FACTORS ASSOCIATED WITH UTILIZATION OF MATERNAL HEALTH CARE SERVICES IN WESTERN PROVINCE, KENYA

BY

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Q50/60220/2010

2013

A Project Submitted in Partial Fulfilment of the Requirements for the Award of Master of Arts Degree in Population Studies, University of Nairobi.

DECLARATION

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

Signed: ..... Date: .....

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

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Mr Ben Obonyo Jarabi

ACKNOWLEDGEMENTS

My heartfelt gratitude to family and friends for financial and moral support towards my education. I greatly appreciate my supervisors Prof. Alfred Agwanda and Mr Ben Obonyo Jarabi for their guidance and kindness during the entire process. I wish to also acknowledge all academic staff at PSRI for their support; they were always willing to assist whenever called upon to. God bless you all.

DEDICATION

I wish to dedicate this work to my daughter, Maria.

Lots of love

ABSTRACT

This study aims to analyze the determinants of utilization of maternal health care services among women of reproductive age in Western Province with focus on the continuum of care for pregnant women during pregnancy and delivery, that is, the use of antenatal care services and skilled assistance during delivery.

This study used data from 2008-09 KDHS for women with a last birth in the five years preceding the survey. Descriptive methods of analysis and multivariate ordinal regression method of analysis were used to determine the significance of independent variables on the utilization of antenatal care and delivery services. Independent variables for this study include: age, marital status, level of education, type of place of residence and household wealth index.

Descriptive and multivariate analysis show that the independent variables affect utilization of maternal health services; women who are married, young and rich are likely to utilize maternal health care services compared to women who are not married, older and are poor. Therefore, more effort is needed to be put to educate the general public on the importance of maternal health care services. Moreover, efforts should be channeled to encourage seeking a continuum of maternal health services by pregnant women. Finally, research should focus into understanding the various factors that influence utilization of maternal health care services.

The data analysis shows that the most important factors associated with utilisation of maternal health care services are age and marital status.

Table of Contents

ACKNOWLEDGEMENTS.....i

DECLARATION.....ii

ACKNOWLEDGEMENT.....iii

DEDICATION iv

ABSTRACT v

TABLE OF CONTENT.....vi

List of Figures and Tables viii

CHAPTER 1: INTRODUCTION..... 9

1.1 Background..... 9

1.2 Problem statement..... 13

1.3 Key Research Question..... 13

1.4 Research objective 15

1.4.1 Specific Objectives..... 15

1.5 Justification of the study 15

1.6 Scope and limitation..... 16

CHAPTER 2: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK.....17

2.1 Introduction..... 17

2.2 Use of antenatal care services..... 18

2.3 Timing of antenatal care visits..... 19

2.4 Use of delivery care services 20

2.5 Summary of Literature Review..... 21

2.6 Conceptual framework and Operational framework..... 22

2.7 Definition of Key Concepts and Variables 25

2.7.1 Dependent variables. 25

2.7.2 Independent variables..... 26

CHAPTER 3: DATA AND RESEARCH METHODS..... 28

3.1 Data Source 28

3.2 Methods of Data Analysis..... 28

3.2.1 Descriptive Analysis..... 28

3.2.2 Ordinal Regression Analysis..... 28

CHAPTER FOUR: FACTORS ASSOCIATED WITH UTILIZATION OF MATERNAL HEALTH CARE SERVICES IN WESTERN PROVINCE 31
4.1 Introduction 31
4.2 Descriptive Analysis 31
4.2.1 Distribution of Population by Background Characteristics 31
4.3 Results of Bivariate analysis 33
4.3.1 Distribution of study covariates by assistance during delivery 33
4.3.2 Distribution of study covariates by timing of antenatal services 36
4.3.3 Distribution of study covariates by the number of visits 38
4.4 Multi-Variate Analysis 42
4.4.1 Results of Multi-variate analysis on utilization of maternal health care services 42
4.5 Discussion 43
CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS 45
5.1 Introduction 45
5.2 Summary 45
5.3 Conclusion 45
5.4 Recommendations 47
5.4.1 Recommendations for programs 47
5.4.2 Recommendations for Research 47
REFERENCES 48

List of Figures and Tables

Figures

2.6.1 Detailed framework for analysing maternal mortality and morbidity (McCarthy& Maine 1992)……..23

2.6.2 The operational framework for maternal health services use……..24

4.1 Distribution of study population by utilization of maternal health services……..31

Tables

2.7.1 Combined index for dependent variable……..26

2.7.2 Independent variables……27

4.1 Distribution of population by background characteristics……..32

4.2 Distribution of study covariates by assistance during delivery…….....34

4.3 Distribution of study covariates by timing of antenatal visits…….....37

4.4 Distribution of study covariates by number of antenatal visits ……..…….....40

4.5 Ordinal Regression Results on utilization of maternal health care services ……..43

CHAPTER 1: INTRODUCTION

1.1 Background

Millions of women in developing countries continue to experience serious health problems related to pregnancy or childbirth. Thaddeus and Maine (1990) argued that not receiving adequate care in time is the overwhelming factor leading to death of women in developing countries. The use of health care services is a complex behavioral phenomenon. It is related to the organization of the health-delivery system and is affected by the availability, quality, costs, continuity and comprehensiveness of services; social structure and health beliefs also affect use (Andersen, 1968; Fiedler, 1981; Kroeger, 1983).

Since the International Conference on Population and Development (ICPD) of 1994, reproductive health has taken center stage in population programmes of many countries in the world. In Kenya, the national maternal health programs include: antenatal care, provider-initiated HIV testing and counseling, skilled attendance at birth, emergency obstetric care, post-partum care and family planning in keeping with national policies.

Hospital-based studies in the world conclude that the majority of maternal deaths are due to one or more preventable direct obstetric complications. Postpartum hemorrhage (PPH) is the most common cause of maternal deaths in sub-Saharan Africa. Other direct causes are puerperal sepsis/infections, hypertensive disorders, obstructed labor/ruptured uterus, and complications of unsafe abortions. Major indirect causes are severe anemia, malaria, HIV/AIDS, and tuberculosis. Also, for every woman who dies, 30 others are maimed by potentially lifelong disabilities such as obstetric fistula.

There are significant variations in maternal mortality levels across and within national boundaries. Globally, an estimated 287,000 maternal deaths occurred in 2010, a decline of 47 percent from levels in 1990. Sub-Saharan Africa (56%) and Southern Asia (29%) accounted for 85 percent of the global burden (245 000 maternal deaths) in 2010. The global MMR in 2010 was 210 maternal deaths per 100 000 live births, down from 400

maternal deaths per 100,000 live births in 1990. The MMR in developing regions (240) was 15 times higher than in developed regions (16). Sub-Saharan Africa had the highest MMR at 500 maternal deaths per 100 000 live births. Nigeria and India contribute a third of global maternal deaths at 14 percent and 19 percent respectively (WHO, UNFPA, UNICEF and the World Bank, 2009).

