FACTORS AFFECTING THE UTILIZATION OF ANTENATAL CARE SERVICES IN MANDERA COUNTY, KENYA

BY

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DECLARATION

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

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

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DEDICATION

I dedicate this work to my husband John Munene and my daughter Queen Joy.

ACKNOWLEDGEMENT

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

ANC   Antenatal Care

KDHS   Kenya Demographic and Health Survey

KNBS   Kenya National Bureau of Statistics

MCH/FP   Maternal Child Health and Family Planning

SDG   sustainable Development Goals

UNPF   United Nations Population Fund

WHO   World Health Organization

ABSTRACT

This study sought to examine the determinants for ANC consumption in Mandera County, Kenya. The purpose of this study was to realize two specific objectives. First, to ascertain the pattern of the utilization of ANC services among women in rural households of Mandera County and secondly, whether the individual characteristics and facility factors demand affect antenatal visits in Mandera County. The study adopted the Human Belief Model for conceptualizing utilization of ANC services among the women. Probit model was applied in the empirical analysis with the explanatory factors being women's age, place of residence, distance to health facility, household wealth quintile, woman's education level, marital status of the woman and woman's employment status. The study relied on the 2014 Kenya Demographic and Health Survey covering 40,300 households from which data file for Mandera County was extracted for analysis, which contained 1,807 observations. The study findings were that ANC utilization among the pregnant women in Mandera County is minimal at best with only 50.53 percent of the women having sought for the antenatal services from the health facilities in the year 2014. Probit model results found that women's education, age and household's wealth quintile had a positive effect on the ANC services utilization. Further, women in the rural dwellings were found to be less likely to utilize ANC services compared to their counterparts in the urban dwellings. Distance to the nearest health facility was found to have a negative and significant effect on ANC utilization. However, women's marital status and their current employment status were found not to have any significant effect. From the findings, the study recommends for the need for the county government to empower the rural households through investing in the community livelihood empowerment programmes at large to boost their wealth status. Secondly, the county government should focus on the expansion of the health facilities' infrastructure to bring ANC Services closer to households. Finally, there exists a necessity for sensitization and awareness creation among women who have no education.

CHAPTER ONE: INTRODUCTION

1.1 Background Information

Maternal morbidity is ill-health related to pregnancy and childbirth 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 its utilization still remains minimal globally. A minimum of four antenatal care visits are recommended in the course of a woman's pregnancy. WHO (2015) defines antenatal care as the routine care offered to gravid women presumed healthy prior to screening to detect and diagnose any diseases or asymptomatic risks that poses a threat to the welfare of the pregnant mother and baby. Furthermore, antenatal care provides important health information on healthy practices to be adopted to ensure safety for both the mother and the baby.

Some of the conditions screened during antenatal visits include obstetric conditions such as pre-eclampsia, immunization against tetanus toxoid as well as sexually transmitted infections such as HIV/AIDS and syphilis. In addition, WHO (2015) indicates that consistent antenatal care coupled with good antenatal services helps in developing good motherhood skills and also increases the chances of delivering under a trained and qualified birth attendant. Consequently, this contributes to the general wellbeing of both the child and the mother, because of good pregnancy, delivery as well as postnatal care. Additionally, this leads to a more productive life for the general population and consequently a better standard of living.

In Kenya, antenatal care is a responsibility of primary level facilities, usually integrated in the Maternal Child Health and Family Planning (MCH/FP) unit. WHO's focused antenatal care (FANC) design suggests a minimum of four ANC visits for each pregnancy. Adequate ANC uptake means that it is initiated before the gestational age of 16 weeks ends, with at least four attended appointments in the course of 9 months. The Kenya Demographic and Health Survey (2003) stipulated that only 42% of women delivered under a trained professional assistant in Kenya (Central Bureau of Statistics

Kenya, Ministry of Health, & ORC Macro, 2004). 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 minimum of four visits was noted, as stated by (KNBS & ICF Macro, 2015).

According to 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).

1.2 Problem Statement

The United Nations Population Fund (2014) reported that pregnancy related conditions accounts for 21% of the deaths. One of the United Nations key areas of focus in its third sustainable development goal aims at fostering a reduction in the maternal deaths to less than 70 cases in every 100,000 births by 2030. According to KDHS (2014), Kenyan's maternal mortality ratio stood at 362, 292 higher than the SDG targets. Furthermore, the UNs Sustainable Development Solutions Network (2014) lists the availability and consumption of antenatal care services as a crucial component to ensuring better health outcomes and quality of life for both the child and the mother.

To guarantee that the child and the mother achieves the maximum life-saving benefits of antenatal care, WHO recommends four visits of focused antenatal care (FANC), provided by a qualified healthcare worker. Only 58% of women in Kenya reportedly completed the recommended minimum of four or more ANC visits in the KDHS (2014). The remaining 42% were left at risk of undiagnosed but preventable pregnancy complications, which could be potentially lethal to the mother and the baby.

According to the KDHS (2014), at least 94% of women from most Kenyan regions reported to have received antenatal care from a certified healthcare provider, with the

2

exception of North Eastern region, which reported only 67%. Furthermore, Mandera County was way below other counties, with only 50.5% reporting to have obtained antenatal care from a skilled healthcare professional. This County was lagging behind other counties, which have closely similar socio-demographic characteristics, such as Garissa and Wajir, which reported 87% and 58% respectively.

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. This study will strive to understand some of the important determinants of the consumption of antenatal care services in Mandera County. Understanding these determining factors will lead to formulation of better strategies when developing mechanisms to improve antenatal care 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 antenatal care services in Mandera County.

1.3 Questions

i.   What is the pattern of antenatal care utilization among women in rural households of Mandera County?
ii. Does the individual characteristics and facility factors demand affect antenatal visits in Mandera County?
iii. What are the policy recommendations based on the findings in (ii) above?

1.4 Research Objectives

1.4.1 General objective

The general objective was to assess the determinants for the utilization of antenatal care utilization among pregnant women in Mandera County.

1.4.2 Specific objectives

i.   To determine the pattern of the utilization of antenatal care services among women in rural households of Mandera County.

ii.   To assess the effect of individual characteristics and facility factors demand for antenatal visits in Mandera County.

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

1.5 Study Justification

KDHS (2008) reported that on top of all the reproductive health issues, complications relating to pregnancy and childbirth were major sources of death and disability among women of aged 14-49 years. With increased antenatal care demand and utilization, these deaths and life-changing complications can be greatly averted as this ensures better adoption of preventive measures, in addition to early detection and treatment by skilled healthcare providers. Despite efforts such as making the entire maternity package free of charge by the Kenyan government, certain parts of the country, especially in Mandera County are still lagging behind on matters of skilled antenatal care consumption is concerned, which goes hand in hand with better pregnancy outcomes.

In 2016, WHO issued new recommendations, mainly aiming at driving the attainment of better quality of antenatal care and ultimately reducing pregnancy complications and still births. In addition, these recommendations were aimed at putting women at the center of care, while enhancing their experiences during pregnancy as well as setting up babies to a good start in life. Understanding the influencing factors for the antenatal care utilization in Mandera County of Kenya, whose performance for this indicator is way below other counties, will help in putting up mechanisms that will target these barriers to influence a positive outcome. If these determinants are well understood, the policy makers and any other relevant agencies will also apply them in other similar settings in efforts for ensuring improved uptake of ANC.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter comprises of three parts; part one provides the theoretical literature for this study. Part two is the empirical literature, which captures the various variables determining the demand for antenatal care services, which was used in this study. Finally, part three summarizes the empirical literature and provides the gap that this study aims at filling.

