DETERMINANTS OF MATERNAL HEALTH CARE SERVICES IN KENYA

BY

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DECLARATION

This research project is my original work and has not been presented for research in any other University.

Signed……………………………………………. Date………………………………..

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X50/60681/2013

This research project has been submitted for presentation with our approval as university supervisors

Signed……………………………………………. Date………………………………..

Dr. Martine Oleche

DEDICATION

I dedicate this thesis to my late grandmother, who believed in the power of Education despite not having received any formal education in her life

ACKNOWLEDGEMENTS

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ABBREVIATIONS AND ACRONYMS

AIDS   Acquired Immune Deficiency Syndrome

ANC   Antenatal Care

CIDA   Canadian International Development Agency

CSBA   Community Based Skilled Birth Attendants

HIV   Human Immunodeficiency Virus

KDHS   Kenya Demographic and Health Survey

MDG5   Millennium Development Goal 5

MDGs   Millennium Development Goals

MMR   Maternal Mortality Ratio

MNCH   Maternal, Neonatal and Child Health

MPS   Making Pregnancy Safe

PMTCT   Prevention of Mother To child Transmission

TBAs   Traditional Birth Attendants

UNFPA   United Nation Fund for Population Activities

WHO   World Health Organization

WMS   Welfare Monitoring Survey

DEFINITION OF TERMS

Maternal Mortality is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO, 2011).

Maternal Morbidity is defined as chronic and persistent ill-health occurring as a consequence of complications of pregnancy and childbirth (Ogunjuyigbe &Liasu, n.d.)

Postnatal Care is healthcare provided following childbirth to both mother and infant.

Skilled Birth Attendance is the process by which a woman is provided with adequate care during labour, delivery and the early postpartum period (Graham et al, n.d.).

Skilled Birth Attendant is an accredited health professional such as a midwife, doctor or nurse WHO has been educated and trained to proficiency in the skills needed to manage normal uncomplicated pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns (WHO, 2004).

ABSTRACT

Maternal mortality are limiting Africa's development. This study explored three main indicators for maternal health status that is the antenatal care, skilled attendance at birth and postnatal care. This study has been conducted with the main objective of determining the factors influencing utilization of maternal health care services in Kenya. Hypotheses were tested at 1%, 5% and 10% significance level upon estimating the probit models on antenatal care, hospital delivery and postnatal care respectively. A national representative data (Kenya demographic and household survey-KDHS, 2008) was used. From the study result, age of the mother, secondary education, more than secondary education, birth order, richer wealth quintile, richest wealth quintile and access to information were significant factors which influence utilization of antenatal care. Hospital delivery was shown to be influenced significantly by age, primary education, secondary education, more than secondary education, birth order, residence, and all wealth indexes, access to information. On the other, primary education levels and secondary education levels were shown to be statistically significant in influencing postnatal care. Analysis across and within the models indicate that education significantly determine utilization of the three models antenatal care, hospital delivery and postnatal care whereby in all cases, it increases the usage. Similar to education, age of the mother also influences usage of Antenatal care and hospital delivery positively and significantly. Finally, the study found out that access to information positively and significantly led to increase in utilization of antenatal care and hospital delivery while birth order reduces the usage of both antenatal and hospital delivery. To improve the effectiveness of the policy, the government needs to introduce more health care facilities to maintain consumption of these services (Antenatal and hospital delivery). Since all levels of education improved utilization of these services, there is need for the government to introduce more institutions to increase knowledge and consequently knowledge on usage of these services. There is also a need for family planning among mothers which encourages the respondents to reduce the number of children born by a single mother in order to improve usage of hospital delivery. Finally, messages through other modes of communicating are important as they are shown to accelerate usage of health care services.

CHAPTER ONE

INTRODUCTION

1.1 Background

Maternal health refers to the health of women during pregnancy, childbirth, and the postpartum period. It includes the health care dimensions of family planning, preconception, prenatal, and postnatal care in order to reduce maternal morbidity and mortality (WHO, 2010).

The health care that a mother receives during the time of pregnancy, at the time of delivery, and soon after delivery is important for the survival and well-being of both the mother and her child. Maternal health (MH) is therefore a very important issue as women strive to fulfill their potential as individuals, mothers and family members, and also as citizens of a wider community. At the individual level, women's poor health causes lack/loss of employment, leading to poor income. This contributes to women's persistent poverty and lack of empowerment. Poor maternal health can also have huge costs on families in emotional, health and economic terms. It is well documented that maternal morbidities and mortalities directly affect the survival and well-being of children and also contributes to poor family relationships (UNFPA, 2005).

Maternal deaths have been reduced globally, including on the African continent, but not sufficiently to make a significant improvement towards the MDG targets for maternal mortality. A woman in Africa, south of the Sahara has a 1 in 39 chance of dying in pregnancy or childbirth, compared to a 1 in 3,800 risk in developed countries. Leading causes of maternal deaths are related to obstetric complications around the time of childbirth, and three-quarters of those deaths and significant morbidity can be prevented by access to a full continuum of quality maternal health services. Nevertheless, access to and utilization of services such as family planning, antenatal care and skilled delivery at birth is still low (UNFPA, 2010)

Complications of pregnancy and childbirth are a leading cause of maternal morbidities and mortalities for women of reproductive age (15 – 49 years) in developing countries. The WHO

estimates that over 500,000 women and girls globally die from complications of pregnancy and childbirth each year with approximately 99% of these deaths occurring in developing countries. Maternal death and subsequent child death is associated with a loss of productivity leading to an estimated global economic loss of about US$ 15 billion (USAID, 2009). Hence, maternal health also has developmental consequences beyond its more obvious health ones

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. In some rural areas of Africa and South Asia, of every two women who die, one dies from pregnancy related causes (Royston and Armstrong, 1989)

Based on the United Nations Population Fund (UNFPA) 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 still records very high maternal mortality rates as well as low access to reproductive health (Republic of Kenya, 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 (WHO, 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. The Health Policy Paper of 2012 indicates that most maternal deaths are caused by hemorrhage 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. According to the Research Agenda on Population and Development in Kenya (2006), each minute, a woman dies at childbirth in the developing countries. The report further says that in Kenya, childbirth claims many mothers daily (Republic of Kenya, 2006)

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% (MDG status report for Kenya, 2011). 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 (Republic of Kenya, 2011)

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, 2001).

