FACTORS INFLUENCING MANAGEMENT AND CONTROL OF DIABETES MELLITUS IN HEALTH PROJECTS: A CASE OF BUNGOMA COUNTY HOSPITAL IN BUNGOMA COUNTY, KENYA

BY
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A RESEARCH REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR AWARD OF THE DEGREE OF MASTER OF ARTS IN PROJECT PLANNING AND MANAGEMENT OF THE UNIVERSITY OF NAIROBI

2015
DECLARATION

This research project is my original work and has not been presented for the award of any degree in any other university.

Sign……………………………………… Date ………………………………………

Fridah Namukhula
REG.NO L50/71666/2014

This research project has been submitted for examination with my approval as the University Supervisor.

Sign ………………………………………………... Date ………………………………………

Prof. Charles Rambo
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DEDICATION

This research project is dedicated to my entire family for encouraging me through my entire studies and particularly to my husband Peter Aura for financial support, my daughters Gina Mando and Marie Zanta for their encouragement and my beloved Mother, Mary Makokha for her constant prayers and teaching me the virtues of hard work and perseverance.
ACKNOWLEDGEMENT

I wish to extend my sincere gratitude to everyone who contributed towards the successful completion of my project. I thank the almighty God for His grace which is sufficient for me and has ensured completion of this work.

Special acknowledgement to my supervisor Prof Charles Rambo for his immense guidance and assistance. I would also wish to appreciate all my lecturers especially Prof. David Macharia for his mentorship, the members of staff of the Nairobi Extra mural Centre for their assistance and support. Special gratitude goes to the Bungoma County Hospital health workers in the diabetes Clinic for their support in ensuring successful data collection and to the University of Nairobi Library College Of Health Sciences who ensured that all the relevant literature was at my disposal.

I am indebted to my dear husband Peter Aura who encouraged me and for his financial support. Last but not least to all my classmates and friends for their thoughtful encouragement and objective criticism throughout the entire process.
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<td>T2DM</td>
<td>Type two diabetes Mellitus</td>
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<td>NCDs</td>
<td>Non-communicable diseases</td>
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<td>CVD</td>
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<td>KNH</td>
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<td>Low- and middle-income countries</td>
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<td>IDF</td>
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<td>DMI</td>
<td>Diabetes Management and Information Centre</td>
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<tr>
<td>DSMS</td>
<td>Diabetes self monitoring system</td>
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<td>WDF</td>
<td>World Diabetes Federation</td>
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<td>CDC</td>
<td>Center for Disease Control and Prevention</td>
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<td>ADA</td>
<td>American Diabetes Association</td>
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<td>CDA</td>
<td>Canadian Diabetes Association</td>
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<td>SSA</td>
<td>Sub Saharan Africa</td>
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<td>MENA</td>
<td>Middle East and North Africa</td>
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<td>SEA</td>
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<td>AFR</td>
<td>African Regions</td>
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<td>SPSS</td>
<td>Statistical Package for Service Solution</td>
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<td>AMPATH</td>
<td>Academic Model Providing Access to Healthcare</td>
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ABSTRACT

Diabetes mellitus is among the top four leading non communicable diseases after cardiovascular diseases, cancer and respiratory diseases; and has been increasing worldwide with its prevalence increasing in Kenya as well. Diabetes mellitus has been described by WHO (2014) as a chronic disease which occurs when the pancreas does not produce enough insulin or when the body cannot effectively use insulin it produces leading to increased glucose in the blood. Poorly managed diabetes mellitus leads to complications such as kidney failure, blindness and limb amputations due to poor blood circulation to the heart and limbs. Diabetes mellitus is one of the common public health issues facing the world with its management and premature mortality affecting the total health care expenditure in several countries, especially in less developed and poor ones. The purpose of this study was to investigate Factors Influencing Management and Control of diabetes mellitus in Health Projects: A case of Bungoma County Hospital in Bungoma County, Kenya. The study was guided by three objectives that is: To determine how professionalism of health workers influence management and control of diabetes mellitus in health projects.; To assess the extent to which medical facilities and infrastructure influence the management and control of diabetes mellitus in health projects and; To establish how networking and partnership linkages influences management and control of diabetes mellitus in health Projects. A descriptive cross sectional survey study was used to a target population of 117 respondents. Stratified proportionate sampling was used to select a sample of 91 respondents that consisted of 76 patients and 15 health workers. A questionnaire was used to collect primary data. The quantitative data collected was analyzed by descriptive analysis using frequencies, percentages, means and standard deviations. Tables were used to summarize responses for interpretations and further analysis and to facilitate comparison. In addition, a content analysis was used to give in depth observations, ideas and attitude to determine the effects of some variables conducted. The results of data analysis were presented in form of frequency tables for interpretation. The study found that professionalism of health workers influence management and control of diabetes mellitus in health projects. The study further established that medical facilities and infrastructure influenced management and control of diabetes mellitus in health projects. Equally, networking and partnership linkages were essential in improvement of service delivery. The study hence concluded that better management and control of diabetes mellitus in health projects was influenced by professionalism of health workers, medical facilities and infrastructure and networking and partnership linkages. The study recommends the need for free oral medications and insulin drugs for diabetes patients as is with the case of HIV and AIDS and tuberculosis to prevent complications related to diabetes mellitus. The government of Kenya through the Ministry of health should provide adequate screening and diagnostic equipment at subsidized screening charges levied to enhance early detection of diabetes mellitus to the general public. The study also recommended that the government of Kenya through Ministry of Health should ensure adequate capacity building and training of diabetes specialists. This will help curtail the continuous increase in the incidence of diabetes in the country and the management of the complications associated with diabetes mellitus in people who live with diabetes.
CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Diabetes mellitus is a chronic disease and is among the top four non communicable diseases [NCDs]. Just like the other three NCDs (cardiovascular diseases (CVD), cancers, and chronic respiratory diseases) diabetes is of long duration and generally of gradual progression World Health Organization (WHO, 2015).

WHO (2014) in a global status report on NCDs defines diabetes mellitus as a chronic disease which occurs when the pancreas does not produce enough insulin or when the body cannot effectively use insulin it produces leading to increased glucose in the blood (hyperglycemia). There are three types of diabetes. Type 1 diabetes (Juvenile Diabetes) which affects mostly children and young adults, it results from insulin insufficiency due to destruction of pancreatic cells. Type 2 diabetes mellitus [T2DM] accounting for 85% to 95% of all cases characterized by insulin resistance when the body no longer uses the insulin properly. The third type is gestational diabetes which occurs during pregnancy (WHO, 2014). This study focused mainly on T2DM which is quite prevalent and can easily be prevented.

Peer, Pascal, Motala and Mbanya (2013) in a study on diabetes in Africa say that the prevalence of undiagnosed diabetes in Africa Regions [AFR] is escalating. The considerable variance in the prevalence of the disease and its risk factors among AFR communities and urban rural locations and sub populations is a reflection of the varying rate at which communities are developing. The risk factors exacerbating diabetes mellitus prevalence in AFR include; Urbanization and ageing, obesity especially in urban areas; insufficient and inaccessible affordable and optimal health care facilities and medication for management of diabetes coupled with poor knowledge on diabetes information. The weak health care systems and work forces; Poor documentation of risk factors which are poorly addressed in most SSA countries; lack of diabetes surveillance systems; limited funding or no funding on health care by governments has worsened the situation.
International Diabetes Federation (IDF, 2014) remarks that the rise in the number of diabetes cases has become a major public health concern worldwide. Globally, the greatest number of people with diabetes is between 40 and 59 years of age with about 179 million people with undiagnosed diabetes. For instance, in 2014, diabetes mellitus caused 4.9 million deaths, while more than 21 million live births were affected by diabetes pregnancy in 2013. By 2030, it is estimated that 23.9 million adults in SSA will have diabetes mellitus. The rise in the number of diabetic cases has become a major public health concern worldwide. There are currently around 382 million people with diabetes across the globe, and this figure is projected to rise to 592 million by 2035 in the globe if no mitigation measures are put in place. An estimated 80% of these cases are in low- and middle-income countries (IDF Atlas, 2013).

Data on the condition of people with diabetes in SSA and the complications of diabetes that they suffer is very scarce. For instance in 2011 in SSA, 14.7 million diabetes cases were reported. Thus, around 3.8% (IDF Atlas, 2011) of all people with diabetes are currently in this region, and the number of individuals with diabetes in SSA is expected to double by 2030. Diabetes pandemic is at crisis levels. Millions of patients suffer disabling and life-threatening complications such as heart attack, stroke, kidney failure, blindness and amputation. Diabetes mellitus is also implicated in and has negative consequences for certain infectious diseases, other than non-communicable diseases (Peer et al; 2013).

In Europe, T2DM cases are estimated to be at 56 million (Tamayo, Rosenbauer, Wild, Spijkerman, Baan, Forouhi and Rathman 2013). Middle East and North Africa [MENA] prevalence of diabetes mellitus is approximated at around 9.2%. Of the 34 million affected with diabetes mellitus, virtually 17 million were undiagnosed in 2013. In Tanzania, more than one million people had diagnosed diabetes in 2006 and the diabetes prevalence rate had reached 9.1% by 2012 (WHO, 2012). In Kenya, diabetes mellitus is presently a major threat with close to two million Kenyans living with diabetes, and 1000 new cases diagnosed each day (MOH, 2012) In fact, WHO, (2013) resonates that the disease is expected to triple between now and 2030 if nothing is done while Jalang’o (2014) asserts that about 60% and 50% of patients in Kenya with renal and cardiac complications respectively are as a result of diabetes, and about
three quarter of these patients attend diabetes clinic hence highlighting the escalating statistics of the disease.

Type 2 diabetes mellitus is the leading cause of mortality among those with CVD (Joseph and Golden, 2014). Furthermore, 20% to 50% of people with diabetes develop co morbidities that greatly increase the economic burden on health care systems (IDF, 2007). The rapid increase in diabetes prevalence in over a decade poses a challenge to care as it requires urgent healthcare response, which may not be possible in many developing economies of Africa (Motala, 2002). According to Peer et al; (2013), over the next 20 years, SSA, and MENA regions will shoulder the greatest increase in diabetes mellitus as 76% of deaths are in people below 60 years of age. This may be a conservative figure given the inadequate and poor documentations on the disease

1.1.1 The symptoms of diabetes mellitus
According to (Canada Diabetes Association [CDA], 2012) diabetes mellitus is a complex, chronic illness requiring continuous medical care with multi factorial risk-reduction strategies beyond blood glucose control. The commonest symptoms include: frequent urination in large quantities; unusual and excessive thirst; extreme hunger at all times; unusual weight loss; extreme fatigue; irritability; nausea and vomiting; and sweet smelling breath especially in type 1 diabetes. T2DM symptoms include: blurred visions, frequent infections such as recurring skin, gum, or bladder infections; slow healing of wounds; tingling or numbness in the hands or feet; itching of the skin and genitals and drowsiness.

1.1.2 The Causes of diabetes mellitus
The major causes of diabetes mellitus are rapid, unplanned urbanization, globalization and lifestyle modifications; ethnicity; gender, age and socio economic burdens. In Europe, Tamayo et al; (2013) equates the high prevalence of T2DM cases to be associated with age, obesity and dietary intake, genetic predisposition alongside modifiable risk factors such as smoking behavior, environmental pollutants, psycho social factors and social economic deprivation.
Majeed, Sayeed, Khoja, Alshamsan, Millett and Rawaf (2013), highlights the disease prevalence from rapid economic development, urbanization, physical inactivity, overweight and obesity to consumption of highly processed carbohydrates in MENA. While in Africa Peer et al; (2013) cites that diabetes mellitus prevalence is due to: increasing age of its communities; rapid urbanization leading to change in lifestyle, with a marked decrease in physical activities leading to obesity and overweight; In addition changes in nutrition where focus is on western and highly processed foods full of saturated fats and sugars contributes to the disease prevalence. In Kenya, Maina, Ndegwa, Njenga and Muchemi (2010), indicate that increased dependency on highly processed foods, decline in physical activity, tobacco and alcohol use are the risk factors attributed to the incidences of diabetes trend.

1.1.3 The Long Term Complications of Diabetes Mellitus
Undiagnosed and or poorly controlled diabetes can lead to premature deaths, lower limb amputation due to poor healing of wounds; dental diseases, miscarriages and still births impotence, and kidney disease. A person with diabetes is four times more likely to become blind than a person without diabetes (CDA, 2012). For instance retinopathy (damage to the retina of the eye) is a major cause of adult blindness in North America which is caused by high blood glucose, especially coupled with high blood pressure, damaging the small blood vessels in the retina of the eye. Diabetics are also at increased risk of developing cataracts and glaucoma. According to Mbanya, (2011) diabetes mellitus also worsens major infectious diseases such as Tuberculosis (TB), HIV/AIDS and malaria. Diabetes mellitus and malaria frequently occur together in countries where malaria is endemic thus complicating the treatment and hence high mortality cases for people with both. HIV/AIDS has also been attributed to the risk of diabetes mellitus as some anti-retroviral treatments (ART) can cause the disease.

1.1.4 Social and Economic Burdens of Diabetes Mellitus
The Global Diabetes Plan (2011-2021) shows that over the next 20 years, Africa, Middle East and South East Asia regions will shoulder the greatest increase in diabetes mellitus prevalence as three out of four people with diabetes live in these low-and middle-income countries. The ten-fold increase in diabetes mellitus prevalence poses a challenge to healthcare as it requires urgent healthcare response, which may not be possible in many developing countries.
Globally, governments are struggling to meet the cost of diabetes care costs to employers and national economies are escalating and every day low-income families are driven into poverty by loss of earnings due to diabetes and the life-long costs of healthcare. In some countries children and young people die for lack of insulin without ever being diagnosed (Ping, Brown, Vistisen, Richard and Nichols 2012). According to (IDF, 2014) diabetes mellitus imposes an increasing economic burden on national health care systems. In the meantime, the very low expenditures per capita in poor countries demonstrate that more resources are required to provide basic diabetes care as it results in high healthcare costs, loss of labour, productivity and decreased rates of economic growth as a result of chronic absenteeism by ailing workers. To put the case into perspective, in 2011 healthcare expenditure for diabetes totaled USD 465 billion equivalent to 11% of total health spending globally with a projection of escalating to USD 595 billion by 2030 without investing in making effective treatments for preventing diabetes complications (IDF 2009). The World Economic Forum has consistently identified NCDs (including diabetes) as a global risk for business and communities. The losses in national income from largely preventable deaths from diabetes mellitus, heart disease and stroke are enormous; For instance those losses are estimated to reach USD 558 billion in China, USD 303 billion in Russia, and USD 237 billion in India from 2005 to date hence more prevention efforts are needed to reduce this burden (IDF, 2007).

