

**CHOICE OF A PLACE OF DELIVERY AMONG WOMEN IN  
KENYA**

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**DECLARATION**

This research paper is my original work and to the best of my knowledge has not been presented for the award of a degree in any other university.

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**APPROVAL**

This research paper has been submitted for examination with my approval as a university supervisor.

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## LIST OF ACRONYMS

<b>ANC</b>	-	Antenatal Care
<b>CBS</b>	-	Central Bureau of Statistics
<b>HF</b>	-	Health Facility
<b>HIV</b>	-	Human Immunodeficiency Virus
<b>KDHS</b>	-	Kenya Demographic and Health Survey
<b>KNBS</b>	-	Kenya National Bureau of Statistics
<b>KSPA</b>	-	Kenya Service Provision Assessment
<b>MDG</b>	-	Millennium Development Goals
<b>MHCS</b>	-	Maternal Healthcare Services
<b>NCAPD</b>	-	National Coordinating Agency and Population for Development
<b>SBA</b>	-	Skilled Birth Attendant
<b>TB</b>	-	Tuberculosis
<b>TBA</b>	-	Traditional Birth Attendants
<b>UN</b>	-	United Nations
<b>UNDP</b>	-	United Nation Development Programme
<b>UNFPA</b>	-	United Nations Fund for Population Activities
<b>UNICEF</b>	-	United Nations Children Endowment Fund
<b>USAID</b>	-	United States Agency for International Development
<b>WHO</b>	-	World Health Organization

## **ABSTRACT**

Maternal mortality rates in Kenya increased from 365/100, 000 live births in 1993 to 488/100,000 live births in 2008. Use of health facilities during delivery is important in the reduction of maternal mortality rates, but the proportion of deliveries taking place in health facilities has remained below 50% for the last two decades notwithstanding the global and national policy initiatives on maternal health. Little is known about what influences the women's choice of place of delivery. This study uses the Kenya Demographic and Health Survey (KDHS) 2008-09 data to investigate what influences the choice of health provider during delivery among women in Kenya. The multinomial logit model used to identify the factors that influence the type of health facility choice was estimated using Stata software. Results show that, women with highest level of education, those from richest wealth index and married women were more likely to deliver in private health facilities. Women with secondary level of education and those from middle wealth index were more likely to deliver in public health facilities. The policy implication of this finding is that health inputs like antenatal care during pregnancy should be encouraged. Information programmes are needed to inform women on the potential risks associated with home delivery as well as the importance of institutional delivery.



# CHAPTER ONE

## 1.1 Background

Health is defined as a state of complete, physical, mental and social well-being and not merely the absence of disease (WHO, 2006). Health is an important component of the human capital; investing in health has vital direct effects on productivity and thus on economic growth (Mwabu, 2001). Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period (WHO, 2008). Maternal health has emerged as a global priority because there is a great gap between the status of mothers' well-being between the developed and the developing countries. Investing in maternal health means that mothers are not only helped to live, but to effectively involve themselves in economic development. There has been considerable evidence that good health in general and maternal health in particular, plays a major role in poverty alleviation and human development (Thomas and Strauss, 1997).

Women make up more than half of the total population of most sub-Saharan African countries and as a result; an inferior maternal health care system will constrain human and sustainable socio-economic development. Every year, over 15 billion dollars in productivity are lost due to maternal and newborn mortality, a huge burden on developing nations (UNFPA, 2010). According to WHO (1999) 'a society that is deprived of the contribution made by women is one that will see its economic and social life decline, its culture impoverished and its potential for development severely limited'.

Maternal mortality refers to the death of a woman while pregnant or within 42 days of the end of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO, 2004). The consequences of losing over 350,000 women in pregnancy and childbirth every year have a ripple effect on families, communities and nations. Children without mothers are less likely to receive proper nutrition, health care and education. The implications for girls tend to be even greater leading to a continued cycle of poverty and poor health (UNFPA, 2010). According to UNICEF (2012), women contribute to majority of the small businesses in the developing countries and their unpaid work on the farm and at home account for a third of the world's GDP.

Maternal mortality could reduce the number of women in labour force and this may lead to reduction in household consumption expenditure, private business, personal savings, and government tax revenues, hence the resources available for investment purposes are reduced. It also affects future human capital creation process; this is because the loss of a mother leads to the loss of an infant which in turn leads to reduction in the size of future labour force (Kirigia et al. 2006).

### **1.1.1 The Global Context**

Maternal mortality remains a global health concern; two decades after the international safe motherhood was launched. It is estimated that every year, 536,000 women die worldwide from pregnancy-related complications, and many times more women suffer obstetric morbidity (WHO, 2007). The Sub-Saharan Africa has the highest mortalities in

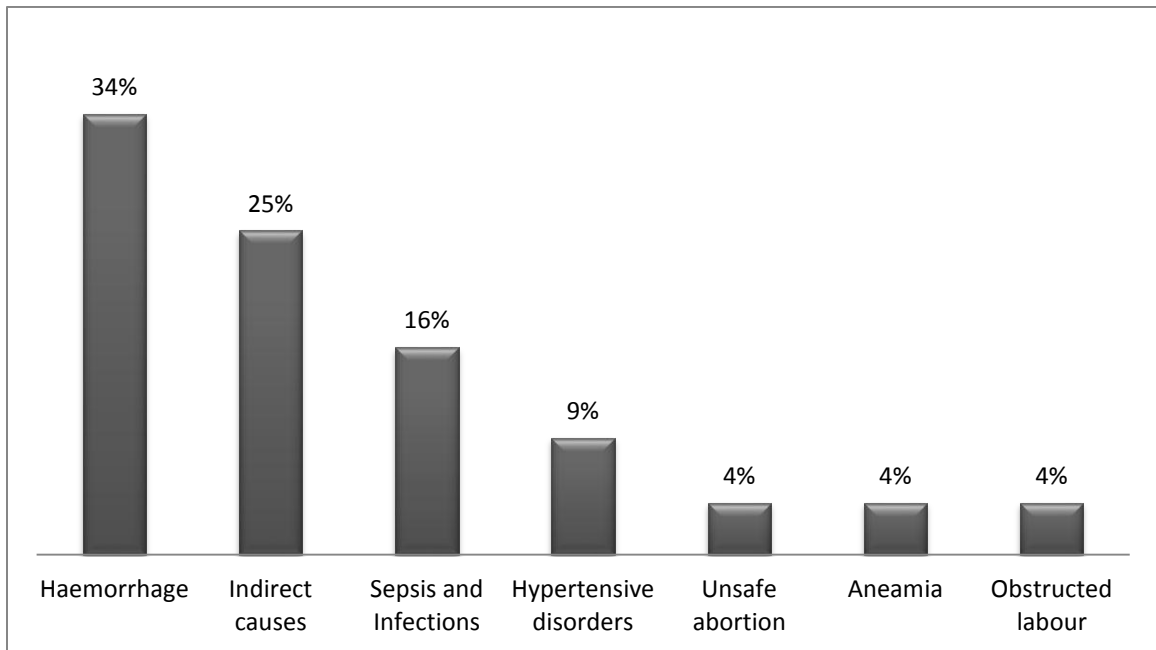
the world, estimated at an average of 640 per 100,000 live births. This high maternal mortality combined with the high fertility rates which is estimated at 5.6 children per woman, increases the lifetime risk of a woman dying due to pregnancy related causes. The ratio of women dying from pregnancy related cause is 1:31 in Sub-Saharan Africa, compared to 1:4,300 in the developed countries (WHO, 2010). Maternal mortality rates prove to be one of the greatest health disparities between the rich and the poor countries.

About 99% of all maternal deaths are estimated to occur in the developing countries; with the greatest burden borne by African countries, which account for 40% of the world total pregnancy-related deaths (UNFPA, 2010). According to WHO (2011), the proportion of births attended by skilled birth attendants increased from 58 percent in 1990 to 68 percent in 2008 worldwide. While in African countries the percentage of births attended by skilled health providers remained at 50% during the same period. Every year, approximately 60 million home deliveries take place worldwide; where, the woman is cared for by a family member, an untrained traditional birth attendant (TBA), or no one at all (LatemoandRakgosi, 2003). In developing countries women prefer home delivery because it is the cheapest option but it is often associated with maternal mortalities and morbidity as well as neonatal mortality. In developed countries 99% of births are attended by skilled birth attendants (SBA), while in developing countries the proportion of births attended by SBAs is only 35.3% (WHO, 2008). The global target of using skilled health personnel at delivery is 90% by 2015(WHO, 2011).

