperglycemic nonketotic syndrome and chronic complications, either microvascular (diabetic retinopathy, nephropathy, neuropathy) or macrovascular (coronary artery disease, peripheral arterial disease, and stroke) (Aalto *et al.,* 1997).

The most serious microvascular diabetes complications are the eye complications. Diabetic patients are strongly advised to have an annual ophthalmic exam. Diabetic retinopathy is the leading cause of blindness in the working population of the Western world. The risk of developing diabetic retinopathy or other microvascular complications

26 of diabetes depends on both the duration and the severity of hyperglycaemia (Almdal *et al.,* 2004).

Diabetes increases the risk that an individual will develop cardiovascular disease. Although the precise mechanisms through which diabetes increases the likelihood of atherosclerotic plaque formation are not completely defined, the association between the two is profound (Laing *et al*., 2003). Cardiovascular disease is a major complication and the leading cause of premature death among diabetic patients (Merz *et a.,l* 2002). Diabetic patients have a 2 to 6 times higher risk for developing complications such as ischemic heart disease, cerebrovascular disease and peripheral vascular disease than the general population.

With bacterial and fungal infections diabetics have increased risk of cystitis and, more important, of serious upper urinary tract infection as well as ear, nose, and throat infections, necrotizing otitis externa principally occurs. Skin and soft tissue infections are common in DM and may spread to adjacent bone causing osteomyelitis infection (Eron *et al.,* 2003). Diabetic patients are also in greater risk of infections than healthy individuals. The association
between diabetes and increased susceptibility to infection in general is not supported by strong evidence. However, many specific infections are more
common in diabetic patients and some occur almost exclusively in them. Other infections occur with increased severity and are associated with an increased risk of complications. Several aspects of immunity are altered in patients with diabetes. There is evidence that improving glycaemic control improves immune function. Fungal cystitis, rhino-cerebral mucormycosis and community-acquired pneumonia are among the most common infections the diabetic patients suffer from (Gu *et al.,* 1998)

Peripheral vascular disease, are often seen in patients who have foot infections. Poorly controlled DM lead to impaired circulation and slow healing from small cuts. The

untreated damage, or failing to heal or unnoticed minor trauma may result in an infection especially in the lower- extremity, where the blood flow delays, and micro-angiopathic lesions lead to cellulitis, osteomyelitis, or nonclostridial gangrene that end in amputation. In 2004 about 60% of non-traumatic lower limb amputations occur in people with diabetes in USA. The complications of diabetes are far less common and less severe in people who have well-controlled blood sugar levels (IDF, 2008)

2.6 Diabetes Management

Diabetes mellitus is primarily a self-managed condition. The Institute of Medicine defines self-management as the task that individuals must undertake to live with one or more chronic conditions. These tasks include having the confidence to deal with medical, behavioral, and emotional management of their conditions. Low awareness and practices among diabetic patients are some of the important variables influencing the progression of diabetes and its complications, which are largely preventable.

Depending on the parameter, blood sugar level, blood pressure and weight should be checked on a regular basis (Hoy B, 2007). Doctor-patient relationship, such as trust and communication (Zgibor and Songer, 2001). Socio-economic status and its constituent elements are accepted as being determinants of health. For primary prevention of diabetes complications to be effective, patients must have access to quality medical care, the means to pay for services (either through insurance or self-pay), and the knowledge and skills to manage their diabetes on a day-to-day basis. Because access and self-care are critical contributors to outcomes in patients with diabetes, socioeconomic mediators (education and/or income) may play a significant role in these processes (Connolly *et al.*, 2001)

2.7 Public health importance

Diabetes is undoubtedly a public health concern epidemiologically and economically. It accounts for 3.8 million deaths worldwide per year, a number similar in magnitude to the mortality attributed to HIV/AIDS (WHO Africa, 2007). Studies suggest that these

deaths can be prevented, especially in economically productive individuals between the ages of 35 and 64 years of age (Roglic *et al.*,2005). Currently, however, statistics show that, every 10 minutes, someone dies from a diabetes-related disease. Unfortunately, the resources and responses to meet this epidemic have not kept pace with its demographic spread and impact.

Therefore, Kenya, as well as other countries in the world, must redouble their efforts to ensure follow-up of patients, whenever treatment has commenced and thus help reduce and/or prevent the high death toll from this chronic and debilitating disease. The adoption of a healthy diet and lifestyle requires not only individual behavioral changes, but also changes in our food, built, and social environments. Public health strategies that target the obesogenic environment are critical. Translating clinical and epidemiologic findings into practice requires fundamental shifts in public policies and
health systems. To curb the diabetes epidemic, primary prevention through the promotion of a healthy diet and lifestyle should be a global public policy priority **(**Zhang *et al.,* 2010).

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study Site

The study was conducted at the Kenyatta National Hospital which is a National Referral hospital situated about three kilometres away from Nairobi city. This study site was suitable as it serves patients from all over the country thus expected to have patients from diverse regions and socio economic statuses. The site had a daily mini diabetic clinic from 0800hrs – 1300hrs and a main one on Friday from 0800hrs – 1300hrs.

3.2 Study Design

The study adopted a cross sectional descriptive design. A structured questionnaire was used to assess awareness levels of diabetes management, self-management practices, and socioeconomic factors amongst diabetic women aged 50years and above.

3.3 Study Population

The study population was women with Type 2 diabetes aged 50 years and above attending the outpatient Diabetic clinic at Kenyatta National Hospital. This population included all Type 2 diabetic cases regardless of how long they had lived with the condition.

3.4 Inclusion criteria

(i) Women who were aged 50 years and above

(ii) Women who had been diagnosed with Type 2 Diabetes Mellitus

(iii) Women who consented to participate in the study

3.5 Exclusion criteria

(i) Women who didn't agree to participate in the study

(ii) Women who were unable to speak due to illness or frailty.

3.6 Sample size determination

The minimum sample size was calculated using the following formula (Araoye, 2004)

$N = Z^2Pq /D^2$

Where:

N = minimum sample size required

Z =standard normal deviation set at 1.96

P = proportion (assumed) of diabetics that have awareness of self management

Q = 1-P

D= the absolute precision

N= 1.96*0.5*0.5/0.1*0.1= 96

The sample size was increased to 105 to allow for non-response.

3.7 Sampling procedures

In this study systematic random sampling was used. The first woman who met the criteria was randomly selected and thereafter every alternate client who met the criteria was recruited.

3.8 Data Collection

Data for this study was collected using a structured questionnaire (Appendix 2).The content of the questionnaire were obtained from modifying sample diabetic patient questionnaires from Stanford University School of Medicine, ICICE Baseline Interview for Diabetes patients, Australian Diabetes Organisation and the International Diabetes Federation. The questionnaire covered question on demographics, awareness levels of diabetes management, self-management practices and socioeconomic factors affecting

the women. Informed consent was sort from the respondents before administration of the questionnaire.

3.9 Data Management and Analysis

Collected data was kept confidential and was only utilized for purposes of this research. Questionnaires were coded according to number of questionnaire and date of interview for ease in traceability. Once questionnaires were filled, cleaning up was done prior to entry on to Microsoft office excel (Ms Excel) spread sheets to form a database. Data was then viewed to correct obvious errors and then exported/transferred to Statistical Package for Social Scientists (SPSS, version 20).

Data was analysed using the techniques below;

Univariate analysis was used for descriptive statistics such as respondent's demographics, type of treatment; years with T2DM were used to summarize frequencies and percentages. Some of the findings were also presented by use of pie charts. Analysis of variance (ANOVA) was used to assess the relationship between two variables for example education level and awareness or time period with diabetes and self management practices. The results were presented in tables.

3.10 Ethical Considerations

Scientific and ethical approvals for this study were sought from the KEMRI Scientific Steering Committee (SSC), Kenyatta National Hospital Ethical Research Committee, KEMRI Ethical Review Committee (ERC) and JKUAT Board of Post Graduate Studies. The study provided no harm to the respondents and was entirely based on the principle of voluntary participation. The participants were informed of their rights to privacy and confidentiality. An informed consent form was issued to the respondents before administration of questionnaires. No coercion or intimidation was

used to obtain any information. Data collected was filed and all files kept under lock and key in a cabinet.

