

**“DETERMINANTS OF UTILIZATION OF IMMUNIZATION
SERVICES IN THE LOW AND HIGH UNDER FIVE MORTALITY
REGIONS OF KENYA”**



By

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DECLARATION

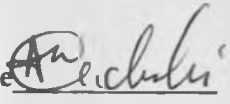
This project is my original work and has not been presented for a degree in any other University.

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DEDICATION

To my late father Charles Muiru, my mother Mrs. Lydiah Muiru, my husband James and our daughters Fiona and Lydiah.

Mum, you showed me the way to success, and I followed it.

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I thank God for the breath of life that has enabled me live and successfully complete this research project.

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ABSTRACT

Under five mortality rates in the developing countries Kenya included has been persistently high with the vaccine preventable childhood diseases attributing highly to these mortality rates. Levels of utilization of immunization services remain persistently low in Kenya despite the increased delivery points through the Kenya Expanded programme on immunization. Little is known of the factors influencing the regional variation of rates of utilization. This study set out to investigate the factors influencing the utilization of immunization services in the low and high under five mortality regions in Kenya.

One of the millennium Development goals is the reduction of infant and child mortality by two thirds by 2015. In order to achieve this goal, efforts are concentrated at identifying cost effective strategies as international agencies have advocated for more resources to be directed to health sector to improve the poor utilization of curative and preventive services. One way of doing this is to identify the factors influencing the utilization of immunization services. The results of this study are also expected to assist in the development and improvement of policies and intervention programs such as immunization. It will also contribute to better understanding of the factors influencing the utilization of immunization services.

The study used secondary data obtained from KDHS 2003 and focused on 1,206 children aged 12 to 24 months. Cross tabulation was used to examine the hypothesized association between immunization status and various independent variables. Chi square test was carried out to show the level of significance of the association. Logistic regression was applied to show the effect of the selected variables on the dependent variable. The factors that were found to influence utilization of immunization services were maternal education, wealth index, birth order and ethnicity. Wealth index, maternal educations were found to positively and significantly influence the utilization of immunization services in both the high and low

under five mortality regions of Kenya. Some ethnic categories were found to have a significant effect on the odds of immunization in both the regions. Birth order was also found to be negatively associated with the utilization of the services in the high under five mortality regions. The study recommends improvement of universal girls' education emphasizing on an increased number of girls going to school, raising economic status of families, discourage social cultural practices that hinder the use of health services. It also advocates for further research to establish the factors influencing the rates of immunization in every province in Kenya, and a further quantitative research at a national level on determinants of utilization of immunization services.

ABBREVIATIONS

WHO World Health Organization

UNICEF United Nations Children Education Funds

MDG Millennium Development Goals

U5M Under five mortality

EPI Expanded Programme on Immunization

KEPI Kenya Expanded Programme on Immunization

MCH/FP Maternal Child Health/Family Planning

KDHS Kenya Demographic and Health Survey

CBS Central Bureau of Statistics

CHAPTER ONE

INTRODUCTION AND PROBLEM STATEMENT

1.1 INTRODUCTION

Immunization describes the whole process of delivery of vaccine and immunity it generates in an individual and population. A vaccine is a special form of a disease causing agent e.g. a virus or bacteria that has been developed to protect against that disease. Immunization is one of the most powerful and cost effective weapon of disease prevention. As documented, vaccine preventable diseases fall sharply where immunization with potent vaccines is widely and appropriately administered to target groups of populations in both developed and developing countries, and therefore immunization remains a major focus of child survival programs throughout the world, World Health Organization (WHO 1998).

Infant mortality rate is a very sensitive index of the status of social development of any country, and it is related to the levels of social and economic development, nutrition status, ecological conditions, the health and the health seeking behavior of the family, United Nations (UN 1994). High child mortality and morbidity in developing countries are highly associated with limited access to and poor quality of health care. Utilization of health services for children plays an important role towards achieving the Millennium Development Goal (MDG) in the reduction of child mortality. However, in most developing countries, illiteracy and poverty are the factors generally considered as a cause of poor utilization of health services and rural areas suffer more from poverty and low levels of education attainment (Chin 2008). Mosley and Chen (1984) argues that socio economic determinants must operate through more basic proximate determinants among them preventive measures such as immunization, that in turn influence the risk of disease and the outcome of disease processes.

The six major preventable childhood killer diseases which affects nearly all children and kills at least two million children annually, including measles which kills more than a

million, neonatal tetanus contracted through contamination of umbilical cord at birth kills at least 430,000 children; pertussis (whooping cough) which kills close to 400,000 children; polio which is a major cause of lameness in the developing world kills about 30,000 children; tuberculosis attacks ten million annually; and diphtheria which is less common but kills 10-15 percent of its victims (WHO 1998, Population and Development Review, 1996).

As part of the National health policy, the Expanded Program on Immunization (EPI) was introduced in the 1974 with the objective of providing free immunization services to all eligible children and expectant mothers. EPI has played an important role in the drive towards "Health for all by the year 2000 (WHO 1986). The EPI goal was by 2010 ensure routine immunization of children under one year of age reach 90 percent nationally and at least 80 percent average in every district or equivalent administrative unit, reduce deaths due to measles by half by 2005, eliminate maternal and neonatal tetanus by 2005, and extend the benefits of new and improved vaccines and other preventive health interventions to children in all countries (WHO 1998, Hellen Wallace et al 1995). In Kenya, as elsewhere in Sub-Saharan Africa, the major causes of infant and child morbidity and mortality are malaria, acute respiratory infections, diarrhea diseases and several childhood vaccine preventable diseases. Malnutrition accompanies most of these diseases (Oucho et al 2000).

The inception of Kenya Expanded Programme on Immunization (KEPI) in 1980 was a direct response to EPI campaign and aimed at strengthening, expanding and improving existing immunization activities through better management in order to reduce the proportion of under five morbidity and mortality attributed to key childhood diseases. However, the achievement of these targets continues to be undermined by the low immunization coverage (WHO 1998).

Empirical studies of preventive services have often found that use of services is more strongly correlated with demographic and socio-economic characteristics than with

health beliefs (UN 1981). Attempts to account for children health and child mortality patterns have been based mainly on approaches that focus on socio-economic factors such as parental education, income, occupation, place of residence among others (Akwara 2000).

This study sets to focus on the determinants of the utilization of immunization services in the low and high under five mortality regions in Kenya.

1.2 PROBLEM STATEMENT

The mortality situation of young children in sub Saharan Africa reveals a crisis that needs to be dealt with urgently. Levels of utilization of immunization services remain persistently low in many developing countries Kenya included with childhood preventable diseases continuing taking a horrible toll and Infant and child mortality remaining high, despite efforts improving child health and survival through such interventions as immunization, maternal and child health and family planning (MCH/FP) clinics as well as primary health care (UN 1994, Wallace et al (1995).

As Mosley and Chen (1984) have argued, socio economic determinants must operate through more basic proximate determinants such as preventive measures like immunization that in turn influences the risk of disease and the outcome of disease processes. Immunization against the six childhood diseases contributes to reduction in morbidity, mortality and permanent disability. Despite the increase in delivery points through KEPI, utilization of immunization services level in Kenya is at 60.1 percent (which is below the KEPI target of 80 percent), geographical variations in immunization coverage existing between regions with some recording a coverage of as low as 8 percent and the highest recording 79 percent. Consequently, the low Under Five Mortality (U5M) regions are seen to have the highest immunization coverage, while the high U5M regions had the lowest coverage. The national coverage rate also shows a decline between the year 1998 and 2003 from 65.4 to 60.1 percent respectively. Consequently, children in the rural areas experience a higher risk of dying and

lower immunization coverage than urban children (KASP 2004; CBS et al 2003; MOH 1990).

While several factors have been noted to influence the utilization of immunization services in general, there has not been an exhaustive understanding of the regional variations as far as the determinants of the utilization are concerned. Health inequalities found in the relationship between various determinants and the utilization of child health services has not been under rigorous examination.

Mosley (1983) argues that, where studies of use and impact of preventive measures have been done, the results have often been ambiguous because of inadequate consideration of socio cultural factors. While Caldwell (1979), Mosley (1983), Mustafa and Odimegwu (2008) argue that educated mothers are more likely than uneducated women to take advantage of modern medicine such as prenatal care and immunization of infants and comply with recommended treatments, Streatfield et al (1990), in a study in Indonesia concluded that it was the possession of that specific knowledge rather than formal education per se that led a mother to ensure that her children received available vaccines. According to Annabel (1996), in a study in Bandafassi, success in immunization coverage is seen not to depend on socio-economic context as Bandafassi population is entirely rural and largely illiterate. On the contrary, Rustein (2000) places a strong emphasis on the importance of mother's education and the type of place of residence as positive determinants of infant and child health. A critical question would be what are the determinants of utilization of immunization services in Kenya?

In light of these arguments, it is important to re-evaluate the link between various factors and the utilization of health services. This study is an attempt to investigate the broad nature of the association between various socio economic, cultural and demographic factors and the utilization of immunization services in Kenya.

1.2.1 Research question

What are the factors associated with the utilization of immunization services in the low and high under five mortality regions Kenya?

What are the demographic, socioeconomic and cultural factors influencing the utilization of immunization services in the low and high under five mortality regions in Kenya?

1.2.2 General objective

The general objective is to investigate the determinants of utilization of immunization services in the low and high under five mortality regions in the low and high under five mortality regions in Kenya.

1.2.3 Specific objectives

- 1) To examine differentials in utilization of immunization services in the low and high under five mortality regions according to different socio economic, demographic and socio cultural characteristics.
- 2). To examine the socio economic factors influencing utilization of immunization services in the low and high under five mortality regions in Kenya.
- 3). To determine the demographic factors influencing the utilization of immunization services in the low and high under five mortality regions in Kenya.
- 4) To determine the socio cultural factors influencing the utilization of immunization services in the low and high under five mortality regions in Kenya.