A number of studies have identified access to maternity health services as a key indicator for reducing maternal mortality in developing countries. According to Making Pregnancy and Childbirth Safer (fact sheet), 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. The situation is worse in developing countries due to inadequate access to modern health services and poor utilization (WHO, 2012)

The World Health Organization indicates that equitable access to quality and integrated health services for mothers, newborns, children and adolescents is critical for the achievement of the Millennium Development Goals (MDGs). 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 (WHO, 2012)

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 at this level is to contribute to the empowerment of women, families and communities to improve and increase their control over maternal and newborn health, as well as to increase the access and utilization of quality health services, particularly those provided by the skilled attendants (WHO,2012)

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 (Republic of Kenya, 2009)

Kenya has introduced free maternal health services in public hospitals from June 2013. The government made budgetary allocation in 2013/14 financial year for free maternity and prenatal care to mothers giving birth in public health institutions with an aim of reducing maternal and prenatal mortalities. In addition, the government also waived the charges for registration. This move by the jubilee government will improve maternal health, as most

mothers will now deliver under skilled care. It will also lead to a reduction in birth-related complications such as hemorrhage and obstructed labor (Republic of Kenya)

1.2 Trends of Maternal mortality across regions

According to the 2010 United Nations Population Fund report, developing nations account for ninety-nine percent of maternal deaths with majority of those deaths occurring in Sub-Saharan Africa and Southern Asia. Globally, high and middle income countries experience lower maternal deaths than low income countries. The Human Development Index (HDI) accounts for between 82 and 85 percent of the maternal mortality rates among countries. In most cases, high rates of maternal deaths occur in the same countries that have high rates of infant mortality. These trends are a reflection that higher income countries have stronger healthcare infrastructure, medical and healthcare personnel, use more advanced medical technologies and have less barriers to accessing care than low income countries. Therefore, in low income countries, the most common cause of maternal death is obstetrical hemorrhage, followed by hypertensive disorders of pregnancy, in contrast to high income countries, for which the most common cause is thromboembolism (UNFPA, 2010)

At a country level, India (19% or 56,000) and in Kenya (14% or 40,000) accounted for roughly one third of the maternal deaths in 2010. Democratic Republic of the Congo, Pakistan, Sudan, Indonesia, Ethiopia, United Republic of Tanzania, Bangladesh and Afghanistan comprised between 3 to 5 percent of maternal deaths each. These ten countries combined accounted for 60% of all the maternal deaths in 2010 according to the United Nations Population Fund report. Countries with the lowest maternal deaths were Estonia, Greece and Singapore (UNFPA, 2010)

In the United States, the maternal death rate averaged 9.1 maternal deaths per 100,000 live births during the years 1979-1986, but then rose rapidly to 14 for every 100,000 patients in 2000 to 24 per every 100,000 patients in 2008. According to the Center for Disease Control and Prevention, approximately 650 women die in the United States each year as a result of pregnancy and delivery complications. There are significant maternal mortality intra country variations, especially in nations with large equality gaps in income and education and high healthcare disparities. Women living in rural areas experience higher maternal mortality than women living in urban and suburban centers because those living in wealthier households, having higher education, or living in urban areas, have higher use of healthcare services than

their poorer, less-educated, or rural counterparts. There are also racial and ethnic disparities in maternal health outcomes which increases maternal mortality in marginalized groups Trends in antenatal and delivery care in Kenya (UNFPA, 2010)

Trends in Maternal Health care in Kenya

The figure 1 below summarizes the trends in key maternity care indicators between the 2003 and the 2014 KDHS.

Figure 1: Trends in Maternal Health Care services in Kenya
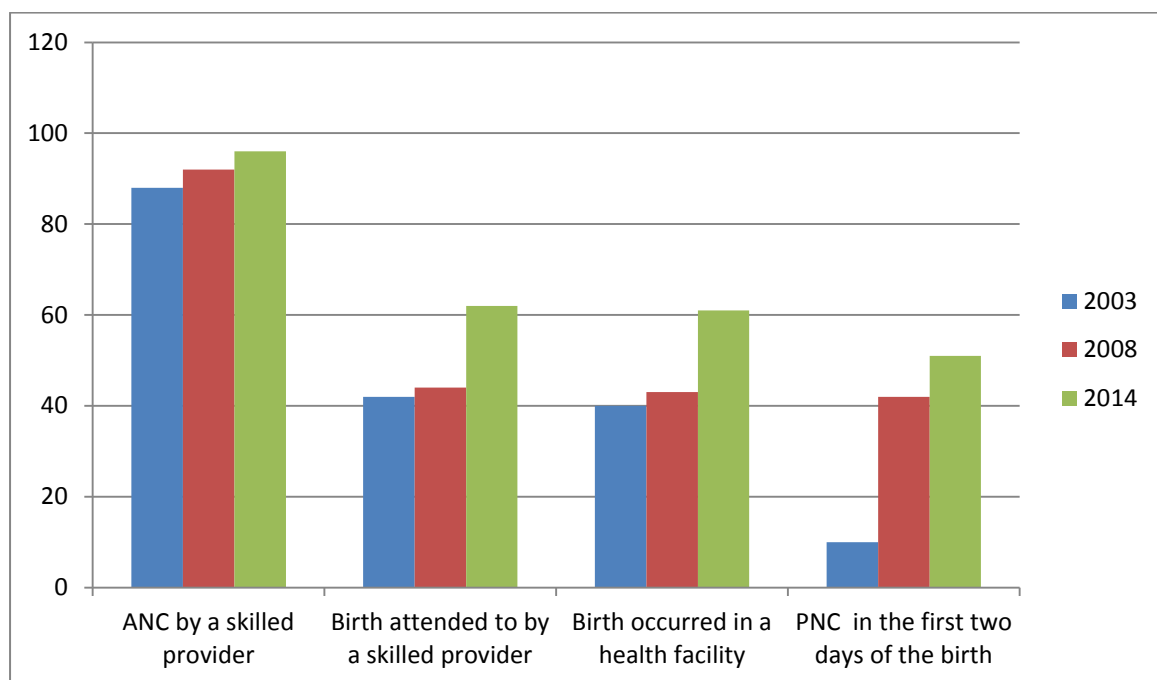
Source: KDHS, 2014

The figure above shows that the proportion of mothers reporting ANC from a health professional increased between 2003 and 2014, from 88 percent to 96 percent.Skilled assistance during delivery has increased from 42% in 2003 to 62% in 2014.Facility-based deliveries have increased from 40% in 2003 to 61% in 2014. The percentage of mothers receiving post natal care increased from 10 percent in 2003 to 50 percent in 2014.The MDG target for ANC by skilled provider is 100%. Kenya is close to reaching this goal. The MDG target for skilled assistance during delivery is 90%. Kenya has not reached this MDG target.

1.3 Problem Statement

Maternal, newborn and child mortality and morbidity are limiting Africa's development. Preventable maternal mortality and morbidity are pressing human-rights issues that violate a woman's rights to health, life, education, dignity, and information. Response to maternal morbidity and mortality should include implementation of specific legal and ethical obligations such as the establishment of effective mechanisms of accountability (i.e., maternal death audits or reviews).

High maternal mortality rates are an indication of poorly functioning health systems. According to the World Health Organization, A woman's chance of dying or becoming disabled during pregnancy and childbirth is closely connected to her social and economic status, the norms and values of her culture, and the geographic remoteness of her home. The poorer and more marginalized a woman is, the greater her risk of death. Maternal mortality rates reflect disparities between wealthy and poor countries more than any other measure of health (WHO, 2008). 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).