2.2 Theoretical Literature Review

This part discusses the health belief model in terms of its application in the demand for a health care service.

2.2.1 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 behavior, 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 notable impact on health behavior. Based on the concepts in this model, four main constructs are believed to influence behavior as in: perceived seriousness/severity, individual's perceived vulnerability/susceptibility, 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 attending antenatal care as advised by the healthcare professionals. However, according to Courtenay (2007), this is not always the trend because some individuals in as much as some individuals are clearly aware of the existing susceptibility, they still go ahead to expose themselves to the risks. As a result, this concept only explains behavior in some instances but not all.

Perceived seriousness/severity: This construct speaks to the acknowledgement of the individual is awareness of how severe/serious a disease can be. Although this largely believed to be informed by possession of medical knowledge, it can also be influenced by the conviction that an individual has of the potential debilitating effects that a disease can cause in one's life. For instance, in this study, a woman residing in a remote rural area might experience cases of neighbours/relatives who do not attend antenatal clinic and end up developing pregnancy related complications that result in death or disability. This experience will make that woman to believe that pregnancy is a serious state that requires keen and consistent medical attention, otherwise one might end up facing undesirable consequences such as death and disability to the mother, baby, or both.

Perceived benefits: This construct 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. Because 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.

Perceived barriers: As it is always the case, most behavior changes are not easy to achieve and hence the formulation of this theory. A study conducted by Janz & Becker (1984) showed that barriers are one of the notable determinants of behavior because, before adopting a certain behavior, one has to assess the possible obstacles and the chances of overcoming them. A person will successfully embrace a new behavior if they are convinced that the resulting benefits are paramount as compared to the barriers to behavior change (Centres for Disease Control and Prevention, 2004). Despite the effort and emphasis on the importance of attending antenatal clinic as well as facts indicating the same, women have to face the reality of the possible barriers such as having to sacrifice their own time, covering long distances with possible poor terrain to the nearest

7

healthcare amenities, including having to cater for any related costs as well as the fear of bad experiences with healthcare providers. It is only when they are successfully able to overcome these barriers that they can successfully attending all the recommended antenatal clinic visits.

Modifying factors: These are distinct characteristics in an individual believed to modify the four main theories of perception. Such characteristics may include literacy levels, cultural background and self-motivation among others. For instance, women from a given region might be fully informed of all the arising benefits for antenatal care utilization as well as the budding risks for non-compliance but still fail to attend antenatal clinics because they have been born and brought up in a religion that does not advocate for people going to the hospital.

2.3 Empirical Literature

A study by Nketiah-Amponsah et al., (2013) demonstrated that the influencing factors for antenatal care uptake among women populations in diverse parts of the world are deeply rooted and dynamic. This implies that a thorough study and understanding of these determinants is of utmost importance in efforts to combat poor utilization and enhance better pregnancy outcomes globally. In low and middle income countries, as in the Kenyan setting, notable determinants includes but not limited to education level of the pregnant women, their financial status as well as the place of residence among others (Nketiah-Amponsah et al., 2013).

Eijk et al., (2006) stipulated that the positive effect of age on ANC uptake is not limited to good progress of the pregnancy but also, positively affects the pregnancy outcomes, meaning a happy, healthy mother and child. Logistic regression model was employed by

the authors of this study to evaluate the link between age and other variables on antenatal care consumption in rural western Kenya. ANC uptake was found to be much less in women aged less than 18 years. This was explained by the understanding that women that are below 18 years were unwilling to seek ANC because of fear of bad encounters with healthcare providers. In addition, this group of women was found to be less confident and comfortable with their pregnant state and therefore preferred keeping their pregnancy a secret, which adversely affected their uptake of these services.

In a community survey on predictors for the uptake of antenatal care by Imdad et al., (2010) in Hafizabad district, Pakistan using a cross-sectional descriptive design among 190 participants, a positive connection was established between a woman's educational level and the uptake of ANC. The interconnection between these variables was derived using a logit model. Elsewhere, Dahiru & Oche (2015) reported similar finding while studying antenatal care uptake determinants in Nigeria using both bivariate and multivariate logistic regressions. Further to this, the study reported a strong positive influence of the level of education of the spouse to the woman's antenatal care uptake as well as the baby's health after birth, thereby confirming the findings of Imdad et al., (2010).

According to this study, only 29% of those mothers that had not acquired any kind of formal education made it to the minimum of four ANC visits while 64.3% of those who were educated up to primary level of education reported at least four visits. The study further indicated that 80.5% of the mothers who had achieved secondary as well as other tertiary levels of education reported to seek for at least 4 ANC visits. This implies that women who are educated up to tertiary level have a likelihood, 4 times higher compared

to their counterparts who have not attained even the least level of formal. In addition, the findings of this study suggested a mutual influence of education on antenatal care uptake alongside other covariates such as the availability of health insurance and the place where the woman resides.

Dahiru & Oche (2015) explained that the reason for this synergistic relationship is because educated mothers were more likely to move and afford living in urban areas as well make enough income that would also cater for their health insurance. Additionally, the findings of this study were echoed by similar findings by Mekonnen & Mekonnen (2003), who reported that the education level of the mother positively directed on the intake of antenatal care while conducting a study on factors that influences antenatal care uptake in Ethiopia, using multivariate logistic regression model.

Gedefaw at al., (2014) conducted a study in Dembecha District of Ethiopia to establish the present status of antenatal care consumption. This was a community based cross-sectional study where 723 women were sampled to represent the population of interest. Associations across the variables were approximated using logistic regression model. Report from the findings of this study reported a 6.6 times possibility of using antenatal care in contrast to their single equivalents, thereby concluding that being married positively impacted on a woman's demand for and uptake of antenatal care services. However, these findings were contrary to those of Zeine et al., (2010) from their study in Hadiya zone of Ethiopia using a simple logistic regression model, which reported that the marital status of the mother was not a true determinant for the demand and use of antenatal care, especially when report is obtained from studies that have been conducted

and generalized nationally but conclusions should rather be made from locally generated and analyzed data.

Akowuah et al., (2018) conducted a study on the determinants of ANC uptake by expectant women in Ghana, using binary logistic regression model to analyse data. The results indicated 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 to the healthcare facilities. Similar findings were reported by Onasoga et al., (2012), noting that a significant negative link existed between antenatal care utilization and distance covered to the nearest healthcare amenity in Osun state, Nigeria.

Chama-Chiliba & Koch (2015) conducted a study in Zambia to establish how the demand for ANC is affected by individual level and community based factors, using multilevel logistic models. The authors found that being employed positively influenced the dependent variable. This led to a conclusion that being employed gives women financial freedom, thereby increasing their mobility, which in return makes them better positioned to access these services. In addition, Simkhada et al., (2008) reported similar findings based on the findings of a systematically reviewed literature on determinants for ANC demand.

Employment empowers women to overcome the potential barriers such as lack of money for transport to the healthcare facility among others. While trying to determine the trends and determinants for the ANC utilization in Ethiopia in the years of 2010 - 2016 using multivariate logistic regression models, Mekonnen et al., (2019) also noted that being

employed positively influenced the women's ability to attend the recommended 4 visits during their pregnancy states.

