SOCIO ECONOMIC DETERMINANTS OF MATERNALHEALTHCARE IN KENYA: A CASE STUDY OF MANDERA COUNTY

BY

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DECLARATION

I declare that this research project is my original work and to the best of my knowledge has not been presented for award of any degree in any other university and institution of higher learning.

Signature ……. Date ……..

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This research proposal has been submitted for examination with my approval as the university supervisor.

Signature ……. Date ……

DR. Martine Oleche

DEDICATION

I dedicate this work to my family for their patience and support during my long absence from home in order to accomplish this work.

ACKNOWLEDGMENT

I wish to extend my gratitude and appreciation to my Supervisor, Dr. Martin Oleche for the encouragement and immense support he offered me to improve the quality of this work. Special thanks also goes to the staffs of the school of economics university of Nairobi, my classmates and colleagues for their endless support, suggestions and inputs throughout the period I was undertaking this work.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS/ABBREVIATIONS

ANC	Antenatal Care
WHO	World Health Organization
OOPHE	Out of Pocket Health Expenditure
MHC	Maternal Healthcare
FANC	Focused Antenatal Care
KDHS	Kenya Demographic Health Survey
KNBS	Kenya National Bureau of Statistics
UHC	Universal Healthcare
GOK	Government of Kenya
UNICEF	United Nations Children Funds
UNFPA	United Nation Family Planning Association
MOH	Ministry of Health
MM	Maternal Mortality
MMR	Maternal mortality Ratio
MDG	Millennium Development Goal
SDG	Sustainable Development Goal

ABSTRACT

This study sought to analyze how various socioeconomic factors affect the consumption of maternal healthcare in Mandera County. The study holistically focused four packages of maternal healthcare namely: antenatal care, facility-based delivery, postnatal care and modern use of contraceptives in the county of Mandera. Probit model was employed in estimating maternal health care among women in Mandera. The dependent variable was demand for maternal health care with the explanatory variables being the socio-economic and demographic factors of the individual or household that influences the decision to demand for maternal health care. The source of the data for this study was obtained from the 2014 Kenya demographic health survey. The study findings were that age had a positive effect on MHC with older women found to utilize MHC service more compared to younger women. On education front, women who are educated utilize MHC services more than the uneducated ones. Married women seek for MHC more than unmarried women though insignificant. On place of residence, rural women have less demand on MHC compared to urban women. The economic front reveals that, household wealth status has positive significant effect on the MHC demand. Similarly is the effect of employment status. Further, possession of a health insurance cover have positive effect. Based on the findings, the study recommends on the need for sensitization and awareness creating among illiterate and rural residing women on the need and importance for MHC services. Second is the need for expansion of the health infrastructure to increase access where distance is a problem. On economic front, there is the need for the county government to empower the rural household through investing in the community livelihood empowerment Programmes at large

CHAPTER ONE: INTRODUCTION

1.1 Background

Maternal morbidity is ill-health related to expectant mothers with undesirable impact on the woman's well-being (WHO, 2013). WHO recommends antenatal care as a way of reducing these undesirable effects on a woman's life, although it's utilization still remains minimal globally. Health and health investment is highlighted in economic and ethical grounds as vital and the therefore provision of, efficient, effective, affordable and quality health services to expectant mothers is core. Maternal health outcomes though it remains limited and underused in the developing countries, due to the interactions of various demand and supply factors, health belief factors and the social structure (WHO, 2015; Ngomane & Mulaudzi, 2012; Strecher & Rosenstock, 1997; Pathak, Singh & Subramanian, 2010), and inequalities in MHC services provisions (Nguhiu, Barasa &Chuma, 2017), hinder positive progress. Hence, according to WHO (2015) a huge proportion of expectant women have ended up developing complications relating to pregnancies ad sometime leading to death.

In Kenya, the provision of Maternal healthcare is a responsibility of primary level facilities, usually integrated in the Maternal Health and Family Planning unit. WHO's focused antenatal care (FANC) design suggests pregnant woman is required to attend a minimum 4 ANC visits during every pregnancy. Adequate ANC uptake means that it is initiated before the gestational age of 16 weeks ends, with at least 4 attended appointments in the course of 9 months. Its estimated that 42 percent of pregnant women delivered under the assistance of professional healthcare providers (Kenya Demographic and Health Survey ,2003). This was a reduction of 8% as compared to 50% in 1989 (Ochako et al., 2003).

Additionally, KDHS (2008-2009) noted an increase from 88% to 92% in the number of expectant women seeking antenatal care from qualified healthcare personnel. In the 2014 KDHS, a 9% increase in the cases of expectant women who completed the recommended at least 4 ANC visits was noted, as stated by (KNBS & ICF Macro, 2015).

As noted by the KDHS, there is a direct correlation between the number of pregnant mothers who sought antenatal care and infant survival rates during the survey years. A decline from 115-77 death cases for children aged below five years was noted in the KDHS 2003 and 2008-2009 respectively. During the KDHS (2014), this further reduced to 52 deaths/1000 live births (Fagbamigbe&Idemudia, 2015).

1.1.1 Maternal and child universal health coverage

The concept of UHC is multi-dimensional and not yet comprehensively defined (Abiiro & Allegri, 2015). In this paper, the authors argue that in legal perspective, UHC means the presence of a framework that enables healthcare provision to all and obliging international community to provide support. It may also be seen as a humanitarian social concept which focusses on enrolling as many individuals as possible into health related social security systems. Finally, they argue that in health economics, UHC's main focus reduction of financial burden to masses by reducing the out of pocket health expenditure. UHC and equality are inter-related concepts that acts together in removing barriers that hinder improvement in health outcomes and limiting impoverishment of households (WHO, 2000; WHO 2010), hence the Government of Kenya (GoK) has prioritized UHC and equity in its 5 years 'big 4' agenda of 2017, (World Bank, 2018).

Saving mothers, (WHO, 2015) and by extension children lives (UNICEF, 2016) by providing quality reproductive healthcare is cited as a core human rights issue protected by the constitution of Kenya. However, Kenya, over the past two and a half decades still records high national MMR with minimal change making no progress towards MDG 5A. In line with the SDG targets 3.8, Kenyan government seeks to move towards UHC by increasing access to affordable essential health services to all population (KHPF, 2014; Kenya vision 2030 & Kenya Constitution, 2010), by reducing health disparities, building a primary care oriented health system and reforming health care financing both at the facilities level and individual population level., the GoK focus towards UHC is backed by the constitution 2010 through devolution, vision 2030, KHPF 2014-2030), health sector strategic plans (KHSSP) through the medium term expenditure frameworks (MTEF 2016-2019), Health bill of 2015 and other health reforms that are being implemented to

drive health equity, right to health and financial risk protection (Kenya Treasury & Ministry of Health (MoH).

The GoK with support from other stakeholders has in the recent past embarked on health reforms, initiatives and specific policy shifts in relation to MHC focusing to reverse the high MMR in Kenya and reduce socioeconomic inequalities as a drive towards UHC (Munge & Briggs, 2014), including; enactment of the new constitution of Kenya 2010 which brought about devolution, protects the right to health, the Kenya vision 2030 agenda - a national strategic plan launched in 2007, to provide equitable and affordable healthcare for all, the Kenya health policy 2012-2030 - promoting free access to essential healthcare including MHC, equalization fund - a 20 years project to increase access and availability of social services to historically marginalized communities in the country, Removal of user fees policy for PHC services to make healthcare access affordable for the poor, beyond zero campaign and free maternity care to enable all women access MHC services in public health facilities and save the lives of mothers and children, health subsidies for the very poor and vulnerable groups so that they can utilize health services when needed and expansion of national insurance coverage to increase health financing options to all citizens (GoK, 2010).

These health initiatives, however have been faced by various challenges such as high direct OOP health expenditure limiting health care access by the poor, increasing, though inadequate government health expenditure, limited public and private insurance coverage, inefficient donor funds that are fragmented and highly un-harmonized to functions, gross inefficiencies in the allocation and utilization of public funds and grand corruption resulting to huge financial leakages. The challenges pose a huge equity obstacle to the country hindering efforts towards UHC and therefore needs to be assessed and addressed for UHC to be realized and by extension reduction of maternal mortality rate.

