FACTORS AFFECTING UNDER FIVE MORTALITY IN COAST AND CENTRAL KENYA

BY

Rachel Mukuhi Macharia
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University of Nairobi
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DECLARATION

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

Signed: .....

Date: 16/12/2008

Rachel Mukuhi Macharia

Q50/7174/2006

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

Signed: .....

Date: 12.12.08

Dr. Lawrence Ikamari

Signed: .....

Date: 17/12/08

Dr. A. T. A. Otieno

DEDICATION

I would like to dedicate this research project to my mother Mary Wanjiku and to my late father James G. Macharia, for their great contribution to the person I am today and also for their great foresight on the value of education.

AKNOWLEDGEMENTS

First and foremost, I thank God for seeing me through this exercise.

I would like to acknowledge the support from all the members of the Population Studies Research Institute, and particularly my supervisors. Dr. Lawrence Ikamari and Dr. Alfred Otieno.

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I would also like to thank my parents, brothers, sisters and friends for their words of encouragement.

In a very special way I would like to thank my husband Gitau and my children Macharia, Gacheru, and Amani for being there for me and being so understanding and walking with me through the entire process.

May God bless you all abundantly.

ABSTRACT

The objective of this study was to compare determinants of under five mortality in different regions. This study is about investigating two areas with significantly different mortality trends but using common variables, namely; - type of place residence, wealth index, maternal education, mother's age at birth, children ever born, source of drinking water and type of toilet facility.

The critical issue in this study was to establish to what extent factors that cause under five mortality in Central Province are similar to those in Coast Province, Central Province is a high mortality region while Coast is a low mortality region. Specifically, this study aimed at establishing the effect of socio-economic, bio-demographic and environmental factors on under five mortality in the Coast and Central Provinces of Kenya.

The Mosley and Chen (1984) framework, has been used as the platform for viewing the effect of the determinants on under five mortality in the different regions.

The study used the 2003 KDHS as the source of data and the children under five in the preceding five years to the survey as the unit of analysis. The study population had a sample of 1429 children who were under five with 85 deaths. Descriptive statistics and multivariate logistic regression have been used for analyzing the data.

The factors that had a statistical significant effect on under five mortality were maternal education and availability of a toilet facility in Coast Province, while in Central Province, none of the selected factors were significantly associated with under five mortality.

The results show that no variable had a significant effect on under five mortality among the selected factors in Central Province, while in Coast Province, the absence of a toilet and maternal education were significantly associated with under five mortality.

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CHAPTER I: INTRODUCTION AND PROBLEM STATEMENT

1.1 Introduction

According to the Central Bureau of Statistics (2002), Central Province had the lowest infant mortality rate of 44 death per 1000 live births and under five mortality rate of 54 per 1000, while Coast Province had an infant mortality rate of 78 per 1000 live births and 116 per 1000 for under five mortality rate. The critical issue in this study is to identify and determine to what extent factors that cause under five mortality in Central Province are similar to those in Coast Province. Specifically, this study aims to establish the effect of socio-economic, bio-demographic and environmental factors on under five mortality in the Coast and Central Provinces of Kenya.

The study has used the 2003 KDHS(Kenya Demographic and Health Survey) as the source of data and the children under five in the preceding five years to the survey are the unit of analysis. Logistic regression has been used for analyzing the data.

The Mosely and Chen(1984) framework, has been used as the platform for viewing the effect of similar determinants on under five mortality in the different regions.

According to studies done in Kenya, substantial regional variations on child mortality have been reported by Ikamari (1996). In addition, Muganzi (2000) reckons that studies done in Kenya have shown that infant mortality differs, not only by place of residence but also by individual characteristics such as ethnic groups, income and education among other factors. Ethnic distribution of population in the country follows distinct geographical boundaries within which exist variations in climate and physical features as well as unique social and cultural practices that tend to differentiate one region from another.

Under five mortality has been found to be higher in Nyanza, Western and Coast Provinces while it is lower in Central, Nairobi and Rift Valley; thus the classification of mortality into high and low mortality regions. Large regional differentials are evident while differences in mortality between urban and rural also emerge clearly. The rise in under five mortality rate has been attributed to the HIV/AIDS pandemic, poverty and general decline in economic performance among other factors.