According to the UN Interagency maternal mortality estimates, maternal deaths were estimated at 358,000 in 2008. Nearly all maternal deaths occur in developing countries; over 80 percent, with hemorrhage being the most common cause of death, particularly in Africa and Asia. Sub-Saharan Africa which is characterized by rapid population growth, high birth rates and increasing rates of HIV infection, has the highest maternal mortality at 640 deaths per 100,000 live births.

Despite the interventions at national level, countries in Africa still face high maternal mortality. The 2008-09 Kenya Demographic and Health Survey shows that maternal mortality ratio (MMR) was 488 deaths per 100,000 live births in the country having slightly increased from 414 deaths per 1000 in the 2003 KDHS. It is estimated that Kenyan women face a 1 in 35 lifetime risk of maternal death (National Reproductive Health Strategy, 2009-2015) which is the leading cause (27 percent) among women of childbearing age. Conditions during and just after birth cause 9 percent of deaths in the country (KSPA, 2010) and thus maternal mortality is a major health problem in Kenya. According to the UN Interagency report of 2008, Kenya contributed over 60 percent of maternal deaths in sub-Saharan Africa.

Provinces in Kenya that have high maternal mortality include Nyanza, Western and Coast (PSRI & UNICEF, 1996). Western Province is characterized by high levels of fertility, neonatal and maternal mortality rates. The 2008 KDHS report shows TFR for Western province as 5.6. This means that women are exposed to risks that can be fatal with each pregnancy and delivery.

In an effort to improve pregnancy outcome, the Safe Motherhood Project in Western Province focused on improving quality of antenatal care, essential obstetric care, clean

and safe delivery, post-partum care, post-abortion care and management issues at all levels. In addition, the project also focused on strengthening referral practices and on addressing factors responsible for delays by pregnant women in making decisions on when, where and how to seek care. (Safe Motherhood Demonstration Project Western Kenya Report, 2004). The Safe Motherhood Conceptual Framework provided the basis for designing the project interventions and overall approach. In addition, use of the three delay model focused the activities in reducing maternal, perinatal and neonatal deaths: (i) delay in deciding to seek appropriate care; (ii) delay in reaching an appropriate health care level; and (iii) delay in receiving adequate emergency care once at a facility. Key issues identified that contributed to high maternal and perinatal morbidity and mortality were: poor referral systems, limited competence and skills among health providers, poor health information system, frequent shortages of essential equipment and supplies, weak management systems at all levels and limited access to basic obstetric care at community level.

Overall, the proportion of women who had heard of a woman dying due to obstetric related complications reduced over the project period. However, despite a reduction in the proportion, a review of maternal deaths records showed that the number of maternal deaths during pregnancy increased at end line. This increase of deaths during pregnancy may indicate more deaths due to abortion complications and probably due to indirect causes such as severe malaria in pregnancy, HIV/AIDS, tuberculosis, cardiac diseases, severe anemia, etc.

The situation regarding neonatal and perinatal health only improved marginally in Western Province. For instance, 30 percent of women said they had lost at least one child at baseline compared to 28 percent at end line. The age of children who had died was not asked at baseline but among women who had lost a child aged one year or less at end line, 36 percent died within the first month of birth.

The fifth MDG goal is to reduce maternal mortality by three-quarters between 1990 and 2015. To achieve this target, maternal health must be addressed as part of a continuum

of care that connects essential maternal, newborn and child health services. Indeed, levels of maternal mortality often reflect the overall performance of a country's national health system – particularly during delivery and in the postnatal period, when mothers and newborns are most vulnerable. To fill this critical gap, services that benefit both mother and child need to be scaled up, as the health of the mother is closely linked to that of her newborn. However, reducing maternal mortality throughout the developing world is slow and efforts must now be accelerated if the goal is to be reached.

Thus this study seeks to establish the factors that affect women's use of maternal health care services in Western Province, Kenya.

1.2 PROBLEM STATEMENT

The 2008-09 KDHS found that less than half (47 percent) of all pregnant women in Kenya make the recommended four or more ANC visits. 60 percent of urban women make four or more ANC visits compared with less than half (44 percent) of rural women. The data further show that most women do not receive antenatal care early in the pregnancy; only 15 percent of pregnant women obtain antenatal care in the first trimester of pregnancy; the median number of months at first visit is 5.7 (KNBS and ICF Macro, 2010).

Despite high antenatal care attendance in Kenya, the rate of delivery in a health facility is low. Only 43 percent of live births in the five years preceding the 2008-09 KDHS took place in a health facility (KNBS and ICF Macro, 2010).

The 2009 National Reproductive Health Strategy for Kenya aims to reduce maternal mortality ratio to 147 deaths per 100,000 live births and to increase percentage of women using skilled care in delivery to 90 percent by 2015. When compared to the 2008 KDHS maternal mortality rate of 488 deaths per 100,000 live births, this target is yet to be achieved.

Western Province is characterized by low utilization of maternal health care services despite the various interventions. The community component of the KSPA 2010 report shows that women from Western Province are least likely to deliver in a health facility. It is known that the majority of the maternal and perinatal deaths can be prevented if women received timely and appropriate care.

In Western Province, the use of skilled health professionals (the use of a doctor, nurse or midwife) during delivery aggregates to 25.8 percent (KDHS 2008). The 2007 Reproductive Health Policy recommends having a health worker with midwifery skills during delivery without which there is high risk of maternal death. Comparison of the 2003 and 2008 KDHS shows that home deliveries increased from 70.6 to 73.3 percent, indicating low utilization of maternal health care services. Having highest proportions of

those who gave birth on their own without assistance in both the 2003 and 2008 KDHS report, this proportion increased from 10.6 percent to 14.6 percent. This means that high proportions of births occur at home without the assistance of a skilled birth attendant.

The National Coordinating Agency for Population and Development (NCAPD) identified the relationship between maternal mortality, age, parity, marital status, birth interval, antenatal attendance and occupation as a research gap (NCAPD, 2006). To provide an in depth outlook that will accelerate progress towards improving maternal services, it is important to understand the level of utilization of maternal health care services among women of reproductive age with intention to examine a continuum of care from pregnancy to delivery rather than study the use of one aspect at a time of maternal health.

1.3 Key Research Question

- What factors influence utilization of maternal health care services in Western Province?

1.4 Research objective

The aim of this study is to establish determinant factors in the utilization of maternal health care services among women of reproductive age in Western Province

1.4.1 Specific Objective

- To establish factors that determine the use of all maternal health care services

3.2 Justification of the study

Maternal mortality rates in Western Province remain high and this study aims at contributing to better understanding about utilization of maternal health care services by expectant women in Western province. Seeking antenatal services on time by pregnant women helps detect complications and informs mothers on ways to care for themselves and the babies while skilled assistance during delivery decreases both neonatal and maternal morbidity and mortality.

Analysis of patterns of maternal health care utilization behaviour by province is necessary in formulating relevant policies to address provincial differentials in maternal mortality. Therefore, this paper is not only beneficial to women but also policy makers.

A better understanding of the utilization of all maternal health care services will aide in attaining national maternal mortality goals as articulated in various strategies and vision 2030 hence contributing to the achievement of MDGs 4 and 5.