Despite the aforementioned reforms with regards to maternal and child healthcare in Kenya, inequalities in maternal healthcare services is evident across regions in Kenya, influenced by social, political, economic, institutional and cultural dimensions (income,

power, rights and opportunities. The outcome of MHC in Kenya varies widely across regions, with about 98% of maternal deaths occurring in just 15 of the 47 counties, with the top 6 of the high burden counties in Kenya contributing more than 50% of all MM in the country (UNFPA, 2014), these counties includes Mandera, Wajir, Marsabit, Isiolo,Lamu and Migori. These regions are already marginalized by other kinds of exclusions and poverty. UN inter-agency project (H6, formerly H4+ partnership) was implemented in the 6 counties to improve access to MHC, train health workforce and provide medical equipment to improve the overall health of mothers and children (UNFPA, Kenya, 2014). Equalization fund through devolution has brought about significant gains in these areas too, for instance, Northern Kenya, managed to perform the first ever caesarean section in 2014 in one of the regions in Mandera County, Lamu County in Coast region in 2017, and Mbeere in Embu county Eastern region in 2017. This presents the need for an investigation as to what are the socio – economic determinants of maternal healthcare across different counties.

1.2 Problem Statement

Women's health is crucial to the sustainable development of nations through their paid and unpaid values on social, economic, demographic, health, psychological and occupational roles, and function in the society that results to substantial contributions to economic growth, human capital development, productivity and consumption. This therefore calls for the protection and advancement of women's health agenda (WB, 2010; WHO, 2000, UNICEF, 2016).

World Health Organization (2015) data, Kenya made no progress towards MDG 5 and is among the top 22 countries considered as having very high MMRs (999-500/100,000) globally. These and other statistics have raised focus on reducing MM in Kenya. The GoK, has over time put in place various MH initiatives to improve MH including; beyond zero program, free MHC, equalization fund, user fees removal and increased health financial among others, though MHC use in Kenya still remains limited with insignificant MM reduction though MM is preventable. Empirical literature has shown that income related inequality is closely associated with inequalities in health and at the same time,

country level data shows huge regional variations in uptake and outcomes of MHC with highly unequal counties like Mandera and Elgeyo- Marakwet (UNFPA, 2014).

According to the KDHS (2014), about 95.5% of women received antenatal care offered qualified provider, nationally. However, for Madera County, only 50.5% of women have obtained antenatal care from a skilled healthcare professional which is way below the national average. With regard to facility-based delivery, the national average for women who delivered at the facilities was 61.2 percent. However, for Mandera County only 36.1 percent of women delivered at the facility a proportion way below the national average. For postnatal services, the national average for women who sought for post-natal services was 98.7 percent. However, for Mandera County only 48.1 percent of women sought for post-natal services. Lastly, on the modern use of contraceptives, the national average for women currently using modern contraceptives was 53.2 percent. However, for Mandera County only a mere 2.3 percent were found to be currently using modern contraceptives. It is therefore clear that Mandera county has been lagging behind the national averages with regard to consumption of maternal health package. Similar inferences can be made between Mandera County and other counties which have closely similar socio-demographic characteristics, such as Garissa and Wajir.

Despite the government efforts such as making the entire maternity package free of charge, studies continue to show alarmingly low utilization in some parts of Kenya, as in the case of Mandera County. This study will strive to understand some of the socio – economic factor influencing consumption of the maternal health care package (antenatal, postnatal, family planning and facility-based delivery) in Mandera County. Understanding these determining factors will lead to formulation of better strategies when developing mechanisms to improve MHC utilization. Further to this, the recommendations of the study can be used to guide resource allocation by the relevant government bodies as well as other stakeholders, especially where the aim is to improve demand and consumption of maternal healthcare in Mandera County.

1.3 Objectives of the study

1.3.1 Main Objective

Mainly, this study sought to determine how various social – economic factors influence maternal healthcare consumption in Mandera County

1.3.2 Specific Objectives

1. To Examine the effect of social economic determinants on antenatal care in Mandera County.
2. To Examine the effect of social economic determinants on facility based delivery in Mandera County.
3. To Examine the effect of social economic determinants on postnatal care in Mandera County.
4. To Examine the effect of social economic determinants on family planning in Mandera County.

1.4 Justification of the study

The study findings would be significant in two ways, first id the importance to the policy makers such as the Mandera county government and concerned stakeholders. The findings of the study would be core in informing the policy makers how different socio and economic factors influence various components of maternal health care. Further, the study findings would inform the policy makers on the inequalities of ANC, Post-natal, facility – based delivery, modern contraceptives usage across the wealth quantiles and other socio characteristics such as place of residence. Such findings would inform policies around which component of maternal healthcare need to be strengthened for which section of the society (urban dwellers versus rural dwellers, poor versus the rich households among others). Secondly, the value to the current literature. The study will be core in validating the theories underpinning this study namely: The Grossman theory of demand and health belief model.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews the theoretical framework that outlines the theories and models that relate to maternal healthcare utilization.

2.2 Theoretical literature review

2.2.1 Grossman theory of demand for health care

Grossman (1972) used the expected utility theory to explain that health care is demanded both as a consumer good and as an investment good. As a consumer good health care makes individuals happier, whilst as an investment good it improves the quality of human capital by increasing the number of healthy working days leading to higher productivity. The theory asserts that healthcare demand is a derived demand. The demand is derived from the demand to participate in leisure or productive work. He notes that investments in education, health care, exercises, diets among others can improve the health capital.

2.2.2 The consumer Theory

Cameroon *et al* (1988) consumer theory assumes that the household's main problem is that of maximizing utility from a given bundle of goods and services given their relative prices, preferences and disposable income. Such consumption bundles can be made up of normal good or inferior good. To maximize utility a household will choose the combination of x_1 (consumer goods) and x_2 (producer good) that maximize its utility.

It is assumed that consumer goods (X_1) and human capital (X_2) - maternal and child healthcare, are normal goods, that is, the demand for maternal and child healthcare will increase with increase in income. Apart from price and income, there are other factors, which affect the demand for these goods. These may include age, education level, and preferences of the household, health status among other factor

2.2.3 Health Belief Model

This model is derived from the principle of cognitive theories of behavior, who argued that the perceived value of the desired outcome greatly influences, with a belief that if behavior is well performed, the desired outcome will be achieved. As explained by Rosenstock (1974), the conceptualization of this model was founded on the realization that certain individual beliefs and perceptions about disease and possible preventive measures have a direct significant impact on health behavior. According to the concepts in this model, four main constructs are believed to influence behavior as in: perceived seriousness/severity, individual's perceived vulnerability/susceptibility as well perceived potential barriers as well as the perceived resulting benefits. In addition, proponents of this model appreciates that there exists modifying factors to the four constructs, as detailed by (Ellingson&Yarber, 1997).

Perceived susceptibility: Among many other factors, this is one of the most influential on individual health seeking behavior. As stated by Maiman& Becker (1974), the more an individual perceives risk, the more likely that person is to adopt actions that will reduce the risk. Similarly, when people are in a situation where they do not perceive any imminent risk, they are less likely to adopt preventive behavior patterns. Relating to this study, a pregnant woman residing in a resource-deprived area with long walking distances to the nearest health facility might feel more vulnerable to succumbing to pregnancy related complications. This might then compel such a woman to be more vigilant in seeking for maternal healthcare as advised by the healthcare professionals.

Perceived benefits arm of the health belief model elaborates individual awareness of the resulting gains that they are likely to achieve by embracing risk-reducing actions. Perceived benefits tend to act as a motivation for the relevant behavior thought to result in expected benefits. According to Maiman& Becker (1974), this theory has been found to greatly influence the embracement of secondary preventive health behaviors such as going for early disease screening. (Simkhada et al., 2008) however notes that a final decision is arrived at after the potential benefits outweigh the expected obstacles. Aligning this theory to the concepts of this study, women might, through their own experiences or those of their fellow women discover that adhering to antenatal care visits

as recommended by their healthcare providers results to a healthy pregnancy, safe delivery and a healthy baby. As a result of this, such women will end up putting all the effort to attend their scheduled antenatal clinics against all the odds so that they can derive the benefits of being remaining safe and healthy as well as have a healthy baby.

2.3 Empirical literature review

A vast body of literature exists in this area though incongruent in their findings depending on the setting of the study at hand. Ngozi and Odimegwu (2014) analyzed the Nigeria's maternal Health Care utilization. Data from 17,542 women aged within reproductive age of 15-49 years was used for empirical analysis. Upon the employment of multi-level analysis method, the study findings were that place of residence, was a core determinant of facility – based delivery. Women living in Northern Nigeria were found to have less utilization of maternal healthcare. On education matters, educated women possessing secondary and post-secondary education status were found to consume facility – based delivery services. However, diversity in ethnicity was reported as a deterrent towards utilization of maternal health.