1.3 JUSTIFICATION

It is documented that, infant mortality rate is the most sensitive index of the status of social development of any country and immunization against the six major childhood diseases can greatly enhance child survival (Ikamari 1996). This confirms the findings of various studies carried out in Kenya concerning immunization of children under the age of 5

years which have shown that the higher the levels of immunization in any given area, the higher the chances of better health and survival of children (MOH 1987, Waweru 1991; and Harvey 1992). Thus it's worth evaluating the determinants of the uptake of immunization services as increased immunization will mean reduction in child mortality and morbidity.

To achieve the year 2000 Millennium Development Goal number four which is to reduce under five mortality by two third by the year 2015, the immunization schedule need be completed for every child on time. Failure to achieve adequate and timely rates of immunization among young children with proper vaccines risks devastating effects on young children such as outbreaks of serious diseases with resulting increase in unnecessary death and disability as the six preventable childhood diseases can have devastating effects on young children (WHO 1998), thus this article focuses on the immunization status of children and the factors influencing the uptake of these services.

The development and improvement of policies and intervention programs such as immunization programmes require that the pathways through which several factors influence the utilization of such services be understood. Mosley and Chen (1984) suggested that the variables mediating the effects of socio economic factors on child health and mortality are the most amenable to policy intervention. Thus, it is worthwhile to identify the factors affecting the utilization of immunization services in Kenya.

According to child survival hypothesis advocates (Preston 1978), significant reduction of infant and child mortality may also result in further reduction in fertility. From the academic point of view, the findings of the study are expected to contribute towards a better understanding of the mechanism through which some of the factors already identified associate with the utilization of health services. Thus this study set to examine the factors affecting the utilization of the immunization services in the high and low U5M regions in Kenya.

1.4 SCOPE AND LIMITATION

The study used secondary data from the Kenya Demographic and Health Survey (KDHS) report carried out in the year 2003 covering all the provinces in Kenya except North Eastern which a few districts were covered. The study focused on children aged 12 to 24 months at the time of the survey as this is the age group that the WHO recommends to be fully immunized (CBS et al 2003).

The study used the receipt of measles vaccine as a proxy for full immunization. There could be cases where a child is orally reported as having received measles vaccine thus considered as fully immunized, and may be he had not received all the other necessary vaccines. The data set only provides information on children who were alive at the time of the study. The KDHS does not provide information on immunization status of children who were dead at the time of the study.

The variable used in the study such as the economic status could have changed since the survey was conducted on information over the preceding five years prior to the survey. The asset based wealth index used is only a proxy indicator for house hold economic status, and it does not always produce results similar to those obtained from direct measurements of income and expenditure where such data are available. And therefore these limitations are likely to lead to untrue picture of the effect of the factors considered on the utilization of immunization services. However, the study results are expected to be significant and allow for informative conclusions that are accurate and credible since it was nationally representative.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Immunization is one of the most powerful and cost effective weapons of disease prevention (WHO 1998). Utilization of health services is a complex behavioral phenomenon. Empirical studies of preventive and curative services have often found that the use of health services is related to the availability, quality and cost of services, as well as social structure, health beliefs and personal characteristics of the user (Andersen and Newman, 1973; Kroeger, 1983; Becker et al, 1993).

In developed countries of the world, over 97 per cent of all children survive through the preschool years. By contrast, in many developing countries 20 to 25 percent of the children die before reaching their fifth birthday, resulting in an estimated 15 million deaths annually. Many of these deaths are preventable with available health technology, United Nations Children Education Fund (UNICEF 1984, UN Population Division, 1983). However, significant differences exists in regional mortality rates due to such factors as ecological conditions, cultural beliefs and practices, access to medical and health services, among others. Illiteracy and poverty are the factors generally considered as cause of the poor utilization of health services in most developing countries, and rural areas suffer more from poverty (Mosley 1983). This sections looks at the various factors which have been found in previous studies to be associated with utilization of health services in the world.

2.2 STUDIES DONE ON THE UTILIZATION OF IMMUNIZATION SERVICES

It is documented that, vaccine preventable diseases fall sharply where immunization with potent vaccines is widely and appropriately administered to target groups of populations in both developed and developing countries (WHO 1998). A spectacular success of controlling poliomyelitis has been achieved in the Americas, where due to effective immunization of high risk population and improved surveillance, the region has virtually eradicated poliomyelitis (Wallace et al 1985).

2.2.1 SOCIO-ECONOMIC FACTORS

According to Palloni (1986), social development which includes educational campaigns and socialized medicine work through nutrition, maternal care, and sanitation as well as disease prevention in reducing mortality among infancy .He sees social development and what he calls non-vertical interventions working through individual households and community conditions to enhance health seeking behavior thus reduce mortality in infancy.

According to Annabel (1996), a study in Bandafassi, a rural area of Senegal, illustrates the major role played by the EPI in regions located far from the capital and deprived of health infrastructures. Child mortality fell drastically when the EPI reached the study area, and the continuation of the decline coverage. Tetanus vaccination of pregnant women and measles vaccination of children was linked to the decline of neonatal mortality and mortality above nine months respectively. These results show the potential contribution of immunization programmes to the reduction of childhood mortality in the less privileged countries. Their success is seen not to depend on socio-economic context as Bundafassi population is entirely rural and largely illiterate.

Access to and use of maternal and child health services, both preventive and curative, directly influence child survival. In an aggregate level analysis of differential utilization of health care facilities in two Indian states, Kerala and West Bengal, Nag (1985) indicate that

the greater access and utilization of health facilities in Kerala , was the most important factors that placed Kerala in a better position in comparison with Bengal .Nag also argues that, education promotes awareness and use of public services. Despite higher per capita income, greater urbanization and industrialization, West Bengal has markedly lower levels of literacy, particularly for women.

Maternal Education

Mosley and Chen (1983) argue that mother's human capital, given by her education achievement was seen to have an influence on immunization. Her skills, time and health operate directly on the proximate determinants. Because of her responsibility in the care of her child through the most vulnerable stages of its life, maternal education level can affect child survival by influencing her choices and increasing her skills in health care practices related to conception, nutrition, hygiene, preventive care such as immunization, and disease treatment. Mothers education act as a proxy variable of a number of background variables representing women's higher socio economic status, thus enabling her to seek proper medical care whenever she perceives it necessary (Wong et al 1987).

A number of researchers using data from Africa countries have established that educational attainment of parents is inversely related to infant and child mortality (Caldwell 1979, Mosley 1983).The inverse association has been attributed to many causes including breakdown of unfavorable traditional, child raising practices, increased hygienic practices and use of modern medical facilities, better nutrition knowledge and child feeding practices, and increased amount of income plus redistribution of family resources in favor of children (K'Oyugi 1992). The effect of health care access on child mortality is often said to vary with education such that the highly educated who presumably have the means and the knowledge to deal with modern bureaucracies, are more likely to take advantage of modern medical services (Ware, 1983). In their comprehensive review, Bicego and Boerma (1993), Mustafa

and Odimwegwu (2008) noted the strong positive association between maternal education and use of modern preventive health care. The positive association is well documented with respect to antenatal care and both child and maternal tetanus immunization.

Caldwell (1979) put a theory that mother's education work through changing feeding and care practices, leading to better health seeking behavior and by changing the traditions familial relationships. Supporting Caldwell's explanation, Hobcraft (1993) explained that education can contribute to child survival by making women more likely utilize prenatal care and immunize their children. According to Caldwell, formal education facilitates knowledge and use of the available health care facilities and thus it is wasteful to put large inputs into health services without putting equivalent inputs into education, especially that of girls.

Mother's education plays an important role in child health as it brings awareness about health hazards and preventive medicine. A study in Gambia 1983 suggests that high degree of illiteracy explains in part the high infant mortality rates. This would probably be due to the fact that literate mothers adopt many improved behaviours related to child health care and nutrition. Educated mothers are more conscious about their children's health and therefore tend to seek medical interventions. They are more likely to participate in child health enhancing programs like immunization and child care talks, and be able to benefit from nutrition and health related media programs (Macharia 2008).

In a study in Bangladesh, Fiona S. et al found economic status, antenatal attendance of the mother, maternal education, maternal age and place of residence to have a significant effect on the uptake of immunization services. A study in Chogoria (Goldberg et al, 1987) clarifies why increased female education is associated with lower mortality. Increased female education increases the percentage of fully immunized children, improves diarrhea management, increases use of health facilities and improves the nutritional status of the

household as education changes the knowledge and perception of modern medicine and general care of a child.

Mosley (1985) argues that the highly successful immunization programme is selective with respect to education and other social characteristics. He admits that the success of primary health programme will depend on better understanding of how socioeconomic determinants operate through intermediate variable to affect infant and child mortality. Mosley has shown that female education and family income are two most important determinant of infant and child mortality. Using probability of dying before attaining age two, he observed that infant mortality change over time in Kenya were due to education whereas provincial variations could be explained by percentage above poverty line. After controlling for maternal education, there appeared to be no difference in infant and child mortality between urban and rural areas, for instance Nairobi was seen to have a higher mortality than the neighboring rural districts in central province. Mosley concluded that about 80 percent of mortality decline seen in Kenya was due to improvement in the educational level of mothers and level of household poverty.

Mutai (1987) in a study at Kericho found that in regard to differential by education, the highest infant and child mortality was among the mothers with no education and lowest among mothers with secondary education and above as the latter were found to utilize modern health services more. Rustein (2000) puts a strong emphasis on the importance of mother's education and the type of place of residence as determinants of infant and child health arguing that mother's socio economic status may lead to good use of health services, improved child care practices among others. In light of these results, the continuation of immunization efforts can be considered a priority for high under five mortality regions.