Maternal health care plays an important role in maternal mortality reduction, especially antenatal care, skilled attendance at birth and postnatal care (Machio, 2008). Maternal health care use in Kenya has improved but is not adequate specifically the proportion of women who make four antenatal care visits, who deliver at health facility and who receive postnatal care. These impedes the progress toward achieving the vision 2030 maternal mortality target of less than 200 per 100,000 live births as well as the millennium development goal five (Machio, 2008). The government in Kenya implemented free maternal care in June 2013 in order to enhance utilization of maternal healthcare services. Similarly, there has been other initiative aimed at increasing utilization of maternal health services. However, despite these initiatives, utilization of maternal care services still remains low

Despite its commitment to maternal health care, Kenya continues to make slow progression with this regard. With a maternal mortality rate of 488 deaths per 100,000 live births, the country is off track in achieving the UN Millennium Development Goal numbers four and

five by 2015. Kenya had committed to reduce these deaths to 147 per 100,000 live births by 2015.

Based on the above discussions, it is clear therefore that there is low utilization of maternal healthcare services in Kenya which could be having adverse effect on the maternal mortality and morbidity rate. This study seeks to analyze the profiles of maternal health care services in Kenya and explore the determinants of the demand for maternal healthcare service utilization in Kenya using data drawn from 2008 Kenya Demographic and Health Survey (KDHS).

1.4 Objectives of the study

The broad objective of this research is to investigate the main factors determining utilization of maternal healthcare services in Kenya.

The specific objectives of this study are to:

i.   Examine the profiles of maternal healthcare services in Kenya
ii. Examine the determinants of maternal healthcare services in Kenya

1.5 Significance of the study

This study is beneficial to scholars as it adds to the existing knowledge on maternal health care services in Kenya, the main determinants of the demand of the maternal health care services and their role in development agenda. It also contributes to existing literature in addressing future research problems.

Policy makers are expected to use this study to evaluate the impact of the government interventions on the main components of maternal health care services with an aim of improving the quality and access to maternal health care services in Kenya. The study therefore is useful for evaluating existing policies that assists in developing clear and relevant policies that are aimed at reducing maternal mortalities and morbidities.

The study may also assist the government in budgeting process as it forms the basis of determining how resources should be allocated to our health deliveries with the aim of reducing maternal deaths while promoting economic growth and development.

Finally, with the implementation of free maternal health care in all government facilities, this study may assist policy makers in the jubilee government to develop a comprehensive policy

framework to guide the implementation. It is my sincere hope that this paper catalyzes action and accelerate the attainment of national and international commitments to maternal and child health targets.

1.6 Organization of the study

The paper is organized in three chapters; chapter one is covering basic introductory and background issues, the statement of the problem, the research questions, the research objectives and significance of the study. Chapter two provides literature review based on study objectives. Chapter three presents the conceptual framework and methodology used. Chapter four and five presents results and discussions and chapter five is the summary, conclusions and policy considerations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Literature Review

The socio-behavioral or Andersen model (Andersen & Newman, 1973) groups in a logic sequence three clusters or categories of factors (predisposing enabling and need factors) which can influence health behavior. The model was specifically developed to investigate the use of biomedical health services. In Anderson and Newman model, an individual access to and use of health care services is considered to be a function of three categories of factors. Predisposing factors such as age, gender, religion, global health assessment, prior Experiences with illness, formal education, general attitudes towards health services, knowledge about the illness among others. Enabling factors such as availability of services, financial resources to purchase services, health insurance, and social network support among others. Need factors include perception of severity, total number of sick days for a reported illness, total number of days in bed, days missed from work or school, help from outside for caring among others (Andersen & Newman, 1973)

Andersen's model has been modified in the International Collaborative Study on Health Care. In addition to the predisposing factors and enabling factors, this version includes Health Service System factors, referring to the structure of the health care system and its link to a country's social and political macro-system. This is a valuable extension as it puts emphasis on the link of health-seeking behavior with structural levels within a macro-political and economic context. However, the model omits the 'need factors which are central for understanding health-seeking behavior (Weller et al., 1997).

A further variant of Andersen's model was elaborated by Kroeger (1983). Based on a extensive and well-elaborated literature revision, he proposed the following framework; – Interrelated explanatory variables, all of which are affected by perceived morbidity, An individual's traits or predisposing factors such as age, sex, marital status, status in the household, household size, ethnic group, degree of cultural adaptation, formal education, occupation, assets (land, livestock, cash, income), social network interactions, Characteristics of the disorder and their perception: chronic or acute, severe or trivial, etiological model, expected benefits or treatment (modern versus traditional), psychosomatic versus somatic

disorders. Characteristics of the service (health service system factors and enabling factors): accessibility, appeal (opinions and attitudes towards traditional and modern healers), acceptability, quality, communication, costs. The interaction of these factors guides the election of health care resources (Kroeger ,1983).

The literature suggests that the use of Maternal Health Care Services in developing countries can be influenced by factors such as the socio-demographic characteristics of women; culture; and availability and accessibility of the services (Mekonnen & Mekonnen, 2002). Various studies in the literature indicate an association between factors such as income, education, ethnicity, religion, culture, age, parity and decision-making power to utilization of Maternal Health Care Services. Majority of the research publications reviewed were of quantitative studies seeking to identify statistical associations between these factors and MHCS use (Abbas & Walker, 1986) Very few qualitative studies were accessed and were found mainly to assess women's perceptions and barriers to seeking maternal healthcare services (Lubbock & Stephenson, 2008; Mrisho et al., 2008). More educated mothers are more likely to have better health, which genetically leads to better health for their children (Behrman and Wolfe, 1987a; Wolfe and Behrman, 1987, b) 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 et al., 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 this 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 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:

$$H^P = f(M_h, X_h, T_h) \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (2)$$

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 et al., 1988).

2.2 Empirical Literature Review

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 et al., 2000).

It is well recognized that mother's education has a positive impact on health care utilization. In another study, Becker and colleagues (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. 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. (Fosu, 1994; Costello *et al*., 1996)

It is well known that increased income has a positive effect on the utilization of modern health care services. 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 (Elo, 1992).

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, 2003; Ortiz, 2008; Rahman, 2009).

Another important factor determining utilization of healthcare services is the income of the household. 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& Singh, 2002).

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 other 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.

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.

Manishimwe (2011) investigates the determinants for maternal health care in Rwanda using 2005 Rwanda demographic and health survey data. She analysis the determinants of antenatal care visits, the timing of first antenatal care check up and delivery care using multinomial logit model and probit model to analyze postnatal care utilization. The result showed that education of wife and husband, income, medical insurance, age and living in urban areas influences positively the utilization of maternal health care services, whereas being a working mother and birth orders hampers it.

In 1993, Mwabu et al 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 (Mwabu et al,1993).

Njaramba (1994) investigated the utilization pattern of antenatal care in the then Thika district. She used national sample survey and evaluation programme (NASSEP) of the central bureau of statistics to classify the population into clusters. She used two stage random sampling. In the first stage eight clusters were selected from fourteen NASSEP list framework using random number tables. In the second stage 128 household were selected from the 8 clusters using random number tables. She estimated an ordinary least square model. The study result revealed that distance and cost of services reduces use of antenatal services. Utilization of antenatal care reduces with the number of children whereas insurance and quality of service increase use. Only large increase in income increases use of antenatal care therefore income is likely to have influence on antenatal use in the long run. Being married family size and the age of the mother increases use of antenatal care (Njaramba, 1994).

Another study by Levi 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 (Levi Mugilwa, 2002).