Ogolla (2015) focused on West Pokot county in attempt to access maternal healthcare with bias on home – based delivery. 18,174 households were the target population but only 600 women participated in the study. The study concluded that 33.3 percent of the recently registered births of the 600 women had facility – based delivery with the rest 66.7 percent having delivered at home. In addition, the study reported that the critical factor towards high levels of home deliveries at the county was the low household socio and economic status.

In Ethiopia, Ayele et al (2014) sampled 495 women in the reproductive age cohort and analysed their maternal care demand. On ANC services, 86.1 percent confirmed to had at least 1 ANC visit in latest pregnancy. However, further results revealed that of those who had sought for ANC services, 61.7% of women never achieved the bear minimum requirement for 4 ANC visits. On delivery front, only 25.3% of deliveries were facility – based. Low level of facility based deliveries in the rural areas were recorded at rural residence at 20.9% compared to urban residence estimated to be at 35.9%. They

recommended for education and sensitization of mothers in particular for maternal health care accessibility. Oyewale and Mavundla (2015), used a cross-sectional survey covering 384 respondents in Nigeria. The study conclusion were that significant difference were evidenced in the consumption of Antenatal services, facility – based delivery care, post-natal care and modern contraceptive usage. Key determinants were mother's age, education, parity, wealth quantile of household, residence and possession of insurance cover.

With regard to literacy levels, Butawa et al, (2010) reported women education status in Nigeria influenced their perception and utilizations of healthcare services positively. Similar findings are reported by Adanu (2010) in Ghana ANC services provision. Avidime et al, (2010) conclude education promotes utilization of modern family planning services. The effect of the age of the mother on maternal health demand has seen mixed results being reported. Awusi, Anyanwu & Okeke (2009) reports significant effect of age on ANC consumption within Nigeria with 87 percent who were below 30 years utilizing antenatal compared to 13% of who are aged more than 30 years. Similar results are evidenced by Doctor and Dahiru (2010) in Northern Nigeria. However, Oguntunde et al. (2010) report that mothers were insignificant in determining antenatal services utilization if the Northern Nigeria region.

Regarding partner's approval, Nyakato and Charles (2013) examined how couples' relations and decision-making hierarchy determine maternal health in Uganda. According to the study, household head is the main decision maker on health demand matters. Nyakato and Charles study was similar to the researcher's study in examining maternal health and women's control and access over family resources. However, the above study focused on respondents aged 20-49 but the researcher's current study focused on married women and men aged 15-49.

On the employment status, Gwamaka (2012), conducted a study in Tanzania among 59,987 women, concluded that women who are employed may be able to save and so will have money to spend on a health facility. Study found that women with higher income had a facility delivery than low income women. Similarly, Yar'zever and Said (2013)

conclude that women employment has a positively shocks maternal health consumption Unemployed women were reported to more likely suffer pregnancy related complications and to some extent even are more likely to die. However, an earlier study by Sharma et al (2007), in a Nepal found women employment status to be insignificant in determining maternal healthcare consumption.

In Nigeria, Yar'zever and Said (2013) adopted descriptive survey for 1,000 women aged 18 – 49 years they concluded that employed women are more likely to demand for maternal health. Unemployed women were found to likely die of pregnancy complications. Benova *et al,* (2014) review maternal care in Egypt. The focus was on two components of maternal healthcare namely: regular antenatal services and facility - based delivery. The finding were that 58.5% of women used ANC and 51.1% of deliveries were facility – based. However, this was lower than the national average 74.2% for ANC utilization and 72.4% for faculty – based deliveries.

2.4 Overview of literature review

Nearly all studies done from across the globe assert that maternal healthcare is of paramount importance and has received lot of emphasis by various governments globally. In addition, the studies are cognizant of the fact that maternal healthcare is subject to many determinants but broadly categorized as socio, economic and demographic factors. These determinants include individual woman's characteristics like her marital status, age and her level of education, in addition to external determinants, as in the case demographic influences such as the place of residence, partner's approval, distance to the nearest healthcare facility, economic well – being of the household among others.

It is also evident that the studies' conclusions are in concurrent in theirs. This present the need for analysis with regard to the social economic determinants - maternal health care nexus in Madera County in order to objectively conclude the effect of each and every factor on maternal healthcare consumption. This study sought to analyze how socio economic factors have influenced all the four maternal healthcare package components namely: antenatal, postnatal, facility – based delivery and use of modern contraceptive.

2.5 Conceptual Framework

Based on the empirical literature reviewed, the conceptual framework presents the linkage between the explanatory and dependent variables in the study is illustrated in figure 2.1as follows:

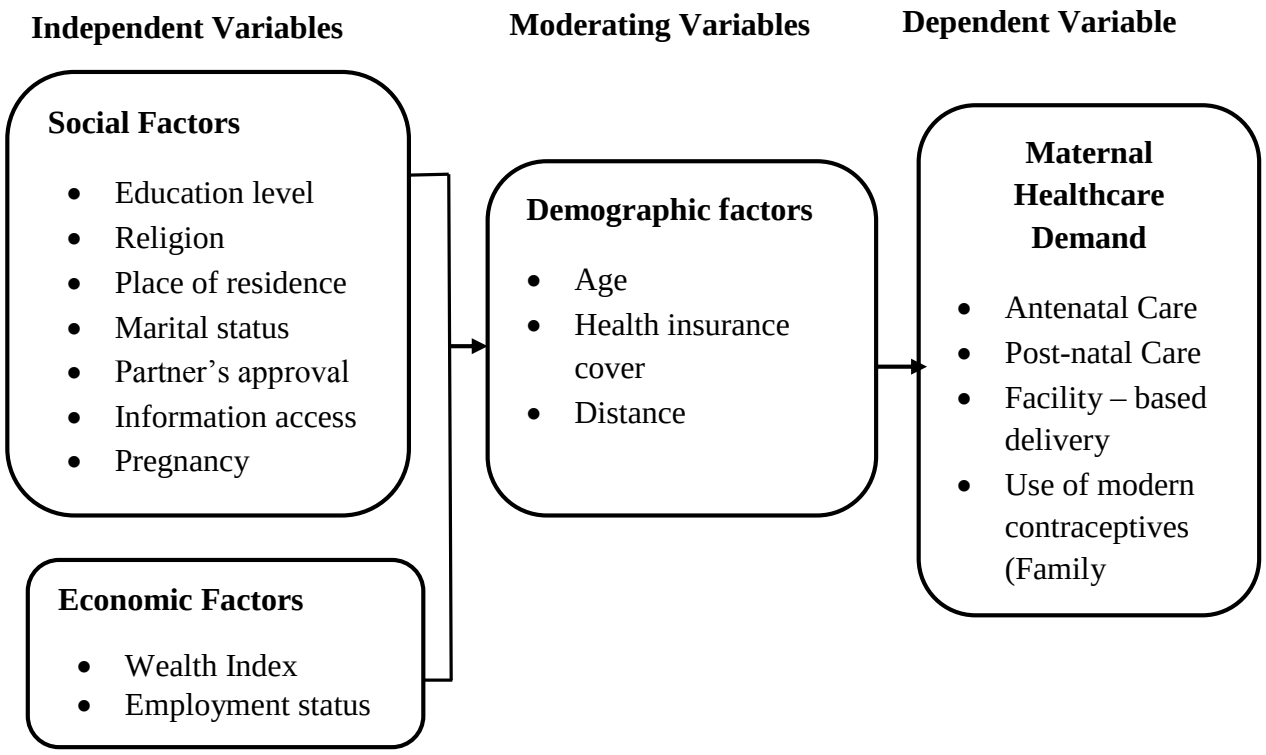

Figure 2:1: Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1Introduction

This chapter covers the methodology and the study design that will be applied in this research. More specifically, it entails research design to be used, theoretical framework, econometric model for the study, variables' operationalization, data for the study, diagnostic tests and lastly the chapter covers data analysis.

3.2 Theoretical framework

The study will employ healthcare framework model for analyzing the maternal healthcare developed by McCarthy (1997) and the behavioral model of health services by Andersen & Newman (2005). From the two models, any interventions aimed at maternal death reduction often assumes three possible pathways namely: planning for pregnancies, reduction of pregnancy – related complications and reduction of likelihood that a pregnancy – related complication will result in death.

The health demand behavioral model by Andersen & Newman (2005) will guide in modeling women socio – economic characteristics affecting maternal health. Such characteristics are the women predisposition factors which could be enablers or hindrance. This study will therefore focus on the predisposing and enabling factors, as captured by the socio and economic characteristics of women with regard to maternal health utilization in Mandera County.

