CHALLENGES FACING PREGNANT WOMEN IN ACCESSING FREE MATERNITY SERVICES: THE CASE OF LEVEL FIVE AND SIX HOSPITALS IN KENYA

BY

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DECLARATION

Student's Declaration

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

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Declaration by Supervisor

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

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DEDICATION

This research project is dedicated to my family, lecturers, workmates, classmates and friends who supported me in prayers, advice and whose patience and understanding played a key role to my success. I would wish to dedicate it to all other academicians, researchers, National and County health Leaders in their respective positions.

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ABBREVIATIONS

ANC	Ante Natal Care
APH	Ante Partum Heamorrhage
APLS	Affordability Ladder Programme
DFID	Department for International Development
ICU	Intensive Care Unit
KDHS	Kenya Demographic Health Survey
KNH	Kenyatta National Hospital
MDG	Millennium Development Goals
MOH	Ministry Of Health
MTRH	Moi Teaching and Referral Hospital
NHSSP	National Health Sector Strategic Plan
PETS	Public Expenditure Tracking Survey
PHC	Primary Health Care
PPH	Post-Partum Heamorrhage
SARAM	Service Availability and Readiness Assessment Mapping
SDG	Sustainable Development Goals
SDI	Survey Delivery Indicator
UHC	Universal Health Coverage
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's' Fund
VIF	Variance Inflation Factors
WHA	World Health Assembly
WHO	World Health Organization

ABSTRACT

Free maternity healthcare services were introduced in Kenya in the year 2013.This is in line with the health system objective of universal health coverage in the fifth millennium development goal. The aim was to increase skilled birth attendants and reduce inequality by making services available to all pregnant women. Access to skilled delivery has been identified as a key factor in reducing maternal mortality. On implementation of the policy, there was increased demand which led to constraints at the health facilities especially levels 5 and 6 facilities. However, there are multiple factors that hinder accessibility, affordability and availability of health services. Therefore this study mainly investigated challenges faced by pregnant mothers in accessing and utilizing free maternal service healthcare especially in levels 5 and 6 health facilities in Kenya. A descriptive, exploratory research design was used in this study. The significance of the coefficients was tested at 1%, 5% and 10% significance levels. Secondary data was obtained from the Ministry of Health on staffing, facilities and deliveries in health facilities under study. From the study, results revealed that at 1% significance level, a hospital with obstetricians, ambulances, beds and presence of free maternity policy significantly increases utilization of free maternity services at levels 5 and 6 health facilities. Midwives and theatres were found to be statistically insignificant in influencing pregnant mothers to utilize free maternity services in levels 5 and 6 hospitals. Based on the analyzed results, the study recommends to the ministry of health through the national government to map out the facilities with high number of deliveries and work out a policy on staffing to guide County governments to ensure increased demand for free maternity services. Since, most mothers share bed at the hospital facility, there is need for improvement of infrastructure to give room for more beds at these facilities to encourage more consumption of free maternity services. Finally, there is a need to increase efficiency and effectiveness at these health facilities to enhance the policy. Therefore the government need to increase the amount of funds to these levels 5 and 6 hospitals to strengthen the free maternity services.

CHAPTER ONE: INTRODUCTION

1.1 Background Statement

Maternal health is the state of women during pregnancy, childbirth and the postpartum period. It encompasses the health care dimension of family planning, preconception, prenatal and postnatal care in order to reduce maternal morbidity and mortality (WHO, 2012). Quality maternal health care is fundamental to the survival of pregnant and childbearing women failure to which leads to maternal mortality. Gilson *et al*., (1993) identified quality as effectiveness, safety, timeliness, efficiency, equity and responsiveness to the preferences, needs and values of mothers and their families. Quality is of more concern to mothers than the cost (Thaddeus & Maine, 1994). Interpersonal behavior is the most widely reported determinant of satisfaction and women identify being treated as human beings as one of the benchmarks of high quality care (Moore *et al*., 2002).

Maternal mortality is a major public health problem. Pregnancy is not a disease and pregnancy related mortality is almost always preventable. In the absence of complications, pregnancy is a simple and natural process that requires little external intervention. However due to unpredictability of birth outcome, skilled attendance at delivery is recommended in a healthy facility (Campbell, 1994).This uncertainty leads to intervention ranging from low intensity (normal delivery) to high intensity (surgical intervention). Globally, over 500,000 women die from pregnancy and child birth each year while approximately 1,600 women die every day due to pregnancy related complications (WHO, 2010).

1.1.1 Maternal Mortality

Maternal mortality is death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not by accident or incidental causes (WHO, 2004). Out of the total number of maternal deaths, 99 percent are from developing countries (WHO, 1996). Half of all maternal deaths occur in Sub Saharan Africa (WHO, 2007). African countries bear the greatest burden with 40 percent of the deaths (UNFPA, 2010). Most of these deaths (88-98 percent) are avoidable as 70 percent are from direct causes namely postpartum heamorrhage,

puerperal sepsis, Pre-eclampsia and eclampsia, obstructed labour and abortion (Abouzahr, 2003).The major causes of maternal mortality are obstructed labour, complications of unsafe abortion, haemorrhage and high blood pressure, all which are preventable if the mother is managed in a health facility (Mxoli, 2007). Further, at least 8 million women every year suffer disability as a result of pregnancy complications. Studies have shown that more than 50 percent of the women who attend Ante Natal Clinic (ANC) deliver outside health facility with unskilled birth attendants (Cotter *et al*., 2006). This is what prompted the International Community to have Millennium Development Goal 5 (MDG-5) which is improving maternal health. The aim was to meet global target for skilled delivery of 80 percent by 2010 and 90 percent by 2015 and reduce maternal mortality by three quarters between 1990 and September, 2015.WHO report estimated deliveries by skilled attendance to be 99.5 percent in developed countries, 46.5 percent in Africa and 65.4 percent in Asia (WHO, 2008). According to report by UNFPA (2004) a woman dies from complications of pregnancy, abortion and child birth every minute of each year.The trends in maternal mortality between 1990 and 2013 by WHO jointly with UNICEF, UNFPA and World Bank rated Kenya as one of the ten countries comprising 58 percent of global maternal deaths (WHO, 2015).

1.1.2 Free Maternity Services

This is offering medical and obstetric care to pregnant women without any financial cost. Maternity services commence from onset of pregnancy till delivery and include maternal and child health clinic, delivery and postnatal care till six weeks after delivery. Literature indicates that the nature and administration of free maternity services has influence on utilization of maternal care (Champagne *et al*., 2006). Improving the quality of service delivery requires adequate investments in infrastructure, medical commodities and human resource. There is need for provision of health output like quality of care access and demand in order to achieve health outcomes. Matua (2004) supports the idea of the government delivering health care freely for all women thus addressing the gaps responsible for these mortalities. Almost half of the 47 African countries have introduced free delivery services in different forms. In Kenya, the government through the Ministry of Health (MoH) on 1st June 2013 abolished maternity charges in public health facilities so as to increase access of skilled attendance to all expectant women leading to reduction in maternal

and child deaths, (MoH, 2015).An assessment done by MoH in 2014 on free maternity services in devolved government indicated an increase in facility deliveries of 22 percent in normal deliveries and 17 percent in caesarean sections. The study showed lowest customer satisfaction on the number of staff though the study did not look into the staffing levels (MoH Report, 2015).

1.1.3 Free Maternity Service Providers

The main factors required for production of health services are inputs which include drugs, equipment and infrastructure and qualified health providers with ability to exert knowledge and skills. These elements should be present in the same facility at the same time (SDI Survey 2010).

Health delivery in Kenya is classified into levels of care based on expected service being provided. The levels of care comprise level 1 (Community Service), Level 2 (Dispensaries) mainly deals with preventive services, Level 3 (Health Centers) which provide ambulatory health services, Level 4 (Sub-County Referral facilities) deal mainly with delivery of healthcare services. The study is based on Level 5 and 6 hospitals which are KNH, MTRH, former provincial hospitals namely; Nyeri, Kakamega, Coast, Nyanza, Embu, Nakuru and Garissa .

In addition, there are five High Volume Hospitals (HVH) namely; Machakos, Meru, Kisii, Thika and Malindi. L5 hospitals (County Referral Facilities) act as intermediary between National, Central level and districts health services and oversee implementation of policy and coordinate all the activities at District health facilities. Level 6 (National Teaching and Referral) facilities that deal with complicated diagnostic, therapeutic and rehabilitative services. Free maternity services are offered in all these levels of care with each level handling services limited to their given facilities (KEPH, 2005). Levels 1-3 handles Maternal, Child Health care and Family Planning and conduct uncomplicated normal deliveries. Levels 4-5 act as referrals for complicated pregnancy related maternity cases that may need operations or close monitoring but also handle normal deliveries as a result of self-referrals. Level 6 acts as referral facilities for pregnancy related complications that may require ICU and Renal dialysis care or specialized services like heart conditions that are only available at that level. Levels 4-6 have departments designated to offer maternity services

which comprise of antenatal, postnatal, gynaecology and labour ward, newborn unit and maternity theatre. Ambulance services are in place for referrals. Levels 2-6 have a laboratory for Ante Natal profile (ANC) (NHSSP II, 2005-2010).

In all the levels the services require specialized nurses qualified in midwifery and authorized by regulatory body. In Level 4, medical officers and anaesthetists are required in addition to midwives and Levels 5-6 requires obstetricians/gynaecologists, anaesthetists, critical care nurses and midwives. Other inputs to support maternal services include delivery equipment for mother and baby care, drugs, water and electricity.