CHAPTER FOUR

RESULTS

4.1 Respondents Background

The average age group of the patient population was 64 years. Most of the respondents (45.7%) lived in the capital city while 37.1% lived in the countryside. Fifty nine percent (59%) of the respondents had primary level of education while 15.2% had not gone to school. A majority of the respondents were small scale farmers (34.6%), followed by housewife's (26.9%) and self employed (19.2%). All the respondents were Christians and 35.2% of the respondents got their first diabetes diagnosis at KNH, 26.7% were first diagnosed at private clinics while 19% were first diagnosed at faith based hospitals. The largest number (38.1%) of patients had lived with diabetes for more than 12 years while 21% of patients having been diagnosed with diabetes six to eight years earlier. Majority of the respondents (81 %) said that the initial treatment prescribed was insulin tablets (Table 4.1).

Table 4.1: Demographic data

Demographics		Frequency	Percent
Residence	Capital city	48	45.7
	Other city	1	1
	Town	17	16.2
	Country Side	39	37.1
Religion	Christian	105	100
Highest education level	No formal education	16	15.2
	Primary	62	59
	Secondary	17	16.2
	College	9	8.6
	University	1	1
Occupation	House wife	28	26.7
	Small scale farmer	37	35.2
	Self employed	20	19
	Formal employment	7	6.7
	Retired	13	12.4
Duration of diagnosis	0-2 years	13	12.4
	3-5 years	19	18.1
	6-8 years	22	21

	9- 12 years	11	10.5
	> 12 years	40	38.1
Where diagnosed	Dispensary	1	1
	Health Centre	13	12.4
	Provincial Hospital	4	3.8
	National Referral	38	36.2
	Private Hospital	26	24.8
	Faith based hospital	20	19
	Pharmacy	1	1
	Others(unemployed)	2	1.9
Initial treatment prescribed	Insulin injections	17	16.1
	Tablets	85	81
	Both insulin & tablets	3	2.9

4.2 Level of awareness of diabetes management

The first objective of the study was to assess awareness levels of diabetes management in Type 2 diabetic women over 50 years. Table 4.2 shows that majority of the respondents (61%) knew that diabetes was hereditary. Slightly over half (50.5%) of the respondents were of the opinion that diabetes could be cured if detected at early stages while 75.2% reported that even if blood glucose had been controlled drugs should not be stopped to avoid recurrence of the attack.

Table 4.2: Awareness levels of respondents on diabetes cause, cure and management

Awareness levels on Diabetes		Frequency	Percent
Is diabetes hereditary	No	38	36.2%
	I don't know	3	2.9%
	Yes	64	61.0%
Can diabetes be cured	No	53	50.5%
	I don't Know	15	14.3%
	Yes	37	35.2%
Once blood glucose has been controlled should drugs be stopped	No	79	75.2%
	I don't Know	12	11.4%
	Yes	14	13.3%

Figure 4.1 illustrates that majority of the respondents (97%) reported that it was important and beneficial to one's health if one stopped smoking or taking alcohol.

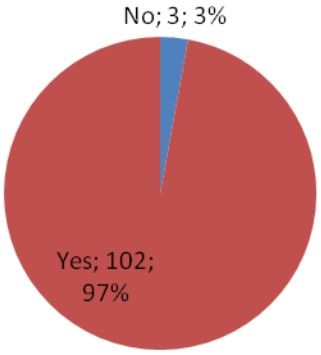

Figure 4.1: Benefits of smoking cessation

The respondents were asked to indicate their perceptions about fasting range for blood glucose. Figure 4.2 revealed that 59% of the respondents indicated between 4.4 – 6.1 mmol.

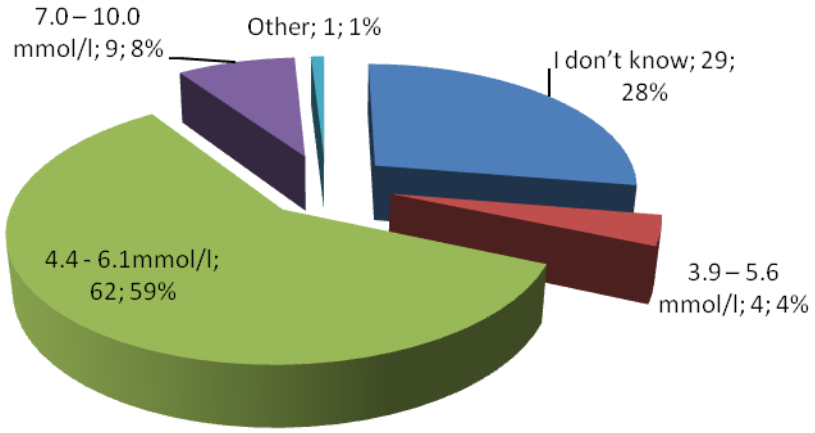

Figure 4.2: Knowledge of the normal fasting range for blood glucose

The study further sought to establish the level of awareness of the respondents about the effect of fruit juice, exercise and other diseases on blood glucose. Table 4.3 indicates

that 93.3% of the respondents reported that fruit juice raised the level of blood glucose, 97.1% of the respondents said exercise lowered the level of blood glucose while 55.2% indicated that other diseases could cause an increase in blood glucose.

Table 4.3: Effect of fruit juice, exercise and other diseases on blood glucose

Effect of Fruit Juice and Exercise		No.	Percent
What effect does fruit juice have on blood glucose	Don't know	5	4.8
	Lowers it	2	1.9
	Raises it	98	93.3
	Has no effect	0	0.0
What effect does exercise have on blood glucose	Don't know	1	1.0
	Lowers it	102	97.1
	Raises it	2	1.9
	Has no effect	0	0.0
Effect of other diseases on blood glucose	Don't know	25	23.8
	Increase blood glucose	58	55.2
	Decrease blood glucose	6	5.7
	No change in blood glucose	12	11.4
	Either increases or decreases	4	3.8

Twenty five point seven percent (25.7%) of the respondents visited the clinic after every three months, while 2.9 % visited once year (Figure 4.3).

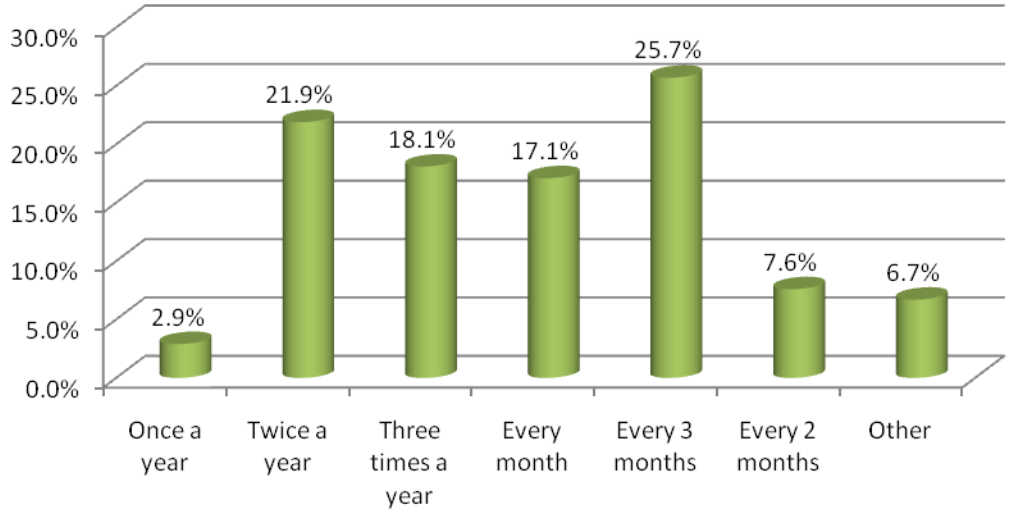

Figure 4.3: Frequency of visits to the KNH Clinic

The respondents were asked to indicate if they had been informed by the doctor about named conditions that they could get from having diabetes. Table 4.4 indicates that majority of the respondents were not aware of the consequences of having diabetes.

