DETERMINANTS OF MATERNAL HEALTHCARE UTILIZATION IN RURAL KENYA

BY

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A Research Project Submitted to the School of Economics, University of Nairobi, in Partial Fulfillment for the Requirements of the Award of Master of Arts Degree in Economics

November, 2014

DECLARATION

This research paper is my original work and has not been submitted for a degree award in any other university.

Signature …….... Date…….

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This research paper has been submitted for examination with our approval as university supervisors.

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DEDICATION

This research paper is dedicated to my loving husband, Mr. Geoffrey K. Sowek for his moral support and our children for their endurance during my studies.

ACKNOWLEDGEMENT

This research paper has seen the views of a number of individuals for the far it has gone. I am indebted to each and every one of them. To start with, I am grateful to my supervisors; Dr. Moses K. Muriithi and Dr. Urbanus M. Kioko for their guidance in ensuring the completion of this research paper.

I greatly acknowledge the financial support of my employer, the then Ministry of State for Planning, National Development and Vision 2030 (currently, Ministry of Devolution and Planning). Thank you so much for your support.

I can't forget the Ministry of Health for allowing me to use the Kenya Demographic and Health Survey, 2008 data for analysis. My classmates made a lot of contributions to the finalization of this research through their views and sharing of ideas.

My husband and children have been of great contribution to the far I have come with this research. I particularly appreciate them for their endurance for the times I have had to arrive home late and at times for being away over the weekends.

All those I have not mentioned, thank you for every support you accorded me throughout the writing of this research paper.

I solely take responsibility for any errors or views expressed in this proposal.

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ACRONYMS

ANC	Antenatal care
CIDA	Canadian International Development Agency
HPP	Health Policy Paper
KDHS	Kenya Demographic and Health Survey
KNBS	Kenya National Bureau of Statistic
MCH	Maternal Child Health
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
MNCH	Maternal, Newborn and Child Health
MPS	Making Pregnancy Safer
NASSEP IV	National Sample Survey and Evaluation Programme IV
PMTCT	Prevention of Mother to Child Transmission
SMI	Safe Motherhood Initiative
SSA	Sub-Saharan Africa
UNPF	United Nations Population Fund
WHO	World Health Organization

ABSTRACT

World Health Organization approximates that every year about 210 million women conceive; approximately 30 million develop complications; and 515,000 die. In addition, 3 million babies are still born while 3 million die in the first week of life and many more bear different levels of disability (WHO, 2010). KDHS 2008 shows that in Kenya, more women are dying of pregnancy and childbirth related causes than was the case in 2003. In 2008, reported maternal deaths were 488 per 100,000 live births compared to 412 per 100,000 live births reported in 2003. Utilization of maternal healthcare services is low in rural areas compared to urban areas (KDHS, 2008). This study therefore sought to explore factors influencing utilization of maternal health care services among the rural women in Kenya using the data from KDHS, 2008 with the key objective of making policy recommendations to the government. The study used the binary probit model to estimate the utilization of antenatal care, hospital delivery and postnatal care services by rural women in Kenya.

Education levels, gender of household head, wealth index, marital status and employment status significantly affect usage of antenatal care services as per the study findings. Hospital delivery is significantly influenced by age, household size, birth order, education levels, religion, wealth index, employment status and mass media. Gender of household head, religion, wealth index, marital status and employment status significantly affect postnatal care. It is recommended therefore that, the government comes up with policies which tend to improve utilization of maternal health care utilization. For instance, for free maternal health care to be successful, the government may want to ensure that all rural women can access healthcare facilities by bringing the facilities closer to the people or by ensuring passable roads in all the rural areas.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Although significant progress has been made in reducing global maternal mortality by almost 50% from 546,000 in 1990 to 287,000 in 2010 (WHO, 2012), in many countries the Millennium Development Goal (MDG) of reducing maternal mortality by three-quarters by 2015 may not be achieved (Rasch, 2007). The two main interventions to prevent maternal mortality - delivery by skilled birth attendants and seeking emergency obstetric care from health facilities are under-utilized, particularly by poorer segments of population. Economic barriers and limited access to quality services are considered the major determinants of low utilization of maternal health care (Gabrysch & Campbell, 2009). Among all health indicators, the largest inequality pervasively persists in maternal health care utilization (Houweling and Ronsmans, 2007).

While in past years significant progress has been made in reducing maternal and child deaths, the overall decrease in mortality is not fast enough to reach, by 2015, MDG 4 (reducing child mortality) and MDG 5 (improving maternal health) in all countries. The Millennium Development Goals Report (2011) indicates that worldwide, maternal mortality rates per 100,000 live births were 400, 340 and 260 in 1990, 2000 and 2008 respectively. However, in Sub-Saharan Africa, higher maternal mortality rates were recorded during the same period at 870, 790 and 640 for the three years respectively.

Millions of women in developing countries experience life threatening and other serious health problems related to pregnancy or childbirth. Complications of pregnancy and childbirth cause more deaths and disability than any other reproductive health problems. In most developing

countries, most of the deaths of women in reproductive age are attributed to pregnancy-related causes (Royston & Armstrong, 1989). In some rural areas of Africa and South Asia, of every two women who die, one dies from pregnancy related causes.

Based on the United Nations Population Fund update on maternal mortality estimates, of the total 514,000 maternal deaths, 98% of these occurred in developing countries (UNPF, 1999). It is rare for maternal mortality rates to be greater than 10 per 100,000 live births in most of the developed countries and yet it is common to observe maternal mortality rates greater than 500 per 100,000 live births in some developing countries (World Bank, 2001). Other statistics show that Sub-Saharan Africa (SSA) still records very high maternal mortality rates as well as low access to reproductive health (United Nations, 2013).

The risk of maternal death (during pregnancy or childbirth) in Sub-Saharan Africa is 175 times higher than in developed countries. Furthermore, risk for pregnancy-related illnesses and negative consequences after birth is even higher. Poverty, maternal health, and outcomes for the child are all interconnected. Neonatal deaths in developing countries account for 98% of worldwide yearly neonatal deaths (Fillipi & Veronique, 2006).

Maternal mortality has been unacceptably high in Kenya. According to Canadian International Development Agency (CIDA, 2011), over 500,000 women globally die every year due to pregnancy related complications, and half of all global maternal deaths occur in Sub-Saharan Africa. About 800 women die from pregnancy or childbirth-related complications around the world every day. In 2010, 287 000 women died during and following pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and most could have been prevented (World Health Organization, Fact Sheet May 2012). Despite improvements in other

health indicators over decades in Kenya, high maternal morbidity and mortality rates are still being recorded (Nicole, 2013). He further states, for every woman who dies in childbirth in Kenya, estimates indicate that another 30 women undergo serious injury or disability due to complications arising from pregnancy or delivery.

While motherhood is often a positive and fulfilling experience, for too many women it is associated with suffering, ill-health and even death. In Kenya, Comprehensive Public Expenditure Review, 2013 indicates that maternal mortality rate deteriorated from 414 per 100,000 live births in 2003 to 488 deaths per 100,000 live births in 2008/09. Also, births attended to by skilled health personnel declined from 51% in 2007 to 43% in 2010/11. Most maternal deaths are caused by haemorrhage during childbirth, HIV and AIDS, malaria, unsafe abortions and the low proportion of deliveries conducted by skilled birth attendants as well as poor staffing among other causes (Health Policy Paper, 2012). According to the Research Agenda on Population and Development in Kenya (2006), each minute, a woman dies at childbirth in developing countries. The report further says that in Kenya, childbirth claims many mothers daily.

According to the Millennium Development Goals Status Report for Kenya 2011, the maternal mortality rates were at 488 per 100,000 live births in 2011 against a target of 147 by 2015. Furthermore, only 43.8% of births (in Kenya) were attended to by trained health personnel against a 2015 target of 90%. This was a decline from 51% in 2007, as per the Fourth Annual Progress Report of 2011-2012 on implementation of the First Medium Term Plan of Kenya Vision 2030.

According to the World Health Organization, reducing maternal and child mortality is an important goal of the Millennium declaration and a major concern for policy makers in many developing countries. More than half a million women die yearly as a result of pregnancy related complications and more than 10 million suffer injury, infection or disease as a result of pregnancy (WHO, 2004).

