ASSESSMENT OF THE FACTORS INFLUENCING UTILIZATION OF DIABETES HEALTH CARE SERVICES AMONG DIABETIC PATIENTS IN KENYA: A CASE OF DIABETIC PATIENTS IN KIAMBU DISTRICT HOSPITAL

By

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

Signature: …………………………..Date: …………………………..

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Supervisor
This project has been submitted for review with my approval as a university supervisor.

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DEDICATION
I dedicate this paper to my family and friends for their support during my proposal and report writing process.
ACKNOWLEDGEMENTS
I sincerely appreciate my supervisor Dr. Julius Korir for his advice and support throughout the development of this project. On the other hand, I would like to thank the Director School of Economics, Prof. Jane Mariara for giving me the opportunity to undertake this programme at the University of Nairobi and my lecturers at the school of Economics who took me through the course work. Finally, I wish to thank the head of Kiambu District Hospital for allowing me collect data on utilization of diabetes care at their clinic and other staff who were willing to assist me gather up to date information. My family members for the moral support they gave me throughout the study period. To my colleagues and friends whom I consulted in the process of developing this paper, God bless you.
TABLE OF CONTENTS

DECLARATION ........................................................................................................................................ ii
DEDICATION ........................................................................................................................................ iii
ACKNOWLEDGEMENTS ....................................................................................................................... v
......................................................................................................................................................... viii
ACRONYMS/ABBREVIATIONS ............................................................................................................ ix
DEFINITION OF OPERATIONAL TERMS ......................................................................................... xi
ABSTRACT ........................................................................................................................................... xii
CHAPTER ONE ................................................................................................................................... 1
INTRODUCTION ................................................................................................................................... 1
  1.1 Background ...................................................................................................................................... 1
  1.2 An Overview of Diabetes Mellitus ................................................................................................. 1
  1.3 Statement of the problem ............................................................................................................... 2
  1.4 Research Questions ....................................................................................................................... 3
  1.5 Objectives of the study ................................................................................................................... 3
      1.5.1 Broad Objectives ..................................................................................................................... 3
      1.5.2 Specific Objectives ................................................................................................................ 3
  1.6 Justification of the study .............................................................................................................. 3
  1.7 Significance of the Study ............................................................................................................... 4
CHAPTER TWO ................................................................................................................................... 5
LITERATURE REVIEW .......................................................................................................................... 5
  2.1 Theoretical Literature ................................................................................................................... 5
      Transtheoretical model ..................................................................................................................... 6
  2.2 Empirical Literature ..................................................................................................................... 8
CHAPTER THREE ............................................................................................................................... 14
METHODOLOGY ............................................................................................................................... 14
  3.1 Conceptual Framework ................................................................................................................ 14
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2 Research Design</td>
<td>15</td>
</tr>
<tr>
<td>3.3. Econometric Model and Model Specification</td>
<td>15</td>
</tr>
<tr>
<td>3.4. Study Variables and their measurement</td>
<td>16</td>
</tr>
<tr>
<td>3.5. Study Area- Kiambu District Hospital</td>
<td>17</td>
</tr>
<tr>
<td>3.6 Study Population and sample size determination</td>
<td>17</td>
</tr>
<tr>
<td>3.7 Data Collection</td>
<td>18</td>
</tr>
<tr>
<td>3.8 Reliability and Validity</td>
<td>18</td>
</tr>
<tr>
<td>3.8 Ethical Considerations</td>
<td>18</td>
</tr>
<tr>
<td>CHAPTER FOUR</td>
<td>20</td>
</tr>
<tr>
<td>RESULTS AND DISCUSSIONS</td>
<td>20</td>
</tr>
<tr>
<td>4.1. Introduction</td>
<td>20</td>
</tr>
<tr>
<td>4.2. Descriptive Statistics</td>
<td>20</td>
</tr>
<tr>
<td>The summary statistics are presented in Table 4.1</td>
<td>20</td>
</tr>
<tr>
<td>4.3. Correlation Analysis</td>
<td>25</td>
</tr>
<tr>
<td>4.4. Estimation Results</td>
<td>27</td>
</tr>
<tr>
<td>4.5 Discussion of the Study Results</td>
<td>28</td>
</tr>
<tr>
<td>CHAPTER FIVE</td>
<td>32</td>
</tr>
<tr>
<td>SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS</td>
<td>32</td>
</tr>
<tr>
<td>5.1 Summary</td>
<td>32</td>
</tr>
<tr>
<td>5.2 Conclusion</td>
<td>32</td>
</tr>
<tr>
<td>5.3 Policy Implications</td>
<td>32</td>
</tr>
<tr>
<td>5.4 Areas for further study</td>
<td>33</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>35</td>
</tr>
<tr>
<td>Annex I: Questionnaire</td>
<td>38</td>
</tr>
</tbody>
</table>
List of Tables

Table 3.1: Variable definition, measurement and empirical evidence ........................................... 16

List of Figures

Figure 1: Andersens phase -2 models of health Utilization services ................................. 8
Figure 2: Andersen phase -3 model of health services Utilization ............................... 8
Figure 3: Andersen’s Behavioural model of health services utilization .....................15
ACRONYMS/ABBREVIATIONS

WHO – World Health Organization
NCDS – Non Communicable Diseases
IDF – International Diabetic Federation
USD – United States Dollar
LEAD – Leadership For Education and Access to Diabetes Care
BMI – Body Mass Index
GDP – Gross Domestic Product
HBAIC – Glycosylated Hemoglobin
IDDM – Insulin Dependent Diabetes mellitus (type I diabetes)
IGT – Impaired Glucose Tolerance
IIF – International Insulin Foundation
NIDDM – Non Insulin Dependent Diabetes mellitus
PPM – Purchasing Power Parity
PARPA – Poverty Reduction Plan
RGB – Random Blood Glucose
WOD – World Diabetes Day
WDF – World Diabetes Federation
E.G - Example
D.M - Diabetes mellitus.
O.P.D – Out patient department.
DEFINITION OF OPERATIONAL TERMS

**Co-morbidity**: It is a condition where an individual has two or more other medical conditions in addition to a disease initially diagnosed.

**Diabetes Mellitus**: This is a group of metabolic diseases characterized by high blood sugar levels due to defects in insulin secretion or action.

**Direct Costs**: This refers to labor and expenses related to the production of a product.

**Economic Cost**: This is the sacrifice involved in performing an activity or following a decision or course of action.

**Non Communicable Diseases**: This is a class of diseases or health related events which are not spread through infectious agents or their pathogenic products. They are caused by lifestyles, diet and environmental hazards or even inborn.

**Quality of Care**: This is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes are consistent with current professional knowledge.

**Utilization**: This refers to put to use. For healthcare services is the measure of the healthcare services available to people like hospital services.
ABSTRACT

Diabetes and other non-communicable diseases poses a major challenge in Kenya today and this is likely to worsen unless major strategies are put in place to control them. This calls for the development of diabetes control strategy to reduce the consequences of the disease and their impacts in the population, improvement of the quality of life and minimizing deaths in those with diabetes. However, this could not be achieved without a clear understanding of factors that influence utilization of diabetic care. This study therefore sought to explore these factors among diabetic patients in Kiambu District Hospital. The study is based on Andersen health behavioral model whereby different factors relating to utilization of diabetes care are explored. Some of the variables considered in this study include the number of visits made to diabetic health center as the dependent variable with education levels, gender, occupation, time taken to access care, marital status, attitude, transport cost, out of pocket, insurance, cost of accessing diabetic services, information obtained from friends, information obtained from media and being either a Christian or Muslim as the explanatory variables. The study results reviewed that age of patients, higher education levels, married, attitude, transport costs, insurance, cost of diabetic care and being a muslim were statistically significant determinants of utilization of diabetic care hence the conclusion that the independent predictors of utilization of diabetic care in Kiambu District Hospital mentioned above need to be addressed so as to improve on service utilization. Based on the results, it was suggested that there is need to introduce cash transfers to the older generation who may not have source of income to continue accessing diabetic care as well as increase awareness through institutions like schools or religious groups especially the Muslim community on the importance of continuous uptake of these services. Further, it was suggested that more health facilities need to be constructed and staffed with relevant personnel and equipment to enable more utilization through reduction of transport costs associated as this will help bring services closer to the population. Finally, there was a suggestion of subsidizing services and introduction of relevant health insurance covers that takes care of costs of a good proportion of services offered in these diabetic care centers. If this is achieved, more and more uptake of diabetic care will be a reality and health status of the population consequently improves.
CHAPTER ONE

INTRODUCTION

1.1 Background

Most Health systems are underfunded with direct costs incurred by the patients to access healthcare like user charges presenting a barrier to accessing services especially for the developing countries. A study by WHO on the consequences of costs like out of pocket payments on utilization of healthcare services in Kenya showed that with removal of these fees there were increases in utilization of curative services. Diabetes mellitus (D.M) health care is a special care that involves early detection, diagnosis treatment and continued monitoring and control of diabetes. There is need to improve on the access to, and the quality of diabetic care to strengthen national health systems capacity to respond to the needs of diabetic patients. This will also strengthen the contribution of the patients to the society, promote reduction of poor eating habits, and promote healthy behaviors and uptake of welfare support and income maximization services.