Table 4.4: Knowledge of conditions arising from Diabetes

Conditions		**Frequency**	**Percent**
Heart Disease	No	103	98.1%
	Yes	2	1.9%
Blindness	No	97	92.4%

	Yes	8	7.6%
Kidney Failure	No	92	87.6%
	Yes	13	12.4%
Amputation of limbs	No	99	94.3%
	Yes	6	5.7%

4.3 Self Management Practices

From the study 97% of the respondents used blood testing method for testing glucose levels in their body, 66.7% of the respondents did not have a glucose meter to do the tests at their work places or homes while 29 % of the respondents conducted self tests. Most of the respondents (40%) checked their blood glucose every month. A majority of the respondents (46.7%) indicated they controlled their diabetes using insulin injections (Table 4.5)

Table 4.5: Responses on self management practices

Diabetes Control Management		Frequency	Percent
Testing Method for Glucose	Don't know	3	2.9
	Blood testing	102	97.1
Glucose Meter	No	70	66.7
	Yes	35	33.3
Place of Testing	Dispensary	13	12.4
	Health Centre	12	11.4
	Provincial Hospital	1	1

	National Referral	17	16.2
	Private Hospital	17	16.2
	Faith based hospital	5	4.8
	Pharmacy	7	6.7
	I test Myself	31	29.5
	Others	2	1.9
Frequency of Checking Blood Glucose	Clinic Appointments	23	21.9
	Once a day	6	5.7
	Twice a day	4	3.8
	Once a week	10	9.5
	A few times a week	11	10.5
	Every month	42	40
	Other	9	8.6
Diabetes Control	Inject insulin	49	46.7
	Follow special diet	4	3.8
	Exercise	1	1
	Take tablet for diabetes	33	31.4
	Both tablet and insulin	18	17.1

Majority of respondents (90.5%) checked for red sores on their feet every day. All the respondents checked their weights at clinic appointments. 37.1% of the respondents checked their eyes on a yearly basis with 22.9% checking every six month. Majority (91.4%) had an idea of dealing with emergencies indicating that they ate some form of sugar (Table 4.6).

Table 4.6: Distribution of responses on self management practices of respondent

Self management practices		Frequency	Percent
Checking feet for sores	I don't check	6	5.7
	Once a month	2	1.9
	Everyday	95	90.5
	Others	2	1.9
Frequency of checking weight	At clinic appointments	105	100
Frequency of checking eyes	Don't know	19	18.1
	Every 6 month	24	22.9
	Every year	39	37.1
	Every two years	14	13.3
	Every 3 or more years	2	1.9
	Other	7	6.7
Dealing with emergencies	Don't know	3	2.9
	Lie down to rest	3	2.9
	Eat some form of sugar	96	91.4
	Other	3	2,9

Majority (88.6 %) of the respondents indicated that they exercised on a daily basis with 84.8% exercising at home. Only 13.3% indicated that they did not exercise because of some medical condition (Table 4.7).

Table 4.7 Distribution of responses on self management practices of respondent

Self management practices		Frequency	Percent
Frequency of exercise	I don't exercise	9	8.6
	Three times a week	2	1.9
	Daily	93	88.6
	Other	1	1
Place of exercise	Home	89	84.8
	Other	16	15.2
Reasons for not exercising	Lack of time	2	1.9
	Lack of money	2	1.9
	Fear of exercise	1	1
	I exercise	85	81
	Medical condition	14	13.3

Of those respondents who used insulin, 39% indicated that they stored insulin in a pot of cold water and 23.8% kept in the refrigerators. 55% of the respondents had never lacked prescribed treatment in the hospitals for the last three months with 62% of those who missed opting for other alternatives such as buying their own medication (Table 4.8).

Table 4.8 Distribution of responses on self management practices

Self management practices		Frequency	Percent
Storage of insulin			
		37	35.2
		25	23.8
	I don't use insulin	41	39
	Refrigeration	1	1
	Pot of cold water		
	Others	1	1
		55	52.4
Lack of prescribed treatment	No	50	47.6
	Yes		
Frequency of lack of prescribed treatment		50	47.6
	Never	9	8.6
	Every month		
	Once or twice in 3 months	46	43.8
		66	
Alternative treatment	Buying	39	62.9
	Others		37.1

4.4 Social Factors

Many (65.7%) of the respondents had access to a health facility. Only 18.1% of the respondents needed to stay with relatives when they had to visit the clinic as they lived too far away to travel back and forth from their homes. The common means of transport public reported by 95.2% of the respondents. Almost half of the respondents (48.6 %)

were accompanied by one person when they attended the clinic. 90.5% of the respondents did not have a paid caretaker because they lived with family members. 93.3% stated that they did not believe herbalists or witchdoctors could cure their condition while 2.9% were not sure (Table 4.9).

Table 4.9: Distribution of responses on social factors of respondent

Social Factors		Frequency	Percent
Do you believe herbalists or witch doctors can cure diabetes	No	98	93.3%
	Don't know	3	2.9%
	Yes	4	3.8%
Distance of nearest health facility from home	< 1 km	69	65.7%
	Between 1 &5 km	13	12.4%
	>5 km	23	21.9%
Where do you stay when you come for treatment at KNH	Home in Nairobi	86	81.9%
	relatives	19	18.1%
Means of transport to access KNH	walking	2	1.9%
	Public transport	100	95.2%
	Personal car	3	2.9%
	0 (none)	51	48.6%

How many people accompany you to KNH			
	1 person	51	48.6%
	2 people	3	2.9%
Have you or your family hired someone to take care of you due to ill health	No	95	90.5%
	Yes	10	9.5%
Does someone from your family take care of you because of your ill health without being paid for it	No	77	73.3%
	Yes	28	26.7%
	Total	105	100%

4.5 Economic factors

Most respondents (74.3%) reported spending more than Ksh 200 ($2.35) for a blood glucose test. Almost half the respondents (45.7%) spent more than Ksh 1000 ($11.76) monthly to manage their diabetes. Most respondents spent Ksh 200 – 499 ($2.35 – 5.87) on transport costs for attending the. 33.3%, of the respondents also incurred other medical costs such as medication for hypertension, kidney complications and other tests amounting to Ksh 1000 – 1999 ($11.76 – 23.51). The major source of funds was from family members (68.6%) Sixty eight point six percent of the respondents reported lack of funds as the major challenge in meeting the costs required to manage their diabetes (Table 4.10).

Table 4.10: Distribution of responses on economic factors of respondent

Economic Factors			Frequency	Percent
How much do you pay for a blood glucose test	Kshs	0-99	1	1%
		100- 199	26	24.8%
		>200	4	74.3%
How much do you spend monthly on insulin (+ syringes)/ tablets	Kshs	0 - 499	21	20%
		500 - 999	36	34.3%
		>1000	48	45.7%
How much does it cost to travel to and from KNH	Kshs	0 – 199	6	5.7%
		200 -499	55	52.4%
		500 – 799	27	25.7%
		>800	17	16.2%
		0 - 999	19	18.1%
How much do you spend per visit to KNH (excluding transport)				
	Kshs	1000- 1999	35	33.3%
		2000 -2999	30	28.6%
		>3000	21	20%
How much do you pay the hired person each month	Kshs			

	0 - 999	99	94.3%
	1000- 1999	1	1%
	2000 -2999	4	3.8%
	>3000	1	1%
How do you pay for the diabetic treatment and care	Current income	32	30.5%
	Family support	72	68.6%
	From saved money	1	1%
What prevents you from accessing diabetic care	Lack of funds	72	68.6%
	I am able to access	33	31.4%

4.6 Bivariate Analysis

4.6.1 Influence of Demographic Characteristics on Awareness levels of Diabetes Management

ANOVA results of education level, occupation and duration in with diabetes against awareness levels of diabetic management indicated that there was no significant relationship between the variables. This was supported by an f statistic of 1.915 (p=0.114), f=1.815 (p=0.132) and f=1.965 (p=0.106) respectively (Table 4.11).

Table 4.11: Analysis of education level, occupation and duration with diabetes against awareness levels of diabetic management

Mean awareness	N	Mean	Std. Deviation	f and p value

Education level	Noformal education	16	0.5938	0.19094	
	Primary	62	0.6230	0.20805	
	Secondary	17	0.5221	0.16078	f=1.915;pvalue =0.114
	College	9	0.4583	0.23385	
occupation	House wife	28	0.5804	0. 19607	
	Farmer	37	0.6351	0.21323	
	Self employment	20	0.5938	0.17619	
	Formal employment	7	0.4286	0.23780	
	Pensioner	13	0.5385	0.19355	f=1.815;pvalue =0.13
Duration with Diabetes	0 – 2 years	13	0.7212	0. 19199	
	3-5 years	19	0.5921	0.24239	
	6-8 years	22	0.5341	0.18168	
	9-11 years	11	0.6023	0.17216	
	12 years and above	40	0.5656	0.19355	f=1.965;pvalue =0.106

4.6.2 Influence of Demographic Characteristics on Self Management Practices

ANOVA results of level of education and duration with diabetes against self management practices indicated that there was no significant relationship between the

variables and self management practices. This was supported by an f statistic of 1.868 (p=0.122) and 1.217 (p=0.308) respectively. However ANOVA results indicated that there was significant relationship between places of residence, occupation with self management practices. This was supported by an f statistic of 2.811 (p=0.043) and 5.264 (p=0.001) respectively. Table 4.12