1.1.4 Challenges of Public Health Service in Kenya

In 1963, an independent Kenyan government took responsibility for the health of its citizens. The government proposed free healthcare for all Kenyans. In 1977 Kenya adopted the World Health Assembly (WHA) ‘‘Health for All by the year 2000’’, the Alma-Ata Declaration on PHC 1978, and the 1981 WHA ‘‘Global Strategy for Health for All by the year 2000’’. Kenya adopted Safe Motherhood Initiative in 1987 which aimed to provide antenatal care (ANC), skilled assistance for normal deliveries, and appropriate referral for women with obstetric complications, postnatal care, and family planning .There was economic crisis in 1973 due to insufficient infrastructure, equipment and staffing which resulted to government reintroducing user fees in 1989.The cost sharing funds were used to supplement government funding to make all health services effective, accessible and affordable (Oyaya& Susan,2003). Worsening poverty situation in the country made health services inaccessible and this led to the MoH changing its cost sharing policy replacing it with a “10/20” policy (MoH, 2004), in dispensaries and health centres.

Lack of guidance to the amount of charges in the other levels of care led to high cost of care which many Kenyans could not afford (Owino, 1998). According to the Kenya Demographic Health Survey (KDHS) 2008, more than 90 per cent of Kenyan women received antenatal care from medical professionals but fewer than half of all births took place in a health facility. Majority of women (56 per cent) gave birth at home with only 44 percent deliveries being conducted by skilled birth attendants. The major factors associated with home deliveries were lack of access, negative attitudes of

health workers, cultural preferences, and the high cost for services (MOH- DFID, 2013).

A study done on Service Availability and Readiness Assessment Mapping (SARAM) in 2013 reported inadequate or lack of medicine as a key factor in underutilization of health services (MoH,2013).The SARAM (2013) and PETS surveys (2010) indicated that seventy two percent of public health facilities had basic medical equipment necessary for most health services .The studies highlighted serious gaps attributed to shortage of human resource which was measured in terms of absentees, knowledge and skills. The Kenya Health Sector Strategic & Investment Plan (2012-2018) also estimates that current staff levels meet only 17 percent of minimum requirements needed for effective operation of the health system.

The task force on strengthening health service delivery (MoH Kenya, 2012), indicated persistent insufficient infrastructure, equipment and staffing. Only about 36 percent of public health facilities have all the basic delivery room infrastructure and equipment while lower level facilities unequipped (MoH, 2015).

1.2 Problem Statement

Kenya is among the 60 countries with highest maternal mortalities in the world (MDG Report, 2013).This led to the introduction of free maternity policy by the government of Kenya in June, 2013 to improve access to maternal health services, reduce inequality and reduce maternal mortality. Despite the introduction of these free services, their utilization across the country by pregnant women from antenatal level, during the birth to postnatal services is still low. These services comprise maternity package in all public health facilities.

Free maternity healthcare services have been adapted in many countries with an aim of increasing deliveries by skilled birth attendants and reduce maternal mortalities. A free maternal health care service is offering medical and obstetric care to pregnant women without any financial cost. Access to skilled attendants during delivery where adequate facilities have been provided is a major factor to reducing maternal mortality (Thaddeus & Maine, 1994). WHO has been calling on countries to provide Universal Health Coverage (UHC) and reduce inequities in health provision. Equitable universal

coverage means right to use and effective coverage that is affordable and not burdensome to population (WHO, 2000). The United Nations General Assembly (2012) passed UHC Resolution and urged all governments to ensure access to affordable healthcare. Policies should be designed and managed to address inequality and allow equity of access to achieve Universal Health Coverage (Frenz & Vega, 2010).

Since independence, Kenya has adopted, designed and implemented policies with an aim of promoting access to modern healthcare and attain health for all as was outlined in Alma Atta declaration. These policies include Health Policy Framework, 1994, 10/20 policy of 2004, Health for all by the year 2000, Safe Motherhood 1987, Campaign for Accelerated Reduction of Maternal Mortality in Africa 2010, Vision 2030 and now Sustainable Development Goals by 2030. Home births have remained high and contribute largely to high maternal death rates. Studies have shown that more than 50 percent of the women who attend (ANC) do not deliver in health facilities (Cotter *et al*. 2006). Health programmes and initiatives aimed at reducing maternal mortality have not been successful. Health system factors may be contributing to barriers in accessing skilled birth attendants.

After introduction of free maternity services in 2013, facilities were overwhelmed with National Referrals and Pumwani maternity getting over 100 percent increase in child deliveries (Burbonis, 2013). Death in facilities is still occurring. Timeliness of intervention is crucial in ending maternal mortality but the third type of delay which is receiving adequate emergency care at facility remains a challenge. A study done by MoH (2014) to assess status of implementation of free maternity services program in the devolved health system indicated an increase of neonatal deaths by 27 percent and maternal deaths by 10 percent. There was least client satisfaction (9 percent) on staffing and quality of care with inadequate documentation which is key in assessing quality of care. Another study by Mugambi (2004) looked into socio economic factors influencing utilization of free maternity services in Nyatike District in Kenya. The study found that most of the mothers who accessed the free maternity services lived near the facilities and walked between 30 minutes to one hour.

Researchers have shown that focus has been mainly on financial barriers but strategies and policies on access are limited (Michael *et.al*., 2013). How accessible and effective free maternity services are to women still remains a question to be answered. There is little evidence on cause and barriers to access from side of provider. Evidence and causes of underutilization of free maternity service is missing in most studies.No study have investigated the challenges faced by pregnant women in accessing free maternity service in level 5 and 6 facilities after introduction of policy in June 2013.

1.3 Research Questions

i. What is the ratio of specialized staff to pregnant women in Level 5 and 6 public hospitals offering free maternity services?
ii. What is the influence of staff and physical healthcare facilities on utilization of free maternity services among pregnant women in Levels 5 and 6 public hospitals?
iii. What are the influences of government policy on utilization of free maternity services in Level 5 and 6 public hospitals?

1.4 Objectives of the Study

The main objective of this study was to investigate the challenges facing pregnant women in accessing free maternity serviceson level 5 and 6 health facilities in Kenya as a result of introduction of new free maternity policy by the government to achieve universal access to reproductive health services.

The specific objectives were to:

i. Identify the ratio of specialized staff to pregnant women in Level 5 and 6 public hospitals offering free maternity services.
ii. To investigate the influence staff and physical healthcare facilities on utilization of free maternity services among pregnant women in Levels 5 and 6 public hospitals.
iii. To investigate the effect of government policy on utilization of free maternity services in Level 5 and 6 public hospitals.

1.5 Justification and Significance of Research

Effective skilled birth attendance plays a major role in improving both new born and women's health status thus reducing the maternal and child mortality rate (WHO,

2012). However, for provision of maternity care to be effective, women need to be active participants and accept responsibility for their health (Mxoli, 2007). Improvement of maternal health was enshrined in the Millennium Development Goals as one of the essential prerequisites of development and poverty eradication (Suzanne *et al*., 2007). Human right framework empowers women to take responsibility and make decision about their health. Statistics indicate that pregnant women do not appear to be motivated with regard to utilizing hospital care services. It has been noted that pregnant women either start attending antenatal clinic late (after 20 weeks of pregnancy), or have less than three antenatal visits at the time of delivery for those who deliver at the health facility.

Finally, the study contributes to literature on free maternity services and thus utilization of maternal health services. Also it may lead to realignment of the free maternity policy in Kenya given that it is a new phenomenon. Other related groups like human right groups, NGOs among others may find it useful in strengthening and in implementation of strategies as outlined in post-2015 maternal strategy aimed at Ending Preventable Maternal Mortality (EPMM).

1.6 Organization of the study

The study is composed of five chapters. Chapter one is introduction, background of the study, problem statement, objectives and justification. Chapter two is literature review where theoretical and empirical literatures on maternal health services are discussed. Research methodology with conceptual framework, research design, study area, empirical model(s) and model specification, variable definitions and expected signs, estimation issues, data sources and diagnostic tests are in chapter three. Chapter four presents the analyzed results both descriptive and econometric estimation while chapter five presents summary, conclusions, policy, limitations and further areas of study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presented reviews of conceptual, theoretical and empirical studies done on challenges faced by healthcare providers on implementation of free maternity services. Theories and studies done on maternity services after implementation of policy on removal of out of pocket payments will be reviewed. The dimensions from different reviews were integrated to come up with a conceptual framework.

2.2. Theoretical Literature Review

The following section of literature review highlights various theoretical arguments on the challenges facing providers of free maternity services.

2.2.1 Specialized Service Providers

Skilled delivery is the single most important factor in preventing maternal mortality (WHO, 1999) and midwives are frontline specialized skilled providers of maternity services. They can perform deliveries at the community level to the highest level of health facilities (Campbell, 2006). Referrals of mothers and newborns with health complications from home or lower to higher health facilities is facilitated by midwives for further management by obstetricians, paediatricians and other specialists (UNFPA, 2011). However WHO (2011) and Manley et al., (2003) argued that there is acute shortage of midwives in most countries leading to compromised quality health care.

According to Bowser (2010), abuse and humiliation of women during childbirth across the world is a major barrier to access to free maternity services. This is due to negative attitude and burn out attributed to shortage of skilled staff and increased demand of services with inadequate supplies. The working environment is not conducive due to heavy workloads, poor remuneration, inadequate supportive supervision, equipment and supplies; weak management causes stress and frustration (Gilson *et al.*1993; Holmes & Goldstein, 2012). Fear of negative attitudes from service providers causes delay in decision by mothers to seek maternal health services (Thaddeus & Maine, 1994). Even with free maternity services, non-financial barriers cause significant constraints (O'Connel, 2012).

2.2.2 Infrastructure

Infrastructures are the basic systems and services necessary for maternal health services. They include buildings, transport, water, electricity and supplies. Due to activities that surround labour and the privacy it requires, most health facilities have a designated maternity unit that serves for ANC, intranatal care, PNC, maternity theatre and a newborn unit. Overcrowding and stock out of drugs and supplies are associated with free maternity services (Hatt, 2013). According to Akashi *et al*., 2004, this leads to consumers of maternity services seeking care elsewhere. Inadequate supplies including drugs or equipment are likely to impact negatively on quality (Oladepo*et al*., 2008). Ability to offer privacy, availability of water and electricity and the time the provider spends with the women are as well linked to quality (Vera, 1993). Further, available resources whenever needed and adequate infrastructure forms a favorable environment (UNFPA, 2011). Chalediary, (2005) claims accessing emergency (EMOC) care is hindered by distance and transport. In most cases the distance to hospital is attached to other aspects like poor communication, poverty, strong traditions among other factors that hinder utilization (Wagle *et al*., 2004 and Ensor *et al*., 2008).