In addition, differentials in Kenya are reinforced, not only by these geographical and socio-cultural factors, but most importantly by the discriminatory colonial development policies. For example Provinces known for high mortality rates (Nyanza, Western and Coast) are also noted for their high prevalence of malaria and other related diseases. These diseases are attributed to factors such as their low lying elevation which allows extensive flooding from tropical rain and numerous irrigation schemes, especially in Nyanza that provide fertile breeding places for mosquitoes and thus increase the incidence of malaria. Murray and Lopez (1996) argue that, although accurate information on causes of death is lacking, the leading cause of under-five mortality in Kenya is pneumonia, malaria, measles and diarrhoeal disease, which are estimated to have been responsible for some 60 per cent of disease burden in the region.

At the same time, Akwara (2000) argues that infant mortality differentials are perpetuated by nutritional and other related factors. Nutritional and other social-cultural studies in Kenya have pointed to very high incidence of malnutrition resulting from food taboos observed and practiced by various ethnic groups, particularly in high mortality areas.

While several factors have been noted to influence under five mortality in general, there has not been an exhaustive understanding of the regional variations as far as the determinants of child mortality are concerned. A critical question would be whether the same determinants that explain the low child mortality in Central Province are the same ones that explain the high mortality in the Coastal region.

The purpose of this study is to capture the difference between Coast and Central Province by how similar variables manifest themselves in the different regions. The demographic, socio-economic and environmental factors considered in this study are maternal education, household income status, type of residence, age of the mother at birth, children ever born, type of toilet facility and source of drinking water.

1.2 Problem statement

As has been mentioned earlier, Central Province has the lowest infant mortality rate of 44 death per 1000 live births and Under-five mortality rate of 54 per 1000, while coast Province had a infant mortality rate of 78 per 1000 live births and 116 per 1000 for under-five mortality rate. These two Provinces represent two different mortality regimes; low and high mortality levels. Currently little is known about the factors that affect under-five mortality in each of these Provinces. In the demographic literature, such as by Preston (1979), it has been indicated that effects of some explanatory variables differ across regions and over time.

The purpose of the study is therefore to establish the effect or influence of selected economic, socio-demographic and environmental factors on under five mortality in Central Province and Coast Province.

Context plays a major role in determining the intra-country differentials in early under five mortality rates. In Kenya huge disparities in socio-economic development, natural resources, means of subsistence and access to health services exist among regions. Both Ikamari (1996) and Muganzi (2000) argue that substantial regional disparities in child survival have previously been attributed to differences in ecology and culture. Past surveys in Kenya and elsewhere clearly show variation in the risk of dying by factors such as age, nutritional status and environment as well as characteristics of the mother.

1.3 Research question

Are there differences in the determinants of under five mortality in Coast and Central Province?

1.4 Objective of the study

To establish the effects of selected socio-demographic and environmental factors on under five mortality in Central and Coast Province.

1.4.1 Specific objectives

1.4.1.1 To establish the effects of bio-demographic factors on under five mortality in Coast and Central Province

1.4.1.2 To establish the effect of socio-economic factors on under five mortality in Coast and Central Province

1.4.1.3 To establish the effect of environmental factors on under five mortality in Coast and Central Province

1.5 Justification

Reducing child mortality is the fourth Millennium Development Goal, whose target is to reduce the under-five mortality rate by two-thirds between 1990 and 2015. Despite numerous interventions and action plans, very little evidence exists on why the infant and child Mortality rates are increasing in Kenya. It is prudent to understand factors that affect under five mortality in a high mortality region (Coast Province) and in a low mortality region (Central Province). Zuberi (2008) points out that excessive deaths of infants and children have historically been noted among the inhabitants of Nyanza Province, in parts of the Rift-Valley and Western Provinces, and among the Coast Province. These patterns have been attributed to the high environmental burden of disease especially malaria and diarrhea diseases and the cultural orientation is surmised as well.