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.

Machio (2008) using the 2003 Kenya Demographic and Health Survey investigates the factors that influences the use of various maternal health care services in Kenya. She estimates five models to that effect; three probit models to analyze the determinants of antenatal, post natal and delivery care services, a poison count data model to analyze the determinants of number of antenatal visits and a multinomial logit model to analyze the influences demand of antenatal care, skilled delivery care services as well as the number of antenatal care visits. As wealth increases so does the probability of using these services. Education of both the women and the husbands increases the demand for postnatal, delivery care and antenatal services as well as the early timing of antenatal visits. Being employed positively influences use of antenatal and post natal care; it however has no impact on use of delivery care and number of antenatal visits as well as timing of antenatal visits. While increase in the age of the mother has positively influences use of antenatal care, post natal care, no of antenatal visits and timing of antenatal visits, it reduces use of skilled delivery services.

Owino (2001) sought to identify the factors that either enhances or constrain the utilization of maternal health services in the former Nyanza province. The study used primary data collected from two villages randomly selected from two divisions of Homabay County. This was supplemented by an in depth interview with the health providers and the traditional birth

attendants. The study used logistic regression to estimate the likely hood of utilization of a given MHCS given a set of social-economic, demographic and exposure factors. The focus of the study was on place of delivery and use of antenatal services. The result showed the factors that were significantly associated with place of delivery and use of antenatal services were: total children ever born; age of the mother; maternal and paternal education; household and economic status, place of residence, use of family planning; number and timing of antenatal checks and the quality of antenatal care received.

2.3 Overview of Literature

Studies conducted indicates that female education, age of the mother, distance to the health facility, quality of the service offered, place of residence, marital status, birth order, number of children, income, occupation of the husband are some of the factors that influence use of maternal health care services.

Utilization of healthcare services of any nature implies consumption where utility is expected to be maximized. Here, a mother derives utility through consumption of healthcare services and other goods subject to her budget constraints and her ability to produce. According to Grossman (1972) education, cost of the service, income and age of the mother are considered important determinants of healthcare demand.

Empirical studies found socio-economic and demographic characteristic of a mother to influence maternal health care demand. Urban women have been observed to demand more maternal health care services than their counterparts in the rural areas. This is due to the advantage urban residents have regarding access to the health facility and various health promotion programs. Previous studies have found utilization of maternal healthcare services to be affected by certain factors. Physical accessibility to health facilities is negatively related to utilization of these services (Njaramba J. 1994; Mugilwa, 2002; Magadi et al 2000). Others factors which affect utilization negatively include age, religion, birth order, and user fees, (Mwabu, 1993). On the other hand, education, access to information, income, and quality of healthcare received to influence utilization positively (Govindasamy& Ramesh, 1997; Machio, 2008; Mwabu et al., 1993; Njaramba, 1994;)

Kenya Demographic and Health Survey (2014) shows that even though use of antenatal services remain high, only 58% of women make more than the recommended 4 visits with

only 11% starting to use antenatal services in the first trimester of the pregnancy (KDHS, 2014).

Most of these studies have been focused on certain geographical areas using primary data collected at source. Only few of the studies have focused on the entire country using the Kenya national Demographic and Health Survey. This study aims to use the 2008 demographic and health survey to find out whether there is significant positive changes despite the many intervention by the government through the ministry of health

CHAPTER THREE

METHODOLOGY

3.1 Theoretical model

Maternal health care demand in this study is based on the theory of consumer behavior. In the theory of consumer behavior, a rational consumer will allocate his income among different competing needs so as to maximize his utility. In this study a mother is assumed to maximize the benefits of utilizing maternal health services subject to her health production function and the budget constraints. This study uses theoretical model formulated by Machio 2008 in the model she assumed a mother maximizes a utility function given as

$$U=f(X,Y,H)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\text{ (3)}$$

Where U is the utility derived by the mother, X is the consumption goods and Y is the health related goods and H is health status of the mother and the child(maternal health care). The mother strives to maximize this utility function subject to a budget constraint and health production function. The budget constrain is stated as follows

$$I= XP_x+YP_y+MP_m\dots\dots\dots\dots\dots\dots\dots\dots\text{ (4)}$$

Where I is the exogenous income, M is the maternal health care and P_x, P_y, P_m are the prices of consumption good (X), health related good (Y) and maternal health care (M) respectively. The health production function is given by

$$H=f(Y,M,Z)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\text{ (5)}$$

Where Y, M are as defined above and Z are the socio-economic and demographic characteristics of the mother such as age, birth order, income, place of residence, education

Using equation (3),(4), and (5) we can express the lagragian function as follow;

$$L= f(X,Y,H)+\lambda_1 \{(H-f(Y,M,Z)\}+\lambda_2 \{ I- XP_x–YP_y-MP_m\}\dots\dots(6)$$

Solving equation (6) generates the reduced form demand function for maternal health care service

Dm= f (P_x, P_y, P_m, I, Z) …………………………….(7s)

Where Dm is the demand for maternal health care services, P_x, P_y, $P_{m,}$ I and Z are as defined above. This implies that maternal health care demand depends on price of goods and services, social economic and demographic characteristics of the mother.

Table 3.1: Definition of variables

VARIABLES	DEFINITION	EXPECTED SIGN
DEPENDENT VARIABLES		
Antenatal care (A)	This will be coded as: A=1 if a mother attends antenatal clinics and A=0 otherwise.	
Delivery care (D)	Delivery care will be coded 1 for hospital delivery and 0 otherwise.	
Postnatal care (P)	This will be coded as: P=1 if a mother attends postnatal clinics and P=0 otherwise.	
INDEPENDENT VARIABLES		
Age of the mother at birth	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: 1= no education 2= primary incomplete 3=primary complete 4= secondary+	Positive
Residence	Urban =1 Rural= 0	Negative
Wealth quintile	A dummy variable measured as: Poorest=1, 0 otherwise Poorer=1,0 otherwise Middle=1, 0 otherwise Rich=1,0 otherwise Richest=1, 0 otherwise	Positive
Religion	A dummy variable measured as:	Negative

VARIABLES	DEFINITION	EXPECTED SIGN
	0= (base variable, Not religion) 1= protestants and other Christians 2= Muslims	
Birth order	A continuous variable measured by the number of children a mother has	Negative
Access to information through mass media	A dummy variable measured as: 1= mass media 0= no mass media	Positive

3.2 Econometric model

3.2.1 Model specification

This study used probit model to analyze the determinants of utilization of maternal healthcare services since the dependent variable is a dummy. It is a type of regression where the dependent variable can only take two values. 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). Probit model limit the values of the regressor between zero and one which is realistic for probability values. The estimation of this model is done using Maximum Likelihood estimation techniques.