According to 'The Making Pregnancy Safer (MPS)' Department of the WHO, improvement of both health services and actions at the community level are required to ensure that women and their newborns have access to the skilled care they need, when they need it. As per the MPS, the aim of working with individuals, families and communities is to empower them to improve and increase their control over maternal and newborn health. This will also enable them have more access to quality health services which will result in increased utilization (WHO, 2010).

The Government of Kenya's 2009 National Road Map for accelerating the attainment of the MDGs Related to Maternal and Newborn Health in Kenya and the Child Survival and Development Strategy 2008 -2015, identified several barriers for improvement of prevention of mother to child transmission (PMTCT) services. The barriers include: lack of recognition of danger signs in pregnancy; poor accessibility and low utilization of skilled attendance during pregnancy, child birth and post birth period; among others. According to the Health Policy Paper of September 2012, only 40% of antenatal care (ANC) facilities currently offer PMTCT services. For the general population, 26% of women have un-met family planning needs. It further says that only 44% of women deliver babies under the care of a health professional.

1.2 Maternal healthcare utilization in Kenya

Antenatal care is more beneficial in preventing adverse pregnancy outcomes if sought early as recommended and is continued throughout pregnancy. However, as per the study sample of the 2008 Kenya Demographic and Health Survey (KDHS), 90.3% of rural women received antenatal care from a skilled provider compared to 95.8% of urban women, yet three-quarters of the population lives in the rural areas. The survey further demonstrates that rural women are less likely than their counterparts to get antenatal care from a doctor, and they are more likely to get no care at all (KDHS, 2008).

World Health Organization recommends that a woman without complications should have at least four antenatal care visits. Existing data however shows that in Kenya, less than half of pregnant women make four or more antenatal visits. Out of these (less than half), 60% of urban women either meet or exceed this recommended target compared to 40% of rural women (KDHS, 2008).

In order to reduce the health risk of both the mother and the baby, there is need to increase utilization of healthcare services during delivery since that is where proper medical attention and hygienic conditions exist. However, KDHS 2008 indicates that only 43% of births in Kenya are delivered in a health facility while 56% takes place at home. Majority of the home deliveries occurred in the rural areas; 63.3% compared to 24.5% in urban areas. Among the deliveries which occurred in a health facility, only 34.5% were from rural areas while 74.7% represent the urban areas (KDHS, 2008).

A large proportion of maternal and neonatal deaths occur during the first 48 hours after delivery implying that postnatal care is important for both the mother and the child to treat any complication that may arise from the delivery (KDHS, 2008). The 2008 KDHS however shows that rural women are less likely to receive postnatal care compared to urban women. 58% of rural women never received any postnatal care compared to only 32.2% from urban areas.

The Health Policy Paper (HPP) of 2012 indicates that MDGs 4 and 5 are the two goals with the least progress made globally and in Kenya. While global, regional and national policies and strategies to improve maternal, newborn and child health (MNCH) exists and interventions to prevent maternal, neonatal and child deaths are available in Kenya, MNCH indicators remain unacceptably poor. Progress has been hindered by poor policy implementation and weak health systems, which do not engage with or respond to community needs. This results in poor access and utilization of preventive and curative health services.

1.3 Statement of the problem

According to the World Health Organization, it is approximated that every year about 210 million women conceive; approximately 30 million develop complications; and 515,000 die. In addition, 3 million babies are still born while 3 million die in the first week of life and many more bear different levels of disability. These are misfortunes which can be avoided (WHO, 2010).

Recent estimates indicate a significant drop worldwide in the number of women dying from pregnancy related causes, from an estimated 422 in 1980 to 251 per 100,000 live births in 2008. In Kenya however, this is not the case. For instance, the KDHS 2008 indicates that more women

are dying of pregnancy and childbirth related causes than was the case in 2003. In 2008, reported maternal deaths were 488 per 100,000 live births compared to 412 per 100,000 live births reported in 2003.

The KDHS 2008 also shows that majority of women who make minimal use of the maternal healthcare services are from the rural areas. For instance, 56% of births which occurred at home, majority of the deliveries (63.3%) were recorded from the rural areas while only 24.5% were from urban areas. On the other hand, out of the deliveries which took place in health facilities, only 34.5% were from rural areas while 74.7% came from urban areas (KDHS, 2008).

Based on the above discussions, it is clear that there is low utilization of maternal healthcare services in rural areas in Kenya which could be having adverse effect on the maternal mortality rate among rural household. This study intends to explore the determinants of maternal healthcare service utilization among the rural households in Kenya, using data drawn from a household survey conducted in 2008. To enhance utilization of maternal healthcare services, the government of Kenya implemented free maternal care in June 2013. Similarly, there have been other initiatives to utilize these services targeting the poor. However, despite these initiatives, utilization of maternal care services still remains low. Considering studies conducted in Kenya, Machio (2008) and Magadi et al (2008) have focused on general utilization of maternal health care services across Kenya where the latter has specifically addressed determinants of delivery care making generalized inferences while in the study by Njaramba (1994) conducted a case study which could not inform the two divides on the consumption of maternal health care services given the setting under which the study was conducted prompting urban bias. This study therefore, endeavors to explore comprehensively the underlying factors behind low utilization of

maternal health care services among the rural women in Kenya. This study informs the policy on re-examining the major principles of equity and equality on increasing disparities of maternal health care utilization despite the heavy budget channeled to free maternal care in a concerted effort of reducing child and maternal mortality.

1.4 Research Questions

The study seeks to answer the following questions:

i. What are the trends of the utilization of maternal healthcare services in rural areas in Kenya?

ii. What are the factors determining utilization of maternal healthcare services among rural women in Kenya?

1.5 Objectives of the study

The general objective of this research was to find out the main factors determining utilization of maternal healthcare services in rural Kenya.

The specific objectives of this study are to:

i. Establish the pattern of maternal healthcare utilization in rural Kenya.

ii. Estimate the determinants of utilization of maternal healthcare services in rural Kenya.

iii. To make policy recommendations based on the findings in (b) above.

1.6 Significance of the study

The fifth Millennium Development Goal target is to reduce maternal mortality ratio by three quarter by 2015 (UN, 2007). Worldwide, Maternal deaths are estimated at 358,000 every year

despite the fact that it is now more than 20 years since the launch of international Safe Motherhood Initiative (SMI). Almost all of these deaths are recorded in Sub-Saharan Africa and Asia (WHO, 2010). More statistics show that in Sub-Saharan Africa, the adjusted maternal mortality ratio (MMR) was 900 deaths per 100,000 live births in 2005 (WHO, 2007).

Despite the fact that many strategies have been put in place with the aim of reducing maternal deaths, still more than half a million of these deaths arise especially in developing countries (WHO report, 2005). According to the World Health Organization, about 289,000 women died in 2013 of complications during pregnancy or childbirth due to causes which are avoidable if the available health resources are well utilized. The main impediment to good utilization has been sighted as inaccessibility of quality maternal healthcare services among women (WHO, 2014).

This study contributes not only to the limited empirical literature but as well as in provision of insights to the relevant sector in identification of strong links between all maternal health care services with important need to ensure that rural women, as their counterparts in urban areas, in equal measures utilize maternity care services and maternal child health care as proposed by WHO (2005) at this era of free maternity services.

The findings confirms an existing awareness gap in the public as a whole which may perhaps lead to the informational campaigns which have not been sufficient, or perhaps the individuals have failed to assimilate these massages at the rural settings, due to lack of education or literacy among other factors.

This study informs the policy process on the causes of low uptake of maternal healthcare services by women in rural Kenya. Therefore, this is a relevant study in the wake of devolution in Kenya and the inception of free maternal services in public hospitals.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Studies on utilization of health services, which can be maternal health, fall under a mixed demand-supply framework (Y1va, 2011). On the supply side, good quality care may not be offered. On the demand side, even if offered, individuals may not utilize that service which would have been of benefit to them (O'Donnel, 2007).

Demand and supply apparently interact, making it difficult to get a clear distinction in the components making up the two sides. In maternal health for instance, if the quality of services provided are poor, the user may not have much interest in utilizing them resulting in low demand. It is further perceived that lack of female health workers in hospitals and health care facilities contributes as an important obstacle to seeking care for women. It is claimed that they hesitate in seeking health care out of fear of being examined by a male doctor, which can be seen as inappropriate.