Premature death is one element of lost income. Many people with diabetes suffer potentially preventable disabling complications which stop them from working, representing a substantial loss to the economy and drive families into poverty and deprive children of opportunities for healthy nutrition, education and future employment especially in countries where there is no social protection. Diabetes hence impacts on poverty and undermines human development. According to Kenya Diabetes Strategy (2010-2015) the cost of treatment and productivity loss undermines and inhibit economic growth and negatively impact on realization of Kenya’s Vision 2030 and the Millennium Sustainable Development goal targets. With a mean wage of one dollar per day for the low income Kenyan, diabetes costs are way beyond their reach as priority is on food rather than medications. Therefore, with its numerous complications, diabetes management requires joint effort of various health care personnel such as diabetologists, ophthalmologists, neurologist, and physician specialist nurses, nutritionists and dietitians.
Apart from the human resources required for proper management of diabetes, other resources such as equipment and instruments are equally important for treatment and management of diabetes. The equipment include: sphygmomanometers for blood pressure measurement; electrocardiographs for measuring heart beat, enzyme linked immunosorbent assay (ELISA), spectrophotometers determining glucose concentration in urine, and glucometer for assessing blood sugar levels. It is therefore expected that a hospital must have a diabetic clinic and the required personnel and services to manage diabetes mellitus properly which unfortunately are inadequate in developing countries.

For effective treatment, stronger healthcare systems, opening up existing medical resources to care for both infectious diseases and NCDs, more efficient distribution of medicines, and education and information to encourage people to maintain a healthy lifestyle, delaying or preventing the development of diabetes; use of diabetic registry, implementations of a patient registry system to enable data collection and patient follow ups are crucial for sharing the benefit of the development of health care systems in developing countries in management and control of diabetes (Motala, 2010).

International Diabetes Federation, (2013) says management and control of diabetes mellitus in Africa has been compounded by a number of challenges that are from; difficult geographical and financial access to diabetes care such as lack of medicines, consultation and analysis facilities, lack of adequate trained health professionals to manage diabetes; inadequate prevention programs; health systems which are not adapted to managing chronic diseases, and focusing on priorities such as HIV, Malaria, Tuberculosis, impacting on treatment and screening accessibility. In addition, nonexistence of diabetes registries limits the accurate estimation of the epidemiology of diabetes in Africa regions.

South Africa and Ghana have steered management of diabetes mellitus by putting adequate measures to ease the burden. For instance in 1996, the Centre for Diabetes and Endocrinology (CDE) for the treatment and management of diabetes mellitus was launched to curb the shortage of trained endocrinologists/diabetologists and other health-care professionals; medical insurance schemes were set up to mitigate the financial costs in the management
regimen and financial incentives for health-care providers to motivate them and hence improve diabetes care in South Africa (Distiller, 2004). While Ghana has a NCD policy related to five strategic areas: Primary prevention – tobacco, diet, physical activity, alcohol and immunization; Early detection and provision of treatment services; Training of health workers and developing human resource capacity; Provision of essential drugs and supplies; Integration of NCD plans into wider health systems planning; Ensure financial mechanisms for improved allocation and efficient use of funds Research and development and Surveillance of NCDs and their risk factors (MoH Ghana, 2012).

In Kenya, diabetes mellitus prevalence has been on increase and is currently classified among the leading non-communicable diseases of public concern. Official statistics in Kenya by Ministry of Health [MOH] notes a diabetes prevalence of 10% of the population. Epidemiological surveys conducted by the Nairobi-based Diabetic Management and Information Center [DMI] gave the estimated prevalence of diabetes mellitus in Kenya above 6% in 2007. In some rural parts of the country such as Nyeri in Central Kenya and Kilifi in the Coast province the prevalence is as high as 11.6% and above 20% among the richer families in the major urban centers (Chege, 2007).

1.2 Statement of the Problem
Diabetes mellitus is a silent, but imminent, public health problem that imposes substantial challenges on the healthcare systems as well as on the economy of most developing nations. This is because a significant proportion of persons who suffer from the condition in SSA countries are within the reproductive age yet these are the same individuals expected to drive the economic machinery in these nations so as to achieve the set millennium development goals (Foma, Saidu, Omoleke and Jafali, 2013).

Poorly managed diabetes mellitus may lead to lifelong complications such as blindness, renal failure, impotence, increased risk of Cardio Vascular Diseases, stroke, and poor blood supply to the limbs leading to amputations. Most of these complications are irreversible and also costly to manage as they generally require management in specialized centers with sophisticated infrastructure and equipment, well trained staff and strong medications, which are all scarce in SSA (IDF, 2013).
In Kenya, prevalence of diabetes mellitus is expected to triple by 2030 (WHO, 2013). Given that the disease has emerged as a major public health concern with inadequate health infrastructure to address this challenge, effective control and prevention strategies based on sound educational programs need to be defined and implemented (Jane et al. 2011).

According to Maina et al. (2010) educational programs help assess people’s risks of diabetes, motivate them to seek proper treatment and care and inspire them to take charge of the condition. In addition, availability and accessibility of screening equipment enables early detection and treatment of complications as well as enhanced early referrals of cases to specialized centers for management and follow-up. However, there are great concerns whether these programmes are achieving the desired goal of management and prevention of diabetes mellitus in developing countries (Omooleke, 2013). Despite the high levels of awareness creation, several studies consistently show that diabetes mellitus prevalence is still on the rise and strategies on approaches that are necessary for the prevention and control of diabetes mellitus seems to be significantly low (Muninarayana, 2010).

The trend of diabetes mellitus demonstrates that there is a problem at hand in Kenya and globally. While there are efforts by the government and other stakeholders to improve provision of health services in Kenya, for example awareness creation, diabetes outreach campaigns, health education, screening services to the general public and networking with institutions to help in management and control of diabetes mellitus, there are major gaps in relation to availability of healthcare services especially at community level. In addition, various studies and researches have been conducted on diabetes management and prevention, patient knowledge on self management and diabetes education. However no research has been done in Kenya on factors influencing management and control of diabetes mellitus in health projects in Bungoma County Hospital in Bungoma County. Little knowledge exists if any in relation to availability of professionalism of health workers; medical facilities and infrastructure; networking and partnership linkages in management and control of diabetes mellitus, that necessitated the need for this study. It is therefore critical to examine the management protocol of diabetes mellitus hence need to stick down to investigate factors influencing management and control of diabetes mellitus in Health Projects.
Based on the trend of diabetes mellitus, Otieno and Macharia (2012) indicate that there is a problem not only in Kenya but globally. Various studies conducted to assess factors that influence utilization of health services internationally and even in Kenya show deficiencies in the health sector with major concerns in; cost of health services and quality of services, inadequate health facilities and infrastructure and insufficient health work force, highlighting the state of the nation’s health care system and policies in place that are not favorable in management of Non Communicable Diseases diabetes included.

Many clinical studies and researches have been conducted on therapeutic approaches on diabetes management globally. For instance lifestyle modification in diabetes management and prevention, Awareness creation, Patient knowledge on self management and dietary intake, yet none had been done on the management and control of diabetes mellitus based on three independent variables that is; professionalism of health workers, medical facilities and infrastructure; networking and partnership linkages as factors contributing to management and control of diabetes mellitus in health projects. It was against these realizations that the study aimed to bridge this knowledge gap and attempted to investigate on the Factors Influencing Management and Control of diabetes mellitus in Health Projects; A case of Bungoma County Hospital in Bungoma County, Kenya.

1.3 Purpose of the Study
The purpose of this study was to establish the factors influencing management and control of diabetes mellitus in health projects: A case of Bungoma County Hospital in Bungoma County, Kenya.

1.4 Objectives of the Study
This study was guided by the following objectives:
1. To determine how professionalism of health workers influence management and control of diabetes mellitus in health projects.
2. To assess the extent to which medical facilities and infrastructure influence the management and control of diabetes mellitus in health projects.
3. To establish how networking and partnership linkages influence management and control of diabetes mellitus in health projects.

1.5 Research Questions
This study sought to answer the following research questions:
1. How does professionalism of health workers influence management and control of diabetes mellitus in health projects?
2. To what extent do medical facilities and infrastructure influence management and control of diabetes mellitus in health projects?
3. How does networking and partnership linkages influence management and control of diabetes mellitus in health projects?

1.6 Significance of Study
The findings of this study may be used by health care professionals to develop health education curricula in institutions so as to empower the patients and general public on the best way to prevent, control and manage diabetes mellitus leading to improved quality life in patients with diabetes and their care givers. In addition, the findings may give an in depth information and foster better relationship between the health care workers and the patients despite the challenges in management and prevention of the disease.

The recommendations of this study may be relevant to the Ministry of Health especially department of Center for Disease Control and Prevention to help in scaling up programmes to halt and reverse the rising trend of diabetes mellitus; emphasize the need for the governments to have a role in responding to the diabetes pandemic through networking and partnerships linkages by provision of adequate improved health facilities, joint capacity building of health personnel and diagnostic services besides adequate medication and support people living with diabetes; improve capacity at the primary health care level; ensure access to treatment, screening services and diabetes education at all levels of learning institutions. The study recommendations may assist policy makers, emphasize on preventive health care and serve as a model for managing other chronic ailment. Finally, the finding of this study may contribute to the current literature on
management and control of diabetes, and serve as a foundation base for future studies by other researchers.

1.7 Delimitations of the Study
This study was limited to the factors influencing management and control of diabetes mellitus at the Bungoma County Hospital in Bungoma County, Kenya that serves patients from Bungoma County and its environs. The diabetes clinic runs every Tuesday and Thursday. The study was limited to the diabetes out-patients and the health workers attending to them. The study was confined to Bungoma County Hospital a referral facility in Western Kenya.

1.8 Limitation of the Study
The main limitation of this study was insufficient documentation on management and control of diabetes mellitus in Kenya. To mitigate this limitation most of literature was sourced from other scholar researchers especially from Europe, United States of America and South East Asia where there are well documented guidelines and established health care systems on the management and control of diabetes mellitus. During data collection the major limitation was language barrier between the respondent and the researcher since the questionnaire had to be translated into the local dialect (Bukusu) which was time consuming and difficult although this was mitigated by the help of a resident health worker who helped in translation. Also the heavy rains hindered most follow up patients from attending the clinic on the specified clinic days as most of them had long distances to cover to the hospital thus the intended sample size targeted was not fully met.

1.9 Assumptions of the Study
In this study the assumptions made included: All respondents would be cooperative; the respondents would answer all questions correctly without withholding crucial information. It was assumed that the respondents had knowledge on management and control of diabetes mellitus.
1.10 Definition of significant terms used in the study

Management and control of diabetes mellitus in health projects—Increased public knowledge about diabetes mellitus, early detection and effective management, decreased cases of diabetes related complications, lifestyle modifications.

Professionalism of health workers—All trained and qualified medical personnel with; ability to diagnose and offer treatment; ability to detect and manage complications; ability to offer counseling and health education.

Medical facilities and infrastructure—This involved availability of screening and diagnostic equipment; adequate trained health workers, Availability of treatment and prevention drugs; Availability of health education, observational and counseling facilities.

Networking and partnership linkages—Joint capacity building and trainings, provision of subsidized drugs and screening equipment, sharing of research studies, support in construction of health facilities.

1.11 Organization of the study

The study was organized into five chapters; Chapter One gave background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the Study, delimitations of the study, limitations of the Study and the definition of significant terms. Chapter Two reviewed the literature on factors influencing management and control of diabetes from global, regional and local perspective based on the objectives of the study and further looked at the conceptual framework and eventually the summary. Chapter Three explained the research methodology of the study. Data from the field was analyzed interpreted and presented in form of tables in Chapter Four. Finally Chapter Five summarized the key findings, conclusion and recommendations.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction
This chapter presents a review of the empirical literature on the topic Factors influencing management and control of diabetes mellitus from global, regional and local perspectives done by other scholars. The study therefore focused on the key variable themes used in review of literature which included: Management and control of diabetes mellitus in health projects, Professionalism of health workers, Medical facilities and infrastructure and lastly networking and partnership linkages in management and control of diabetes mellitus in health projects.

2.2 Management and Control of diabetes mellitus in Health Projects
Management and control of chronic diseases (diabetes included) provides a major challenge to healthcare systems across the globe. This is attributed to escalating prevalence, multi-morbidity and lack of coordination between different components and professional groups within the healthcare systems (Tamayo et al; 2013).

Diabetes mellitus imposes an increasing economic burden on national health care systems worldwide. Low expenditure per capita in poor countries demonstrates that more resources are required to provide basic diabetes care. Mbanya et al; (2013) in “Diabetes in Africa; An update:” found that health care expenditure and treatment of diabetes mellitus in SSA is woefully inadequate given the substantial projected rise in cases and the overwhelming burden of premature deaths. For instance in 2013, AFR health expenditure on diabetes was USD 4.0 billion representing less than one percent of the total global health care expenditure allocated to diabetes. The study further indicates that Ministries of Health in Africa have committed departments responsible for NCD with 61 percent funded for treatment and control of diabetes mellitus. However a minimum percentage of 26 percent out of 90 per cent ministries had operational programmes. According to Diabetes Research and clinical Practice (2010), Kenya health expenditure in 2010 was USD 22,334.37 with a minimum of USD 43.03 per person and projected to rise to USD 92,176.54 by 2030. Mbanya’s observation demonstrates that most AFR countries health systems are ill equipped to tackle diabetes mellitus thus need for sensitization on the magnitude of the problem. To
this effect, there is need to culcate primary prevention measures that prevents incurring high financial costs before onset of complications.