Table 4.12: Analysis of demographics against self management practices

		N	Mean	Std. Deviation	f and p value
Education level	None	16	1.7857	0.38244	
	Primary	62	1.6993	0.35565	
	Secondary	17	1.8151	0.38800	
	College	9	2.0317	0.32363	
	University	1	1.9286		f=1.868;pvalue=0.122
Residence	Capital city	48	1.8318	0. 36347	
	Other city	1	2.5000		
	Town	17	1.6681	0.31231	f=2.811;pvalue=0.043
	Country side	39	1.6978	0.37276	
Occupation	House wife	28	1.8189	0. 31795	
	Farmer	37	1.6815	0.39684	
	Self employment	20	1.5714	0.30657	
	Formal employment	7	1.9490	0.23224	

	Pensioner	13	2.064	0.31250	f=5.264;pvalue=0.001
Duration with diabetes	0 – 2 years	13	1.6813	0. 52051	
	3 – 5 years	19	1.6654	0.38099	
	6 -8 years	22	1.7695	0.27614	
	9 – 11 years	11	1.6818	0.34011	
	12 years and above	40	1.8518	0.35305	f=1.217;pvalue=0.308

4.6.3 Influence of social economic and cultural factors on diabetes management

There was no significant relationship between use of herbal medicine, cost for testing blood glucose and cost of insulin with management of diabetes This was supported by an f statistic of 0.597 (p=0.553), 2.330 (p=0.102) and 0.848 (p=0.431) respectively. ANOVA results also indicated that there was no significant relationship between distance from the hospital and residential place with management practices. This was supported by an f statistic of 0.219 (p=0.804) and 0.032 (p=0.858). Table 4.13

Table 4.13: Analysis of social economic and cultural factors on diabetes management

		N	Mean	Std. Deviation	f and p value
Use of herbal medicine	No	98	1.7675	0. 37647	
	Don't know	4	1.5714	0.26726	f=0.597;pvalue= 0.553
	Yes	3	1.8333	0.8248	
Cost of testing blood glucose in Kshs	0 – 99	1	1.7143	0. 37647	
	100 – 199	26	1.8956	0.26726	
	>200	78	1.7179	0.8248	f=2.330;pvalue= 0.102
Cost of insulin in Kshs	0 - 499	21	1.6837	0. 37647	
	500 - 999	36	1.7480	0.26726	
	>1000	48	1.8065	0.8248	f=0.848;pvalue= 0.431
Distance to nearest facility	<1 km	69	1.7723	0. 37647	
	Between1&5km	13	1.7857	0.26726	
	>5 km	23	1.7174	0.8248	f=0.219;pvalue= 0.804

Residence occupied when attending KNH	Nairobi	86	1.7650	0. 35788	
	Relatives	19	1.7481	0.42483	
	Total	105	1.7619	0.36872	f=0.032;pvalue= 0.858

ANOVA results indicated that there was a significant relationship between means of transport used, transport costs and hospital expenses with management practices. This Iis supported by an f statistic of 4.582 (p=0.012), 3.128 (p=0.029) and 4.360 (p=0.006) respectively. Table 4.14

Table 4.14: Analysis of social economic and cultural factors on diabetes management

		N	Mean	Std. Deviation	f and p value
Means of transport	Walking	2	2.5000	0. 10102	
	Public transport	100	1.7436	0.36167	
	Personal car	3	1.8810	0.08248	f=4.582;pvalue =0.012
Transport costs in Kshs	0 - 199	6	1.3690	0.17738	
	200 - 499	55	1.8052	0.33261	
	500 - 799	27	1.7116	0.39397	

	>800	17	1.8403	0.41614	f=3.128;pvalue =0.029
Hospital expenses in Kshs	0 - 999	19	1.5639	0.35785	
	1000- 1999	35	1.7020	0.34712	
	2000- 2999	30	1.9095	0.32160	
	>3000	21	1.8299	0.39479	f=4.360;pvalue =0.006
	Total	105	1.7619	0.36872	

ANOVA results of home care costs against management practices indicate that there is no significant relationship between home care cost and management practices. This is supported by an f statistic of 0.720 (p=0.542). There was also no significant relationship between family support, source of funds and management practices. This was supported by an f statistic of

0.028 (p=0.977) and 0.579 (p=0.562) respectively. There was no significant relationship between access to hospital challenges and management practices. This was supported by an f statistic of 2.560 (p=0.113). Table 4.15

Table 4.15Analysis of social economic and cultural factors on diabetes management

		N	Mean	Std. Deviation	f and p value
Home care costs in Kshs	0 - 999	99	1.7612	0.37383	
	1000- 1999	1	1.7857		

	2000- 2999	4	1.8929	0.22208	
	>3000	1	1.2857		f=0.720;p value=0.542
Family support	No	77	1.7625	0.34068	
	Yes	28	1.7602	0.44383	f=-0.028, pvalue=0.977
Source of funds	Current income	32	1.7969	0.38018	
	Family support	72	1.7510	0.36579	
	Savings	1	1.4286		f=0.579; pvalue=0.562
Challenges experienced	Lack of funds	72	1.7232	0.37008	
	Am able	33	1.8463	0.35675	f=2.560; pvalue=0.113

CHAPTER FIVE:

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Awareness levels of diabetes management

The first objective of this study was to assess the awareness levels of the patients with regard to diabetes management. 82.7% of the respondents had moderate levels of awareness and 1% had low awareness. These findings are consistent with similar studies by Karam *et al.,* (2012), Shah *et al.,* (2009) and Priyanka *et al.,* (2010) that found that two thirds of patients were aware of diabetes management. Improving patient knowledge on diabetes will allow them to better contribute to their care. Studies show that intensive diabetes education and care management can improve patient outcome, glycaemic control and quality of life of patient (Mc Murray *et al.,* 2002). Training in self-management is integral to the treatment of diabetes. Proper management requires patients to be aware of the nature of the condition, its risk factors, its treatment and its complications.

During the course of this study it was noted that diabetes education takes place weekly at the mini clinic and it is self-sponsored. This is a barrier for those patients that do not have the necessary funds. A shortage of nurses also hinders effective teaching of diabetes self-management education to patients (Gross *et al*., 2010) and the diabetes educators' cadre in Kenya is not officially recognized (MOPHS, 2010).These factors may contribute to the study findings where majority of the patients having moderate knowledge about diabetes self-management.

5.2 Self-management practices

In this study 54.87% of the respondents had a moderate score of self-management practices. 38.5% had high self-management practices and 6.7% had low self-management practices. Similar results were found in other studies for instance 30.8%

had high self-care behavior in a study in Myanmar (Sandhi *et al.,* 2010) and 39.2% in a study in Ethiopia (Ayele *et al.,* 2012).

Knowledge is an important contributing factor for behaviour change but is not sufficient one its own (Rosenstock *et al.,* 1988). In this study awareness of the respondents about self-management was moderate however; majority of them did not follow the recommended self-care practices. This may be associated to factors such as barriers of self-care, less perceived severity of the disease and its complications, infrequent cues to action, low income and educational status which is supported by the a study done in Nigeria (Adibe 2009).

5.3 Socio- economic factors affecting diabetes management

Geographic factors play an important role in access to and use of health services (Snow *et al*. 1994). In Sub-Saharan Africa and other low-income countries, distance contributes to the time required to access health services (Hjorstberg and Mwikisa 2002), delays in decisions to seek treatment (Amooti-Kaguna and Nuwaha 2000) and increases in household expenditure on treatment and opportunity costs as a result of time spent away from income generating activities (Ensor & Cooper 2004).

The two most significant barriers to entry in the Kenyan health system are the cost of care, and the availability of suitable care within a reasonable distance (i.e., geographic barriers). According to NHSSP II, “the health infrastructure in some regions of the country has coverage of one facility per 50-200 km,” making the availability of health resources to those who are sick virtually non-existent in certain cases (NHSSP II, 2005).Most health care providers are located in urban areas and therefore persons who live in

rural areas face significant challenges in receiving timely, safe and quality diabetes care. They often forgo important diabetes management (Landon *et al*., 2004). Travelling the long distances necessary to access diabetes clinics hinders patients from rural areas from receiving quality diabetes care from the clinics (Mutea and Baker, 2008; Rourke, 2010).