This chapter therefore highlights the main determinants of maternal healthcare utilization within the context of an economic framework of the demand for health care. The section covers theoretical as well as empirical literature and overview of previous findings.

2.1 Theoretical literature

Grossman model portrays allocation of resources by individuals in order to produce health. His model portrays an individual as a producer of health and not just a consumer (Dolan, 2003).

A consumer is presumed to have an aim of maximizing utility which is constrained by income level, the price of health inputs, consumption activities, and the opportunities of transforming health inputs into health (McGuire, Henderson & Mooney, 1988).

According to Henderson (2005), health production function summarizes the relationship between health status and the various factors that may be used to produce good health. This can be represented as follows:

Health=f (medical care, other inputs, time)…….(1)

Equation (1) above implies that individuals use medical care in combination with other inputs and their own time to produce good health, which in our case, is maternal health (Henderson, 2005). The assumption of the model is that one inherits an initial stock of health which depreciates with age but can be increased through investments with things like a healthy lifestyle as inputs and also medical services; hence can be analyzed as a capital good. He further says that individuals are not passive consumers of health but rather active producers of the same who spend time and money to produce health. In this case, equation (1) above can be translated into:

$H^p=f(M_h,X_h,T_h)$…….....(2)

Where: Hp is the production of health; M_h are the market healthcare inputs, X_h are other inputs in the production of health and T_h is the time spend on improving health. This therefore shows that healthcare, which in this case is maternal health (made up of antenatal, delivery and postnatal care), is one of the factor inputs used to produce health.

According to Grossman, demand for healthcare is a derived demand for health while demand for health is a derived demand from a demand for utility. Consumers demand health for two reasons: as consumption as well as an investment commodity. As consumption commodity, health enters the utility function of the consumer while as an investment; it determines the amount of time available for work (McGuire, Henderson & Mooney, 1988).

2.2 Empirical literature

Health agencies are of the agreement that utilization of maternal healthcare is a major factor in maternal and child mortality (Raghuphaty, 1996). Maternal healthcare services are essential for women to avoid pregnancy-related complications like haemorrhaging, eclampsia, and worse of all, mortality (Smith and Sulzbach, 2008).

A number of studies have identified access to maternity health services as a key indicator for reducing maternal mortality in developing countries (Bulatao and Ross, 2003; Ensor & Cooper, 2004). Abbas and Walker (1986) are of the opinion that the physical accessibility of MCH services is the most important variable associated with utilization of the services. Several other studies also found that physical proximity of health care services, especially in the developing countries, plays an important role in utilization of these services (Stock, 1983; Airey, 1989; Paul, 1991). Rahaman *et al*., 1982 say that geographical distance is one of the most important determinants of healthcare services utilization in rural areas.

It is well recognized that women's current age plays an important role in the utilization of medical services (Fiedler, 1981; Elo, 1992; Fosu, 1994). Mother's age may sometimes serve as a proxy for the women's accumulated knowledge of health care services, which may have a

positive influence on the use of health services. On the other hand, because of development of modern medicine and improvement in educational opportunities for women in recent years, younger women might have an enhanced knowledge of modern health care services and place more value upon modern medicine.

The economic status of a family, woman's education, access to finances, proximity to services and the overall health-related beliefs of the household can all affect medical decisions (Smith et al., 2008). Previous studies further reveal that unplanned or unwanted pregnancies reduce the need to seek services of a trained health worker (Magadi, Madise & Rodrigues, 2000).

It is well recognized that mother's education has a positive impact on health care utilization. In another study, Becker *et al*. (1993), found mother's education to be the most consistent and important determinant of the use of child and maternal health services. Several other studies also found a strong positive impact of mother's education on the utilization of health care services (Fosu, 1994; Costello *et al*., 1996). It is argued that better educated women are more aware of health problems, know more about the availability of health care services, and use this information more effectively to maintain or achieve good health status. Mother's education may also act as a proxy variable of a number of background variables representing women's higher socioeconomic status, thus enabling her to seek proper medical care whenever she perceives it necessary.

According to Govindasamy and Ramesh (1997) and Caldwell (1979), higher levels of utilization of maternal healthcare services have been associated with literacy of the mother since it allows a woman to break away with traditions. Education also helps a mother to put a lot of importance to the health of her household. Educated husbands have also been found to contribute to better

utilization of maternal healthcare services among their spouses (Sharrif & Singh, 2002; Chakraborty et al, 2002; Ortiz, 2008; Rahman, 2009).

It is well known that increased income has a positive effect on the utilization of modern health care services (Elo, 1992; Fosu, 1994). Husband's occupation can be considered a proxy of family income, as well as social status. Differences in attitudes to modern health care services by occupational groups portray occupation as a determining factor. Other studies by Elo (1992), Jayaraman (2008), and Ochako et al (2011) found out that income has a positive relationship with utilization of these services. These implies that women from well off households demand more maternal services than those from poor households since they can afford the charges.

Access to information on health issues boosts utilization of the services. In developing countries, media is the major source of information including health information. Women who are exposed to more information on health issues through electronic and print media tend to have better utilization of healthcare services than those who don't get the information (Kistiana, 2009; Shariff and Singh, 2002).

Shaikh and Hatcher (2004) suggest that women's access to health services is actually limited by constrictions on their independence. Female autonomy can be described as the ability of a woman to make decisions within the household relative to her husband. They claim that men play an important role in determining the health needs of a woman especially in developing countries. The decision to seek care depends on who controls the household resources , a decision which often lies with man and he then decides when and where the woman should seek care. However, the authors to some extent agree that the only place women have independence on utilization of health services is concerns maternal

health services. In their study, they found a positive relationship between female autonomy and service utilization.

Religion has been found to be one of the determinants of maternal utilization. Shariff and Singh (2002) in their study observed that Muslims have low utilization of maternal healthcare services. Other studies have however brought to light that religion has no significant role in determining utilization of these services (Overbosch et al, 2004).

Age of the mother also affects the level of utilization of maternal healthcare services. It is said that a middle age mother utilizes more antenatal care services but on the contrary, older mothers tend to demand more delivery and postnatal care (Rahman, 2009). This variation, according to Begun et al (2010) could be due complications which the older mothers might have gone through in earlier births.

Ylva_ Kalin (2011) conducted an investigation into accessing to and Utilization of Health Services in Rural Bangladesh. The study employed logit model in regression whereby it was shown that the probability of seeking any type of care is significantly determined by whether the individual has to pay for transportation to a qualified allopath, whether there is any user charges when seeing a qualified allopath, and whether there is any visit cost to paraprofessionals.

Several studies have found a strong association between birth order and use of health care services (Wong et al., 1987; Elo, 1992). Because of perceived risk associated with first pregnancy, a woman is more likely to seek maternal health care services for first birth than subsequent births. Having more children may also cause resource constraints, which have a negative effect on health care utilization (Wong et al., 1987). Women with a large number of

children underutilize available health services because too many demands on their time force them to forgo health care (McKinlay, 1972). According to Shariff and Singh 2002, birth order determines utilization of maternal healthcare services in that as the number of children a mother has increases, the need to utilize the healthcare services tends to fall.

Mwabu et al (1993), examined the effect of the quality of medical care on the utilization of medical facilities in Kenya using the data from Meru district. The findings were that shortages in particular types of drugs may be either negatively or positively related to demand for medical care. Generally, if drugs are available, the demand will increase. Income was also found out to affect demand for medical care positively if it rises, with a shift from informal health care to formal healthcare where majority of these end up at private or mission health facilities. User fees and distance, according to the findings of the study, reduce demand for healthcare though insignificantly.