According to Peer et al; (2013) high proportions of undiagnosed diabetes reflects poorly on the local health care systems, strained economic resources and ill equipped health care systems-mainly responsible for inadequate detection and management of diabetes mellitus with conditions only diagnosed when patients present obvious visible complications like neuropathy and retinopathy. In essence early detection and treatment is essential to mitigate the serious and fatal consequences associated with the development of complications. Peer’s observation brings out the gap of late diagnosed cases of the disease an indication that both the patient and health workers lack sufficient knowledge on diabetes in regard to the symptoms, complications, care and management; bringing the availability, competence, and knowledge-ability of the health care workers in diabetes matter to scrutiny. Late screening and monitoring due to lack of equipment, poor skills to operate the equipment and inaccessibility to health facilities brings the gap of infrastructure availability and accessibility for both the health workers and the patients, depicting the challenges contributing to management and control of diabetes mellitus in health care systems particularly in Africa. Besides diagnosis, care and knowledge about diabetes mellitus among providers and the general public; lack of priority among policy makers; unsettled political situations, traditional beliefs; illiteracy; poverty; cultural and economic problems; dependence on one large meal by most families; lack of interest among providers due to the challenging nature of the disease; poor financial rewards; low motivation and over burdened health facilities with scarce resource and limited infrastructure hamper management of diabetes (Masoud, 2011).

Jalang’o et al; (2014) indicate that poor documentations of risk factors; Lack of diabetes surveillance systems especially in SSA (if available) are poorly addressed; and governments investing heavily in prevention of communicable diseases that are donor prioritized to achieve millennium development and sustainable goals; hinder significantly information for prevention programme, disease control and treatment. Just like in SSA, South East Asia [SEA] also crumples with lack of adequate trained personnel and infrastructure leading to limited access to medical services in rural areas that pose major challenges to diabetes care
and management. Lack of integrated care policies and unmotivated health personnel hold back prevention, detection and management of diabetes and related co-morbidities (IDF, 2013).

Habib (2010) approximates that 80 % of T2DM can be prevented through early management and lifestyle modifications. Therefore, health education and aggressive community awareness of diabetes and its risk factors are vital in the successful management and control of diabetes mellitus. The findings in the study bring out poor patient and provider knowledge on diabetes which is the primary mitigation measure in management and control of diabetes mellitus. The fact that T2DM can be prevented early enough yet little is being done about it brings out the inadequacy of infrastructure such as inadequate trained health workers, insufficient resources in terms of literature for education and wider coverage in grass root diabetes campaign. Inadequate training and capacity building to enhance skills and knowledge of diabetes on health workers may demonstrate lack of will by the government ministry or not a policy agenda in SSA.

Networking and partnership linkages with public and private sectors, Non Governmental Organizations [NGO], Faith based organizations, [FBO] MOH departments and collaboration with universities and other stakeholders that advocate for diabetes control is the best strategy in SSA to combat diabetes mellitus. Networking and partnership linkages enhance wider coverage in terms of awareness creation, provision of drugs such as insulin, and setting up infrastructure like screening centers that may not be a priority by the government besides the financial constrains. For instance, security issues are apriority thus hefty budgets are allocated to it in comparison to the health sector. These challenges evidently weigh heavily on the health sector making management and control of diabetes mellitus becomes very elusive and weakens the efforts of control and management of the disease.

Despite the challenges faced across the globe in management of diabetes mellitus, there are varied strategies and approaches used to address the chronic disease by different healthcare systems globally. In Europe, Tamayo et al; (2013) found that disease prevention and early detection by highly skilled and qualified professionals, nurse led clinics, use of secondary
care physicians at community based clinics and integrated care models that attempt to combine treatment for multiple morbidities are enhanced. In Ontario, promoting lifestyle modification and counseling; early identification and rehabilitation are effective management strategies in place.

In the South East Asian countries Ramachandran, Snehalatha, Shettya, Naditha (2013) established; educating policy makers on the gravity of diabetes prevalence, stressing on inadequate health care resources and emphasis on primary prevention; enhanced collaboration between Ministries of Health, Education, Agriculture and Information and technology use that is mobile phone technology, internet based health care management systems, peer support networks for patient empowerment and health care delivery have been embraced. These approaches probably could be duplicated in SSA specifically in Kenya as measures employed cut across the relevant structures vital in the management and control of diabetes mellitus.

2.3 Professionalism of Health Workers on Management and Control of Diabetes Mellitus in Health Projects

Many countries are experiencing shortages of professional health care workers. Hence globally, policy-makers and system managers have developed a range of methods and initiatives to optimize the available workforce and achieve the right number and mix of personnel needed to provide high-quality care. In this study indicators of professional health workers were threefold; ability to diagnose and offer treatment; ability to detect and manage complications and ability to offer counseling and health education.

Lavernia (2010) says successful management of diabetes mellitus requires a synchronized interaction between health workers and the patient while Mechanic (2008) indicates that professional ethics, competence, responsibility to patients, advocacy for respectful relationship with patients and fair treatment regardless of a patient’s social status is vital in health care delivery hence successful management of chronic diseases like diabetes.
In Canada, Carrie, Christopher and Jonathan, (2010) found that diabetes educators’ lack of confidence and insufficient training in counseling especially in delivering physical activities and exercise to diabetic patients, hinder patients’ ability to engage in physical activities. Kunt and Snoek, (2009) on the other hand attributes low motivation, lack of experience and time constraints as challenges experienced by health care professionals in Germany in management of diabetic patients. In the Gambia Foma et al; (2013) cites inadequately trained health professionals on diabetes education and care as a contributor to poor management of diabetes mellitus. In Tanzania, Ramaiya (2010) showed that many doctors and nurses have had inadequate training in detecting the early symptoms of diabetes mellitus, and this often results in an incorrect diagnosis as malaria or other conditions. In one study, over 10% of patients diagnosed with malaria had pre-coma or coma induced by uncontrolled diabetes mellitus.

Jalang’o et al; (2014) observed that non adherence to stipulated health care guidelines by the health workers led to delay in early detection of complications in Kenya. Masoud (2011) equates physician characteristics including; knowledge and competence, attitude and ability to interact with patients contributed significantly to management and control of diabetes mellitus. The findings clearly point out that diabetes care and management is far from success if nothing is done based on the varied reasons across the globe. Consequently, it evidently demonstrates the gaps that highly contribute to management and control of diabetes mellitus worldwide thus the need to investigate on management and control of diabetes mellitus in health projects in Kenya.

A study in the United Kingdom “Rethinking Medical Professionalism: The Role of Information Technology and Practice Innovations” assessed through various but relevant literatures, examination of relevant websites, and working with medical leaders notes that use of Information Technology [IT], Electronic Health Records[ERC], and other practice facilitators for professionalism enhanced changes in an organization and reinforced medical competence, improved physician-patients relationship, implemented disease management programs and increased transparency and accountability Mechanic (2008). In essence, the study called for team work revealing the magnitude and complexity of diabetes management that requires multiple efforts, high skills and knowledge especially from the health care workers.
In Kenya’s context, most public health facilities lack IT equipment and most of those in peripheral facilities are manned by one clinical officer or general practitioners negating the team work approach as the facilities are understaffed hence contributing to inadequate management and control of diabetes mellitus. As a matter of fact, if the health workers managing these facilities are inadequately trained and ill equipped then early detection of the disease is overlooked and most patients are only diagnosed when presenting complications at the tertiary levels hampering control of the disease in time. Philips, Mashige and Clarke (2012) in a descriptive cross sectional study in an optometric private clinic in Malmesbury Western Cape, South Africa concurs with Mechanic (2008) that diabetes mellitus treatment is best facilitated by a team approach consisting of health care professionals including dieticians, psychologists and ophthalmologists and not left to general practitioners and other medical officers which is the case in most health care facilities in Kenya.

Jalang’o et al.; (2014) in a retrospective descriptive study based on a record review of 377 outpatient files to assess healthcare practitioner’s adherence to diabetes care guidelines at KNH, demonstrates an overall poor adherence by healthcare professionals despite the stipulated care guidelines and recommendations to assist health care providers achieve set goals by informing care practices. On the other hand Masoud, (2011) in a descriptive cross sectional study at the same facility administered on 212 patients observed physicians characteristics such as knowledge, attitude and ability to interact with patients as major contributors in diabetes management. The deficiencies in practice represent lost opportunities for early detection and management of preventable complications that are attributed to care costs and poor quality of life. Jalang’o’s study gives an insight on the deploring quality of services offered by the health workers at the facility and need for coordinated services given the complexity of diabetes management. The study findings clearly shows that the limited number of professional health workers and limited infrastructure to the soaring patients contributing to non adherence and lack of screening facilities for further referrals based on the high cases of non referral cases found in the study. However the study did not conclusively show why the health workers did not adhere to the stipulated guidelines.
The retrospective descriptive study method relied heavily on secondary data. The review of out-patient files is biased in that it does not give an opportunity to find out the professionalism of the health workers in the facility and conclusively identify the challenges for non-adherence. The study revealed that preventive measures were poorly executed that strongly called for an investigation thus a basis for this study. Unlike Jalango’s retrospective study, this study was a descriptive cross-sectional study focusing on the outpatients and the health workers at the Bungoma County Hospital diabetes clinic as the target population. Use of structured questionnaires was employed to collect primary data from the health workers and the patients.

2.4. Medical Facilities and Infrastructure on Management and Control of diabetes mellitus in Health Projects
Management and control of diabetes mellitus success solely relies on robust health care system. Availability and accessibility to right equipment and health facilities; adequate training and capacity building of health workers to enhance diabetes care and management is prudent. Darkwa (2010) in a survey on “Prevalence of diabetes mellitus and resources available for its management in the Cape Coast Metropolis” in a study population made up of 10 health facilities in the Cape Coast Metropolis. Care for diabetic patients showed that equipment, services and drugs available for diabetes care and management were highly inadequate. Masoud (2011) in “Quality of glycemic control among insulin treated ambulatory patients with diabetes mellitus at Kenyatta National Hospital” identified inadequacy in sugar monitoring by patients demonstrating poor services that is associated with limited resources and inaccessibility to screening tests due to lack of glucometer machines and strips, syringes, intermittent supply of insulin, blood and urine reagents; explaining the high uncontrolled sugars in most patients especially those from rural areas.

A similar study “Knowledge on Diabetes Mellitus among Diabetes Patients attending Kanyatta National Hospital Outpatient clinic” by Gitonga, (2008) administered on 105 patients observed lack of training and teaching aids such as information pamphlets, charts, brochures and audio-visual aids an indication of an ill-equipped facility. Nalwa, (2010) in a descriptive cross-sectional study in Kisumu’s referral New General Nyanza Hospital “Glycemic control, Cardiovascular Risk Profile and therapeutic interventions in Type 2 Diabetes Mellitus Patients at New Nyanza
Provincial General Hospital in Kisumu” administered on 118 participants equated limited resources especially in laboratory technology and limited knowledge on diabetes especially from patients from peripheral clinics a major factor in diabetes management in the region. Nalwa’s study points out lack of sufficient health facilities compounded with limited screening machines; low stocked pharmacies with essential drugs; unskilled and poorly qualified health personnel to handle the diabetes pandemic as contributors of the high prevalence of the disease in the region. Mwanza (2014), in a conference organized by KPMG “Training and Resourcing in a Devolved Government Devolution of Healthcare Services in Kenya” report indicates that globally the healthcare sector is facing enormous challenges both in development and maintenance. The report found that in Africa, the sector is undergoing major policy, system, and infrastructural changes. Systems across the globe have and are experimenting with old as well as new approaches to “secure” their health systems in efforts to improve access, service delivery, minimize the costs, increase accountability, and improve responsiveness.

This report explains the state of health care experienced currently in Kenya. According to Vision (2030) health sector, devolution of funds and management of health care are supposed to be handled by the communities and district medical officers while the Ministry deals with policy and research issues; thus shifting the bias of the national health bill from curative to preventive care perhaps a measure to streamline health care management. The teething problems being experienced from the sector coupled with frequent strikes impacts negatively on management and control of diabetes mellitus.

Ramachandran (2013) in the study “Primary prevention of T2DM in South East Asia regions” found challenges such as under development of integrated chronic care, channeling of health care resources towards acute and advanced diseases and high use of complementary and alternative therapies compounded with high rate of loss of follow up patients, low levels of public awareness; poor detection and management of diabetes co-morbidities rendering late diagnosis, contributed to poor management and prevention of diabetes mellitus. This study highlights resource limitation an indicator that there is a general lack of screening and diagnostic equipment, inadequate trained personnel for a greater a team approach in management and
control of the disease. Lack of proper infrastructure hindered accessibility to medical services especially in rural areas by both the patient and the health workers.

WHO cited, Kenya as one of the 57 countries with a critical shortage of health workers. This was attributed to poor work environment among other challenges that delayed service delivery a demonstration of poor infrastructure that hampers management and control of NCDs. M’Kiunga (2011) in a cross sectional descriptive survey investigating “Barriers preventing long term complications among patients with type 2 Diabetes Mellitus at Kenyatta National Hospital” involving 147 participants found that co-morbidity, irregular check -ups and follow- up visits, non adherence to treatment regimens and lack of physical activities and inadequate dietary intake compromised optimum diabetes care. This study highlights inadequate infrastructure services in terms of personnel, lack of affordable medications for the patients and inaccessibility to health facilities due to distance and cost implications. High prevalence of co morbidity cases demonstrated late detection caused by lack of basic screening equipment like glucometers. The cases also emphasize lack of awareness on the dangers of diabetes; insufficient drugs and long queues discouraged follow up visits. The gaps identified in this study thus called for inquiry to find out whether medical services and infrastructure was a factor in management and control of diabetes mellitus.

Pastakia, Ali, Kamano, Akwanalo, Ndege, Buckwalter, Vendanthan and Bloomfield (2013) in a feasibility survey conducted by Academic Model Providing Access To Health care [AMPATH] in Western Kenya Webuye town, showed a higher number of people screened in home based (door to door) and community based screening though less follow ups at referral facility than in hospitals, an indication that most people would not go for diabetes screening in health facilities probably because of distance, financial constrains, or low knowledge on dangers of diabetes mellitus. Given the fact that HIV&AIDS counselors were used to conduct home based screening it shows the importance of staff mix with mixed skills as a way of combating the human resource limitation as a factor in management and control of diabetes mellitus in health projects.

Diabetes education is widely accepted to be an integral part of comprehensive diabetes care as it allows patients to assume greater responsibility for their own care. Foma et al; (2013) in a
descriptive study “Awareness of diabetes mellitus among diabetic patients in the Gambia: A strong case for health Education and Promotion, found that patient education is the cornerstone of diabetes prevention and management as it accounts for almost 50% in management. The study further shows that diabetes education should be a continuing process with regular visits for reinforcement and not a process to be completed after one or two visits to a healthcare worker or facility. Therefore with consequent improvements in knowledge, attitudes and skills, diabetes education will lead to better control of the disease.