3.3 Econometric model specification

From an econometrics perspective, the analysis the maternal healthcare assumes the healthcare demand function. The study will employ probit model. The main concern will be estimation of probability for seeking maternal healthcare given the explanatory variables. The model assumes latent variable y* and explanatory variables Xi are linearly related. The general model is presented in equation 1 as follows:

$$y^* = X_i\beta + \varepsilon \quad \text{.....(1)}$$

Where y is ranges between -∞ to + ∞ whilst Xi represents a vector of explanatory

variables which influence demand for maternal and child healthcare, β is a vector parameter to be studied and e is the error term. Equation 2 links latent variable y* and the observed variable.

The study will employ probit model. The general structural probit model can be presented as follows:

$$y_{ij}^{*} = \alpha + \beta X_i + \varepsilon_{ij} \quad \text{.....(2)}$$

$$y_{ij} = \begin{Bmatrix} 1 \; if \; \gamma_{ij}^{*} > 0 \\ 0 \; otherwise \end{Bmatrix} \quad \text{... ... ... (3)}$$

Where: **y* =** is the probability for MHC demand (1 if demanded, 0 otherwise).

Xi = the explanatory variable vector

β = a vector of the parameters of explanatory variables

e = the error term.

The average characteristic of variables X_i are then regressed against y to determine the influence of each variable on the woman consuming MHC or not. The probit regression model for MHC demand is given by the equation;

$$ANC = \alpha_1 + \beta_1 Age + \beta_2 Educ + \beta_3 Mstat + \beta_4 \text{Residence} + \beta_5 \text{Infaccess} + \beta_6 \text{Preginfo} + \beta_7 \text{Religion} + \beta_8 Approval + \beta_9 Wealth + \beta_{10} Employment + \beta_{11} Insurance + \beta_{12} \text{Distance} + \varepsilon_i \quad \text{.....(4)}$$

$$PNC = \alpha_1 + \beta_1 Age + \beta_2 Educ + \beta_3 Mstat + \beta_4 \text{Residence} + \beta_5 \text{Infaccess} + \beta_6 \text{Preginfo} + \beta_7 \text{Religion} + \beta_8 Approval + \beta_9 Wealth + \beta_{10} Employment + \beta_{11} Insurance + \beta_{12} \text{Distance} + \varepsilon_i \quad \text{.....(5)}$$

$$FBD = \alpha_1 + \beta_1 Age + \beta_2 Educ + \beta_3 Mstat + \beta_4 \text{Residence} + \beta_5 \text{Infaccess} + \beta_6 \text{Preginfo} + \beta_7 \text{Religion} + \beta_8 Approval + \beta_9 Wealth + \beta_{10} Employment + \beta_{11} Insurance + \beta_{12} \text{Distance} + \varepsilon_i \quad \text{.....(6)}$$

$$FP = \alpha_1 + \beta_1 Age + \beta_2 Educ + \beta_3 Mstat + \beta_4 \text{Residence} + \beta_5 \text{Infaccess} + \beta_6 \text{Preginfo} + \beta_7 \text{Religion} + \beta_8 Approval + \beta_9 Wealth + \beta_{10} Employment + \beta_{11} Insurance + \beta_{12} \text{Distance} + \varepsilon_i \quad \text{.....(7)}$$

Where:

ANC	-	Antenatal Care by a household i,
PNC	-	Post Natal Care by a household i,
FBD	-	Facility Based Delivery
FP	-	Family planning/ modern contraceptive use
Age	-	Mother's age
Educ	-	Education status of the mother;
Mstat	-	Mother's marital statsus
Residence	-	is the households place of residence
Infacess	-	Accessibility to general health information by the household;
Preginfo	-	mother's awareness on pregnancy and delivery complications;
Religion	-	Religion of the household;
Approval	-	is the partner's approval
Wealth	-	Wealth index of the household;
Employment	-	Employment status of mother;
Insurance	-	Whether household has a health insurance cover
Distance	–	is if distance is a problem in seeking for MHC services
ε	-	is the error term of the model

We note that the MHC will comprise of four different healthcare namely: the Antenatal Care, Facility Based Delivery care, modern contraceptive use, and Postnatal Care.

3.4 Operationalization of variables

The dependent variable is the demand for maternal health care. The independent variables will include, mother's education level, age of mother, wealth index of the household, occupational status of mother, information on pregnancy status, information awareness on general health matters, religion of the household, place of residence household, partner's consent / approval and whether household has a health insurance cover.

Table 3.1 : Definition, measurement and expected outcomes of study variables.

Variable	Definition	Measurement	Expected Sign
Dependent Variable			
Antenatal health Care	Whether mother sought 4+ Antenatal health Care services	1 if sought Antenatal Health Care, 0 otherwise	
Modern use of Contraceptive (family Planning)	Whether mother is using any Modern Contraceptive	1 if using modern contraceptive, 0 otherwise	
Facility Based Delivery	Whether mother delivered in any health facility	1 if sought facility based delivery care, 0 otherwise	
Postnatal Care	Whether mother received any postnatal Care within 2 weeks of delivery	1 if got postnatal Care, 0 otherwise	
Independent Variable			
Social factors			
Age	Age of mother in years	1 if 15-19 yrs, 2 if 20-24 yrs 3 if 25-29 yrs 4 if 30-34 yrs 5 if 35-39 yrs 6 if 40-44 yrs 7if 45-49 yrs	Positive
Education level	The highest education level attained by mother	1 if Primary education, 2 if secondary education, 3 if postsecondary education, 0=otherwise / no education at all	Positive
Marital Status of the woman	Whether a mother is married or not	1 if married, 0 otherwise	Positive
Residence	Place of residence of the household	1 if rural, 0 otherwise	Negative
Access to health information by household	Is the household access to information on the general health matters	1 if household in possession of radio, TV or reads newspapers, 0 otherwise	Positive
Pregnancy complications	Mother having information on pregnancy related complications	1 if mother has received information 0 otherwise	Positive
Religion of the household	Is the religion of the household	1 if Muslim 0 if others	Positive / negative

Partner approval	Whether the partner is consulted to give approval for seeking of maternal health	1 if partner approval 0 otherwise	Positive
Economic factors			
Wealth Index of the household	Is the wealth quantile of the household based on their income – expenditure bracket	1 if poorest, 2 if poorer, 3 if middle, 4 if richer, 5 if richest	Positive
Employment/Occupational Status	Is the employment status of the mother	1 if employed, 0 otherwise	Positive
Health insurance cover	Whether the household has a health insurance cover of not	1 if presence of health insurance cover 0 otherwise	Positive
Distance	Is the distance to the nearest health facility	1 if distance is a problem in seeking MHC services	Positive

3.5 Data and Data Sources

The study will rely on the Kenya Demographic Household Survey (KDHS for 2014). This is the third and latest of a series of such surveys following the ones done in 2003 and 2008 respectively. The design of the survey provided for representative estimates at the national level, regional (former provinces) urban and rural, and county level for selected indicators. From the databases, data sets for data on maternal child health services will be obtained from women of reproductive (15 - 49 years) for analysis purposes. From the national database. The dataset for Mandera County will be extracted for empirical analysis. Specifically, information containing background characteristics such as maternal age, education level, place of residence, partner's approval as well as the respective maternal and child healthcare utilization indicators were captured in the survey which is very crucial in this study.

3.6 Diagnostic tests

3.6.1 Multicollinearity

Multicollinearity could occur in cross sectional data such as the one in this study. Multicollinearity consequences include incorrect magnitude of coefficients and signs that may cause drawing final conclusions that are not precise. This is because it causes an increase in the variance of the parameters. In this study, it will be checked using variance inflation factor or collinearity matrices.

3.6.2 Heteroscedasticity test

Heteroscedasticity is a serious problem in econometrics that tends to have consequences on the Ordinary Least Square (OLS) estimators. If present, heteroscedasticity doesn't bias the OLS estimator. However, the standard error that will be estimated is usually incorrect. This in turn renders confidence intervals and hypotheses tests unreliable. In this study, we note that there will be no need for testing for heteroscedasticity problem. This is because the study will rely on the Generalized Linear models for estimation. Ideally, from the econometric point of view, the generalized linear models (GLM) effectively accommodate the problem of skewness in data and heteroscedasticity through variance-weighting.

CHAPTER FOUR: DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter details the descriptive statistics of the socioeconomic determinants of maternal healthcare in Mandera County. In addition, analyses of the probit model result for the antenatal postnatal, facility based delivery and modern family planning among the surveyed households.