1.2 An Overview of Diabetes Mellitus

Diabetes mellitus as one of the Non communicable diseases (NCDS) is a chronic disease defined by high blood glucose levels as people with the disease can’t use the glucose from digested food as energy for their cells. This is due to lack of insulin or the insulin is not functioning to enable glucose enter the cells. Diabetes mellitus is a growing epidemic and the cost of treating the disease is largely increasing in the whole world and more so in the developing countries where resources are more scarce.

An article on economic cost of diabetes in the US of 2002 published in March 2003 which estimated the medical expenditures for U.S population with or without diabetes in 2002 calculated based on the national health care survey data concluded that diabetes imposes a substantive cost burden to society and in particular to those individuals with diabetes and their families. A research in Cameroon in 2001 reviewed the barriers to accessing quality diabetes care as affordability, irregular supply of medicines including insulin, inadequate health care infrastructure and disproportionate distribution of the facilities.
Diabetes mellitus is a prevalent condition with significant complications and serious consequences in many countries including Kenya. The prevalence of the disease in Kenya was estimated to be 3.3%, (IDF, 2007). This may not be the actual figure as people found to have diabetes in Kenya usually come to the health care facilities with very different complaints as opposed to those of diabetes. Therefore majority of those with diabetes do not know they have the disease (IDF, 2007). The prevalence in 2014 was 3.6% (IDF, 2014).

Empirical studies on utilization and continuity of care and the health care outcomes for diabetic patients indicate that better continuity of care may lead to earlier diagnosis of diabetes, higher patient’s satisfaction or quality of life. Increase in out of pocket costs may have negative effects on use of healthcare services including those that may be useful for the management of chronic diseases like diabetes mellitus and others. Together with cost of care, education, income, individual knowledge of diabetic status and quality of care, all these are thought to be very important in influencing the utilization of diabetes care and the resultant health outcomes. People with higher education are much more likely to receive diabetic care from medical doctors than those without education (Mwai 2013). Similarly the higher the wealth quintile the more likely a patient is to get health care from a doctor.

Quality of care is also a major factor that influences utilization of diabetic health care services. Ayieko (2011) studied quality of health care services, patient’s perceptions and their effects on service utilization in Nyeri District, Kenya. The results showed that different factors and the perception by patients are key predictors of health services demand. Especially patient’s perception about quality of health facilities are significant factors in utilization of health care services. A study done in Mombasa general hospital to determine the factors influencing utilization of health care services among Type 2 diabetic patients reviewed that the level of education was a significant factor in use of health facilities for diabetes healthcare. Patient’s knowledge on their diabetes status was also significantly associated with utilization of health facility for diabetes health care. These factors need to be addressed to increase the utilization of diabetes health care services in the country to arrest the growth of the disease in the early stages and alleviate its secondary manifestations that are more fatal and more expensive to treat.
1.3 Statement of the problem

Health is essential to all as an investment and consumption good. Ill health leads to losses in productivity hence resulting in poverty. One way of ensuring good health is by making sure health care is affordable and accessible to all who need it and at the right time. Today it affects all people and the economies of all the populations and especially the poor, even more than infectious diseases, Mwai (2013). In 2010 over 12 million people in sub-Saharan Africa were estimated to have diabetes and 330,000 people to die from diabetes related conditions over the next 20 years (Motala and Ramaiya 2010). Kenya is experiencing a rise in diabetic cases posing an economic challenge in managing both communicable and non communicable diseases in the country. About 1% of deaths in Kenya were directly attributable to diabetes in 2012 according to WHO report of November 2014.. Though there are few studies on utilization of diabetic care in Kenya and more so at the district levels, there is need for more research on utilization that will help bridge the knowledge gap. Most district hospitals run diabetic clinics but the reasons why the patients decide to use or not use the services are not known, hence the aim of my study is to assess the factors that influence the use of diabetes health care services among diabetic patients in Kiambu District Hospital.

1.4 Research Questions

(a) What are the predisposing, enabling and the needs based factors that influence the utilization of diabetes care services in Kiambu District Hospital?

(b) What are the policy implications of this study findings?

1.5 Objectives of the study

1.5.1 Broad Objectives
To determine the factors that influence the utilization of diabetic healthcare services among diabetic patients in Kiambu District Hospital.

1.5.2 Specific Objectives
(a) To determine the predisposing, enabling and the needs based factors that influence the utilization of diabetes health care services in Kiambu District Hospital.
(b) To provide policy recommendations based on the study findings to improve on the utilization of diabetes healthcare services.

1.6 Justification of the study

There is need to address diabetes and other non-communicable diseases which take a major portion of the disease burden in Kenya and may increase further as the country puts more attention to preventing and arresting infectious diseases and reducing the high rates of mortality and morbidity associated with child bearing and infancy. The national diabetes strategy (2010-2015) gives a framework and implementation guidelines based on overall goal of preventing or delaying the development of diabetes and its likely complications in the Kenyan population, improvement of the quality of life and preventing mortality in people with the disease. Kiambu District Hospital is the main hospital in Kiambu District which has the highest population in the former central province. Reports from the hospital records showed that diabetes was among the top ten leading causes of both outpatient and inpatient morbidities and mortalities in the years 2013 and 2014. The number of patients seen in the hospital’s diabetic clinic has been increasing from 40-50 patients in a month in the last two years to over 100 patients in this year (2015). The number of patients admitted with uncontrolled blood sugars and other complications associated to diabetes has been increasing since the last 2 years. No study has been carried out in Kiambu District Hospital to explain the utilization patterns of healthcare services hence the purpose of this study is to investigate the factors influencing the utilization of diabetes health care services among diabetic patients in Kiambu District Hospital with the view to addressing them in order to increase the rate of utilization of the services in Kiambu District and the country at large.

1.7 Significance of the Study

The study contributes to the existing knowledge about utilization of healthcare services in Kenya. Further, the study shall inform individuals and groups in local; national regional and even international while developing policies and interventions on improving diabetic care services and stem the tide of the disease.

The results of the study provides empirical and relevant evidence to policy makers on additional policies e.g. increasing number of diabetic care centers improving quality of
diabetic care and advocacy on diabetes. The study aims to bridge some knowledge gap since no other study has been done in Kiambu District Hospital on utilization of diabetic care.
CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Literature

Information and proper knowledge on healthcare seeking behavior is paramount to health care providers and policy makers especially in managing the highly increasing demands for health care services under limited resources. It’s not always easy to tell the factors that play a major role when one makes a decision to use healthcare. Factors thought to influence the decision to use healthcare services include culture, perceptions, access, economics, knowledge, age, gender roles and beliefs in efficacy among others. Several models and theories have been used to study healthcare utilization. These models and theoretical approaches have given different views and information on why some individuals may or may not utilize healthcare services effectively. A few of these are discussed below, 1.

The socio-demographic approach-- This approach looks at variations in healthcare utilization in terms of age, education level, gender, occupation and socio-economic status. Healthcare utilization among individuals will differ depending on their social-demographic characteristics. 2. Socio-psychological approach __This identifies knowledge belief and attitude towards symptoms experienced by a patient as the major influences to decision making in healthcare seeking behaviour (Stoeckle, Zola, and Davidson, 1963). 3. Socio-cultural approach- in this approach, healthcare is viewed as part of cultural complex. Organization of hospitals and other health care services is based on the cultural setting in the community (Glazer, 1970). Health belief model proposed by Rosenstock, Stretcher and Becker, (1994). This model states that, the individual’s action to treat and prevent disease is influenced by 4 main variables, i.e.