In this study, 70.2% the respondents reported spending Ksh 100 – 199 ($1.20 – 2.40) for a blood glucose test and 24% spent less than Ksh 99 ($1.19) for the same. This was comparable to a study carried out in Mali, Mozambique and Zambia that found that patients spend $2.38 per test (IIF 2004). Also 45.2% the respondents spent more than Ksh 1000 ($12.04) monthly to manage their diabetes while another 34.6% spent Ksh500 – 999 ($ 6.00 – 12.04) monthly. A similar study in Sudan found that patients spent $22.49 monthly on diabetes drugs (Hind, 2007).

Studies have shown that the cost of care nevertheless remains a paramount issue in Kenya. For those who were ill but did not seek treatment, the high cost of care was noted as the primary reason by 44% of those surveyed in KHHEUS 2003. Funding by the national government to the health sector has been inadequate for minimizing out of pocket expenses on care. As a result, funding for the health sector is financed primarily by the private sector, with 36% of it originating from households mainly through out of pocket spending (MOPHS, 2008).

The major source of funds was from family members (68.3%) while 30.8% relied on their personal income. 69.23% of the respondents reported facing challenges in meeting the costs required to manage their diabetes. Low socio-economic status including low education levels has been associated with development of diabetes mellitus (Ismail *et al.*, 1999). An association between increasing poverty levels and increasing prevalence of diabetes has been shown among women (Walker *et al*., 2011 and Robbins *et al*., 2000). According to Lester**,** (2011). Ksh 510 ($6 U.S) enabled a patient to monitor her or his glucose at home for a month and ksh 2125 ($25) subsidized eight months of insulin

therapy for a patient. But in a country where 60 percent of the population lives on less than ksh 170 ($2) per day, these costs were often out of reach

Only 18.3% of the respondents needed to stay with relatives when they had to visit the clinic as they lived too far away to travel back and forth from their homes. The common means of transport used was public reported by 95.2% of the respondents. Almost half of the respondents (48.1%) are accompanied by one person when they attend the clinic. 90.4% of the respondents did not have a paid caretaker because they lived with family members (26%) or were able to take care of themselves (74%). In this study the utilization of herbal medicine was low as most of the respondents lived in urban areas and their environs and were therefore more likely to make use of conventional medicine. As seen 92.3% stated that they did not believe herbalists or witchdoctors could cure their condition while 4.8% were not sure. The frequency of utilization of alternative medicine is increasing worldwide and is well documented in both African and global populations to be between 20 to 80%. Cultural and economic reasons were largely responsible for use of alternative medicine (Shappiro and Rapport 2009).

5.4 Limitations of the study

The small sample size and restricted research site limit the transferability of the findings to the general population with T2DM. Data on medication adherence, nutritional intake, and physical activity were obtained by self-report and may be limited by recall and other biases. Due to its limited scope of covering only the KNH, this study had limitation of not having access to data from other health centres and medical centres. The area of health and self management was also sensitive and therefore the respondents were not willing to respond to some questions. However confidentiality and protection of information was assured to the respondents. Information was coded to avoid direct

reference to particular individuals. Also due to time and budgetary constraints the study concentrated on the objectives stated.

5.5 Conclusions

We can conclude from the study management of diabetes requires knowledge, motivation, training, and support, which is mostly provided by health care workers. Decisions to seek care were influenced by a number of factors for example, severity of signs and symptoms of the disease, recognition of signs and symptoms, support from the community, availability of resources to seek care and services available at the health care facilities.

The decision to seek care at healthcare facilities for many patients appeared to be hindered by a lack of financial resources to pay the transport costs to health care facilities, medical tests and prescribed medication. Travel distances from patients' residences, coupled with inadequate and poor public transport infrastructure were reported to negatively influence the decisions to seek health care.

Majority of the respondents had moderate awareness levels of diabetic management however this awareness had not led to any changes in the disease management because patients were not sufficiently equipped with the knowledge to comprehensively manage their disease.

Recommendations

The hospital management should recast their communication strategy by revitalizing their information, communication and education avenues in order to bolster information on diabetic management.

The findings suggest that patients with type 2 diabetes require reinforcement of knowledge through health communication to encourage them to understand their disease management better, for more appropriate self-care.

The results of this study send a strong message to diabetes healthcare providers and educators for the actual need for developing education and prevention programs about diabetes targeting type 2 diabetes patients at outpatient clinics.

There is a deep need for an increase in the awareness of diabetes management and its complications in the primary healthcare sector.

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APPENDICES

APPENDIX 1 CONSENT FORM

My name is Esta Mwaloma. I am Masters Student in Public Health from JKUAT. You are invited to take part in research about diabetes in women. You are a potential participant because you are a woman attending the Diabetic clinic at the Kenyatta National Hospital. We ask that you read this form before agreeing to be in the research. If you cannot read, you can request the researcher or a member of hospital staff to read it to you.

Purpose

The purpose of the research is to assess your level of awareness of diabetes management, self management practices, socioeconomic and cultural factors that affect your diabetes management.

Procedures

If you agree to be in this research, and sign this consent form, I or my assistant will describe the questions you will be asked including their purpose. The questions should take only 20 - 30 minutes of your time.

Risks and Benefits

There are no direct benefits to you of the study. The risk level of this research is considered to be less than minimal.

Confidentiality

The records of this study will be kept private. Anything you tell us will remain confidential. In any sort of report of the study, we will not include any information that will make it possible to identify you. We are not asking for your name, address, or phone number. Your name and other identifying information will not be kept with this survey. The surveys will be kept in a

locked file; only the researchers for this study will have access to the records.

Voluntary nature of study

Your decision whether or not to participate will not prejudice your future relations with Kenyatta National Hospital, Kenya Medical Research Institute, Jomo Kenyatta University of Agriculture and Technology and staff helping with this study. If you do not wish to take part or you do not want to answer some of the questions, you do not

have to give us a reason. Even if you sign the consent form, you are free to stop at any time. You do not need to complete it if you feel uncomfortable doing it.

Contact

The researchers conducting this study are Esta Mwaloma and her assistant. You may contact the researchers at anytime. Questions regarding the rights of research subjects may be directed at the Ethical Committee at the Kenya Medical Research Institute.

In case of any queries or concerns, please contact the Principal investigator or KEMRI on:

Esta Mwaloma
P.O. Box 55916-00200; Nairobi
Cell phone Number: +254 720 954 660
Email: estamwaloma@gmail.com

OR

The Director;
Institute of Tropical Medicine and Infectious Diseases
Jomo Kenyatta University of Agriculture and Technology
P.O. Box 62200-00200; Nairobi
Tel: 067-52711
Email: itromid@kemri.org

OR

The Chairperson;
KEMRI National Ethical Review Committee
P.O. Box 54840-00200; Nairobi
Tel: 2722541-2713349-0722-205901

Consent

I have read the above information and understand that this survey is voluntary and I may stop at any time. I consent to participate in the study.

_____

Signature of participant Date

_____

Signature of researcher/ research assistant Date

FOMU YA KIBALI

ANWANI:

Jina langu ni Esta Mwaloma. Mimi ni mwanafunzi kutoka chuo kikuuu la JKUAT. Nakualika uwe mmoja wa wanawake ambao watuulizwa maswahili kuhusu ugonjywa wa kisukari. Umechaguliwa kwa kuwa wewe ni mwanamke anayepokea matibabu ya ugonjwa wa kisukari katika hospitali ya Kenyatta. Nakuoomba tafadhali usome fomu hii kabla ya kukubali kujibu maswali. Kama huwezi kusoma naweza kukusomea ama uniulize nikusomme ama mtu yeyote ambae ameeandikwa katika hospitali hii.

Mada

Utafiti huu unanuia kugundua kama wagonjwa wa Diabetis wanajua jinsi ya kuitawala, jinsi wanvyo itawala na shida za fedha na kijamii ambazo zinawakumba.

`

Utaratibu wa utafiti

Ukikubali kuhusika na utafuti huu na utie sahihi fomu hii, mimi ama msaidizi wangu atakuekezea maswahili utakayoulizwa na umuhimu wao. Maswali yatachukua dakika ishirini ama thelathini.

Manufaa na hatari

Utafiti huu ni kwa ajili ya masomo tu. Hakuna faida au manufaa kwa mhusika yeyote kabla au baada ya utafiti. Hakuna madhara yoyote kwa wale wote watakaohusika katika utafiti huu.

Usiri

Matokeo na maneno yote yatakayotokana na utafiti huu yatawekwa kwa usiri wa hali ya juu. Hakuna jina la mhusika litatumiwa; ilhali nambari

maalumu tu ndizo zitakazotumika. Hoji zote zitawekwa ndani ya kabati na kufungwa ndipo ziwe salama. Watafiti tu ndio wataweza kuona matokeo haya.