Strategies to increase health facility delivery in sub Saharan Africa are; to provide comprehensive antenatal care, ensure that pregnant women are prepared for delivery and

to strengthen emergency obstetric care within the health facilities. Even though many health facilities have a functioning health system, many women still prefer home delivery hence not utilizing the health facilities for deliveries. This therefore calls for an approach where the skilled birth attendants assist women who deliver at home (MOH, 2012).

**Figure1.1: Causes of maternal mortality in Sub- Saharan Africa**



*Source:* United Nations, (2007)

Figure1.1shows that the leading cause of maternaldeaths in Sub-Saharan Africa is hemorrhage (34%). Indirect causes of maternal deaths include malaria and tuberculosis. These cases could be avoided if the expectant mother attends the antenatal clinics as required and such cases can be treated. One explanation for the poor health outcomes among women and children in developing countries is inadequate access to modern health services and poor utilization of these services by many women. Preventing

unwanted pregnancy through the contraceptive use could avert 25% of maternal deaths; however, the level of contraceptive use in Africa remains low (22%) in 2005 (UN, 2007).

In Sub-Saharan Africa, the proportion of births attended by skilled personnel increased from 42% to 45% from 1990 to 2005. While in North Africa, the percentage of births attended by skilled health personnel rose dramatically from 40% to 75% during the same period (UN, 2007). Skilled birth attendance for women in most developing countries follows a pattern similar to the use of health facilities. The reason being skilled personnel can only be found in health facilities.

Presence of a skilled birth attendant at delivery has been greatly emphasized in all the international initiatives of maternal health. According to the world health organization (WHO) a skilled birth attendant is, an accredited health professional such as a midwife, doctor, or nurse who has been trained to proficiency in the skills needed to manage normal pregnancies, childbirth and the immediate postnatal period (WHO, 2004). The World Bank claims that in all the countries where skilled birth attendance is higher than 80%, the maternal mortality ratios are estimated to be less than 200 per 100,000 births.

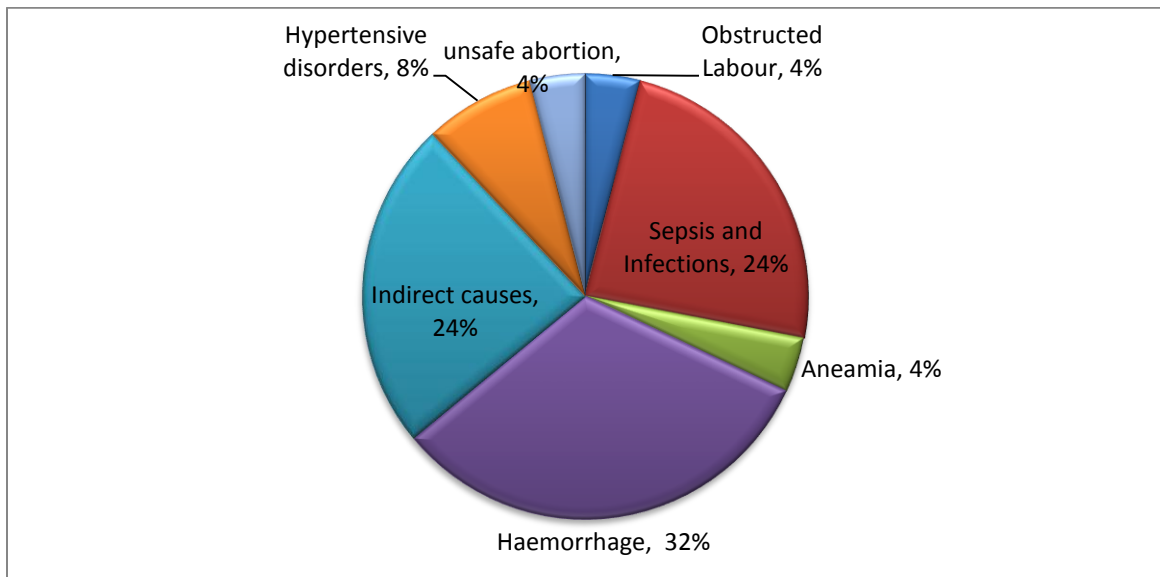
Skilled birth attendance refers to a skilled attendant operating within an enabling environment or health system capable of providing care for normal deliveries, as well as appropriate emergency obstetric care for all women who develop complications during childbirth (Canavan, 2009). Skilled birth attendance at delivery is advocated as the most important factor in preventing maternal deaths (WHO, 1999). Even so, many women (57%) in low-income countries deliver at home without skilled help; millions of women

survive but suffer from morbidity related to pregnancy and childbirth. It is estimated that for each maternal death; 30 to 50, morbidities occur (WHO, 2010). Use of skilled attendants at delivery has been identified as a key indicator of the achievement of the Millennium Development Goals adopted by the United Nations in the year 2000.

### 1.1.2 The Kenyan context

The recent trend on maternal mortality ratios in Kenya has been increasing. According to the Kenya Demographic and Health Survey (KDHS) 2008-09, more women are dying of pregnancy and childbirth-related causes than was the case in KDHS2003 (KNBS and ICF Macro, 2010). The major causes of these maternal deaths arise from well known preventable causes, these are; a ruptured uterus/obstructed labour, postpartum hemorrhage (PPH), Hypertensive disorders, Unsafe Abortion, Severe Anemia, HIV/AIDS, Malaria and Tuberculosis (NCAPD, 2010)

**Figure 1.2: Causes of maternal deaths in Kenya**



Source: NCAPD policy brief (2010).

Figure 1.2 shows that, the leading cause of maternal deaths in Kenya is postpartum hemorrhage at (32%) and is slightly less than the sub Saharan which is at 34%. The percentage of deaths caused by sepsis and infections in Kenya is at (24%), this is a higher compared to the sub Saharan Africa figure which is at (16%). This shows that more women are dying in from sepsis and infections compared to other sub Saharan countries. Malaria is among the common indirect causes of poor maternal health outcomes. Efforts to reduce malaria among pregnant women are being scaled up through the government of Kenya's policy of distribution of insecticide-treated mosquito nets free of charge to pregnant women attending ANC clinics in areas where malaria is endemic (KSPA, 2010). Other indirect causes of maternal deaths are; HIV/AIDS and tuberculosis.

**Table 1.1: Uptake of Antenatal Care versus Delivery Services and Maternal Mortality Ratios in Kenya**

Year	Antenatal care visits				Skilled attendance at delivery (%)	MMR(Per 100,000 live births)
	1 visit	2-3 visits	4 or more visits	1 or more visits		
1989	-	-	-	78	50	-
1993	2.6	26.6	64.0	95	45	365
1998	3.7	27.7	60.8	92	44	590
2003	2.5	22.1	66.7	88	42	414
2008	3.6	29.8	60.0	92	43	488

*Source:* KDHS (1989); KDHS (1993); KDHS (1998); KDHS (2003); KDHS (2008/09)

Despite the high utilization of antenatal care in Kenya as depicted above, many of these visits (at least 40%) occurred after the sixth month of pregnancy hence making it difficult to carry out most of the effective interventions of the antenatal care like; identification and treatment of anemia, tetanus toxoid immunization and identification of hypertensive

disorders of pregnancy (KDHS, 2003). Hence the quality of antenatal care is compromised. The proportion of women making the recommended number of prenatal care visits of at least four per year declined from 64% in 1993 to 60 percent in 2008/ 09. Whereas, the proportion of women receiving skilled care during delivery, declined from 45% in 1998 to 42% in 2003 and increased to 44% in 2008/09 (UNDP, 2012).

Table 1.1 shows that more women are dying from pregnancy related causes than they did 15 years ago. In 1993, the number of women dying from pregnancy related causes was 365 deaths per 100,000 live births, while in 2008 the number had increased to 488 deaths per 100,000 live births. Kenya is far below the target on MDG 5 which aims to reduce maternal deaths from 414 per 100,000 live births in 2003 to 147 per 100,000 live births by 2015. In Kenya the slow progress in achieving the targets of maternal and newborn health is attributed to limited availability of health facilities, poor accessibility, and low utilization of health facilities for delivery services and postnatal care, low coverage of emergency obstetric care and newborn care (MOH 2012).