2.2.3 Funding

There is need to addressing both financial and non financial barriers to eliminate inequity in healthcare utilization. Delays, insufficient funds or failure in fees reimbursements led to lack of equipment and stock out of supplies with negative impact on quality of care in most countries where fee had been waived or removed (Witter *et al*., 2013). The government's responsibility is to put in place policies, budgets, and regulations to address other factors which have influence in successful implementation of the free maternity services (WHO, 2014).

Before introduction of free maternity services, the out of pocket fee which remained at the health facility level covered local operating costs like purchase of drugs, supplies, and salary supplements of staff hired on locum bases. These influence the likelihood of improved quality and high consumption of health services (Hatt *et al*., 2013). Removing the user fee means replacement of forgone revenue and ensuring quality in responding to the changes in utilization which usually is increased (UNICEF, 2009).

There are several theories in health care domain, however this section is anchored on the following theories, namely; three delay model, theory of effective coverage, economic theory of demand for health care and health seeking behavior model.

2.2.4 Three Delay Model

Thaddeus & Maine (1994) considers delay in seeking treatment to have adverse outcome on care. He talks of three types of delays which are decision to seek health care, reaching the facility and receiving adequate and appropriate treatment. The factors that cause these delays are social cultural, distance, cost and quality. Shortage of qualified staff, essential drugs and supplies is a major cause of delay in commencement of treatment after arriving in the facility. Financial cost is not a major determinant as women are more concerned with the quality of care (Thaddeus & Maine, 1994).Women will find poor services as a barrier to utilizing free maternity services.

2.2.5 Theory of Effective Coverage

Tanahashi (1978) theory of health coverage indicates that health services are a concept expressing interaction between the service and the people to whom it is intended. This interaction is a process from resource allocation to achievement of desired objective and defines utilization as relationship between service capacity and service output. The interaction is made possible through availability of resources (manpower, facilities, drugs), accessibility, acceptability, contact and effective (quality) coverage. Access is made available through these dimensions together with individual's empowerment to use the health services following informed decision (Mclintyre*et al.,* 2009). Frenz and Vega (2010) used the dimensions of Tanahashi's model to assess the equity of access to UHC especially to the marginalized and hard to reach areas. Dahlgren and Whitehead (2007) propose using Affordability Ladder Program (ALPS) to assess social inequities in health care among different social groups. Women will utilize free maternity services when barriers in supply and demand side factors are removed.

2.2.6 Economic Theory of the Demand for Health Care

Ensor and Cooper, 2004 states that demand of a commodity is determined by the market prices. When prices are lowered there is increase in quantity demanded and

decreases when prices are high. This is the relationship that has motivated user fee exemption policies with an aim of increasing deliveries by skilled birth attendants. The demand theory is adapted from Grossman model which states that demand for healthcare is derived from demand for health. Better healthcare is an investment as well as a consumption good produced through use of good nutrition and healthcare among other commodities (Grossman, 1972). A pregnant woman who attends ANC and seeks delivery in a health facility by skilled attendant will have not only good health but also a healthy infant. However, there are determining factors that influence utilization of the healthcare services on both supply and demand sides.

Supply is determined by factors from healthcare production function which interact to produce effective healthcare services as follows: Qs = S (factor prices/availability, technology, prices management). Factor prices are items required to produce treatment like staff time, capital equipment and buildings, drugs and consumables and staff efficiency. These are combined with technology, in the case of maternal health the specialized personnel. Price determines quality. The theory explains that the product may change in quality as the price drops. Delay of reimbursement fee or lack of funds in many countries that have introduced free maternity services led to lack of supplies and demotivated staff. Scarcity of resources results in delays, long waiting time and compromised quality (Ensor & Cooper, 2004).

Grossman analyzes individual investment and consumption decisions to improve health and utilize healthcare (Grossman, 2000).The model indicates that that the individual, community and price of medical care and other goods determine the decision to seek healthcare, written as: Qd= D (individual/household factors, community factors, prices). Demand is determined by quality, accessibility, price, waiting time and knowledge of healthcare needs (Ensor & Cooper, 2004). Reduction of direct financial barriers results in increased utilization of services, workload and consumption of supplies (Witter *et al*., 2013). Apart from direct hospital fees, there are other costs like transport cost and price of substitutes which will determine if a woman seeks to deliver in a health facility or at home. Addressing financial barriers is only one factor among many and maternal health programs require engaging governments to address all factors that affect maternal outcome (USAID, 2014). Determining factors of demand and supply for maternal healthcare may generate

barriers if not addressed. According to Hatt*et al*. (2013) the impact of user fee reductions on population health outcomes depend on demand for and quality of services.

2.2.7. Health Seeking Behavior Model

The theory explains that health seeking behavior is influenced by societal determinants, health services system and individual characteristics. Individual characteristics that influence decision to seek care are predisposing, enabling and need factors. Predisposing factors comprise of social demographic factors and past experience. Pregnant women may fail to utilize services because of past mistreatment to them or fears of mistreatment as heard from others. Abuse, mistreatment and negligence of mothers have been reported in Kenyan public health facilities for a long time (KNHCR, 2013). Enabling factors include income and access to service provider which includes transport costs and availability of facilities within proximity. Need factors in a pregnant woman include onset of illness or labour pains (Anderson & Newman, 1973).

2.3 Empirical Literature Review

The empirical literature covered studies done in relation to staffing, infrastructure and free maternity services. Campbell *et al*. 2011 suggest the need to ensure availability and accessibility of affordable quality services through support for the supply side.

2.3.1 Specialized Service Providers and Free Maternity Services

Aiken *et al*. 2002 carried out a cross sectional study on association of staffing and patient outcomes in 168 hospitals in Pennsylvania. The study used a sample of 10,184 registered nurses and 232,342 patients. Needleman *et al*. (2002) carried out a cross sectional study in 43 hospital units in England. The study was to find out the association of nurse staffing and inpatient hospital mortality. The study investigated 197,961 patients and 176,676 nursing eight hour shifts. The two studies demonstrated high mortality rates in relation to poor staffing ratios. Studies by Fund (2008) in London on staffing levels and deployment to address challenges of safe delivery found positive relationship between increased staff and improved outcomes. Staffing issues were more critical during childbirth hours.

A qualitative study done in labour wards in seven hospitals in England indicated unreported near misses caused by shortage of midwives (Ashcroft *et al*., 2003). A near miss is a woman who survives life threatening condition arising from complications of pregnancy and childbirth and has many common aspects with those who die of such complications (WHO, 2004). High level of obstetricians was associated with accurate interventions defined by higher level of caesarean sections and high positive outcomes (Joyce *et al*., 2004). Inappropriate use of oxytocin and undiagnosed labour complications were common where there were no obstetricians (Ashcroft, 2008). There was continuity of care in hospitals with regular obstetricians while hospitals that employed on-call obstetricians reported third and fourth degree tears with more caesarean sections. This is because the complications in labour are sudden in most cases and require adequate and continuity of care (Abenhaim *et al*., *2007*).

A study in UK on effects of staffing to care showed positive relationship between increased staffing levels and improved outcomes and also between reduced errors and reduced mortality (Currie *et al*., 2005). In the US twenty eight studies done to investigate increased staffing levels and their impact on patient outcomes indicated increased hours of direct contact care, improved safety, reduced errors and reduced mortality (Kane *et al*., 2007).

In Ghana loss of user fees revenue at health facilities led to stock-outs of drugs and supplies, negatively affecting the quality of care provided (Tornui *et al*., 2007).There was inaccessibility in some regions due to distances (Buors, 2003).

After implementation of free maternal and child health services in Nigeria there was inadequate staff and infrastructure, poor remuneration and out of stock syndrome. Many doctors left the country for developed countries where there was better pay. (Abel *et al*., 2013).This led to underutilization with over 65 percent of pregnant women delivering at home. In Nepal, there was an increase in the proportion of women giving birth in a health facility where there was adequate staff, drugs and good infrastructure. There was 33 percent to 54 percent increase in the rate of institutional deliveries in high populated areas and 6 percent to 21 percent in low populated districts between 2005 and 2010. The successful implementation of the program is as a result of support from external funders (Collins *et al*., 2013).

Health facility deliveries under skilled birth attendants in Tanzania have remained low since 1990s. A study was carried out in four public hospitals to find out why women do not deliver in hospitals. Women complained of mistreatment and abusive language by healthcare providers and unnecessary referrals which made them spend more than if they had delivered in facilities near their homes (Mselle *et al*., 2013). In Tajikistan training of health workers on effective communications skills and professional attitude resulted in increased facility deliveries from 10 percent to 70 percent and reduced harmful practices by 90 percent (Han *et al*., 2010).

Increasing number of midwives and doctors in Columbia resulted in increased deliveries by skilled attendants by 71 percent (55 percent in health facility and 16 percent at home (DHS, 2010). Kenya national referral hospitals reported 26 percent increase of normal deliveries and 22 percent in caesarean sections. There was inadequate staffing and poor documentation especially in partogram used for monitoring labour (MoH, 2015). Part time nurses were hired on locum basis in MTRH due to work overload. Maternal mortality had increased as the service providers used more of their time on complicated referral cases.

In Kenya both the SARAM report of 2013 and an assessment report of free maternity services of 2015 reported shortage in staffing both for specialized and non-specialized services. A study on the assessment of free maternity services in Kenya indicated that the lowest area of client satisfaction was on staffing levels .The management of complications like APH and PPH was inadequate, the documentations were incomplete and there was a 10 percent increase in maternal mortality (MOH,2015).

2.3.2 Infrastructure and Free Maternity Services

Women from rural and mountainous areas without transport will not seek health facility delivery even when services are free (Wagle *et al*., 2004).Studies done in Afghanistan, Bolivia, Ethiopia and Kenya reviewed geographical barriers where those in mountainous regions were not accessing health services adequately (Byrne *et al*., 2014).