This study analyses maternal health care demand looking at antenatal care, delivery care and post natal care. It intends to estimate the probability that a mother uses these services or not. Therefore binary probit model was used for this purpose

3.2.2 Binary probit model

Binary probit model is used to analyze determinants of demand for antenatal care, post natal care, delivery care and reproductive health care among pregnant women since the variables are binary in nature (Greene 2002). We assume the probability of an individual utilizing or not utilizing the above services is determined by underlying response variable

$Y_i = X_i\beta + \varepsilon$………………………………………………………………………..(8)

Where Y_i is the dependent variable; antenatal care (D_1), delivery care (D_2), post natal care (D_3)

$D_1=1$ if a woman attended antenatal care

0 if otherwise

$D_2=1$ if a woman was attended to by a skilled attendant during delivery

    0 if otherwise

$D_3=$ if a woman received post natal care

  0 if otherwise

X_i is a vector of independent variables such as maternal education, income, place of residence, age of the mother, husbands education, religion, ethnic group, marital status

β is a vector of the parameters to be estimated

ε is the error term

Since Y_i represent D_3, D_2 and D_1, three binary probit models was estimated which represent antenatal care utilization, delivery services utilization and postnatal care utilization.

$$D_1=\alpha_0+\alpha_1X_{1+}\ \alpha_2X_{2+}\ \alpha_3X_{3+}\ \alpha_4X_{4+}\ \alpha_5X_{5+}\ \alpha_6X_6+\ \alpha_7X_7+\varepsilon\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(9)$$

$$D_2=\beta_0+\ \beta_1X_{1+}\ \beta_2X_{2+}\ \beta_3X_{3+}\ \beta_4X_{4+}\ \beta_5X_{5+}\ \beta_6X_6+\beta_7X_7+\varepsilon\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.(10)$$

$$D_3=\sigma_0+\sigma_1X_1+\ \sigma_2X_{2+}\ \sigma_3X_{3+}\ \sigma_4X_{4+}\ \sigma_5X_{5+}\ \sigma_6X_{6+}\ \sigma_7X_7+\varepsilon\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..(11)$$

The error term is assumed to have a standard normal distribution which leads to a probit model.

We can define the binary response model (Greene 2002) by transforming Xβ into a probability such that;

$$\text{Prob } (y_i=1)=F(X,\beta)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..(12)$$

Therefore the probability that Y=1 given X was given by the standard normal cumulative distribution function described as follows:

$$\text{prob } (y_i=1/X) = G(Z) = \Phi(Z) = \int_{-\infty}^{-z} (2)^{-1/2}\exp(-Z^2/2)\ dZ\ \dots\dots(13)$$
where $Z=Y-X'\beta$

The estimation of the model by maximum likelihood technique implies to maximize the log likelihood function

$$\ln\mathcal{L}(\beta) = \sum_{i=1}^{n}\left(y_i\ln\Phi(x_i'\beta)+(1-y_i)\ln\left(1-\Phi(x_i'\beta)\right)\right)$$

Which is the log of the likelihood function

$$L = \prod_{i}^{n} [\Phi X'\beta]^{yi} [1 - \Phi X'\beta]^{1-yi}$$

The optimal solution is a set of parameter estimates $\hat{\beta}$

3.3 Data source

The study used 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.

CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter covers the study results of main factors determining utilization of maternal healthcare services in Kenya. The binary regression model has been utilized in establishing the relationship. Both descriptive and econometric estimation have been presented in tables.

4.2 Descriptive statistics

Table 4.2 below indicates descriptive statistics of the study variables (age of the mother, education levels, residence, wealth quintile, religion, birth order and access to information). These were the independent variables while the dependent variables were maternal health outcomes such as antenatal care (visits), hospital delivery and postnatal care.

Table 4.1: Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Antenatal care	4016	0.4706175	0.4991981	0	1
Hospital delivery	6053	0.433504	0.4955995	0	1
Post natal care	2153	0.634928	0.4815622	0	1
Age of the mother	6079	28.23557	6.664807	15	49
No education	6079	0.213851	0.4100566	0	1
Primary education	6079	0.5642375	0.4958972	0	1
Secondary education	6079	0.1684488	0.3742951	0	1
Higher education	6079	0.0534627	0.2249729	0	1
Birth order	6079	3.445139	2.322099	1	13
Residence (urban)	6079	0.2413226	0.4279207	0	1
No religion	6079	0.0361902	0.1867784	0	1
Christians	6079	0.7580194	0.4283178	0	1
Muslim	6079	0.1987169	0.3990673	0	1
Poorest wealth index	6079	0.320941	0.3821196	**0**	**1**
Poorer wealth index	6079	0.1774963	0.3821196	0	1
Middle wealth index	6079	0.1620332	0.3685116	0	1
Richer wealth index	6079	0.1620332	0.3685116	0	1
Richer wealth index	6079	0.1774963	0.3821196	0	1
Mass media	4851	2.406514	0.5205774	1	3

The study results shows that approximately 47.06% of the respondents attended and received adequate antenatal care. This implies that about 52.94% had less than four antenatal visits as

recommended. The variation on the antenatal visits from the average was 49.92%. Similarly, about 43.35% of the women received skilled delivery. This was a slightly lower figure compared to those who reported to have had the required visits. On the other hand, they had same variations. Postnatal care was reported to be attended by over half the proportion of respondents. The results indicated that approximately 63.49% of the respondents attended postnatal care with a close variation as both antenatal care and hospital delivery.

Most mothers had approximately 28 years on average with the youngest being 15 years while the oldest was 49 years. The variation in general was little at 6 years from the average. On maternal education, the study revealed that about 21.38% had no any education at all while 56.42% had primary level of education. This was the level with the highest number of respondents while secondary education level were 16.84% and lastly the higher education level which comprised of college and University was having 5.35%.

Birth order of child was assessed and found that most children were of either third or fourth birth order with a variation being between the second and third child. The results also indicate that 24.13% of the respondents reside in the urban areas while a huge population of 75.87% are rural residents. Further, respondents with no religion at all were only 3.62% as Christians who comprised of both Catholics and Protestants formed the largest category of 75.8% while Muslims were 19.87% of the surveyed women population. On wealth index, majority of the respondents were either in the second or third wealth quintiles. This implies that most of the surveyed women were either in poorer or middle wealth quintiles. Finally, the study indicated that respondents either owned a radio, TV or read newspapers. Most of the respondents (76.77%) were shown to own a radio, about 33.62% watched a TV and about 31.63% read the newspaper frequently.

4.3 Diagnostic Tests

4.3.1 Normality test

Based on the normality test, the study revealed that all dependent variables (antenatal care, hospital delivery and postnatal care) to be normally distributed. Also Christians and wealth index were shown to be normally distributed while the other variables were shown to be non-normally distributed since their respective p varies were less than 5% which led to rejection of null hypothesis of the normality of the residues.