Women who are residents of urban settings had an almost two times likelihood of utilizing antenatal care services as compared to their rural equivalents. This was as per the findings of Tekelab et al., (2019) in Ethiopia using random effects model to estimate the association. Similar findings we reported by Kedir et al., (2019), who used multilevel binary logistic regression model over a study period of 15 years to assess the social influences of the demand and use of ANC in Ethiopia. According to this study, living in rural areas is associated with more barriers such as fewer sources of income and disparity in the distribution of healthcare facilities. This leads to fewer women utilizing antenatal care services in rural areas in contrast to their urban counterparts where there are more money-making opportunities as well as more healthcare facilities in a close range (Kedir, et al., 2019).

In a study of the effect of wealth on the utilization of ANC in Ghana using both univariate and multivariate models of analysis, a positive effect was established between wealth and ANC use (Arthur, 2012). This author established that as the wealth quintiles went higher, ANC uptake increased. These findings were echoed by those of Adeniyi & Erhabor (2016) on a study of the influence of wealth on ANC uptake in Nigeria using logistic regression model to study the association. In this study, a 53.7% ANC utilization gap was reported between women in the lowest wealth quintiles and those in the highest quintile, in favour of those that were in the highest.

2.4 Overview of the Literature

Nearly all studies done from across the globe reports that antenatal care use is subject to many determinants. These determinants include individual woman characteristics such as her marital status, age and her academic level, in addition to external determinants, as in the case demographic influences such as the place where the she resides and the distance that she covers to the healthcare facility.

(Akowuah et al., 2018: Onasoga et al., 2012) found that distance to the healthcare facilities negatively affects antenatal care utilization. Chama-Chiliba & Koch (2015) reported that being employed positively influenced antenatal care uptake, findings that were also echoed by Simkhada et al., (2008) as well as Mekonnen et al., (2019). As to whether the demand for ANC is subject to a woman's residence, both Tekelab et al., (2019) and Kedir et al., (2019) agreed that being an urban resident was associated with more ANC uptake as opposed to in a rural environment. Eijk et al., (2006) acknowledges that ANC use is positively impacted by a woman's age. In addition, the highest education level attained by the woman has a positive correlation to the antenatal care utilization, as stated by (Imdad et al., 2010: Dahiru & Oche, 2015: Mekonnen & Mekonnen, 2003). As far as marital status is concerned, a study by (Gedefaw at al., 2014) stipulated a positive connection between ANC utilization and the marital status of the mother, although Zeine et al., (2010) differed with this generalization. (Arthur, 2012 & Adeniyi & Erhabor 2016) both agreed that wealth quintile positively impacts ANC usage.

In addition to the variables captured by the above authors, this study incorporated distance among other variables in its analysis. No similar study has been conducted

specifically in Mandera County and as such, my study will focus on this County, looking at variables such as marital status, which other authors argue that its impact on antenatal care utilization is specific to the region under consideration. This, in addition to studying the pattern of ANC utilization in Mandera County will inform both the healthcare workers and the relevant policy makers on areas to focus on for better ANC provision.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter entails a discussion of the methodology used in this study. This includes a conceptual framework, model estimation and specification, variable operationalization, study data and analysis.

3.2 Conceptual Framework

This framework is based on the author's conceptualization, where the dependent variable will depend on the independent variables. This is consistent with the theoretical literature discussed on the health belief model. This is shown in **figure.1.1**

| Distance to the healthcare facility |

| Education level |

| Employment status |

| Age |

| Marital status |

| Wealth index / quintile |

| Residence |

| Utilization of antenatal care services |
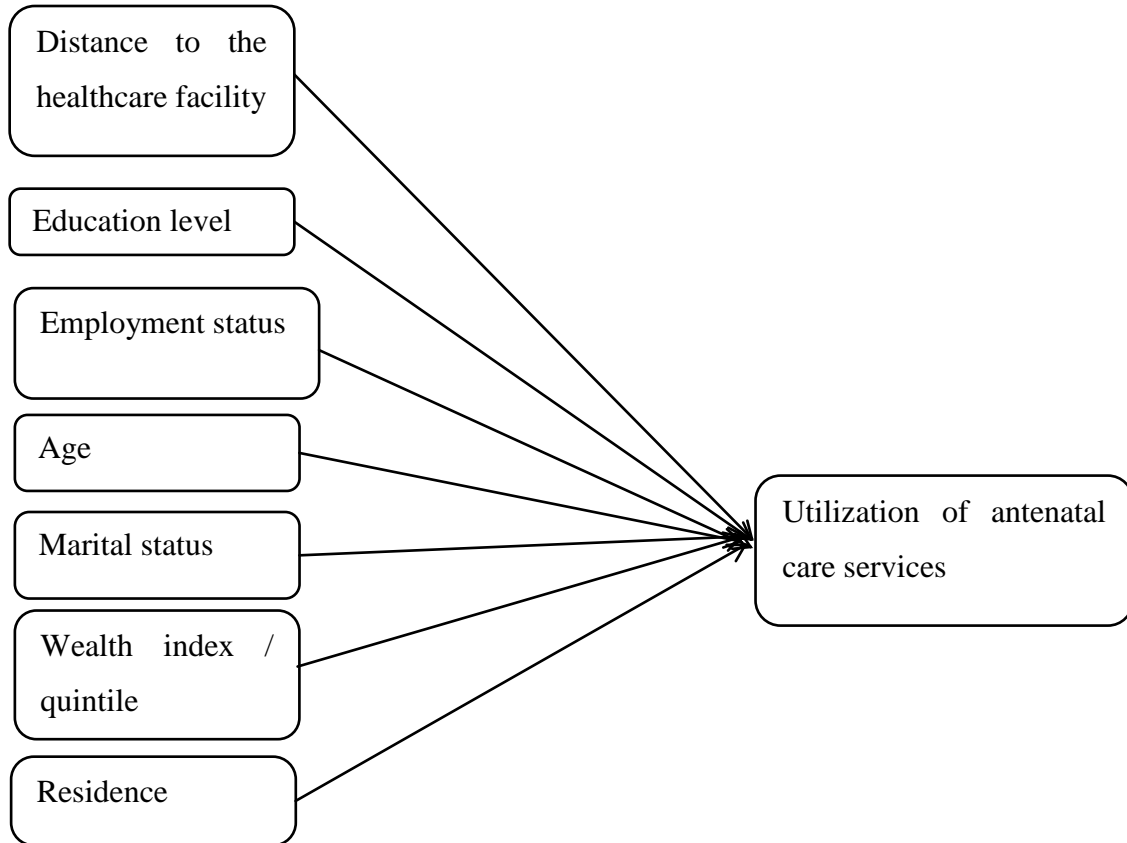
Figure 1.1: Conceptual framework

Source: Author

3.3 Estimation and Specification

The study estimated the relationship between the variables using a probit model, a binary outcome model. The choice of this model was informed by the nature of the study, where antenatal care services can be either utilized or not. Similar studies where this model was applied include an estimation of the demand and utilization of healthcare services by Kamau (2016), Muriithi (2013), Machio (2008) and), Orayo (2014). According to Ani (2013), probit model is derived from a probit link function and an assumption that there is a stringent standard normal distribution. The conceptualization of this model assumes that a linear relationship exists between unobservable variable m* (because of our inability to observe and measure the latent variable y*) and explanatory variables (X_i), usually expressed as:

$$y^* = \alpha + \beta'x' + \mu_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots1$$

Where y^* is unobserved/ latent variable (probability of ANC services).

x' is vector of independent variables such as social and demographic factors.