4.2 Descriptive Summary Statistics

The results reveal that from the KDHS database, there were 1,807 households surveyed from Mandera County. From the descriptive statistics, it is evident that the utilization of the antenatal services is very limited in the county at best. Out of the 1,807 households surveyed in the county in 2014, maternal health care indicators posit that only 50.53 percent of the households sought for the antenatal services from the health facilities compared to 49.47 percent who never sought for any antenatal services. Only a decimal 2.32 percent of surveyed women cited to have ever used modern contraceptive for family planning purposes. 36.14 percent of woman had a facility – delivery thus a high home – based deliveries in Mandera County as at year 2014. On postnatal services, 47.04 percent of women in the County sought for postnatal services from specialized healthcare provider.

The age cohorts of the women reveal that less that 1 percent were aged between 15 and 19 years with those being in this age group being 0.22 percent. 5.53 percent of the women were aged 20 to 24 years with 17.71 percent aged between 25 – 29 years. The bulk of the women were aged between 30 years and 44 years with the mean being 21.42 percent, 26.23 percent and 20.97 percent for 30-34, 35-39 and 40-44 years respectively. Only 7.91 percent of surveyed women were categorised in the 45 – 49 years age bracket.

The current marital status of women reveals that 94.08 of women were married. The place of residence indicate that 64.31 percent of women were from rural dwelling households. Only 36.64 percent of women indicated to be frequently receiving information either via radio, television or newspaper channel. The knowledge on

pregnancy related complications mainly during ANC visits indicate that a mere 2.49 percent of women were furnished with pregnancy related complications during their ANC visits. Review of the type of religion indicates that 99.67 percent of women were from households which of Muslim faith. Other religions (catholic, Protestants, Hindu) accounted for less than 1 percent of the surveyed households. 15.72 percent of women were found to have sought for their partner's consent / approval with regard to seeking of maternal healthcare services.

On the economic front, the household's wealth status indicates that 73.88 percent of the households in the county are classified as poorest with 3.87 percent being of poorer status. 3.49 percent of households belonged to middle wealth quantile, 8.63 percent being richer and 10.13 percent being richest. The current employment status of the women indicates that only 3.27 percent were formally employed against 96.73 percent who were unemployed. 2.66 percent of women were either having or have come from household that has a health insurance cover. Lastly, 32.60 percent of the women had distance as a hindrance to accessing maternal health care.

Table 4.1: Descriptive Statistics

Variable		Observations	Mean	Std. Dev.	Min	Max
Antenatal Services		1,807	0.5053	0.5001	0	1
Modern family planning		1,807	0.0232	0.1507	0	1
Facility based delivery		1,807	0.3614	0.4805	0	1
Postnatal services		1,807	0.4704	0.4993	0	1
Information access		1,807	0.3664	0.4819	0	1
Pregnancy information		1,807	0.0249	0.1559	0	1
Married		1,807	0.9408	0.2361	0	1
Partner approval		1,807	0.1572	0.3641	0	1
Distance problem		1,807	0.3260	0.4689	0	1
Age	15-19 yrs =1	1,807	0.0022	0.0470	0	1
	20-24 yrs=2	1,807	0.0553	0.2287	0	1
	25-29 yrs=3	1,807	0.1771	0.3818	0	1
	30-34 yrs=4	1,807	0.2142	0.4104	0	1
	35-39 yrs=5	1,807	0.2623	0.4400	0	1
	40-44 yrs=6	1,807	0.2097	0.4072	0	1
	45-49 yrs=7	1,807	0.0791	0.2700	0	1
Education	No education	1,807	0.9275	0.2594	0	1
	Primary = 2	1,807	0.0504	0.2187	0	1
	Secondary =	1,807	0.0100	0.0993	0	1
	Post-Sec= 4	1,807	0.0122	0.1097	0	1
Residence	Rural	1,807	0.6431	0.4792	0	1
	Urban	1,807	0.3569	0.4792	0	1
Religion	Muslim	1,807	0.9967	0.0575	0	1
	Other	1,807	0.0033	0.0575	0	1
Wealth quantile	Poorer wealth	1,807	0.7388	0.4394	0	1
	Poorer wealth	1,807	0.0387	0.1930	0	1
	Middle wealth	1,807	0.0349	0.1835	0	1
	Richer wealth	1,807	0.0863	0.2809	0	1
	Richest	1,807	0.1013	0.3018	0	1
Employment status	Employed	1,807	0.0327	0.1778	0	1
	Not employed	1,807	0.9673	0.1778	0	1
Insurance cover	Insured	1,807	0.0266	0.1608	0	1
	Uninsured	1,807	0.9734	0.1608	0	1

4.3 Diagnostic Tests

4.3.1 Multicollinearity Test

The Variance Inflation Factor was applied to test for Multicollinearity in the model. The results for Multicollinearity are presented in table 4.2. From the results, the mean variance inflation factor for ANC, postnatal, facility – based delivery and modern contraceptives models were 3.18, 3.06, 3.50 and 2.87 respectively. Using a rule of thumb of 10, we conclude that there is no Multicollinearity among the variables since the mean VIF for all the models are less than 10 (Gujarat, 2012).

Table 4.2: Variance Inflation Factor results – Test for Multicollinearity

		ANC Model		**Postnatal Model**		**Delivery Model**		**FP Model**	
	Variable	**VIF**	**1/VIF**	**VIF**	**1/VIF**	**VIF**	**1/VIF**	**VIF**	**1/VIF**
Age	35-39 yrs=5	9.61	0.0112	9.61	0.0112	7.93	0.0112	8.61	0.0112
	30-34 yrs=4	8.13	0.0128	6.13	0.0128	8.53	0.0128	7.13	0.0128
	40-44 yrs=2	7.03	0.013	9.03	0.013	7.73	0.013	7.03	0.013
	25-29 yrs =3	7.69	0.0148	5.84	0.0148	7.69	0.0148	6.69	0.0148
	45-49 yrs=7	4.41	0.0291	4.86	0.0291	4.31	0.0291	3.41	0.0291
	20-24 yrs =2	4.83	0.0403	2.83	0.0403	4.82	0.0403	2.83	0.0403
	Rural residence	2.29	0.4374	2.29	0.4374	2.29	0.4374	2.29	0.4374
Wealth	Richest =5	2.08	0.4812	2.08	0.4812	2.08	0.4812	2.08	0.4812
	Richer =4	1.68	0.595	1.68	0.595	1.68	0.595	1.68	0.595
	Middle =3	1.32	0.757	1.32	0.757	1.32	0.757	1.32	0.757
	Poorer =2	1.18	0.8451	1.18	0.8451	1.18	0.8451	1.18	0.8451
	Info access	1.61	0.6201	1.61	0.6201	1.61	0.6201	1.61	0.6201
	Insured	1.4	0.7164	1.4	0.7164	1.4	0.7164	1.4	0.7164
	approval	1.36	0.7335	1.36	0.7335	1.36	0.7335	1.36	0.7335
	Employed	1.35	0.7412	1.35	0.7412	1.35	0.7412	1.35	0.7412
	Distance	1.2	0.8339	1.2	0.8339	1.2	0.8339	1.2	0.8339
	Preg info	1.18	0.8496	1.18	0.8496	1.18	0.8496	1.18	0.8496
	Married	1.06	0.9439	1.06	0.9439	1.06	0.9439	1.06	0.9439
	Muslim	1.05	0.9483	1.05	0.9483	1.05	0.9483	1.05	0.9483
	Mean VIF	**3.18**		**3.06**		**3.5**		**2.87**	

4.3.2 Test for Heteroscedasticity

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity reveal that the Prob > chi2 = 0.000. Thus, we reject the null and implying that the model has heteroscedasticity problem (Gujarat, 2012). The results for the heteroscedasticity are reported in table 4.3.

Table 4.3: Breusch-Pagan / Cook-Weisberg Test Results – Test for Heteroscedasticity

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity	
Ho: Constant variance	
ANC Model	
Chi2(1) = 0.14	Prob > chi2 = 0.7045
Postnatal Model	
Chi2(1) = 0.12	Prob > chi2 = 0.7339
Facility – based delivery Model	
Chi2(1) = 0.03	Prob > chi2 = 0.8601
Family Planning Model	
Chi2(1) = 0.45	Prob > chi2 = 0.9755

The Probability values for the respective chi square statistics for the Breusch-Godfrey LM for all the models are greater than 5 percent indicating absence of heteroscedasticity in the models.