1. The individuals perceived susceptibility to disease – one will seek health services if he or she believes they are susceptible to disease. 2. Individual’s perception of illness severity. 3. Individuals rational perception of benefits versus costs. The treatment must be perceived to have greater benefits than the costs. 4 Individual’s cues to action – friends, media family or well known people can provide an impetus for prevention. The individual’s choice to utilize health services is contextually dependent (Wolinsky, 1988b).
Transtheoretical model

Transtheoretical model, also known as stages-of-change model, assumes that behavioral change progresses as the individual moves through the following stages (John et al, 1999):

1. Precontemplation, where benefits of lifestyle change are not considered,
2. Contemplation, where the individual starts to consider change but not yet begun to act on the intention.
3. Preparation, where the person is ready to change the behavior and prepares to act,
4. Action, where one makes the initial steps towards behavior change and
5. Maintenance, where one maintains behavior change while often experiencing relapses.

Health care providers can utilize and apply one or a combination of these behavior change theories and models to optimize their client’s behavior change efforts to achieve better health outcomes. Diabetes health care utilization can be enhanced if health care providers can properly utilize information from these theories and models.

Andersen model

The Andersen model developed in 1968 provides a more comprehensive way of studying the determinants of healthcare utilization hence this study adopted the use of the model. According to this model; demographics, socioeconomic and health beliefs play an important role in determining an individual’s likelihood of utilizing health services (Andersen, 1968). The model classified health care utilization determinants into 3 categories i.e. Predisposing, Enabling and Need factors. The predisposing factors refer to the socio-cultural characteristics existing prior to the onset of the illness and include demographics like age, gender. Socio-cultural includes education level, occupation and social networks. On the other hand, health beliefs include attitudes and values. Enabling factors determine the logistical aspects of obtaining healthcare and include individual or family characteristics like income and medical insurance whereas community characteristics include availability of health
facilities and personnel. Need based factors include the perceived and clinically evaluated needs like presence of a disease condition, severity of the disease and co-morbidities.

Andersen model was later on revised to include the health care systems comprising of healthcare policies, resources and organization. This was done to demonstrate the role of health system in understanding the determinants of the utilization of health care services. A further revision was done on the model to incorporate consumer satisfaction which reflects on the use of healthcare services and available healthcare services and became the Anderson phase-2 model which is illustrated in figure 1.

![Andersen's phase-2 model of health services utilization](image)

**Figure 1: Andersen’s phase-2 model of health services utilization.**

*Adapted from Andersen (1995)*

In 1980’s- 1990’s this model was revised to form a linear relationship of 3 components that included the primary determinants- these were noted to be the direct causes of health behavior e.g. demographics, politics and health care system. The other components are the health behavior that includes the health practices observed by an individual and the health outcomes that include perceived health status and consumer satisfaction (Andersen, 1995).
The model categorises the factors into 3 groups. Predisposing factors like age, gender, social structure, and health beliefs. Enabling factors—this is the means available to use the services like individual, family, or community resources. Need based factors—perceived needs and clinically evaluated needs.

2.2 Empirical Literature

A number of studies have been carried out to test the Andersen model and few other models. Studies are reviewed as per the factors as given below:

Predisposing factors.

Age

Bice, Eichhorn and Fox, (1972) conducted a study and showed that children and elderly utilized healthcare services irrespective of socio-economic status due to their increased susceptibility to disease and disabilities. Kwabena and Timothy, (2014) undertook a study to describe the association of age and use of healthcare under the affordable Care Act in the military health system in America. The study revealed that free healthcare increased the demand for healthcare among the young adults in America. Further, age was indicated to have the negative correlation with health care. Gender and marital status were both found to influence the utilization of health care services

Sex

A study on sex differences in medical care utilization showed that women have a higher rate of morbidity thus a higher use of healthcare services. The main predictors to sex differences in outpatient healthcare utilization from the study were the number of chronic health problems and giving birth during the study period. This was obtained from the records of healthcare providers in the area of study (Cleary, Mechanic and Greenley, 1982).
According to a study by Bertaksi, et. al., (2000), women have a higher utilization of health services and consequently higher associated charges. However the study could not determine the appropriateness of the differences but the implications on the healthcare were clear.

**Level of education**

Mwai (2013) did a survey in Kenya to determine the factors influencing the use of health care services among Type 2 diabetic patients attending coast provincial General Hospital, Mombasa. The study used a descriptive cross sectional study which utilized quantitative technique. A total of 250 participants were purposively selected and recruited for the study as they visited coast provincial General Hospital for diabetes healthcare. The study results indicated that the level of education was significantly associated with utilization of health facility for diabetes healthcare; patients’ knowledge of their diabetes status was also significantly associated with utilization of health facility for diabetes healthcare. Gender, occupation, income levels and age of the respondents were not significantly associated with utilization of health facility for diabetes healthcare. The study concluded that education levels and individual knowledge of diabetic status among diabetic patients influences utilization of diabetes healthcare.

**Quality of care**

Ayieko (2011) studied quality of health care services, patients’ perception and their effects on services utilization in Nyeri, District Kenya. The findings and the literature review showed that different factors and the perception by patients are significant predictors of health service demand. Especially, patients’ perceptions about quality of health facilities are important factors in use of health services. The study indicated that 31.9% of patients at the health facilities in Nyeri are below the age of 5 years more over a significant number of patients lived between 1 and 5 km from the health facility 40.5%. The findings further reviewed that public hospitals were the preferred source of care 45.8%. Other factors influencing the use of health facilities included travel time, age of adult care givers, household size, gender of the patient, attitude of the service providers, education and user charges.
Religion and beliefs

Glaser, (1970) in a survey of 16 countries revealed a positive association between the religious beliefs in a society and the utilization of medical facilities. However, attitude of health care workers was found to have a negative relationship to utilization of health care services.

Mwabu (1984) developed a theoretical and empirical framework for analyzing choices of healthcare facilities by households during episodes of illness. Data for the study considered the quality of health care facilities and that consumers have partial knowledge about facilities. The study established that education, quality of healthcare facilities and religion were important factors on the choice of facility. The study found economic variables such as time and money costs marginally influencing demand for medical care.

Enabling factors

Cost of care

Mwabu et al (1991) sought to test the effects of the primary reforms to health care demand in Kenya. They tested the hypothesis that user charges have a negative effect on demand for health care. They used data on when user charges were in place and when the government had suspended it. They used a utility maximization model. The results showed that user charges discourage the utilization of health facilities.

Younger and Genicot (2002) studied the demand for health care services in rural Tanzania. The findings reviewed that consumers in Tanzania are more responsive to the cost of health care and that this responsiveness is greater among the individuals at the lower end of income distribution. Own price elasticities are high although less so for public clinics and dispensaries than other options, when prices of services are increased there will be a precipitous decline in use of those services. This will happen even if the private sector responds to the shifts in demand by raising its own prices.

Lindelow (2002), tested the demand for health care services in rural, Mozambique using the 1996/97 household survey data in a multinomial logit model. The study findings were that household characteristic e.g. (age, education and reported symptoms) significantly affect the demand for healthcare. Price and time costs associated with consultations at different health
care providers were found to be important in determining the choices made by the respondents.

Okurut and Adebua (2006) did a study on the determinants of healthcare demand in Lira District Northern Uganda. The study looked at the price and non-price factors that affect healthcare demand in rural Uganda using household data from Lira District in Northern Uganda which is the poorest region. The results suggested that the demand for government healthcare services was negatively and significantly influenced by the user fees, transport cost and drug unavailability. A simulation analysis suggested that an increase in medical charges (user fees) leads to a decline in demand for government health facilities but a rise in the demand for both private health facilities and self medication. Controlling for drugs availability the demand for government health facilities falls when drugs are not available while demand for private health facilities rises. Joseph et al. (2006) on their study on use of healthcare services by lower-income and higher income uninsured adults concluded that despite high income lack of healthcare insurance cover resulted in reduced use of recommended healthcare services.