α is the constant coefficient

β' are other parameters to be estimated

μ is the error term

Probit model assumes y* to be a normally distributed random variable

$$y = \{1 \quad if \quad y^* > 0 \: 0 \quad if \quad y^* = 0 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..2$$

In the above case, y denotes the probability of the uptake of ANC, such that 1= utilization, otherwise 0. As a result, the probit model adopted in this case is expressed as a cumulative distribution function in equation 3.

$$\Pr(y=1/X)=\Phi(X'\beta)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.3$$

Therefore, the estimation of *y* can take a cumulative normal probability function of equation 4.

$$P_i=F(y)=1/\sqrt{2}\prod\int_{-\infty}^{-z} e^{-s2/2}ds \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.4$$

This can further be simplified in equation 5.

$$y=F^{-1}(P_i) = \alpha+\beta x+\mu\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.5$$

In equation 5 above, Pi is interpreted as an estimate for the probability that a pregnant woman will utilize antenatal care services. When using the probit model, interpretations are made by estimating the probability of observing the independent variable since the coefficients are not identifiable without the assumptions made about the mean and variance of the random error term. The computation of Marginal Effects (ME) was conducted for interpretations (Ani, 2013). The ME were interpreted as the change in the probability of utilizing antenatal care services in Mandela, for a unit change of any of the independent variable other factors held constant.

A general multiple binary regression analysis was used in estimating the probability for the uptake of antenatal care in Mandera as indicated in equation 6 below:

$$y = \beta'x' + \mu_i\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.6$$

Where;

y= is antenatal care services utilization

β'= A vector of parameters associated with the independent variable

x'= A vector of covariates for the independent variables

This model can further be re-specified as;

$$y = \alpha + \beta' \sum_{i=1}^{n} x + \mu_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.7$$

Since y is binary, the above equation will be estimated representing antenatal care uptake in Mandera where;

α = The constant coefficients

β' = The estimated coefficients of the respective variables.

$\sum_{i=1}^{n} x'$s= All study variables as in social demographic factors.

ε_i= The disturbance/error term implying that the model is stochastic in nature.

3.4 Operationalization of Variables

Table 1.1 Definition, measurement and expected sign of the variables

Variables	Definition	Measurement	Sign
Dependent variable Uptake of ANC	Utilization of antenatal care services by a pregnant woman	Women sought for ANC =1 Otherwise =0	
Independent variables			
Distance	Time taken by the woman to the nearest health facility	Time in minutes taken to the nearest health facility	Negative (Akowuah et al., 2018: Onasoga et al., 2012)
Education	Highest level of academic achievement	No education =0 Primary =1 Secondary = 2 Tertiary = 3	Positive (Imdad et al., 2010: Dahiru & Oche, 2015: Mekonnen & Mekonnen, 2003)
Employment	Having paid work	Currently employed = 1 Otherwise = 0	Positive (Chama-Chiliba & Koch 2015: Simkhada et al., 2008: Mekonnen et al., 2019).
Age	Number of years at the time of pregnancy	14 – 19 years = 1 20 – 25 years =2 26 – 31 years =3 32 – 37 years =4 38 – 43 years =5 44 – 49 years =6	Positive (Eijk et al., 2006)
Marital status	Having a marriage partner	Currently married=1 Otherwise=0	Positive (Gedefaw at al., 2014)
Residence	Where one lives	Rural residence =1 Otherwise=0	Positive (Tekelab et al., 2019: Kedir et al., 2019)
Wealth quintile	Population divided in proportions of 20%, depending on the asset value owned.	Lowest = 1 Second = 2 Middle = 3 Fourth = 4 Highest = 5	Positive (Arthur, 2012 & Adeniyi & Erhabor 2016).

3.5 Data source

The study used the Kenya Demographic and Health Survey for 2014. A cross-sectional survey design was adopted, 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. To ensure that reproductive health data such as the antenatal care services demand and utilization was well captured, women of reproductive age were issued with a separate questionnaire, specially designed to capture the information of interest from this group of respondents. 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.

3.6 Data issues

Multicollinearity: This occurs when there is a correlation among independent variables in a regression model. In this study, multicollinearity was detected through computation of correlation matrices, where highly correlated variables with values higher than 0.5 in absolute values were removed to enable generation of more valid results. Such results can therefore be used for the purposes of policy making without the fear of the presence of inflated coefficients.

Heteroscedasticity: This happens when the variability of a dependent variable is uneven across a scope of independent variables that predict it. This was tested through the use of probit model residual test using the STATA software.

CHAPTER FOUR: DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter details the descriptive statistics of the factors affecting the utilization of ANC in Mandera County in Kenya. In addition, analyses of the probit model result.

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 ANC demand is very limited at best. Out of the 1,807 households surveyed in the county in 2014, 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.

A review of the wealth status of the households posits that more than half of the households are in severe poverty levels with 73.88 percent of the households ranked poorest, 3.87 percent are poor, 3.49 percent lie in the middle wealth quintile, 8.63 percent were categorized to be rich with 10.13 percent being richest. Statistics for the place of residence asserts that on average, 64.31 percent of the county households are rural dwellers. The marital status of the women in the surveyed households shows that 94.08 percent are married. This outcome could be attributed to the culture and the effect of the dominant religion in the county. Only 3.27 percent of the women in the surveyed households were employed at the time of the survey. This also could resonate well with the culture of the dominant community in the county, which subjects women to be mainly housewives.

On the women education attainment, majority have no formal education whatsoever at 92.75 percent. Only a handful of women possess formal education with primary education attainment being at 5.04 percent, secondary education at 1 percent and tertiary education at 1.22 percent. Lastly, on the women age group, only a mere of 0.22 percent were within the 14 – 19 years age group. 12.06 percent were within 20 – 25 years; 28.67 percent were within the 26 – 31 age bracket; 28.83 percent of women were within 32 – 37 years; 21.52 percent were categorized in the 38 – 43 years age bracket and 8.69 percent being within 44 – 49 years age cohort.

The Odds ratio results indicate that the odds are 1.0039 times higher that women living far away from nearest health centre will seek for ANC services. On the wealth quintiles, the odds are 0.6985 times higher that women from lowest wealth quintile households will seek for ANC services. Further, the odds are 1.8000, 0.9688, 6.8000 and 4.9032 times higher that women from second, middle, fourth and highest wealth quintile households will seek for ANC services respectively.

On the place of residence, the odds are 0.5576 times higher that women living rural areas will seek for ANC services. The marital status indicates that odds are 0.9814 times higher that married women will seek for ANC services while the odds are 0.9814 times higher that unmarried women will seek for ANC services. For employment, the odds are 0.9667 times higher that employed women will seek for ANC services. For education level, the odds are 0.9741, 1.6, 1.7, and 1.4444 times more, that lack of education, possession of primary, secondary and tertiary levels increases likelihood of seeking for ANC services respectively.