According to Mutw’iwa, (2008) in “Prevalence of Lifestyle Risk Factors among Diabetes Patients at Kenyatta National Hospital”, there are some drawbacks in effective education which regrettably results in increase of diabetes mellitus and the development of related complications. For instance, lack of updated educational reviews, lack of proper documentation in most health institutions, few qualified diabetes educators and low socio-economic or cultural consideration such as a syllabus for diabetes education. It is prudent that diabetes education be offered by professionals like nurses, dieticians, Pharmacist with specialized patient education skills and certified in diabetes education. The study underscores the challenges experienced in management and control of diabetes that need to be effected as soon as possible.

American Diabetes Association [ADA, 2015] stipulates that Diabetes Self Management Education [DSME] and Diabetes Self Monitoring Systems [DSMS] are the ongoing processes of facilitating the knowledge, skill, and ability necessary for diabetes self-care. The overall objectives of DSME and DSMS are to support informed decision making, self-care behaviors, problem solving, and active collaboration with the healthcare team to improve clinical outcomes, health status, and quality of life in a cost-effective manner (Mbanya, Motala, Sobngwi, Assah and Enoru 2010).

Marrero (2013) and Martin, Sima et al; (2012) say that current best practice of DSME is a skill-based approach that focuses on helping those with diabetes mellitus make informed self-management choices. Continuous DSME and DSMS in people with T2DM maintain effective self-management throughout a lifetime of diabetes as they face new challenges and as treatment advances become available. This study correlates with that of Gitonga (2008) that self
management includes adherence to medication regimens are essential in diabetes management. However, inadequate diabetes specialists, limited quality health care services in Kenya hinder promotion of DSMS and DSME among patients.

In a descriptive survey Maina, Njenga, and Muchemi (2010) “Knowledge Attitude and Practices Related to Diabetes among Community Members Across Four Provinces in Kenya ” found lack of comprehensive primary care programmes for diabetes; health education done within health facilities through microteaching targeting those with diabetes only, lack of structured guidelines regarding diabetes education coupled with low knowledge of diabetes among health care workers resulted to uncoordinated health promotion jeopardizing public knowledge and awareness on diabetes. The study identified the peoples’ perceptions about diabetes and knowledge however it did not give an insight of measures in place to address management and control of this disease. Unlike Maina’s large cross sectional survey that cut across Kenya, this study was limited to Bungoma District hospital focusing on Factors influencing management and control of diabetes mellitus in Health Projects.

Diabetes mellitus is a long-lasting disease with severe consequences characterised by elevated blood sugars (hyperglycemia). The main objective of treatment is reducing the hyperglycemia to minimize the risk of possible complications of the disease. According to CDA, (2012) 35% to 44% of people with diabetes mellitus are only diagnosed upon onset of complications. The National Diabetic Fact Sheet [NDFS] (2011) shows that most people living with diabetes in Kenya are diagnosed too late in free medical camps or when hospitalized during routine medical examinations when preventing complications of the disease is no longer possible. Identifiable risk factors like obesity; age – (45 years and older); Family history; high risk ethnic group such as African, Hispanic, Asian, or Aboriginal; glucose intolerance history; previous diagnosis of gestational diabetes or had a baby weighing more than 4 kilograms; high blood pressure; cholesterol abnormalities; should be targeted in screening for T2DM. Screening services therefore promote the importance of support systems for better self-care management and educate the care givers on the information required to support people found to be diabetic. Public awareness and community education on diabetes mellitus, detection, diagnosis, of complications
and the role of management and control as a primary preventive approach was attributed to early screening (DMI, 2011).

Philips et al; (2012) and Gitonga (2008) indicated that management of diabetes mellitus was controlling elevated blood glucose without causing abnormally low levels of blood sugar. Treatment is with concurrent employment of nutritional low sugar index diet, exercise, oral and insulin medications, with mandatory counseling that provides information directed at safe and appropriate use of medication thereby enhancing therapeutic outcomes. This observation is similar to the ADA, (2015) stipulating that a proper diet, insulin injections, and oral tablets to lower blood glucose levels are the basis of diabetes treatment and prevention. Self-management education or training focuses on self-care, healthy eating, regular exercises, and frequent monitoring of the blood sugar the key steps in improving health outcomes and quality of life. Therefore for continuous patient self-management education and support there was need for screening services, adequate education, counseling and consultancy facilities that were essential in preventing acute complications and reducing the risk of long-term complications. CDC (2012) emphasized that early treatment of hyperglycemia and a reduction in high risk behavior reduced significantly the risk of developing complications.

In SSA use of alternative medicine that is herbal medicine instead of western biomedical care demonstrated the cost implication and unaffordable drugs in the management of diabetes mellitus in comparison to biomedical health care. The scenario therefore presents the bigger burden of insufficient health workers, health facilities and high costs of essential drugs like insulin that is a life - long medication. Liani, (2014) exploratory study into “How Type 2 Diabetes patients perceive and manage their illness in Kenya” showed that patients perceived diabetes as more than a biomedical disease, due to integrating factors from both the biomedical model and folk belief systems in understanding of the disease signaling that the biomedical framework alone would not enable health care providers to effectively manage this chronic disease. The limitation of the study was a small sample size of 38 participants which was insufficient to generalize that the participants’ views represented the general diabetes patients in Kenya.
IDF (2014) says that healthy lifestyle modifications such as physical activity, eating habits, and weight could benefit people by reducing diabetes incidences and improving overall health. Exercise is an important part of the diabetes management plan hence regular, moderate intensity physical activity such as walking, cycling, or participating in sports are essential. Regular exercise has been shown to improve blood glucose control, reduce cardiovascular risk factors, contribute to weight loss, and improve well-being. In fact WHO (2012) recommends at least 150 minutes of regular physical activities of moderate intensity per week for adults to prevent and reduce the risk of diabetes and cardiovascular diseases.

In a study on Prevention of diabetes on High Risk individuals in the United States (US) Carrie et al; (2010) showed that lifestyle intervention such as increased physical activity reduced the development of T2DM by 58% during a 3-year period. The findings further indicated that either lifestyle modification or treatment with metformin (insulin injection) intervention was effective in prevention or delay of T2DM in all racial and ethnic groups studied and has been shown to persist for at least 10 years (CDC 2011). The study correlates with a similar research in South and Central America (SACA) by Pablo et al; (2014) that says diabetes prevalence was much lower in rural settings than in urban and the differences attributed to lifestyle changes.

Similarly, in Kenya Masoud (2012) agrees with Carrie et al; (2010) that insulin use was effective medication in reduction of any elevated levels of blood glucose to recommended targets, in addition to healthy lifestyle modification. However, despite improved therapy and knowledge, blood glucose control is still unsatisfactory in many patients in the case of Kenya. This may be as a result of inconsistence in therapy regimen, lack of medication or inaccessible health facilities and inadequate knowledge on diabetes management. For instance, the high numbers of motor cycles and long hours of traffic jam shows less physical activity among urban and rural population. The mushrooming of fast foods especially in shopping malls and more so in supermarkets is evidently a sign of high demand for fast foods contributing to poor dietary intake coupled with high intake of highly processed carbohydrates high in sugars, saturated fats and salts which are prohibited in prevention and management of diabetes mellitus.
Renzaho (2015) in “The Post 2015 development agenda for diabetes in Sub Saharan Africa: Challenges and future directions.” Cross national data analysis in 75 states on regulating the food and beverage industry established that high consumption of soft drinks contributes to obesity and T2DM in adults. These issues greatly increase prevalence of diabetes which should be an area to be further studied as a greater contributor to management and control of diabetes mellitus.

M’Kiunga (2011) in a study “Barriers in preventing Long term complications among Type 2 Diabetes Mellitus at Kenyatta National Hospital” found that majority of diabetic patients lack knowledge on the dietary intake. For instance the patients could not differentiate between protein, carbohydrates and fat sources from a daily diet. Besides, the food portions taken at one meal serving were not considered as an essential component of adherence to dietary recommended regime with a significant proportion routinely adding salt to food at the table. The findings revealed a gap in nutrition education to the patients. The health workers do not offer adequate general lifestyle modification information when tackling nutrition education to the patient probably due to few nutritionists, time constrain, inadequate training and teaching facilities and equipment; given the large population served daily by the overstretched health workers. The insufficient services offered to the patients at KNH a regional referral facility in Kenya, was an indication of a grave picture in the peripheral facilities especially in the rural areas.

Muchemi (2013) noted that if the 2.5 million people living with diabetes in Kenya (of the productive age 18-60 years) did not adopt a healthy lifestyle, the number will triple by 2025. The statistics demonstrates a gap of education awareness to the patients signaling a deficiency of skilled knowledgeable personnel, facilities offering diabetes education among others hindering disease management and control. Therefore this study proved crucial to informing policies and actions of various institutions and stakeholders in diabetes management. However, Muchemi only provided prediction through the statistics of the diabetes increase without offering solutions to current and future situations. It is this gap that this study sort to seek through investigating the factors influencing management and control of diabetes mellitus in health projects.
2.5 Networking and Partnership linkages on Management and Control of diabetes mellitus in Health Projects

Networking and partnership linkages with different organizations enhance advocacy issues on diabetes mellitus as well as source for funds to mitigate the disease and its co morbidity. Partnership linkages on the other hand help strengthen institution frameworks, by monitoring, evaluation and communicating outcomes. Otieno and Macharia (2010), say that the private sector (both for-profit and not-for-profit) contributed over 40 % of health services in Kenya, providing mainly curative health services and very few preventive services with activities guided by MoH standards and protocols. The NGOs, FBOs and other private entities work with communities in collaboration with the county health medical teams thus supplementing government role. The networking and partnership linkages indicate inadequate public health facilities and services that are supplemented by the private sector, NGO and FBOs which are at times costly. Most of these organizations are widespread in the areas where the government does not access, giving hope for diabetes care in remote areas. The individual and material cost of diabetes mellitus is a base of increasing concern for health professionals, representative organizations and governments worldwide. The scale of morbidity and mortality led the United Nations to issue a resolution on diabetes, calling for national policies for prevention, treatment and care. Clearly there was an urgent need for concerted response from all interested stakeholders at the community, national and international level to work towards the goals of the resolution and create effective, sustainable treatment models, care systems and prevention strategies (Mwanzia, 2014).

Renzaho (2015) in “The Post-2015 Development Agenda for diabetes in Sub Saharan Africa: Challenges and future directions” stipulated that creating linkages between government funded health care systems and the emergency response were prudent to maximizing access to medication, to prevent disruption in continuum care during emergency situations that is displacements caused by terrorism, political instability, natural calamities and other disasters. Consequently positioning diabetes as a priority and identifying political opportunities to mobilize resources is an effective avenue to treat and manage diabetes in emergency situations.

Partnership is essential in setting up aid actions between the government and other stake holders in an extensive network. AMPATH, in collaboration with a consortium of academic health
centre such as Moi University, Moi Teaching and Referral Hospital, consortium of North American Academic health centers led by Indiana university works with Kenya’s MoH to deliver services and provide research centers, academic institutions in preventing and managing NCDs and communicable diseases. AMPATH has partnered with the Kenya MoH to implement widespread implementation of diabetes and hypertension screening programs; Linkage strategy such as provision of home based care via community health workers has been incorporated to mitigate against low rates follow up; utilization of governmental partnership approach a vital component in addressing the large health care workforce needs for chronic disease management (Pastakia et al; 2013). Similarly KNH partnered with University of Nairobi School of Medicine and College of Health Sciences in training diabetes specialists as a measure to increase the number of diabetes management workforce in the facility (Ngugi, 2012).

Thakker (2014) in a report “Public-Private Partnerships County Engagement in a Devolved Government Devolution of Healthcare Services in Kenya” noted that Private Public Partnerships Health - KENYA (PPP-HK), state and non-state actors in health sector have come together to ensure improved access and quality of healthcare for all Kenyans; in an effort to ensure continuous interaction between private and public sectors, a consultative approach to addressing health issues, and to create an environment that enables healthcare innovation in Kenya. In addition PPP deliver health services and products and /or address health system gaps impacting on management and service delivery.

According to (IDF, 2015) partnerships with different organizations and professional bodies aim at enhancing advocacy issues on diabetes care across the globe by providing medication, personnel and facilities and equipment to enhance diabetes management. In the US, the Centers for Disease Control and Prevention (CDC) helps coordinate the National Diabetes Prevention Program, a resource designed to bring evidence based lifestyle change programs for preventing T2DM to communities (ADA, 2015).

In Mali, the government partnered with the National Board of Health and various Mali government structures associated with preventing and managing diabetes. Simultaneously, this approach was strengthened by the creation of an extensive network of partners in the north
(research centers, universities, patient organizations and international experts) which eventually resulted to: Strengthening the local authority mobilization against diabetes mellitus: Strengthening donor mobilization; mobilization of a large network of international partners to support the fight against diabetes and, help achieve large-scale solid progress for patients.

Australian Diabetes Council and HOPE worldwide (Australia) provides insulin, syringes, glucometers and strips, education materials, professional training, capacity building, vocational training and advocacy through annual walks and diabetes camps. For instance since 2011, Life for A Child (LFAC) supported KNH with free insulin to 1000 diabetic children reducing mortality rates significantly. The Kenya Diabetes Management and information centre a nonprofit organization steers outreach campaigns on management of diabetes enhancing diabetes education across the country. The presence of these institutions demonstrates a magnitude of the disease and how partnership linkages support enhance the management and control of diabetes mellitus in health projects. The Global Partnership for Effective Diabetes Management a multidisciplinary task force of international experts committed to improving outcomes for people generates publications and interactive educational materials for global audience. In addition it translated learning from clinical data into daily practice to encourage early and effective treatment of diabetes mellitus to reduce the risk of complications, and supporting healthcare professionals globally in tailoring treatment to the individuals.

Mwanzia (2014) cited a tenet of the Constitution of Kenya, 2010 [COK, 2010], as the right to healthcare for every individual. To this end, the government of Kenya is working towards achieving universal health coverage for its citizen. The Government of Kenya faces many challenges including the increased demand for quality health service. In a conference report organized by KPMG on “Devolution of Health care services in Kenya” measures to address health care services deficiency included: use of telemedicine for certain services to mitigate distance barrier to access and address the health care workers shortage and the skills gap that is typically exemplified in rural marginal areas; ensuring the availability of sufficient health care facilities to meet the ever increasing needs especially at the county levels; and harmonization of available resources to ensure that limited resources are optimally utilized. The mitigation measures suggested captured the challenges faced by the health sector that significantly
contributes to management and control of diabetes. Based on the various literatures from different scholars, diabetes management and control is essential in bringing down the high prevalence cases as well as the complications related to the disease. Therefore this study was out to attempt to fill the identified gaps and give more input in the body of knowledge to other researchers on diabetes management and control in health projects in Kenya.