Payment modes
A study was done to investigate the factors affecting health care costs and hospitalization among diabetic patients in Thai public hospitals. A retrospective study was conducted by using administrative claims data obtained from diabetic patients during October 1, 2002 and September 30, 2003. Dependent variables were total health care costs and the occurrence of hospitalizations. Independent variables included demographic factors, health care utilizations complications, co-morbidities and payment methods. Multivariate statistical analyses were applied. The results of this study suggested that demographic factors of patients (i.e. age and male sex) payments methods (i.e. capitation fee for service and out of pocket) were significantly associated with higher health care costs and probability of hospitalization. Patients receiving treatment from teaching hospitals significantly consumed higher healthcare costs. In addition the more health care utilization the higher heath care costs the patients significantly had. Diabetic patients taking insulin had significant higher health care costs and risk of hospitalization. Furthermore co-morbidities (e.g. hypertension and cancer) and diabetes –related complications (e.g nephropathy, retinopathy, coronary artery disease, cardiovascular disease and peripheral vascular disease) were significantly associated with an increase in health care costs and hospitalization
A study called the cost of Diabetes in India (CODI) was done to estimate the direct cost of diabetes based on a total monthly expenditure based on various items related to treatment, treatment delivery, laboratory tests and investigations, transportation and other miscellaneous costs. Recent or past hospitalization and financial resources used to meet these costs. Patients were selected using a listing method and a total of 5516 persons with diabetes (and on treatment) in the towns and cities constituting a representative sample of Indian population were identified through various sources and interview. Almost all respondents indicated that their mode of payment for their expenses was through family and personal resources irrespective of work status. Some patients got help from government institutions where parts of the services are free. The majority of patients 89% used their household income to fund the monitoring and treatment of their diabetes. Many socio-economic factors and health care delivery issues impact on the outcome of diabetes and consequently the cost and vice versa.

**Distance**

Acton (1975) studied non-monetary factors in the demand for medical services. The study used a utility maximization model. A simultaneous equation system was used for the outpatient department and municipal hospitals. The study showed that non-monetary factors such as distance (economic costs) act like prices in discouraging demand. It also showed that earned income and non-earned income have different i.e. as money prices out of pocket reduced, because of private or public insurance schemes, demand becomes more responsive to time prices and other non-monetary factors. This study will consider both monetary and non-monetary factors influencing utilization of diabetic health care services.

**Need factors**

Eichhorn and Fox (1972) showed that children and elderly utilized healthcare services irrespective of socio economic status due to their increased susceptibility to disease and disability.

Evashwick, et al., (1984) examined healthcare use by the elderly which applied the Andersen model to the elderly to predict utilization of healthcare services by the elderly and in planning for these services showed that the need factors were the single most predictor to the utilization of medical services by the elderly. On the other hand, in a study conducted by Bice,
In their study Andersen and Aday, (1978) looked at the role of need and access to health facilities and the utilization of healthcare services. The study describes utilization as a more objective indicator of the actual use of healthcare compared to access that looks at the entry point of an individual to the healthcare system and which is often prompted by needs and resources available. Health needs and a consistent source of care were noted as the two most important factors related to visiting a doctor in Brazil (Raul and Sevilla, 2007).

2.3 Overview of the Literature Review.

The findings and results of different studies have shown that some of the factors that influence utilization of healthcare services include Age( Lindelow 2002), level of education (Mwabu 1984, Lindelow 2002), gender( Ayieko 2011), cost of care( Okurut and Adebua 2006), quality of care( Ayieko2011, Mwabu 1984), knowledge( Mwabu 1984), health beliefs and culture( Ayieko 2011). For diabetic care the factors include Age( Mwai 2013), education levels( Mwai 2013), knowledge of diabetes( Mwai 2013), gender( Mwai 2013), cost of diabetic care among others. The studies applied different techniques and models among them quantitative techniques( Mwai 2013), logit models( Lindelow 2002) utility maximization model Acton( 1975) and the results agreed in some ways and differed in others e.g. Education levels, individual knowledge of diabetes status have been shown to significantly influence utilization of diabetic care with occupation and income levels shown to have a statistically insignificant positive relationship between them and demand for healthcare( Mwai 2013). Ayieko 2011 showed that gender significantly influences healthcare utilization. Cost of care has been found to be insignificant determinant of medical care e.g( Akin et al 1985,1986) which is not in line with economic theory. In other studies prices have been shown to be important determinants for medical care utilization e.g. (Mwabu et al 1991). From the literature reviewed most of the studies done in Kenya on utilization of healthcare services have looked at health care services in general with only one by( Mwai 2013) being specific on utilization of healthcare facilities but only among type2 diabetic patients. This study will adopt the Andersen model with the aid of count regression model to determine the factors that influence utilization of diabetic health care services in Kiambu District Hospital and will involve all types of diabetic patients.
CHAPTER THREE

METHODOLOGY

3.1 Conceptual Framework

Utilization of healthcare services is an important step to disease management as it provides opportunities for disease treatment and prevention. The ultimate goal in treatment of diabetes is the control of blood sugars to avoid or minimize the morbidity and mortality associated with uncontrolled blood sugars which require proper utilization of diabetic care services. The factors associated with access to and utilization of healthcare services as adapted from Andersen model 1995 is characterized as follows; predisposing characteristics which includes the socio cultural characteristics existing prior to the onset of the illness and include demographic characteristics like age, gender and socio cultural factors like education, occupation, and social networks. Health beliefs include attitudes and values. The enabling characteristics which determine the logistical aspects of obtaining healthcare and include individual or family characteristics like income and medical insurance. Community characteristics like availability of health facilities and personnel. Lastly, there are the need factors which include the perceived and clinically evaluated needs for seeking healthcare services. Below is a summary of the framework.

Figure 3: Andersen Model of Health Services Utilization. (From Andersen, 1995).
3.2 Research Design

This is a cross-sectional case study of diabetic patients screened for participation in the study in Kiambu District Hospital. Cross-sectional studies are used to infer causation. To run this study, research questions were formulated and sample population chosen. Variables of the study and population relevant to the research questions were determined. A method for conducting sample subjects were devised and then implemented which facilitated data collection and analysis. This study describes factors influencing diabetic healthcare utilization in Kiambu District Hospital.

3.3. Econometric Model and Model Specification

This study considers the number of visits made to the hospital by diabetic patients as a dependent variable, hence it implies that to estimate health care service utilization, a count model is more appropriate. The Poisson distribution is appropriate in this case since it takes only non-negative integer count values. According to Cameron and Trived, (1990) Poisson can be used to model the number of occurrences of an event, such as number of patient visits to hospital.

The Poisson density, or more formally the Poisson probability mass function, with rate parameter $\lambda$ presented as;

$$f(y|\lambda) = e^{-\lambda} \frac{\lambda^y}{y!}, \text{where } y \text{ (number of hospital visits) } = 0, 1, 2, \ldots$$

In this model, the specific parameter $\lambda$ vary across individual patients according to a specific function of explanatory variables (vector $x$) and parameter vector $\beta$. Therefore, our model specification is presented as indicated below;

$$\lambda = \exp(x' \beta)$$

This implies that the mean $\lambda > 0$.

We further considered Maximum Likelihood Estimation (MLE) based on the selected sample. As described by Cameron and Trived, (2005) the Maximum Likelihood (ML) estimator maximizes the log-likelihood function.

The likelihood function is the joint density, which given independent observations are the product of the individual densities, where we have conditioned on the regressors. The log-
likelihood function is then the log of a product, which equals the sum of logs. Thus, the Poisson ML estimation is represented as;

\[
L(\beta) = \frac{1}{N} \sum_{i=1}^{N} \left[ -\exp(x_i'\beta) + y_i x_i'\beta - \ln y_i! \right]
\]

Where the scale factor \( \frac{1}{N} \) is included so that \( L(\beta) \) remains finite as the number of patient visits (N) tends to infinity \( (N \to \infty) \).

The model to be estimated is specified as shown below;

\[
y = \beta_0 + \beta_2 age + \beta_2 gender + \beta_3 cost + \beta_4 occupation + \beta_5 distance + \beta_6 quality + \beta_7 education + \beta_8 maritalstatus + \epsilon
\]

\( Y \) is the number of visits made to hospital

\( \beta \) are the coefficients to be estimated

\( \epsilon \) is the error term

**3.4. Study Variables and their measurement**

<table>
<thead>
<tr>
<th>Type and name of variable</th>
<th>Measure</th>
<th>Empirical evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent - Utilization of diabetic care in number of visits</td>
<td>Number of visits in the six months prior to the study</td>
<td></td>
</tr>
<tr>
<td>Independent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (continuous variable)</td>
<td>Actual number of years.</td>
<td>Demand for healthcare services increases with increase in age (Lindelow, 2002) in Mozambique.</td>
</tr>
<tr>
<td>sex</td>
<td>Female=1, male=0</td>
<td>Positive (Bertaksi, et al., 2000)</td>
</tr>
<tr>
<td>Highest Level of education attained by the respondent (Discrete variable)</td>
<td>None=0 Primary=1 Secondary=2 Higher education=3</td>
<td>Positive (Mwai 2013)</td>
</tr>
<tr>
<td>Occupation of patient (categorized variable)</td>
<td>Formal employment = 3. Informal=2</td>
<td>-</td>
</tr>
<tr>
<td>Marital status categorized variable</td>
<td>Never married ,Married , Divorced/seperated, windowed.</td>
<td>-</td>
</tr>
<tr>
<td>Cost of services</td>
<td>Average cost of services</td>
<td>Negative (Younger, Genicot,2002)</td>
</tr>
<tr>
<td>Quality of care.</td>
<td>Services provided and their quality. 1. Good. 2. Fair. 3. poor</td>
<td>Positive (Ayieko, 2011)</td>
</tr>
<tr>
<td>Distance to health facility.</td>
<td>Transport is required=1, Walking distance=0</td>
<td>Acton (1975)</td>
</tr>
</tbody>
</table>