3.2 Scope and limitation

This study will use data from the 2008-09 KDHS which interviewed 8444 women of age 15 to 49, 1039 from Western Province with a birth in the past five years. The data is retrospective since information is collected in regard to births five years preceding the survey. Therefore, the accuracy of information relies on the ability of the respondent to recall.

Secondary data is limited to characteristics handled in available data. Information on beliefs and practices that would have been included is not available.

In addition, this study focuses on services during pregnancy and at time of delivery. That is ANC services (the number of visits and timing of visits) and the use of skilled delivery. This excludes other maternal health care services such as the use of postnatal care services and family planning. Further, the study does not include information regarding place of delivery which is crucial to maternal and child health.

Data used in this study is of quantitative nature thus it does not offer explanations to findings in this study. For example, quality of care, cost of transport and distance to a health facility are some of the possible underlying factors in determining the utilizing maternal health care services.

Finally, this study focuses on Western Province only; therefore, its findings and conclusions cannot be generalized to other provinces in the country.

CHAPTER 2: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 Introduction

Previous studies have shown that the uptake of maternal health care in developing countries has significant consequences for both the safe transition of the mother through pregnancy and child birth, and the survival and health of the child during early infancy (Khan, 1987).

In spite of the importance of maternal care, poor access to and low utilization of such services continue to be important determinants of maternal mortality and morbidity throughout the world (Mekonnen, 2003). Despite the benefits of maternal healthcare services, many women in developing countries do not receive pre-natal care at all, and the care that is received is often characterized by an insufficient number of visits timed late into the pregnancy. Furthermore, the delivery care utilized in most developing countries is dominated by homebirths. Hence high risk pregnancies are often not identified, obstetric histories are ignored, opportunities for transmitting FP messages are missed and important information on child nutrition and healthcare is not disseminated to a large proportion of mothers. Previous literature has documented an urban-rural dichotomy in child health and survival and the utilization of maternal healthcare in developing countries (Madise and Diamond 1996, 1997; Stephenson, 1998).

The Safe Motherhood Demonstration Project in Western Province 2004 identified five major causes of maternal death: hemorrhage, infection, hypertensive disease in pregnancy, unsafe abortion and obstructed labor. Many of these deaths could be averted if women had access to essential obstetric care when they need it. However, despite a reduction in the proportion, a review of maternal deaths records showed that the number of maternal deaths during pregnancy increased at end line. This increase of deaths during pregnancy may indicate more deaths due to abortion complications and probably due to indirect causes such as severe malaria in pregnancy, HIV/AIDS, tuberculosis, cardiac diseases, severe anemia, etc.

The situation regarding neonatal and perinatal health only improved marginally. For instance, 30 percent of women said they had lost at least one child at baseline compared to 28 percent at end line. The age of children who had died was not asked at baseline but among women who had lost a child aged one year or less at end line, 36 percent died within the first month of birth.

2.2 Use of Antenatal Care Services

Health professionals recommend that the first antenatal visit should occur within the first trimester of pregnancy and continue on a monthly basis through to the 28th week and fortnightly up to the 36th week or until birth (Central Bureau of Statistics- Kenya, Ministry of Health- Kenya & ORC Macro, 2004).

Studies demonstrating the high levels of maternal mortality and morbidity in developing countries and research identifying causes of maternal death have emphasized the need for antenatal care and availability of trained personnel to attend to women during labor and delivery. The importance of tetanus toxoid injections given prior to birth is to reduce neonatal mortality. Although antenatal cannot prevent all obstetric emergencies (Vilar, 1997), the information provided by the antenatal service provider on danger signs, diet and planning for delivery, along with testing anemia, malaria and high blood pressure are important for the successful management of pregnancies and subsequent well-being of the child.

At the ANC clinic, women are screened for risk factors and receive appropriate advices, get tetanus toxoid vaccinations, health education and counseling on individual birth planning, intermittent presumptive treatment of malaria and iron supplementation. Therefore, use of antenatal care can help to diagnose pre-existing health problems or to detect health complications while use of care during and after delivery can treat complications that may arise during childbirth hence leading to reduction of maternal mortality.

There are some key factors that determine the utilization of maternal health care services. Mother's education greatly influences health care utilization. For instance, in a study in Peru using DHS data, Elo (1992) found quantitatively important and statistically significant effect of mother's education on the use of antenatal care and delivery services. In a study on inaccessibility and utilization of antenatal health-care services in Balkh Province of Afghanistan, Hadi et al (2007) reported that years of schooling have a significant positive influence at both moderate and adequate levels of services. Researches by Caldwell et al. (1983) and Raghupathy (1996) on the role of education in the use of health services by women present similar results.

2.3 Timing of antenatal care visits

Antenatal care initiated in the first trimester facilitates early diagnosis of anaemia and allows treatment at the periphery so that the condition can be corrected before delivery. Services that have the greatest impact on the health of the baby and the mother when obtained early include the correction of anaemia and the elimination of hookworm which are common health problems in developing countries (WHO, 1998). Although women are encouraged to start ANC early in pregnancy, studies from Kenya and a host of other developing countries indicate that a majority of women tend to seek antenatal services after the first trimester of the pregnancy (APHRC, 2006; Ikamari, 2007; Mpembeni et al, 2007).

The uptake of ANC services by a health professional in Kenya is generally high (over 90 percent) although the proportion of women attending more than the four recommended ANC visits declined from 52.3 percent to 47.1 percent in 2003 KDHS and 2008-09 KDHS respectively. While most provinces report a percentage of less than 1 of women who access ANC at home, Western Kenya has the highest percentage at 4.6. In addition, 2.8 percent of women received ANC from TBAs. Although North Eastern has equally high incidences of home deliveries, the proportion is reducing (from 91.9

percent to 81.3 percent). Lastly, the province has the highest proportion of women who seek postnatal services from TBAs estimated at 17.5 percent.

2.4 Use of Delivery Care Services

Studies show that the health and, to a large extent, the survival of the mother before and after delivery is determined by the skills of the birth attendant, sanitary conditions of the place of delivery and the hygienic procedures followed during delivery. Perhaps the Kenya National Reproductive Health Strategy for 1997-2010 sought to increase professionally-attended deliveries from 45 percent in 1995 to 90 percent by the year 2010 (Ministry of Health, 1996).

Apart from education which has been discussed under the use of antenatal care services, other important factors play an important role in the use maternal health care. Whereas there is consensus on age as a key factor determining use of maternal health care services, there are contradicting reports as to who is more likely to use the services among the young and older women. Chakraborty et al (2003) in a study of determinants of the use of maternal health services in rural Bangladesh found out that older women are more likely to seek maternal health care services than younger women. Based on findings on a study of utilization of maternity services in Tanzania, Mpembeni et al (2007) report that the proportion of women who were attended during delivery by a skilled attendant was seen to decrease significantly with increasing age of women. Similar findings were presented by studies in Kenya, China and Jordan among others (Ikamari, 2007; Short & Zhang, 2004; Obermeyer 1991).