4.4 Regression Model: Probit Model: Socioeconomic Determinants of Maternal Healthcare in Kenya

Prior to estimating the probit model, the benchmark categories for the variables were determined and set accordingly. For the age cohort, 15 – 19 years age bracket was set as the benchmark category. For women education variable, no education was used as the benchmark category. For women's current marital status, not currently married was set as the reference dummy. On place of residence, urban residence was set as the benchmark category. The lack of information access was set as the reference category for information access variable. On pregnancy – related complication information, lack of information was set as the reference dummy. In the religion, other religions were

assigned the reference category. On partner's approval, lack of approval was the benchmark category. On the household wealth index / quintile, lowest (poorest) wealth index was set as the benchmark category. On the current employment status of the household head, not currently employed was set as the reference category. Being uninsured was set as the reference category for the household's health insurance variable. Lastly, for the distance, distance being not an impendent to seeking of maternal health services was set as the benchmark category.

Table 4.4: Probit Models for ANC, Postnatal, Delivery and Family Planning Models

		ANC Model			Postnatal Model			Delivery Model			FP Model		
		Marginal effects	**z**	**P>z**	**Marginal Effects**	**z**	**P>z**	**Marginal Effects**	**z**	**P>z**	**Marginal effects**	**z**	**P>z**
Age	20-24 yrs =2	0.3326** (0.2808)	1.18	0.037	0.9494** (4.8175)	0.04	0.028	0.2309*** (0.2619)	0.88	0.018	0.0959 (0.0472)	2.03	0.405
	25-29 yrs = 3	0.2631*** (0.2784)	0.94	0.005	0.9679** (4.8175)	0.04	0.017	0.2967*** (0.2594)	1.14	0.003	0.0831 (0.0434)	1.92	0.277
	30-34 yrs = 4	0.3268*** (0.2785)	1.17	0.001	0.9524** (4.8175)	0.04	0.008	0.3182** (0.2593)	1.23	0.020	0.0757 (0.0428)	1.77	0.243
	35-39 yrs = 5	0.3512*** (0.2782)	1.26	0.000	0.9604** (4.8175)	0.04	0.038	0.3255** (0.2592)	1.26	0.010	0.0875 (0.0434)	2.01	0.231
	40-44 yrs = 6	0.3315** (0.2786)	1.19	0.005	0.9308** (4.8175)	0.04	0.042	0.2986** (0.2595)	1.15	0.050	0.0775 (0.0431)	1.8	0.274
	45-49 yrs = 7	0.4093** (0.2802)	1.46	0.014	0.8984** (4.8175)	0.04	0.019	0.3037 (0.2612)	1.16	0.245	0.0901 (0.0452)	1.99	0.269
Education	Primary = 2	0.1186*** (0.0560)	2.12	0.000	0.0244*** (0.0556)	0.44	0.001	0.0117** (0.0523)	0.22	0.043	0.0174* (0.0151)	1.15	0.082
	Secondary = 3	0.0663*** (0.1356)	0.49	0.000	0.0540*** (0.1349)	0.4	0.000	0.0364*** (0.1229)	0.3	0.000	0.1063** (0.0278)	3.83	0.043
	Post-Sec= 4	0.1949*** (0.1168)	1.67	0.000	0.1900*** (0.1159)	1.64	0.000	0.0708* (0.1064)	0.67	0.062	0.2739*** (0.9520)	0.29	0.000
	Married	0.1173 (0.0511)	2.29	0.822	-0.0338 (0.0510)	0.66	0.507	0.0019 (0.0489)	0.04	0.969	0.0021 (0.0179)	0.12	0.959
	Rural residence	-0.0114***	-0.31	0.000	-0.0020***	-	0.000	-0.0183***	-0.52	0.004	0.0326	1.61	0.607

		(0.0366)			(0.0367)	0.05		(0.0352)			(0.0202)		
	Info access	0.0488** (0.0306)	1.59	0.012	0.0401** (0.0306)	1.31	0.012	0.0143* (0.0352)	0.49	0.075	0.0030 (0.0115)	0.26	0.618
	Preg info	0.1307** (0.0806)	1.62	0.006	0.2017 (0.0848)	2.38	0.018	0.3794 (0.0825)	4.6	0.534	0.0540 (0.1347)	0.4	0.000
	Muslim	-0.1654 (0.2298)	-0.72	0.472	0.1900 (0.2236)	0.85	0.396	-0.0393 (0.2055)	-0.19	0.848	-0.1949*** (0.1168)	-1.67	0.006
	Approval	0.0869*** (0.0375)	2.32	0.001	0.0731 (0.0371)	1.97	0.249	0.1081 (0.0346)	3.12	0.002	0.0021** (0.0129)	0.16	0.022
Wealth	Poorer wealth = 2	0.0909*** (0.0655)	1.39	0.000	0.1536*** (0.0672)	2.29	0.003	0.0272** (0.0625)	0.44	0.013	0.0228 (0.1388)	0.16	0.669
	Middle wealth = 3	0.1015*** (0.0739)	1.37	0.001	0.0365*** (0.0729)	0.5	0.000	0.0161* (0.0694)	-0.23	0.076	0.1802 (0.1471)	1.22	0.807
	Richer wealth = 4	0.0584*** (0.0540)	1.08	0.000	0.0089*** (0.0540)	0.16	0.000	0.0080** (0.0519)	-0.16	0.047	0.0338** (0.0231)	1.46	0.046
	Richest wealth= 5	0.0683*** (0.0571)	1.2	0.232	0.0701*** (0.0572)	1.23	0.001	0.1027*** (0.0540)	1.9	0.000	0.0251** (0.0242)	1.04	0.041
	Employed	0.0479 (0.0791)	0.6	0.545	0.0846** (0.0788)	1.07	0.024	0.0437 (0.0728)	0.6	0.549	-0.0238 (0.0246)	-0.97	0.549
	Insured	0.1616*** (0.0903)	1.79	0.000	0.0212*** (0.0878)	0.24	0.000	0.0448*** (0.0819)	0.55	0.004	0.0521 (0.0267)	1.95	0.575
	Distance	-0.0439** (0.0271)	-1.62	0.005	-0.0055** (0.0272)	-0.2	0.014	-0.0533*** (0.0261)	-2.05	0.041	-0.0104 (0.0100)	-1.05	0.042

Note: standard errors are in parenthesis, * are significant at 10% level, ** are significant at 5% level, *** are significant at 1% level.

Source: Author's computation based on KDHS 2014

4.5 Interpretation of the Probit Model Results

From the probit model estimates, we first interpret the coefficients of the respective independent variables to the model as presented in table 4.4. Based on the probit model estimates, the following findings are evident: the women age has a positive effect on the demand for antenatal services, postnatal services, facility based delivery and use of modern contraceptives for family planning. Results indicate that women aged 20 years to 49 years are more likely to seek for antenatal services, postnatal services facility based delivery and use of modern contraceptives compared to women aged 15 - 19 years.

From the marginal effects results of the probit model, of the four MHC components, postnatal healthcare is the most pronounced with regard to women age. Women aged 20-24 yrs seek for postnatal healthcare more compared to women aged 14 – 19 years by 94.94 percent holding other factors constant. The highest effect was 25 - 29 age group at 96.04 percent. For the facility – based delivery, women aged 35 – 39 years had the highest likelihood at 32.55 percent compared to women aged 14 – 19 years. Similar results are reported for the ANC model where women aged between 35 – 39 years.

In overall it is notable that the effect of age on ANC, postnatal and facility based delivery models was found to be significant at 5 percent significance level except for women aged 45 - 49 yrs whose likelihood to utilize facility based delivery was found to be insignificant at all. However, for the family planning model, the effect of age was insignificant across all the age cohorts.

On the education attainment front, results indicate that attainment of formal education has a positive effect in determining maternal healthcare consumption. Specifically, educated women seek for maternal healthcare services more than the uneducated. Similarly, results are evidenced for married women. The study findings were that primary education leads to seeking of ANC, postnatal, facility – based delivery and modern contraceptives more by 11.86 percent, 2.44 percent, 1.17 percent and 1.74 percent respectively compared to women who have no education at all. However, the effect of primary education on demand on modern contraceptives was not significant at 5 percent. Similar results were revealed for secondary education level with 63 percent, 5.4 percent, 3.64 percent and

10.63 percent for ANC, postnatal, facility – based delivery and modern contraceptives respectively. The effect of secondary education was significant across all the components of MHC at 5 percent significance level. For the post – secondary education level, women with post – secondary education were found to be more likely to seek for ANC, postnatal, facility – based delivery and modern contraceptives by 19.49 percent, 19.00 percent, 7.08 percent and 27.39 percent respectively compared to women who have no education at all. The effect of post-secondary education was significant across all the components of MHC except for facility – based delivery.