Table 4.2 Shapiro Wilk test for normality

Variable	Obs	W	V	z	Prob>z
Antenatal care	4016	0.99995	0.114	-5.649	1.00000
Hospital delivery	6053	0.99992	0.241	-3.752	0.99991
Postnatal care	2153	0.99972	0.358	-2.618	0.99557
Age	6079	0.96997	96.764	12.069	0.00000
Education	6079	0.99205	25.629	8.562	0.00000
Birth Order	6079	0.95305	151.287	13.248	0.00000
Residence	6079	0.99925	2.401	2.312	0.01039
Catholic	6079	0.99099	29.048	8.892	0.00000
Christian	6079	0.99949	1.645	1.314	0.09449
Muslim	6079	0.99891	3.518	3.320	0.00045
Wealth index	6079	0.99956	1.409	0.905	0.18272
Mass media	4851	0.99136	22.781	8.194	0.00000

4.3.2 Heteroscedasticity

To find out whether there was constant variance, the study undertook a test on residual plots method. The residual plots method involves plotting the squared residuals of the regression model against the predicted values of the dependent variable or each of the explanatory variables. If there is heteroscedasticity, then there should be no systematic pattern between the plotted variables. If heteroscedasticity is absent the plots would exhibit a systematic pattern. From Figure 2, the scatter plots are systematic which leads to failure of rejecting the null of homoscedasticity.
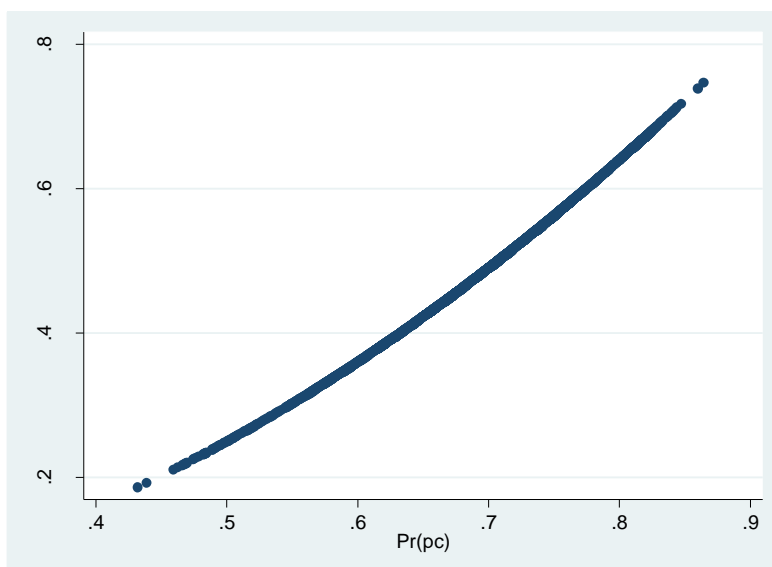
Figure 2: Heteroscedasticty test on residual plots method

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4.3.3 Multicollinearity test

Multiconninearity is deemed absent if VIF is less than 10 and present if otherwise. From the above three models for antenatal, hospital delivery and postnatal care were shown to have some Multicollinearity through some of the variables such as age, Christian and mass media for both models. Birth order only had high VIF on the third model. However, Multicollinearity is not a problem for cross sectional studies, (Awiti, 2013).

Table 4.3: Variance inflation factors (Antenatal care)

Variable	VIF	1/VIF
Age	40.45	0.024719
Education		
Primary education	9.46	0.105748
Secondary education	4.71	0.212499
Higher education	2.42	0.413956
Birth order	8.86	0.112913
Residence	3.22	0.310535
Religion		
Catholics	7.27	0.137536
Protestants and other Christians	22.79	0.043880
Muslims	4.40	0.227407
Wealth Index		
Poorer	2.17	0.459959
Middle	2.30	0.434493
Richer	2.66	0.375272
richest	5.82	0.171934
Mass Media	24.18	0.041350
Mean VIF	10.05	

Table 4.4: Variance inflation factors (Delivery Dare)

Variable	VIF	1/VIF
Age	40.44	0.024729
Education		
Primary education	8.51	0.117519
Secondary education	3.95	0.253066
Higher education	2.15	0.465468
Birth order	8.50	0.117652
Residence	3.20	0.312482
Religion		
Catholics	6.56	0.152394
Protestants and other Christians	20.40	0.049028
Muslims	4.40	0.227321
Wealth Index		
Poorer	2.09	0.478533
Middle	2.12	0.472667
Richer	2.38	0.419604
Richest	5.19	0.192524
Mass Media	22.56	0.044325
Mean VIF	9.46	

Table 4.5: Variance inflation factors (Postnatal care)

Variable	VIF	1/VIF
Age	42.90	0.023312
Education		
Primary education	7.42	0.134730
Secondary education	2.36	0.423690
Higher education	1.16	0.864611
Birth order	11.02	0.090742
Residence	2.27	0.440440
Religion		
Catholics	5.55	0.180070
Protestants and other Christians	17.48	0.057214
Muslims	4.31	0.231860
Wealth Index		
Poorer	1.99	0.502919
Middle	1.90	0.526445
Richer	1.99	0.501620
richest	2.71	0.369240
Mass Media	19.32	0.051761
Mean VIF	8.74	0.051761

4.4 Correlation Analysis

The study undertook to investigate biasness suspected among the key variables in the study. Appendix I gives the details of the existing correlations. This is meant to establish whether there is Multicollinearity or not. Variables which predict other perfectly tend to have biased results. The result show that most of the relationships had low correlations implying absence of high correlations thus absence of Multicollinearity. From Table A1 antenatal care was found to be negatively correlated with birth order, no religion and being Muslim. Hospital delivery was negatively correlated with age of the mother; post natal care, birth order, residence, wealth index, being Muslim and mass media while post natal care was negatively correlated with age of the mother, birth order, no religion, being Muslim and mass media. Therefore, the study proceeds to estimation.

4.5 Econometric Estimation

To explore and thus understand clearly factors influencing maternal health status in Kenya, the study considered both the demographic factors and socio economic factors that significantly influence utilization of maternal health care by pregnant women and also new-born mothers. The study conducted three probit regression model(s) in estimating the effect of the demographic as well as socio-economic characteristics on utilization of maternal health care. Table 4.6, 4.7 and 4.8 indicates factors influencing usage of antenatal care, hospital delivery and postnatal care respectively. However, it should be noted that the probit regressions coefficients are interpreted as changes in the probit indexes (Marginal effects).

From the table 4.6 the study found a p value of 0.0000 which was less than 5% implying that the variables considered fit the model well thus the variables used in the model were significant in explaining how antenatal care affects maternal healthcare services in Kenya. The pseudo R was very low (0.0716). From the results of the model, age of the mother, secondary education, more than secondary education, birth order, richer wealth quintile, richest wealth quintile and access to information were statistically significant in determining antenatal care while primary education, residence, being catholic, Muslim and protestants and other Christians, poorer wealth quintile and middle wealth quintile were shown to be statistically insignificant at all significance levels.

Birth order was found to have a negative relationship with antenatal care. The study found out that an additional birth reduces the probability of utilizing antenatal care by 3.5%. Education is a highly significant factor which indicated a positive relationship with antenatal care. Having secondary education increased utilization of antenatal care by 1.15% while more than secondary education led to an increase on antenatal care by 3.0% all factors held constant.

On the wealth index, it was found that being in the richer and richest wealth index increases the probability of antenatal care by 9.3% and 12.4% respectively. Usage of mass media led to increased usage of antenatal care by 4.4% all factors held constant.