Use of antenatal care services has been attributed to increased likelihood of an expectant mother to deliver in a hospital. Various studies seem to agree that women who attended ante-natal clinics were found to be more likely to make use of other services provided to expectant mothers as compared to those who did not attend the clinics (Short & Zhang, 2003; Obermeyer & Potter, 1991). For example, in a study on obstacles to utilization of institutionalized delivery care in Teso district of Kenya, Ikamari

(2007) reports that women who had more contacts with the health facilities in terms of the number of antenatal clinic visits were more likely to deliver in a health facility than the women with less or no antenatal clinic visits.

Type and place of residence has been viewed to affect the utilization of maternal health care services. Living in an urban area increases the probability of pregnant women using trained professionals for birth deliveries (Letamo et al, 2003). Rural areas in Western Province are characterized by inadequate transportation to health facilities and poor road networks. Studies seem to concur that accessibility of health institutions has effect on use of delivery services. Women nearer to health facilities are more likely to use them during delivery. In terms of physical accessibility, urban dwellers are more likely to deliver at hospitals while their rural counterparts use traditional birth attendants.

Cost of services brings out another dimension to accessibility of modern delivery care services. Women who are in some form of employment are likely to deliver in hospitals compared to those with no source of income. Poor women living in informal settlements in urban areas deliver at home despite the fact that they are near many health facilities as the facilities are 'inaccessible' as they cannot afford to pay for the services (Buor, 2004).

2.5 Summary of Literature Review

Available literature on use of maternity services shows that antenatal care services are widely used by expectant mothers. Most expectant mothers start antenatal visits in the second trimester of their pregnancies regardless of recommendations by health care providers and practitioners that antenatal visits should start during the first trimester of pregnancy.

Compared to antenatal care services, use of modern delivery care services is disturbingly low in Kenya and other developing countries. Studies in Kenya, report that use of maternal health care is determined by age, education, parity and distance to the health facility. Mothers with higher education are more likely to use health care facilities

during delivery. Magadi et al (2000) concurs that use of antenatal care in Kenya is associated with a range of socio-economic, cultural and reproductive factors. The availability and accessibility of health services and the desirability of a pregnancy are also important. More educated women are more likely to use modern health care services compared to less educated. Similarly, women with higher parity often do not deliver at hospitals.

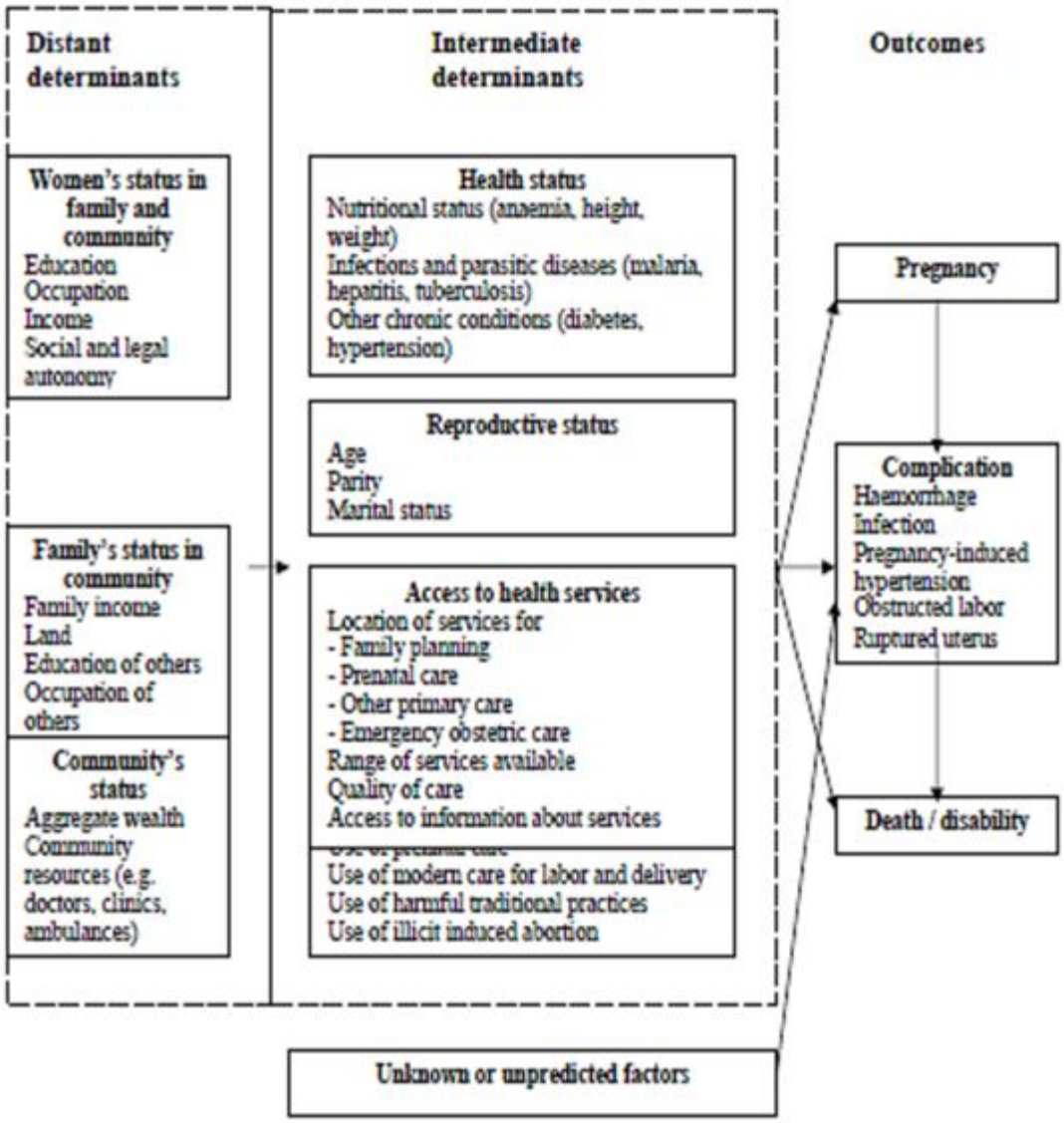
Lastly, there has been no study examining the continuum of care for pregnant women during pregnancy to birth since most studies focus on each maternal care service.

2.6 Conceptual framework and Operational framework

2.6.1 Conceptual framework

McCarthy & Maine 2002 model on determinants of maternal mortality applicable in developing provides the model of choice for this study.