Kenya ranks among the top countries with huge regional disparities, with maternal mortality rates as high as 1300/ 100,000 live births in some areas such as North Eastern Province and maternal mortality rates as low as 100/100,000 live births in Central Province (KDHS 2008). What may not be seen through mere statistics are the devastating effects on Kenyan communities; whereby the death of a mother can lead to the breakdown of family units and a lifetime opportunity for remaining children, and a crucial loss of income for already impoverished households.



### 1.1.3 Trends in health facilities deliveries in Kenya

Modern health services in Kenya date back to the establishment of missions in the mid-19th century. A clear health policy objective was realized in 1901, but the development of formal health services was recorded in 1950, and this led to the formation of the Ministry of Health in 1960 (Njaramba,1994). However, maternal health services in Kenya began in 1972 as a part of an integrated Mother to Child Health (MCH) program. It was not until the inauguration of the Safe Motherhood Initiative in Nairobi in 1987 that, specific programs to reduce maternal mortality and improve maternal health were established. Initially, efforts were focused on training traditional birth attendants (TBAs) to screen high-risk pregnancies for complications. Efforts are now being directed towards providing women with access to skilled care during pregnancy, delivery and the postpartum period.

**Table 1.2: Trends in health facility deliveries in Kenya**

Year	Nairobi (%)	North Eastern (%)	Eastern (%)	Central (%)	Nyanza (%)	Coast (%)	Western (%)	Rift Valley (%)	Total (%)
1989	83.3	-	40.8	73.3	53.8	40.9	34.8	44.7	46.5
1993	79.0	-	45.9	72.5	37.7	30.9	32.6	38.9	44.0
1998	75.6	-	49.0	69.2	35.6	33.0	26.6	36.1	42.0
2003	77.9	7.7	37.7	66.9	36.2	31.2	28.4	35.9	41.0
2008/09	89.4	17.3	42.8	73.0	44.2	44.4	25.3	32.9	43.0

*Source:* KDHS (1989), KDHS (1993), KDHS (1998), KDHS (2003), KDHS (2008/09)

Table 1.2 shows that, there are regional disparities in terms of health facility deliveries in Kenya. The level of facility delivery varies from one region to another. In Nairobi Province three quarters of births take place in health facilities, whereas in western

province less than 35% of births take place in health facilities. In NorthEastern province, less than a quarter of births take place in health facilities. InCentral province two thirds of births take place in health institutions; whereas, in coast eastern and rift valley less than 50% of births occur in health facilities. The large disparities in health facility deliveries in Kenya could be attributed to accessibility and availability of health facilities in some regions in Kenya. A case in point is that Nairobi province has a high number of health facilities; therefore, women can easily access the health facilities during delivery hence increased health facility deliveries. Table 1.2 shows that health facility delivery in Kenya declined from 1989 to 2003 from 47% to 41% respectively. However, it increased gradually in 2008 to 43%.

In Kenya normal delivery services are available in only 30% of healthcare facilities. Emergency services also are not widely available, only half of all health facilities have a system in place to provide transport to a referral site for maternal emergencies. Only 5% of facilities nationwide can perform a Caesarean section. (KSPA, 2010) In Kenya, there are major problems regarding the availability and distribution of health sector manpower. There is a recognized shortage of doctors, clinical officers and nurses across the country, particularly in rural areas and at facilities below the hospital level. More than half of the health personnel and four-fifths of doctors are based in urban facilities (MOH, 1996).

#### **1.1.4 Kenya Health Policy**

Kenya has endorsed several international conventions and commitments, these commitments include; the International Conference on Population and Development (ICPD) which spells out the rights of women to be informed and to have access to

maternal health care services, and the Millennium development goals articulated in the millennium declaration. Nationally, Kenya's own Vision 2030 emphasizes women's health and the reduction of maternal deaths in Kenya. As a follow-up of the recommendations of the ICPD, and the government of Kenya drew up the National Reproductive Health Strategy (NRHS) (2009-2015), this policy states the commitment to the achievement of the ICPD recommendations and the millennium development goals as well as other international priority targets and goals on maternal health.

Kenya Health Sector Strategic and Investment Plan (KHSIP) (2012-2018) emphasizes on prioritization of investments and implementation of interventions that relate to maternal and newborn health. Kenya Health Policy (2012-2030) developed the community midwifery model that seeks to support the provision of quality, accessible, equitable and affordable health services to all Kenyans using the primary health care approach. The Constitution of Kenya 2010 introduced a rights based approach in the provision of all services including those delivered by the health sector at all levels.

The above sample from the literatureshows that most of the maternal deaths occur during delivery. It also shows that most women in Kenya deliver at home despite various health policies that have been developed; this shows that there is an underlying problem that should be addressed so that maternal deaths in Kenya can be reduced. This study seeks to find out what influences the choice of place of delivery. It also seeks to agree or disagree with some of the past studies and finally to add to the already existing literature on maternal health.

## **1.2 Research Problem**

High rates of maternal deaths and morbidity are related to knowledge about health services, the access to and the utilization of services. The choice of place of delivery has consistently been associated with maternal and neonatal outcomes. Childbirth in a health facility while attended by a trained health professional has been associated with lower rates of maternal and neonatal mortality and morbidity. On the other hand, home deliveries are associated with; increased rates of maternal mortality, neonatal mortality and morbidity (Stephenson et al, 2006).

About 75% of maternal deaths occur during the process of childbirth or in the first week thereafter (NCAPD, 2010). Antenatal care coverage as per the 2008-2009 Kenya demographic and health survey is estimated at 92%. Despite this high coverage of ANC, it is estimated that only 43% of pregnant women in Kenya give birth in health institutions. In fact, 28% of women deliver at home assisted by traditional birth attendants, 21% by untrained relatives or friends, and 7% with no assistance from anyone. This means that there are other factors causing restraint to seek health facility delivery care by pregnant women in Kenya.

No doubt, some studies have been carried out on demand for maternal healthcareservices (Machio 2008, Obago 2013 and Owino 2001).These studiessought to identify the determinants of utilization of maternal health services; they focusing on home and hospital delivery. Most of these studies have not specified the choice of delivery care provider in Kenya. This study therefore seeks to bridge the information gap on what

factors influences the choice of delivery care provider in Kenya. It will also inform policy makers on the appropriate measures to be taken, with the view of improving health facility services.

### **1.3 General Objective**

1. To describe the factors that influences the choice of delivery care provider among women in Kenya

#### **1.3.1 Specific Objectives**

1. To identify the factors that influences the choice of public hospital delivery among women in Kenya.
2. To identify the factors that influences the choice of private hospital delivery among women in Kenya.
3. To draw policy recommendations based on the above findings.

### **1.4 Justification of the study**

Most obstetric complications occur within the time of delivery and cannot be predicted. Every year, it is estimated that 170 million pregnancies occur worldwide and every time a woman is pregnant her life is at a risk of sudden and unpredictable complications that could result in death or injury. It is estimated that around 15% of all pregnant women develop a life threatening complication that requires skilled care and a major obstetrical intervention during delivery for her to survive (Koblinsky et al, 2006).

Therefore, it is important that all pregnant women have access to a skilled attendant. Skilled attendance during delivery is advocated as the single most important factor in

preventing maternal deaths and the proportion of births attended by skilled health personnel is one of the indicators for MDG goal 5 (WHO, 1999). Access to skilled care delivery is also vital in improving newborn survival and preventing neonatal deaths. MDG goal five target for Kenya is to have a maternal mortality rate of 147 per 100,000 live births by 2015 this target might not be achieved since the current maternal mortality rate is 488 per 100,000 live births with only a few years left before 2015.