Table 4.6: Marginal Effects: Dependent variable - Antenatal care

Variables	Marginal Effects	Std. Err.	z	P>z	[95% Conf. Interval]	
Age of the mother	0.01324030	0.0019278***	6.87	0.000	0.0094619	0.0170187
Education levels						
Primary education	0.0438669	0.0341946	1.28	0.200	-0.0231532	0.1108871
Secondary education	0.1149212	0.0396956***	2.90	0.004	0.0371193	0.192723
More than secondary education	0.2953462	0.0498672***	5.92	0.000	0.1976082	0.3930842
Birth order	-0.0348695	0.0061006***	-5.72	0.000	-0.0468265	-0.0229125
Residence	-0.0017629	0.0274687	-0.06	0.949	-0.0556005	0.0520748
Religion						
Catholics	0.0340898	0.0661359	0.52	0.606	-0.0955343	0.1637139
Protestants and other Christians	0.0202159	0.0642252	0.31	0.753	-0.1056631	0.1460949
Muslims	-0.0305584	0.0668459	-0.46	0.648	-0.1615739	0.1004572
Wealth index						
Poorer wealth quintile	-0.0117126	0.0292989	-0.40	0.689	-0.0691374	0.0457123
Middle wealth quintile	0.0236851	0.0298413	0.79	0.427	-0.0348029	0.0821731
Richer wealth quintile	0.0925757	0.0314107***	2.95	0.003	0.0310118	0.1541395
Richest wealth quintile	0.1243144	0.0392022***	3.17	0.002	0.0474796	0.2011493
Access to information	0.0439608	0.0180184**	2.44	0.015	0.0086454	0.0792762
Probit regression Number of observations= 3265 LR chi2 (14) = 324.24 Prob> chi2 = 0.0000 Log likelihood = -2100.9524 Pseudo R2 = 0.0716						

*** 1% significance, ** 5% significance

Table 4.7 below shows a p value of 0.0000 which was less than 5% indicating that the variables used in the model were significant in explaining how hospital delivery affects maternal healthcare services in Kenya. The pseudo R (0.1991) was very low. From the results of the model, age of the mother, primary education, secondary education, birth order, more than secondary education, residence, poorer wealth quintile, middle wealth quintile, richer wealth quintile, richest wealth quintile and access to information were statistically significant in determining how hospital delivery affects maternal healthcare services in Kenya, while being catholic, protestant and Muslim were statistically insignificant at all significance levels.

Age was highly significant and had a positive impact whereby an additional age of the mother led to 1.0% increase in utilization of hospital delivery. On the other hand education increases hospital delivery by 1.2% secondary education and 2.6% more than secondary education all other factors held constant. Similarly, wealthy index led to an increase in utilization of hospital delivery with 0.8% poorer wealth quintile, 1.4% middle wealth quintile, 1.7% richer wealth quintile and 2.9% richest wealth quintile.

Residence significantly increases utilization of hospital delivery by 7.7% while access to information has increased the probability of hospital delivery by 0.9% all other factors held constant. Finally, birth order had a negative influence on hospital delivery where the birth of an extra child reduces the probability of utilizing hospital delivery by 0.5%.

Table 4.7: Marginal Effects: Dependent variable - Hospital delivery

Variables	Marginal Effects	Std. Err.	z	P>z	[95% Conf. Interval]	
Age of the mother	0.0100277	0.0015271***	6.57	0.000	0.0070346	0.0130208
Education levels						
Primary education	0.119788	0.0247102***	4.85	0.000	0.071357	0.1682191
Secondary education	0.264844	0.0296907***	8.92	0.000	0.2066513	0.3230367
More than secondary education	0.3972298	0.0424908***	9.35	0.000	0.3139495	0.4805102
Birth order	-0.0457527	0.0046035***	-9.94	0.000	-0.0547754	-0.03673
Residence	0.0769333	0.0210414***	3.66	0.000	0.035693	0.1181736
Religion						
Catholics	0.044679	0.0473228	0.94	0.345	-0.048072	0.13743
Protestants and other Christians	0.0217309	0.045729	0.48	0.635	-0.0678962	0.1113581
Muslims	0.0284851	0.0476146	0.60	0.550	-0.0648378	0.121808
Wealth index						
Poorer wealth quintile	0.0824908	0.0217408***	3.79	0.000	0.0398796	0.1251019
Middle wealth quintile	0.1417579	0.022654***	6.26	0.000	0.0973569	0.1861589
Richer wealth quintile	0.1696573	0.0241531***	7.02	0.000	0.122318	0.2169966
Richest wealth quintile	0.2914465	0.031523***	9.25	0.000	0.2296625	0.3532305
Access to information	0.0910053	0.0129302***	7.04	0.000	0.0656625	0.1163481
Probit Regression Number of observation = 4798 LR chi2(14) = 1324.61 Prob> chi2 = 0.0000 Log likelihood = -2663.3834 Pseudo R2 = 0.1991						

*** 1% significance, ** 5% significance

From Table 4.8 below, the study found a p value of 0.0189 which is less than 5% indicating that the variables used in the model were significant in explaining how post natal care affects maternal healthcare services in Kenya. The pseudo R was very low (0.0140). From the results in the model, primary education and secondary education were statistically significant in

determining how postnatal care affects maternal healthcare services in Kenya while the other variables were statistically insignificant at all significance levels.

Education levels proved to be the only factor with a positive relationship on utilization of postnatal care. Primary and secondary education increased the usage of post natal care by 0.8% and 1.0% respectively all other factors held constant.

Table 4.8: Marginal Effects: Dependent variable - Post natal care

Variables	Marginal Effects	Std. Err.	z	P>z	[95% Conf. Interval]	
Age of the mother	0.00133	0.0028982	0.46	0.646	-0.0043504	0.0070105
Education levels						
Primary education	0.0844268	0.0402324**	2.10	0.036	0.0055727	0.1632809
Secondary education	0.1026805	0.0518038**	1.98	0.047	0.0011468	0.2042141
More than secondary education	0.1600166	0.1093638	1.46	0.143	-0.0543326	0.3743658
Birth order	-0.0058655	0.0083548	-0.70	0.483	-0.0222405	0.0105096
Residence	0.0606871	0.0468085	1.30	0.195	-0.0310558	0.15243
Religion						
Catholics	0.1108693	0.0816156	1.36	0.174	-0.0490943	0.2708329
Protestants and other Christians	0.1011742	0.0785839	1.29	0.198	-0.0528473	0.2551958
Muslims	0.0681529	0.0817571	0.83	0.405	-0.092088	0.2283939
Wealth index						
Poorer wealth quintile	0.0084567	0.0334674	0.25	0.801	-0.0571382	0.0740516
Middle wealth quintile	-0.0506988	0.0363021	-1.40	0.163	-0.1218496	0.020452
Richer wealth quintile	0.0439369	0.0393075	1.12	0.264	-0.0331044	0.1209783
Richest wealth quintile	0.002619	0.0590861	0.04	0.965	-0.1131877	0.1184257
Access to information	-0.0322825	0.0254558	-1.27	0.205	-0.082175	0.01761
Probit regression Number of observations = 1549 LR chi2(14) = 27.06 Prob> chi2 = 0.0189 Log likelihood = -953.16139 Pseudo R2 = 0.0140						

*** 1% significance, ** 5% significance

4.5 Discussion of the study results

Education was discovered to have a positive impact on utilization of maternal healthcare services in Kenya that is antenatal care, hospital delivery and postnatal care. These significant relations increase the probability of utilizing maternal healthcare services in Kenya. This finding concurs with Govindasamy and Ramesh (1997) and Caldwell (1979) who established that higher levels of education that is literacy, positively influences utilization of maternal

healthcare services in Kenya. Also a study conducted by Machio (2008), indicated that education on the women and the husbands increases demand for postnatal care, hospital delivery and antenatal care. Becker *et al*., 1993 found out that mother's education is the most consistent and important determinant of the use of child and maternal health services. This result implies that educated mother makes rational decision regarding utilization of any antenatal care, hospital delivery and postnatal care.