Kutojihusisha

Kila mhusika, una uhuru wa kukataa kuhusishwa katika utafiti huu wala hakuna hatari, machungu ama vitisho vyovyote vitakavyoambatana na uamuzi wako. Hata ukikubali kuitkia kutia sahihi wakati wowote ule unaweza kukatta kuendelea.

Mawasiliano

Watafiti ni Esta Mwaloma na msaidizi wake. Unaweza kuwasilian nao wakati wowote. Ukiwa na maswali mengine kuhusu utafiti huu unaweza kuwasiliana na KEMRI.

Esta Mwaloma
S.L.P: 55916-00200; Nairobi
Simu ya rununu: +254 720 954 660
Barua pepe: estamwaloma@gmail.com

AU Msimamizi;
Institute of Tropical Medicine and Infectious Diseases
Jomo Kenyatta University of Agriculture and Technology
S.L.P: 62200-00200; Nairobi
Simu: 067-52711
Barua pepe: itromid@kemri.org

AU Mwenyekiti;
KEMRI National Ethical Review Committee
S.L.P: 54840-00200; Nairobi

Simu: 2722541-2713349-0722-205901

Kujitolea

Nimeesoma ama nimeelezwa fomu hii na naelewa ya kuwa sijalazimishwa na wakati wowote naweza kusimamisha mahijiano haya. Nakubali kuwa katika utafiti huu.

_____

Sahihi ya mhusika Tarehe

_____

Sahihi ya mtafiti au msaidizi wake Tarehe

APPENDIX 2: QUESTIONNAIRE

Form serial number			
Research assistant's name			
Date of interview			

Part 1: Background

1. How old are you/ When were you born?

Year of Birth	
Age	

2. What is your education level?

0 No formal education	
1Primary	
2Secondary	
3College	
4University	

3. Where is your home?

1 Capital city	
2 Other city	
3 Town	
4 Country side	

5 Other

4. What is your employment status?

1 I work only around the home stead
2 I am a small scale farmer
3 I am self-employed but not as a farmer
4 I am on formal employment
5 I am retired or a pensioner

5. What is your religion?

1 Christian
2 Muslim
3 Traditional
4 Other (specify)

6. How long have you had Diabetes?

1 0 – 2 years
2 3 - 5 years
3 6 - 8 years
4 9 – 11 years
5 12 years and above

7. Which facility gave you this diagnosis?

1 Dispensary
2 Health Centre
3 Provincial Hospital
4 Referral Hospital
5 Private Hospital
6 Faith based Hospital
7 Pharmacy
8 Other

8. When you were first diagnosed what advice or treatment were you given?

0 None
1 Insulin injections
2 Tablets
3 Change diet and exercise
4 Lose weight
5 Both insulin and tablets

Part 2: Awareness of Diabetes management

9. Is diabetes hereditary?

0 No
1Yes
2 I don’t know

10. Can diabetes be cured?

0 No
1Yes
2 I don’t know

11. If you are a smoker or you take alcohol is it beneficial to stop?

0 No
1Yes

12. What is the normal fasting range for blood glucose?

0 I don’t know
1 3.9 – 5.6 mmol/l
2 4.4 - 6.1mmol/l

3 7.0 – 10.0 mmol/l
4 Other

13. Once blood glucose has been controlled should drugs be stopped?

0 No	
1Yes	
2 I don't know	

14. What effect does fruit juice have on blood glucose?

0 Don't know	
1 Lowers it	
2 Raises it	
3 Has no effect	

15. What effect does exercise have on blood glucose?

0 Don't know	
1 Lowers it	
2 Raises it	
3 Has no effect	

16. What effect does any other sickness have on blood glucose?

0 Don't know
1 An increase in blood glucose
2 A decrease in blood glucose
3No change in blood glucose
4 Either increases or decreases

17. How often do you visit the KNH Diabetes mini clinic in a year?

1 Once a year
2 Twice a year
3 Three times a year
4 Every month
5 Every 3 months
6 Every 2 months
7 Other

18. Please tell me which conditions I have listed a doctor has EVER said you may get from having Diabetes. 0 No 1 Yes

Diabetes complications	**Response**

Heart Disease/Hypertension	
Blindness	
Kidney disease	
Amputation of toe, foot, or leg	

Part 3: Self management practices

19. Which is the best method for testing glucose?

0 Don't know
1 Urine testing
2 Blood testing
3 Both are equally high
4 Other

20. Do you have a blood glucose meter?

0 No
1Yes

21. If not where do you regularly measure your blood glucose?

1 Dispensary
2 Health Centre
3 Provincial Hospital

4 Referral Hospital
5 Private Hospital
6 Faith based Hospital
7 Pharmacy
8 I test myself
9 Other

22. How often do you check your blood glucose?

0 I don’t check/ At clinic appointments
1 Once a day
2 Twice a day
3 Once a week
4 A few times a week
5 Every month
6 Other

23. What do you do to keep your diabetes under control?

0 Nothing
1 Inject insulin
2 Follow a special diet
3 Exercise
4 Take tablets for diabetes
5 Both tablets and insulin

24. How often do you check your feet for sores or red spots?

0 I don’t check
1 Once a week
2 Once a month
3 Everyday
4 Other

25. How often do you measure your weight?

0 At clinic appointments

1 Once a week
2 Once a month
3 Every six months
4 Other

26. How often do you measure your blood pressure?

0 At clinic appointments
1 Once a week
2 Once a month
3 Everyday
4 Other

27. If you suddenly feel shaky, nervous or hungry, what should you do?

0 Don’t know
1 Lie down and rest
2 Eat some form of sugar
3 Take more insulin or diabetes pills
4 Other

28. How often do you get your eyes checked?

0 Don't know
1 Every 6 months or sooner
2 Every year
3 Every two years
4 Every three or more years
5 Other

29. How often do you exercise?

0 I don't exercise (go to Q 30)
1Three times a week (go to Q31)
2 Daily (go to Q31)
3 Other

30. If you do, where do you exercise?

1At home
2 In a gym
3 Other

31. If you don’t, what prevents you from exercising?

1 I don’t have time
2 I don’t have money to go to the gym
3 My family/ society does not encourage me to exercise
4 I don’t know which exercises to do
5 I exercise
6 I fear exercising
7 I have a medical condition that prevents me
8 Other

32. How do you store your insulin?

0 I don’t use insulin

1 Refrigerator
2 Pot of cold water
3 Room temperature
4 Other

33. In the last 3 months, have you ever missed getting your prescribed insulin or diabetic pills from the hospital?

0 No
1 Yes
2 Don’t use Insulin/ diabetic pills

34. If yes, how frequently have you missed your supplies?

0 Never
1 Every month
2 Once or twice in 3 months

35. When you miss your supplies of insulin or diabetic pills, what do you usually do?

1 Buy your own
2 Wait till supplies are available from the hospital

3 Other

Part 4: Socioeconomic and cultural factors

36. Do you believe herbalists or witchdoctors can cure diabetes?

0 No	
1Yes	
2 Don't know	

37. If you do not have a blood glucose meter how much do you usually pay for the test?

1 0 - 99	
2 100 - 199	
3 > 200	

38. If you use insulin/tablets to manage your diabetes, how much do you spend on it monthly (plus syringes)?

1 0 - 499	
2 500 - 999	
3 > 1000	

39. How far is the nearest health facility from your home?

1 < 1km
2 Between 1 and 5 km
3 > 5 km

40. Where do you stay when you come for treatment at KNH?

1 Home is in Nairobi/Environs
2 Relatives
3 Hotel

41. Which means of transport do you use to access KNH?

1 Walking
2 Public transport
3 Personal car

42. How much does it cost to travel to and from KNH?

1 0 - 199
2 200 - 499
3 500 - 799
4 > 800

43 How many people accompany you when you are visiting KNH?

1 0
2 1
3 2
4 > 2

43. How much do you spend per visit to KNH (excluding transport)?

1 0 - 999
2 1000 - 1999
3 2000 - 2999
4 > 3000

44. Have you or your family hired someone to take care of you because of your ill health?

0 No
1 Yes

45. IF YES, How much do you pay this person each month?

1 0 - 999

2 1000 - 1999
3 2000 - 2999
4 > 3000

46. Does someone from your family take care of you because of your ill health without being paid for it?

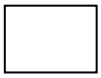
0 No
1 Yes

47. During the past 12 months, how did you pay for or get the medical services, care-givers, medicines, and medical supplies that you, yourself, used?