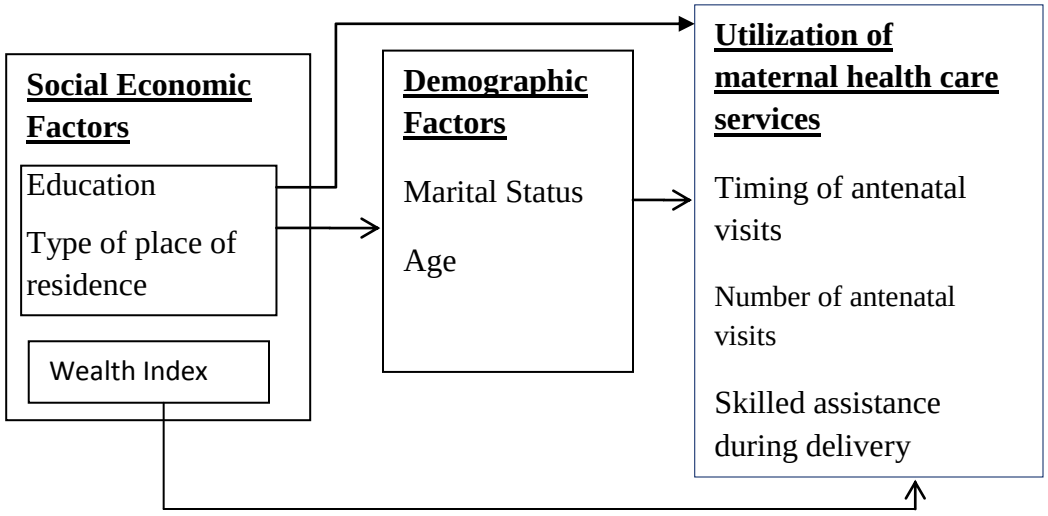
Fig. 2.6.1: A Detailed framework for analyzing the determinants of maternal mortality and morbidity (McCarthy & Maine 1992)



2.6.2 Operational framework

This is a modified framework presenting variables used in this study that are included in the model.

Fig. 2.6.2 Operational framework



Socio-economic factors are social and economic factors that determine the use of maternal services in society. These are education, wealth index and type and place of residence.

Demographic factors relate to individual characteristics that influence utilization of maternal health care services and include age and marital status.

The hypotheses in this study is a range of socio-economic and demographic factors that influence use of maternal health care services in Western Province of Kenya:-

1. The higher the maternal age, the less the likelihood of utilizing maternal health care services.

2. Women who are married are more likely to utilize maternal health care services.

3. Woman with high education level of education are more likely to use maternity services compared to those with lower level of education.

4. Women who are rich are more likely to use maternal health care services.

5. The place of residence influences use of maternal health care services.

2.7 Definition of Key Concepts and Variables

2.7.1 Dependent Variable

In this study, the dependent variable is the use of maternal health care services. A detailed description of each of the dependent variables considered in this study is as follows;

- Use of antenatal care services is measured by the number of antenatal visits. Women who saw a provider for four or more recommended visits and those who did not. The provider refers to doctor, nurse/midwife, traditional birth attendant or no one.

- Skilled assistance during delivery refers to assistance offered by a doctor, nurse/midwife, or no-one.

- Timing of antenatal visits. Women who made early visits during the first trimester of pregnancy are considered early while services sought during second or third trimester are considered late.

Computation of composite index on utilization of ANC and intrapartum care

The dependent variable combines three maternal health care services, that is, use of ANC (Timing and number of visits) and assistance during delivery. These three variables are combined to form the dependent variable; all use of services involves early timing of antenatal care services, four or more antenatal care visits and using a skilled provider during delivery. Partial involves receiving any two of the three services while less than partial involves receiving one of the three services. Lastly, women who did not receive any of the three services are those that received late antenatal care, had less than four antenatal care visits and did not use a skilled provider.

Table 2.7.1 Combined index for utilization of maternal health care services

Dependent variables	Measurement
Use of skilled or un-skilled assistance during delivery	1= assistance at birth by skilled attendance (doctors, nurses or midwives)
	0= assistance at birth by un-skilled attendants (Traditional Birth Attendants, friends and relatives, no one)
Timing of antenatal care visit	1= mother sought antenatal care services in first trimester
	0= mother sought antenatal care services in second or third trimester (Includes those who did not attend)
Number of antenatal care visits	1=mother sought 4+ antenatal care visits
	0=mother sought less than 4 antenatal visits (includes those who did not attend)
Utilization of maternal health care services	0=none of the three service
	1=only one of the three services
	2-only two or 3 of the three services
	3=All services

2.7.2 Independent Variables

1. Maternal education refers to the highest level attained by the mother. Level of education is categorized into no education, primary and secondary+.

2. Type of place of residence refers to either urban or rural.

3. Marital status in this study referred to the status of women at the time of the survey. The categories include married and those who are either divorced or separated and those that had never married.

4. Mother's age is divided into three groups; 15-24, 25-34 while women aged 35-49 form the last age group.

5. Wealth Index is categorized into the poor, middle and rich

Table 2.7.2 Independent Variables

Independent Variables	**Measurement**
Demographic factors	
Maternal age	Age groups 15-24=1, 25-34=2, 35-49=3
Marital status	1=never/formerly married, 0=married
Socioeconomic factors	
Maternal level of education	No education=1, Primary=2, Secondary+=3
Type of place of residence	Rural= 2, Urban= 1
Wealth Index	Poor=1, Middle=2, Rich=3

CHAPTER 3: DATA AND RESEARCH METHODS

3.1 Data Source

This study utilizes data collected during the Kenya Demographic Health Survey (KDHS) carried out in 2008 by the Kenya National Bureau of Statistics in collaboration with other stakeholders. The survey had a sample size of 8444 women aged between 15 and 49 years from all provinces in Kenya.

In this study, factors determining full utilization of maternal health care services are derived using data from the women file subset. The data was derived from women with a birth in the five years preceding the survey. The entire sample size of women interviewed in Western province was 1039 respondents.

3.2 Methods of Data Analysis

3.2.1 Descriptive Analysis

Descriptive statistics such as frequency distributions of the respondents are used to determine demographic and socio-economic characteristics of the respondents. Cross-tabulation is used to examine the hypothesized association between use of maternal health care services and socio-economic and demographic characteristics. Since cross tabulations only give simple associations between dependent and independent variables, Chi-square test is carried out to test the significance of the assumed associations.

3.2.2 Ordinal Regression Analysis

The outcome of the dependent variables falls into four categories; all use of services, partial use of services, less than partial use of services and non-use of services. Since these items have order of hierarchy, multinomial model is not the most appropriate model due to the ordering levels; non-use of service, less than partial use of services, partial use of service and all use of services. Therefore ordinal regression provides a more appropriate model for analysis.

The ordinal logistic model is one of many models subsumed under the rubric of generalized linear models for ordinal data. The model is based on the assumption that there is a latent continuous outcome variable and that the observed ordinal outcome arises from discretizing the underlying continuum into *j*-ordered groups. The thresholds estimate these cutoff values.

The basic form of the generalized linear model is

$$\text{link}(\gamma_j) = \frac{\theta_j - [\beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k]}{\exp(\tau_1 z_1 + \tau_2 z_2 + \ldots + \tau_m z_m)}$$

Where γ_j is the cumulative probability for the j^{th} category, θ_j is the threshold for the j^{th} category, $\beta_1 \ldots \beta_k$ are the regression coefficients, $x1 \ldots xk$ are the predictor variables, and *k* is the number of predictors.

The numerator on the right side determines the location of the model. The denominator of the equation specifies the scale. The $\tau_1 \ldots \tau_m$ are coefficients for the scale component and $z_1 \ldots z_m$ are *m* predictor variables for the scale component (chosen from the same set of variables as the *x*'s).

The above general model contains scale parameters, thus proportional odds model which does not contain the scale effect is given by;

$\ln(\theta_j) = \alpha_j - (\beta_1 X_1 + B_2 X_2 + \ldots B_p X_p)$

where j goes from 1 to the number of categories minus 1.