Wealth Index

Economic status of the household is associated with the general health and development status of the family. Poor families may have inadequate resources for childcare, and may not utilize resources for health on sustainable basis (UN 1994). According to Graham and Muray 1997, low socio economic status subjects individuals to poor health and nutrition status, limited knowledge and awareness of health, lack of decision making power and lack of resources for seeking health care. Inequality in health could be as a result of voluntary decision or as a result of constraints that limit individual choices including lack of knowledge and motivation. According to the UN the relative costs of travel may well be greater for the poor, women with children and domestic responsibilities, may find their daily routines largely confined to local neighborhood.

Economic power of the mother to some extent determines the greater strength a mother would have a child immunized. For example, mothers who had money would travel long distance to access immunization centre, the same mother can hire a house help to carry out her domestic chores as she take the child for immunization. It is alleged in some studies that a mother who dressed poorly, and had their badly kept children with worn out clothes got poor treatments from nurses and other medical personnel. Such mothers would not avail their children for immunization during next appointment (Immunization Coverage Survey in Kenya 1992, KEPI 1992).

Type of place of residence.

According to Stock (1983), the most important variable associated with utilization of maternal, child health services is the physical accessibility of the services. Physical proximity of health care services, especially in the developing countries plays a major role in the utilization of these services.

Available literature shows that the rate of fully immunized children was slightly higher in urban than in rural areas. Hill (2001) argues that while for the relationship between rural - urban residence and child mortality, urban residence areas showed higher mortality risks than rural, but when adjusted for HIV prevalence, child mortality was lower in urban areas. A presumed explanation that the general awareness of immunization in urban areas than in rural areas. At the same time, more health institutions were available and within reach due to good infrastructure in towns as compared to rural areas (KEPI 1987, Immunization coverage survey for measles in Kisumu and Siaya districts, 1992). Kisumu urban had more children immunized (96 percent) and Siaya districts had 90 percent coverage.

According to Muganzi (1984), it is not the availability of malaria and immunization programs in a given country that helps reduce mortality but rather how such programs can effectively reach the more than 80 percent rural population, a process which itself depends on many other aspects of socio economic development for instance efficient transport.

Service delivery factors.

According to a joint study by UNICEF and Ministry of Health Division of family Health in 1992, factors that promote and hinder immunization establish that long waiting time, negative attitude of the health workers, lack of vaccines and stationery at times discouraged mothers from attending clinics. For example, mothers who were petty business women or farmers found it extremely time wasting to wait for long hours and sometimes the services would be delivered at the expense of their businesses or other economic activities (Waweru 1991). Other factors found to hinder delivery of services included; failure of the medical/health staff in writing on the clinic card date of next appointment, mothers did not know when to return for follow-up boosters, and failure to display the immunization schedule. It was also felt that the health personnel failed at times to educate the mothers on the benefits of the immunization and effects for failure of the follow-up antigens.

2.2.2 SOCIO-CULTURAL FACTORS

According to Muganzi (1984), the ideas of modern medical services has least penetrated the strong traditional beliefs and practices of the nomadic groups who believe in traditional herbs and roots, and several health and child care instructions may be ineffective or ignored in traditional and transitional societies where people's ideas and behavioral patterns conflict with the knowledge being passed to them.

Kenya is heterogeneous in terms of ethnic, racial and religious composition as well as traditional beliefs and practices that lead to wide disparities in infant and child welfare. Cultural factors such as superstitions, witch craft, mother-in-laws and husband's negative attitudes have negative influence on immunization coverage mainly in Nyanza and some parts of Western Kenya (KEPI, UNICEF and REACH Initiative 1992).

The lower rates of immunization coverage among daughter-in-laws in rural Bangladesh could have been a reflection of their low status within the household and their low participation in household decision making (Fiona Steel, 1996). Religion has been seen to work against immunization of children in Kisumu and Siaya. Some religious sects did not believe in medicinal treatment and prevention of illness. Mothers belonging to certain sects believe "God to be adequate" to disease prevention, thus leading to poor health of their children. Others believe in herbal medicine and not medicine sought from a hospital such as immunization antigens (KEPI 1987).

A study on population health, nutrition and family planning in Kisumu (Ominde, et al 1983) found that children's illness and death were believed to be caused by violation of forbidden acts, relationships and sexual affairs. The belief in 'evil eye' is quite prevalent among some ethnic groups. For instance polio is by fate and tuberculosis is caused by an evil eye (UNICEF, 1992). Belief in such uncontrollable supernatural act making child health and care interventions not yield much in such areas.

2.2.3 DEMOGRAPHIC FACTORS

Maternal age

Several studies in Kenya have shown that age of the mother attributed to high levels of immunization. For instance, there was a tendency towards the youngest mothers and oldest mothers having their children with the lowest coverage. The peak of the fully immunized children was seen in mothers in age group 20-24 years (National Coverage Survey by KEPI, 1987, Immunization Coverage survey at Kisumu and Siaya, Kenya 1992).

A study in rural Bangladesh by Fiona S. et al (1996) shows that maternal age has a significant effect on the uptake of immunization, with the lowest rates among teenage mothers.

Birth Order

Several studies have found a strong association between birth order and use of health care services. Having more children may cause resource constraints, which have a negative effect on health care utilization (Wong et al ,1987). Women with a large number of children under utilize available health services because too many demands on their time force them to forgo health care (McKinley, 1972)

Summary of the Literature Review.

After the review of various literatures, we can conclude that the following factors may be associated to the uptake of immunization services. There is a general consensus that socio economic status of a household, demographic and some socio cultural factors can have significant effect on the uptake, though a study in Bangladesh proved otherwise. The education status of women, type of place of residence, current age of the mother, marital status, ethnicity, religion were also found to influence the utilization of immunization services .

In agreement with Cadwell (1979), Rustein (2000), Mosley and Chen (1984) among others, the mother's level of education is strongly linked to higher utilization of immunization

services, Since education exposes mothers to information about modern medicines, better knowledge about childhood illnesses, preventive and curative measures.

2.3 CONCEPTUAL FRAMEWORK

There are various seeking behaviour approaches that attempt to explain factors that influence the utilization of health care services. These include McKinley (1992), Kroeger (1983) among others. These frameworks provide vital insights in this study on the factors that influence the utilization of immunization services in Kenya.

McKinley (1972) identified six factors that are influential in determining the health seeking behaviour. First is the economic dimension, which relates to financial barriers. Second are the socio demographic factors that emphasize the role of features such as age, parity, gender and education attainment. Thirdly are geographic factors that account for proximity to health services. Fourth is socio-psychological dimension that involves individual motivations. Fifth are the socio-cultural factors where norms, values, beliefs, and lifestyle are all important. Finally is the effect for health care organization to the health seeking behaviour (Ward et al, 1977). According to Mosley and Chen (1984) proximate determinants framework, socio economic determinants must operate through more basic proximate determinants among them personal illness control such as personal preventive measures like immunization, that in turn influence the risk of morbidity and the outcome of disease processes. Growth faltering and ultimate mortality in children are the cumulative consequences of multiple disease processes.

This study used a conceptual framework of health seeking behavior developed by Kroeger (1983). In this model Kroeger argued that the socio economic and demographic factors together with exposure to modern health services factors which includes the availability of health facilities and accessibility to health care are crucial in determining the decision to seek care. Kroeger's framework has been applied in previous studies, for instance

in his study on determinants of utilization of health services by women in rural and urban areas in Ghana, Buor 2004 successfully applied this model and found that income, education, place of residence, influenced by culture and the perception of women in society influenced the utilization of health services in Ghana. The frame work was also applied by Irma T. Elo in his study of use of health services in Peru exploring the hypothesis that formal education of women influences the use of maternal health care services in Peru. A modification of Kroger 1983 frame work was also successfully applied by Amlan Majumder 2006 in his study on utilization of health care services in North Bengal. Amlan found that cost of the service, age, family size education and the type of place of residence influence the utilization of health services.

Based on an extensive review of the anthropological and socio medical literature of health care, Kroeger proposed that determinants of utilization of health care services in developing countries could be grouped under three broad heading;

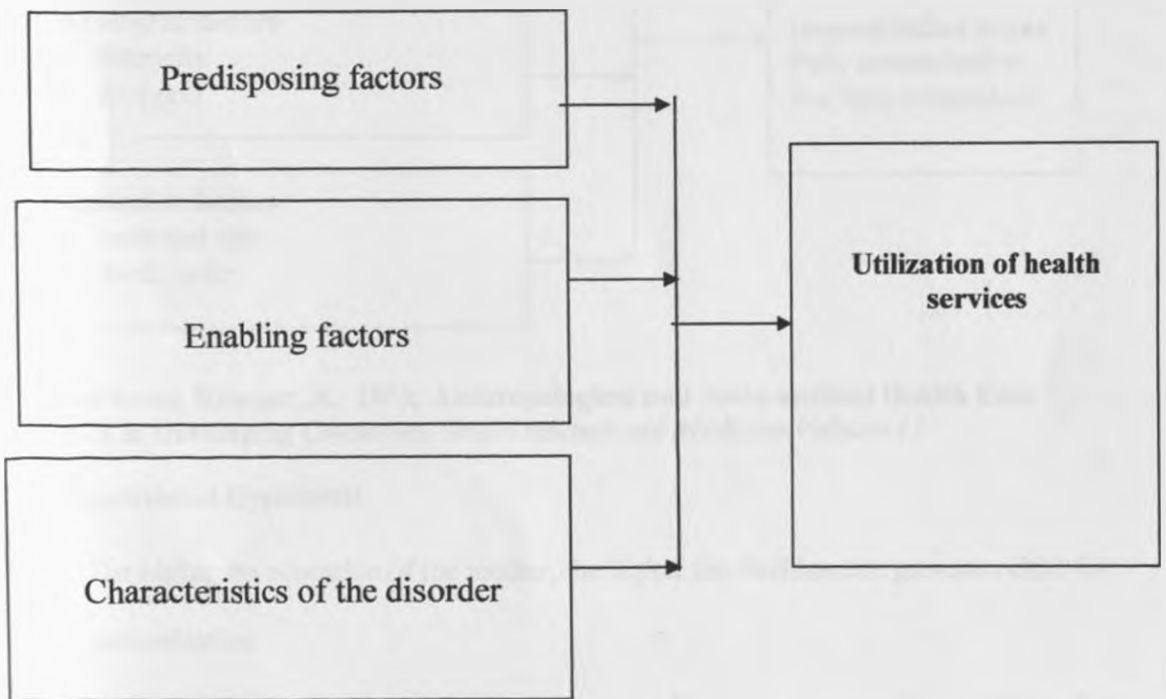
- Characteristics of the subject /predisposing factors. Predisposing factors are those which are supposed to make an individual susceptible towards a specific action, behaviour or experience. Different factors in this category are family characteristics (age, gender, household size, and marital status), social structure (education, employment, and ethnicity) and assets/affordability (land, livestock, and cash/income).
- Characteristics of services/enabling factors; Important factors in this category are availability of health facilities, accessibility to health care, quality of care and cost. Increased distance between residents and health care providers decreases the use of health care.
- Characteristics of the disorder; intensity of the illness, number of spells, expected benefits from the treatment and beliefs about disease causation further influence the