A study done in Madya, India on twenty two cases of deceased women classified the causes using the three delays model (Raj, 2014). Eleven out of the 22 women died due to delays in deciding to seek care after becoming aware of complications. Twenty one women died of delay in reaching the facility as a result of poor transportation with 12 dying in the health facility and 8 during referral from one health facility to another. Thirteen women out of the 22 reached the facility but shortage of drugs, blood and staff negligence caused delay in receiving adequate care (Raj, 2014). This was attributed to shortage of resources including skilled personnel, supplies and inadequate infrastructure (Witter *et al*., 2013).

A study in Bangladesh showed inadequate facilities and lack of skilled care. Though there was reduction in maternal mortality ratio (MMR) from 574 deaths per 100,000 live births to 194, more than 75 percent of deliveries took place at home (WHO, 2014). A health assessment survey of 2006 in Tanzania confirmed that most facilities lacked electricity and sterile equipment and this kept women from using them (Ass. Survey, 2006).

In Columbia the improvement of roads, communication, education and increase of health facilities helped to reduce maternal mortality from 472/100,000 to 206/100,000 live births from 2000 to 2010. Referral systems were strengthened (DHS 2010). Kenya Service Availability and Readiness Assessment Mapping (SARAM report 2013) found that only 32 percent readiness for maternity services (MoH, 2013). The assessment report of free maternity services reported overcrowding which made women to share beds, or be discharged prematurely (MoH, 2015). Functionality of equipment and other amenities was inadequate. Most of the ambulances (50 percent) were nonfunctional causing delays in referrals, toilets and bathrooms in some facilities were broken down (MoH, 2015).SARAM also reported poor communication services both for administrative functions and for operations and ambulances (MoH, 2013).

2.3.3 Funding and Free Maternity Services

In Mali waived fee was replaced by Medecins Sans Frontieres (MSF).The quality of care was maintained with consistency in drug supply (Ponsar *et al*., 2011). The

outcome was decreased post-caesarean maternal and neonatal deaths (El-Khoury *et al.*, 2012). In Columbia the equity funds were provided to reduce financial barriers.

In Kenya there are delays in reimbursement of funds. The 2014 assessment study on implementation of free maternity services showed that the reimbursed fee is not appropriately allocated to maternity services. This may impact negatively on quality of maternity services. Referral hospitals complained of under reimbursement as they were dealing with more complicated cases and some women took longer in the hospitals (MoH, 2015).

2.4Overview of Literature and Research Gaps

Many declarations, resolutions and goals have been made in order to achieve reduction of maternal mortality. The most recent was MDGs which ended in September 2015. The SDG on maternal health aims to reduce preventable maternal mortality by 140 per 100,000 live births by 2030.Delivery by skilled birth attendants is the solution to maternal mortality reduction. Many countries in the past have introduced free maternity services to increase deliveries by skilled birth attendants. This is in line with law of demand in economics which states that there is increase in demand of product when prices are lowered. According to Tanahashi theory of effective coverage, the dimensions of accessibility are affordability, availability of resources and acceptability of services, contact and effectiveness which come from quality of services offered (Tanahashi, 1978).Thaddeus and Maine (1994) states that cost is not a main barrier compared to other barriers. Non-financial barriers cause significant constrains to equitable access (O'Connel, 2012).

Several studies have been done in different countries to evaluate outcome of free maternity services. A study by Aiken *et al.*, 2000, and Currie et.al studied the relationship between staffing and outcome of maternal healthcare services. The study did not address other challenges faced by the maternity service providers like infrastructure and funding. Abel *et al.*, 2013 and Tornui*et al.*, 2005 studied the challenges in terms of supply stock outs and left out issues of human resource and funding. Raj, 2014 studied different causes of delays and the effect on maternal mortality. He did not address other factors that influence utilization. The challenges to

dimensions affecting supply of services have not been addressed holistically which causes a negative impact on demand side and hinder utilization of maternal services.
In Kenya, free maternity services were introduced in the year 2013.The study done was on assessment of implementation of the policy. No study have been done on challenges faced by pregnant women in accessing free maternity services in level 5 and 6 facilities in relation to specialized staff and efficiency of the facilities after the implementation of the policy. None of the studies have been done to investigate if there are policies to guide on the implementation.

There is limited evidence on effectiveness of the policy and interventions to address equity access to allow all pregnant women deliver in facilities or by skilled attendant. Assessment by MOH study in 2014 already reported an increase in maternal mortality by 10 percent. The ANC services still record high numbers as compared to those who deliver in the hospitals.

This gives the need to identify other factors that may be affecting utilization of the maternity services even when provided at no cost .This study seeks to investigate the challenges faced by the providers of free maternity healthcare services or the supply side as well as the demand side. The challenges will definitely impact on the utilization if not addressed.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter will present the research design, conceptual framework, estimable model and model specification, definition of study variables and other estimation issues. Data sources are clearly explained at the end of the chapter.

3.2 Research Design

The study used cross-sectional descriptive design in investigating the challenges faced by Level 5 and 6 free maternity service providers. The study examined the effect of different variables in relation to facility delivery by skilled birth attendants. The relationship between variables and skilled delivery attendants is described as explained in theory of Tanahashi (1978).

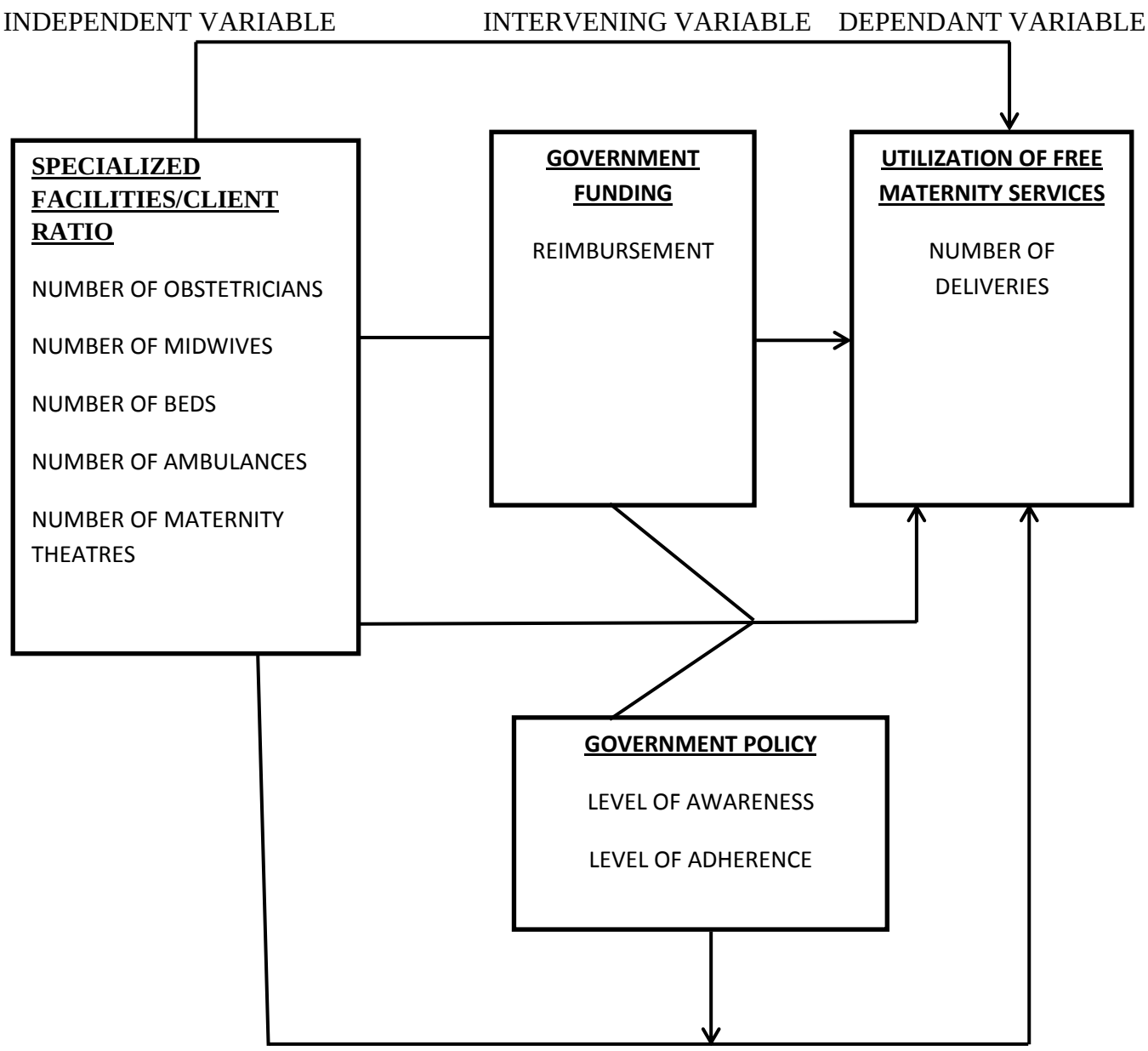
3.3 Study Area

The study focused on Level five and six hospitals in Kenya. This is because these are the hospitals that act mainly as referrals from lower levers and handle the buck of the work. They are the facilities that are equipped to handle complicated deliveries that may require specialized and emergency care.

3.4 Conceptual Framework

The Thaddeus and Maine three delay models have clearly identified several causes of delays in seeking care. The model suggests factors that cause delay in deciding to seek care to include financial cost, distance from health facility, availability and quality of services. The model examines the individual and structural determinants and quality aspects that affect a woman's decision to seek care. This study modified the framework and included other factors describing usage of hospital delivery such as relationship of specialized staff to pregnant women, health facility infrastructure, government funding and policy (Figure 3.1).