On the age cohorts, the odds are 0.1409 times higher that 14 -19 years old women will seek for ANC services. The odds are 1.4494 times higher that 20 - 25 years old women will seek for ANC services, the odds are 0.8974 times higher that 26 - 31 years old women will seek for ANC services. Further, the odds are 1.0757, 0.8498 and 0.1528 times higher that women aged between 32 – 37 years, 38 – 43 years and 44 – 49 years will seek for ANC services respectively. On the distance, results reveal that the average time taken to the nearest facility was approximately 74 minutes with the minimum time being 5 minutes and maximum time being 180 minutes.

Table 1.2: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max	Odds ratios
ANC utilization	1,807	0.5053	0.5001	0	1	
Lowest quintile	1,807	0.7388	0.4394	0	1	0.6985
Second quintile	1,807	0.0387	0.1930	0	1	1.8000
Middle quintile	1,807	0.0349	0.1835	0	1	0.9688
Fourth quintile	1,807	0.0863	0.2809	0	1	6.8000
Highest quintile	1,807	0.1013	0.3018	0	1	4.9032
Rural residence	1,807	0.6431	0.4792	0	1	0.5576
Urban residence	1,807	0.3569	0.4792	0	1	3.3581
Marital status - Married	1,807	0.9408	0.2361	0	1	0.9814
Not married	1,807	0.0592	0.2360	0	1	1.9722
Employed	1,807	0.0327	0.1778	0	1	0.9667
Not employed	1,807	0.9673	0.1778	0	1	0.5802
No education	1,807	0.9275	0.2594	0	1	0.9741
Primary education	1,807	0.0504	0.2187	0	1	1.6000

Secondary education	1,807	0.0100	0.0993	0	1	1.7000
Tertiary education	1,807	0.0122	0.1097	0	1	1.4444
14 – 19 years	1,807	0.0022	0.0470	0	1	0.1409
20 – 25 years	1,807	0.1206	0.3258	0	1	1.4494
26 – 31 years	1,807	0.2867	0.4523	0	1	0.8974
32 – 37 years	1,807	0.2883	0.4531	0	1	1.0757
38 – 43 years	1,807	0.2999	0.4584	0	1	0.8498
44 – 49 years	1,807	0.0869	0.2817	0	1	0.1528
Distance	1,807	73.9059	64.1714	5	180	

4.3 Diagnostic tests

4.3.1 Multicollinearity test

Table 1.3: Multicollinearity test results

Variable	VIF	1/VIF
Highest wealth quintile	2.38	0.419397
Fourth wealth quintile	1.71	0.583973
Middle wealth quintile	1.21	0.825922
Second wealth quintile	1.17	0.851942
38 – 43 years	1.82	0.549101
32 – 37 years	1.79	0.557594
26 – 31 years	2.38	0.420387
26 – 31 years	2.38	0.420387
20 – 25 years	1.74	0.573223
14 – 19 years	1.03	0.971245
Rural residence	2.24	0.446143
Distance	1.9	0.525303

Variable	VIF	1/VIF
Employment	1.19	0.839654
Tertiary education	Tertiary education	0.933785
Secondary education	1.14	0.875611
Primary education	1.08	0.929558
Married	1.08	0.923607
Mean VIF	**1.56**	

Source: Author's computation based on KDHS 2014

The Variance Inflation Factor test was applied in testing for multicollinearity in the model. From the results, the mean variance inflation factor is 1.56. Using a rule of thumb of 10, we conclude absence of multicollinearity given that the mean VIF for the model is less than 10.

4.3.2 Test for heteroscedasticity

Table 1.4: Test for heteroscedasticity results

ANC utilization	Coef.	Std. Err.	Z	P>z	95% Conf. Interval	
ANC utilization						
Second quintile	0.0156	0.0062	2.51	0.012	0.003438	0.02780
Middle quintile	5.3703	1990.4270	0.00	0.998	-3895.8	906.536
Fourth quintile	4.8450	1990.4270	0.00	0.998	-3896.32	3906.011
Highest quintile	1.8593	0.7145	2.60	0.009	0.458909	3.25961
Rural residence	-0.7065	0.2940	-2.40	0.016	-1.28263	-0.13032
Marital status – Married	0.1579	0.1682	0.94	0.348	-0.17183	0.48769

Employed	4.2799	628.3843	0.01	0.995	-1227.33 1235.89
Primary education	5.6301	628.3858	0.01	0.993	-1225.98 1237.244
Secondary education	6.0117	628.3863	0.01	0.992	-1225.6 237.626
Tertiary education	6.4323	628.3870	0.01	0.992	-1225.18 38.048
Distance	-1.4739	0.3279	-4.49	0.027	0.117328 .908496
14 – 19 years	0.1213	0.1966	-0.62	0.537	-0.50666 0.264026
20 – 25 years	0.0689	0.1867	0.37	0.712	-0.29713 0.434862
26 – 31 years	1.0949	0.3741	-2.93	0.003	-1.82825 -0.36165
32 – 37 years	0.3051	0.2523	-1.21	0.226	-0.79954 0.189326
38 – 43 years	14.6470	2087.2670	-0.01	0.994	-4105.62 4076.322
lnsigma2	0.0017	0.0069	0.24	0.809	-0.0118 0.015115
Likelihood-ratio test of lnsigma2 = 0 : chi2(1) = 0.049				Prob > chi2 = 0.6282	

The heteroscedastic probit model was estimated upon which we analysed the chi2 statistic of the regression and its respective probability value. From the results, we find that the Prob > chi2 = 0.6282. Thus, we accept the null and so the model has no heteroscedasticity or in other words heteroscedasticity is not a problem in the model at 5 percent significance level.

4.4 Odds ratio for the regression model

Odds ratio is the chance of the event occurring to the likelihood of the same not occurring. It therefore relates exposure of the event happening to the outcome of the event. The odds ratios for the models are presented in table 1.5 as follows:

Table 1.5 Odds ratios

Antenatal Care	Odds Ratio	Std. Errors	Z - statistic	P>z	[95% Conf. Interval]	
Second quintile	1.3305	0.4004	0.95	0.343	0.737616	2.39981
Middle quintile	0.4041	0.1211	3.02	0.002	0.224676	0.726948
Fourth quintile	2.6555	0.7844	3.31	0.001	1.488423	4.737788
Highest quintile	2.2524	0.7028	2.6	0.009	1.221965	4.151785
Rural residence	-0.2099	0.0344	-9.51	0	0.15213	0.289477
Marital status – Married	0.3424	0.0815	4.5	0	0.214759	0.545836
Employed	0.1728	0.0631	4.81	0	0.084498	0.353568
Primary education	1.0017	0.269	0.01	0.995	0.591803	1.695423
Secondary education	11.3752	12.6217	2.19	0.028	1.292669	100.0993
Tertiary education	0.476	0.2914	1.21	0.225	0.143406	1.579874
Distance	-1.0019	0.0012	-1.65	0.098	0.999647	1.00416
14 – 19 years	0.5557	0.6631	0.49	0.622	0.053598	5.761975
20 – 25 years	0.8436	0.1837	0.78	0.435	0.550632	1.292596
26 – 31 years	0.5555	0.1019	3.2	0.591	0.387706	0.79582
32 – 37 years	0.6564	0.106	2.61	0.949	0.478259	0.900869
38 – 43 years	0.4358	0.0709	5.11	0.041	0.316835	0.599414
Constant	11.4872	4.0598	6.91	0	5.746257	22.96376

From the results, women from the second wealth quintile households are 1.3305 times more likely to demand for ANC compared to those in the poorest households. Similarly, women from middle, fourth and highest quintile households are 0.4041, 2.6555 and 2.2524 times more likely to be consuming ANC services compared to those in the

lowest wealth quintile households respectively. The findings are in agreement with the findings by Arthur (2012) who found that as the wealth quintiles went higher, ANC uptake increased in Ghana. Findings that agreed to these were detailed by Adeniyi & Erhabor (2016) in Nigeria who found that a 53.7% ANC utilization gap existed between women in the lowest wealth quintiles and those in the highest quintile, in favor of those that were in the highest.