decision to seek care. Intensity of illness and number of spells significantly affect utilization of health care services. The higher the severity or number of spells, the higher the degree of utilization of services.

Kroeger (1983) framework was used because it encompasses most aspects underlying the typical health seeking behavior of communities especially in the developing countries. The original model is well suited for this study. However, it has concepts which are beyond the scope of this study. Therefore the frame work was modified accordingly such that only what is relevant to the study will be included.

Figure 1

2.3.1 A Conceptual Framework for the Utilization of Health Services



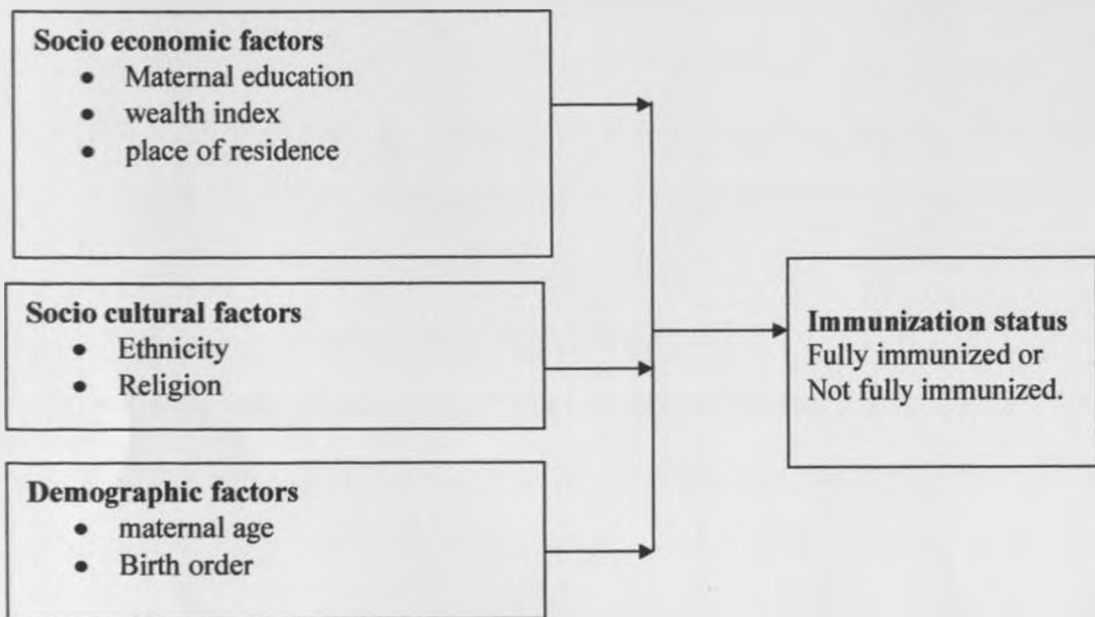
Adopted from Kroeger, (1983). *Anthropological and Socio-medical Health Care Research in Developing Countries. Social science and Medicine Volume 17.*

2.3.2 Conceptual Hypothesis

A range of predisposing, enabling and characteristics of disorder factors are likely to act with one another to influence the utilization of health services.

2.4 OPERATIONAL FRAMEWORK

Figure 2



Adopted from; Kroeger, A. 1983; *Anthropological and Socio-medical Health Care Research in Developing Countries. Social science and Medicine Volume 17*

2.4.1 Operational Hypothesis

1. The higher the education of the mother, the higher the likelihood to present a child for immunization.
2. Women of higher economic status are more likely to present their children for immunization than women of lower economic status.
3. Young and old mothers are less likely to utilize the services than medium aged mothers.

4. Children of high order births are less likely to utilize the services than the low birth order
5. Women who are urban residents are more likely to utilize the immunization services than those in rural residents.

CHAPTER THREE

DATA AND METHODS

3.1 DATA SOURCE

The study utilized data from the 2003 Kenya Demographic and Health Survey (KDHS 2003), which is a nationally representative sample of 8,195 women aged 15 to 49 and 3,578 men aged 15- 54 selected from 400 sample points/ clusters throughout Kenya. It was designed to provide data to monitor the population and health situation in Kenya, as a follow-up of the 1989, 1993 and 1998 KDHS. The survey utilized a two –stage sample based on the 1999 population and Housing Census and was designed to produce separate estimates for indicators for each of the eight provinces in Kenya. Data collection took place over a five month period, from 18th April to 15th September 2003, covering all provinces in Kenya except North Eastern which only half of it was covered.

To assess the Kenya Expanded Programme on Immunization (KEPI), the 2003 KDHS collected information on vaccination coverage for all children who were born in the five years preceding the survey. My focus was on 1,131 children aged 12- 23 months at the time of the survey, since according to the World Health Organization recommendations; they are the age group that should be fully immunized against the six childhood diseases namely, tuberculosis, polio, diphtheria, pertussis, measles and tetanus. The information was collected in two ways; from vaccination cards seen by the interviewer for children aged five years and below and from mothers, verbal reports if the card was not available. If a card was presented but a vaccine was not recorded as having been given, then the mother was asked to recall whether that particular vaccine had been given. In the event that the mother was not able to present a card for a child at all, she was asked to recall whether or not the child had received BCG, DPT, and Polio, (including the number of doses for each), and measles vaccination (CBS et al (2004).

3.2 METHODS OF ANALYSIS

This section is concerned with the tools to be used in data analysis. Besides frequency distribution to show the basic characteristics of the study population, cross tabulation and logistic regression were applied.

3.2.1 Descriptive Statistics

Frequencies were used to show the percentage distribution of complete and incomplete immunization. Cross tabulation will be carried out to examine the association between immunization status and socio-economic, demographic and cultural variables considered in the study. Since cross tabulation only give simple associations between dependent and independent variables, chi-square test was carried out to show the level of significance of the association.

3.2.2 Logistic Regression

Binary logistic regression, more commonly called binary logit regression, is used when the response variable is dichotomous (i.e. binary). The predictor variables may be quantitative categorical, or a mixture of the two. Since the dependent variable is dichotomous denoting whether a child is fully or not fully immunized binary logistic regression was used. It was used in the study to assess the effect of the factors (independent variables) that are theoretically said to be associated with the utilization of immunization status (dependent variable).

Logistic regression is derived from the principle of Odds Ratio. The ratio of probability that an event will occur, (p) to the probability that it will not occur, (1-p) is called the odds.

The logit of p is derived from the logistic function;

$$P = \frac{1}{1 + e^{-z}}$$

Thus a logistic regression model may be expressed as follows:-

$$\text{Logit}(p) = \ln\left(\frac{p}{1-p}\right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots + \beta_n x_n + \varepsilon$$

Where P = the probability that the event will occur

\ln = the natural logarithm

$1-p$ = the probability that an event will not occur

α = a constant or the intercept of the model

β_1 to β_n are logistic coefficients

X_1 to X_n are explanatory variables and E is a binomially distributed error term.

3.3 DEFINITION OF VARIABLES

3.3.1 Dependent Variable

Immunization Status

In this study a child will be considered as either fully immunized or not fully immunized. Receipt of measles vaccine will be used as a proxy of full immunization. For those who will not have received measles vaccine, they will be considered as not fully immunized. According to WHO (2005), receipt of measles has been adopted as a key indicator of full immunization in the millennium development goals. As a tool to monitor the implementation of the millennium declaration adopted at the United Nations general assembly in September 2000, a series of 48 indicators were developed by experts of international organizations, and the proportion of one year old children immunized against measles was used in the Millennium Development Goals as a health indicator.

Clinically, a child can only be administered with measles vaccine when he has received all other WHO recommended vaccines. A child will first be put on other vaccines before the measles vaccine is administered.

3.3.2 Independent Variable

Socio Economic Factors

These are factors that reflect the economic status of individuals in a society. The study will consider mother's education, wealth index, mother's work status.

Maternal education to refer to the highest level of formal education attained by the mother.

It will be categorized as no/preschool education, primary complete, secondary and above.

Wealth Index to refer to the house hold wealth and disposable income. It will be categorized as low, medium and high socio-economic status. It will act as a proxy for the standard of living in the household.

Type of place of residence to refer to the usual place of residence. It will be categorized as either urban or rural.