According to Kenya demographic and health surveys, the national rate of health facility delivery declined from 50% in 1989 to 44% in 1998. The same survey in 2008-09 shows that, only 43% of births occur in health facilities, with considerable variation in different parts throughout the country. This study, therefore, is important in that seeks to identify the factors that influences the choice of delivery services among women in Kenya. This study also is important in that it comes at a time when free maternity services in all government health facilities have been introduced in Kenya. It will also contribute to the existing literature on maternal health and inform policy makers on the appropriate measures to be undertaken to curb the rising maternal mortality and morbidity.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Theoretical Literature**

The theoretical literature of this research paper is based on the theory of consumer behaviour. Consumer behaviour is normally expressed as utility maximization subject to a budget constraint. A budget constraint is an important element since it makes choice necessary and it also makes the trade-offs among the alternatives very explicit. The individual choice behaviour is a function of the set of the available alternatives, the attributes of the decision maker, decision rule and constraints. However, individual choice process depends on; the utility derived from each alternative and the choice based on decision rule of achieving maximum utility. The following theories explain the individual choice behaviour and how they relate to choice of health delivery care.

##### **2.1.1 Rational choice theory**

Rational choice is the process of determining what alternatives are available and choosing the best alternative. This theory assumes that an individual is rational if her preferences are transitive and complete, and she chooses her most preferred alternative. It also emphasizes that individuals choose the alternatives that maximizes their utility. The choice of a rational decision maker is normally represented in a utility function and the choice made is viewed as the result of utility maximization.

##### **2.1.2 Orthodox (Expected) utility theory.**

This theory is a component of the neoclassical model of rational behaviour; it predicts the preference for dominant alternatives. This theory assumes that; individuals will make

decisions based on a set of alternatives given. It also assumes that choices are made with a view of maximizing the expected utility, and that the individual knows and considers the probability of obtaining each outcome. Therefore, decision makers will always choose alternatives which produce higher utility over those alternatives with less utility. This theory argues that the manner of presentation of alternatives should not influence the choice; hence, choice is invariant. Therefore, a rational economic actor will always maximize his utility subject to the constraints he faces. However, this theory does not consider the researchers uncertainty regarding the decision's makers valuation of a particular choice.

### **2.1.3 Random utility theory**

This theory assumes that an individual has a perfect discriminatory power hence; an individual is able to rank the alternatives in a consistent and well defined manner. Random utility theory is based on the hypothesis that all individuals are rational decision makers, maximizing utility relative to his or her choices. This theory assumes that the decision maker in making a choice considers a set of mutually exclusive alternatives. The decision maker therefore ranks her alternatives according to the perceived utility and selects the alternative that maximizes her utility. The utility assigned to each alternative depends on the alternatives attributes and the characteristics of the decision maker. But the utility assigned by the decision maker to each alternative is not known by the researcher wishing analyze the decision maker's choice behaviour. However it is possible to express the probability that the decision maker will choose a certain alternative.



Random utility theory is concerned with the analyst's uncertainty regarding the individual's decision. This means that the probabilistic choice theory is introduced to reflect the lack of information regarding the attributes of the individual or lack of information regarding the characteristics of alternatives. A researcher will only observe that part of utility that makes up the alternative. This means that the utility function is in accordance with the neoclassical economics in that the decomposition of the utility function into observable component and a random component; whereby the observable component is a vector of attributes that influence the individual's choice.

The choice of place of delivery will depend on the pregnant woman knowledge on the availability of different types of health facility delivery care, the expected utility gain from using such health services and the woman's attributes. It will also depend on the cost of the delivery services and any other expenses incurred during the process like transport costs. The distance to the health facility and the quality of services offered is also important when making a choice.

This study therefore bases its analysis in a random utility theory that assumes that an individual has a perfect discriminatory power. Therefore, a pregnant woman can determine her best choice on where to deliver. In this study we introduce the probabilistic choice theory since we do not have information on the attributes of the alternatives. The multinomial logit or MNL model form is commonly used as it is a good approximation to the economic principle of utility maximization. In this study, the multinomial logit is used to analyze the factors that influence the choice of place of delivery.

## **2.2 Empirical Literature**

In this study we review past and recent studies from different countries on use of choice models and also the socio- economic factors that influence the use of obstetric care during delivery. Most of these studies have used national representative surveys such as the Demographic and Health Survey (DHS) and different models. Most of the studies in developing countries have investigated the factors that influence the women's use of health delivery care. Majority of the studies have used choice based models where a woman chooses an option from an alternative set that maximizes her utility.

Green (2008) argues that rational choice analysis usually begins with a premise that an individual is maximizing utility when he or she chooses the best alternative. According to McFadden (1974), consumers have different preferences over levels of consumption of different goods and services. Consumers expressed preferences are functions of their personal characteristics including both observed and the unobserved components; experience and their taste templates. Manski (1977) formalized the random utility model that assumes that all individuals will always select an alternative which maximizes their utility. Martin and Cees (2003) argued that most of the analytical choice modeling used in investigating the choice of obstetric care among women (binary, conditional, nested multinomial and multinomial logit/probit models.) are based on individual choice theory. This suggests that concepts on the relationship among choice, preference and utility are used.

Majority of the studies focus on maternal health care(Chakarabati and Chaudhuri, 2007; Hasan et al, 2008, Stephenson et al, 2006; Machio, 2008; Kistiana 2009, Obago, 2013). Most of these studies focus on demand factors which determine the woman use of maternal health care. Studies show that higher education for both women and husbands increases the likelihood of women delivering in a modern health facility (Kistiana, 2009; Chakarabati and Chaudhuri, 2007; Machio, 2008; Ochako et al, 2011; Hasan et al, 2008; Mehari, 2013; Obago, 2013). The studies suggest that the positive relationship might be because highly educated women are informed about the benefits of using modern health services during delivery.

According to Grossman (2000), ageing leads to depreciation in health stock. This implies that the marginal cost of health investment increases. Therefore older women are more likely to use health facilities unlike the young women. Several studies show that being older increases the likelihood of a woman delivering in a health facility (Fosu 1994; Chakra borty et al, 2003; Mekonnen and Mekonnen, 2002; Kistiana 2009).However, being older can negatively influence the choice of place of delivery this could be attributed to non-complicated pregnancies in the past. Mwaniki, Kabiru and Mbugua, (2006) shows that, older women are less likely to deliver in the health facility

Living in the urban area increases the likelihood of women using the health facilities during delivery (Owino, 2001; Hasan et al 2008; Mekonnen and Mekonnen, 2002). The main reason for this observation could be accessibility, availability and quality of services at the health facilities. Residing in a rural area reduces the likelihood of Women using health facilities during delivery (Mekonnen and Mekonnen, 2002). In most developing countries urban areas are more developed than rural areas. Gabrysch and

Campbell, (2009) argued that, place of residence is also associated with; the ability to pay, education level, accessibility, quality and availability of health services.

Costs and accessibility to a health institution are important factors which influence the use of health facilities during delivery, but from economic theory price is negatively related to the demand. Therefore high costs of services in health facilities may reduce the likelihood of women using the health facility services during delivery. Breen and Ensor (2011) noted that, the derived utility and the subsequent decision of whether to seek skilled delivery care is a function of costs and perceived benefits. Costs are made up of the direct costs of reaching the health facility and receiving the skilled care and the opportunity cost of time. The perceived benefit is a function of individual education, quality of health care and societal attitudes surrounding the access of health care.

The effect of religion on use of healthcare services during delivery varies significantly from one study to another and from country to another. Hasan et al (2008) found out that, being a Muslim reduces the likelihood of a woman using health facility during delivery. (Mekonnen and Mekonnen, 2002) clearly shows a significant variation in the choice of place of delivery by different religions; Protestant women are more likely to use institutional delivery services compared to women who follow traditional beliefs. A study in Ghana by Abor et al (2011) shows that, women of the Roman Catholic faith are more likely to use institutional delivery services as compared to those with no religion. Low parity increases the likelihood of a woman using health facility services during delivery while high parity reduces the likelihood of a woman using the health facility during delivery. The reason could be that, low parity women are more likely to be educated. The other reason could be as a result of first time mothers receiving stronger advice from

health workers to seek care. For high parity women as the number of children increases, women tend to believe that skilled delivery care is not important and they tend to rely on past knowledge and experiences from the previous births. (Breen and Ensor, 2011; Kistiana, 2009 ; Mekonnen and Mekonnen (2002), Hasan et al (2008), Mehari (2013), Ochako et al, (2011), and Obago ( 2013).