With regard to the place of residence, the odds ratio results reveal that rural women are -0.2099 times less likely to be consuming antenatal care services than urban women. This concurs with Tekelab et al., (2019) in Ethiopia who reported that women who are residents of urban settings had an almost two times likelihood of utilizing antenatal care services as compared to their rural equivalents. Similar findings we reported by Kedir et al., (2019), who asserts that living in rural areas is associated with more barriers such as fewer sources of income and disparity in the distribution of healthcare facilities. This leads to fewer women utilizing antenatal care services in rural areas in contrast to their urban counterparts where there are more money-making opportunities as well as more healthcare facilities in a close range.

Further, women who had marriage partners were found to be having 0.3424 more likelihood of consuming antenatal care services than those that didn't. This would be explained by the culture of the area residents in which the household head is the overall decision maker. Therefore, the decision to utilize the ANC services among the married women could be propelled by their respective male partner, hence the positive effect. However, the opposite would have been the case for unmarried women who may have some liberty in making health related decisions such as ANC utilization. As a result, this

finding is similar to the report by Zeine et al., (2010) who indicated that the mother's marital status was not a true determinant for the demand and uptake of ANC in Ethiopia.

On employment status, women who had a job were found to have a 0.1728 more likelihood of consuming ANC services than those who were not into employment. This finding is similar to that of Chama-Chiliba & Koch (2015) in Zambia who found that being employed positively influenced ANC utilization. This led to a conclusion that being employed gives women financial freedom, thereby increasing their mobility, which in return makes them better positioned to access these services. Similarly, Mekonnen et al., (2019) noted that being employed positively influenced the ability of a woman to attend the recommended four ANC visits during their pregnancy periods.

On women education level, possession of education gives women 1.0017, 11.3752 and 0.4760 times likelihood of consuming antenatal care services than those with no education at all for primary, secondary and tertiary education respectively. This is in agreement with Nketiah-Amponsah et al., (2013) who noted that for countries such as Kenya, notable determinants for ANC uptake includes but not limited to the education level of the pregnant women, their financial status as well as the place of residence among others. This is also in agreement with the findings by Imdad et al., (2010) who reported that a positive connection was established between a woman's educational level and the uptake of antenatal care in Pakistan, as well as those of Mekonnen & Mekonnen (2003) in Ethiopia.

For the age cohort, women within 20 – 25 years have a 0.8436 times more likelihood of utilizing ANC services than those within 45 – 49 years. On the distance, women from

30

households living far away from the health facility are 1.0019 times less likely to be consuming antenatal care services than those from households living near the health facility. These findings resonates with those of Akowuah et al., (2018) who 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 to the healthcare facilities in Ghana.

4.5: Probit Model for the study

The probit model was used to estimate the determinants of ANC services uptake in Mandera County. However, prior to estimating the probit model, the benchmark categories for the variables were determined and set accordingly. On the household wealth index / quintile, lowest (poorest) wealth index was set as the benchmark category. On place of residence, urban residence was set as the benchmark dummy. For women's current marital status, not currently married was set as the reference dummy. On the current employment status of the household head, not currently employed was set as the reference category. For women education variable, no education was used as the benchmark category. Lastly, for the women's age, the 44 – 49 years age cohort was set as the benchmark category. This is because at this age group, majority of the women are likely to be at their menopause and therefore consumption of ANC services likely to be minimal at best. The outcome of the probit model is presented in table 4.2.

Table 1.6: Probit Model Results

ANC Utilization	Coefficient	Std. Errors	Z statistics	P>z
Second quintile	0.2234	0.1792	1.25	0.019
Middle quintile	0.5292	0.1796	2.95	0.008
Fourth quintile	0.5794	0.1658	3.5	0.000
Highest quintile	0.4602	0.1760	2.62	0.000
Rural residence	-0.9412	0.0975	-9.65	0.000
Marital status – Married	-0.6517	0.1457	-4.47	0.000
Employed	-0.9473	0.2036	-4.65	0.000
Primary education	0.0221	0.1489	-0.15	0.837
Secondary education	1.3447	0.5854	2.3	0.024
Tertiary education	0.4524	0.3461	-1.31	0.245
Distance	-0.0011	0.0007	-1.6	0.028
14 – 19 years	0.3453	0.7178	0.48	0.536
20 – 25 years	0.0922	0.1305	0.71	0.325
26 – 31 years	0.3404	0.1103	3.09	0.011
32 – 37 years	0.2524	0.0959	2.63	0.016
38 – 43 years	0.4786	0.0962	4.98	0.001
Constant	1.4608	0.2113	6.91	0.000

4.6: Interpretation of the Estimation results

From the probit model estimates, we first interpret the coefficients of the respective independent variables to the model as presented in table 4.2. Based on the probit model estimates, the following findings are evident: Concerning household wealth quintile, women in households in the second, middle, fourth and highest wealth quintiles are more likely to seek for ANC compared to the poorest.

In terms of residence, women residing in rural areas have a lesser likelihood of seeking ANC services compared to women dwelling in urban areas. Similarly, married women are less likely to seek for ANC services compared to unmarried women. With regard to the current employment status, women who are currently employed are less likely to seek for ANC services compared to their counterparts who are not currently employed.

On the education attainment front, results showed that there exists a positive correlation between possession of formal education and the uptake of the ANC services. Specifically, women with primary, secondary and tertiary education levels are more likely to seek for ANC services in contrast to their equivalents who have no education at all.

Distance has an adverse effect on the demand and uptake of ANC among women. Women from the households that are far from the health facilities are less likely to seek for ANC services compared to women from the households near the health facilities. Lastly, with regard to the age cohorts, results posit that women in lower age brackets are more likely to seek for ANC services compared to women in the 44 − 49 years age bracket.

4.7: Marginal effects of the Probit Model estimates

We note that the probit model estimates only allows us to explain the effect of the independent variables on the dependent variable by explaining the sign of the respective coefficients. As such, from the probit model estimates, one cannot tell the magnitude of the effects of various independent variables on the outcome variable. To determine the magnitude of the effect of respective independent variables for a probit model, the

marginal effects for the respective variables are computed. The marginal effects enable us to tell the magnitude under the probit model with sanctity. The respective marginal effects for the respective variables of the model are presented in table 4.3.