Figure 3.1: Conceptual Model



Author; Kasina , 2015

3.5 Estimable Models and Specification

To determine the challenges faced pregnant mothers in accessing free maternity services in level 5 and 6 health facilities, the following empirical model was used.

$$Y_{it} = \beta_0 + \sum^{k}_{1} \beta_j X_{jit} + \varepsilon_{it};$$

Where;

Y_{it} is a measure of consumption of free maternity services in health facility *i* in time *t*

X_{jit} are observed explanatory variables for health facility *i* in time *t*

β_0 is the constant term

β_j are the parameters to be estimated

ε_{it} is the idiosyncratic disturbance term for health facility *i* in time *t* with a zero mean and variance of one.

The study adopted and modified Tanahash model which stated that health services accessibility involved availability of resources, accessibility, acceptability, contact and effective coverage. The model explored the relationship between service capacity and service output. The above factors were considered as challenges related to utilization of free maternal health care services by pregnant women. They were used to develop a multivariate model which considered other factors like availability of resources as indicated in the literature in relation to utilization of maternal health care services by pregnant women. Variables used by Matua (2004) were incorporated to reveal challenges associated with utilization of free maternity services.

3.5.1 The relationship between specialized facilities/ client ratio and utilization of free maternity services.

Multiple regressions was used to analyse this relationship

$HD_{ij} = \beta_0 + \beta_1 OBS_{it} + \beta_2 MID_{it} + \beta_3 BED_{it} + \beta_4 AMB_{it} + \beta_5 MAT_{it} + \varepsilon_{i,t}$

Where;

HD_{ij} is the number of hospital deliveries of facility $_i$ where j=1,2 where j is the mode of delivery.

β_0 is the constant or the Y intercept

$\beta_{1\ldots} \beta_5$ are the coefficients of regression

OBS_{it} is the number of the obstetrician to client ratio of facility $_i$ in time $_t$

MID_{it} is the number of midwives to client ratio of facility $_i$ in time $_t$

BED_{it} is the number of beds to client ratio facility $_i$ in time $_t$

AMB_{it} is the number of ambulances to hospital facility $_i$ in time $_t$

MAT_{it} is the number of maternity theatres in facility $_i$ in time $_t$

$\varepsilon_{i,t}$is the error term

3.5.2 Specialized facilities, government funding and utilization of free maternity services.

Multiple regressions was used to analyse the intervening effect of government funding in the relationship between specialised facilities and utilization of free maternity services

$HD_{ij} = \beta_0 + \beta_6 SPF_{it} + \beta_7 GF_{it} + \varepsilon_{i,t}$

Where;

HD_{it} is the number of hospital deliveries of facility $_i$ in time $_t$

β_0 is the constant or the Y intercept

β_6 and β_7 are the coefficients of the regression

SPF is the merged specialised facilities in facility $_i$ in time $_t$

GF is the government funding in facility $_i$ in time $_t$

$\varepsilon_{i,t}$ is the random error term

3.5.3 Specialised facilities, government policy and the utilisation of free maternity services.

Stepwise regression analysis was used to find out the moderating effect of government policies in the relationship between specialised facilities and utilization of free maternity services.

$HD_{ij} = \beta_0 + \beta_1 SPF_{it} + \beta_2 GP_{it} + \beta_3 (SPF) + \varepsilon_{i,t}$

where;

HD_{it} is the number of hospital deliveries of facility $_i$ in time $_t$

β_0 is the constant or the Y intercept

β_1 and β_3 are the coefficients of the regression

SPF is the merged specialised facilities in facility $_i$ in time $_t$

GP is the government policy for facility $_i$ in time $_t$

$\varepsilon_{i,t}$ is the random error term

3.5.4 Specialised facilities, government funding, government policy and utilization of free maternity services.

Multiple regressions was used to determine the pooled effect of the intervening and moderating effects of government funding and policy in the relationship between specialised facilities and utilisation of free maternity services.

$H.D_{i,j} = \beta_0 + \beta_1 OBS_{it} + \beta_2 MID_{it} + \beta_3 BED_{it} + \beta_4 AMB_{it} + \beta_5 MAT_{it} + \beta_6 GF + \beta_7 GP + \varepsilon_{i,t}$

Where;

HD_{it} is the number of hospital deliveries of facility $_i$ in time $_t$

β_0 is the constant or the Y intercept

$\beta_{1...}\beta_7$ are the coefficients of regression

OBS, MID, BED, AMB and MAT is as per explanation in section 3.4.1

GF and GP is as per 3.4.2 and 3.4.3 sections

ε_{it} is the error term

3.6 Definition, Measurement and Expectation

Variables	Measurement	Expected sign
Dependent Variable		
Usage of free maternal services (Hospital delivery care)	The number of women delivering in health care facility *i* in time *t*	
Explanatory variables		
Specialized staff	Adequate no of specialized staff is associated with reduction in maternal mortality	Positive
Government funding	Appropriate reimbursement and allocation of funds will improve availability of services	Positive
Health facility	Adequate infrastructure to accommodate increased demand of services	Positive
Government free maternity policy	Adherences will enable implementation	Positive

3.7 Estimation Issues

While analysing the information collected, diagnostic tests were done to check for the presence of Multicollinearity as well as normality of data collected to avoid spurious estimates as suggested by Gujarati, (2004). Adjustments were made upon unearthing such as indicated by Mukras (1993).

3.8 Data Sources

Secondary data were obtained from the Ministry of Health (MoH, 2014) which collected information on trends on utilization of maternity services (caesarean sections and spontaneous vertex delivery) before and after policy announcement across level 5 and 6 public health facilities in Kenya. Further the data has the key information per health facility on the actual total number of beds, the level of the hospital based on classification rules, the number of trained obstetricians and nurse midwives, total number of available ambulances, actual number of theatres and the respective location. Data was consolidated, cleaned, analysed and interpretation done.

CHAPTER FOUR
RESULTS AND DISCUSSIONS

4.1 Descriptive statistics

The study considered the following descriptive statistics; mean, standard deviation, minimum and maximum. The mean is the average value, standard deviation is a measure of dispersion that shows how the variables are scattered around their means, and the minimum is the least value while maximum is the highest value of that particular indicator under consideration.

The variables under study used dependent variables which included total deliveries comprising normal and caesarean section deliveries. Independent variables were midwives, obstetricians, theatres, ambulances, beds and free maternal policy. The total observations were 65 and 13 health facilities (levels 5 and 6 hospitals). The average deliveries between the years 2011 and 2015 were 6, 565 births with a variation of 2, 776 birth over the same period. The year which recorded highest birth had 14, 785 births while 2, 676 births were found to be the lowest births across panels. Normal and caesarean deliveries had 4, 850 and 1,636 births on average across all health facilities and over the study period.

Table 4.1: Summary Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
Total deliveries	overall	6564.746	2775.556	2676	14785	N = 63
	between	2915.928	3136.4	13972		n = 13
	within	1091.243	2589.746	9604.746		T-bar = 4.84615
Normal deliveries	overall	4849.797	1998.041	942	10454	N = 64
	between	1636.747	2541.8	7888.8		n = 13
	within	1219.082	-761.7031	7456.297		T-bar = 4.92308
Caesarean deliveries	overall	1652.921	1023.336	346	5756	N = 63
	between	1234.066	594.6	5548		n = 13
	within	218.5689	1068.721	2217.321		T-bar = 4.84615
Government funding	overall	31.33748	39.3704	4.08	170.5375	N = 26
	between	32.63505	8.975	112.0963		n = 13
	within	22.96918	-27.10377	89.77873		T = 2

Midwives	overall	49.61538	25.15682	9	129	N = 65
	between	25.04549	16.4	118.4		n = 13
	within	6.692813	33.41538	61.01538		T = 5
Obstetricians	overall	3.671875	4.357277	1	19	N = 64
	between	4.334233	1.2	16		n = 13
	within	1.089269	-1.328125	6.671875		T = 4.92308
Theatres	overall	1.269841	0.4474425	1	2	N = 63
	between	0.3192037	1	2		n = 13
	within	0.3187678	0.4698413	2.069841		T-bar = 4.84615
Ambulances	overall	2	1.517197	1	9	N = 54
	between	1.15446	1	5.6		n = 13
	within	0.9226364	-0.6	5.4		T-bar = 4.15385
Beds	overall	88.55385	43.23375	20	202	N = 65
	between	40.44158	31.2	159.8		n = 13
	within	18.32638	38.75385	144.7538		T = 5
Free maternal policy	overall	0.6	0.4937104	0	1	N = 65
	between	0	0.6	0.6		n = 13
	within	0.4937104	0	1		T = 5

Further, government funding in Kenya shillings was captured after the announcement of the free maternal policy. Table 4.1; show that on average, health facilities were sent Kenya Shillings 31.34 million. The facility which had least funding had Kshs 4.08 million while Kshs 170.54 million formed the highest amount of money which was received by a health facility.

Among all 13 health facilities considered, a facility with 129 midwives formed the highest number while 9 midwives represented a health facility with the least number of midwives. However, the number of midwives was varying with 50 midwives. On the other hand, one and nineteen obstetricians represented the least and the highest among all the health facilities. Both theatres and ambulances were two respectively on average across all facilities. Finally, the bed capacity had a mean of 89 beds with the highest number of beds reported to be 202

beds while the least being 20 beds among the surveyed health facilities. The free maternity service policy has been in existence for over 60% of the study period.