Married women seek for ANC, postnatal, facility – based delivery and modern contraceptives more by 11.73 percent, 3.88 percent, 0.19 percent and 0.21 percent respectively compared to unmarried women. However, the effect of marital status was insignificant across all the MHC components.

The place of residence negatively effects demand for MHC in Mandera County. More specifically, rural women utilized ANC, postnatal, facility – based delivery and modern contraceptives by 1.14 percent, 0.20 percent, 1.83 percent and 3.26 percent less respectively compared to urban women. The effect was significant across all MHC components at 5 percent significance level

Information access was key in so far as demand for MHC. Women from households that have radio, television and access to newspapers were found to be more likely to seek for ANC, postnatal, facility – based delivery and modern contraceptives by 4.88, 4.01, 1.43 and 0.30 percent respectively compared to women from households that have no radio, television and access to newspapers. However, only the effect on ANC, postnatal services is significant at 5 percent. Similarly outcomes are reported for women who had knowledge of their possible pregnancy related complications during ANC services were found to be more likely to seek for ANC, postnatal, facility – based delivery and modern contraceptives by 13.07 percent, 20.17 percent, 37.94 percent and 5.40 percent respectively compared to women with no information on pregnancy related complications during ANC services. However, the effect of information on pregnancy related complications was significant only for ANC services.

On the religion, the dominant religion in the County had a negative effect on ANC services, facility based delivery and use of modern contraceptives by 16.54 percent and 3.93 percent respectively compared to other religions. In addition, it is evident that the effect of religion on use of modern contraceptives is very significant at 1 percent significance level. Partner's approval had a positive effect on all components of MHC. Women with their partners' consent were found to be more likely to seek for ANC, postnatal, facility – based delivery and modern contraceptives by 8.69 percent, 7.31 percent, 10.81 percent and 0.21 percent respectively compared to women with no partner's consent. However, the effect of partner's approval was significant for ANC services and use of modern contraceptives.

On the economic front, women from poorer households seek for ANC, postnatal, facility – based delivery and modern contraceptives more by 9.09 percent, 15.36 percent, 2.72 percent and 2.28 percent respectively compared to poorest households. However, the effect is insignificant with regard to use of modern contraceptives. Similar results for middle wealth quantile. Further, Women from richer households seek ANC, postnatal, facility – based delivery and modern contraceptives more by 5.84, 0.89, 0.80 and 3.38 percent respectively compared to poorest households with the effect being significant for the 4 MHC services. Similarly, Women from richest households are more likely to seek for ANC, postnatal, facility – based delivery and modern contraceptives by 6.83 percent, 7.01 percent, 10.27 percent and 2.51 percent respectively compared to poorest households with the effect being significant for the 4 MHC services

The effect of the employment status revels that employed women seek for ANC, postnatal and facility – based delivery more by 4.79 percent, 8.46 percent, 4.37 percent and 2.51 percent respectively compared to unemployed women. However, they are less likely to use modern contraceptives by 2.38 percent compared to unemployed women though insignificant. Possession of a health insurance cover had a positive effect on ANC, postnatal and facility – based delivery. Insured women seek for ANC, postnatal, facility – based delivery and modern contraceptives more by 16.16 percent, 2.12 percent, 4.48 percent and 5.21 percent respectively compared to uninsured women. However, the effect of insurance on use of modern insurance is insignificant.

Distance adversely effects on the utilization of MHC services in Mandera County. More specifically, those living far seek less ANC, postnatal, facility – based delivery and modern contraceptives services by 4.39 percent, 0.55 percent, 5.33 percent and 1.04 percent respectively though the effect on use of modern contraceptives is insignificant at 5 percent significance level.

4.6 Discussion of the Results

The study findings were that mother's age is a critical determinant on demand for MHC services in Mandera County. The age had a positive effect on MHC with older women found to utilize MHC service more compared to younger women. In overall it is notable that the effect of age on ANC, postnatal and facility based delivery models is significant for women aged 45 - 49 yrs whose likelihood to utilize facility based delivery was found to be insignificant at all. However, for the family planning model, the effect of age was insignificant across all the age cohorts. This finding concurs with the findings by Awusi, Anyanwu & Okeke (2009) who reported that maternal age had a significant effect on ANC utilization. Doctor and Dahiru (2010) in Northern Nigeria evidence similar results. However, Oguntunde *et al*... (2010) report that mother's age was insignificant in determining antenatal services utilization if the Northern Nigeria region

From the results, women who are educated utilize MHC services more than the uneducated ones. These findings were consistent with the findings by Butawa *et al.*, (2010) and Adanu (2010) in Ghana. In addition, Avidime *et al.*, (2010) found that women education positively influences utilization of modern family planning services.

Married women seek for ANC, postnatal, facility – based delivery and modern contraceptives more by 11.73 percent, 3.88 percent, 0.19 percent and 0.21 percent respectively compared to unmarried women. However, the effect of marital status was insignificant across all the MHC components. Similarly, Zeine *et al*., (2010) in Ethiopia found that marital status of the mother was not a true determinant for the demand and use of antenatal care.

The place of residence had a negative and significant effect on the demand for MHC in Mandera County. More specifically, rural women have less demand for ANC, postnatal, facility – based delivery and modern contraceptives compared to women residing in the urban area. This finding is in agreement with the finding by Oyewale and Mavundla (2015) who concluded that rural residence has a negative effect on MHC utilization in Nigeria. Partner's approval has positive effect on all components of ANC. Women with their partners' consent were found to be more likely to seek for ANC, postnatal, facility – based delivery and modern contraceptives. This finding is on concurrence with the finding by, Nyakato and Charles (2013) who in examining how couples' relations and decision-making hierarchy determine maternal health in Uganda concluded that household head plays crucial role in decision making as far as healthcare demand is concerned.

On the economic front, household wealth status has positive significant effect on the MHC demand. Women from poorer, middle, richer and richest households seek for ANC, postnatal, facility – based delivery and modern contraceptives frequently compared to low wealth households. This finding is in agreement with the finding by Oyewale and Mavundla (2015) who concluded that the key determinants of MHC in Nigeria were mother's age, education, parity, wealth quantile of household, residence and possession of insurance cover. Similar findings are reported by Ogolla (2015) focused on West Pokot county who attributed low MHC utilization to be arising from low household socio and economic status.

The effect of the employment status reveals that employed women seek for ANC, postnatal and facility – based delivery more but use modern contraceptives less compared to unemployed women though insignificant. The findings resonate with the findings of Gwamaka (2012) in Tanzania who concluded that employed women are capable of and so will have money to spend on a health facility. Yar'zever arrived at similar conclusion and Said (2013) conclude that women employment positively shocks maternal health consumption. However, the findings are in contrary to findings of Sharma *et al.,* (2007) reported a negative effect of employment on MHC utilization among Nepalese women.

Possession of a health insurance cover have positive effect on ANC, postnatal and facility – based delivery. Insured women seek for ANC, postnatal, facility – based delivery and modern contraceptives more. This finding is in agreement with the finding by Oyewale and Mavundla (2015) who concluded that the key determinants of MHC in Nigeria were mother's age, education, women parity, wealth quantile of household, residence and possession of insurance cover. Distance adversely effects utilization of MHC services in Mandera County. This finding resonates with the finding by Akowuah *et al*., (2018) who conducted a study on the determinants of antenatal care utilization by pregnant women in Ghana. From the study, distance is a key determinant to the regularity or irregularity of the utilization of antenatal care. This study reported that the chances of regular antenatal visits reduced by 6.7% for the cases where distance is long enough requiring the mother to use a car, as compared to cases of short walking distances.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

The chapter entails conclusions and summary of findings based on the findings fitted in the probit model, policy recommendations and areas for further study.

5.2 Summary of the Study

The study sought to examine the socioeconomic determinants of maternal healthcare in Mandera County. The study focused on the Mandera County. The choice for Mandera County was informed by the low uptake maternal health care services among the pregnant women with the average number of women seeking for these services being below the national averages for ANC services, postnatal, facility – based deliveries and use of modern contraceptives for family planning (KDHS, 2014). In addition, Mandera County was found to be lagging behind other counties which have closely similar socio-demographic characteristics, such as Garissa and Wajir with regard to MHC services utilization. It is noted that despite the government efforts such as the introduction of free services for the entire maternity package, studies continue to show alarmingly low utilization in some parts of Kenya, as in the case of Mandera County.