Demographic factors

These are factors which are inherent in a mother or a child. These are factors which may positively or negatively influence the presentation of a child for health service .In this study mother's age, and marital status has been considered.

Current maternal age will mean the number of years at the time of the interview the mother will have lived since she was born. It will be categorized as 15-19 as young, 20-34 as middle age, and 34+ as older age.

Birth Order; This refers to the ordinal position in which a child was born in the family. It will be categorized as 1st, 2nd, 3rd, and 4th and above birth order.

Cultural Factors; Refers to the norms and values which govern life in a society. These include ethnic identity and religious affiliation of the members of society (See table 2.5.3.)

Concerning the region of residence the study considered two categories i.e. the high and low under five mortality regions. High under five mortality regions included the provinces which in KDHS 2003 had under five mortality rates more than 115 deaths per 1000 live births.

These included, Nyanza, Coast, North Eastern and western provinces. Low under five mortality regions were the provinces which had under five mortality rate less than 115 deaths per 1000 live births. These included Central, Nairobi, Eastern and Rift valley provinces.

3.3.3 A Summary of Variable Description

Variable Name	Measurement	Type
Immunization status	0-Fully immunized 1-Not fully immunized	Dependent variable.
Socio economic variables		
Maternal education	0=No education 1=Primary 2= secondary +	Independent
Wealth Index	0=low 1=middle 2=highest	Independent
Type of place Of residence	0= Urban 1= Rural	Independent
Demographic variables		
Maternal Age	15-19 young 20-34 middle age 35 and above years Older age	Independent
Birth order	0= Birth order 1 1= Birth order 2 2= Birth order 3 3= Birth order 4+	Independent
Socio Cultural variables		
Ethnicity	0= Kikuyu/Meru/Embu/Kamba 1=Mijikenda/Taitaveta/Luhya/Luo/Kisii/Kuria 2= Kalenjin/Maasai/Turkana/Others 3 = Somali	Independent
Religion	0=Roman catholic 1=Protestant 2= Muslim 3=Others	Independent

CHAPTER FOUR

DETERMINANTS OF UTILIZATION OF IMMUNIZATION SERVICES

4.0 Introduction

This chapter discusses the percentage distribution of the study population (children aged 12 to 24 months), and differentials in immunization status by background characteristics of the study population. It presents the frequencies and cross tabulation results of both the high and low under five mortality regions in Kenya. Section 4.1 describes the distribution of the study population by background characteristics while section 4.2 presents the results of the cross tabulation and the chi square tests. It also discusses various factors that are responsible for the differentials. Binary Logistics regression was used to establish the net effect of the set of independent variables on the dependent variable. Tables 4.5 and 4.6 below presents the results of the logistics analysis in the High and Low under five mortality regions of Kenya.

4.1 Descriptive Statistics

Table 4.1 and 4.2 represents the distribution of the children aged 12 to 24 months by social economic, demographic and cultural factors in the low and high under five mortality regions respectively.

The results in table 4.1 shows that in the low under five mortality regions the children aged 12 to 24 months who were fully immunized were 80 percent while those not fully immunized were about 20 percent. On the other hand, the high under five mortality region in table 4.2 had a lesser count of about 64 percent of the children fully immunized, and a higher count (36 percent) of not fully immunized children. Looking at the education levels of the mothers in the low under five mortality region in table 4.1, the greatest proportion (62 percent) of children was born to mothers with primary education, 26 percent was born to mothers with secondary and above education while the least proportion of the children was about 12 percent was born to mothers with no education. On the other hand in the high under

Table 4.1; Distribution of Children aged 12- 24 Months by Various Background Characteristics in the Low Under five Mortality Region.

Variable	(n)	percent
Immunization Status		
Not fully immunized	131	19.8
Fully immunized	529	80.2
Total	660	100
Maternal education		
No education	84	11.9
Primary	438	62.1
Secondary +	183	26.0
Wealth Index		
Lowest	246	34.5
Medium	134	19.0
Highest	325	46.1
Type of Place of Residence		
Rural	526	74.6
Urban	179	25.4
Maternal age		
15-19	63	8.9
20-34	524	74.3
35-49	118	16.7
Birth Order		
1	197	27.9
2	136	19.3
3	118	16.7
4+	254	36.0
Religious Affiliation		
Roman Catholic	187	26.5
Protestants	477	67.7
Muslims	18	2.6
Others	23	3.3
Ethnicity		
Kikuyu/Embu/Meru/Kamba	383	54.3
TaitaTaveta/Mijikenda/Luo/		
Luhya/Kisii/Kuria	104	14.8
Kalenjin/Maasai/Turkana/Others	204	28.9
Somali	14	2.0

Table 4.2; Distribution of Children aged 12-24 Months by various Background Characteristics in the High Under Five Mortality Region.

Variable Type	(n)	percent
Immunization Status		
Not fully immunized	194	35.5
Fully immunized	352	64.5
Total	546	100
Maternal education		
No education	170	27.2
Primary	340	54.5
Secondary +	114	18.3
Wealth Index		
Lowest	338	54.2
Medium	119	19.1
Highest	167	26.8
Type of Place of Residence		
Rural	467	74.8
Urban	157	25.2
Maternal age		
15-19	67	10.7
20-34	465	74.5
35-49	92	14.7
Birth Order		
1	132	21.2
2	112	17.9
3	104	16.7
4+	276	44.2
Religious Affiliation		
Roman Catholics	107	17.1
Protestant	307	49.3
Muslims	190	30.4
Others	20	3.2
Ethnicity		
Kikuyu/Embu/Meru/Kamba	16	2.6
TaitaTaveta/Mijikenda/Luo/ Luhya/Kisii/Kuria	475	76.1
Kalenjin/Maasai/Turkana/Others	26	4.2
Somali	107	17.1

On the other hand in the high under five mortality region, 55 percent of the children were reported by mothers with primary education, 27 percent by mothers with no education while those with secondary and above education reported 18 percent of the children.

In the low under five mortality regions, children born to mothers in the highest wealth index were 46 percent, followed by children born to mothers in the lowest wealth index at 35 percent of the children while the least portion (19 percent) of children was born to mothers within the medium wealth index. Looking at the results in the high under five mortality region, the lowest wealth index had the highest proportion of children at 54 percent, followed by the highest wealth index which had 27 percent of the children, while the least was 19 percent reported in the medium wealth index. Closely in line with population trends, in the low under five mortality regions, children born to mothers in the rural area were 75 percent and those born to mothers in the urban area were 25 percent, while in the high under five mortality regions, mothers residing in the rural area reported the highest proportion (75 percent) of the children while those residing in the urban area had the least proportion at 25 percent.

In regard to demographic characteristics in the low under five mortality region, children born to mothers aged 20- 34 years were the most at 74 percent, followed by children born to mothers in the older age who were 17 percent while the least proportion (9 percent) of children was born to mothers in the young age group mothers. Comparing with the results in the high under five mortality region, about 75 percent of the children were reported among the mothers aged 20-34 years, 15 percent were born to older mothers aged 34+ while the least count was 11 percent reported by the young mothers.

Looking at the various birth orders in the low U5M regions, the highest proportion of children was 36 percent reported in the 4th and above birth order, followed by 28 percent in the 1st birth order, 19 percent in the second birth order while the least was 16 percent reported

in the 3rd birth order. On the other hand, the results in the high under five mortality region show that, distribution of the study population was unevenly distributed. Children in the 4th and above birth order were the most at 44 percent, followed by the 1st birth order which had 22 percent of the children, 2nd birth order which had 18 percent and the least count was reported in the 3rd birth order which was 17 percent.

As far as socio cultural factors are concerned, children were not evenly distributed in the low U5M regions. The Protestants had the highest percent (68 percent), followed by the Roman Catholics at 27 percent and the least was among both the Muslims and Others at 3 percent. On the other hand in the high under five mortality region, the Protestants reported the highest (49 percent) count of children, followed by the Muslims at 30 percent, while the Roman Catholics reported 17 percent of the children and the least count was reported among the Others at 3 percent.

In regard to the ethnicity in the low U5M regions, the highest proportion of the children was born to mothers in the Kikuyu/Embu/Meru/Kamba communities at 54 percent, followed by the Kalenjin/Maasai/Turkana who reported a count of 29 percent, while the Luo/Luhya/Kisii/Kuria mothers reported a lower proportion of 15 percent and mothers among the Somali reported the lowest proportion of children at 2 percent.

Looking at the results in the high U5m regions children born to mothers in the TaitaTaveta/Mijikenda/Luo/Luhya/Kisii/Kuria communities were the most at 76 percent compared with those born among the Somali who were at 17 percent, followed by the children born among the Kalenjin/Maasai/Turkana/Other who were 4 percent and the least proportion was 3 percent of children reported by mothers in the Kikuyu/Embu/Meru/Kamba communities.

Comparing the two regions in general, the low under five mortality region had higher level of full immunization at 80 percent, and low level of children not fully immunized at 20

percent, while the high under five mortality region had 64 percent fully immunized children and 36 percent not fully immunized children. Thus utilization of immunization services was higher in the low than in the high under five mortality regions.

4.2 Differentials in Immunization Status

This section presents the results of bivariate analysis that shows the association between immunization status and the other study variables. The tables 4.3 represents the low under five mortality region results and 4.4 represents results for the high under five mortality regions on the differentials in immunization status by the various selected factors. Cross tabulation and chi square tests are mainly used to establish association between the dependent and independent variables and the level of significance of their association.

4.2.1 Differentials in the Low and High Under Five Mortality Region

The bivariate analysis for the Low Under Five mortality region in table 4.3 shows that level of education, type of place of residence, wealth index, birth order, ethnicity and type of religion were found to be significantly associated with utilization of immunization services. On the other hand the results of bivariate analysis of the high under five mortality region in table 4.4 shows that maternal education, wealth index, type of place of residence, birth order and ethnicity were found to be significant at $p < 0.001$.