Table 1.7: Marginal effects results

	Marginal Effects (dydx)	Std. Err.	Z	P>z
Second quintile	0.0739	0.0592	1.25	0.212
Middle quintile	0.1750***	0.059	2.97	0.003
Fourth quintile	0.1916***	0.0543	3.53	0
Highest quintile	0.1522***	0.0579	2.63	0.009
Rural residence	-0.3113***	0.0297	-10.48	0
Marital status – Married	-0.2155***	0.0474	-4.55	0
Employed	-0.3133***	0.0665	-4.71	0
Primary education	0.0073	0.0492	0.15	0.882
Secondary education	0.4447***	0.193	2.3	0.014
Tertiary education	0.1496	0.1143	-1.31	0.191
Distance	-0.0004	0.0002	-1.6	0.109
14 – 19 years	0.1142***	0.2374	0.48	0
20 – 25 years	0.0305***	0.0431	0.71	0
26 – 31 years	0.1126***	0.0362	3.11	0.002
32 – 37 years	0.0835	0.0315	2.65	0.421
38 – 43 years	0.1583	0.0312	5.07	0.739

Note: * are Significant at 10% level, ** are significant at 5% level, * are significant at 1% level**

Source: Author's computation based on KDHS 2014

4.7.1 Interpretation of the marginal effects results

From the marginal effects results, we conclude that women in households in the poorer households are more likely to seek for ANC services in contrast to the poorest households by 7.39 percent holding other factors constant. Similarly, results indicate that women in households in the middle, fourth and highest wealth quintile are more likely to seek for ANC services compared to their counterparts in poorest households by 17.50 percent, 19.16 percent and 15.22 percent respectively.

Rural dwelling women seek for ANC services more than urban women by 31.13 percent holding other factors constant. The effect is very significance at 5 percent significance level as evidenced by the p – value (p – value =0.000). On the current marital status of the women, results evident that married women are less likely to seek for ANC services than unmarried women by 21.22 percent. The effect is significant at 5 percent significance level as evidenced by the p – value (p – value =0.000).

With regard to the current employment status, women who are currently employed are less likely to seek for ANC services compared to their counterparts who are not currently employed by 31.33 percent. . The effect is significant at 5 percent significance level as evidenced by the p – value (p – value =0.000). This would be explained by the culture of the area residents whereby women are subjected to the role of housewives at large, thus hindering them from formal job employment.

On the education front, results reveal that women with primary, secondary and tertiary education levels are more likely to seek for ANC services compared to their counterparts who have no education at all by 0.73 percent, 44.47 percent and 14.96 percent

respectively. Distance has an adverse effect on the utilization of the ANC services. Women from the households that are far from the health facilities are less likely to seek for ANC services compared to women from the households near the health facilities by 0.04 percent. The effect of distance on ANC services utilization is significant at 1 percent significance level.

Lastly, with regard to the age cohorts, results posit that women in 14 – 19 years bracket and 20 – 25 years old women seek for ANC services more that the 44 – 49 years old women by 11.42 percent and 3.05 percent respectively, with the effect being significant at 5 percent significance level. However, women in 26 -31 years, 32 – 37 years and 38 – 43 years old utilize ANC services more than 44 – 49 year old women by 11.26 percent, 8.35 percent and 15.83 percent respectively, though insignificant. Further, the results reveal that women in 14 years – 25 years age bracket have a higher demand for ANC given their prime reproductive age than 44 – 49 year old women who are most likely in their menopausal stage of reproduction.

4.7.2 Discussion of the findings

From the marginal effects results, we conclude that increase in economic wealth-being increases the likelihood of women utilizing the ANC services. Therefore, women from richest household background utilize ANC services more than women in other wealth quintiles. This finding resonates with the economic augment with regard to demand for healthcare services. Higher wealth quintile comes with economic wellbeing, which will increase the propensity for consuming ANC services.

We note that the effect of middle, fourth and highest wealth quintiles on ANC utilization is significant at 1%. These findings are in agreement with the findings by Arthur (2012) who found that as the wealth quintiles went higher, ANC uptake increased in Ghana. Similar findings were reported by Adeniyi & Erhabor (2016) in Nigeria who found a 53.7% ANC utilization gap between poorest quintiles and those in the highest quintile, in favour of those that were in the highest.

Rural dwelling women do not utilize ANC services as much as those women in urban dwellings. This finding can be informed by a number of factors. First is the possibility that in the rural areas the health facilities are limited in number and even those that are present, distance is a deterrent given their sparse distribution. This is contrary to the urban areas where health facilities are likely to be evenly distributed. The second element is the economic wellbeing in the rural areas. Majority of the rural dwellers are likely to be in the lowest wealth quintile, thus limiting their utilization of ANC among their women. In addition, the exposure and the information asymmetry in the rural areas would inform the finding as to why women in the rural dwellings are less likely to seek for ANC services compared to their counterparts in the urban regions. Women residing in urban areas are more likely to have information access with regard to ANC services given the exposure and information symmetry that is likely to come with the urban settings as opposed to those women in the rural areas, hence the above finding.

The above results are in agreement with those of Tekelab et al., (2019) in Ethiopia who found that women who are residents of urban settings had an almost two times likelihood of utilizing antenatal care services as compared to their rural equivalents. Similarly, Kedir et al., (2019), asserted that living in rural areas is associated with more

barriers such as fewer sources of income and disparity in the distribution of healthcare facilities. This leads to fewer women utilizing antenatal care services in rural areas in contrast to their urban counterparts where there are more money-making opportunities as well as more healthcare facilities in a close range.

On the current marital status of the women, results evident that married women have a lesser tendency of utilizing ANC services than the unmarried women. This would be explained by the culture of the area residents in which the household head is the overall decision maker. Therefore, the decision to utilize the ANC services among the married women could be curtailed by their respective male partners, hence the negative effect. However, the opposite would be the case for unmarried women who may have some liberty in making health related decisions such as ANC utilization. These findings are in harmony with Zeine et al., (2010) in Ethiopia.

With regard to the current employment status, employed women seek for less ANC services that the unemployed. This would be explained by the culture of the area residents whereby women are subjected to the role of housewives at large, thus hindering them from formal job employment. Further, working women are likely to be overwhelmed by work and therefore not get time to seek for ANC services and in some instance where they seek for ANC services, they may not actually adhere to the schedule.

However, this finding is contrary to the finding by Chama-Chiliba & Koch (2015) in Zambia who found that being employed positively influenced ANC utilization. This led to a conclusion that being employed gives women financial freedom, thereby increasing

their mobility, which in return makes them better positioned to access these services. Similar findings were reported by Mekonnen et al., (2019) who noted that being employed positively influenced the women's ability to attend the recommended four visits in the course of their pregnancy.

On the education front, results reveal that educated women seek ANC services more than the uneducated ones. Literacy comes with the information symmetry and empowerment to make essential decisions. Educated women are more enlightened on matters regarding the importance of ANC and therefore are more likely to utilize ANC services compared to women who have no education. Educated women are probably capable of knowing when to attend ANC services, when to seek for medical help given the symptoms displayed during their pregnancy and much more.

Similarly, Nketiah-Amponsah et al., (2013) reports that in settings of low and middle income such as Kenya, notable determinants includes but not limited to education level of the pregnant women, their financial status as well as the place of residence among others. Similarly is the finding by Imdad et al., (2010) who reports that a positive connection was established between a woman's educational level and the uptake of antenatal care in Pakistan and Mekonnen & Mekonnen (2003) in Ethiopia.

Distance has a negative effect on the ANC services seeking behaviour among Mandera County women. Women from the households that are far from the health facilities are less likely to seek for ANC services compared to women from the households near the health facilities. Long distance to the health facility is a deterrent towards seeking of health services. The longer the distance, the higher the shoe – leather cost for going to

the health facilities to seek for care. This comes in form of high transport costs and spending more time commuting to seek for healthcare services.