This study seeks to examine whether the factors responsible for under five mortality in Coast Province are the same as those affecting under five mortality in Central Province. Its purpose is to provide a better understanding of how similar factors affect under five mortality in different mortality region. Although this study is not in a position to ascertain the specific reasons for the differences in the levels of under five mortality , it will contribute towards a better understanding of the factors that affect under five mortality in the specific regions. This will in turn inform policy and particularly where interventions are concerned. An effective intervention program and strategy require a clear understanding of how various factors determine under five mortality in Coast and Central Provinces of Kenya.

1.6 Scope and Limitations.

The study will cover two regions; namely Coast and Central Province. The data utilized in analysis was collected from women aged between 15 and 49 in Coast and Central Province from the KDHS survey carried out in 2003.This study will focus only on children who are under five years old, who have died or were surviving.

The limitations of the study were; quality of data may have been compromised since the recording is done retrospectively hence could have lead to underreporting of child death especially those that occurred very soon after birth. Due to this, only live births in the five years preceding the survey were considered so as to reduce recall bias.

The use of secondary data restricted the use of variables to only those used in the survey. This did not allow for certain control and /or independent variables to be tested against the dependent variable hence restricted new knowledge.

The variables used in the study are maternal age at birth, number of children ever born, type of residence, wealth index, maternal education, availability of toilet facility and source of drinking water.

CHAPTER II: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 Introduction

This chapter presents literature on the relationship between the independent variables and under five mortality. This includes views of scholars and empirical research works. Secondly it provides the analytical framework and operational hypotheses through which the study will be conducted and the variables through which the differences will be measured.

Murray and Lopez (1996) argue that although accurate information on causes of death is lacking, the leading cause of under-five mortality in Kenya is pneumonia, malaria, measles and diarrhoeal disease, which are estimated to have been responsible for some 60 per cent of disease burden in the region (Murray and Lopez, 1996). Context plays a major role in determining the intra-country differentials in early childhood mortality rates. In Kenya huge disparities in socio-economic development, natural resources, means of subsistence and access to health services exist among regions. Substantial regional disparities in child survival have previously been attributed to differences in ecology and culture. Past surveys in Kenya and elsewhere clearly show variation in the risk of dying by factors such as age, nutritional status and environment as well as characteristics of the mother. Risk of dying among children varies considerably by Province. As has been mentioned earlier, Central Province had the lowest infant mortality rate of 44 death per 1000 live births and Under-five mortality rate of 54 per 1000, while coast Province had a infant mortality rate of 78 per 1000 live births and 116 per 1000 for under-five mortality rate.

A study conducted in Kenya by Mosley (1989), suggests that an impressive parallel exists between the regional differentials in child mortality and the regional disparity in national development. Firstly, the relative magnitude of child mortality differentials by mother's education is roughly the same within each Province, irrespective of the overall mortality level. A more detailed analysis by district shows that this effect of mother's education persists. Secondly, the inter-provincial mortality differentials are generally maintained even within education groups and are strongly correlated with variations in the level of household poverty.

2.2 Bio-demographic factors

According to Hobcraft et al. (1985), a number of studies conducted in different parts of the world have revealed the influence of maternal age at delivery on the health and survivorship of children. In general, these studies have shown that births to women less than age 18, and first and higher order births (5 and above) and births with shorter inter-live birth interval tend to exhibit a higher risk in mortality during the first year of life. Since a very young mother is biologically not fully mature, the chances of pregnancy related complications are high and being naive, she may not be able to provide good care for the infants effectively. Beyond age 30, the risks of pregnancy complications increase because of the increasing inflexibility of the female reproductive organs. Mortality is clearly higher among children of teenage mothers, with a slight attenuation of the disadvantage after the second birth. One of the most important variables known to have an effect on infant and child mortality is the mother's age at the time of delivery.

The adverse influence of the short birth interval is that appropriately spaced births allow more time for child care, and that there is often more maternal resources made available for the care of each child. This in turn will increase the chances of survival of infants. A study by Hobcraft et al (1985) shows that the risk of dying is generally considerably increased for a child who has a sibling born within the preceding two years, regardless of the risk status of the family.