The negative sign before the coefficients of the predictor variable helps in identifying lower and higher coefficients, lower coefficients having a negative signs. So that larger coefficients indicate an association with larger scores (meaning higher order values). When it is a positive coefficient for a dichotomous factor, shows that higher scores are more likely for the first category. A negative coefficient shows that lower scores are more likely. For a continuous variable, a positive coefficient indicates that as the values of the variable increase, the likelihood of larger scores increases. An association with

higher scores means smaller cumulative probabilities for lower scores, since they are less likely to occur. Each logit has its own constant term (θ_j) but the same coefficient (β_j). That means that the effect of the independent variable is the same for different logit cut off functions. That's also the reason the model is also called the proportional odds model. The terms, called the threshold values, often aren't of much interest. Their values do not depend on the values of the independent variable for a particular case. They are like the intercept in a linear regression, except that each logit has its own. They are used in the calculations of predicted values. From the ordinal regression you also see that combining adjacent scores into a single category won't change the results for the groups that aren't involved in the merge. That's a desirable feature.

CHAPTER FOUR:

FACTORS ASSOCIATED WITH UTILISATION OF MATERNAL HEALTH CARE SERVICES AMONG WOMEN OF REPRODUCTIVE AGE IN WESTERN PROVINCE

4.1 Introduction

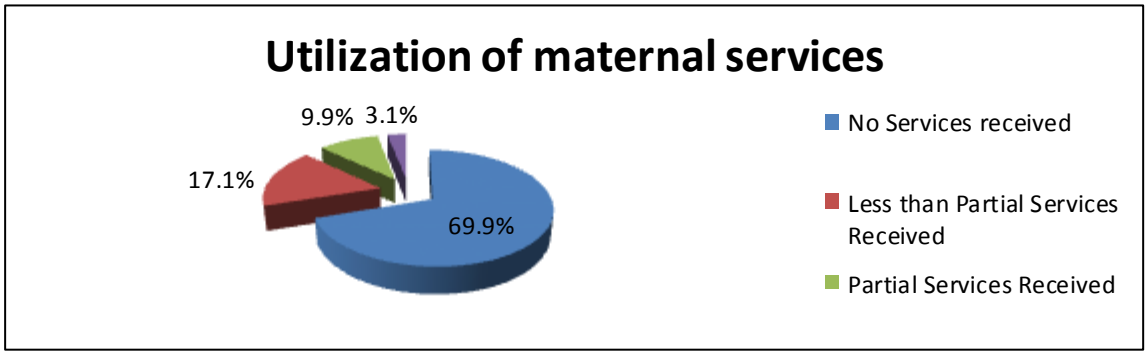
This chapter presents the results of the study findings on factors associated with utilization of maternal health services in Kenya. Section 4.2 is a description of the background characteristics of the population under study while section 4.3 presents the results of bivariate analysis. Cross tabulations are used to determine the hypothesized relationships while chi-square test helps to determine the significance of the relationships. Section 4.4 shows the results of multivariate analysis while section 4.5 presents the discussion of the findings.

4.2 Descriptive Analysis

4.2.1 Distribution of Population by Background Characteristics

The distribution of study population by background characteristics is shown in Figure 4.1 and Table 4.1 below. Only 3.1 percent of women in Western Province received maternal health care services while a majority at 69.9 percent did not receive maternal health care services at all.

Figure 4.1 Distribution of study population by utilization of maternal health services



From the Table 4.1 below, highest number of women were aged 15-24 contributing 44.4 percent of the cases. Most of the women reside in rural forming almost at 80 percent. In terms of education, 4.7 percent of women have no education, 66.6 percent have primary while 28.7 percent have secondary or higher. Almost half of the population are poor at 44.3 percent

Table 4.1 Distribution of study population by background characteristics

	Characteristic	Frequency	Percent distribution
Demographic factors			
	Marital age		
	15-24	461	44.4
	25-34	296	28.5
	35-49	282	27.1
	Marital Status		
	Married	603	58.0
	Others	436	42.0
Socio-Economic factors			
	Highest educational level		
	No education	49	4.7
	Primary	692	66.6
	Secondary+	298	28.7
	Type of place of residence		
	Urban	230	22.1
	Rural	809	77.9
	Wealth Index		
	Low	460	44.3
	Middle	228	21.9
	High	351	33.8

4.3 Results of Bivariate analysis

4.3.1 Distribution of study covariates by assistance during delivery

Table 4.2 shows the distribution of frequencies or counts of assistance during delivery grouped into two groups; skilled assistance and unskilled assistance and the total of both groups. The factors are categorised by demographic factors (age and marital status) and social-economic factors (highest level of education, type of residence and wealth index). Women with unskilled assistance had the highest frequencies, Women aged between 15 to 24 years with 37.4 percent, while married women with 44.2 percent, women with highest level of education as primary education with 58 percent, women from rural area with 67.4 percent and women with low wealth index with 39.6 percent.

Table 4.2 Distribution of study covariates by assistance during delivery

Factors	Skilled Assistance		Unskilled Assistance		Total Count
Demographic factors	**Count**	**percent**	**count**	**percent**	
Age					
15-24	72	6.9	389	37.4	461
25-34	73	7.0	223	21.5	296
35-49	32	3.1	250	24.1	282
Chi-square	19.292				
P value = 0.0001[a]					
Marital Status					
Married	144	13.8	459	44.2	603
Others	33	3.2	403	38.8	436
Chi-square	47.637				
P value = 0.0001 [a]					
Socio-economic factors					
Level of Education					
No education	7	0.7	42	4.0	49
Primary	92	8.9	600	57.7	692
Secondary+	78	7.5	220	21.2	282
Chi-square	24.723				
P value = 0.0001 [a]					
Type of place of residence					
Urban	68	6.5	162	15.6	230
Rural	109	10.5	700	67.4	809
Chi-square	32.811*				
P value = 0.0001 [a]					
Wealth index					
Low	49	4.7	411	39.6	460
Middle	34	3.3	194	18.7	228
High	94	9.0	257	24.7	351
P Value = 0.0001 [a]					
Chi-square	47.637*				

P values: *P is ≤ 0.05

1[a -] Extremely statistically significant.

Table 4.2 shows the distribution of study covariates by assistance during delivery. The results show that there is an association between the use and non-use of skilled assistance during delivery with the various study variables. Demographic factors influence utilization of maternal health care services. Younger mothers are more likely to use skilled assistance as compared to older mothers since the percentage of mothers using skilled attendance decline with an increase in age. Married women are more likely to seek skilled assistance with 13.8 percent of them seeking assistance during delivery in comparison to the 3.2 percent women who are not married. The socio economic factors in this study play a role in utilisation of maternal health services. The higher the level of education the higher the percentage of those who sought skilled assistance during delivery. Results show that mothers with at least primary education are more likely to utilize skilled assistance during delivery with 8.9 percent seeking skilled assistance during delivery. 7.5 percent mothers with secondary or higher level of education utilized skilled assistance during delivery while 0.7 percent were mothers without any education. Type of place of residence is another factor showing that women from rural areas are more likely to use skilled assistance during delivery. 10.5 percent of women from rural areas utilised skilled assistance during delivery compared to 6.5 percent from urban areas. Another factor in the utilization of skilled delivery, wealth index, shows that women from rich households are more likely to utilize maternal health care services than those from middle or poor households. 9.0 percent of women from rich households utilized skilled assistance compared to 3.3 percent from middle households and 4.7 percent from poor households.