1 By spending out of your current income/pension
2 Donations of medicines or supplies
3 With financial support from friends or family
4 From saved money
5 By borrowing money
6 By selling possessions like furniture, animals or property

48. Please tell me which one of the following has prevented you from getting medicines or medical care, over the last 12 months:

1 Lack of funds to pay for the care
2 Lack of transportation
3 No one to help me get there/ Too sick to make the trip
4 Would have taken too long to go there/too far away
5 Would have had to wait too long once I was there
6 No doctor or other professional was available
7 I am able
8 Other



MASWALI

Nambari ya Fomu			
Jina la msaidizi wa utafiti			
Tarehe ya mahojiano			

Part 1: Background

1. Una miaka mingapi/ Ulizaliwa mwaka gani?

Mwaka wa kuzaliwa	
Miaka	

2. Umesoma mpaka kiwango kipi?

0 Sijasoma

1 Shule ya msingi
2 Shule ya upili
3 Chuo cha kadri
4 Chuo kikuu

3. Je, waishi wapi?

1 Mji mkuu
2 Mji mwingine
3 Mji mdogo
4 Mashambani

4. Hali yako ya ajira ni gani?

1 Nafanya kazi ya nyumbani
2 Mimi ni mkulima
3 Nimejiajiri lakini si kama mkulima
4 Nimeajiriwa
5 Nimestaafu

5. Dini yako ni gani?

1 Mkristo	
2 Muislamu	
3 Dini ya Kiasili	
4 Nyingine (fafanua)	

6. Umekuwa ukiuugua Diabetis kwa muda gani?

1 miezi - miaka miwili	
2 miaka tatu - miaka tano	
3 miaka sita - miaka nane	
4 miaka tisa -miaka kumi na moja	
5 miaka kuma na miwili - zaidi	

7. Hospitali gani ilikuambia kuwa una diabetis?

1 Zahanati
2 Hospitali ndogo
3 Hospitali ya mkoa
4 Hospitali kuu
5 Hospitali ya kibinafsi
6 Hospitali ya kidini
7 Duka la dawa

8. Ulipoambiwa kuwa una Diabetis uliambiwa nini kuhusu kuitawala?

0 Hakuna
1 Kudungwa insulin
2 Tembe
3 Kula kwenye afya na mazoezi ya mwili
4 Kupunguza kipimo
5 Tembe na kudunga insulin

Part 2: Awareness of Diabetes management

9. Je, diabetis ni ugonjwa wa kijamii?

0 La

1Ndio
2 Sijui

10. Je, diabetis yaweza kutibiwa?

0 La	
1Ndio	
2 Sijui	

11. Je, kuwacha kuvuta sigara ama kunywa pombe kuna manufaa?

0 La	
1Ndio	

12. Wakati hujakula chochote,kiwango cha sukari katika mwili ni ngapi?

0 Sijui	
1 3.9 – 5.6 mmol/l	
2 4.4 - 6.1mmol/l	
3 7.0 – 10.0 mmol/l	
4 Nyingine	

13. Kiwango kinachotakikana cha sukari kinakapotimia, unafaa kuacha kunywa dawa?

0 La	

1Ndio
2 Sijui

14. Juisi ya matunda inabadilisha vipi kiwango cha sukari chako?

0 Sijui
1 Inaongeza
2 Inapunguza
3 Haibadilishi

15. Je, mazoezi yanafanya nini kwa kiwango cha sukari yako?

0 Sijui
1 Inaongeza
2 Inapunguza
3 Haibadilishi

16. Magonjwa yanafanya nini kwa kiwango cha sukari yako?

0 Sijui
1 Inaongeza
2 Inapunguza
3 Haibadilishi
4 Saa zingine inapanda, saa zingine inashuka

17. Je, unamwona daktari wa klinkiki ndogo ya Daibetis ya KNH mara ngapi kwa mwaka kwa uangalizi?

1 Mara moja kwa mwaka

2 Mara mbili kwa mwaka
3 Mara tatu kwa mwaka
4 Kila mwezi
5 Kila baada ya miezi tatu
6 Kila baada ya miezi miwili
7 Nyingine

18. Tafadhali niambie magonjwa yale daktari amekuelezea kuwa unawea pata kuotkana na Diabetis. 0 La 1 Ndio

Magonjwa	**Ndio au LA**
Ugonjwa wa moyo/ Presha	
Upofu	
Ugonjwa wa figo	
Kukatwa mguu au jino la mguu	

Part 3: Self management practices

19. Je, kipi ni kipimo bora cha sukari chako?

0 Sijui
1 Kipimo cha mkojo
2 Kipimo cha damu
3 Vyote viko sawa

20. Je, una kifaa cha kupima sukari yako?

0 La
1Ndio

21. Kama huna kifaa cha kupima glukos, unapimwa wapi kawaida?

1 Zahanati
2 Hospitali ndogo
3 Hospitali ya mkoa
4 Hospitali kuu
5 Hospitali ya kibinafsi
6 Hospitali ya kidini
7 Duka la dawa
8 Najipima

22. Umejipima au umepimwa kiwango cha sukari mara ngapi?

0 Sipimi/ Napimwa nikija kwa clinic
1 Kila siku
2 Mara 1-2 kwa siku
3 Mara moja kwa wiki
4 Mara kadhaa kwa wiki
5 Kila nwezi
6 Nyingine

23. Je, wafanya nini ili sukari yako iwe katika kiwango kinachotakikana?

0 Hakuna
1 Natumia insulin
2 Nakula chakula maalum
3 Mazoezi
4 Nanywa dawa za diabetis
5 Nanywa dawa na kudunga insulin

24. Je, wakagua miguu yako mara ngapi kuangalia vidonda?

0 Sikagui
1 kila wiki
2 kila mwezi
3 kila siku
4 Nyingine

25. Je, wajipima mara ngapi kwa mwaka?

0 Nikija kwa clinic
1 Kila wiki
2 Kila mwezi
3 Kila miezi sita
4 Nyingine

26. Je, wapia pressure mare ngapi?

0 Nikija kwa clinic
1 Kila wiki
2 Kila mwezi
3 Kila siku
4 Nyingine

27. Ukihisi njaa, kutetemeka ama kutoa jasho, unafaa kufanya nini?

0 Sijui
1 Kulala na kupumzika
2 Kula kitu chenye sukari
3 Kunywa tembe za diabetis ama kuongeza insulin
4 Nyingine

28. Je, unakaguliwa macho mara ngapi?

0 Sijui
1 kila miezi sita
2 Kila mwaka
3 Kila miaka miwili
4 Kila miaka tatu ama zaidi

5 Nyingine

29. Je, wafanya mazoezi?

0 La (enda Q 30)	
1 Mara tatu kwa wiki (enda Q31)	
2 Kila siku (enda Q31)	
3 Nyingine	

30. Kama unfanya, wafanyia wapi?

1 Nyumbani	
2 Kwa gym	
3 Nyingine	

31. Kama hufanyi,ni kwa nini?

1 Sina wakati	
2 Sina pesa ya kenda kwa gym	
3 Famila/ jamii hainiruhusu kufanya mazoezi	
4 Sijui nifanye mazoezi yapi	
5 Nafanya mazoezi	
6 Naogopa kufanya mazoezi	
7 Hali yangu ya afya hainiruhusu kufanya	