Table 4.2: Trends in work load per mid-wife

Hospital	2011	2012	2013	2014	2015
COAST	210.78	141.47	98.93	150.63	123.59
EMBU	98.37	55.94	63.11	61.76	56.03
GARISSA	337.34	146.2	116.58	152.63	118.2
JOOTRH	130.73	140.77	110.95	123.97	126.86
KAKAMEGA	114.93	87.33	106.05	122.79	94.17
KISII	113.52	85.22	114	128.63	102.62
KNH	9.15	-	61.03	75.70	66.23
MACHAKOS	76.63	64.29	77.39	72.96	78.22
MERU	229	92.32	95.33	129.63	81.29
MTRH	88.2	112.18	128	158.39	128.72
NAKURU	136.73	128.83	147.43	142.62	114.62
NYERI	77.77	45.52	43.65	63.12	46.98
THIKA	154.76	178.28	211.72	195.13	171.8

The ratio of pregnant women to midwife was found to be very high with over 61.54. 50%, 53.85%, 69.23% and 53.85% of facilities having a ratio of more than expected (i.e. 100 deliveries per midwife) in the years 2011, 2012, 2013, 2014 and 2015 respectively. According to the WHO, the required ratio is 1:1 in delivery room and 1:5 in antenatal and post natal wards. WHO (2011) and Manley et al., (2003) claim that the acute shortage in most countries compromised quality of healthcare. Increased workload with shortage of midwives leads to burnout which is associated with negative attitude (Gilson *et al*., 1993). Studies by Aiken *et al* (2002) and Needleman *et al*.(2002) demonstrated high mortality levels to poor staffing. Ashcroft *et al* (2003) study indicated unreported near misses due to shortage of midwives. The increased workload in the health facilities may be as a result of free maternity care provided under the new government policy.

Table 4.3: Trends in work load per obstetricians

Hospital	2011	2012	2013	2014	2015
COAST	4480.5	3761.5	2597	2232.25	2439.5
EMBU	2589.5	4162	2251	2506.5	2269.5
GARISSA	3383	2676	1394.5	3722	-
JOOTRH	5034	2561.5	1274.75	1920.33	1393.5
KAKAMEGA	5972	2406.5	1754.67	2339.68	2850
KISII	2420	2563	6217	7048	3170.5
KNH	-	-	801.94	778.16	752.63
MACHAKOS	2741	2265.5	6045	7409	3826.5
MERU	5582	1869.5	4086	1820.33	1200
MTRH	522.75	878.33	1201.67	1276.5	1139
NAKURU	4013	6959	4309.5	5500.5	4611
NYERI	5180	1852.5	1139	2472.5	1896
THIKA	6303	6100	7093	8066	3476

The ratio of deliveries to obstetrician is expected to be 1:1000.The study found that on average,92.3% of the health facilities had high ratio far beyond expected ratio with KNH being the only facility with ratio below the threshold. Kenyatta National Hospital is a training center for postgraduate students doing obstetrics and this raises the number of obstetricians. High level of obstetricians was associated with accurate interventions and continuity of care (Joyce *et al.*, 2004). Literature indicates inappropriate use of oxytocin, undiagnosed complications, third and fourth degree tears where there were no obstetricians or were doing calls(Ashcroft, 2008). The trends observed especially in the last three years may be as a result of free maternity services in various health facilities.

4.2 Correlation matrix

The study undertook correlation matrix to establish the collinearity between dependent and independent variables as well as among independent variables. It also shows the strength of association between the study variables. Further we were able to detect multicollinearity by identifying those variables which are highly correlated and either retain them if they are significant to our study and if they are not highly correlated or dropped them if they pose a severe multicollinearity or correct them. In this study, we corrected variables which had

multicollinearity through conducting first differences (see Annex 1). This led to elimination of multicollinearity since most correlation coefficients were below the absolute value of 0.6 as required. Table 2 below shows more details.

Table 4.4: Correlation matrix

Variable	Total deliveries	Midwives	Obstetricians	Theatres	Ambulances	Beds	Government maternal policy
Total deliveries	1.0000						
Midwives	0.7233*	1.0000					
Obstetricians	0.7319*	0.7957*	1.0000				
Theatres	0.4364	0.3448	0.6211*	1.0000			
Ambulances	0.0806	-0.0543	-0.0395	-0.0449	1.0000		
Beds	0.4636	0.6550*	0.4148	0.2700	-0.0956	1.0000	
Government maternal policy	0.3382	0.2864	0.2026	0.0913	0.0449	0.3055	1.0000

*High correlation coefficients imply presence of multicollinearity.

From the correlation matrix, the correlation between total deliveries and all independent variables were positively correlated. Other correlations that only exhibited a negative correlation include the correlation between ambulances and midwives, obstetricians, theatres; and also the correlation between beds and ambulances.

4.3Challenges facing pregnant women in accessing free maternity services focusing on levels five and six hospitals in Kenya.

4.3.1 Introduction

As indicated and observed over five decades ago, Kenya had for a long time adopted, designed and implemented policies aimed at promoting access to modern healthcare in an attempt to attain its long-term objectives of health for all as outlined in Alma Atta declaration. Accessibility to healthcare services for the general population has been quite emphasized by both theoretical and empirical literature. It is suggested that accessibility to

health services especially among the women implies and thus reflects improved health status of mothers and children in the country. This objective therefore intends to identify specific key indicators depicting barriers to utilization of the free maternal health care services. Through descriptive statistics, variations across panels and among the parameters elucidate that predisposition are observed. In this objective, we were interested explore how the said variables with their stochastic nature relates with accessibility and utilization of free maternal health care services in Kenya across health facilities. The study adopted the econometric model of analysis which was based on dynamic panel data with both cross sectional and time series components which were used to demonstrate the significance and its implication on utilization of free maternal services in Kenya. The conceptualized model is estimated by random effects through Hausman specification test.

4.3.2 Hausman Specification test

In model selection, the study compared fixed effects and random effects where the former assumes that the real effect size is the same in all 13 health care facilities. The summary effect forms the estimate of this common size effects in the former model and is our estimate of the mean of these effects. The latter assumes that the true size effects varies from one facility to another and that the levels 5 and 6 health facilities under study represents a random sample of size effects that could have been observed .Baltagi (2005) suggests that under fixed effects, there is an assumption that all the dispersion in observed effect is due to sampling error whereas under random effects, there is allowance that some of the dispersion observed may illustrate real differences in size effect across facilities.

The study adopted Hausman specification test to determine the best fitting model whereas the fixed effects model specification was compared to the random effects model. The coefficients differences were not systematic and therefore it was null hypothesis. Individual level effects were best modeled using the random effects method indicated by conducting the test which showed P-value of 0.7590.

Table 4.5: A Test for Model selection

Variables	Coefficients of Fixed Effects (F)	Coefficients of Random Effects (R)	Difference (F-R)	S. Error
midwives	97.6682	96.19857	1.469633	25.87677
Obstetricians	-315.2369	-92.11337	-223.1236	159.6245
Theatres	792.7552	794.3271	-1.57185	166.5965
Ambulances	84.71498	123.0924	-38.37741	64.5086
Beds	9.124896	4.06357	5.061326	5.672498
Free maternal policy	734.0635	730.1274	3.936131	194.8409
Chi2(10) = 3.39 **Prob>chi2 = 0.7590**				

H_o: Difference in Coefficients not systematic

In our study, the Hausman test preferred random effects model to fixed effects model which allows estimation effects of the mean of the distribution effects rather than estimating one true effect.

Since in each health facility represented in our study provides varied information about a different size effect, they were all represented in the summary estimate.

4.4 Results for Random Effects Model

The adoption of random effects model was based on different health facilities which may not have shared the common effect size in terms of accessibility to free maternity service and the core objective of establishing the challenges leading to utilization of free maternity policy. After undertaking model selection, the random effects variant is valid for interpretation. Table 4.6 indicates the results of the regression.

Table 4.6: Final Model; Random-Effects GLS regression

Robust				
	Coefficients	**Std. Err.**	**Z**	**P>z**
D. Midwives	18.47692	31.01607	0.60	0.551
Obstetricians	401.3856***	80.78392	4.97	0.000
Theatres	676.1637	535.551	1.26	0.207
Ambulances	173.5276***	62.04794	2.80	0.005
D. Beds	24.77156***	8.194773	3.02	0.003
Free maternal policy	1154.029***	392.3107	2.94	0.003
Constant	2976.197	586.2053	5.08	0.000
Number of Observations = 43 Number of Groups = 13 R-Squared: Within = 0.4591, Between = 0.7216 and Overall = 0.6755 Wald Chi2(6) = 221.54 Prob> Chi2 = 0.0000 Durbin-Watson statistic (*d*) = 1.9801 Sigma_u=2051.5987 Sigma_e = 827.77697 Rho= 0.8599966				

Source: Author's calculation based on the available data

The total variations explaining accessing and utilizing maternal health care services in levels 5 and 6 health facilities were 67.55% while the other proportion (32.45%) may be attributed to other factors omitted or not considered in this study. Also, 72.16% of the variations explain accessing free maternity services in between the panels while 45.91% of the variations explain the usage of free maternal health care within levels 5 and 6 health facilities in Kenya. Further, the overall p values of 0.000 (overall P value is less than 5% significant level) implies that the variables used as independent variables significantly explained the dependent variable in this case usage or utilization of maternal services (proxied by total deliveries) across level five and six health facilities in Kenya.

Table 4.6 indicated that the coefficients of the obstetricians, ambulances and free maternity policy were statistically significant since all of their p-values were significant at 1% significant level well, none of their confidence intervals included zero. The standard deviation of residuals within groups was 2051.6 and variance attributable to the differences across the panels was 0.86. On the other hand, the standard deviation of residuals between groups is 827.78. Therefore, there is no correlation between the error terms and the regressors.

The significant and working model for challenges facing pregnant mothers among the thirteen health care facilities was therefore expressed as shown below;

THD= 2976.2+ 401.39OBST +173.53AMB+24.77D.BEDS+1154.03FMP

Where;

THD_{it} is the total number of hospital deliveries at health facility $_i$ in time $_t$

$OBST_{it}$ is the number of obstetricians at health facility $_i$ in time $_t$

AMB_{it} is the number of ambulances at health facility $_i$ in time $_t$

$D.BEDS_{it}$ is the first differences of the number of beds at health facility $_i$ in time $_t$

FMP_{it} is the presence of free maternal policy at health facility $_i$ in time $_t$

From the model above, if all factors were kept constant, a total of 2977 pregnant mothers will deliver. The results revealed that for an additional obstetrician, there are approximately 402 more births at 1% significance levels holding other factors constant. Similarly, the extra ambulance or bed in the health facility at 1% significant level, leads to approximately 174 and 25 births at ceteris paribus. Finally, the presence of free maternal policy influence utilization of deliveries at levels 5 and 6 facilities significantly. The study results reveal that at 1% significant level, announcement of free maternal policy led to a significant rise in hospital delivery by 1155 births at ceteris paribus.