Looking at the results of the low U5M region, about 91 percent of the children fully immunized and 9 percent of the children not fully immunized were born to mothers with secondary and above education. Of the children born to mothers with primary education, 80 percent were fully immunized while 20 percent were not fully immunized. Among mothers with no education 57 percent of the children were fully immunized while 43 percent were not fully immunized. In the high U5M region, about 80 percent of children fully immunized and 20 percent not fully immunized were born to mothers with at least secondary and above education, while the children reported to be fully immunized and not fully immunized born to

Table 4.3; Distribution of Children Aged 12-24 Months by Background Characteristics and Immunization Status in the Low Under five Mortality Region.

Variable Name	Immunization Status	
	Fully Immunized	Not Fully Immunized
Maternal Education	%(n)	%(n)
No education	57.0(45)	43.0(34)
Primary	80.2(328)	19.8(81)
Secondary +	90.7(156)	9.3(16)
X² = 38.729	df = 2	sign. = 0.000***
Wealth Index		
Lowest	67.1(155)	32.9(76)
Medium	84.9(107)	15.1(19)
Highest	88.1(267)	11.9(36)
X² = 38.627	df = 2	sign. = 0.000***
Type of place of Residence		
Rural	77.7(384)	22.3(110)
Urban	87.3(145)	12.7(21)
X² = 27.223	df = 1	sign. = 0.007**
Birth Order		
1 st	84.9(158)	15.1(28)
2 nd	83.6(107)	16.4(21)
3 rd	83.0(88)	17.0(18)
4 th and above	73.3(176)	26.7(64)
X² = 11.202	df = 3	sign. = 0.011**
Maternal Age		
Young (15-19)	76.8(43)	23.2(13)
Middle (20-34)	82.1(407)	17.9(89)
Older (35-49)	73.1(79)	26.9 (29)
X² = 4.860	df = 2	sign. = 0.088
Ethnic Affiliation		
Kikuyu/Embu/Meru/Kamba	83.6(306)	16.4(60)
TaitaTaveta/Mijikenda/Luo		
/Luhya/Kisii/Kuria	79.6(74)	20.4(19)
Kalenjin/Maasai/Turkana/Others	73.5(139)	26.5(50)
Somali	83.3(10)	16.7(2)
X² = 29.668	df = 3	sign. = 0.000***
Religion		
Roman Catholic	76.4(133)	23.6(41)
Protestants	81.9(367)	18.1(81)
Muslims	100(15)	0(0)
Others	60.9(14)	39.1(9)
X² = 8.028	df = 3	sign. = 0.45

NB: ***p<0.001 **p<0.01 *p<0.05

Table 4.4; Distribution of Children Aged 12-24 Months by Background Characteristics and Immunization Status in the High Under five Mortality Region.

Variable name	Immunization Status	
	Fully Immunized	Not Fully Immunized
Maternal Education	% (n)	% (n)
No education	46.4(71)	53.6(82)
Primary	68.7(202)	31.3(92)
Secondary +	79.8(79)	20.2(20)
X² = 34.256	df = 2	sign. = 0.000***
Wealth Index		
Lowest	54.1(164)	45.9(139)
Medium	73.8(76)	26.2(27)
Highest	80.0(112)	20.0(28)
X² = 32.798	df = 2	sign. = 0.000***
Type of place of Residence		
Rural	60.2(248)	39.8(164)
Urban	77.6(104)	22.4(30)
X² = 13.392	df = 1	sign. = 0.000***
Birth Order		
1 st	78.2(93)	21.8(26)
2 nd	69.5(66)	30.5(29)
3 rd	68.5(61)	31.5(28)
4 th and above	54.3(132)	45.7(111)
X² = 22.332	df = 3	sign. = 0.000***
Maternal Age		
Young (15-19)	70.7((41)	29.3(17)
Middle (20-34)	64.5(264)	35.5(145)
Older (35-49)	59.5(47)	40.5(32)
X² = 1.835	df = 2	sign. = 0.40
Ethnic Affiliation		
Kikuyu/Embu/Meru/Kamba	86.7(13)	13.3(2)
TaitaTaveta/Mijikenda/Luo		
/Luhya/Kisii/Kuria	68.6(282)	31.4(129)
Kalenjin/Maasai/Turkana/Others	72.0(18)	28.0(7)
Somali	41.1(39)	58.9(56)
X² = 29.668	df = 3	sign. = 0.000*
Religion		
Roman Catholic	71.3(72)	28.7(29)
Protestants	66.3(169)	33.7(86)
Muslims	57.9(99)	42.1(72)
Others	63.2(12)	36.8(7)
X² = 5.653	df = 3	sign. = 0.130

NB: ***p<0.001 **p<0.01 *p<0.05



mothers with primary education were 69 and 31 percent respectively. The least proportion of the fully immunized was 46 percent born to mothers with no/preprimary education and still these mothers had the highest count (54 percent) of children not fully immunized. The results reveal that the higher the level of mother's education the more likely a child stands to be fully immunized. Education was found to be significantly associated with immunization ($p < 0.001$) in both the regions. This is consistent with various studies that educated mothers are more likely to adopt improved behaviours related to child health care and nutrition, and they are conscious about their children's health thus tends to seek medical intervention.

In the low U5M region, the household economic status measured by the wealth index was found to be significantly associated with the uptake of immunization services ($p < 0.001$). Children born to mothers in the highest wealth index recorded the highest proportion (88 percent) of the fully immunized and the least proportion (12 percent) of the children not fully immunized compared to 85 percent of children born to mothers in the medium wealth index who were fully immunized and 15 percent who were not fully immunized. On the other hand mothers in the lowest wealth index reported the least percent (67%) of fully immunized children and the highest proportion (33 percent) of not fully immunized children.

Consequently in the high U5M region, the study found that wealth index is significantly and positively associated with the utilization of immunization services ($p < 0.001$). The data shows that as mothers improve their wealth status from lowest to highest, the proportion of the children fully immunized increases. Within the highest wealth index 80 percent of children were fully immunized while 20 percent were not fully immunized. In the medium wealth category, 74 percent of the children were reported to be fully immunized while 26 percent were not fully immunized. Consequently, the highest proportion of the not fully immunized (46 percent) and the lowest count of the fully immunized was reported in the

lowest wealth index. The scenario depicted here is that the higher the wealth status, the more likely a child is to be immunized.

In regard to the type of place of residence in the low U5M region, children born to mothers residing in the urban areas were more likely to be fully immunized than the rural residents. According to Stock (1983) physical proximity of health care services plays a major role in the utilization of immunization services. Urban residences have better access to education, health care and facilities compared to the rural resident. Of the children born to mothers in the rural area, 78 percent were fully immunized while 22 percent were not fully immunized. On the other hand, mothers in the urban area reported a higher proportion fully immunized (87 percent) children and the least of the not fully immunized children at 13 percent. Type of place of residence was found to be significantly associated with utilization of immunization services ($p < 0.01$).

In the high U5M region, the highest proportion (78 percent) of the fully immunized was reported by mothers residing in the urban areas and the least fully immunized (60 percent) was in the rural area. The rural areas still had the highest proportion (40 percent) of the children not fully immunized while the urban areas recorded 22 percent of not fully immunized children. Type of place of residence was found to be statistically significant ($p < 0.001$) with utilization of immunization services. This is too consistent with the previous literature that urban resident have greater accessibility to health services than rural residents thus higher immunization level in urban areas.

With regard to birth order, results in the low U5M region shows that children in the 1st birth order had the highest number of full immunization at 85 percent and the least of the not fully immunized at 15 percent. Of the fully immunized and not fully immunized children, 84 percent and 16 percent respectively were in the 2nd birth order, while the 3rd birth order had 83 percent of fully immunized children and 17 percent of not fully immunized children.

The least proportion of the fully immunized (73.3 percent) and the highest proportion of not fully immunized (27 percent) were reported among children in the higher birth order. This confirms the findings of Wong et al (1987) and Mckniley (1972) that having more children may cause resource constrains and thus women with large number of children under utilized available health services because of the too many demands on their time force them to forgo seeking health care.

In the high U5M region, it is observed that the highest proportion (78 percent) of the fully immunized children was reported in the 1st birth order, followed by 70 percent in the 2nd birth order, 69 percent in the 3rd birth order and the least (54 percent) of the fully immunize children was reported in the 4th and above birth order. Consequently, the 4th and above birth order reported the highest proportion (46 percent) of the not fully immunized children, followed by the 3rd birth order at 31 percent, 2nd birth order at 30 percent and the least proportion of the not fully immunized was reported in the 1st birth order at 22 percent. Birth order was found to be significant and negatively related with utilization of immunization services ($p < 0.001$). The higher the birth order, the less likely is a child to be fully immunized.

As far as maternal age is concerned, results in the low U5M region shows that the middle aged mothers had the highest count (82 percent) of fully immunized children and the lowest count (18 percent) of not fully immunized children. The young mothers followed with 77 percent of fully immunized children and 23 percent of not fully immunized children. The Older mothers had the smallest count of 73 percent fully immunized children and the highest count 27 percent of not fully immunized children. The data reveals that the higher the birth order, the less likely a child is to be immunized. However maternal age was found not to be significantly associated with the uptake of immunization services ($p = 0.088$).

Looking at the results in the high U5M region, young mothers (15-19 years) reported a 71 percent of children fully immunized and 29 percent not fully immunized while the

medium aged (20-24) mothers had 65 percent of children fully immunized and 36 percent not fully immunized. The least proportion (60 percent) of fully immunized children was among the older mothers (34-49 years), and they also reported the highest proportion (41 percent) of children not fully immunized. The results were however not statistically significant at $p < 0.05$.