Given this phenomenon, the study sought to establish the socioeconomic determinants of ANC services, postnatal, facility – based deliveries and use of modern contraceptives for family planning. The study women utilization of MHC services to be determined by mother's age, place of residence, distance to health facility, household wealth quantile, woman's education level, marital status of the woman and woman's employment status, health insurance cover, partner's approval, religion, information access and possession of pregnancy – related complications information.

Probit model was applied in the empirical analysis. The choice of the model was informed by a number of facts. First, is the nature of the dependent variable which is a binary outcome with hat 1= MHC utilization, otherwise 0. Secondly is the fact the in the

Probit model assumes latent unobserved variable is assumed to be a normally distributed random variable with the error term being normally distributed.

The study relied on the 2014 Kenya Demographic and Health Survey. The dataset is a cross-sectional survey design where information about antenatal care components and timing of the visits was collected from individuals across all the selected households. A total of 40,300 households were sampled from across the 47 Kenyan counties, which were stratified into rural and urban strata. Specifically, information containing background characteristics such as maternal age, education level, County of residence as well as the respective antenatal care utilization indicators were captured, which is very crucial in this study. From the dataset data file for Mandera County was extracted for analysis which contained 1,807 observations. Upon probit model regression, Multicollinearity and heteroscedasticity were tested for in the model.

5.3 Conclusions of the Study Findings

The study found that utilization of the MHC services in Mandera county is minimal at best. From the descriptive statistics, only 50.53 percent of the women sought for the antenatal services from the health facilities, 2.32 percent reported having used modern contraceptive for family planning, 36.14 percent of woman had facility – based deliveries with 47.04 percent of women having sought for postnatal services from specialized healthcare provider. All these outcomes were found to be below the national averages as per the KDHS report of 2014.

The age cohorts of the women reveal that less than 1 percent were aged between 15 and 19 years with those being in this age group being 0.22 percent. 5.53 percent of the women were aged 20 to 24 years with 17.71 percent aged between 25 – 29 years. The bulk of the women were aged between 30 years and 44 years with the mean being 21.42 percent, 26.23 percent and 20.97 percent for 30-34, 35-39 and 40-44 years respectively. Only 7.91 percent of surveyed women were categorised in the 45 – 49 years age bracket.

The current marital status of women reveals that 94.08 of women were married. The place of residence indicate that 64.31 percent of women were from rural dwelling households. Only 36.64 percent of women indicated to be frequently receiving

information either via radio, television or newspaper channel. The knowledge on pregnancy related complications mainly during ANC visits indicate that a mere 2.49 percent of women were furnished with pregnancy related complications during their ANC visits. Review of the type of religion indicates that 99.67 percent of women were from households which of Muslim faith. Other religions (catholic, Protestants, Hindu) accounted for less than 1 percent of the surveyed households. 15.72 percent of women were found to have sought for their partner's consent / approval with regard to seeking of maternal healthcare services.

On the economic front, the household's wealth status indicates that 73.88 percent of the households in the county are classified as poorest with 3.87 percent being of poorer status. 3.49 percent of households were rated as of middle wealth quantile, 8.63 percent being richer and 8.63 percent being richest. The current employment status of the women indicates that only 3.27 percent were formally employed against 96.73 percent who were unemployed. 2.66 percent of women were found to either have or have come from household that has a health insurance cover. Lastly, 32.60 percent cited distance as a hindrance to accessing maternal health care.

The probit model estimates, concluded that the women age has a positive effect on the demand for antenatal services, postnatal services, facility based delivery and use of modern contraceptives for family planning. Results indicate that women aged 20 years to 49 years ae more likely to seek for antenatal services, postnatal services facility based delivery and use of modern contraceptives compared to women aged 15 - 19 years.

On the education attainment front, results indicate that attainment of formal education has a positive effect in determining maternal healthcare consumption. Specifically, educated women seek for maternal health more often. Similarly, results are concluded for married women.

In terms of the place of residence, results reveal that women in the rural dwellings are less likely to seek for MHC services compared to their counterparts in the urban dwellings. Access to information was found to have positive effect on the consumption of MHC services. Results reveal that women who have access to information are more

likely to seek for MHC services compared to their counterparts who have no access to information. Similarly, knowledge on the pregnancy – related complications was found to have positive effect on the consumption of MHC whereby women with information on pregnancy – related complications were found to be more likely to seek for MHC services compared to their counterparts who have no such information.

Partner's approval was found to have positive effect on the for MHC services. Women with their respective partner's approval were found to be more likely to seek for MHC services compared to women without their partner's consent in as much as seeking for MHC services is concerned. Concerning household wealth quintile, women in households in the second, middle, fourth and highest wealth quintiles are more likely to seek for MHC services compared to their counterparts in the households classified to be in the lowest wealth quintiles.

With regard to the current employment status, employed women seek for MHC services more than unemployed women. Possession of a health insurance was found to have positive effect on the MHC services. Women possessing health insurance cover seek MHC services more than the uninsured women. The effect of the distance had an adverse effect on the consumption of MHC services. In overall, the study concludes that demand for ANC services, postnatal services and facility – based deliveries in Madera County is positively and significantly determined by mother's age, education level, information access, partner's approval, household's wealth quantile and possession of a health insurance cover. However, distance and rural residences were found to have a negative and significant effect on ANC services, postnatal services and facility – based deliveries. With regard to use of modern contraceptive for family planning purposes, study conclude that women education and partner's approval were the major determinants having a positive and significant effect on modern contraceptives usage. However, religion was found to have a negatively significant effect on the use of modern contraceptives.

5.4 Policy Recommendations

Kenyan government has formulated policies towards promotion of maternal health in the county. As envisaged in the big four agenda, universal health coverage is one of the four agenda that the government seeks to attain. In addition, health initiatives such as beyond zero Programmes, Linda mama initiatives and Mama Kit introduced by the Mandera County government are all geared towards enhancing good marital health among pregnant mothers. To this effects the findings of this study have a number of policy implications with regard to utilization of MHC services among pregnant women in Mandera County.

First is the policy with regard to sensitization and awareness creating among women on the need and importance for MHC services. The study found high levels of women illiteracy in the county in reference to formal education. Therefore, there is need for the County governance and the relevant stakeholders to come up with the sensitization and awareness creation Programmes to educate the majority of illiterate women on the importance of seeking ANC services during their pregnancy periods. Further is the sensitization of the male partners on the importance of MHC. Partner's approval was found to be a key determinant on all MHC services and most importantly the use of modern contraceptives for family planning. Such sensitization should focus on the encouraging the male partners to support their partners in seeking for MHC services in their reproductive years. In addition, the sensitization and awareness creation should be extended to religion fronts in order to encourage the religious leaders to be focal in so far as the importance of MHC is concerned.

Second is the policy matters regarding the expansion of the health infrastructure. The findings of the study were the distance to the nearest health facility was a deterrent to seeking ANC services among pregnant women in Mandera County. There is therefore the need for the County government to expand the existing health infrastructure to bring health services closer to the peoples especially in the rural areas. In addition is the need to refocus on alternative healthcare models for providing MHC services such as use of mobile MHC clinics, community health workers, digital tracking of pregnancy women

for provision of MHC healthcare via digital platforms to reach those far in the interior among other models.

With regard to the household wealth quantile, the study findings were that the utilization of the MHC services rises with the rise in the household wealth status. There is therefore the need for the county government to empower the rural household through investing in the community livelihood empowerment Programmes at large.

5.5 Limitations of the Study

From empirical analysis we suspect the presence of endogeneity which was not accounted for Since we had challenge of the scarcity of data as households surveyed were few in Mandera County. This is informed by the fact that then dataset used was only for the households surveyed from Mandera County which was extracted from the national wide survey. The results and conclusions arrived at in this study therefore cannot be generalized to all other counties covered in the KDHS for 2014 given that the socioeconomic demographic of different counties different from each other. In addition, the total numbers of cases surveyed in different counties differ and as such the results of this results cannot be generalized to national level or to other counties.

5.6 Areas for further Study

The study explored the determinants of the MHC uptake among pregnant women in Mandera County. The analysis may not apply on the national front. Given that in the current administration dispensation, health functions have been devolved, this study would recommend similar analysis in other counties given the heterogeneity across different counties with regard to factors considered in the analysis. Further, the study recommends addition into socio – economic variables covered in the Kenya Demographic House Survey beyond the ones captured in the study such as the women parity, health insurance coverage, religion, partner / husband's education level among others. A cross county analysis for the counties that share similar socioeconomic and demographic characteristics would be a worth adventure for future research in this area.

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