2.6 Theoretical Framework

This study was grounded on a nursing theory known as Self-Care Deficit Nursing Theory (SCDNT)

2.6.1 Self-Care Deficit Nursing Theory (SCDNT)

This theory is also known as the Orem Model of Nursing. The main proponent of this theory is Dorothea Orem who developed it between 1959 and 2001. This theory covers a broad scope as the general concepts are applicable to all instances of nursing. The theory emphasis is on all patients who want to take care of themselves and hence ability to recover quickly. This theory is particularly used in rehabilitation and primary care and other settings where patients are encouraged to be independent. The theory states that individuals whose requirement for self care exceeds their capabilities for engaging in self care are said to be experiencing a self care deficit. The existing or potential self care deficit therefore identifies individuals and resources essential for nursing; Forming the central focus of Orem’s grand theory of nursing. Health related limitations in providing self care that call for nursing range from illness, lack of knowledge, appropriate infrastructure or results of medications and treatments. Self care deficit results when an individual is not able to meet self care demands. Nursing action hence focuses on identification of limitations, inadequacies and helping people meet their own needs.

This theory was relevant in this study as patients suffering from diabetes mellitus most often develop long term complications that lead to inadequacy in proper self-care (the patients experience self care deficit). Their self-care limitations may result from deficits in self medications and morbidity, effects related to the health care systems for example the health care infrastructure and health workers attitudes and capabilities; and deficit from diabetes self care knowledge. Currently health workers can use this theory to care for patients and make the transition from the hospital or full-time care facility to their own home much smoother. This study focused on identifying the sources of patients’ self-care deficit thus representing factors influencing management and control of diabetes mellitus.
2.7 Conceptual Framework

This is the concise description of the phenomena under study accompanied by visual depiction of the variables under study (Mugenda and Mugenda, 2003). The independent variables include: professionalism of health workers, medical facilities and infrastructure; networking and partnership linkages while the dependent variable is the Management and Control of Diabetes Mellitus in Health Projects.

**Independent Variables**

- **Professionalism of health workers**
  - Ability to diagnose and offer treatment
  - Ability to detect and manage complications
  - Ability to offer counseling and health education

- **Medical facilities and infrastructure**
  - Availability of screening and diagnostic equipment
  - Adequate trained health workers
  - Availability of treatment and prevention drugs

- **Networking and partnership linkages**
  - Joint capacity building and trainings
  - Provision of subsidized drugs and screening equipment
  - Sharing of research findings
  - Support in construction of health facilities.

**Moderating Variable**

- Government policy and Management of diabetes Mellitus

**Dependent Variables**

- Increased public knowledge on diabetes mellitus
- Early detection and effective management
- Decreased cases of diabetes related complications
- Lifestyle modifications.

**Intervening Variables**

- Fear and acceptance
- Hostility
- Patients’ attitude
- Lack of knowledge
- Poverty

*Figure 2.1: Conceptual Framework on which the study is based*
2.8 Research Gap and Summary

This chapter reviewed the relevant literature in relation to the research questions presented in the study. The discussion tackles all the research objectives posed and provided a firm theoretical background for the study. The chapter discussed how to manage and control diabetes mellitus in Kenya using a theoretical and empirical review.

Table 2.1: Research Gap and Summary

<table>
<thead>
<tr>
<th>Variable</th>
<th>Author (Year)</th>
<th>Title of study</th>
<th>Findings</th>
<th>Knowledge gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionalism of health workers</td>
<td>David Mechanic (2008)</td>
<td>“Rethinking Medical Professionalism: The Role of Information Technology and Practice Innovations”</td>
<td>Professionalism enhanced changes in an organization and reinforced medical competence, improved physician-patients relationship, implemented disease management programs and increased transparency and accountability. Adherence to diabetes guidelines by healthcare professionals at the hospital was poor and this worsen during patients’ subsequent visits. Poor adherence to annual risk assessment was also identified representing lost opportunity for early detection of preventable complications.</td>
<td>The study was done in United Kingdom and none at Bungoma District Hospital, Kenya. The gap here was that most of the health workers were less motivated due to poor working environment and needed to have a mix of qualifications to manage the condition. The findings found a gap that called for the health workers competences, availability and reasons for non adherence to be investigated</td>
</tr>
<tr>
<td>Medical facilities and infrastructure</td>
<td>Sarah Darkwa (2011)</td>
<td>Prevalence of diabetes mellitus and resources available for its management in the Cape Coast Metropolis</td>
<td>Equipment, services and drugs available for diabetes care and management in the Cape Coast Metropolis are highly inadequate Limited resources especially in laboratory technology and limited knowledge on diabetes especially from patients from peripheral clinics a major factor in diabetes prevalence in the region</td>
<td>The study was done in Ghana and none has been done at Bungoma District hospital Kenya. The gap identified was that inadequate facilities greatly contributes to prevalence of diabetes mellitus This study was carried out in Kisumu Kenya and not at Bungoma District Hospital. There is need for health facilities to have sufficient medical facilities and equipment to manage and control diabetes mellitus</td>
</tr>
<tr>
<td></td>
<td>Wafula Z. Nalwa (2010)</td>
<td>Glycemic control, Cardiovascular Risk Profile and therapeutic interventions in Type 2 Diabetes Mellitus Patients at New Nyanza Provincial General Hospital in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Networking and Partnership Linkages</td>
<td>Amit Thakker (2014)</td>
<td>Public-Private Partnerships County Engagement in a Devolved Government Devolution of Healthcare Services in Kenya</td>
<td>Public private partnership delivers health services and products and /or address health system gaps impacting on management and service delivery. Partnership, collaborations with governments that incorporate sustainability, long-term goals and a holistic approach continue to be a driving force for change to educate, inform and deliver a long-term, lasting impact on patient and public health.</td>
<td>The study looked at the general service delivery in Kenya and not specifically at Bungoma District Hospital. There was an urgent need for concerted response from all interested parties at the community, national and international level to work towards the set goals and create effective, sustainable treatment models, care systems and prevention strategies.</td>
</tr>
<tr>
<td>Management and Control of diabetes mellitus in Health Projects</td>
<td>KC Phillips, KP Mashige and PC Clarke-Farr (2012)</td>
<td>Knowledge of diabetes mellitus in privately funded diabetic patients attending a rural optometric practice in Malmesbury, South Africa. The Post-2015 Development Agenda for diabetes in Sub Saharan Africa: Challenges and future directions</td>
<td>Poor self-management practices of the diabetic patients towards diabetes care and management. Optometrists should form part of a team of health professionals to assist in the management of diabetes mellitus. Positioning diabetes as priority and identifying political opportunities to mobilize resources may be an effective avenue to treat and manage diabetes mellitus in emergency situations.</td>
<td>This study was done in a private clinic in South Africa. There is no similar study done in Bungoma District Hospital, Kenya. Most health facilities are manned by specific specialists thus for effective management and control there is need for a team approach. The study found that diabetes mellitus has not been prioritized as a policy issue. Thus need for prioritizing it.</td>
</tr>
</tbody>
</table>
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction
This section outlines various stages and phases that were followed in completing the study. In this chapter the researcher presents the methodology that was used to carry out the study. This chapter therefore presents the overall research design, target population, study sample size, sampling techniques, methods of data collection, data collection instruments and procedures, the data analysis and finally the operationalization of variable table.

3.2 Research Design
Research design refers to the plan and structure of investigating so conceived as to obtain answers to research question. Creswell (2009) and Cooper and Schindler (2007), define a descriptive survey as a design concerned with finding out the what, where and how of a phenomenon. This study used a descriptive cross sectional survey design to obtain pertinent and precise information and help elicit the respondents’ opinions, attitudes and observations concerning the factors influencing management and control of diabetes mellitus in health projects: A case of Bungoma County Hospital in Bungoma County in Kenya.

3.3 Target Population
Allan, Bryman & Emma (2007) refer target population to the “universe” from which the sample is selected. Mugenda and Mugenda (2003) explain that the target population should have some observable characteristics to which the researcher intends to generalize the results of the study. The target population was the health workers and the patients at the outpatient diabetes clinic in Bungoma County Hospital. The study constituted of 17 health workers at the diabetes clinic and 100 patients attending the diabetes clinic every Tuesday and Thursday.
Table 3.1: Distribution of Target population

<table>
<thead>
<tr>
<th>Type of Respondent</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical officers</td>
<td>4</td>
</tr>
<tr>
<td>Medical Officers intern</td>
<td>2</td>
</tr>
<tr>
<td>Nurses</td>
<td>4</td>
</tr>
<tr>
<td>Nutritionist</td>
<td>1</td>
</tr>
<tr>
<td>Clinical officers</td>
<td>6</td>
</tr>
<tr>
<td>Diabetic Patients</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>117</strong></td>
</tr>
</tbody>
</table>

Source: MOH Bungoma County Hospital 2015

3.4 Sampling Size and Sampling Procedures

This section describes the sample size and the sampling procedures used in the study. Sampling may be defined as the selection of some part of an aggregate or totality on the basis of which a judgment or inference about aggregate or totality is made (Fraenkel and Norman, 1990).

3.4.1 Sample size

A sample size is a subset of the total population that is used to give the general view of the target population (Kothari 2004). This study used Yamane (1967) formula of sample selection to generate a sample size as indicated. This sampling method was suitable because the sample population was homogeneous. The sample size for this study was 91 respondents as indicated;

\[
n = \frac{N}{1 + Ne^2}
\]

Where: \( n \) = Sample size
\( N \) = Target Population (117)
\( E \) = Error = 0.05

\[
n = \frac{117}{1 + 117 (0.05)^2}
\]

\[n = 91\]

3.4.2. Sampling Procedure

The sampling procedure starts with sample frame development. Cooper and Schindler, (2007) describes the list of all population units from which the sample will be selected as a sample frame. Ngechu (2004) underscores the importance of selecting a representative sample through
making a sampling frame. From the population frame the required number of respondents, were selected in order to make a sample.

Stratified proportionate random sampling technique was used to select the sample. According to Babbie (2004) stratified proportionate random sampling technique produce estimates of overall population parameters with greater precision and ensures a more representative sample is derived from a relatively homogeneous population. Stratification aims to reduce standard error by providing some control over variance. The sampling procedure used a proportionate method of sampling to get the sample size as indicated.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Total population</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical officers</td>
<td>4/117×91</td>
<td>=3.1</td>
</tr>
<tr>
<td>Medical officers intern</td>
<td>2/117×91</td>
<td>=1.55</td>
</tr>
<tr>
<td>Nurses</td>
<td>4/117×91</td>
<td>=3.1</td>
</tr>
<tr>
<td>Clinical Officers</td>
<td>6/117×91</td>
<td>=4.6</td>
</tr>
<tr>
<td>Nutritionist</td>
<td>1/117×91</td>
<td>=0.7</td>
</tr>
<tr>
<td>Diabetic patients</td>
<td>100/117×91</td>
<td>=77.7</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>117</strong></td>
<td><strong>90.75</strong></td>
</tr>
</tbody>
</table>

**Table 3.1 Sample Size**

3.5 Research Instruments

This study collected both primary data and secondary data. Secondary data was obtained from scholarly paper reviews while primary data was collected by use of questionnaires. According to Kothari (2010), a self administered questionnaire is the only way to elicit self report on people’s opinion, attitudes, beliefs and values. Ngechu (2004) says that it is a cost effective method of acquiring information especially from a large or sparsely located group of respondents. The research questionnaire for data collection in this study had five parts. Part A sought to obtain demographic characteristics of the respondents, part B solicited information on on professionalism of the health workers and management and control of diabetes mellitus in health
projects, Part C probed on the medical facilities and infrastructure on management and control of diabetes mellitus in health projects, Part D obtained data on networking and partnership linkages and part E sought information on the dependent variable regarding management and control of diabetes mellitus in health projects. In all parts the direction for filling in the responses was provided. The questionnaire consisted of items applying the likert scale with the responses ranging from strongly agree, agree, not sure, disagree and strongly disagree on a 1,2,3,4,5 rating scale. The questionnaire also consisted of both open-ended and closed ended questions to offer opportunities for further explanations, suggestions and areas of improvement.

3.5.1 Pilot Study
A pilot study was conducted to clarify instructions, check the appropriateness of the language used in the research instruments and to determine the difficulty of the items in the instruments in order to make adjustments in the study questionnaire. A pilot study hence was administered on one nutritionist, 2 medical doctors and 1 clinical officer and 2 diabetes patients however there results were not included in the main findings. This helped in making necessary adjustments on the tools after pretesting thus improving the validity of the instruments.

3.5.2 Validity of Instrument
According to Creswell (2003), validity is the degree by which the sample of test items represents the content the test is designed to measure. Mugenda and Mugenda (2003) contend that the usual procedure in assessing the content validity of a measure is to use a professional or expert in a particular field. In this study, professional advice was sought from experts in the subject matter, especially my supervisor. Construct validity was measured by administering a few questionnaires to some respondents and analyzing the results to evaluate whether the questionnaire measured what it was required to measure. Criterion validity was measured by analyzing outcome provided by the data collected using the questionnaires.
3.5.3 Reliability of Instrument
Reliability refers to the consistency, stability or dependability of measurement data Babbie (2004). Reliability is increased by including many similar items on a measure, by testing a diverse sample of individuals and by using uniform testing procedures. A split-half method was employed in this study (given the sensitivity and emotional being of most diabetes patients) that purport to measure the same construct were randomly divided into two sets. The researcher randomly divided the test into two parts; which is often done using an even-odd approach. The researcher selected a pilot group of individuals from the universe however the pilot data was not included in the actual study. The researcher administered the entire instrument to a sample of respondents and calculated the total score for each randomly divided half. Each half of the test had the same number of questions. The questions in each half should be more or less equivalent. Essay questions were included and were evenly distributed between halves in terms of content and point value. Reliability index was calculated using the coefficient alpha (\( r_\alpha \)). A reliability of 0.8 and higher is generally considered to be good.

\[
r_\alpha = \left( \frac{k}{k-1} \right) \left( 1 - \frac{\Sigma a_i^2}{k} \right)
\]

where \( a_i \) = variance of one test item, \( k \) is the total number of test items, \( \Sigma \) is the sum

3.6 Data Collection Procedures
This study collected quantitative and qualitative data using a self-administered questionnaire. A drop-and-pick method was employed for the questionnaires administered on the health workers respondents since they were very busy when on duty, thus the researcher allowed them time to fill the questionnaire and collected them after two days. To ease follow ups, the researcher requested for the respondents’ telephone contacts.