Regarding the ethnic affiliation in the low U5M region, percentage immunization of children was even as the highest percent of fully immunized children was 84 percent reported by mothers in the Kikuyu/Embu/Meru/Kamba communities while the least was 74 percent reported by mothers in the Kalenjin/Maasai/Turkana/Other community while the Taitaveta/Mijikenda/Luo/Luhya/Kisii/Kuria mothers reported 80 percent of fully immunized children and the Somali reported 83 percent of fully immunized children. The highest count of the not fully immunized children was 27 percent reported by mothers in the Kalenjin/Maasai/Turkana/Other communities while the lowest (16 percent) count was reported by mothers in the Kikuyu/Embu/Meru/Kamba communities. The Taitaveta/Mijikenda/Luo/Luhya/Kisii/Kuria communities had 20 percent of not fully immunized while the Somali had 17 percent of children not fully immunized. Ethnicity was found to be significantly associated with the utilization of immunization services at $p < 0.001$.

Considering ethnic affiliation in the high U5M region, the Kikuyu/Embu/Meru/Kamba reported the highest count (87 percent) of fully immunized children and the lowest (17 percent) of not fully immunized children while the Kalenjin/Maasai/Turkana/Other reported a count of 72 percent of fully immunized children and 28 percent of not fully immunized children. The mijikenda/Taitaveta/Luo/Luhya/Kuria/Kisii mothers reported had a count of 69 percent of their children fully immunized and 31 percent not fully immunized. On the other hand, the Somali had the least count (41 percent) of fully immunized children and the highest count (59 percent) of not fully

immunized children. Ethnic affiliation in the High Under five mortality region was found to be significantly associated with utilization of immunization services at $p < 0.001$.

Looking at the religious affiliation in the low U5M region, the Muslims had their all (100 percent) children fully immunized, while the Protestants had 82 percent fully immunized children and 18 percent not fully immunized children, the Roman Catholics had 76 percent fully immunized children and 24 percent not fully immunized children, and the least count of fully immunized children was 61 percent and the highest count of 39 percent of not fully immunized children both reported by mothers from Other tribes. Religion was found not to have a significant association with utilization of immunization services at $p < 0.05$.

Looking at the religious affiliation in the high U5M region, the Roman Catholics reported the highest count (71 percent) of fully immunized and the least count (29 percent) of not fully immunized while the Protestants reported 66 percent fully immunized and 34 percent not fully immunized children. On the other hand, the Muslims reported a count of 58 percent fully immunized children and 42 percent not fully immunized children while the least proportion (12 percent) of fully immunized children was among Others, and this is the group which had the highest (37 percent) of not fully immunized children. Religion was found not to be statistically associated with utilization of immunization services at $p < 0.13$.

In conclusion in both the low and high under five mortality regions, maternal education, wealth index, type of place of residence, birth order and ethnicity were found to have a significant association with utilization of immunization services.

4.3 Results of the Logistics Regression in the Low and High Under Five Mortality Regions

The net effect of variables in table 4.5 shows that in the low under five mortality region, maternal education, wealth index and ethnic affiliation were found to exhibit a significant effect on utilization of immunization services while table 4.6 shows that in the High Under five mortality regions, only maternal education, one wealth index category, some birth order and ethnicity categories exhibited a significant effect on immunization.

Maternal Education

Controlling for other variables, the results show that in the Low under five mortality regions, children born to mothers with secondary and above education were 4 times more likely to be fully immunized compared to children born to mothers with no education while children born to mothers with primary education were found to be 3 times more likely to be fully immunized compared to children born to mothers with no education. On the other hand in the high under five mortality region, children born to mothers with secondary and above education level were found to be 2.9 times more likely to be fully immunized compared to children born to mothers with no education, while children born to mothers with primary education were 1.7 times more likely to be fully immunized than children born to mothers with no education.

In consistent with previous studies, maternal education was found to have a positive and significant effect on the odds of immunization in the low and high under five mortality regions. Previous studies have found that higher levels of maternal education enhance better utilization of modern health services. This could be explained by the increased knowledge, awareness and access to modern health information and health services. Various scholars among them Odimwengu (2008) found that educated mothers are more likely than uneducated mothers to take advantage of modern health services such as immunization.

Table 4.5 The Effect of Selected Background Characteristics on Immunization In the Low Under Five Mortality Region.

Variable	B	S.E	Exp.(B)
Maternal education			
No/preprimary(RC)	-	-	-
Primary	.979**	.332	2.662
Secondary and above	1.482***	.424	4.403
Wealth Index			
Lowest(RC)	-	-	-
Medium	.892**	.313	2.440
Highest	1.077**	.305	2.937
Place Of Residence			
Urban(RC)	-	-	-
Rural	-.041	.344	.960
Maternal Age			
Young 15-19(RC)	-	-	-
Medium 20-34	.494	.424	1.638
Old 35-49	.458	.527	1.581
Birth Order			
1st(RC)*	-	-	-
2nd	-.348	.361	.706
3 rd	-.251	.388	.778
4 th +	-.464	.352	.662
Religious Affiliation			
Roman Catholic (RC)	-	-	-
Protestants	.267	.235	1.306
Muslims(##)	21.453	9464.619	2.1E+09
Others	-.562	.529	.570
Ethnicity			
Kikuyu/Embu/Meru/Kamba	-	-	.072
TaitaTaveta/Mijikenda/Luo/Luhya/ Kisii/Kuria	-.722*	.339	.486
Kalenjin/Maasai/Turkana/Others	.216	.281	1.241
Somali	-1.492	1.383	.225
Constant	-.365	.619	.694

(RC) Reference Category ***p<0.001 **p<0.01 *p<0.05 ## Sparse data

Table 4.6 The Effect of Selected Background Characteristics on Immunization In the High Under Five Mortality Region.

Variable	B	S.E	Exp.(B)
Maternal education			
No/preprimary(RC)			
Primary	.552	.326	1.738
Secondary and above	1.066**	.418	2.905
Wealth Index			
Lowest(RC)			
Medium	.551*	.272	1.734
Highest	.573	.322	1.773
Place Of Residence			
Urban(RC)			
Rural	-.523	.314	.655
Maternal Age			
Young 15-19(RC)			
Medium 20-34	.240	.400	1.271
Old 35-49	.733	.493	2.080
Birth Order			
1st(RC)			
2nd	-.522	.366	.593
3 rd	-.319	.389	.727
4 th +	-1.033**	.345	.356
Religious Affiliation			
Roman Catholic (RC)			
Protestants	-.233	.272	.792
Muslims	-.742	.386	2.100
Others	-.094	.584	1.098
Ethnicity			
Kikuyu/Embu/Meru/Kamba			
TaitaTaveta/Mijikenda/Luo/Luhya/			
Kisii/Kuria	-.696	.803	.499
Kalenjin/Maasai/Turkana/Others	-.505	.921	.604
Somali	-1.932*	.894	.145
Constant	1.360	.939	3.897

(RC)- Reference Category ***p<0.001 **p<0.01 *p<0.05

Wealth Index

The results in both the low and high under five mortality regions further revealed that wealth which normally shows similar trends with education is positively related to full immunization. Controlling for other variables, it was observed in the low under five mortality region that children born in high wealth category were 2.9 times more likely to be fully immunized compared to children born in poor categories while children born in medium wealth category were 2.4 times more likely to be fully immunized compared to children in the poor wealth category.

Comparing with the results in the high under five mortality region, children born in high wealth category were 1.8 times more likely to be immunized compared with a children born to mother in the lowest wealth category, while children born to mothers in the medium wealth category was 1.7 times more likely to be immunized compared to children born to mothers in the lowest wealth category. However, only the medium wealth category showed a significant effect ($p < 0.05$) on the utilization of immunization services. Wealth index was found to exhibit a positive and significant effect on the odds of immunization. The higher the wealth category the more likely a mother is to have her child immunized.

Ethnicity

Arguably, due to the different cultural beliefs and practices, children born in some communities in the low under five mortality regions were more likely to be fully immunized more than other children born in other communities. In the low under five mortality region, it was only the category of the TaitaTaveta/Mijikenda/ Luo/Luhya/Kisii/Kuria which was found to have a significant effect ($p < 0.05$) on the odds of immunization. Children born among the TaitaTaveta/Mijikenda/ Luo/Luhya/Kisii/Kuria were 0.48 times less likely to be immunized compared to a children born among the Kikuyu/Embu/Meru/Kamba communities while children born to mothers in the Kalenjin/Maasai/Turkana/Other communities were 1.2 times

more likely to be immunized compared to a child born to mothers in the Kikuyu/Embu/Meru/Kamba communities. On the other hand, children born to mothers in the Somali community were 0.2 times less likely to be immunized compared to a child born to mother in the Kikuyu/Embu/Meru/Kamba communities.

Looking at the results in the high under five mortality regions, only the Somali showed a significant effect on immunization in the high under five mortality regions at $p < 0.05$. Compared to the Kikuyu/Embu/ Meru/Kamba communities, the Somali were 0.1 times less likely to be immunized, while the TaitaTaveta/Mijikenda/Luo/Luhya/Kisii/Kuria were 0.5 times less likely to be immunized and the Kalenjin/Maaai/Turkana/Other communities were 0.6 times less likely to be immunized. This could be explained by the different cultural practices and beliefs, availability of health services in regions where these communities live and the level of maternal education among women in these communities.