Njaramba (1994) carried out a study demand for maternal health services using a case study of Thika Division of Kiambu District. The findings were that distance to the health facility as well as the cost of health services negatively affect demand for maternal health service utilization. It further says that the number of children a mother already has reduces the utilization of maternal healthcare services by reducing the number of visits that mother makes to the clinic. The study found out that a woman who is expecting for the first time is most likely to make more clinic visits than one who has given birth before. Increasing levels of education and income on the other hand increases utilization of these services. Also, insurance and work increases utilization of antenatal services according to the study. Women in permanent employment have a higher level of utilization than their counterparts who are casual workers or housewives

Another study by Mugilwa in 2002 on demand for healthcare in Kenya on a case study of Vihiga District found out that prices, income, distance, education and quality of services greatly determine utilization of healthcare in the study area. The study further resulted in the fact that women headed-households tend to seek health care services better than men-headed ones. The study used data from the third Welfare Monitoring Survey (WMS III) which was collected between February and May, and September and November 1997.

A study by Magadi et al (2000) on analysis of individual and community level determinants of delivery care in Kenya found out that socio-economic and cultural factors associated with individual woman or household, demographic status of a woman, availability and accessibility of health services determine delivery care in Kenya. The study was based on the Kenya Demographic and Health Survey data of 1993. The analysis used the multilevel logistic for place of delivery and multilevel multinomial regression models for the type of childbirth attendant.

Chepkoech (2003) carried out a study on the demand for antenatal and obstetric care services in the slums of Nairobi. The study used the binary logit model to analyze the decision to or not to use the antenatal care and a multinomial model as decision to deliver in a health facility or not with a primary data obtained from a sample of 205 women. One of the findings of the study was that lack of money to meet delivery care costs was the reason why many women failed to deliver at a modern health facility. Number of children one already has also affects antenatal care utilization such that as the number rises, antenatal care utilization falls. The quality of service provided as measured by the time spend by a medical personnel examining a woman is positively related with the demand for antenatal care if the time spend is higher. Other factors

which have positive effect on demand for antenatal and obstetric care services according to the study are marital status and age. Cost of the service however has a negative effect.

Machio (2008) did a study on demand for maternal health care services in Kenya using the Kenya Demographic and Health Survey of 2003. The study used the probit model to analyze the determinants of utilization of antenatal, delivery and postnatal care services. The study found out that wealth, education, age, employment and marital status have a positive relationship with the use of antenatal care services. On the contrary, women with many children already and those from rural areas have low utilization of antenatal services. For those in the rural areas, the low utilization could be due to poor transport facilities or ignorance.

2.3 Overview of Literature

Previous studies have found utilization of maternal healthcare services to be affected by a number of factors. Physical accessibility to health facilities is negatively related to utilization of these services (Abbas & Walker, 1986; Rahaman *et al*., 1982; Stock, 1983; Airey, 1989; Paul, 1991; Njaramba J. 1994; Mugilwa, 2002; Magadi et al 2000). Others factors which affect utilization negatively include age, religion, birth order, and user fees (Shariff & Singh, 2002; Wong et al., 1987; McKinlay, 1972; Mwabu, 1993). In addition, women in rural areas have been observed to demand less maternal healthcare services than their counterparts in urban areas (Machio, 2008).

On the other hand, education, access to information, income, and quality of healthcare received influences utilization of maternal healthcare services positively (Becker et al., 1993; Elo, 1992; Fosu, 1994; Kistiana, 2009; Shariff & Singh, 2002; Govindasamy & Ramesh, 1997;Caldwell,

1979; Elo, 1992; Machio, 2008; Jayaraman 2008; Ochako et al, 2011; Kistiana, 2009; Shariff; Singh, 2002; Mwabu, 1993; Njaramba, 1994).

Considering the level of utilization among the urban and rural women, there are few studies regarding whether or not to utilize these services among rural women, and the reason behind such decision. Although other related studies have been done in rural settings in the past, they dealt with specific regions which cannot be used to make generalized inferences on the population. In our study, we shall basically consider rural women in Kenya where we shall critically examine their utilization of antenatal, delivery care and postnatal care using the appropriate econometric model.

This study is dynamic and similar to studies by Machio (2008) and Magadi, et al (2000), will make use of (KDHS, 2008) survey but in addition to concentrating on all rural areas of Kenya, it will incorporate previous national surveys in an effort to improve the data set and provide an in-depth picture of maternal health care utilization. The findings of the study will contribute greatly to the literature by unveiling the amplitude of the specific factors behind low utilization of maternal health care services in Kenya.

CHAPTER THREE

METHODOLOGY

3.1 Analytical Framework

This study was based on the theory of consumer behavior by Ajakaiye and Mwabu (2010). A consumer is presumed to aim at maximizing utility. This utilization is constrained by income level which is allocated to different needs, the price of health inputs, consumption activities, and the opportunities of transforming health inputs into health (Alistair et al, 1988). Maximization of utility in this case is dependent on the decision of either to use or not to use maternal healthcare services for antenatal, delivery and postnatal care.

According to Pindyck and Rubinfeld (2005), consumer theory relates preferences, indifference curves and budget constraints to individual demand curve. Utility maximization is subject to the budget and health production function constraints. Hence the optimization problem is utility maximization, stated as follows:

$U=f(C, X, H)$……..……..……..(3)

Where U is the utility of the consumer; in this case the mother, C represent consumption goods which yield utility to a mother but does not have direct effect on her health; X is health related good or behavior which directly affects the mother's health and H are health-status of the mother. This utility is maximized subject to a budget constraint and a production function.

The budget constraint is given by:

$Y=CP_c+NP_n+MP_m$…….(4)

Where Y is income, C is the consumption good, N is the health related goods and M are the maternal services. P_c, P_n and P_m are respectively price of consumption goods, health related goods and maternal health services.

On the other hand, the health production function is given by:

$H=f(M,N,S)$……………………………………………………………...………………(5)

Where M is maternal healthcare services, N is the market purchased inputs and S is social demographic characteristics of the mother (James, 2005)

Solving the optimization problem using Lagrangian function yields the following function:

$L= U\text{-}f(C,X,H)+ß_1(Y-CP_c-NP_n-MP_m)+ß_2[(H-f(M,N,S)]$…………….………………………(6)

Equation (6) yields a demand function and its solution gives the optimal values: C*, X* and H* which maximizes utility of the consumer, who in this case is the mother. The reduced form of the demand function for utilization of maternal healthcare services is:

$M_h=f(P_c,P_n,P_m,Y,S\ )$………………………………………………………..………………(7)

Where M_h represents the maternal healthcare services utilized and P_c, P_n, P_m, Y, and S are as defined above. It implies that maternal healthcare utilization depends on prices of goods and services (P_c, P_n, and P_m), income(Y) and socio-economic and demographic characteristics of a mother (S).

3.2 Econometric model

This study used Binary Probit model to analyze the determinants of utilization of maternal healthcare services since the dependent variable is a dummy variable. Binary-choice models assume that individuals are faced with a choice between two alternatives and the choice of any of the two depends on certain factors (Robert & Daniel, 1998). Given that the dependent variable Y is binary, and can be regressed on a number of independent variables (Maddala, 1977), the probit model can be presented as:

$Pr(Y=1/X) = \Phi(X'\beta)$……………..………………………………………………...…….(8)

Where Pr denotes probability, Φ is the cumulative distribution function (CDF) of the standard normal distribution and β is a vector of parameters to be estimated. The probit model is estimated using the maximum likelihood method and an increase in X increases/decreases the likelihood that y=1 (Ani, 2013). Equation (8) above can be motivated as a latent variable model as follows:

$Y^*= X'\beta+\varepsilon$, where ε is normally distributed with N(0,1)………………………………………..(9)

Where Y* is the dependent variable of either utilize or not utilize; X is a number of independent variables; β is a vector of parameters and ε is the error term. Here, the dependent variable ‘Y’ can only be observed if $y>0$. Hence, $y=\beta x+\mu$ if:

$\beta x+\mu>0$ or $\mu>-\beta x$, and $y=0$ otherwise.

The probit model assumes that Y_i^* is a normally distributed random variable (Robert & Daniel, 1998). Therefore, Y_i can be estimated using cumulative normal probability function given as follows:

$P_i=F(y_i)=1/\sqrt{2}\prod\int_{-\infty}^{-z} e^{-s2/2}ds$ ……(10)

To obtain an estimate of Y_i, the inverse of the cumulative normal function to equation (10) is applied as:

$y_i=F^{-1}(P_i)= \beta x+\mu$……(11)

Equation (10) can be interpreted as the probability Pi as an estimate of the conditional probability that a mother will utilize maternal healthcare services given certain identified factors, X_i.