Studies show that antenatal care visits increases the likelihood of delivering at a health institution While women who never attended ante natal care visits were less likely to deliver in a health facility (Obago, 2013; chepkoech 2003; Machio, 2008; Mehari 2013; Ochako et al, 2011; Owino, 2001, Van Eijk et al 2006, Hasan et al, 2008, Mekonnen and Mekonnen, 2002; Kistiana, 2009). However, a study by Breen and Ensor (2011) argue that, receiving antenatal care during the first trimester of pregnancy does not increase the likelihood of later use of skilled attendance during delivery. In contrast, receiving antenatal care in several occasions has a significant effect on the use institutional delivery services.

Women in a higher wealth index are more likely to use health institutions during delivery, when compared to women in poor wealth index. Wealth increases the likelihood of women delivering in a health facility (Owino, 2001; Chakra borty et al, 2003; Machio; 2008). The reason could be wealthy women or women from wealthy households can afford the health facility services.

### **2.3 Overview of the Literature**

Past and recent empirical studies have found that the choice of place of delivery (home delivery and hospital delivery) is determined by demographic, cultural, and

socioeconomic factors, such as education, age of a woman, birth order, place of residence, religious background, accessibility, costs, wealth index, Antenatal care use has also been identified as a good predictor in the choice of place of delivery. It has also found out that most of the studies have used choice models in the analysis of the data.

The empirical literature shows that, most of the studies have focused on factors influencing use of home delivery and hospital delivery and the factors affecting the choice of place of delivery. The studies show some areas of agreements, disagreements and gaps. Most of the studies agree that higher education, higher wealth index, number of antenatal care visits, low birth orders and living in the urban area increases the likelihood of a woman using a health facility during delivery. The studies disagree on factors such as age and religion in that some studies find the factors increasing the likelihood, while others found it to be reducing the likelihood of a pregnant woman delivering in a health facility.

The gaps that have been identified the empirical literature include the distinction between giving birth in a public and a private hospital and the factors influencing the private and public hospital delivery use. This study therefore seeks to bridge the information gap by distinguishing the health facility as public and private, and to also to identify the factors that determine the choice of place of delivery (home delivery, public hospital delivery and private hospital delivery). This study is necessary because in Kenya, besides the public health facilities there is a strong private health sector. This study just like the other studies will use the choice model in the analysis since it is based on individual choice theory.

## CHAPTER THREE

### METHODOLOGY

#### 3.1 Theoretical Framework

This study is based on the assumption that a pregnant woman has already decided on where to deliver either at home or at the health facility. The choice of whether to deliver in the hospital or at home can be expressed in a random utility model. The model is used since an individual has to make a choice from a set of alternatives. Utility is not directly observable but it can be estimated from the observed choices. Individuals make choices based on some underlying choice process, which is assumed to be utility maximization (Green, 2008). However, individuals will vary on how they make choices. It is assumed that individuals will rank alternatives based on the utilities they derive from it. A pregnant woman will choose a place of delivery that yields the maximum utility (A place of delivery that offers the best services). Therefore, the utility derived by the pregnant woman can be expressed as follows:

$$U = \text{Max}(U_{\text{homedelivery}}, U_{\text{publichospital}}, U_{\text{privatehospital}})(1)$$

In this study the dependent variable is the choice of where to deliver and the independent variables consists of the pregnant woman's characteristics. A pregnant woman chooses where to deliver from a set of three choices (at home, private hospital or public hospital). The pregnant women are indexed by  $i = (1 \dots n)$ , the alternatives (home delivery care, private hospital delivery care and public hospital delivery care) are indexed by  $j = (1,$

2....j). Suppose a pregnant woman  $I$  choose alternative  $j$ ; it is assumed that alternative  $j$  yields the maximum utility, therefore  $U_{ij}$  is the maximum utility chosen. The individual's utility from choosing alternative  $j$  is expressed as follows;

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (2)$$

Where;  $U_{ij}$  is the true but unobservable utility for alternative  $j$ .  $V_{ij}$  is the observable component of utility and it shows the degree to which pregnant woman  $i$  prefer alternative  $j$  among other alternatives.  $\varepsilon_{ij}$  is the random or unexplained component of the utility of alternative  $j$  for individual  $i$ , it captures the factors that affect utility but are not included in  $V_{ij}$ . The observable component of the utility  $V_{ij}$  is expressed as follows;

$$V_{ij} = \alpha_{0j} + \alpha_{1j}x_i \quad (3)$$

Where,  $x_i$  is a vector of the individual characteristics,  $\alpha_0$  and  $\alpha_1$  are vectors of parameters representing the influence of attributes of the individuals and alternatives. The  $j$  subscripts on the coefficients are to allow the coefficient to vary depending on the alternative chosen. The observed choice is determined by the difference in utility and not the level of utility. The amount of difference in the observed utility is determined by the difference in the probability of choosing an alternative. Therefore the probability of choosing alternative  $j$  as opposed to another alternative  $1$  can be expressed as follows;



$$\text{Prob}(U_{ij} > U_{i1}) = \text{Prob}(V_{ij} + \varepsilon_{ij} > V_{i1} + \varepsilon_{i1}) = \text{Prob}(V_{ij} - V_{i1} > \varepsilon_{ij} - \varepsilon_{i1}) \quad (4)$$

### 3.2 Model specification

The random utility model can be applied using the multinomial logit model. The multinomial logit is used to analyze the pregnant woman's choice of place of delivery. The model is an extension of the binary logit model; it is used when an individual has to make a choice from a set of more than two unordered categories. It is also used when independent variables have dummy coding. From equation four it means that the utility<sup>1</sup> derived from one alternative should be higher than that derived from other alternatives. Therefore the probability of a pregnant woman choosing a place of delivery which yields high utility is as shown below:

$$\text{Prob}(y=j) = \frac{\exp(x_j \beta_j)}{1 + \sum_{j=0}^3 \exp(x_j \beta_j)} \quad (5)$$

Where  $y=j$  when a pregnant woman chooses alternative  $j$ .

$$j=1, 2, 3, \dots, j-1.$$

Equation (5) gives the probability of a pregnant woman choosing the alternative that gives the highest utility from the alternatives available. It is important to note that it is the

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<sup>1</sup>Other models which could have been used in this study include; multinomial probit, nested logit, ordered logit and ordered probit. The above methods could not be used in this study because; multinomial probit has practical limitations in that it is difficult to obtain the partial effects on the response probabilities and for a study with more than five alternatives the maximum likelihood is infeasible. Nested logit is appropriate when the set of alternatives can be partitioned into nests (subsets). Ordered logit models can only be used where there are categorical variables; where respondents are asked to report on a certain category (Wooldridge 2002)

difference in the utilities functions that determine the probabilities. In multinomial logit model there should always be a base category in which other alternatives are compared to. The equation below is used to compute the base/reference category:

$$\text{Prob}(\mathbf{y}=\mathbf{j}) = \frac{1}{1 + \sum_{j=0}^3 \exp(x'_{ij}\beta_j)} \quad (6)$$

Where  $\mathbf{j}$  is the base category

It is important to specify the conditional utility function before applying equation (5) above. Therefore, the utility function can be expressed as a function of the pregnant mother characteristics and hence it can be expressed in a linear functional form as shown below:

$$\text{Prob } ij = f(\alpha_{0ij} + \alpha_1 \text{AGE}_{ij} + \alpha_2 \text{EDUC}_{ij} + \alpha_3 \text{BO}_{ij} + \alpha_4 \text{MM}_{ij} + \alpha_5 \text{RLG}_{ij} + \alpha_6 \text{RSD}_{ij} + \alpha_7 \text{WI}_{ij} + \alpha_8 \text{NACV}_{ij} + \alpha_9 \text{MS}_{ij}) \quad (7)$$