Birth Order

Controlling for other variables, birth order was found to have a significant effect on utilization of immunization services only in the high under five mortality regions controlling for other variables. The result reveals that, the higher the birth order, the less likely a child is immunized. Children born to mothers of birth order 4 and above were 0.4 times less likely to be fully immunized compared to children of birth order one, while children of birth order 3 were 0.7 times less likely to be fully immunized compared to children of birth order 1. Children born to mothers of birth order 2 were 0.6 times less likely to be immunized compared to children born to mothers of birth order 1. However only birth order 4 and above showed a statistical significance effect ($p < 0.01$) on odds of immunization. Birth order is negatively associated with the uptake of immunization services. This is consistent with the views of Wong et al (1987) that women with large number of children under utilize health services because too many demands on their time force them to forgo health care.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS.

5.1 Introduction

This chapter presents the summary of the findings, conclusions and recommendations for policy and further research.

5.2 Summary of findings

This study set out to investigate the factors that influence the utilization of immunization services in both the high and low under five mortality regions in Kenya. Specifically, the study sought to examine the socio economic, demographic and socio cultural factors influencing the uptake of immunization services in the low and high under five mortality regions in Kenya. The dependent variable was immunization status, i.e. whether a child is fully or not fully immunized. Receipt of measles vaccine was used as a proxy for full immunization. The data utilized was extracted from the KDHS 2003. The study population was 1,206 children (546 and 660 in the High and Low under five mortality regions respectively) aged 12- 24 months who according to the WHO, it is the age group which should be fully immunized with all the childhood preventable disease vaccines namely BCG, Oral Polio 1-3, DPT 1-3, and Measles. The study applied the Kroger 1983 framework on health seeking behaviour. The study employed cross tabulations to establish the association between various factors under study and immunization. Logistics regression was also applied to establish the effect of the various selected factors on immunization.

Based on the study objectives, most of the findings were in line with the hypothesis. The research findings shows that utilization of immunization services in the high under five mortality regions was lower compared to immunization levels in the low under five mortality regions. In the high under five mortality region the study found that 31 percent of the children were not fully immunized while 56 percent were fully immunized. On the other hand, in the

low under five mortality regions, 18 percent of the children were not fully immunized while 75 percent were fully immunized.

The second specific objective was to examine the socio economic factors influencing the utilization of immunization services in both the high and low under five mortality regions in Kenya. It is clear that immunization is a consequence of a variety of factors the main ones being maternal education and household wealth index in both the high and low under five mortality region. The study found that maternal education and wealth index positively influences utilization of immunization services in both regions. The study confirms the findings from other previous studies that show that children born to mothers with higher levels of education attainment and those born in households with higher wealth index levels have a higher likelihood of being fully immunized.

The third specific objective was to determine the demographic factors influencing the utilization of immunization services in both the regions. Birth order was the only demographic factor found to be significantly associated with the use of immunization services, and this was only in the high under five mortality regions. Birth order was found to be negatively associated with immunization in the high under five mortality regions. The higher the birth order, the less likely a child is to be immunized.

The third specific objective was also to determine the socio cultural factors influencing the utilization of immunization services in both the regions. In each of the regions, one category of ethnicity found to have a significant effect on utilization of immunization. In the low under five mortality region it was only the TaitaTaveta/Mijikenda /Luo/Luhya/Kisii/Kuria category and in the high under five mortality region Somali community which were both found to have a significant effect ($p < 0.05$) on immunization.

These findings have important implications for evaluation of health intervention programmes/child survival programmes being implemented in different regions with different social and economic development levels.

5.3 Conclusion

From the study findings, we can conclude that maternal education and wealth are the most important factors that influence the utilization of immunization services in the low and high under five mortality regions in Kenya. The higher the level of wealth index and education level of the mother, the higher the likelihood of full immunization. Other factors found to influence immunization were birth order and ethnicity. Higher birth orders exhibited less likelihood of full immunization than lower birth orders while some ethnic groups had higher levels of full immunization than others.

5.4 Recommendations

This study presents findings that have important implications for improving immunization programmes and points out gaps that necessitate further research. Based on the conclusions, the following recommendations are given such that they would be used for programme planning and to initiate further research.

5.4.1 Recommendations for policy

Programmes geared towards the improvement of child health depends on the extent to which the family can effectively utilize available resources. It is clear that survival of a child depends much on the efforts made by the mother in terms of child care and health seeking behaviour, provision of food among others.

The study shows that education influences the utilization of immunization services. Despite the fact that the Kenya government has made primary education free and universal, not all young girls access it. More efforts should be geared towards emphasizing on an increased number of women to go to school. The government should ensure the retention of

the girl child in school so as to attain a higher level of education for better child health. Hence concerted efforts should be made by the government, NGOs and other stake holders. More efforts should be geared towards the information education and communication to enhance intensifying the immunization campaign in the high mortality regions where the uptake of the vaccines low. Efforts towards discouraging cultural practices that tend to lower the use of modern health technologies among the communities that showed a significant influence on the use of immunization services.

The study revealed that socio economic status of a family influence the utilization of immunization services. To improve the economic status of families, more efforts should be channeled towards eradicating poverty. The illiterate too should have access to informal education to train them in various vocational skills, and also be made to have easy access to bank credits to be able to establish their own small scale industrial ventures. Measures aimed at improving the quality and accessibility of child health programs should be emphasized. Vaccination coverage rates should also be closely monitored. Advocacy on small family norms and birth spacing should also be steered up.

5.4.2 Recommendations for further research

This study assessed the determinants of utilization of immunization services at regional level i.e. low and high under five mortality regions. Future research is necessary to investigate the factors at national level.

There is also a need to carry out investigations at the provincial level to enable identification of province specific factors determining the utilization of immunization services. This provincial analysis is needed because of differences in the socio economic development.

A Comparative study on the determinants of utilization of immunization services in the urban and rural areas should be carried out.

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APPENDICES

APPENDIX 1

LOW U5M REGION

Variables in the Equation

Step		B	S.E.	Wald	df	Sig.	Exp(B)
1	MaternalEducation			12.831	2	.002	
	MaternalEducation(1)	.979	.332	8.689	1	.003	2.662
	MaternalEducation(2)	1.482	.424	12.214	1	.000	4.403
	WealthIndex			15.486	2	.000	
	WealthIndex(1)	.892	.313	8.142	1	.004	2.440
	WealthIndex(2)	1.077	.305	12.452	1	.000	2.937
	PlaceOfResidence(1)	-.041	.344	.014	1	.904	.960
	MaternalAge			1.372	2	.504	
	MaternalAge(1)	.494	.424	1.357	1	.244	1.638
	MaternalAge(2)	.458	.527	.756	1	.385	1.581
	BORDrec			1.867	3	.600	
	BORDrec(1)	-.348	.361	.932	1	.334	.706
	BORDrec(2)	-.251	.388	.416	1	.519	.778
	BORDrec(3)	-.464	.352	1.740	1	.187	.629
	RELIGIONrec			3.401	3	.334	
	RELIGIONrec(1)	.267	.235	1.286	1	.257	1.306
	RELIGIONrec(2)	21.453	9464.619	.000	1	.998	2.1E+09
	RELIGIONrec(3)	-.562	.529	1.130	1	.288	.570
	EthnicityRecoded			7.003	3	.072	
	EthnicityRecoded(1)	-.722	.339	4.536	1	.033	.486
	EthnicityRecoded(2)	.216	.281	.590	1	.442	1.241
	EthnicityRecoded(3)	-1.492	1.383	1.164	1	.281	.225
	Constant	-.365	.619	.349	1	.555	.694

a. Variable(s) entered on step 1: MaternalEducation, WealthIndex, PlaceOfResidence, MaternalAge, BORDrec, RELIGIONrec, EthnicityRecoded.

APPENDIX 2

HIGH UNDER FIVE MORTALITY REGION

Variables in the Equation

Step		B	S.E.	Wald	df	Sig.	Exp(B)
1	MaternalEducation			6.526	2	.038	
	MaternalEducation(1)	.552	.326	2.878	1	.090	1.738
	MaternalEducation(2)	1.066	.418	6.506	1	.011	2.905
	WealthIndex			5.901	2	.052	
	WealthIndex(1)	.551	.272	4.082	1	.043	1.734
	WealthIndex(2)	.573	.322	3.158	1	.076	1.773
	PlaceOfResidence(1)	-.423	.314	1.817	1	.178	.655
	MaternalAge			3.164	2	.206	
	MaternalAge(1)	.240	.400	.359	1	.549	1.271
	MaternalAge(2)	.733	.493	2.206	1	.137	2.080
	BORDrec			11.829	3	.008	
	BORDrec(1)	-.522	.366	2.034	1	.154	.593
	BORDrec(2)	-.319	.389	.674	1	.412	.727
	BORDrec(3)	-1.033	.345	8.970	1	.003	.356
	RELIGIONrec			8.106	3	.044	
	RELIGIONrec(1)	-.233	.272	.734	1	.392	.792
	RELIGIONrec(2)	.742	.386	3.688	1	.055	2.100
	RELIGIONrec(3)	.094	.584	.026	1	.873	1.098
	EthnicityRecoded			10.130	3	.017	
	EthnicityRecoded(1)	-.696	.803	.750	1	.386	.499
	EthnicityRecoded(2)	-.505	.921	.301	1	.583	.604
	EthnicityRecoded(3)	-1.932	.894	4.672	1	.031	.145
	Constant	1.360	.939	2.098	1	.147	3.897

a. Variable(s) entered on step 1: MaternalEducation, WealthIndex, PlaceOfResidence, MaternalAge, BORDrec, RELIGIONrec, EthnicityRecoded.

Appendix 3

2003 KDHS Report; Under Five Mortality Rates and Immunization Levels

	U5M Rates/Deaths per 1000 live Births	Immunization Level (%)
National	115	60.1
Low U5M Regions		
Central	54	79
Nairobi	95	63
Rift Valley	77	56
Eastern	84	65
High U5M Regions		
Nyanza	206	38
Western	144	50
Coast	116	66
North Eastern	163	9