This finding resonates with the finding by Akowuah et al., (2018) who conducted a study on the factors that influence ANC utilization in Ghana. Distance was stipulated as a key determinant to the regularity or irregularity of the uptake of ANC. 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 the cases of short walking distances to the healthcare facilities. Similarly, Onasoga et al., (2012), noted that a significant negative link existed between antenatal care utilization and distance covered to the nearest healthcare amenity in Osun state, Nigeria.

Lastly, with regard to the age cohorts, results posit that women in 14 – 19 years and 20 – 25 years seek for ANC services more in comparison with the 44 – 49 years old women by 11.42 percent and 3.05 percent significantly with the effect being significant. However, women in 26 -31, 32 – 37 and 38 – 43 year old women were found to utilize ANC services more than 44 – 49 years old women by 11.26 percent, 8.35 percent and 16.14 percent respectively though not significant at 5 percent significance level.

These results reveal that women in 14 years – 25 years have a higher demand for ANC given their prime reproductive age as compared to women in the 44 – 49 years age bracket, who are most likely in their menopause stage of reproduction. However, these findings are contrary to those of Eijk et al., (2006) in rural western Kenya. This was explained by the understanding that women that are below 18 years were reluctant to

seek antenatal care because of the fear of bad encounters with healthcare providers. In addition, this group of women was found to be less confident and comfortable with their pregnant state and therefore preferred keeping their pregnancy a secret, which adversely affected their uptake of these services.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the study findings. In addition, the chapter gives conclusions based on the findings fitted in the probit model. Recommendations about areas for further study are also covered in this chapter.

5.2 Summary of the study

The study sought to examine the women's health seeking behaviour with a focus on the antenatal care in Madera County. The choice for Mandera County was informed by the low ANC uptake with the average number of women seeking for these services being 50.5 percent. In addition, Mandera County was found to be lagging behind other counties, which have closely similar socio-demographic characteristics, such as Garissa and Wajir, which reported 87% and 58% ANC utilization levels respectively. It is noted that despite the government's 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 aimed at establishing the pattern of the utilization of antenatal care services among women in rural households of Mandera County and secondly, whether the individual characteristics and facility factors demand affect antenatal care visits in Mandera County. The study adopted the Human Belief Model by Rosenstock (1974), which asserts that four main constructs are believed to influence individual's health seeking behaviour namely: perceived seriousness/severity,

individual's perceived vulnerability/susceptibility, perceived potential barriers as well as the perceived resulting benefits.

Based on the empirical literature reviewed, the study conceptualized ANC demand to be a function of women age, residence place, distance, household wealth quintile, woman's education level, marital status of the woman and woman's employment status. Probit model was applied in the empirical analysis. The model choice was informed first by the nature of the dependent variable which is a binary outcome where 1= ANC utilization, otherwise 0. Secondly, the fact that the Probit model assumes a latent unobserved variable, 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 was 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 heteroskedasticity were tested for in the model.

5.3 Conclusions of the study findings

This study reviewed one key theoretical literature and several other empirical literatures relating to the determinants ANC utilization among pregnant women within Mandera County. The study relied on the Kenya Demographic Household Survey data collected by The Kenya National Bureau of Statistics in 2014. The results of the study reveal that ANC utilization among pregnant women in Mandera County is minimal at best with only 50.53 percent of the women having sought for the antenatal services from the health facilities compared to 49.47 percent who never sought for any antenatal services in the year 2014.

Further, the levels of literacy remain significantly low among the women with an overwhelming majority having no formal education whatsoever at 92.75 percent. In addition, distance remains a major impediment cited by the women as the core challenge for not receiving ANC services with a frequency of 87.05 percent. The wealth quintiles of the households reveal that more than half of the households are in severe poverty levels with 73.88 percent of the households ranked in the lowest wealth quintile (poorest) and only 10.13 percent being in the highest wealth quintile (richest).

Rural dwellings dominate the county estimated at 64.31 percent. On the marital status of the women, 94.08 percent of women are married, an outcome that could be attributed to the culture and the effect of the dominant religion in the county. The employment status reveals that only 3.27 percent of the women were employed, an outcome that could resonate well with the culture of the dominant community in the county, which subjects women to be mainly housewives. Lastly, on the women age group, majority of the women surveyed were aged between 26 – 43 years, accounting for 79.02 percent.

The objectives of the study were achieved by estimating the probit model. From the probit model estimation, the study deduces that as the household wealth quintile rises, the demand for ANC services rises as well. This can be explained by the rise in the economic well – being that comes with the urge for improved healthcare. On the residence front, rural residence has a negative effect on ANC usage compared to urban residence, a finding that alludes to the fact that living in rural areas is associated with more barriers such as fewer sources of income and disparity in the distribution of healthcare facilities. The marital status of women can be concluded to not have any significant effect on the utilization of the ANC services by pregnant women in Mandera County. Similar finding is concluded for the current employment status, women who are currently employed are less likely to seek for ANC services compared to their counterparts who are not currently employed, though insignificant.

The literacy level of women has a strong positive correlation with the ANC uptake. Increased literacy levels come with increased awareness on the benefits of utilizing ANC services during pregnancy, thus promoting the uptake of the services. Distance was found to have an adverse effect on the utilization of ANC services. Women from those households that are far from the health facilities are less likely to seek for ANC services compared to women from the households near the health facilities. This could speak into the increased shoe – leather cost for seeking ANC.

Lastly, with regard to the age cohorts, results posit that younger women seek for ANC services more compared to older women given the prime – reproductive age of the women in lower reproductive age cohorts compared to women in higher age brackets who are most probably in their menopausal stage.

5.4 Policy Recommendations

Kenya, through the ministry of health has formulated policies towards promotion of maternal health in the country. As envisaged in the big four agenda, universal health coverage is one of the key areas that the government seeks to attain. In addition, health initiatives such as beyond zero programmes and Linda mama initiatives are all geared towards enhancing good marital health among pregnant mothers and unborn babies. To these effects, the following policy implications with regard to ANC usage are pronounced for Mandera County.

First is the policy with regard to sensitization and awareness creation among women on the need and importance for ANC services. The study found illiteracy levels within Mandera County to be very high. 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.

Secondly is the policy matter regarding to the expansion of the health facilities' infrastructure. The findings of the study were that distance to the 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 people especially in the rural areas. In addition, there is a need to refocus on alternative healthcare models for providing ANC services such as the use of mobile ANC clinics, community health workers, digital tracking of pregnancy women for provision of ANC healthcare via digital platforms to reach those far in the interior among other models.

With regard to the household wealth quintile, improvement in the wealth status of the household was found to positively impact on the ANC services usage. There is therefore the need for the county government to empower the rural households by 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 a challenge with scarcity of data as households surveyed were few in Mandera County. This is informed by the fact that the 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 social, economic and demographic factors of different counties differ from each other. In addition, the total number of cases surveyed in different counties differs and as such, the results of this study cannot be generalized to national level or to other counties.

5.6 Areas for further Study

The study explored the determinants of the ANC utilization 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 and Health Survey beyond the ones captured in this study such as the approval from the partner / husband, women parity, health insurance coverage, religion, partner / husband's education level among others.

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