Another questionnaire was administered to the patients who could read and write attending the clinic. The main researcher and a research assistant were available to administer the questionnaires to other patient respondents and make clarification as well as assist those who were unable to read and write. The questionnaires were collected as soon as the respondents finished filling them before leaving the clinic.
A permit was sort from National Commission for Science Technology and Innovation (NACOSTI) to give authority to undertake the study at the health facility. Alongside this, a permission letter from the university was sort to allow the researcher to collect data. A cover letter that explained the aims of the research and offering assurance of confidentiality and anonymity alongside questionnaires were then forwarded in hard copies to the respondents by researcher. In addition, the researcher sought the consent of the respondents to participate in the study.

3.7 Data Analysis Techniques
Before processing the responses, the completed questionnaires were edited for completeness and consistency. The data collected was then coded to enable the responses to be grouped into various categories. The Statistical Package for Social Science (SPSS Version 22) software was used to aid carrying out descriptive analysis. Quantitative data collected was analyzed by descriptive statistics including the mean, standard deviation, frequencies and percentages. Tables were used to summarize responses for further analysis, interpretation and facilitate comparison.

3.8 Ethical Consideration
The researcher sought prior permission from the University of Nairobi and a research permit from the National Council for Science and Technology prior to undertaking field work on data collection. In addition a transmittal letter accompanying a questionnaire was done to introduce the researcher and clarification that data would be strictly used only for academic purposes and information is not divulged to unauthorized parties. Consent of the respondents was sought and that no respondents were coerced to participate in the study as such participation in the study was free and voluntary. The researcher was open and explained the purpose of the study to the respondents and assured them of confidentiality and anonymity. No Participants’ names were indicated on the questionnaire. The findings from the intended study were shared with the organization that participated.
3.9 Operationalization of Variables

This sub-section identifies and operationalizes the key variables (independent and dependent variables) of the study. It further highlights the criteria of measurement that the researcher used as shown in Table 3.2

Table 3.2: presents operational definition of variables on which the study was based

<table>
<thead>
<tr>
<th>Objective</th>
<th>Variables</th>
<th>Indicators</th>
<th>Measurement</th>
<th>Measurement scale</th>
<th>Data Collection method</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>To determine the influence of professionalism of health workers in management and control of diabetes mellitus in health projects</td>
<td>Independent variable</td>
<td>Ability to diagnose, manage and offer treatment</td>
<td>level of staff training,</td>
<td>Nominal</td>
<td>Questionnaires</td>
<td>Descriptive</td>
</tr>
<tr>
<td></td>
<td>Professionalism of health workers</td>
<td>Ability to detect and manage complications</td>
<td>professional qualifications</td>
<td>Ordinal</td>
<td></td>
<td>Statistics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ability to offer counseling and health education</td>
<td>training in counseling</td>
<td>Ordinal</td>
<td></td>
<td>Inferential</td>
</tr>
<tr>
<td>To assess the extent to which medical facilities and infrastructure influence management and control of diabetes mellitus in health projects</td>
<td>Independent variable</td>
<td>Availability of screening and diagnostic equipment</td>
<td>No of screening machines and diagnostic equipment available</td>
<td>Nominal</td>
<td>Questionnaires</td>
<td>Descriptive</td>
</tr>
<tr>
<td></td>
<td>Medical facilities and infrastructure</td>
<td>Availability of health workers</td>
<td>Number of health workers in the facility</td>
<td></td>
<td></td>
<td>Statistics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Availability of treatment and prevention drugs</td>
<td>Accessibility and affordability of the drugs</td>
<td></td>
<td></td>
<td>Inferential</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Availability of health education, observational and counseling facilities</td>
<td>No of consultancy and training rooms</td>
<td></td>
<td></td>
<td>Statistics</td>
</tr>
<tr>
<td>To establish how</td>
<td>Independent</td>
<td>Joint capacity building and</td>
<td>No of joint trainings to the</td>
<td>Nominal</td>
<td>Questionnaires</td>
<td>Descriptive</td>
</tr>
<tr>
<td>Networking and partnership linkages influences management and control of diabetes mellitus in health projects</td>
<td>variable</td>
<td>trainings</td>
<td>health workers</td>
<td>Ordinal</td>
<td></td>
<td>Statistics</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Networking and partnership linkages</td>
<td></td>
<td></td>
<td></td>
<td>Inferential Statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provision of subsidized drugs and screening equipment</td>
<td>Availability and supply of drugs and screening equipment</td>
<td>Nominal</td>
<td>Descriptive Statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sharing of research findings</td>
<td>No. of documented research findings shared</td>
<td>Nominal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Support in construction of health facilities</td>
<td>No. of health facilities constructed</td>
<td>Nominal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management and control of diabetes mellitus in Health Projects</td>
<td>Dependent Variable</td>
<td>Increased public knowledge about diabetes mellitus</td>
<td>No of people with public knowledge about diabetes</td>
<td>Nominal</td>
<td>Questionnaires</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Early detection and effective management</td>
<td>No. of early detected cases and people being screened for diabetes mellitus</td>
<td>Nominal</td>
<td>Descriptive Statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lifestyle modification</td>
<td>Reduced diagnosed cases of diabetes mellitus</td>
<td>Nominal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decreased cases of diabetes related complications</td>
<td>No of reduced cases of diabetes related complications</td>
<td>Nominal</td>
<td>Questionnaire</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inferential Statistics</td>
</tr>
<tr>
<td>Descriptive Statistics</td>
</tr>
<tr>
<td>Descriptive Statistics</td>
</tr>
</tbody>
</table>
CHAPTER FOUR
DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSIONS

4.1 Introduction
This chapter presents the study findings which have been discussed in line with the study objective themes and sub themes areas as follows: questionnaire response rate, the general information of the respondents, Professionalism of health workers, Medical facilities and infrastructure, networking and partnership linkages and finally management and control of diabetes mellitus in health projects. The objective of the study was to investigate Factors Influencing Management and Control of Diabetes Mellitus in Health Projects: A case of Bungoma County hospital in Bungoma County, Kenya. To enhance quality, the collected data from all the respondents was analyzed using the Statistical Package for Social Sciences (SPSS). Results are presented in this section in form of frequency tables, percentages, mean and standard deviations, while the qualitative data was analyzed using content analysis.

4.2 Questionnaire Response Rate
Questionnaires were administered to the respondents present at the clinic on Tuesday and Thursday the designated clinic days. Out of the 91 questionnaires administered to the respondents, a total of 55 fully responded to the questionnaire giving a response rate of 60%. The low response rate was due to the heavy rains that may have hindered some respondents to attend clinic as most of the patients were from far places. However, the drop and pick technique administered to health workers ensured that all the questionnaires were filled in good time probably after the day shifts. On the other hand the diabetic patients answered all the questionnaires on the spot after the preliminary observations as they awaited the arrival of the medical doctors who were still attending to inpatients in the wards. The response rate was sufficient and representative and conforms to Mugenda and Mugenda (2003) stipulating that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and above is excellent. Thus, a response rate of 60% was fit and reliable for the study as shown in Table 4.2.
Table 4.1: Questionnaire Response Rate

<table>
<thead>
<tr>
<th></th>
<th>Patients</th>
<th>Health Workers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>76</td>
<td>15</td>
<td>91</td>
</tr>
<tr>
<td>Response</td>
<td>41</td>
<td>14</td>
<td>55</td>
</tr>
<tr>
<td>Response Rate (Percent)</td>
<td>54%</td>
<td>93%</td>
<td>60%</td>
</tr>
</tbody>
</table>

4.3 Demographic Characteristics of Respondents

This section sought to identify the demographic information of the respondents including gender, age group, period working in the organization and the level of education. These characteristics are important because they are known to influence the variables in a given study. The gender and age of the respondents was important as diabetes has complications that most patients for instance would prefer sharing with persons of same gender or age bracket. The profession and working period of the health workers in the clinic was important to determine their area of specialization, qualifications and competences to manage diabetes mellitus. The general information points at the respondents’ suitability in answering the questions and vast awareness on management and control of diabetes mellitus.

4.3.1 Distribution of the Respondent by Gender

The study sought to establish the gender distribution of the respondents. The findings are shown in table 4.2.

Table 4.2: Gender of Respondents

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>26</td>
<td>47.3</td>
</tr>
<tr>
<td>Female</td>
<td>29</td>
<td>52.7</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.2 shows majority of the respondents 52.7% were female while 47.3% were male. This finding indicates that diabetes management and control cuts across both gender thus the need to look at gender of respondents so as to have the opinion of both in management and control of diabetes mellitus in health projects.
4.3.2 Distribution of the Respondents by Age
The study sought to determine the age distribution of the respondents. The age was used to determine the maturity of respondents as diabetes mellitus has complications that are best shared with people of same age. In addition the age of health workers was important to gauge the experience and maturity of handling diabetes mellitus. The findings are shown in Table 4.3.

Table 4.3: Distribution of Respondents by Age

<table>
<thead>
<tr>
<th>Age of health workers</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>below 24 years</td>
<td>2</td>
<td>14.3</td>
</tr>
<tr>
<td>25-30 years</td>
<td>6</td>
<td>42.9</td>
</tr>
<tr>
<td>31-34 years</td>
<td>3</td>
<td>21.4</td>
</tr>
<tr>
<td>35-40 years</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td>41-44 years</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td>45-50 years</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age of patients</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 24 yrs</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>31-34</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>41-44</td>
<td>5</td>
<td>12.2</td>
</tr>
<tr>
<td>45-50</td>
<td>14</td>
<td>34.1</td>
</tr>
<tr>
<td>Above 51</td>
<td>20</td>
<td>48.8</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The study findings presented in Table 4.3 established that majority of the health workers ranged between 25-30 years of age (42.9%) indicating that the youthful health workers may not have adequate experience in handling diabetes cases especially the elderly patients who were above 51 years of age at 48%. Followed by 45-50 year olds at 34.1%. The study also revealed that diabetes mellitus was prevalent in elderly people.

4.2.3 Period worked by health workers at the clinic
The health workers were asked to indicate the number of years they had worked with the Clinic. This information was important given that diabetic patients are delicate and emotional and thus need a lot of experienced personnel to handle them. The findings are well illustrated in Table 4.4:
Table 4.4: Working Period of the health workers

<table>
<thead>
<tr>
<th>Working period</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 6 months</td>
<td>4</td>
<td>28.6</td>
</tr>
<tr>
<td>7-12 months</td>
<td>8</td>
<td>57.1</td>
</tr>
<tr>
<td>2-3 years</td>
<td>2</td>
<td>14.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table 4.4, indicates that 57.1% of the health workers had worked at the clinic for 7-12 months. 28.6% less than 6 months and only 14.3% had worked between 2-3 years. This findings show that most of the respondents have been at the clinic long enough to give in depth information on the status of the hospital in regard to the study variables under investigation. This also implies that majority of the staff are well experienced have knowledge and capable of handling diabetic patients given their nature.

### 4.2.4 Highest Level of Education of the Respondents

The study also sought to establish the level of education attained by the respondents. The findings are shown in Table 4.5:

Table 4.5: Highest Level of Education of the Respondents

<table>
<thead>
<tr>
<th>Highest Level of Education of patients</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>College/University</td>
<td>12</td>
<td>29.3</td>
</tr>
<tr>
<td>Secondary</td>
<td>17</td>
<td>41.5</td>
</tr>
<tr>
<td>Primary</td>
<td>10</td>
<td>24.4</td>
</tr>
<tr>
<td>Non Formal</td>
<td>2</td>
<td>4.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The findings in Table 4.5, show majority of the patients could read and write based on the level of education. In addition they are knowledgeable enough to make decisions in terms of management.
and control of diabetes may be the reasons why they adhere to the follow up clinics. On the other hand health worker s’ level of education was important to evaluate their qualifications competence and whether they are equipped with necessary skills and knowledgeable on matters concerning diabetes management and control given that the patients fully relied on their expertise.

4.2.5 Profession of health workers

The researcher sought to find the health workers’ profession to ascertain whether the clinic had diabetes specialists like diabetologists and other consultant physicians that are mandatory for efficient management of diabetes mellitus (Mechanic 2008). The findings are indicated in table 4.6

<table>
<thead>
<tr>
<th>Profession of health workers</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Doctors</td>
<td>4</td>
<td>28.6</td>
</tr>
<tr>
<td>Clinical Officers</td>
<td>6</td>
<td>42.9</td>
</tr>
<tr>
<td>Nurses</td>
<td>4</td>
<td>28.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The findings in Table 4.6 indicate that 42.9% were clinical officers while the Medical doctors (MOH) who are general practitioners and nurses were each at 28.6%. This indicates that the clinic lacked specialists correlating to a study by Lavernia (2010) on successful management of diabetes mellitus requires a synchronized approach of health workers and must be headed by a specialist. In this case the clinic is headed by general practitioners who are not specialized in diabetes and as such most of complications may be referred to tertiary facilities thus prevalence of the disease. As depicted by the high number of clinical officers at the clinic and therefore mostly handling the diabetics.