Marginal effects in a probit model

According to Ani (2013), marginal effects reflect the change in the probability of y=1 given a unit change in an independent variable X. The marginal effect can be calculated as:

$\partial p/\partial xj= \Phi(X'\beta)\beta j$……(12)

Marginal effect can be estimated either as the average of the individual marginal effects or for the average person in the sample X. Most of the time, the two ways produce identical results but in the later method, the average person may not be in the sample. As the average of the individual effects therefore, the marginal effect is given as (Ani, 2013):

$\partial p/\partial xj=[\{\sum F'(X'\beta)\}/n]\beta j$……(13)

3.3 Estimable model

Maternal healthcare services are either utilized or not hence the choice of using a binary probit model. The assumption here is that the probability of an individual utilizing or not utilizing the

maternal healthcare services (antenatal, delivery and postnatal) is determined by some factors (Maddala, 1977), such that:

$Y_i = X_i ß + €$……..... (14)

Where Y_i is the dependent variable made up of antenatal care (A), delivery care (D) and postnatal care (P), and thus represent three models:

A=1 if a woman received antenatal care and 0 otherwise

D= 1 if a woman delivered in a health facility and 0 otherwise

P= 1 if a woman receives postnatal care and 0 otherwise

X_i represents a number of independent variables: age of the mother (A_m), maternal education (E_m), size of the household (S_h), wealth index (W_i), religion (R), birth order (B), and access to information through mass media (A_{in}).

ß is a vector of parameters to be estimated

€ is the error term

Since Y_i represent A, D and P, three binary probit models will be estimated which represent antenatal care utilization, delivery services utilization and postnatal care utilization.

$A = \alpha_0 + \alpha_1 X_{1+} \alpha_2 X_{2+} \alpha_3 X_{3+} \alpha_4 X_{4+} \alpha_5 X_{5+} \alpha_6 X_6 + \alpha_7 X_7 + \varepsilon$……..……..…….(15)

$D = \beta_0 + \beta_1 X_{1+} \beta_2 X_{2+} \beta_3 X_{3+} \beta_4 X_{4+} \beta_5 X_{5+} \beta_6 X_6 + \beta_7 X_7 + \varepsilon$…….…….……..……..(16)

$P = \sigma_0 + \sigma_1 X_1 + \sigma_2 X_{2+} \sigma_3 X_{3+} \sigma_4 X_{4+} \sigma_5 X_{5+} \sigma_6 X_{6+} \sigma_7 X_7 + \varepsilon$……...……..(17)

3.4 Definition of variables and expected signs

3.4.1 Dependent variables

The study focused on three maternal healthcare services: antenatal, delivery and postnatal care. Antenatal care will be coded 1 if a mother attends antenatal clinics and 0 otherwise. Delivery care will be coded 1 for hospital delivery and 0 otherwise. Finally, postnatal care will be coded as 1 if a mother consumes the service and 0 otherwise.

3.4.2 Explanatory variables

The following variables were analyzed during the study that is age of the mother, maternal education, size of the household, wealth index, religion, birth order, access to information through mass media, gender of the head of household, marital status and employment status. .

Table 3.1: Definition of variables and Expected signs

VARIABLES	DEFINITION	EXPECTED SIGN
DEPENDENT VARIABLES		
Antenatal care (A)	This was coded as: A=1 if a mother attends antenatal clinics and A=0 otherwise.	
Delivery care (D)	Dummy variable for delivery care 1 for hospital delivery and 0 otherwise.	
Postnatal care (P)	This was coded as: P=1 if a	

	mother attends postnatal clinics and P=0 otherwise.	
INDEPENDENT VARIABLES		
Age of the mother	A continuous variable measured by the age of the mother in years	Negative
Education of the mother	A discrete variable measured by level of education as: 0= no education 1= primary 2= post primary	Positive
Size of the household	A continuous variable measured by the number of persons in the household	Negative
Wealth index	A dummy variable measured whereby 0=Lowest quintile and 1= highest quintile	Positive
Religion	A dummy variable measured as 1 if Religion(Christian, Protestant and Muslim) 0 if No religion	Negative
Birth order	A continuous variable measured by the number of children a	Negative

	mother has	
Access to information through mass media	A dummy variable measured as: 1= If mass media 0= No mass media	Positive
Gender of head of household	A dummy variable measured as: 1= If head of household is female 0= If head of household is male	Positive
Marital status	A dummy variable measured as: 1= If married 0= If not married	Positive
Employment status	A dummy variable measured as: 1=If employed 0= If not employed	Positive

Source: Author's consideration

3.5 Data source

The study made use of the data from the Kenya Demographic and Health Survey (KDHS), 2008. The survey is carried out after five years and is designed to provide data to monitor the population and health situation in Kenya. The survey, which is a household-based, utilized a two-stage sample based on the 1999 Population and Housing Census. It used a representative sample of 10,000 households to allow for separate estimates of key indicators for each of the eight provinces in Kenya then as well as for urban and rural areas separately. A representative

sample of 8,444 women aged between 15 and 49 and 3,465 men aged between 15 and 54 was used. The sample was selected from 400 sample points (clusters) throughout Kenya.

The first stage of sampling the respondents involved selecting data collection sample points (clusters) from a national master sample framework maintained by the Kenya National Bureau of Statistic (KNBS). The framework selected a total of 400 clusters where 133 and 267 were urban and rural respectively. The second stage involved the systematic sampling of households from an updated list of households which had been developed for the National Sample Survey and Evaluation Programme IV (NASSEP IV) in 2002.

The survey obtained detailed information on fertility levels, marriage, sexual activity, fertility, preferences, awareness and use of family planning methods, breastfeeding practices, nutritional status of women and young children,, childhood and maternal mortality, maternal and child health, and awareness and behavior regarding HIV/AIDS. It further identified information on ownership and use of mosquito nets, domestic violence and HIV testing among adults. This study will use data on maternal and child health since that is where issues of utilization of maternal healthcare services are handled.

The data has a component of both rural and urban residents. Out of the 8,444 women respondents, 6,296 represent rural areas while 2,148 represent urban areas. For men respondents, 2,392 came from rural areas while 866 came from urban areas. The data is therefore a good representative of all the rural areas in Kenya.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION, AND DISCUSSION

4.1 Introduction

This chapter presents the study findings. It comprehensively analyses factors that affects rural women in terms of utilization of maternal health care services since KDHS 2008, which is used in this study suggests that majority of women who make minimal use of the maternal healthcare services are from the rural areas. A number of study variables have been identified which provides information on what causes low utilization of maternal healthcare services in rural areas. We objectively evaluated their relationship and the extent of their effects through a binary probit regression model. It reveals the relationship between the indicators of utilization of maternal health care services (Antenatal care, hospital delivery and postnatal care services) and explanatory variables like age, education levels, household size, wealth index, employment status, religion, birth order and access to information.

We have used both descriptive statistics and econometric analysis in estimation of the model where average marginal effects have been provided for interpretation.

4.2 Descriptive statistics

There were 4612 women from entire rural areas in Kenya who form our study target population making 75.87% of the study population. Table 2 below gives the characteristics of the variables used in the model in estimating utilization of maternal health services by rural women in Kenya. The average age of the rural women who were involved in the survey was found to be approximately 28 years with about 99.2%, 80.3% and 94.4% of the women utilizing antenatal care services, hospital delivery and postnatal care respectively. Table 2

below indicates the proportion of rural women to urban women in Kenya and the distribution of the gender of households in various age groups.

Table 4.1: Age distribution among the rural women in Kenya

Age group	Obs	% of rural to urban women	%F. headed households
15-19	252	71.49%	6.14%
20-24	1255	79.97%	27.21%
25-29	1201	72.97%	6.59%
30-34	942	73.28%	18.54%
35-39	615	81.35%	13.69%
40-44	250	86.49	5.69%
45-49	97	89.81	2.14%

Source: Author's calculation

About 96.5% of the women are married and more than half of the households are headed by female (56.1%). From Table 4.1 above, we revealed that most female headed households lied between 30-34 years with 18.54% with the lowest lying between 45-49 years of 2.14%. We explored those women who were either in the highest wealth quintiles or in the lowest wealth quintiles and found that about 89.7% of the rural women were in the lowest wealth quintiles while only 10.3% were in the highest wealth quintiles.