Where  $\text{Prob } i$  – is the probability that a pregnant woman  $i$  will make a certain choice given the individual attributes.  $\alpha_0, \alpha_1, \alpha_2, \dots, \alpha_9$  are the parameter vectors to be estimated. The independent variables are; **EDUC** – Education, **BO**- Birth order, **MM** -mass media, **RLG**- Religion, **RSD**- Residence, **WI** –Wealth index, **NACV**- Number of antenatal care visits and **MS** – Marital status. Most of these variables are dummies. The subscript  $ij$  represents the  $i^{\text{th}}$  pregnant woman across  $j$  alternatives. In this study the dependent variable is the place of delivery; therefore the three options can be coded as follows; 1= home delivery, 2= public hospital delivery and 3= private hospital delivery. Therefore the probabilities of choosing any of the three options will be derived by the following equations:

$$\text{Prob (Home delivery=1)} = \frac{1}{1 + \exp(x'_i1\beta_1) + \exp(x'_i2\beta_2) + \exp(x'_i3\beta_3)} \quad (8)$$

$$\text{Prob (Public facility=2)} = \frac{\exp(x'_i3\beta_3)}{1 + \exp(x'_i1\beta_1) + \exp(x'_i2\beta_2) + \exp(x'_i3\beta_3)} \quad (9)$$

$$\text{Prob (private facility=3)} = \frac{\exp(x'_i3\beta_3)}{1 + \exp(x'_i1\beta_1) + \exp(x'_i2\beta_2) + \exp(x'_i3\beta_3)} \quad (10)$$

### 3.3 Model Estimation

To estimate the multinomial logit model, the probability that an expectant mother  $i$  will choose a type of delivery care  $j$  will be derived in a likelihood function as follows:

$$L = \prod_{i=1}^n \prod_{j=0}^J \{Pr(Y_i = j/x_i)\}^{1(G_{ij})} \quad (11)$$

Equation (11) is the likelihood function which is interpreted as the expectant mother  $i$  probability of observing her actual choice. By taking logs on equation (11) we have the log likelihood function of the multinomial logit model as follows;

$$\ln L = \sum_{i=1}^n \sum_{j=0}^3 G_{ij} \cdot \ln(\pi_{ij}) \quad (12)$$

Where,

$G_{ij} = 1$  if the expectant mother  $I$  choose alternative  $j$ .

$G_{ij} = 0$  otherwise

$\pi_{ij}$  is the probability of the expectant mother  $i$  choosing alternative  $j$ .

### **3.4 Data sources**

This research paper analyzes data from Kenya demographic and health survey (KDHS) 2008-2009. This is a nationally representative sample survey of 3465 men aged 15-54 and 8444 women aged 15-49 selected from 400 sample clusters throughout Kenya . This survey is conducted in Kenya after every five years. KDHS (2008-09) is a follow up of the 1989,1993,1998,2003 surveys (KNBS, and ICF Macro, 2010). The survey is designed to provide data to monitor the health situation and population in Kenya. The survey utilized a systematic two stage sampling technique based on the 1999 population and housing census, during the selection of households to be included in the sample, the design used in the survey is cross sectional. This research paper is focusing on choice of place of delivery at birth; therefore, information on the most recent births is necessary. Hence, the population of interest is women aged 15-49 years who gave birth in the last five years preceding the survey. The analysis will cover 3973 women. This research is based on secondary data that is freely available to the public with no identifiable information on the respondents; hence, no ethical considerations are necessary.

#### **3.4.1 Variables Used in the Study**

The dependent variable in this study is the place of delivery; Place of delivery can either be at home or in the health facility. Delivery in the health facility can either be in a private health facility or public health facility. Public health facilities include all government hospitals whereas private health facilities include; private hospitals, mission hospitals, hospitals managed by NGO'S, clinics, centers and other health facilities. On the hand, delivery at home includes; delivery at the woman's home and delivery en route to a healthcare facility, in that it reflects women who had attempted to deliver at home

and later on decide to go to a health facility. The determinants of utilization of health facility delivery services from the literature review include age, education, marital status, religion, residence, birth order, distance, number of antenatal care visits, access to mass media and wealth index. The independent variables for this study therefore will be age of the mother, mother's level of education, place of residence, exposure to mass media, wealth index religion, number of antenatal care visits, and marital status. The variables chosen are important in that they are the major characteristics that influence the decision of an individual

**Table 3.1 Variable Definitions**

<b>Variable</b>	<b>Variable definition and measure</b>	<b>Expected sign</b>
<b>Dependent variable</b>		
Place of delivery	Y=1 Home delivery. Y=2 Private facility delivery Y=3 Public facility delivery	
<b>Independent variables</b>		
Age	Mother's age at birth	
	0=15-20 years,	Negative
	1=21-34 years,	Positive/
	2 = 35 years and over.	Positive/
Religion	Mother's religion.	
	0=Roman catholic	Positive
	1=Protestant	Positive
	2=Muslim	Negative
	3= No religion,	Negative
Education	Mother's highest level of education.	
	0=None,	Negative
	1=Primary	Negative
	2=Secondary,	Positive
	3=Higher.	Positive
ANC visits	Number of ANC visits during the period of pregnancy	
	0=0 visit,	Negative
	1=1-3 visits,	Positive/Negative
	2=4 or more visits.	Positive
Birth order/parity	Number of births/deliveries the mother has ever had during her life.	
	0=1-3 deliveries,	Positive
	1=4-5 deliveries	Positive/Negative
	2= 6 or more deliveries.	Negative

Variable	Variable definition and measure	Expected sign
Mass media	Level of exposure to mass media (listening to radio)	
	0= Non Exposure to mass media	Negative
	1=Exposure to mass media less than once a week.	Negative
	2=Exposure to mass media at least once a week.	Negative/positive
	3=Exposure to mass media almost everyday	Positive
Residence	Mother's place of residence	
	0=Urban,	Positive
	1=Rural.	Negative
Wealth index	0=Poorest,	Negative
	1=Middle,	Positive
	2=Richer.	Positive
Marital status	0=Single	Positive/negative
	1=Married/ living together	Positive
	2=Widowed	Negative
	3=Divorced	Positive

### 3.5 Data analysis

The data in this study was analyzed by statistical analysis software 'STATA' version 12 which is a programme based analytical tool. Multinomial logit model has been used in this study because of analysis of more than two alternatives. This model is used based on the assumption that error terms are independently and identically distributed (IID). This means that the unobserved factors affecting utility from one alternative are not related to the unobserved factors affecting another alternative.

Most of the time when using categorical predictor variables it is important to have dummy variables, because the categorical variables cannot be directly regressed. Dummies are used when the variables are qualitative rather than quantitative. For instance a categorical variable with **n** levels will use a set of **n-1** dummy variables to represent the **n** category variable. When dummy variables are used one category is chosen as 'the reference category'; the category to which we compare other categories. Dummy variables are coded **1** if the case is in that category and **0** if otherwise. The regression

coefficient for each variable will be interpreted as how it compares with the reference category.

For regression analysis we combine respondent's home, another home, and en route to the provider as 'home delivery'; we also combine government hospital, government health centers, government dispensary and other public, 'as public hospital delivery'; Mission hospital/clinic, private hospital/clinic, nursing/maternity home and other private clinic as 'private hospital delivery'. Women who reported giving birth in another place are excluded in the regression analysis, since there is no exact information regarding the place of delivery. To measure the effects of the explanatory (independent) variable on the response (dependent) variable we compute the marginal effects.<sup>2</sup>

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<sup>2</sup>Dummy variables are "proxy" variables or numeric stand-ins for qualitative facts in a regression model. A dummy independent variable which for some observation has a value of 0 will cause that variable's coefficient to have no role in influencing the dependent variable, while when the dummy takes on a value 1 its coefficient acts to alter the intercept

## CHAPTER FOUR

### EMPIRICAL RESULTS AND ANALYSIS

#### 4.0 Introduction

This chapter present and discusses the empirical results on the factors influencing the choice of place of delivery in Kenya. This chapter is organized into two sections. Section 4.1 presents the descriptive statistics for both dependent and independent variables and section 4.2 presents the empirical results of the multinomial logit regression analysis.

#### 4.1 Descriptive Statistics

The general characteristics of the sample of women used in this study are presented in the table below.