In a study conducted by Al Nahedh (1999), in Saudi Arabia, a third world country, the observed birth interval of almost three years is comparable to figures in some developing countries that rely mainly on lactational amenorrhea and breast-feeding practices for birth spacing. A birth interval of 3 years has a considerable beneficial effect on the birth weight of children and consequently lowers their risk of death. This could be one of the factors responsible for the reported gradual decline in the infant and child mortality levels in Saudi Arabia in recent years. The good health care system, which is accessible to and affordable by the people, has also helped to reduce infant and child mortality.

From the study conducted by Hobcraft et al. (1985), first children continue to be at a disadvantage during the remainder of infancy. Beyond the first year of life, the mortality of first born children is on average lower than for children of birth order two or three. Regardless of the risk status of the family, the study finds that a short birth interval is clearly associated with considerable excess mortality risk for the index child (around 50 to 60 per cent on average). A study conducted by Vella,.et al (1992),in South West Uganda to examine socio economic risk factors for child mortality showed that children of birth order 5 were more likely to die, while children with the greatest child survival were those of birth order between 3 and 5.

A longitudinal study conducted in Machakos Kenya by Richard,.et al (1991) as cited by Njagi (2007) shows that the probability of having a child under five die increases proportionate to the number of other under five children that the mother has. If a number increases 1 through 2 so does the probability of death.

2.3 Socio-economic factors

Child mortality is determined by background characteristics of the mother as well as the environmental factors, the differentials in Infant and Child Mortality are by sex of child, rural -urban residence and mother's level of education. As expected, nationally, childhood mortality rates are higher in rural areas than in urban areas. According the KDHS 2003, IMR in rural areas is 79 per 1000 compared to 61 per 1000 in urban areas, while CU5MR are 117 and 93 respectively. Central Province has the lowest IMR of 44 per 1000 and a CU5MR of 54 per 1000. Coast Province on the other hand has an IMR of 78 per 1000 and a CU5MR of over twice that of Central Province at 116 per 1000.

In his explanation of relationships between maternal education and infant mortality in Nigeria, Caldwell (1979) contends that mothers with more education are less likely to be influenced by traditional practices harmful to health care. In the context of African countries he averts that education has an effect on i) the power balance between the spouses and between generations such that an educated mother has a say in devoting greater resources in children as opposed to parents and grandparents. Ii) the degree of fatalism with respect to children's ill health and iii) a confidence in the human capacity to manipulate the world through knowledge of the location of facilities as well as access to their utilization.

Ikamari (1996), argues that in Kenya, infant and child mortality varies according to socio-economic factors and proximate variables such as maternal factors, exposure to diseases and use of modern health services. The said socio-economic factors have been seen to influence child survival through " a complex web of pathways" in which case access to and use health facilities ,access to a toilet facility and piped drinking water are some of the mediating factors for majority of the socio-economic factors in Western and Central Province using the KDHS 1998.

A study by Omariba (2005) on changing childhood mortality conditions in Kenya, found that secondary or higher education was associated with a 42% reduction in risk of childhood mortality. The mother's level of education is strongly linked to child survival. Higher levels of educational attainment are generally associated with lower mortality rates, since education exposes mothers to information about better nutrition, use of contraceptives to space birth and knowledge about childhood illnesses and treatment. According to Mutunga (2007) larger differences have been found to exist between the mortality of women who have attained secondary education and above and those with primary education or less

Education of parents, especially mothers' has emerged out as an important determinant of the health and survival status of the children in studies conducted by Caldwell (1976) and Mosley (1989). A large number of studies from many less developed countries have shown a strong negative association between mother's educational level and child mortality. Nevertheless, there is still considerable uncertainty about the actual total strength of the impact of education, let alone its underlying mechanisms and its variation between different settings. One important reason for the uncertainty, as pointed out by many authors e.g., Hobcraft (1993), is that a woman's education is determined by her parents' resources and attitudes and various other factors that may also have a bearing on mortality, and that are often unavailable or inadequately measured in the data that are used.