4.4 Professionalism of Health Workers on Management and Control of Diabetes Mellitus

In order to determine the influence of professionalism of health workers in management and control of diabetes mellitus, the respondents were asked to indicate the extent to which they thought Professionalism of health workers influence management and control of diabetes mellitus. This was measured using a Likert scale of 1-5 where 1=Strongly disagree, 2= Disagree, 3= Not Sure, 4 =Agree, 5=Strongly. From the responses, descriptive measures of central dispersion: mean and standard deviation were used for ease of interpretation and generalization of findings.
Table 4.7 Professionalism of Health Workers on Management and Control of Diabetes mellitus

<table>
<thead>
<tr>
<th></th>
<th>SD</th>
<th>D</th>
<th>M</th>
<th>A</th>
<th>SA</th>
<th>Mean</th>
<th>Std.Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>The health workers in the clinic have the ability to diagnose and offer treatment of diabetes mellitus</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>24</td>
<td>29</td>
<td>4.07</td>
<td>0.690</td>
</tr>
<tr>
<td>Health workers have the ability to detect and manage diabetes mellitus related complications</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>34</td>
<td>6</td>
<td>4.18</td>
<td>0.547</td>
</tr>
<tr>
<td>Health workers have the ability to offer counseling and health education</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>29</td>
<td>16</td>
<td>4.00</td>
<td>0.770</td>
</tr>
<tr>
<td>Health workers are friendly and treat all patients fairly and equally</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>33</td>
<td>14</td>
<td>4.15</td>
<td>0.911</td>
</tr>
</tbody>
</table>

The findings on health workers have the ability to detect and manage diabetes mellitus related complications had the highest mean of 4.18 with a standard deviation of 0.547 followed by health workers are friendly and treat all patients fairly and equally which had a mean of 4.15 with a standard deviation of 0.911, the health workers in the clinic have the ability to diagnose and offer treatment of diabetes mellitus had a mean of 4.07 with a standard deviation of 0.690 and health workers have the ability to offer counseling and health education had the least mean of 4.00 with standard deviation of 0.770. This shows that health workers were able to manage, diagnose, and offer counseling to their patients. This findings correlates to Mechanic (2008) who stipulates that enhanced professionalism reinforced medical competences improves physician patient relationships while Masoud (2011) equates physicians knowledge and competence, attitude and ability to interact with patients contribute significantly to management and control of diabetes mellitus. This findings may have some biasness given the fact that a profession is self evaluated on matters of qualification.
4.5 Medical Facilities and Infrastructure on Management and Control of Diabetes Mellitus

In order to determine the influence of medical facilities and infrastructure on management and control of diabetes mellitus, the respondents were asked to indicate the extent to which they agreed with various statements put forward. This was measured using a Likert scale of 1-5 where 1= Strongly disagree, 2= Disagree, 3= Not Sure, 4 =Agree, 5=Strongly .The findings were used to compute mean and standard deviation as shown in the Table 4.8:

Table 4.8: Medical Facilities and Infrastructure on Management and Control of Diabetes Mellitus

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SD</td>
<td>D</td>
<td>M</td>
<td>A</td>
<td>SA</td>
<td>Mean</td>
<td>Std.Dev</td>
</tr>
<tr>
<td>Diabetes clinic is fully equipped with screening and diagnostic equipment</td>
<td>0</td>
<td>28</td>
<td>14</td>
<td>13</td>
<td>0</td>
<td>2.58</td>
<td>1.117</td>
</tr>
<tr>
<td>The diabetes clinic has adequate trained health workers</td>
<td>0</td>
<td>20</td>
<td>14</td>
<td>21</td>
<td>0</td>
<td>3.00</td>
<td>1.072</td>
</tr>
<tr>
<td>The diabetes clinic has sufficient treatment and prevention drugs related to diabetes conditions</td>
<td>0</td>
<td>21</td>
<td>9</td>
<td>25</td>
<td>0</td>
<td>3.13</td>
<td>1.156</td>
</tr>
<tr>
<td>The diabetes clinic has sufficient counseling, education and observation rooms</td>
<td>18</td>
<td>23</td>
<td>6</td>
<td>8</td>
<td>0</td>
<td>2.07</td>
<td>0.97</td>
</tr>
<tr>
<td>The diabetes clinic has sufficient teaching Aids used in health education</td>
<td>31</td>
<td>14</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>1.71</td>
<td>0.975</td>
</tr>
<tr>
<td>The diabetes clinic has adequate space to accommodate the patients and health workers</td>
<td>22</td>
<td>20</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>2.07</td>
<td>1.184</td>
</tr>
</tbody>
</table>

The findings indicate that the clinic is hard hit with insufficient infrastructure like teaching aids as expressed with the highest respondents 31 with a lowest mean of 1.17. The clinic lacks teaching
aids like pamphlets, posters and visual aids that are essential in health education. In addition the researcher sought to find out if the patients undertook routine urinalysis which is mandatory for all diabetic patients to check the presence of ketones in the urine as a preventive measure for renal complications. The findings indicated that 80.5% of the patients did not undergo the test because they were not aware of it and neither were they advised by the health workers. Further probe on the health workers revealed that the hospital only had one urinalysis machine that served the entire hospital and was not adequate notwithstanding the screening charges of KSHS. 200/= the patients could not afford. So the patients were only requested to take the test when there was absolute need.

The great variation in standard deviation in response to the statements that the clinic was fully equipped with screening and diagnostic equipment and had adequate trained health workers was because the patients may not have a benchmark to compare what equipment are needed as long as they got the services required while the health workers on the ground acknowledged the challenges they faced thus more inclined to respond differently from the patients. For instance the entire hospital had a single glucometer for assessing sugar levels that served the entire hospital, had no Spectrophotometers for determining glucose concentration in urine and had a single Sphygmomanometers for blood pressure measurement Lacked Electrocardiographs for measuring heart beat and Enzyme linked immunosorbent assay (ELISA) that are crucial for control and management of diabetes mellitus. Both the respondents faced challenges of shortage of supplies especially drugs. The drug supplies were intermittent and patients had to purchase from other chemists. The clinic had one consultancy room that was shared amongst 4-6 consulting health workers and lacked privacy. The observation room was a large verandah that doubled as the waiting bay. In fact health education was administered on the patients while seated on benches on the queue outside in the sun. Lack of essential equipment and infrastructure hinder management and control of diabetes mellitus Ramachandran (2013). From the findings we can conclusively say that the clinic lacks medical equipment and infrastructure necessary for management and control of diabetes mellitus.

4.6 Networking and Partnership Linkages and Management of Diabetes Mellitus
The study sought to establish how networking and partnership linkages influences management and control of diabetes mellitus in health projects. The respondents were asked to indicate to what
extent support in construction and expansion of health facilities and infrastructure through partnerships influenced management and control of diabetes mellitus. This was measured using a Likert scale of 1-5 where 1= Strongly disagree, 2= Disagree, 3= Not Sure, 4 =Agree, 5=Strongly.

The findings are indicated in Table 4.9

Table 4.9: Networking and Partnership Linkages and Management and control of Diabetes Mellitus

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint capacity building and training influences management and control of diabetes mellitus</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>1 (1.8%)</td>
</tr>
<tr>
<td>Provision and supply of subsidized drugs and screening equipment enhances management and control of diabetes mellitus</td>
<td>1 (1.8%)</td>
</tr>
<tr>
<td>Sharing of research findings and expertise amongst health practitioners influences management and control of diabetes</td>
<td>0</td>
</tr>
<tr>
<td>Support in construction and expansion of health facilities and infrastructure through partnerships influences management and control of diabetes mellitus</td>
<td>1 (1.8%)</td>
</tr>
</tbody>
</table>

As indicated in Table 4.9, the response was highest on Provision and supply of subsidized drugs and screening equipment enhances management and control of diabetes mellitus with a highest mean of 4.49 followed by support in construction and expansion of health facilities and infrastructure through partnerships influences management and control of diabetes mellitus which had a mean of 4.45 with a standard deviation of 0.633. This response rate magnified the fact that the study established that the patients purchased their insulin which at times was out of stock from the hospital pharmacy. These findings are similar to a study by Otieno and Macharia (2010) where
they indicate that private sectors both for profit and not-for-profit contributes over 40% of health services. This study correlates with Renzaho (2015) report stipulating that creating linkages between government funded health care systems and the emergency response are prudent to maximize access to medication. Hence the findings established that the respondents agree that networking and partnership linkages contribute significantly in management and control of diabetes. Therefore from the findings the respondents agree that networking and partnership linkages influence management and control of diabetes mellitus.

4.7 Management and Control of Diabetes Mellitus in Health Projects

The researcher sought to know whether proper management and control of diabetes mellitus was as a practice of increased public knowledge about diabetes mellitus; early detection and effective management; lifestyle modification and decreased cases of diabetes related complications. This was measured using a Likert scale of 1-5 where 1= Strongly disagree, 2= Disagree, 3= Not Sure, 4 =Agree, 5= Strongly. From the responses, descriptive analysis of mean and standard deviation were used for ease of interpretation and generalization of findings. The responses are indicated in table 4.10

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th></th>
<th></th>
<th></th>
<th>Mean</th>
<th>Std.Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good management of diabetes</td>
<td>SD</td>
<td>D</td>
<td>M</td>
<td>A</td>
<td>SA</td>
<td>Mean</td>
</tr>
<tr>
<td>mellitus</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>37</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>(32.7%)</td>
<td>(67.3%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early detection and screening</td>
<td>SD</td>
<td>D</td>
<td>M</td>
<td>A</td>
<td>SA</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>20</td>
<td>30</td>
<td>2.91</td>
</tr>
<tr>
<td></td>
<td>(9.1%)</td>
<td></td>
<td>(36.5%)</td>
<td>(54.5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased public knowledge</td>
<td>SD</td>
<td>D</td>
<td>M</td>
<td>A</td>
<td>SA</td>
<td>Mean</td>
</tr>
<tr>
<td>and health education</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>36</td>
<td>3.12</td>
</tr>
<tr>
<td></td>
<td>(34.5%)</td>
<td></td>
<td>(65.5%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>SD</td>
<td>D</td>
<td>M</td>
<td>A</td>
<td>SA</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>20</td>
<td>32</td>
<td>4.31</td>
</tr>
<tr>
<td></td>
<td>(5.5%)</td>
<td></td>
<td>(36.4%)</td>
<td>(58.2%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As indicated in Table 4.10, increased public knowledge and health education had highest mean of 3.12 with a standard deviation of 0.115 followed by good management of diabetes mellitus which had a mean of 3.00 with a standard deviation of 0.012, Lifestyle modification had a mean of 2.95 with a standard deviation of 0.229 and early detection and screening had a mean of 2.91 with a standard deviation of 0.290. Therefore the respondents are aware that management and control of diabetes mellitus is prudent in control of the disease prevalence. Early detection and treatment is essential in mitigating the serious and fatal consequences associated with the development of complications related to diabetes mellitus Peer et al.;(2013). This is only possible when both the patient and health workers have sufficient knowledge on diabetes in regard to the symptoms, complications, care and management; bringing the availability, competence, and knowledge-ability of the health care workers in diabetes matter to scrutiny. Late screening and monitoring due to lack of equipment, poor skills to operate the equipment and inaccessibility to health facilities brings the gap of infrastructure availability and accessibility for both the health workers and the patients, depicting the challenges contributing to management and control of diabetes mellitus in health care systems particularly in Africa.
CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction
This chapter presents summary of study findings, conclusion and recommendations on factors influencing Management and control of diabetes mellitus in health projects: A case of Bungoma County hospital Bungoma County, Kenya.

5.2 Summary of findings
This section presents a summary of the findings as per the research objectives and the research questions as summarized in themes below.

5.2.1 Professionalism of health workers on management and Control of diabetes mellitus in health projects
The findings indicate that the health workers at Bungoma County Hospital were competent and knowledgeable in management and control of diabetes mellitus. The health workers, counseled and disseminated health education to the patients on individuals and groups on a weekly basis. The health workers were responsible fair and friendly to the patients which encouraged the patients to express themselves freely and confide in them. In addition the health workers have the ability to detect diagnose and manage diabetes related complications based on the clinic records that indicated at least 2 to 4 cases could be detected on a weekly basis. Therefore professionalism of health workers influences management and control of diabetes mellitus in health projects.

5.2.2 Medical facilities and infrastructure on management and control of diabetes mellitus in health projects
The study established that Bungoma County hospital was not adequately equipped with facilities and infrastructure to manage and control diabetes mellitus. For instance the study found out that the clinic tested patients only for fasting random glucose, while urine glucose ketone, total cholesterol and insulin test, although essential for all diabetics was not performed as per the guidelines due to inadequate equipment. From the findings the hospital had only one glucometer.
that served both the general hospital and the diabetes clinic. The study established that the facility had inadequate personnel.

The hospital lacked consulting physician specialists like diabetologists and neurologists instead the clinic was headed by clinical officers with the medical doctors stepping in after routine duties in the general hospitals. Health education was done mostly by a nutritionist the only one in the entire hospital without use of teaching aids. The subordinate staffs (the cleaners) were in charge of taking the patients’ blood pressure weight and recording in the clinic registry an indication of understaffing. The study further established that the hospital did not have adequate counseling, education and observation rooms as indicated by respondents. The consulting health workers squeezed in one room sharing three desks. Basically there was no privacy between patients this hindered confidentiality. The clinic had only one observation bed in the main consultation room which was not much used. Therefore inadequate medical facilities worsens diabetes cases hence its prevalence.

5.2.3 Networking and partnership linkages on management and control of diabetes mellitus in health projects

The study found that Bungoma County Hospital was not affiliated to any diabetes management organization. In fact most of the health workers did not know any organization that rendered diabetes management services. In addition the hospital did not have any joint partnerships with any learning institutions to enable exchange of ideas and expertise from other health practitioners. However the respondents agreed that partnership and networking was essential in management and control of diabetes mellitus in Kenya.

5.2.4 Management and control of diabetes mellitus in health projects

The study established that 74.5% of patients and 25.5% health worker respondents agreed that lifestyle modification practices, Increased public knowledge and health education, Early detection and screening and Good management of diabetes mellitus reduces related complications and prevalence of the disease.
5.3 Conclusion
Findings from this study show that professionalism of health workers, medical facilities and infrastructure (resources) networking and partnership linkages on the management and control of diabetes mellitus is inadequate at the hospital and most other facilities in Kenya in general. The hospital as a known fact was ill equipped with inadequate health personnel especially physician specialists to care for diabetics. The hospital lacks equipment and other physical facilities and general infrastructure for example drugs for treating diabetes and related conditions were intermittent and costly, inadequate health personnel and insufficient observation and consultancy rooms hence the rising prevalence cases. Despite the existing inadequacies, training more professionals associated with diabetes management as well as provision of medical infrastructure especially screening and diagnostic equipment and subsidized drugs which can be accessed through partnership linkages, will help manage diabetes better and reduce prevalence. Most of the factors that lead to the development of diabetes mellitus can be avoided or controlled.