**Table 4.1 Descriptive Statistics**

<b>Variable</b>	<b>Mean</b>	<b>Std deviation</b>	<b>Min</b>	<b>Max</b>
<b>Dependent variable</b>				
Home	0.529	0.499	0	1
Public Hospital	0.347	0.476	0	1
Private hospital	0.124	0.329	0	1
<b>Independent variables</b>				
<b>Age</b>				
15-24 years	0.416	0.493	0	1
25-34 years	0.308	0.462	0	1
Over 35 years	0.276	0.447	0	1
<b>Highest educational level</b>				
No education	0.147	0.354	0	1
Primary	0.522	0.480	0	1
Secondary	0.247	0.431	0	1
Higher education	0.085	0.278	0	1
<b>Place of residence</b>				
Urban	0.309	0.462	0	1
Rural	0.690	0.462	0	1
<b>Religion</b>				
Roman Catholic	0.201	0.401	0	1
Protestant/other Christian	0.614	0.487	0	1
Muslim	0.162	0.368	0	1
No religion	0.023	0.150	0	1



<b>Variable</b>	<b>Mean</b>	<b>Std deviation</b>	<b>Min</b>	<b>Max</b>
<b>Level of exposure to mass media</b>				
Not at all	0.184	0.387	0	1
Less than once a week	0.082	0.274	0	1
At least once a week	0.156	0.363	0	1
Almost every day	0.576	0.493	0	1
<b>Wealth index</b>				
Poorest	0.201	0.401	0	1
Poorer	0.152	0.359	0	1
Middle	0.172	0.378	0	1
Richer	0.191	0.394	0	1
Richest	0.283	0.450	0	1
<b>Parity</b>				
1-3 deliveries	0.406	0.491	0	1
4-5 deliveries	0.160	0.366	0	1
6 or more deliveries	0.434	0.496	0	1
<b>No of ANC Visits</b>				
No visit	0.095	0.294	0	1
1 visit	0.044	0.204	0	1
2-3 visits	0.390	0.488	0	1
4 or more visits	0.471	0.499	0	1
<b>Marital status</b>				
Single	0.301	0.457	0	1
Married	0.597	0.490	0	1
Widowed	0.042	0.200	0	1
Divorced	0.061	0.239	0	1

*Source:* Computation from KDHS data 2008-09

The descriptive statistics summarizes the variables that are used in this study. Results show that despite the risks associated with home delivery 53% of women delivered at home prior to 2008 in Kenya, with 34.8% of women delivering in public hospitals and 12.2% of women delivering in private hospitals. This implies that most women choose home delivery to hospital delivery and most women use public health facilities as compared to private health facilities. It is evident that, majority of women had attained primary education with 14.71% of women having no education at all.

Results further show that 43.4% of women had six or more deliveries and 40.7% of women had 1-3 deliveries. The highest birth order recorded was 15 while, the lowest was

1. This shows that most women in Kenya have a higher parity. The wealth index is based on the household standard of living like; dwelling characteristics, type of drinking water source, consumer goods among others. Results show that 28.3% of women are categorized as very rich with 20.1% of women categorized as very poor. This implies that a fifth of women in the sample cannot access common basic needs. Results further show that 69.0% of women were from the rural areas with 31.0% from the urban areas

In regard to the usage of antenatal care services the highest number of ANC visits was 20, the lowest was 0 with a mean of 5. Only 9.5% of women did not attend ante natal clinics with 46.5% of women attending at least four antenatal clinics. The results further show that 57.8% of women were exposed to mass media almost every day with 18.4% of women not accessing mass media at all. Exposure to mass media may indicate an increased awareness on the national health campaigns. Marital status is also important in that it determines the social support that a woman receives for herself and her newborn baby. Results show that 59.8% of women were married, with 30.0% being single. The remaining 10.2% of women were either divorced or widowed.

#### **4.2 Multinomial logit results on choice of place of delivery**

In this study the dependent variables are; home delivery, public hospital delivery and private hospital delivery. Home delivery is the reference category. The reference category is considered as the baseline comparison group. Therefore, the multinomial logit will show the results for public hospital delivery and private hospital delivery in comparison to home delivery.

**Table 4.2 Multinomial Logit results for public and private hospital delivery care**

Variable	Public hospital delivery		Private hospital delivery	
	Coefficient	P> Z	Coefficient	P> Z
Age (24-35 years)	0.143	0.152	0.333	0.021
Age (35 years)	0.237	0.017	0.815	0.000
Mass media access (less than once a week)	0.457	0.007	0.909	0.001
Mass media access (at least once a week)	0.414	0.005	0.380	0.113
Mass media access (almost every day)	0.466	0.000	0.475	0.020
ANC (one visit)	0.560	0.043	-2.055	0.561
ANC (2-3 visits)	1.412	0.000	0.680	0.013
ANC visits (4 or more visits)	1.899	0.000	1.198	0.000
Parity (4-5 children)	-0.572	0.000	-0.675	0.000
Parity (over 6 children)	-0.629	0.000	-1.338	0.000
Religion (protestant)	-0.018	0.860	-0.382	0.008
Religion ( Muslim)	-0.015	0.918	-0.448	0.049
Religion (no religion)	-0.168	0.551	-1.085	0.090
Marital status ( married)	0.077	0.592	0.441	0.040
Marital status ( widowed)	0.256	0.336	-0.096	0.857
Marital status (divorced)	-0.079	0.697	-0.325	0.322
Wealth index ( middle)	0.639	0.000	-0.395	0.068
Wealth index ( rich)	0.913	0.000	1.438	0.000
Education ( primary)	0.485	0.001	0.727	0.010
Education ( secondary)	1.251	0.000	1.672	0.000
Education ( higher)	1.829	0.000	3.223	0.000
Place of residence (rural)	-0.653	0.000	-0.832	0.000
Constant	-2.764	0.000	-3.948	0.000
<b>Number of obs= 4054</b> <b>LR chi2(44) = 1596.72</b> <b>Prob &gt; chi2 = 0.0000</b> <b>Log likelihood= -3085.1169</b> <b>Pseudo R2 = 0.2056</b>				

Source: Computation from KDHS 2008/09 data using Stata version 12

The coefficients of the multinomial logit results cannot be interpreted directly because they represent the unit change in logit for each unit change in the predictor. They show the direction of the partial effects on the multinomial logit index/score but they do not correspond to the average partial effects. Therefore there is a need to compute marginal effects which gives the derivative of the probability that the dependent variable equals one with respect to a particular conditioning variable. The  $P > |Z|$  values in table 4.2 shows that each coefficient is different from 0. If the p-value is lower than 0.05 then the independent variable has a significance influence on the dependent variable.

The table further shows that the significant variables in respect to public hospital delivery include; place of residence, education levels, wealth index, parity, ANC visits and mass media. The significant variables in respect to private hospital delivery include; place of residence, education levels, wealth index (richer), marital status (married), religion (protestant and Muslim), parity, ANC visits (2-3 visits and 4 or more visits), mass media (less than once a week and almost every day) and age.

**Number of obs=4054** this is the number of observations that were used in the analysis. This number is smaller than the total number of observations in the data set this means that there are some missing values for any of the variables used in this logistic regression. By default, stata does a list wise deletion of incomplete cases (Bruin, 2006). **Pseudo R2=0.2056** this is the pseudo R-squared and is not equivalent to the R-squared that is found in Ordinary Least Squares (OLS) regression. Therefore, its interpretation is different. **LR chi2 (44) = 1596.72** this is the likelihood ratio chi square test for both equations (public hospital delivery relative to home delivery and private hospital delivery

relative to home delivery) that at least one of the predictor, regression coefficient is not equal to zero.

The number in the parentheses indicates **44** degrees of freedom of the chi-square distribution. **Prob> chi2 = 0.000** is the probability of obtaining the chi-square statistic (1596.72) if there is no effect on the independent variables on the dependent variables. The p-value is normally compared to a critical value (in this analysis the critical value is 0.05) to determine if the overall model is significant In this case the model is statistically significant since the p-value is 0.000. The marginal effect in our case refers to the partial effects on the probability of choosing a health facility type as opposed to the home delivery which is used as base category. The marginal effects of using a public and a private hospital are represented in the table below.<sup>3</sup>

**Table 4.3 Probability of using public or private hospitals during delivery**

Variable	Public hospital delivery		Private hospital delivery	
	Marginal effects	Z	Marginal effects	Z
Age (24-35 years)	0.023	1.05	0.022	2.06
Age (35 years)	0.024	0.73	0.067	3.06
Mass media (less than once a week)	0.068	1.76	0.070	2.28
Mass media (at least once a week)	0.085	2.53	0.017	0.84
Mass media (almost every day)	0.093	3.43	0.022	1.53
ANC (one visit)	0.143	2.14	-0.033	-1.46
ANC (2-3 visits)	0.305	7.24	0.005	0.22
ANC visits (4 or more visits)	0.384	10.20	0.029	1.53
Parity (4-5 children)	-0.109	-4.83	-0.033	-3.25
Parity (over 6 children)	-0.109	-3.79	-0.066	-5.85
Religion (protestant)	0.007	0.36	-0.030	-2.75
Religion ( Muslim)	0.008	0.27	-0.030	-2.33
	<b>Marginal effects</b>	<b>Z</b>	<b>Marginal effects</b>	<b>Z</b>
Religion (no religion)	-0.016	-0.27	-0.054	-2.58