The random effects model due to time series component makes assumptions on normal distribution of the stochastic random error term, constant variance of error terms across observations, linearity, no serial autocorrelation of the error terms and no perfect correlation between any pair of independent variables. Therefore, diagnostic tests were undertaken so as to validate the yielded estimates.

4.4.1 Multicollinearity Test

Multicollinearity is considered to exist when there is perfect linear relationship between the variables under the study. The variance inflation factors were used to determine if any pair of independent variables was highly collinear and the size and magnitude of the pairs of variables determined by the correlation matrix. This bias arises when one or more pairs of independent variables are perfectly correlated to each other. Therefore, the Variance Inflation Factors (VIF) and the correlation matrices were examined. The VIF test measured how much variance of an estimated coefficient increased due to collinearity. For VIF values greater than 10 and 1/VIF values less than 0.10 multicollinearity is deemed to be presence.

Table 4.7: VIF

Variable	**VIF before first differencing**	**1/VIF before first differencing**	**VIF after first differencing**	**1/VIF after first differencing**
Midwives	**18.87**	**0.052996**	1.36	0.735143
Obstetricians	4.43	0.225542	2.53	0.394987
Theatres	7.27	0.137549	7.06	0.141738
Ambulances	2.55	0.392523	2.33	0.429396
Beds	**10.99**	**0.091007**	1.35	0.740900
Free maternal policy	3.92	0.255241	4.98	0.200652
Mean VIF	8.00		3.27	

Source: Author's calculations

Table 4.4 shows that high correlation indicated by midwives and beds implying presence of multicollinearity. However, upon first differencing of these variables, multicollinearity was eliminated. The presence of multicollinearity may lead to spurious regression.

4.4.2 Normality Test

The study applied the Shapiro Wilk test to ensue with estimation, for normal data or distribution of the stochastic random error terms. Table 4.5 below revealed that at 5% significance level, overall residuals of the variables were normally distributed since the overall p value of the residuals was 24.64%.

Table 4.8: Test for Normality

Variable	Observations	W	V	Z	Prob>z
Residuals	50	0.97067	1.379	0.686	0.24643

*These Variables are normally distributed at 5% significance level.

Table 4.5 indicates the p-value of the residuals of 0.2464 which exceeds 0.05 implying that the null hypothesis of normality of residuals is not rejected. Therefore, data was normally distributed.

4.4.3 Linearity

The study adapted scatter plots to these effects. The scatter plot of total deliveries (tds) against its fitted values and the scatter plot of estimated residuals against the fitted values are shown by Figures 4.1 and 4.2 below. It can be observed that the plots are fairly symmetrical around 45 degree line which implies that when making unusually large or small prediction, the model fails to make systematic errors.

Figure 4.1: Graph of total deliveries (tds) against the fitted values

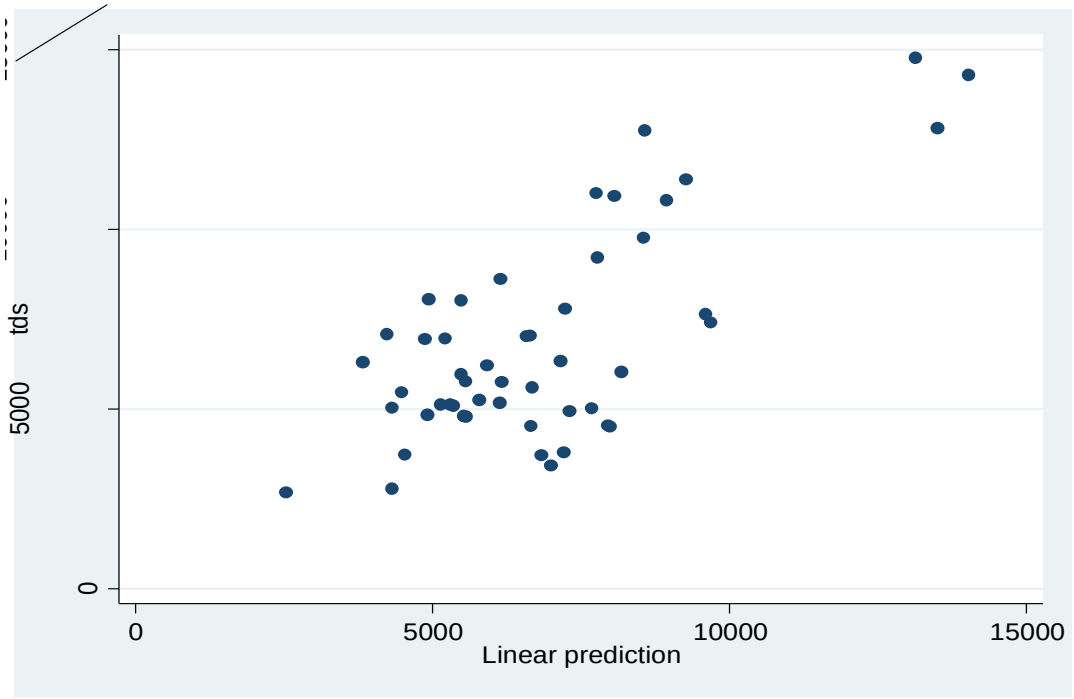
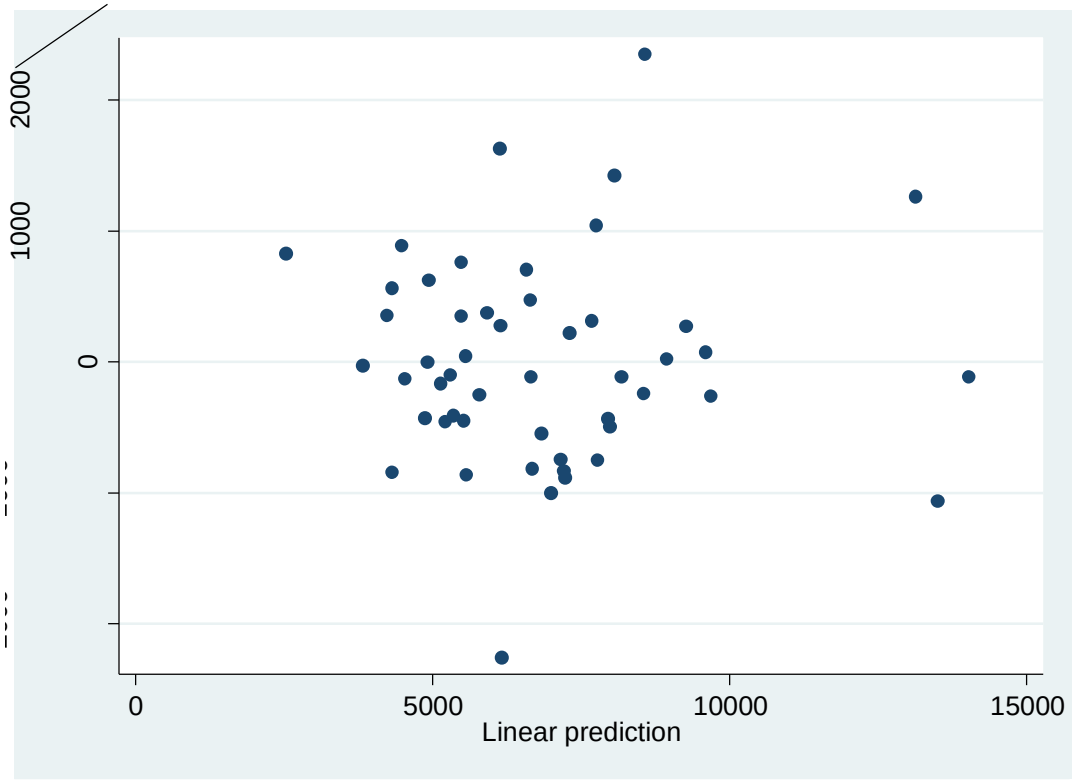


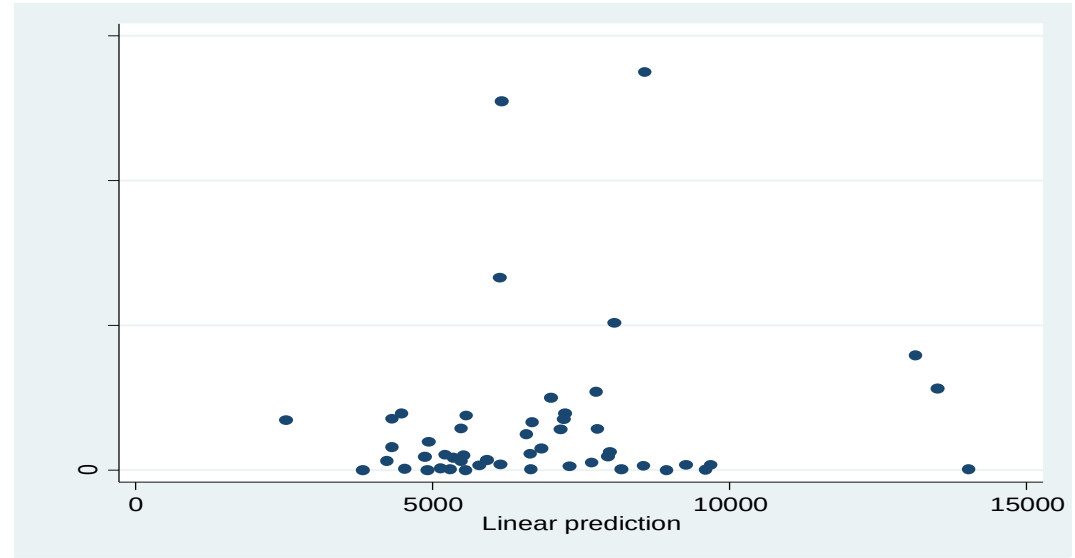
Figure 4.2: Graph of residuals against the fitted values



4.4.4 Homoscedasticity

The study utilized the residual plot method to confirm its presence. Due to time series component in panel data, the study explored the presence of constant variance of the error terms across all the observations in the panels. The scatter plots exhibit a systematic pattern. This implies that heteroscedasticity is present. The study utilized robust standard errors to avoid spurious estimates as a remedy.