The study finding indicates that age of the mother significantly led to increase use of antenatal and hospital delivery services. As indicated by (Rahman, 2009) older mothers demand for delivery and postnatal care which is because of complications that older mothers might have gone through in earlier births (Begun et al,. 2010). Further, (Fiedler, 1981; Elo, 1992; Fosu, 1994) established that women's current age is important in utilization of medical services.

Birth order was found to negatively influence antenatal care and hospital delivery. This corresponds with studies by (Wong et al., 1987; Elo, 1992). The authors found that having more children causes resource constraints which negatively affect healthcare utilization. The authors established that a woman is more likely to seek maternal healthcare services at first birth than subsequent births. Further, (Shariff and Singh 2002) determined that as the number of children a mother has increases, the need to utilize healthcare services tends to fall.

Access to information significantly increased antenatal care and hospital delivery. In a study conducted by (Kistiana, 2009; Shariff& Singh, 2002), they found that women who are exposed to more information on health issues through electronic and print media better utilize healthcare services than those who don't get the information.

Religion had a negative significance influence on all indicators. According to a study conducted by (Shariff and Singh 2002), they found that Muslims have low utilization of maternal healthcare services. Other studies by (Overbosch et al., 2004) indicated that religion has no significant impact in determining utilization of maternal healthcare services.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter presents summary of the study results investigating factors behind usage of maternal health care services in Kenya. It further makes comprehensive conclusions based on the established relationship on key indicators of maternal health care services in Kenya and thereafter major policy interventions are made. Finally areas of further research are suggested.

5.2 Summary of the study results

Maternal health care plays an important role in maternal mortality reduction. Maternal mortality rates reflect disparities between wealthy and poor countries more than any other measure of health. Literature shows that response to maternal morbidity and mortality is associated with implementation of specific legal and ethical obligations such as the establishment of effective mechanisms of accountability. This study explored three main indicators for maternal health status that is the antenatal care, skilled attendance at birth and postnatal care. This study has been conducted with the main objective of determining the factors influencing utilization of maternal health care services in Kenya. Hypotheses were tested at 1%, 5% and 10% significance level upon estimating the probit models on antenatal care, hospital delivery and postnatal care respectively. A national representative data (Kenya demographic and household survey-KDHS, 2008) was used. Other necessary estimation issues (such as multicollinearity) were undertaken to validate the model employed.

The study found out that age of the mother, secondary education, more than secondary education, birth order, richer wealth quintile, richest wealth quintile and access to information were significant factors which influence utilization of antenatal care. Hospital delivery was shown to be influenced significantly by age, primary education, secondary education, more than secondary education, birth order, residence, and all wealth indexes, access to information. On the other, primary education levels and secondary education levels were shown to be statistically significant in influencing postnatal care.

Analysis across and within the models indicate that education significantly determine utilization of the three models antenatal care, hospital delivery and postnatal care whereby in all cases, it increases the usage. Similar to education, age of the mother also influences usage of Antenatal care and hospital delivery positively and significantly. Finally, the study found out that access to information positively and significantly led to increase in utilization of antenatal care and hospital delivery while birth order reduces the usage of both antenatal and hospital delivery.

5.3 Conclusions of the findings

The millennium development goal five and vision 2030 maternal mortality target is less than 200 per 100,000 live births. Kenya is committed to reduce maternal mortality rate at 147 per 100,000 live births by 2015.To realize this among women in Kenya, the government need to consider factors which lead to utilization of antenatal care (education levels, age, wealth index, birth order and access to information); hospital delivery include considering factors like age, education levels, birth order, residence, wealth index and access to information; and lastly postnatal care services include considering education levels.

5.4 Policy Recommendations

The Government of Kenya, on 2013 introduced a policy of free maternity services in all public facilities with an objective of reducing maternal and prenatal mortalities. This was meant to ensure that mothers were not charged for delivering in public health facilities and thus promote and improve hospital deliveries. To improve the effectiveness of the policy, the government needs to introduce more health care facilities to maintain consumption of these services (Antenatal and hospital delivery). This is because age was shown to increase the likelihood of utilizing both antenatal care and postnatal care. Since all levels of education improved utilization of these services, there is need for the government to introduce more institutions to increase knowledge and consequently knowledge on usage of these services. There is also a need for family planning among mothers which encouraged the respondents to reduce the number of children born by a single mother in order to improve usage of hospital delivery. This is because higher birth order was associated with low usage of maternal health care services. Wealth quintiles (richer and richest) were associated usage of antenatal care while all wealth quintiles were positively and statistically related with usage of hospital delivery. Finally, messages through other modes of communicating are important as they are

shown to accelerate usage of health care services. Apart from Radio, TV and newspaper, the study recommends usage of more other channel.

5.5 Areas for further study

This study mainly considers determinants of maternal health care services in Kenya. There are however need for more studies are required in examining the relationship between maternal health status using nutritional factors among women in Kenya. Further studies should also focus on the impact of devolution on improvement of maternal health care services in Kenya.

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APPENDICES

Appendix I: Correlation matrix

Variables of study	Antenatal care	Hospital delivery	Post natal care	Age of the mother	Education	Birth order	Residence	No religion	Christians	Muslims	Wealth index	Mass media
Antenatal care	1.0000											
Hospital delivery	0.0464	1.0000										
Post natal care	0.1048*	-0.0143	1.0000									
Age of the mother	0.0528	-0.0104	-0.0189	1.0000								
Education	0.1246*	0.0524	0.0815	-0.0830	1.0000							
Birth order	-0.0268	-0.0123	-0.0364	0.8077*	-0.2080	1.0000						
Residence	0.0195	-0.0399	0.0568	-0.1708	0.0523	-0.2060	1.0000					
No religion	-0.0250	0.0267	-0.0484	-0.0325	-0.1373	0.0209	-0.0356	1.0000				
Christian	0.0777	0.0375	0.0653	0.0140	0.3144	-0.0282	-0.0378	-0.3646	1.0000			
Muslims	-0.0667	-0.0517	-0.0452	0.0074	-0.2689	0.0275	0.0604	-0.0692	-0.8940	1.0000		
Wealth index	0.0862	-0.0167	0.0517	-0.1025	0.2480	-0.2185	0.5595	-0.0560	0.1232	-0.1022	1.0000	
Mass media	0.0802	-0.0070	-0.0161	-0.0264	0.1461	-0.0893	0.1260	-0.0117	0.0137	-0.0167	0.2964	1.0000

*High correlation