4.3.2 Distribution of study covariates by timing of antenatal services

Table 4.3 shows the distribution of frequencies or counts by timing of antenatal visits, grouped into two groups; early and late, and the total of both groups. The factors are categorised by demographic factors (age and marital status) and social-economic factors (highest level of education, type of residence and wealth index).

Women with late antenatal visits had the highest frequencies, Women aged between 15 to 24 years with 41.9 percent, while married women with 51.9 percent, women with highest level of education as primary education with 61.6 percent, women from rural area with 72 percent and women with low wealth index with 41.2 percent.

Table 4.3 Distribution of study covariates by timing of antenatal services

Factors	**Early**		**Late**		**Total Count**
Demographic factors	**count**	**percent**	**count**	**percent**	
Age					
15-24	26	2.5	435	41.9	461
25-34	36	3.5	260	25.0	296
35-49	15	1.4	267	25.7	282
Chi-square	13.643*				
p-value = 0.0011					
Marital Status					
Married	64	6.1	539	51.9	603
Others	13	1.3	423	40.7	436
Chi-square	21.480*				
p-value = 0.0001					
Socio-economic factors					
Level of Education					
No education	2	0.2	47	4.5	49
Primary	52	5.0	640	61.6	692
Secondary+	23	2.2	275	26.5	282
Chi-square	0.843*				
p-value = 0.6561					
Type of place of residence					
Urban	16	1.5	214	20.6	230
Rural	61	5.9	748	72.0	809
Chi-square	0.089*				
p-value = 0.7655					
Wealth index					
Low	32	3.1	428	41.2	460
Middle	15	1.4	213	20.5	228
High	30	2.9	321	30.9	351
Chi-square 1.029*					
p-value = 0.5978					

P values: *P is ≤ 0.05

Table 4.3 shows the distribution of study covariates by the timing of antenatal visits. The results show that there is an association between early and late timing of antenatal care visits during pregnancy with the various study variables. Demographic factors influence

utilization of maternal health care services. Results show that middle aged women (25-34) are more likely to receive antenatal care services in the first trimester compared to younger and older women. 3.5 percent of middle aged women received antenatal care services on time compared to 2.5 percent younger women and 1.4 percent older women. This also shows that the use of timely antenatal care declines as age increases. Married women are more likely to seek antenatal care services on time at 6.1 percent compared to 1.3 percent of women not married. The socio economic factors in this study play a role in utilisation of maternal health services. There is an association between use of antenatal services and the level of education. Results show that mothers with primary education are more likely to receive timely antenatal care services with 5.0 percent mothers seeking antenatal care services on time, compared to 2.2 percent for those with secondary or higher and 0.2 percent for those without education. Type of place of residence is another factor that shows that women from rural areas are more likely to seek timely antenatal care services. 5.9 percent of women from rural areas utilised the use of antenatal care services on time compared to 1.5 percent from urban areas. Another factor in the utilization of maternal health care services, wealth index, show that women from poor and rich households are more likely to utilize maternal health care services on time than those from middle households. 3.1 percent of women from poor households and 2.9 percent from rich households used antenatal care services on time compared to 1.4 percent mothers from middle households.

4.3.3 Distribution of study covariates by the number of antenatal visits

Table 4.4 shows the distribution of frequencies or counts of total number of antenatal visits, grouped into two groups; skilled assistance and unskilled assistance and the total of both groups. The factors are categorised by demographic factors (age and marital

status) and social-economic factors (highest level of education, type of residence and wealth index).

Women with less than four antenatal visits had the highest frequencies, Women aged between 15 to 24 years with 37.8 percent, while married women with 40.3 percent, women with highest level of education as primary education with 52.7 percent, women from rural area with 61.1 percent and women with low wealth index with 34.9 percent.

Table 4.4 Distribution of study covariates by the number of antenatal visits

Factors	4+ visits		Less than 4 visits		Total Count
Demographic factors	**count**	**percent**	**count**	**percent**	
Age					
15-24	68	6.5	393	37.8	461
25-34	106	10.2	190	18.3	296
35-49	52	5.1	230	22.1	282
Chi-square	49.468*				
P Value = 0.0001					
Marital Status					
Married	185	17.8	418	40.3	603
Others	41	3.9	395	38.0	436
Chi-square	67.299*				
P Value = 0.0001					
Socio-economic factors					
Level of Education					
No education	7	0.7	42	4.0	49
Primary	144	13.9	548	52.7	692
Secondary+	75	7.2	223	21.5	282
Chi-square	4.009				
P Value = 0.1347					
Type of place of residence					
Urban	51	4.9	179	17.2	230
Rural	175	16.8	634	61.1	809
Chi-square	0.031				
P Value = 0.8602					
Wealth index					
Low	97	9.3	363	34.9	460
Middle	48	4.7	180	17.3	228
High	81	7.8	270	26.0	351
P Value = 0.7607					
Chi-square	0.547				

P values: *P is ≤ 0.05

Table 4.4 shows the distribution of study covariates by the total number of antenatal care visits. The results show that there is an association between receiving and not receiving the recommended 4+antenatal care visits by mothers with the various study variables. The percentage of mothers receiving the recommended number of antenatal visits decline with an increase in mother's age. Younger mothers are more likely to receive recommended 4+ antenatal visits compared to older mothers. Married women are more likely to achieve the optimal number of visits with 17.8 percent of them receiving more than four antenatal care visits in comparison to 3.9 percent women who are not married. The socio economic factors also play a role in utilisation of maternal health services. Results show that women with primary education are most likely to receive more than four antenatal visits with a decline for those with secondary or higher education. 13.9 percent of women who received more than four visits had primary education, 7.2 percent had secondary or higher and 0.7 percent did not have any education. Type of place of residence is another factor that shows that women from rural areas are more likely to receive more than four antenatal care visits. 16.8 percent of women from rural areas utilised antenatal care services compared to 4.9 percent from urban areas. Another factor in the utilization of maternal health care services, wealth index, show that women from poor households are more likely to utilize maternal health care services with 9.3 percent women receiving more than the recommended four visits in comparison to 7.8 percent of women from rich households and 4.7 percent of those from households that fall in the middle.

4.4 Multivariate Analysis

Multivariate analysis is used to establish the effect of independent variables or predictor variables on the utilization of maternal health care services. The ordinal logistic model for independent variables is then

$$\ln(\theta_j) = \alpha_j - (\beta_1 X_1 + B_2 X_2 + ... B_p X_p)$$

where j goes from 1 to the number of categories minus 1.

Table 4.5 contains the estimated coefficients for the above model. The estimate labelled threshold are the α_j's, the intercept equivalent terms. The estimates labelled location are the coefficients for the predictor variables.