**3.5. Study Area- Kiambu District Hospital**

Kiambu is among the districts in Kiambu county of Kenya located in the South of the county and has a total area of 1.448km². The district borders Nairobi to the south, Murang’a to the north and Thika District to the east. Kiambu is the fifth largest district in the former central province of Kenya and has the highest population (914,000 persons) with a projected growth rate of 3.7% per annum. Kiambu is very densely populated having an average of 373 persons/km² ranging from 178 persons /km² to 948 persons/km². Due to its close proximity to Nairobi the district is partly cosmopolitan with many people who work in Nairobi residing in the district. Kiambu District is among the most populated districts in the country. The hospital is a high volume level four hospital and the only hospital in the district that has a diabetic clinic that is operational five days a week with 20 -30 patients attending the clinic per day.

**3.6 Study Population and sample size determination**

Study population consists of patients on diabetic treatment at the time of the study, recruited from the hospital’s diabetic clinic. The study uses Andrew fisher, et al (1998) formula for calculating sample size at precision level of 0.05. This formulary is suitable due to its power to generate representative sample for large populations.

\[ N = Z^2Pq \]
\[ d^2 \]

\[ N = \text{the desired sample size when population is greater than 10,000.} \]

\[ P = \text{Estimated populations proportion (default = 50%).} \]

\[ q = 1 - P = 1 - 0.5 = 0.5. \]

\[ d = \text{Degree of freedom} = 5%. \]

\[ N = \frac{Z^2 P q}{d^2} \]

\[ = \frac{1.96^2 \times 0.5 \times 0.5}{(0.05)^2} \]

\[ = 3.842 \times 0.25 \]

\[ = 0.955 \]

\[ = 384.16 = 384 \]

\[ Z = \text{Z score corresponding to the level of confidence with which it is desired to be sure that the} \]

\[ \text{desired to be sure that the true population lies within +/-} \%

\[ \text{points of sample estimate (95% = 1.96).} \]

3.7 Data Collection

A closed and open ended questionnaire was used. Patients’ files were also be used for data verification. Regular verifications and validations of data were done to check all inconsistencies and resolved with the researcher, research assistants and the data entry clerk. Count regression method (Poisson discussed in section 3.2 above) was used to estimate the relationship between the number of visits and the different explanatory variables. Data is then presented in frequency tables.

3.8 Reliability and Validity

To ensure reliability the research assistants were trained and monitored/supervised to ensure they were competent and administered the questionnaires correctly during pretesting of tools and data collection. Standard operating procedures for data collection were used to ensure consistency in collection. All completed questionnaires were scrutinized and all errors corrected. On the other hand, validity of the instruments was ensured through a well-designed
questionnaire and instruments pretested to ensure coherence and comprehensiveness. Standardized questionnaires were used for desired answers.

3.8 Ethical Considerations

Ethical clearance for this study was obtained from Nairobi University Ethics review committee and Kiambu District Hospital. Verbal consent was also obtained from diabetic patients in the hospital who consented to be part of the study. Privacy and confidentiality was ensured throughout the study.
CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1. Introduction

This chapter presents the findings obtained from the survey conducted at Kiambu District Hospital involving diabetic patients and their experience of utilization of diabetic care. The chapter contains descriptive statistics of the personal profiles of the patients and their socio economic characteristics. Also econometric analysis based on Poisson regression model is presented. Finally, a comprehensive discussion focusing on the significant factors affecting utilization of diabetic care is presented.

4.2. Descriptive Statistics.

The summary statistics are presented in Table 4.1

Table 4.1: Summary statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observation</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>363</td>
<td>52.6363</td>
<td>15.15227</td>
<td>18</td>
<td>88</td>
</tr>
<tr>
<td>Transport cost</td>
<td>363</td>
<td>221.157</td>
<td>229.7363</td>
<td>0</td>
<td>1000</td>
</tr>
</tbody>
</table>

Table 4.1 shows the youngest respondent was 18 years while the oldest respondent was 88 years. On average, respondents were aged 53 years with a variation of approximately 15 years. On accessibility to health care facilities, the highest amount of money paid as cost for transport to access diabetic care was Kshs 1000 while the least spent nothing implying the patient walked due to insignificant distance. However, the transport cost to the diabetic center was Kenya shillings 221.16 on average.

Table 4.2: Sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number of respondents.</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>87</td>
<td>23.97</td>
</tr>
<tr>
<td>Female</td>
<td>276</td>
<td>76.03</td>
</tr>
<tr>
<td>Total</td>
<td>363</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 4.2 shows the distribution of the respondents by sex.

The study found out as indicated in Table 4.3, approximately 76.03% of the respondents were female while 23.97% were male.

**Table 4.3: Number of visits made to diabetic care center prior to study**

<table>
<thead>
<tr>
<th>Visits to diabetic centre</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>72</td>
<td>19.83</td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>49.59</td>
</tr>
<tr>
<td>2</td>
<td>52</td>
<td>14.33</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>4.41</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>3.31</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>4.41</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>2.75</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>0.83</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>0.55</td>
</tr>
<tr>
<td>Total</td>
<td>363</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Table 4.3 shows that majority of the respondents made two visits representing 49.59% for the last six months by time of the survey followed by those who had never made a visit and they were making their first visit (19.83%). The visits ranged from zero to eight visits prior to survey. Note that those who recorded zero visits were visiting the diabetic clinic for the first time during the survey. Prior to the survey, the study shows that approximately 98.62% of the respondents had made up to six visits for the six months.

**Table 4.4: Marital status**

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>60</td>
<td>16.71</td>
</tr>
<tr>
<td>Married</td>
<td>217</td>
<td>60.45</td>
</tr>
<tr>
<td>Widowed</td>
<td>53</td>
<td>14.76</td>
</tr>
</tbody>
</table>
At the same time, the study showed that about 60.45% were married and 16.71% were single. On the other hand, those who had divorced or separated were less than 10%. Details are as shown in Table 4.4.

Table 4.5: Educational levels

<table>
<thead>
<tr>
<th>Education levels</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No education</td>
<td>11</td>
<td>3.04</td>
</tr>
<tr>
<td>Primary education</td>
<td>27</td>
<td>7.46</td>
</tr>
<tr>
<td>Secondary education</td>
<td>96</td>
<td>26.52</td>
</tr>
<tr>
<td>College education</td>
<td>162</td>
<td>44.75</td>
</tr>
<tr>
<td>University education</td>
<td>66</td>
<td>18.23</td>
</tr>
<tr>
<td>Total</td>
<td>362</td>
<td>100.00</td>
</tr>
</tbody>
</table>

On education levels, 7.4%, 26.4% and 63.1% had primary, secondary and higher education respectively. This is as indicated in Table 4.5.

Table 4.6: Employment Status

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployed</td>
<td>115</td>
<td>31.86</td>
</tr>
<tr>
<td>Employed</td>
<td>246</td>
<td>68.14</td>
</tr>
<tr>
<td>Total</td>
<td>361</td>
<td>100.00</td>
</tr>
</tbody>
</table>

On socio-economic characteristics, the results indicated that approximately 68.1% of the respondents were employed or were engaged in some other form of productive activities while about 31.9% had no any form of employment or engaged in any other form(s) of activities.

Table 4.7: Attitude of Service Providers

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>7</td>
<td>1.93</td>
</tr>
<tr>
<td>Fair</td>
<td>237</td>
<td>65.29</td>
</tr>
<tr>
<td>Good</td>
<td>101</td>
<td>27.82</td>
</tr>
<tr>
<td>Very good</td>
<td>18</td>
<td>4.96</td>
</tr>
<tr>
<td>Total</td>
<td>363</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Attitude of the service providers was assessed as majority had between categories two and three. The question responded to sought to understand how the respondents rated the attitude of service providers towards diabetic patients. Majority rated the attitude of service providers as to range between fair and good, (65.29% and 27.82% respectively). Other details are as shown in Table 4.7. Time taken to access diabetic care services was found to fall between 20–40 minutes and thus rated as “good.”