5.4 Recommendation
It is recommended that with the limited resources available for managing diabetes in the health facilities there is the need:

1. To provide free oral medications and insulin drugs for diabetes patients as the case of HIV and AIDS and Tuberculosis to prevent complications related to diabetes mellitus.
2. The government of Kenya through the Ministry of health should provide adequate screening and diagnostic equipment at subsidized screening charges levied to enhance early detection of diabetes mellitus to the general public.
3. The government of Kenya through Ministry of Health should ensure adequate capacity building and training of diabetes specialists. This will help curtail the continuous increase in the incidence of diabetes in the country and the management of the complications associated with diabetes mellitus in people who live with diabetes.

5.5 Limitations of the Study
As a case of Bungoma County Hospital, the study results may be more specific to Bungoma county and therefore generalization of the results to cover the whole of Kenya may be inappropriate or an exaggeration. Also, using a small sample size may increase error and
significance. However, highlighting the increase in prevalence of diabetes mellitus and the lack of resources and networking and partnership linkages to manage it would help raise awareness and help the government adopt solutions to help reduce the prevalence.

5.6 Areas for Further Research

1. The researcher recommends that further studies on the medical facilities and infrastructure influence on management and control of diabetes mellitus in health projects could be done in other counties in Kenya in order to generalize the results.

2. Since this study concentrated on factors influencing management and control of diabetes mellitus in health projects with special reference to Bungoma County hospital in Bungoma County, further studies could be done in other major hospitals and clinics in Kenya for comparison purposes and allow for generalization of the findings.
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APPENDICES

Appendix 1: Letter of Transmittal

University of Nairobi
School of Continuing and Distance Education,
P.O. Box 30197
Nairobi.

Dear Respondent,

REF: INTRODUCTION LETTER

My name is Namukhula Fridah; I am a student at the University of Nairobi,
Reg. No. L50 /71666/ 2014 undertaking a Masters Degree in Project Planning and Management. I am conducting a study to investigate the Factors Influencing Management and Control of Diabetes Mellitus in Health Projects. To facilitate this exercise you have been randomly selected as a participant in this study.

You are kindly requested to participate in answering the questionnaire. Please be assured that any information obtained will be treated with utmost confidentiality and will be used only for the purpose of this study.

Thank you

Yours Faithfully,

Fridah Namukhula
Appendix II: Research Questionnaire to Health workers

This questionnaire is intended to gather general research information on the Factors Influencing Management and Control of Diabetes mellitus in Health Projects in Bungoma County, Kenya. The questionnaire has five sections.

For each section, kindly respond to all items by using a tick (√) in the appropriate box or write answers in the space provided. Please *do not* write your name on the questionnaire. Kindly respond to all question items honestly. Your response will be kept strictly confidential. Your assistance and cooperation will be highly appreciated.

This questionnaire has five sections. Are you willing to participate in the exercise and thereby respond to the questions I will put to you?

A. Yes [ ]

B. No [ ]

If yes please put a tick to the correct answer or give details as appropriate in the following questions

**Section 1: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS**

1. What is your gender?
   A. Male [ ]
   B. Female [ ]

2. Which age bracket do you belong (Tick whichever appropriate)
   - Below 24 Years [ ]
   - 25 - 30 Years [ ]
   - 31 - 34 years [ ]
   - 35 - 40 years [ ]
   - 41 - 44 years [ ]
   - 45 - 50 years [ ]
   - Over- 51 years [ ]

3. What is your highest level of education? (Tick as applicable)
   - Primary certificate [ ]
   - Secondary certificate [ ]
   - Diploma/certificate [ ]
   - Bachelors’ degree [ ]
Postgraduate degree [ ]
Others-specify……………………………

4. What is your job title/ designation (Specify your professional category)

………………………………………………………………………………………………………

5. For how long have you worked at this clinic? (Please tick appropriate age bracket)
   A. 1-6 months [ ]
   B. 7-12 months [ ]
   C. 2-3 years [ ]
   D. 4-5 years [ ]
   E. Over 5 years [ ]

SECTION 2: PROFESSIONALISM OF HEALTH WORKERS

1. Does the clinic conduct diabetes education to patients?
   A. Yes [ ]
   B. No [ ]

If yes how frequently do you conduct diabetes education in the hospital? (Please indicate)……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………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<tr>
<td>The health workers in this clinic have the ability to diagnose and offer treatment of diabetes mellitus</td>
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<tr>
<td>The health workers in this clinic have the ability to detect and manage diabetes related complications</td>
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<td>The health workers in the clinic have the ability to offer counseling and health education</td>
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<tr>
<td>The health workers in this clinic are friendly and treat all patients fairly and equally</td>
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**SECTION 3: MEDICAL FACILITIES AND INFRASTRUCTURE**

1. Do you routinely administer blood sugar level tests to all patients?
   - A. Yes [ ]
   - B. No [ ]

   If no why please explain briefly?

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

   Who gives the education / counseling?
   - A. Trained counselors [ ]
   - B. Nurses [ ]
   - C. Consultant physicians [ ]
   - D. Nutritionist [ ]

2. How often do you administer ophthalmological checkups on the patients?
   - A. Every time they come for follow up visits [ ]
   - B. At least once a year [ ]
C. At least once in three years [    ]
D. At least once in five years [    ]

3. Do you have the following screening equipment? (PLEASE TICK ON YES OR NO)
   A. Sphygmomanometers for blood pressure measurement
      Yes [    ] No [    ]
   B. Electrocardiographs for measuring heart beat
      Yes [    ] No [    ]
   C. Enzyme linked immunosorbent assay (ELISA)
      Yes [    ] No [    ]
   D. Spectrophotometers determining glucose concentration in urine
      Yes [    ] No [    ]
   E. Glucometer for assessing blood sugar levels.
      Yes [    ] No [    ]

4. Do you use teaching aids during the diabetes education /counseling session?
   A. Yes [    ]
   B. No [    ]

If yes please tick the teaching aids used during education and training on diabetes mellitus.
   A. Audio visual aids videos/ televisions [    ]
   B. Charts [    ]
   C. Pamphlets [    ]
   D. Posters [    ]

If no please indicate why

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

5. How many observational beds does the clinic have? Please indicate

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

6. Do you give diabetes drugs for free or are they purchased by the patient?
   A. Given for free [    ]
   B. Are purchased [    ]

If they are purchased are the prices subsidized?
   A. Yes [    ]
   B. No [    ]
7. How many consultation rooms does diabetes clinic have? Please indicate

8. How many counseling/education rooms does the clinic have?

9. What is the number of health workers working at the diabetes outpatient clinic?

SECTION 4: NETWORKING AND PARTNERSHIP LINKAGES

1. Is the clinic affiliated to any diabetes management organization?
   A. Yes [ ]
   B. No [ ]

2. If yes are you a registered member of any of the organizations?
   A. Yes [ ]
   B. No [ ]

   If yes kindly list down the names of the organization

3. Do you have joint capacity building and refresher training courses?
   A. Yes [ ]
   B. No [ ]

4. If yes how often do you hold the training?
   A. After every three months [ ]
   B. After every six months [ ]
   C. Once a year [ ]

5. With whom do you partner with? Kindly list them down

6. How does the diabetes clinic source for the patients drugs?
   A. Purchase from the pharmaceutical companies [ ]
   B. Supplied by the Ministry of Health [ ]
   C. Donated by collaborating charitable organizations [ ]
7. To what extent do you agree with the following statements? Please tick next to the appropriate column in the table below;

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<th>Strongly disagree</th>
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<tr>
<td>Joint capacity building and training influences management and control of diabetes mellitus</td>
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<tr>
<td>Provision and supply of subsidized drugs and screening equipment enhances management and control of diabetes mellitus</td>
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<td>Sharing of research findings and expertise amongst health practitioners influences management and control of diabetes</td>
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<td>Support in construction and expansion of health facilities and infrastructure through partnerships influences management and control of diabetes mellitus</td>
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SECTION 5: MANAGEMENT AND CONTROL OF DIABETES MELLITUS IN HEALTH FACILITIES

1) Tick the range of group that you train in one session?
   A. All new patients [  ]
   B. Follow up patients [  ]
   C. Care givers [  ]
   D. All the above [  ]
2) Based on the diabetes education you offer has the prevalence of diabetes related complication decreased?
   A. Yes [ ]
   B. No [ ]
If yes kindly indicate by what percentage? .................................................................

If no what is the number of early detection cases recorded per week?
...........................................................................................................................................

3) What are the challenges you experience during service delivery? Kindly enlist the challenges
...........................................................................................................................................
...........................................................................................................................................

Thank you for your cooperation
Appendix III: PATIENTS’ QUESTIONNAIRE

This questionnaire is intended to gather general research information on the Factors Influencing Management and Control of Diabetes mellitus in Health Projects. The questionnaire has five sections. For each section, kindly respond to all items by using a tick (√) in the appropriate box or write answers in the space provided. Please DO NOT write your name on the questionnaire. Kindly respond to all question items honestly. Your response will be kept strictly confidential. Your assistance and cooperation will be highly appreciated.

This questionnaire has five sections. Are you willing to participate in the exercise and thereby respond to the questions I will put to you?

Yes [ ] No [ ]

If yes please put a tick to the correct answer or give details as appropriate in the following questions?

SECTION 1: DEMOGRAPHIC INFORMATION OF RESPONDENTS

1. Please indicate your Gender
   A. Male [ ]
   B. Female [ ]

2. Please specify your age bracket
   Below 24 Years [ ] 25 - 30 Years [ ]
   31 - 34 years [ ] 35 - 40 years [ ]
   41 - 44 years [ ] 45 - 50 years [ ]
   Over- 51 years [ ]

3. What is your highest academic level? (Please tick one)
   A. College/university [ ]
   B. Secondary [ ]
   C. Primary [ ]
   D. Non Formal [ ]
SECTION B. PROFESSIONALISM OF HEALTH WORKERS

1) Had you ever heard of diabetes mellitus before you were diagnosed?
   A. Yes [   ]    B. No [   ]

2) What do you think causes diabetes mellitus? (Please Tick one)…
   A. Eating too much sugary foods [   ]
   B. The pancreas does not produce enough insulin for the body [   ]
   C. Taking too much alcohol [   ]

3) What were the major complaints during your doctor’s first visit? (list them please)
   ………………………………………………………………………………………
   ………………………………………………………………………………………

4) For how long did you experience these complications before seeking medical advice?
   A. More than 12 months [   ]
   B. Between 4 to 12 months [   ]
   C. 1-3 months [   ]
   D. Less than a month [   ]

5) Do you discuss your disease condition with your doctor?
   Yes [   ]    No [   ]

   If yes please state the issues you discuss with the doctor
   ………………………………………………………………………………………

   If no kindly state why you don’t discuss with her/him
   ………………………………………………………………………………………

6. Please specify to what extent do you agree with the following statements? Please tick next to the appropriate column in the table below; (Strongly disagree, Disagree, Not Sure, Agree, Strongly agree on a scale of 1, 2,3,4,5 rating scale)

<table>
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<td>The health workers in this clinic have</td>
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The ability to detect and manage diabetes related complications

| The health workers in the clinic have the ability to offer counseling and health education | 1 | 2 | 3 | 4 | 5 |
| The health workers in this clinic are friendly and treat all patients fairly and equally | 1 | 2 | 3 | 4 | 5 |

**SECTION C: MEDICAL FACILITIES AND INFRASTRUCTURE**

1. Do you go for routine medical checkup?
   - Yes [   ]
   - No [   ]

2. If yes how often do you go for routine medical checkups?
   - A. At least once a year [   ]
   - B. At least once in three years [   ]
   - C. At least once in five years [   ]
   - D. At least once in more than five years [   ]

3. Do you routinely undergo urine tests?
   - Yes [   ]
   - No [   ]

4. If no why please explain briefly?
   ........................................................................................................................................... ….................................................................................................

Do you undergo eye checkups?

- Yes [   ]
- No [   ]

5. How often do you undergo eye checkup?
   - A. After every 6 months [   ]
   - B. Annually [   ]
   - C. Occasionally [   ]

6. If no kindly give reasons why you don’t

........................................................................................................................................... ….................................................................................................

7. What drugs do you use for treating your condition (Diabetes Mellitus)
   - A. Oral tablets [   ]
B. Insulin injections [ ]
C. Herbal [ ]
D. None [ ]

8. Are there occasions you miss taking your medication?
   Yes [ ]  No [ ]

If yes please explain the reasons for missing?

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

9. How do you get your medicines?
   A. Purchase from the pharmacy [ ]
   B. Given freely at the hospital [ ]
   C. Donated by charitable organizations [ ]

10. Kindly specify to what extent do you agree with the following statements? Please tick next to the appropriate column in the table below; (Strongly disagree, Disagree, Not Sure, Agree, Strongly agree on a scale of 1, 2, 3, 4, 5 rating scale)

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<tr>
<td>The diabetes clinic is fully equipped with screening and diagnostic equipment</td>
<td>1</td>
<td>2</td>
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<td>The diabetes clinic has adequate trained health workers</td>
<td>1</td>
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<tr>
<td>The diabetes clinic has sufficient treatment and prevention drugs related to diabetes conditions</td>
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<tr>
<td>The diabetes clinic has adequate counseling, education and observation rooms</td>
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<tr>
<td>The diabetes clinic has sufficient teaching Aids used in health education</td>
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<td>The diabetes clinic has adequate space to accommodate the patients and health workers</td>
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SECTION D: NETWORKING AND PARTNERSHIP LINKAGES

1. Kindly specify to what extent do you agree with the following statements? Please tick next to the appropriate column in the table below; (Strongly disagree, Disagree, Not Sure, Agree, Strongly agree on a scale of 1, 2,3,4,5 rating scale)

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<td>Support in construction and expansion of health facilities and infrastructure through partnerships influences management and control of diabetes mellitus</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

SECTION E: MANAGEMENT AND CONTROL OF DIABETES MELLITUS

1) To what extent do you agree with the statements in the table? Please tick next to the appropriate column in the table below; (Strongly disagree, Disagree, Not Sure, Agree, Strongly agree on a scale of 1, 2,3,4,5 rating scale)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good management of diabetes mellitus reduces complications related to the disease</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Early detection and screening reduces the cases of diabetics</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Increased public knowledge and health education reduces increase of diabetes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Lifestyle modification i.e. frequent exercise, proper dietary intake cessation of smoking and alcohol consumption is essential in management and control of diabetes

<table>
<thead>
<tr>
<th>cases</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifestyle modification i.e. frequent exercise, proper dietary intake cessation of smoking and alcohol consumption is essential in management and control of diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THANK YOU FOR YOUR COOPERATION