From the observed significance levels of 0.05 in Table 4.5 below age, education, wealth index and marital status are all significantly associated to the ratings of maternal utilization. Type of place of residence, highest level of education being no education and middle wealth index are not significant in the model, thus drop. From the model, Women aged 15-24 are 71.4 percent more likely to utilize all maternal services than women aged 35-49. Also, women aged 25-34 are two and a half times likely to use all maternal services than women aged 35-49. Women with primary education are 30.7 percent less likely to utilize all maternal health services than women with secondary+ education, poor women are 35.7 percent less likely to utilize all maternal health care services than rich women, and women who are not married are 43.9 percent less likely to assign higher ratings than those married.

4.4.1 Results of Multi-variate analysis on utilization of maternal health care services

Table 4.5 Ordinal Regression Results on utilization of maternal health care services

Characteristics		Estimate	Std. Error	Sig.
Threshold	No services used	0.315	0.221	0.155
	Less than Partial services received	1.496	0.229	0
	Partial services received	3.123	0.275	0
	All services (reference category)			
Location	15-24	0.539	0.194	0.005**
	25-34	0.911	0.184	0***
	35-49	0a	.	.
	Urban	0.052	0.206	0.802
	Rural	0a	.	.
	No education	-0.374	0.368	0.309
	Primary	-0.366	0.157	0.02*
	Secondary+	0a	.	.
	Low	-0.442	0.203	0.03*
	Middle	-0.255	0.218	0.241
	High	0a	.	.
	Never/Formerly married	-1.578	0.177	0***
	Currently married	0a	.	.

P values: *** P is ≤ 0.001, ** P is ≤ 0.01, * P is ≤ 0.05, a – reference category

Pseudo R-Square

Cox and Snell	.132
Nagelkerke	.159
McFadden	.080

Link function: Logit.

4.5 Discussion

The findings show that age is an important factor in determining the use of skilled assistance, early antenatal care visits and more than four antenatal visits. Older women are less likely to utilize maternal health services compared to younger ones. This finding is similar to a study by Ochako (2003) in which young women are more likely to seek skilled assistance in health facilities in comparison to older ones. This can be explained by the fact that for older women, pregnancy is not considered as an illness hence having

experience makes them think that they can give birth on their own at home (KSPA, 2010).

Married women are more likely to seek maternal health care services when compared to those that are formerly married and those that have never been married. This can be explained by perception whereby women who are not married are shy or ashamed to be noticed by others especially during queuing for services (KSPA, 2010).

The finding of a strong education effect is consistent with findings from elsewhere in the World (Letamo, 2003; Stephenson, 2006; Navaneetham, 2002). There are a number of explanations for why education is a key determinant of health service use. Education is likely to enhance female autonomy so that women develop greater confidence and capability to make decisions about their own health (Caldwell, 1981; Raghupathy, 1996). It is also likely that educated women seek out higher quality services and have greater ability to use health care inputs that offer better care (Celik and Hotchkiss, 2000).

There is high utilization of maternal health services among rural women compared to those from urban is not as expected. It is presumed that urban women tend to benefit from increased knowledge and access to maternal health services compared with their rural counterparts. The results from western province can be partially explained by the fact that most of the population reside in rural.

Findings for wealth index show that women with low as well as a high status are more likely to seek maternal health care services. Cost constraints have been found to be a barrier in seeking maternal health services (Letamo, 2003; Stanton et al, 2007; Houweling, 2007) and hence high income has a positive impact on utilization of maternal health services since women from rich households are able to afford transport, registration and any other costs related to the health services. This cannot explain the case for the poor women who utilize maternal health care services almost at the same proportion with rich women.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the study findings and conclusions, as well as recommendations for programs and research drawn from the findings. Section 5.2 summarizes the study findings while section 5.3 gives recommendations based on the findings both to program implementers as well as recommendations for research.

5.2 Summary

The study set out to analyse the determinants of utilisation of maternal health services in Western Province and the association of the selected variables namely maternal age, marital status, highest level of education, type of residence and wealth index.

In order to determine the association between the explanatory variables and the dependent variable, cross tabulations analysis was done and Chi square used as test of significance. On the other hand, to find out the effect of predictor variables on utilisation of maternal health services, multivariate ordinal regression was done.

In this study, the depended variable is a composite index consisting of skilled assistance during delivery, timing of antenatal visits and the number of antenatal visits. Multivariate analysis results indicate that the selected independent variables had influence on the utilisation of maternal health services. The factors have a similar influence on the use of skilled assistance, early antenatal care visits and more than four antenatal visits.

5.3 Conclusion

This study set out to determine factors that are associated with utilization of maternal healthcare services among women of reproductive age in Western Province, Kenya. It examines health seeking behaviour in reference to seeking a continuum of maternal health care services from onset of pregnancy to delivery, that is, timing of antenatal visits, number of antenatal visits and skilled assistance during delivery.

In this study maternal service is measured with ordered scale and analyzed using ordinal regression model to find the factors associated with the use of maternal services. The ordinal coefficients are interpreted using odds ratio. Bivariate analysis has been used to establish association of independent variables on utilization of maternal health care services.

This study shows that the demographic and socio-economic factors play a role in determining utilisation of maternal health services. The findings of this study therefore confirm the conceptual framework discussed above.

Bivariate analysis results show that while age and marital status are consistently strong predictors in the utilization of all the maternal health services considered in this study, other determinants generally vary in magnitude and level of significance by the type of maternal service- timing and number of antenatal visits, and skilled assistance. Bivariate analyses of skilled assistance during delivery show that all the independent factors are extremely significant. Age and marital status are significant in determining utilization of all maternal health care services. Wealth and type of place of residence are more significant in determining the timing of antenatal visit than in determining the total number of antenatal visits. Similarly, the highest level of education is more significant in determining the total number of visits than in timing of antenatal visits.

Multivariate ordinal regression results indicate that type of place of residence, highest level being no education and middle wealth index are not significant in the model. Women with primary and higher education, young, married and rich are more likely to utilize maternal health care services.

Lastly, women who seek antenatal care on time and have at least four antenatal visits are more likely to use skilled delivery services from health facility.

5.4 Recommendations

5.4.1 Recommendations for programs

The findings show that utilization of maternal health services for Western province is very low. Increased efforts should focus on sensitizing the general public on maternal health services and so programs should promote health seeking behavior among women. The health personnel need to be trained about maternal health services and should take part in educating their target populations on the importance of seeking maternal health care services on time.

This study shows that women without education, poor women and those who are not married are less likely to seek maternal health care services. Maternal health programs should therefore be intensified for poor and illiterate women. Programs should be designed to particularly target younger and older women, poor women and those with low levels of education.

5.4.2 Recommendations for Research

More research is needed in understanding determinants of utilization of maternal health services specifically on why women of middle wealth are less likely to seek early antenatal visits and will not go for the 4+ visits compared to poor women. More studies also need to be done to understand why middle wealth is not a significant factor in utilization of maternal health services. Lastly, research should focus on why the rural women are utilizing maternal health care services more than women who reside in urban areas.

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