Table 4.8: Other Diseases

<table>
<thead>
<tr>
<th>Other diseases</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No co-morbidities</td>
<td>260</td>
<td>71.63</td>
</tr>
<tr>
<td>Presence of co-morbidities</td>
<td>103</td>
<td>28.37</td>
</tr>
<tr>
<td>Total</td>
<td>363</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Similarly the study results show that approximately 28.4% of the respondents had other diseases apart from diabetes usually referred to as co-morbidities. Approximately 71.63% were found with absence of co-morbidities.

Table 4.9: Information on diabetic care services

<table>
<thead>
<tr>
<th>Information on diabetic care</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through friend</td>
<td>2</td>
<td>0.55</td>
</tr>
<tr>
<td>Through relative</td>
<td>12</td>
<td>3.31</td>
</tr>
<tr>
<td>Through media</td>
<td>214</td>
<td>59.12</td>
</tr>
<tr>
<td>Through Visiting diabetic health care centre</td>
<td>134</td>
<td>37.02</td>
</tr>
<tr>
<td>Total</td>
<td>362</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Information regarding diabetes health care service was assessed in four ways that is information obtained through friends, relatives, visit to a health facility and through media. The results indicated 0.55% of diabetic patients obtained information through friends, 3.3% through relatives, and 37.02% through visiting a health facility while 59.1% of the respondents knew about diabetic care through media. These details are as indicated in Table 4.9.

Table 4.10: Cost of diabetic care

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Average (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than Kshs 500</td>
<td>289</td>
<td>79.61433</td>
</tr>
</tbody>
</table>
Table 4.10 shows a majority of the respondents (79.61%) paid less than Kshs 500 to access diabetic care. The minimum paid was Ksh 80 while highest cost incurred was Kshs 1500. On average however, most respondents paid approximately Kshs 460.30.

**Table 4.11: Mode of payment for diabetic care**

<table>
<thead>
<tr>
<th>Mode of Service payment</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out of pocket</td>
<td>282</td>
<td>77.69</td>
</tr>
<tr>
<td>Medical Insurance</td>
<td>65</td>
<td>17.91</td>
</tr>
<tr>
<td>Waiver/exemption</td>
<td>16</td>
<td>4.41</td>
</tr>
<tr>
<td>Total</td>
<td>363</td>
<td>100.00</td>
</tr>
</tbody>
</table>

On the other hand, mode of payment for diabetic services by most respondents (77.69%) was cash at point of service delivery what is usually referred to as out of pocket expenditure while 17.1% paid through insurance. Diabetic care services was shown to be affordable to 37.6% of the respondents while most of them (62.4%) reporting it to be costly. Table 4.11 presents more details.

**Table 4.12: Satisfaction levels of diabetic health care**

<table>
<thead>
<tr>
<th>Level of satisfaction</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>6</td>
<td>1.65</td>
</tr>
<tr>
<td>Satisfied</td>
<td>136</td>
<td>37.47</td>
</tr>
<tr>
<td>Somehow satisfied</td>
<td>181</td>
<td>49.86</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>40</td>
<td>11.02</td>
</tr>
<tr>
<td>Total</td>
<td>363</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Satisfaction levels to diabetic health care among the respondents assessed in five different levels; very satisfied, satisfied, somehow satisfied, dissatisfied and very dissatisfied. As indicated in Table 9 below, most respondents were somehow satisfied with a mean of 49.86% while those who were satisfied were 37.47%. The study results show that no respondent was found to be very dissatisfied and few (1.65%) of the respondents were very satisfied with the diabetic services offered. See Table 4.12 for other details.
Table 4.13: Religion

<table>
<thead>
<tr>
<th>Religion</th>
<th>Number of respondents.</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No religion</td>
<td>25</td>
<td>6.91</td>
</tr>
<tr>
<td>Christians</td>
<td>237</td>
<td>65.47</td>
</tr>
<tr>
<td>Muslims</td>
<td>85</td>
<td>23.48</td>
</tr>
<tr>
<td>Other religion</td>
<td>15</td>
<td>4.14</td>
</tr>
<tr>
<td>Total</td>
<td>362</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Finally, majority of the respondents were either Christians or Muslims. The study showed that 53% of the respondents were Christian while 23.8% were Muslims. Other details are as presented in Table 4.13.

4.3. Correlation Analysis

This was conducted as a result of multicollinearity which has a bias arising when one or more pairs of independent variables are perfectly correlated to each other. The correlation matrix is thus examined. The association measured is not expected to exceed |0.5| beyond which we suspect the presence of Multicollinearity which leads to the spurious estimates. From Table 4.14, we found out that almost all pairs of the relationships were below the threshold value with absolute correlation coefficients of less than 0.5.

The study results indicates that the number of visits made to diabetic health center (dependent variable) is positively correlated to age, marital status, attitude, time taken, information on diabetic health, other diseases, mode of payment, cost of diabetic care and religion. The rest of the variables (female, education and occupation) exhibited a negative correlation.

Further, significance of the correlation coefficients was examined. The number of visits to diabetic health center was found to be significantly correlated with education, attitude, information on diabetic care services, other diseases, transport cost, mode of payment and cost of diabetic services at 5% significance level. The rest of variables were uncorrelated with the number of visits made to diabetic center. Other details are as presented in Table 4.14.
### Table 4.14: Correlation Matrix

<table>
<thead>
<tr>
<th>Variables</th>
<th>Visits to diabetic centre</th>
<th>Age</th>
<th>Female</th>
<th>Education</th>
<th>Marital status</th>
<th>Occupatio</th>
<th>Attitude</th>
<th>Time taken to access of diabetic services</th>
<th>Informatio</th>
<th>Other diseases</th>
<th>T-cost</th>
<th>Mode of payment</th>
<th>Cost of diabetic services</th>
<th>Religion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visits to diabetic centre</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.0367</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>-0.0367</td>
<td>0.1999*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>-0.2052*</td>
<td>-0.2429*</td>
<td>-0.0345</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>0.0730</td>
<td>0.3279*</td>
<td>0.0150</td>
<td>-0.0799</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>-0.0984</td>
<td>-0.0575</td>
<td>0.0596</td>
<td>0.3271*</td>
<td>-0.1131*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>0.1861*</td>
<td>0.0045</td>
<td>0.0605</td>
<td>-0.0730</td>
<td>0.0054</td>
<td>0.0129</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time taken to access of diabetic services</td>
<td>0.0593</td>
<td>0.0286</td>
<td>-0.0029</td>
<td>-0.1648*</td>
<td>-0.0452</td>
<td>-0.0167</td>
<td>0.1810*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information of diabetic services</td>
<td>0.2109*</td>
<td>-0.0783</td>
<td>-0.0621</td>
<td>-0.2005*</td>
<td>-0.0361</td>
<td>-0.1828*</td>
<td>0.1483*</td>
<td>0.1742*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other diseases</td>
<td>0.1482*</td>
<td>0.3270*</td>
<td>0.0528</td>
<td>-0.3192*</td>
<td>0.1639*</td>
<td>-0.2626*</td>
<td>0.0574</td>
<td>0.1940*</td>
<td>0.2193*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-cost</td>
<td>-0.3648*</td>
<td>0.1031*</td>
<td>0.0621</td>
<td>0.2879*</td>
<td>0.0552</td>
<td>0.2443*</td>
<td>-0.1211*</td>
<td>-0.1571*</td>
<td>-0.3404*</td>
<td>-0.2826*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mode of payment</td>
<td>0.1495*</td>
<td>-0.0345</td>
<td>0.0490</td>
<td>-0.1379*</td>
<td>-0.1363*</td>
<td>-0.1433*</td>
<td>-0.0013</td>
<td>0.0621</td>
<td>0.1916*</td>
<td>0.1171*</td>
<td>-0.1701*</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of diabetic services</td>
<td>0.1491*</td>
<td>-0.0269</td>
<td>0.0479</td>
<td>-0.0414</td>
<td>0.0150</td>
<td>0.0071</td>
<td>0.2238*</td>
<td>0.1076*</td>
<td>0.1249*</td>
<td>-0.1448*</td>
<td>0.0223</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td>0.0536</td>
<td>-0.0071</td>
<td>0.0715</td>
<td>0.0538</td>
<td>-0.0335</td>
<td>0.0771</td>
<td>0.0054</td>
<td>-0.0002</td>
<td>0.0251</td>
<td>-0.1474*</td>
<td>0.0794</td>
<td>0.0191</td>
<td>-0.0663</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

*Significant correlation at 5% significance level
4.4. Estimation Results

The study conducted Poisson regression whereby the dependent variable was the number of visits to diabetic health center. Various explanatory variables (both demographic, socio-economic and facility based factors) were explored. Upon conducting the test to establish the correct model, the Vuong test (Prob>z = 0.5000) preferred standard Poisson model instead of zero inflated Poisson model. Out of the total observations considered by the study, 70 of them were zero implying that they were in their first visit to the diabetic health facility while 287 of the respondents had more than one visit to diabetic center. Table 4.16 shows more details of the results.