Figure 4.3: Graph of Residual Square against linear prediction



4.4.5 Autocorrelation

There is high likelihood of the existence of serial correlation if there is a suspected or proved correlation between random error terms of the subsequent time periods. If present, the bias leads to spurious estimates of accessibility to free maternal services in Kenya. Table 4.3 indicates that adjacent observations were not correlated given the Durbin-Watson statistic results of 1.9801 (positive autocorrelation) which is close to two. This implies that the random effects regression did not underestimate the coefficients of the standard errors.

4.5 Discussion of the study results from random effects model

The findings are ready for discussion. The study explored significant factors upon specifying the random effects model, as indicated by Table 4.3, a positive and significant relationship established implies that obstetrician encourages hospital deliveries among pregnant women in Kenya with regard to utilization of free maternal health care services. This sync with the study results of Joyce *et al*., (2004) and Ashcroft, (2008) who found that high level of obstetricians was associated with accurate interventions defined by higher level of caesarean sections and high positive outcomes. There was continuity of care in hospitals with regular obstetricians while hospitals that employed on-call obstetricians reported third and fourth degree tears with more caesarean sections. Further, the effects of staffing on care in UK showed positive relationship between increased staffing levels and improved outcomes as well as between reduced errors and reduced mortality (Currie *et al*., 2005).

Literature in Ghana by Buors, (2003) and Tornui *et al*., (2007) indicated that loss of user fees revenue at health facilities led to stock-outs of drugs and supplies which negatively affected the quality of care provided. Interestingly, there was inaccessibility in some regions due to distances. The positive relationship established by infrastructural facilities such as ambulances and beds concurred with the literature. Collins *et al*., (2013) found that, there was an increase in the proportion of women giving birth in a health facility where there were adequate drugs, good and adequate infrastructure in Nepal. According to DHS (2010) in Columbia, the improvement of roads, communication, education and increase of health facilities led to reduction of maternal mortality. This move was attributed to increased and strengthening of the referral systems.

Free maternity policy significantly increased utilization of hospital care by pregnant women. In addition to delays in reimbursement of funds in Kenya, the implementation of free maternity services was found to be weakened by inappropriate reimbursement of fee through inappropriate allocation of the same funds to health facilities for maternity services. This was suspected to lower the quality of maternity services and thus usage of the same services. This finding was consistent with the study results obtained by El-Khoury *et al.*, (2012) in Mali. The authors waived fee and maintained the quality of care with consistency in drug supply as indicated by Ponsar *et al*., (2011). The outcome was decreased post-caesarean maternal and neonatal deaths through increased utilization of hospital care by mothers.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings of the study variables and concludes with a key focus on the established factors behind utilization of free maternity services among pregnant women in Kenya. Thereafter, relevant policy and areas of further research are suggested as a way of filling the gap.

5.2 Summary of the study findings

As indicated, several declarations, resolutions and goals have been made in order to achieve reduction of maternal mortality. MDG 5 aimed to achieve skilled deliveries of 90 per cent by 2015 and reduce maternal mortality by 75 per cent. The trends in maternal mortality between 1990 and 2013 rated Kenya as one of the top ten countries comprising 58 per cent of global maternal deaths (WHO, 2015) far from achieving the MDG target. End of MDGs lend to Sustainable Development Goals (SDGs) on maternal health which aims at reducing preventable maternal mortality by 140 per 100,000 live births by 2030. Many countries in the past have introduced free maternity services to increase deliveries by skilled birth attendants but still coverage remains to be a quagmire. This is attributed to the challenges related to the dimensions of accessibility that is; affordability, availability of resources and acceptability of services, contact and effectiveness which come from quality of services offered. Literature further shows cost as not being a main barrier as compared to other barriers. Non-financial barriers cause significant constrains to equitable access to maternal health care. Imperatively, this study sought to investigate and estimate challenges relating to utilization of free maternity services among pregnant women in Kenya with a focus of levels 5 and 6 health facilities. The study specifically explored the proportion of staff to the deliveries at levels 5 and 6 hospitals, the influence of staffing and physical facilities on utilization of free maternity services in levels 5 and 6 hospitals and finally, the role of government policy on utilization of free maternity services in levels 5 and 6 hospitals in Kenya. The study used random effects model in estimation. Significance of the study variables was limited to 1%, 5% and 10% significance levels. The study results revealed that at 1% significance level, a hospital with obstetricians, ambulances, beds and presence of free maternity policy significantly increases utilization of free maternity services at levels 5 and 6 health facilities. Midwives and theatres

were found to be statistically insignificant in influencing pregnant mothers to utilize free maternity services in levels 5 and 6 hospitals.

5.3 Conclusions of the Study Findings

According to the report of Ministry of Health, (2014) timeliness of intervention is crucial in ending maternal mortality but the third type of delay which is receiving adequate emergency care at facility remains a challenge. Considering the status of implementation of free maternity services program in the devolved health system, there was an increase of neonatal deaths by 27% and maternal deaths by 10%. The study results points that a policy need to be made on staffing and physical health facilities which significantly influence the usage of free maternity services among pregnant women in level 5 and 6 hospitals in Kenya. The ratio of midwives to deliveries remained very high with over 69% of facilities having ratio of 1:>100.The acceptable ratios are 1:1 in labour ward,1:5 in ante natal and post natal wards. Over 92% of health facilities had the ratio of obstetricians above expected ratio of 1 to 1000 population. The proportion of staff with regard to hospital deliveries was very low implying challenges in service provision as a result of increased and unbearable workloads.

5.4 Policy Recommendations

The Millennium Development Goals enshrined the improvement of maternal health as one of the essential prerequisites of development and poverty eradication. On the other hand, human right framework empowers women to take responsibility and make decision about their health. Statistics indicate that pregnant women do not appear to be motivated with regard to utilizing hospital care services. Thus, the government of Kenya through the ministry of health introduced free maternity policy to curb the rising levels of death among mothers and both children of below five years and unborn children. It has been noted that pregnant women either start attending antenatal clinic late (after 20 weeks of pregnancy), or have less than three antenatal visits at the time of delivery for those who deliver at the health facility.

Based on the analysed results, firstly; the study revealed a positive and significant influence of obstetricians on utilization of free maternity services in levels 5 and 6 hospitals in Kenya. This implies that as the number of obstetricians rise so is the hospital deliveries. Unfortunately, most of the health facilities have a few to no obstetricians challenging utilization of these maternity services by pregnant women in Kenya. Therefore, there is a need for ministry of health through the national government to formulate policy on staffing to guide County governments to ensure increased demand for free maternity services.

Secondly, the study found out that availability of ambulances and beds led to increased usage of hospital deliveries significantly. Therefore there is a necessity to have more physical health facilities like ambulances and enough beds for delivery. More ambulances implies easy and quick referrals of mothers and new-borns from the home or health centre to the hospital and to the care of obstetricians, paediatricians and other specialists and in any other case of emergency. Since, most mothers share bed at the hospital facility, there is need for more beds at these facilities to encourage more consumption of free maternity services.

The Kenyan government has endeavored to design appropriate health policies. These policies include Health Policy Framework, 1994, 10/20 policy of 2004, Health for all by the year 2000, Safe Motherhood 1987, Campaign for Accelerated Reduction of Maternal Mortality in Africa 2010, vision 2030 and now Sustainable Development Goals by 2030. However, still much needed to be done to reduce and encourage hospital deliveries and thus reduce maternal and child mortality which stands at high figures. Since free maternity policy was significant at increasing deliveries at levels 5 and 6 hospitals, there is a need to increase efficiency and effectiveness at these health facilities to enhance the policy. Therefore the government need to increase the amount of funds to these levels 5 and 6 hospitals to strengthen the free maternity services.

5.5 Limitations of and Areas for further study

The study was limited to the available data but there was inefficient as well as scanty information on the actual funds reimbursed to individual health facilities. The terms of service of medical staff and motivation of the staff in terms of payment at various facilities for the entire study period was not looked into in this study. This and heavy workload after introduction of free maternity services could have contributed to increased number of strikes that have been experienced in the health ministry prior and after devolution. This is expected especially for a developing nation like Kenya with new systems of governance (Devolution). This also makes it difficult to evaluate facilities at the lower levels say levels 3s and 4s. Further, there was absence of a comparative policy with sets of guidelines on the use of the resources meant for the same activity. On the other hand, health programmes and initiatives aimed at reducing maternal mortality have not been successful since independence; this study basically explored the challenges associated with utilization of free maternity services in levels 5 and 6 hospitals. However, a similar study needs to be conducted taking regional and lower facility levels into considerations. This is because rural and urban areas have different

dynamics which needs to be considered even as the policy on free maternity services for pregnant mothers is initiated and implemented. There is also a need to explore challenges associated with usage of free maternity service with a particular focus on staffing at labour wards since this study considered staffing in maternity units which comprise ante natal, post natal, labour ward and new born units. Finally, other studies need to consider terms of service and motivation levels of medical staffs.

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APPENDICES

ANNEX I: CORRELATION MATRIX (AFTER FIRST DIFFERENCES)

Variables	Total deliveries	D. midwives	Obstetricians	D.theatres	Ambulances	D. Beds	Government maternal policy
Total deliveries	1.0000						
D1. midwives	0.1710	1.0000					
Obstetricians	0.7709	0.0937	1.0000				
Theatres	0.5001	-0.0303	0.6165	1.0000			
Ambulances	0.0857	0.0131	-0.0269	-0.0908	1.0000		
D. Beds	0.1270	0.0339	-0.0706	-0.0264	-0.1297	1.0000	
Government maternal policy	0.3330	0.0282	0.2039	0.1339	0.0190	0.0159	1.0000