We further explored household size which ranges between a minimum of one and nineteen household members whereby we found that rural women are approximately staying in an average of five to six household size or members of the household with a birth order of approximately three children.

Table 4.2: Summary statistics of the study variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Hospital Delivery	1941	0.8037094	0.3972932	0	1
Antenatal Care	4264	0.9917917	0.0902374	0	1
Postnatal Care	1242	0.9436393	0.2307099	0	1
Age	6079	28.23557	6.664807	15	49
No Education	2431	0.465652	0.4989214	0	1
Primary Education	3527	0.7782818	0.4154614	0	1
Post primary Education	1588	0.4628463	0.4987748	0	1
Marital Status	3842	0.9648621	0.1841524	0	1
No religion	1643	0.1205113	0.3256576	0	1
Christians	3236	0.8207664	0.3836071	0	1
Muslims	2069	0.4374094	0.4961869	0	1
GHH	2534	0.5607735	0.4963908	0	1
Employment Status	3224	0.7881514	0.4086815	0	1
Wealth Indexes	1750	0.8965164	0.4925477	0	1
Frequency listening Radio	3604	0.9436737	0.2305827	0	1
Frequency Watching TV	1695	0.6702065	0.4702768	0	1
Frequency reading Newspaper	1890	0.621164	0.4852256	0	1
Household Size	6079	5.908702	2.475558	1	19
Birth Order	6079	3.445139	2.322099	1	13

Source: Author's calculation

Note: GHH=Gender of the head of household

On access to mass media, it was revealed that about 94.4%, 67% and 62.1% of rural women access and listen to the radio, watch television or read the newspaper at least less than a week, once a week, or daily which implies they access healthy information on maternal health care services.

4.3 Diagnostic Test

Before estimating the model, we conducted Multicollinearity test through use of correlation matrix and normality test which was carried out through Shapiro Wilk test.

4.3.1 Correlation Analysis

This shows the linear relationship between the dependent variable and independent variation and amongst independent variables themselves. It also shows the strength of association between the study variables. Further we can be able to detect Multicollinearity by identifying those variables which are highly correlated and either retain them if they are significant to our study and if they are not highly correlated or drop them if they pose a severe Multicollinearity or correct them. We found that there was no Multicollinearity since most correlation coefficients were below the absolute value of 0.6 as required. Appendix 1 shows those relationships.

We found out that most pairs of the variables were positively correlated. Considering the dependent variables (antenatal care –A, and hospital delivery –D, Postnatal care –P) it was found that Antenatal care was positively with other variables except wealth index, religion and mass media while the same negative association was observed by hospital delivery with religion and wealth index.

Postnatal care had negative relationship with education, gender of the head of the household, religion and wealth index. Among the independent variables, household size was negatively

correlated with education, gender of the head of the household, wealth index, marital status and mass media. Birth order was negatively correlated with education, wealth index and mass media while education was negatively associated with the gender of the household head, religion and marital status.

Gender of the head of the household was negatively associated with wealth index, marital status and mass media whereas religion is negatively correlated with wealth index, employment status and mass media. Finally, it was revealed that wealth index and marital status was negatively associated with marital status and mass media respectively.

4.3.2 Normality test

We used Shapiro Wilk test to explore the distribution of the data. We found that most variables were not normally distributed however; this could not have an impact in our estimation. Variables like sex of the head of the household, wealth index and employment status were normally distributed. However, most variables have W value more than 70% which is a cut-off point. Table 4 illustrates the study variables and their respective W values with the specific probability value.

Table 4.3: Shapiro Wilk Test

Variable	Observations	W	z	Prob>z
Antenatal care	4264	0.94460	12.712	0.00000
Hospital Delivery	1941	0.99740	2.791	0.00262
Postnatal Care	1242	0.97548	7.335	0.00000
Age	6079	0.96997	12.069	0.00000
Household Size	6079	0.94649	13.594	0.00000
Birth Order	6079	0.95305	13.248	0.00000
Education	6079	0.99205	8.562	0.00000
GHH	6079	0.99954	1.064	0.14363
Religion	6036	0.99548	7.053	0.00000
Wealth Index	3030	0.99979	-2.607	0.99544
Marital Status	5220	0.99574	6.529	0.00000
Employment Status	6056	0.99999	-8.237	1.00000
Mass media	4851	0.99136	8.194	0.00000

Source: Author's calculations

4.4 Econometric results

We conducted three probit regression models for antenatal care, hospital delivery and postnatal care as indicated by tables 4.4, 5.5 and 4.7 respectively. Since we could not be able to interpret the probit regressions, we computed their respective marginal effects as indicated by tables 4.5, 4.7 and 4.9 respectively.

Table 4.4: Probit regression results for women attending antenatal care

Variables	Coefficients	Z
Age	-0.049	-1.24
Household Size	**0**.112	0.97
Birth Order	-0.155	-1.27
Education	**0**.817	2.45
GHH	1.547	2.34
Religion	-0.341	-1.40
Wealth Index	-3.093	-3.69
Marital Status	2.166	3.43
Employment Status	**0**.877	2.26
Mass media	**0**.003	0.01
Constant	2.909	2.06
Probit regression LR chi2(11) = 76.63 Prob > chi2 =0.0000 Log likelihood = -85.612684 Pseudo R2= 0.3092		

Source: Author's computation

Table 4.5: Average Marginal Effects for women attending antenatal care

Variables	**ME**	**Z**
Age	-0.001	-1.24
Household Size	**0**.002	0.96
Birth Order	-0.003	-1.26
Education	**0**.018	2.42**
GHH	**0**.034	2.35**
Religion	-0.008	-1.41
Wealth Index	-0.069	-3.61**
Marital Status	**0**.048	3.39**
Employment Status	**0**.019	2.21**
Mass media	**0**.00006	0.01

From Table 4.5 above, we found out that the probability of a woman attending antenatal care is reduced by 0.11% as age increases. Therefore, an additional age of a rural woman discourages utilization of antenatal care services. However, age was found to be insignificant factor. Household size was found to be positively related to usage of antenatal care services whereby it increases antenatal visits by 0.25% although it is insignificant. Similarly, birth order is insignificant factor which reduces utilization of antenatal services by 0.34% holding other factors constant. Further religion and access to mass media are insignificant factors as revealed by the study whereby having a religion reduces utilization of antenatal care by 0.76% while accessing to mass media led to more usage of antenatal care by 0.006%.

It was revealed that education levels, gender of the head of the household, wealth index, marital status and employment status as the only significant factors which determined utilization of antenatal care by the rural women in Kenya. Therefore, it was shown that there was a positive relationship between education levels and usage of antenatal care. Higher educational levels significantly increases antenatal visits among the rural women by 1.81% if all other factors are held constant. On the gender of the head of the household, there was a positive relationship between head of household and antenatal care. It was specifically found that female headed households, increases utilization of antenatal care by 3.43% compared to male headed households holding other factors constant.

Wealth index which is a proxy of the income levels of the respondents demonstrated a negative relationship with usage of antenatal care services. As illustrated by Table 4.2, there were few women in high wealth quintile implying that majority could not acquire high lifestyles. The study found out that being in high wealth index reduces the probability of using antenatal care by 0.0687 that is 6.87% compared to those women who are in lower wealth quintiles. This means that those rural women with more income are less likely to utilize antenatal care services.

We further explored marital status and found out that it was significant factor with a positive relationship whereby married rural women are more likely to utilize antenatal care services compared to unmarried or single mothers. Married rural women were 4.81% more likely to utilize antenatal care compared to single mothers. This may be attributed to the support they get from their partners.

Lastly, employment status positively and significantly contributed to the utilization of antenatal care by rural women whereby working rural women were more likely to utilize antenatal care compared to those who are not working or without jobs. This factor increased

utilization of antenatal care services among employed rural women by 1.95% compared to their colleagues who are not working if all other factors were held constant.