mazoezi
8 Nyingine

32. Unahifadhi vipi insulin?

0 Situmii insulin
1 Jokofu/friji
2 Chungu cha maji baridi
3 Joto la kawaida chumbani
4 Nyingine

33. Katika miezi 3 iliyopita, umewahi kukosa insulin/ tembe za diabetis yako hospitalini?

0 Ndiyo
1 Hapana
2 Situmii insulin ama tembe

34. Kama jibu la swali iliyopita ni Ndiyo, Je umekosa mara ngapi?

1 Kila mwezi
2 Mara moja au mbili katika miezi 3

35. Ukikosa insulin au sindano huwa unafanya nini?

1 Nanunua mwenyewe
2 Nasubiri mpaka nipate kutoka hospitali

Part 4: Socioeconomic and cultural factors

36. Je, waamini kuwa waganga ama madaktari wa mitshamba wanaweza kutibu diabetis?

0 La
1Ndio
2Sijui

37. Kama huna, walipa pesa ngapi kupimwa?

1 0 - 99
2 100 - 199
4 > 200

38. Kama watumia insulin watumia pesa nagpi kila mwezi kuinunua (pamoja na sindano)?

1 0 - 499
2 500 - 999
3> 1000

39. Umbali wa zahanati iliyo karibu zaidi ni gani?

1 < 1km
2 Between 1 and 5 km
3> 5 km

40. Ukija wa matibabu Kenyatta wakaa wapi?

1 Natoka Nairobi ama karibu	
2 Kwa familia	
3 Kwa hoteli	

41. Watumia mbinu gani kufika Kenyatta?

1 Natembea	
2 Matatu au Basi	
3 Gari langu	

42. Watumia pesa ngapi kusafiri toka nyumbani na kurudi toka Kenyatta?

1 0 - 199	
2 200 - 499	
3 500 - 799	
4> 800	

43. Waletwa na watu wangapi Kenyatta?

1 0	
2 1	
3 2	
4> 2	

44. Watumia pesa ngapi ukija Kenyatta (toa nauli)?

1 0 - 999	
2 1000 - 1999	
3 2000 - 2999	
4 > 3000	

45. Je, wewe ama familia yako imeajiri mtu wa kukuangalia juu ya ugonjwa wako?

0 La	
1 Ndio	

46. Kama ndio, wampipa pesa ngapi kila mwezi?

1 0 - 999	
2 1000 - 1999	
3 2000 - 2999	
4 > 3000	

47. Kuna mtu anakuangalia kwa ajili ya ugonjwa wako bila malipo?

0 La	
1 Ndio	

48. Kwa mwaka uliopita umetumia pesa toka wapi kulipia madawa

unayoutumia?

1 Pesa nazozoipata kwa mwezi/ pensheni
2 Wapaji wa madawa
3 Familia na marafiki
4 Akiba
5 Kuomba
6 uuza wanyama au shamba

Tafadhali niambie kama sababu yeyote imekufanya usipate matibabu katika mwaka moja:

1 Kukosa fedha za hospitali
2 Kukosa mbinu ya kesafiri
3 Hakuna mtu wa kunipeleka/ Mgonjwa sana kuenda
4 Ningechukua mud asana kuenda/ Iko mbali sana
5 Ningengoja sana kama ningeenda
6 Daktari ama msaidizi wake hakuwa
7 Sina shida yeyote
8 Nyingine

APPENDIX 3: APPROVAL LETTERS

CITI Collaborative Institutional Training Initiative

Biomedical Research - Basic/Refresher Curriculum Completion Report
Printed on 3/17/2012

Learner: Esta Mwaloma (username: emwaloma)
Institution: Kenya Medical Research Institute
Contact Information Department: Centre for Public Health Research
Email: estamwaloma@gmail.com

Biomedical Research - Basic/Refresher: Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in biomedical research with human subjects.

Stage 1. Basic Course Passed on 03/17/12 (Ref # 7623946)

Required Modules	Date Completed	Score
Belmont Report and CITI Course Introduction	03/11/12	3/3 (100%)
History and Ethical Principles	03/11/12	5/6 (83%)
Basic Institutional Review Board (IRB) Regulations and Review Process	03/11/12	5/5 (100%)
Informed Consent	03/11/12	4/4 (100%)
Social and Behavioral Research for Biomedical Researchers	03/12/12	3/4 (75%)
Records-Based Research	03/12/12	1/2 (50%)
Genetic Research in Human Populations	03/15/12	1/2 (50%)
Research With Protected Populations - Vulnerable Subjects: An Overview	03/15/12	3/4 (75%)
Vulnerable Subjects - Research Involving Prisoners	03/15/12	4/4 (100%)
Vulnerable Subjects - Research Involving Children	03/15/12	3/3 (100%)
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates	03/15/12	3/3 (100%)
International Studies	03/16/12	1/1 (100%)
FDA-Regulated Research	03/16/12	4/5 (80%)
Research and HIPAA Privacy Protections	03/16/12	4/5 (80%)
Vulnerable Subjects - Research Involving Workers/Employees	03/16/12	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects	03/17/12	4/5 (80%)
Avoiding Group Harms: U.S. Research Perspectives	03/17/12	2/3 (67%)
Avoiding Group Harms: International Research Perspectives	03/17/12	3/3 (100%)
I Have Agreed to be an IRB Community Member. Now What?	03/17/12	4/5 (80%)
Stem Cell Research Oversight (Part I)	03/17/12	2/5 (40%)
Kenya Medical Research Institute	03/17/12	no quiz

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840-00200, NAIROBI, Kenya
Tel (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org info@kemri.org Website:www.kemri.org

ESACIPAC/SSC/101063 22nd November, 2012

Esta Mwaloma

Thro'
Director, CPHR
NAIROBI

Forwarded
23/11/2012

REF: SSC No. 2387 (Revised) – Factors affecting diabetes management in diabetic women aged 50 years and above at Kenyatta National Hospital.

I am pleased to inform you that the above mentioned proposal, in which you are the PI, was discussed by the KEMRI Scientific Steering Committee (SSC), during its 196th meeting held on 5th November, 2012 and has since been approved for implementation by the SSC.

Kindly submit 4 copies of the revised protocol to SSC within 2 weeks from the date of this letter i.e, 6th December, 2012.

We advise that work on this project can only start when ERC approval is received.

Sammy Njenga, PhD
SECRETARY, SSC

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Website: www.uonbi.ac.ke
Link:www.uonbi.ac.ke/activities/KNHUoN

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi
13 December 2012

Mwalcma Esta
TM310-1132/2011
JKUAT

Dear Esta

RESEARCH PROPOSAL: FACTORS AFFECTING DIABETES MANAGEMENT AMONGST DIABETIC WOMEN AGED 50 YEARS AND ABOVE AT KENYATTA NATIONALHOSPITAL (P430/07/2012)

This is to inform you that the KNH/UoN-Ethics & Research Committee (KNH/UoN-ERC) has reviewed and **approved** your above revised proposal. The approval periods are 13th December 2012 to 12th December 2013.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH/UoN ERC before implementation.
c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH/UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.
g) Submission of an *executive summary* report within 90 days upon completion of the study This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

For more details consult the KNH/UoN ERC website **www.uonbi.ac.ke/activities/KNHUoN**

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KEMRI/RES/7/3/1 **April 18, 2013**

TO: **ESTA MWALOMA (PRINCIPAL INVESTIGATOR)**

THROUGH : **DR. YERI KOMBE;**
DIRECTOR, CPHR forwarded 30/4/2013

RE: **SSC PROTOCOL NO. 2387 – REVISED (*RE-SUBMISSION*): FACTORS AFFECTING DIABETES MANAGEMENT AMONGST DIABETIC WOMEN AGED 50 YEARS AND ABOVE AT KENYATTA NATIONAL HOSPITAL**

Make reference to your letter dated March 25, 2013, Received on March 27, 2013.

We acknowledge receipt of;
a. The Revised Study Protocol
b. The Revised Informed Consent Documents

This is to inform you that the Ethics Review Committee (ERC) reviewed the document listed above and is satisfied that the issues raised at the 211th meeting held on 6th February, 2013 have been adequately addressed.

The study is granted approval for implementation effective this **18th day of April 2013**. Please note that authorization to conduct this study will automatically expire on **April 17, 2014**. If you plan to continue with data collection or analysis beyond this date, please submit an application for continuing approval to the ERC Secretariat by **March 7, 2014**.

Any unanticipated problems resulting from the implementation of this protocol should be brought to the attention of the ERC. You are also required to submit any proposed changes to this protocol to the ERC to initiation and advise the ERC when the study is completed or discontinued.

You may embark on the study.

Sincerely,

EAB

Dr. Elizabeth Bukusi,
ACTING SECRETARY,
KEMRI/ETHICS REVIEW COMMITTEE

0722 954 660

OFFICE OF THE GRADUATE
RECEIVED
04 SEP 2013
PROGRAM COORDINATOR
ITROMID

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

DIRECTOR, BOARD OF POSTGRADUATE STUDIES

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RFF: BPS/ TM310-1132/2011

8th August, 2013

Ms. Esta Mwaloma
c/o COHES
JKUAT

Dear Ms. Mwaloma

RE: APPROVAL OF RESEARCH PROPOSAL AND SUPERVISORS

Kindly note that your research proposal entitled: **"Factors affecting Diabetes management amongst diabetic women aged 50yrs and above at Kenyatta National Hospital"** has been approved. The following are your approved supervisors:-

1. Dr. Joseph Gikunju
2. Mr. Joseph Mutai

Yours sincerely

PROF. BERNARD OTOKI MOIRONGO
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

Copy to: Ag. Principal, COHES

/pw