Tabl 4.15: Poisson regression results (marginal effects)

<table>
<thead>
<tr>
<th>Visit to Diabetic Care</th>
<th>Coefficients</th>
<th>Std. Err</th>
<th>Z</th>
<th>P&gt;z</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.0672916**</td>
<td>0.0305366</td>
<td>2.20</td>
<td>0.028</td>
<td>0.007441 - 0.1271422</td>
</tr>
<tr>
<td>Age square</td>
<td>-0.0006493**</td>
<td>0.0002902</td>
<td>-2.24</td>
<td>0.025</td>
<td>-0.001218 - 0.0000806</td>
</tr>
<tr>
<td>Gender (Female=1)</td>
<td>-0.2044845</td>
<td>0.1561028</td>
<td>-1.31</td>
<td>0.190</td>
<td>-0.5104403 - 0.1014713</td>
</tr>
<tr>
<td>Primary Education</td>
<td>-0.1919442</td>
<td>0.3766813</td>
<td>-0.51</td>
<td>0.610</td>
<td>-0.9302259 - 0.5463375</td>
</tr>
<tr>
<td>Secondary Education</td>
<td>-0.3900223</td>
<td>0.3447698</td>
<td>-1.13</td>
<td>0.258</td>
<td>-1.065759 - 0.2857141</td>
</tr>
<tr>
<td>Higher Education</td>
<td>-0.6113386*</td>
<td>0.3462108</td>
<td>-1.77</td>
<td>0.077</td>
<td>-1.289899 - 0.0672222</td>
</tr>
<tr>
<td>Married</td>
<td>-0.5669358***</td>
<td>0.1750623</td>
<td>-3.24</td>
<td>0.001</td>
<td>-0.9100517 - 0.22382</td>
</tr>
<tr>
<td>Single</td>
<td>-0.1759101</td>
<td>0.2014147</td>
<td>-0.87</td>
<td>0.382</td>
<td>-0.5706757 - 0.2188555</td>
</tr>
<tr>
<td>Occupation</td>
<td>-0.0478725</td>
<td>0.1597317</td>
<td>-0.30</td>
<td>0.764</td>
<td>-0.3609409 - 0.265196</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.3187527***</td>
<td>0.1081754</td>
<td>2.95</td>
<td>0.003</td>
<td>0.1067329 - 0.5307726</td>
</tr>
<tr>
<td>Time taken to access care</td>
<td>-0.0644394</td>
<td>0.1085936</td>
<td>-0.59</td>
<td>0.553</td>
<td>-0.2772788 - 0.1484001</td>
</tr>
<tr>
<td>Information_friend</td>
<td>0.4975262</td>
<td>0.6336842</td>
<td>0.79</td>
<td>0.432</td>
<td>-0.7444719 - 1.739524</td>
</tr>
<tr>
<td>Information_media</td>
<td>-0.1214171</td>
<td>0.1626694</td>
<td>-0.75</td>
<td>0.455</td>
<td>-0.4402432 - 0.1974091</td>
</tr>
<tr>
<td>Other diseases</td>
<td>0.1064746</td>
<td>0.1632129</td>
<td>0.65</td>
<td>0.514</td>
<td>-0.2134168 - 0.426366</td>
</tr>
<tr>
<td>Transport cost</td>
<td>-0.0015739***</td>
<td>0.0003996</td>
<td>-3.94</td>
<td>0.000</td>
<td>-0.002357 - 0.0007908</td>
</tr>
</tbody>
</table>
Table 4.15 shows the study had an overall p value of 0.000 implying all the independent variables significantly fitted the regression model well while the R-Squared is very small (9.78%) although this is common for most cross sectional data. The study estimated the effect of 20 independent variables on the utilization of diabetic care services and found that only nine variables were statistically significant although with different signs. The results found out the important factors to include age of the individual with its square, higher education, married, attitude, transport cost and insurance as a mode of payment, cost of diabetic care services and being a Muslim. Out of the significant factors, those which had a positive relationship were; age, attitude, insurance, cost of the diabetic services and being a Muslim while the rest (age square, higher education, married and transport cost) had a negative and significant relationship. The subsequent section presents discussion of significant factors that influences utilization of diabetic care services in Kiambu District Hospital.
4.5 Discussion of the Study Results

The results indicate the coefficients of age and age square were both shown to be statistically significant. An additional year was shown to have a significant increase in the utilization of diabetic care by 6.73% other factors held constant. This implies that as one grows older, the number of visits for diabetic care increases significantly. On the other hand, age square was shown to have a negative and statistically significant relationship with a coefficient of 0.0006493 which is too small implying that age has a non-linear relationship to utilization of diabetic services. The positive relationship established by age variable concurs with the study findings presented by Ayieko (2011) who studied quality of health care services, patients’ perception and their effects on services utilization in Nyeri, District Kenya. The study concluded that age of adult care givers was found to be significant determinant influencing the utilization of health facilities. Other studies confirming this finding include (Bice, Eichhorn and Fox, 1972; Lindelow, 2002) who found out that age was a significant factor which led to increased utilization of diabetic care. However, Kwabena and Timothy, (2014) revealed that age has a negative correlation with health care utilization. On the contrary, Mwai, (2013) found that age was not a significant determinant of utilization of diabetes care.

The study results revealed coefficient of higher education to be statistically significant at 10% significant levels. Compared to patients with no education, the study found that there is a reduction in the number of visits made by an individual on higher education level by 61.13% holding other factors constant. This study was shown to differ with results of Mwai (2013) who concluded that education levels and individual knowledge of diabetic status among diabetic patients has a positive effect on utilization of diabetes healthcare care facilities among type 2 diabetics. This results may be due to the better information empowerment for those highly educated resulting to better investment on preventive measures and reduced reliance on hospital care.

Marital status is found to reduce the usage of diabetic care utilization. The results indicated that married patients have a reduced utilization of diabetic care at 1% significance levels by 56.69% other factors held constant. This finding concurs with the findings obtained by Kwabena and Timothy, (2014) who investigated the association of age and use of healthcare under the affordable Care Act in the military health system in America. In their results,
marital status was found to significantly influence utilization of health care. The low utilization in the married could be due to may be discouragement from the partners.

From the results, the respondents rated the attitude of service providers towards diabetic patients which was thereafter revealed to have a positive effect and statistically significant. The study showed that the coefficient of attitude increased utilization of diabetic care services by 31.88% holding other factors constant. This implies that the positive attitude by most respondents led to increased significant utilization of diabetic care. This finding was found to contradict the results of Ayieko (2011) and Glaser, (1970) which revealed a negative relationship of attitude of the health care workers on utilization of health care services.

Similarly, the study found out that transport cost significantly reduced the usage of diabetic care by 0.16% holding other factors constant. For a unit increase in the cost of transport for diabetic care, the study found out that utilization of diabetic care services was significantly low. Okurut and Adebua (2006) who studied the determinants of healthcare demand in Lira District Northern Uganda found a similar result where transport cost affect healthcare demand in rural Uganda using household data from Lira District in Northern Uganda. The results suggested that the demand for government healthcare services was negatively and significantly influenced by the user fees, transport cost and drug unavailability.

Results found out that there was significant utilization of diabetic care at 1% significant level which significantly increased by 77.43% if one paid through insurance. This implies that being on an insurance program significantly increases usage of diabetic health care. Joseph et.al, (2006) concluded that there was low use of healthcare services by lower-income and higher income uninsured adults, despite high income and lack of healthcare insurance cover resulted in reduced use of recommended healthcare services. This result may imply that the medical insurance scheme in question reduces the burden of paying for diabetic care services. As argued by Grossman (1972), health insurance prevents individuals from catastrophic impoverishment as a result of paying for health care services.