Table 4.6: Probit results for women delivering in Hospital

Variables	**Coefficients**	**Z**
Age	0.070	3.18
Household Size	0.140	2.55
Birth Order	-0.195	-2.66
Education	0.657	4.92
GHH	0.277	1.13
Religion	-0.385	-2.59
Wealth Index	-2.562	-9.95
Marital Status	0.496	1.62
Employment Status	0.418	2.52
Mass media	1.742	2.80
Constant	-2.159	-2.48
Probit regression LR chi2(11) =256.95 Prob > chi2 =0.0000 Log likelihood = -162.9 Pseudo R2=0.4410		

Source: Author's computation

Table 4.7: Average marginal effects for women delivering in hospital

Variables	ME	Z
Age	0.014	3.31**
Household Size	0.028	2.60**
Birth Order	-0.039	-2.73**
Education	0.131	5.44**
GHH	0.055	1.13
Religion	-0.077	-2.65**
Wealth Index	-0.512	-16.17**
Marital Status	0.099	1.64
Employment Status	0.083	2.57**
Mass media	0.349	3.00**

Note: ME is the discrete change from the base level.

Source: Author's computation

Women delivering in hospital were those women who delivered in health centers or any health facility available. We considered those variables which were significant. We found that only two factors were insignificant: gender of the head of the household did not matter among rural women consuming hospital delivery services and marital status was also insignificant.

Age here was highly significant and had a positive influence whereby an additional year of the woman led to a 1.4% increase in utilization of hospital delivery, unlike in the case of antenatal care. Similarly, as household increases in size, that is an additional member of a

household is likely to increase utilization of hospital delivery significantly by 2.8% if all other factors are held constant.

Birth order on the other hand, has a negative relationship with hospital delivery. We found out that an additional birth that is (n^{th}+1) child is likely to reduce the probability of a rural woman to have a hospital delivery. An extra child, led to a 3.9% decline in utilization of hospital delivery by rural women if all other factors are held constant.

Education is highly significant factor which illustrated a positive relationship with the consumption of hospital delivery care. We found that rural women who are at higher education levels are likely to consume more hospital delivery services by 13.13% compared to those rural women who are in lower education levels that is not educated. This may be attributed to the fact that educated women are able to read and get health information more leading to consumption of health care services in general compared to those who are not educated or at the lower education levels.

We explored the impact of having a religion and revealed those rural women who were Christian, Muslim or protestant were 7.7% more likely to utilize hospital delivery services compared to those who had no religion. They had a positive relationship with hospital delivery services. Wealth index illustrated a significant negative relationship with hospital delivery whereby rural women who were on higher wealth quintiles were 51.2% less likely to utilize hospital delivery services. This is contrary to our expectations. It implies that rural women who have more incomes have less probability of utilizing hospital delivery services.

Employment status that is occupation of the rural woman significantly and positively contributes to the usage of hospital delivery services whereby those rural women who are working were revealed to be 8.34% more likely to utilize hospital delivery services compared

to their counterparts who are not working. Lastly access to mass media by rural women significantly increases usage of hospital delivery services by 34.94% if all other factors are held constant compared to rural women who lack access to mass media.

Table 4.8: Probit regression results for women attending postnatal care

Variables	**Coefficients**	**Z**
Age	**0**.060	0.99
Household Size	**0**.282	1.68
Birth Order	-0.336	-1.69
Education	**0**.309	0.92
GHH	1.397	2.25
Religion	-0.710	-2.02
Wealth index	-4.401	-4.75
Marital Status	1.375	1.94
Employment Status	**0**.864	1.84
Mass media	**0**.853	0.93
Constant	-0.004	-0.00
Probit regression LR chi2(11) =131.88 Prob > chi2 =0.0000 Log likelihood = -25.4 Pseudo R2 =0.7220		

Source: Author's computation

Table 4.9: Average Marginal effects for women attending postnatal care

Variables	**ME**	**Z**
Age	0.003	1.00
Household Size	0.014	1.78
Birth Order	-0.017	-1.77
Education	0.015	0.94
GHH	0.069	2.42**
Religion	-0.035	-2.17**
Wealth index	-0.216	-7.76**
Marital status	0.068	2.08**
Employment status	0.042	1.99**
Mass media	0.042	0.82

Note: ME is the discrete change from the base level.

From Table 4.8, we found out that age, household size, birth order, education levels and mass media (frequency of listening to radio or watching television) were not significant factors which determine utilization of postnatal care among rural women in Kenya.

However, the study identified gender of the head household, religion, wealth index; marital status and employment status of the rural woman as significant factors which determined the utilization of postnatal care services.

A female headed household was found to have a positive relationship with utilization of postnatal care services. If household was headed by a female, a rural woman was 6.86% more likely to use hospital delivery services compared to male headed household. This may be attributed to the fact that female do not like taking risks compared to the male counterparts. Religion was also found to be significantly related to postnatal care usage although the relationship was negative. Those women who have religion reduce utilization of postnatal care services by 3.49% compared to women who had no religion if all factors were held constant.

Similarly to religion, wealth index was found to be significant and negatively associated with usage of postnatal care services whereby rural women in higher wealth index reduce by 21.62% if all other factors were held constant. Rural women in the higher income levels were less likely to utilize postnatal care. On the other hand, married rural women increased the usage of postnatal care services significantly by 6.75% if all factors were held constant compared to the single women usually referred to as single mothers.

Finally, on occupational status, rural women who are working increased utilization of postnatal care services by 4.24% compared to those women who are not working keeping other factors constant. This may be due to availability of resources which may enable them to access the services.

4.5 Further Discussions of the Results

It was found out that age was significant factor which led to an increase in consumption of only hospital delivery care as found by Fiedler, (1981) and Fosu, (1994) who argued that women's current age plays an important role in the utilization of medical services. This positive relationship was postulated in our prior predictions and supported by Grossman (1972) model whereby it was claimed that as one advances in age, more medical attention is needed. Further the older mothers tend to demand more delivery and postnatal care as suggested by Rahman, (2009). This may be attributed to either complication which the older mothers might have gone through in earlier births (Begun et al., 2010).

Size of the household or the number of household members significantly influenced rural women into consuming hospital delivery compared to antenatal care and postnatal care. This was also a positive relationship whereby an additional member of the household led to increase in the probability of a pregnant rural women delivering at the hospital.

Birth order was explored among the three indicators of maternal utilization whereby it was found to have a significant negative relationship only with hospital delivery. An additional child by a rural woman is likely to decrease the probability of utilizing hospital delivery compared to the first child. This study concurs with studies by Wong et al., (1987) and Elo, (1992). They found that having more children may also cause resource constraints, which have a negative effect on health care utilization which implies that subsequent children. Because of perceived risk associated with first pregnancy, the author's claimed that a woman is more likely to seek maternal health care services for first birth than subsequent births. Further, Machio (2008) her study suggests that women who have more children already and those from rural areas have low utilization of antenatal services. The study concluded that

rural women were more likely to have low utilization which could be attributed to poor infrastructural facilities like transport facilities and poor knowledge.

Education was revealed to influence utilization of maternal health care services that is antenatal care and hospital delivery positively. These significant relationships increase the probability of utilizing these maternal health care services. Our findings concurs with the findings by Govindasamy and Ramesh (1997) and the study by Caldwell (1979) who found out that higher levels of education that is literacy contributes positively to utilization of maternal healthcare services. Also, study conducted by Becker, et al., (1993) found out that mother's education is not only the most consistent but also important determinant of the use of child and maternal health services. Further, Njaramba (1994) concluded that increasing levels of education and income on the other hand increases utilization of these services.

Gender of the household head demonstrated significance to utilization of antenatal care services and postnatal care services positively. Households headed by female has increased probability of utilizing antenatal care as well as postnatal care services compared to male headed households. This may be due to lack of maternal knowledge among male heads of households since female head of households with maternal knowledge helps them to put a lot of importance to the consumption of maternal health care services. These findings concurs with the study conducted by Mugilwa (2002) who explored the demand for healthcare in Kenya and found out that women headed-households tend to seek health care services better than men-headed ones.

Religion had a negative significant influence on both utilization of hospital delivery and postnatal care. Rural women who are either Christian or Muslim decreases the probability of utilizing hospital delivery and postnatal care compared to rural women who have no religion. According to studies by Shariff and Singh (2002) observed that Muslims have low utilization

of maternal healthcare services. However, on the contrary, Overbosch et al, (2004) they found out that religion has no significant role in determining utilization of these maternal services.