<sup>2</sup>Partial effect shows how much the probability of choosing one alternative increase if the explanatory variable increases by one unit

Variable	Public hospital delivery		Private hospital delivery	
Marital status ( married)	0.005	0.19	0.029	2.33
Marital status ( widowed)	0.063	1.02	-0.015	-0.43
Marital status (divorced)	-0.009	0.02	-0.020	-1.07
Wealth index ( middle)	0.139	5.29	0.008	0.50
Wealth index ( rich)	0.159	6.47	0.089	5.64
Education ( primary)	0.089	2.78	0.040	2.02
Education ( secondary)	0.213	5.14	0.106	2.90
Education ( higher)	0.123	1.89	0.331	4.65
Place of residence (rural)	-0.123	-4.97	-0.047	-3.74

*Source:* Computation from KDHS 2008/09 data using Stata version 12

The results show that; living in the rural area reduces the probability of a pregnant woman delivering in a public and a private facility by 12.3% and 4.7% respectively. This could be attributed to inadequate health facilities whereby pregnant women are forced to travel long distances to seek maternal health services. It could also be attributed to quality of health services being offered in the public hospitals in the rural areas. Hence, most women in the rural areas find it safe and secure to give birth in the presence of their family members. The traditional birth attendants are found in the rural areas and hence most women would prefer them compared to skilled birth attendants in hospitals since they are cheaper and easily accessible. The low utilization of hospital delivery could also be attributed with the cost of the delivery services. Women in the rural areas also can be easily influenced by the prevailing traditional delivery practices hence most of them are not likely to deliver in the health facilities.

Women with higher birth orders are less likely to deliver in health facilities. An increase in the number of children reduces the probability of a woman delivering in a public health facility by 10.9%. It also reduces the probability of a woman delivering in a private health facility by 6.6%. High parity means a large family size therefore allocation of household income for hospital delivery purposes may not be a priority. It could also

be explained by the fact that during the previous births the mother had no difficulties during delivery. High birth order means more responsibilities hence less time to go the health facility.

Being with no religion, Muslim or a Protestant reduces the probability of delivering in a private health facility by 5.4%, 3.0% and 3.0% respectively. However, Muslim and Protestant women are more likely to deliver in a public health facility. This could be attributed to the fact that they get information on the importance of health facility delivery from their Muslim and church leaders respectively. Women with no religion are less likely to deliver on a public or a private health facility. The reason could be most of these women are traditionalists and hence their beliefs do not allow women to deliver in health facilities.

Women who had at least one ANC visit are likely to deliver in public health facility. One ANC visit increases the probability of delivering in a public health facility by 14.3% and decreases the probability of delivering in private facility by 3.3%. Four or more ANC visits increases the probability of delivering in a public health and private health facility by 38.5% and 2.9% respectively. The reason behind the strong association between the number of ANC visits and use of health facility during delivery is that during antenatal care women are enlightened on the importance of health facility delivery. The other reason could be; women who are in employment are financially stable hence they are more likely to attend antenatal clinics because they can afford. In addition, they know the importance of antenatal care visits.

Wealth index is useful in ranking the socio economic status of households. The results show that being from a middle class and rich household increases the probability of

delivering in a public health facility by 13.9% and 15.9% respectively. It also shows that being from a middle class or rich household increases the probability of delivering in a private health facility by 0.8% and 8.9% respectively. Most women from middle class household are more likely to deliver in public hospitals and they are less likely to deliver in the private hospitals. This could be attributed to the fact that public hospitals are cheaper than the private hospitals. Women from rich households are more likely to deliver in both public and private hospital this could be attributed to their ability to meet the hospital costs.

The KDHS data used in this study could have been more useful if it contained other variables like cost of the health delivery care services, distance to the health facility and the cost of transport. The data set used in this study had missing data. The data analysis using stata shows only 4054 observations were made this means that stata dropped almost half of the respondents. Missing data normally leads to biased results but the data set was so large such that after half the data set was dropped the remaining data set was large enough hence the results were not biased.



## **CHAPTER FIVE**

### **CONCLUSION AND POLICY RECOMMENDATIONS**

#### **5.1 Conclusion**

The major findings in this study can be summarized as follows; the choice of a place of delivery among pregnant women depends on age, education of the woman, marital status, place of residence, wealth index, access to mass media, number of antenatal visits, religion and birth order. Health facility delivery is highly influenced by the woman's place of residence. This study shows that, women from rural areas are less likely to use health facilities during delivery. Women who listen to the radio almost every day are more likely to deliver in a public or a private health facility, unlike women who never listened to the radio at all. The level of education of a woman has a significant impact on the choice of place of delivery. Women with higher education are more likely to deliver in private hospitals.

Women with higher birth orders are less likely to deliver in a public or private health facility. Older women are more likely to deliver in a public or private health facility. The number of ANC visits also influences the choice of place of delivery. High number of ANC visits increases the likelihood of women delivering in a health facility. Women with no religion are less likely to deliver in health facility, while protestant and Muslim women are more likely to deliver in a public hospital and less likely to deliver in a private hospital. Women who are divorced are less likely to deliver in a private or a public health facility. Women who are widowed are more likely to deliver in the public hospital and

they are less likely to deliver in a private hospital. Married women are more likely to deliver in a private or a public hospital.

## **5.2 Policy Recommendations**

In Kenya the use of health facility delivery care is still low and therefore this should be a matter of concern for policy makers. Women from the rural areas are less likely to use health facilities during delivery. This could be as a result of inadequate health facilities. Therefore, the government should ensure that more health facilities are put up in the rural areas; so that the coverage of modern maternity services is increased and the health of the rural women is improved. Initiatives such as focused antenatal care, emergency obstetrics and postnatal care in health facilities in Kenya should be made available and accessible.

The ministry of health should also carry out promotional messages on the importance of ANC visits; which should include both demand and supply sides so that; women can understand the ANC services to ask for. The accessibility and the quality of antenatal services should be improved so that more women can use the ANC services. More midwives should also be deployed to the rural areas so that the maternal health care is improved. For the rural midwives to be used fully; they should have good working conditions, good remuneration and economic security.

Women with no education, women in the youngest age groups and women with higher birth order were less likely to deliver in a health facility. This means that providing adequate information on the importance of health facility delivery care is essential to these women. The information should be passed to them through mass media especially radios and television preferably in their local languages so that they can understand. On the other hand health professionals, community midwives and other health personnel

should play a key role in educating women in these categories so that they can be informed on the importance of using health institutions during delivery

Wealth index has been identified as a good predictor on the utilization of the appropriate health services during delivery. Therefore, women should be empowered economically so that they can be able to raise their standards of living and move to higher wealth index. The Kenyan government has rolled out the women enterprise fund and uwezo fund; these funds are meant to enable all women in Kenya irrespective of their education levels to be empowered economically.

The government through the ministry of education should encourage the girl child education. The government of Kenya in 2003 started the free primary education and in 2008 it rolled out the free day secondary school programme; this was meant to help the poor and the marginalized communities' access education equally. However, some communities in Kenya still do not value the girl child education and hence makes it difficult for girls to attend school. The government should therefore make education compulsory for all school age children. The effect of education on utilization of health care has been attributed to; higher ability to acquire new information, increased autonomy and decision making power, and changing attitudes towards health problems and health services (Kunst& Howling, 2001).

### **5.3 Research limitations**

In this study the regression analysis included only nine independent variables. These variables have significant predictive ability on whether a woman would use a health facility for delivery or not. However, other variables which could have been included

here which would also have been significant predictors of use of professional delivery care services among pregnant women. The variables which could have been included are the cost of maternal health care services, distances to health facilities, household savings, and the level of household income. However, information on these important variables was not collected in the Kenya demographic and health survey 2008-2009. Lack of such vital information has constrained a detailed analysis. Therefore, it would be important to collect information on these variables in the future surveys so that appropriate policies can be put forward to improve on maternal health care in Kenya.

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