Cost of diabetic services was shown to increase the usage of diabetic care. This was based on the question responded by the respondents in the survey regarding the cost incurred for accessing the diabetic care services on average per visit. The results indicated that for a unit increase in the cost of accessing diabetic care, there is a consequent increase in the usage of diabetic care services by 0.039% holding other factors constant. However, the effect of this
coefficient is too small. The positive relationship may imply that as the cost of accessing diabetic care rises, more support and encouragement from both government and relevant Non-Governmental Organizations (NGOs) lead to increased number of visits made for diabetic care in Kiambu District Hospital. These results are in line with results of Mwabu (1984) who developed a theoretical and empirical framework for analyzing choices of healthcare facilities by households during episodes of illness. In the study, it was shown that economic variables such as time and money costs marginally influencing demand for medical care.

Religion was shown to be positive and influences utilization of diabetic health care facility. It was found that being a Muslim increased utilization of diabetic care by 40.88% holding other factors constant. Similarly, Glaser, (1970) in a survey of 16 countries revealed a positive association between the religious beliefs in a society and the utilization of medical facilities.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Summary

The study explored various variables as reviewed in the literature which includes the number of visits made to diabetic health center as the dependent variable with education levels, gender (female), occupation, time taken to access care, marital status, attitude, transport cost, out of pocket, insurance, cost of accessing diabetic services, information obtained from friend, information obtained from media and being either a Christian or Muslim.

The standard Poisson regression results found out that age of the patients, high education levels, married, attitude, and transport cost, medical insurance, cost of diabetic services and Muslim were significant determinant of diabetic care. The rest of the factors are not significant determinants of diabetic care in Kiambu District Hospital.

5.2 Conclusion

The study concludes that there is a need to consider significant factors which discourage utilization of diabetic care such as distance to healthcare facilities, higher education levels being married and transport costs together with those factors with positive but significant relationship with utilization of diabetic healthcare services for maintenance and even improving the uptake of diabetic care among the populations.

5.3 Policy Implications

Based on the study results, age was shown to increase utilization, so there is a need for government to consider increasing access of diabetic care to elderly generation. This could be done through cash transfers or subsidizing costs of diabetic care to this population. Advocacy on the use of diabetic healthcare services among the younger generation is also required.

There is need to have specialized institutions to encourage utilization of diabetic care. More sensitization on diabetes needs to be conducted as this will enable more people with higher education to receive diabetic care from the diabetic care centers as higher education has been shown to have a negative effect on utilization of diabetic care by the study results.
Married couples were found to have low utilization rates, hence creation of awareness on the consequences of this group should be done to both parties as these results may be associated with restrictions or cultural believes on diabetic care.

Attitude of the service providers increased utilization of the care. Therefore, to maintain the continuous uptake of the services, service providers need to be encouraged and rewarded for the good service offered to diabetics.

Costs were shown to significantly reduce the usage of diabetic services. This includes the transport costs to seek diabetes care. More health care facilities are required to be built to reduce the distance covered to the existing health care facilities to bring services closer to the population and cut on the transport costs at the same time subsidizing the cost of diabetic care.

Insurance had a positive relationship with usage of diabetic care. Therefore, there is a need to encourage patients as well as the entire population to own an appropriate health insurance cover to reduce the high costs associated with accessing diabetic care.

Studies show that cost of care, income and individual knowledge of diabetic status and quality of care play a major role in influencing the utilization of diabetes care and the resultant health outcomes. However, from the study results, cost of diabetic services was shown to increase the usage of diabetic care. There is a need for a government through the relevant ministry to consider revising the total costs incurred by diabetic patients in accessing the services from the available health care centers. This is because the aid provided by other institutions may not be sustainable and may leave patients at the cross roads if they happen to withdraw their support.

Finally, it is necessary to use religious groups in creating awareness to maintain and increase utilization of diabetic care. This is because Muslims were found to have higher utilization compared to Christians. There is a need to have both verbal and written messages on the significance of utilizing diabetic care services.

5.4 Areas for further study

This study was limited to investigating the factors that influenced utilization of diabetes care services among diabetic patients in Kiambu District Hospital with the view to addressing them in order to increase the rate of utilization of the services. The primary data used was
obtained from Kiambu District Hospital. There is a need for similar study but focusing for more than one health care facility to authenticate inference of the results. Further, a study including more other independent factors such as culture, geographical location, availability of relevant and appropriate facilities need to be conducted. This will give more effort to the study findings relating to utilization of diabetic care. Finally, a study utilizing other dependent factors apart from the number of visits is required. A study that will also compare the utilizers and non utilizers of diabetic health care services is recommended.
REFERENCES


Report of the international insulin foundation of the rapid assessment protocol for insulin access in Mozambique IIF and AMODIA S Atwww.aecess2insulin.org.


Annex I: Questionnaire

UNIVERSITY OF NAIROBI
SCHOOL OF ECONOMICS
DEPARTMENT OF HEALTH ECONOMICS

AN ASSESSMENT OF THE FACTORS INFLUENCING UTILIZATION OF DIABETIC HEALTH CARE SERVICES AMONG DIABETIC PATIENTS IN KIAMBU DISTRICT HOSPITAL.

Interview guide for diabetic patients who have been on treatment within the periods of 1st February 2015 to 31st July 2015.

INTRODUCTION

Dear Respondent

This questionnaire is designed to collect data on the topic below.

ASSESSMENT OF THE FACTORS THAT INFLUENCE UTILIZATION OF DIABETIC HEALTH CARE SERVICES AMONG DIABETIC PATIENTS IN KIAMBU DISTRICT HOSPITAL.

I request you to kindly answer the questions given below by either ticking or writing the appropriate answer when required.

Confidentiality will be observed.

SECTION A: SOCIO-DEMOGRAPHIC DATA

1. Age of respondent
   1. Actual age in number of years.

2. Sex
   1. Male
   2. Female

3. Occupational Status
   1. Formal employment
   2. Self employed
   3. Unemployed

4. Educational Status
1. Non-education
2. Primary
3. Secondary

5. Marital Status
   1. Single
   2. Married
   3. Widowed
   4. Divorced/Separated

6. Religion
   1. No religion
   2. Christian
   3. Muslims

7. No of Children

SECTION B: QUALITY OF CARE PROVIDED

8. Do you access diabetic care any time you need it.
   1. Yes
   2. No

9. Where do you attend your diabetic care mainly
   1. Government hospital
   2. Private hospital
   3. Traditional doctors
   4. Non attendants

10. Can you give any reason for your choice made above (No. 8)

11. How would you rate the attitude of service providers towards diabetic patients
   1. 1 -2 poor
   2. 3 – 4 fair
   3. 5-6 good
   4. 7-8 Excellent

12. Do they encourage patients
   1. Yes
   2. No
13. Which services do they render at the diabetic clinic
   1. Health education
   2. Screening
   3. Management of minor ailments
   4. Management of diabetic complications
   5. Others specify

14. Have you had any diabetic complication in the last one year

15. Do they offer referral in case of complications
   1. YES  2. NO

16. How long does it take one to access diabetic care services
   1. 1 – 20 min – excellent
   2. 21 – 40 minutes- good
   3. 41 – 60 minutes- fair
   4. Over 60 minutes - poor

17. In a scale of 1-5, what is your level of satisfaction with the diabetic care services provided?
   1. Very satisfied
   2. Satisfied
   3. Somehow satisfied
   4. Dissatisfied
   5. Very dissatisfied

18. Apart from diabetes are you on medication for any other disease? If yes which one.

SECTION C KNOWLEDGE ABOUT DIABETIC CARE

19. How did you get information on diabetes health care service?
   1. Through a friend
   2. Through relatives
   3. Through media
   4. During a visit to a health institution

20. What are some of the benefits of diabetes care services?

SECTION D: ACCESSIBILITY OF DIABETIC CARE SERVICES
21. Are diabetic care services accessible to you?
   1. Yes
   2. No

22. What means of transport do you use to access diabetic care services?
   1. Walk
   2. Public means
   3. Private means
   4. Others specify

23. Approximately what distance do you cover to the diabetic care centre?
   1. 1 – 5 km
   2. 6 – 10 km
   3. 11 – 15 km
   4. 16 – 20 km
   5. 26 – 30 km
   6. Above 30 km

24. How many times have you visited the diabetic care center in the last 6 months?
25. How much do you pay for transport to and from the diabetic care center?
26. Do you pay for your diabetic health care services?

27. How much do you pay for the diabetic care services on average per visit?
28. Are you able to afford all the services offered per visit?
   YES/ NO

29. Do you have any other comment

   Thank you