Among the three indicators for utilization of maternal health care services, it was revealed that wealth index significantly affect all indicators. Wealth index has a negative relationship with maternal health care services in general. This implies that as rural woman receive more income, they tend to significantly reduce consumption of antenatal care, hospital delivery and postnatal care. Also study by Mugilwa (2002) found out that income; greatly determine utilization of healthcare. This concurs with the findings by Mwabu, et al., (1993) who as well found that income affect demand for medical care positively.

Marital status was revealed to significantly increase antenatal and postnatal care which concurs with the study carried out by Chepkoech (2003) which focused on the demand for antenatal and obstetric care services in the slums of Nairobi, whereby it was found out that marital status had a positive effect on demand for antenatal and obstetric care services. Also, Machio (2008) confirmed a positive relationship between marital status and the use of antenatal care services among women in Kenya.

Employment status similar to wealth index increases both antenatal care, hospital delivery and postnatal care significantly. This is an important factor which determines the capacity of the rural women to pay for the maternal health services. A study by Machio (2008) focused on demand for maternal health care services in Kenya and concurs with our findings whereby it was found out that employment had a positive relationship with the use of antenatal care services.

Access to mass media by rural women in Kenya significantly increased utilization of hospital delivery compared to those who did not have access to mass media. According to the study by Kistiana, (2009), it was found that women who access more health information through electronic and print media is likely to have better utilization of healthcare services compared to their counterparts who lack access to mass media. Radio, newspapers and television are current devices with health information Shariff and Singh, (2002).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings of the study in relation to the determinants of maternal health care services by rural women in Kenya. The chapter further makes decisive conclusions based on the established relationship between determinants for utilization of Antenatal health care services, hospital delivery and postnatal care services across rural Kenya and thereafter draw major recommendations. Further areas of research are captured later in filling the gaps.

5.2 Summary of the study results

The women's health is one of the important non-income indicators of poverty which implies that to reduce poverty we have to improve the health of women. In this study we refer maternal health as the health of women during pregnancy, during childbirth and the postpartum period. In the absence of complications, pregnancy should be a simple and natural process that requires little external intervention. In order to reduce the health risk of both the mother and the baby, there is need to increase utilization of healthcare services before delivery, during delivery since that is where proper medical attention and hygienic conditions exist and after delivery process.

This study has been conducted with the main objective of investigating the factors influencing utilization of maternal health care services by rural women in Kenya. The study has utilized Kenya demographic and household survey (KDHS) of 2008, whereby study variables were identified and cleaned. Necessary tests were carried out leading to estimation of three binary

probit models in establishing the relationship of independent variables with dependent variables (antenatal care, hospital delivery and postnatal care).

It was found that age of the individual, size of the household members and birth order are significant factors which influence utilization of hospital delivery. Age and household size increases consumption of hospital care while birth order decreases usage of hospital care. Education was found to significantly determine utilization of both antenatal care and hospitals care whereby in both cases, it increases the usage.

Similar to education, Gender of the head of the household also influences usage of Antenatal care and postnatal care positively and significantly. On the other hand, those rural women who had religion (Christians, Muslims and Protestants) significantly reduce utilization of both hospital delivery and postnatal care whereas women in higher wealth index had lower utilization of both antenatal care, hospital delivery and postnatal care.

The study further found out that marital status led to increase in utilization of antenatal care and postnatal care while employment status positively and significantly influence utilization of both antenatal care, hospital delivery and postnatal care. Finally, it was established that mass media positively and significantly influences usage of hospital delivery among rural women.

5.3 Conclusions

The fifth Millennium Development Goal is meant objectively to reduce maternal deaths by three quarters by 2015 and thus achieve maternal mortality ratio (MMR) of 54 per 100,000 live births. To realize this among the rural women in Kenya, the government needs to consider factors which lead to utilization of antenatal care (education levels, gender of the household head, wealth

index, marital status and employment status); hospital delivery include considering factors like age, household size, birth order, education levels, religion, wealth index, employment status and access to mass media. Under postnatal care services, it includes considering the gender of household head, religion of the rural women, wealth index, marital status and employment status.

5.4 Policy Recommendations

The Government of Kenya, on June 2013 initiated a policy of free maternity services in all public facilities to eliminate the financial burden of delivery for all Kenyan mothers. This was meant to ensure that mothers were not charged for delivering in public health facilities and thus promote and improve hospital deliveries.

In this light, to improve utilization of maternal health services in Kenya, we recommend to the government to encourage rural women who have ability to pay for maternal care services by introducing health insurance services focusing on women. Rural women on higher wealth quintiles should consider increasing probability of using any maternal health services.

Family planning should be encouraged to reduce the number of children born by a single mother in order to improve usage of hospital delivery by rural women in Kenya. The government should consider involving faith based organizations (Christians and Muslims) in creating awareness and the benefits of utilizing hospital delivery and postnatal care services.

5.5 Areas for further study

In this study we mainly considered determinants of maternal health care services among rural women in Kenya. However, more studies are necessary in exploring the relationship between maternal mortality and the place of child delivery among rural women in Kenya. Further studies

should also focus on the impact of public health expenditures on utilization of maternal health care services among the rural women in Kenya.

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Appendix One: Correlation Matrix

Variables	A	D	P	age	Household size	Birth order	education	GHH	Religion	Wealth index	Marital status	Employment status	Mass media
age	0.0083 ***0.5888***	0.1307 ***0.0000***	0.1177 ***0.0000***	1.0000									
Household size	0.0165 ***0.2822***	0.1035 ***0.0000***	0.1414 ***0.0000***	0.3202 ***0.0000***	1.0000								
Birth Order	0.0046 ***0.7621***	0.0206 ***0.3650***	0.1418 ***0.0000***	0.7273 ***0.0000***	0.5091 ***0.0000***	1.0000							
Education	0.0273 ***0.0747***	0.1952 ***0.0000***	-0.0279 ***0.3257***	0.0138 ***0.2812***	-0.1774 ***0.0000***	-0.2589 ***0.0000***	1.0000						
GHH	0.0144 ***0.3476***	0.0232 ***0.3065***	-0.0116 ***0.6841***	0.0131 ***0.3063***	-0.1470 ***0.0000***	0.0035 ***0.7856***	-0.0607 ***0.0000***	1.0000					
Religion	-0.0406	-0.1554	-0.0311	0.0016	0.0250	0.0500	-0.2415	0.0344	1.0000				

	0.0081	***0.0000***	***0.2744***	***0.9002***	***0.0521***	***0.0001***	***0.0000***	***0.0075***				
Wealth index	-0.2257 ***0.0000***	-0.5171 ***0.0000***	-0.7464 ***0.0000***	-0.0492 ***0.0068***	-0.4172 ***0.0000***	-0.3984 ***0.0000***	0.6023 ***0.0000***	-0.0893 ***0.0000***	-0.1437 ***0.0000***	1.0000		
Marital status	0.0744 ***0.0000***	0.0656 ***0.0079***	0.0832 ***0.0068***	0.2342 ***0.0000***	-0.0288 ***0.0372***	0.2799 ***0.0000***	-0.1274 ***0.0000***	-0.1804 ***0.0000***	0.0940 ***0.0000***	-0.1131 ***0.0000***	1.0000	
Employment status	0.0198 ***0.1958***	0.1445 ***0.0000***	0.0452 ***0.1115***	0.1733 ***0.0000***	0.0093 ***0.4714***	0.0971 ***0.0000***	0.2228 ***0.0000***	0.0094 ***0.4632***	-0.2081 ***0.0000***	0.1280 ***0.0000***	0.0123 ***0.3770***	1.0000
Mass media	-0.0345 ***0.0467***	0.0124 ***0.6043***	-0.0904 ***0.0053***	0.0076 ***0.5970***	-0.1034 ***0.0000***	-0.1766 ***0.0000***	0.3084 ***0.0000***	-0.0519 ***0.0003***	-0.0130 ***0.3674***	0.5794 ***0.0000***	-0.0615 ***0.0001***	0.0373 ***0.0094***