Kravdal (2004) argues that one should also be concerned about the possibility that an individual-level perspective may fail to reveal the entire impact of education, for there may be a beneficial effect of the education of other women in the community above and beyond that of the mother's own education. In that case, an expansion of

education would reduce mortality not only because more women would enter an educational category associated with lower mortality, but also because everyone, including those who themselves remained uneducated, would benefit from the generally higher level of education in the community.

According to the 2003 KDHS, the large majority of respondents have not gone beyond the primary level of education; generally younger persons have reached higher levels of school than older people. 48 percent of females in urban areas have attended at least some secondary school, compared with 23 percent of rural women. The majority of investigators have found negative associations of maternal schooling level with child mortality. Illiteracy is a risk factor for under nutrition, and for mortality from measles, dysentery and kwashiorkor. The effect of maternal education seems to act partly through knowledge about nutrition, diarrhea, and better economic conditions. However, there appear to be circumstances in which education has no effect or even an adverse one. It can be associated with shorter duration of breastfeeding .

However, contrarily, a study conducted by Jan Van Dan Broeck et al., (1996), in Northern Zaire, maternal education was associated with increased child mortality. In rural tropical areas, where survival strongly depends upon hard female labor on the fields and in the household, education may be a disadvantage. Analysis of the data suggests that chronic stress situations, as indicated by previous deaths among older siblings or created by maternal invalidity, high parity or high distance from health care facilities, increase child mortality.

KDHS (2003) provides information on livestock and land ownership, which are indicators of both economic and social status of a household. Land ownership is also an indicator of income from agriculture. In addition,the KDHS collects information on asset ownership, such as car, radio, television, refrigerator etc. Asset ownership is a proxy for wealth and economic status. In low-income countries, where household income is often difficult to measure (particularly in rural areas), consumption expenditures are often used in determining poverty. Although asset ownership is less sensitive to short-term fluctuations than consumption

expenditures, asset ownership and consumption expenditures are strongly correlated.

As observed in most studies, a household's income has a significant effect on the survival prospects of children. Higher mortality rates are experienced in low income households as opposed to their affluent counterparts. According to the 2003 KDHS, both IMR and CU5MR were highest in areas with the lowest wealth quintile, at a rate of 96 per 1000 and 149 per 1000 respectively. Interestingly, areas classified as the fourth wealth quintile and not the highest wealth quintile had the lowest IMR of 53 per 1000 and a CU5MR of 77 per 1000. The poor growth of Kenya's economy has contributed to deterioration in the overall welfare of the population. Similarly, the economy has been unable to create jobs at a rate to match the labor force. Poverty has increased, such that about 56 percent of the population lives in poverty and over half live below the absolute poverty level (CBS, 2003)

In a study conducted by Syamala (2004),in Goa India, the association between standard of living and survival chances of children was positive when living standard improved from low to medium, the survival chances improved by 6.58 per- cent. As the living standard increased from medium to high, there is a considerable improvement in the survival chances (9.21 percent)

Contradicting studies for example by Landers (1995) show that in the recent years, women's increased economic activity has been a response to the erosion of family income. As women inevitably shoulder multiple responsibilities the lack of good quality non-maternal child care negatively affects both women and children. Children lacking appropriate care are exposed to a clustering of risk factors such as illness, poor nutrition, family stress and non stimulating environments. Long term costs can be measured in terms of school dropout, unemployment, delinquency and failure. The period of early childhood provides a window of opportunity to generate long term benefits by making at least small positive changes in the young child's environment.

According to Brockerhoff (1994),large rural-urban child mortality differentials in many developing countries suggest that rural families can improve their children's survival chances by leaving the countryside and settling in towns and cities.

2.4 Environmental factors

According to a UNICEF (2006) publication, more than any other group, young children are vulnerable to the risks posed by contaminated water and poor sanitation and hygiene. Unsafe drinking water, inadequate availability of water for washing and cooking and lack of access to sanitation together contribute to more than 1.5 million of the 1.9 million deaths of children under age five each year that are due to diarrhea diseases. Better sanitation alone could reduce diarrhea-related morbidity by more than one third; improved sanitation combined with hygiene awareness and behavior change could reduce it by two thirds. Improved household practices would include consistent use of a toilet or latrine by each person in the household, safe disposal of young children's feaces, hand washing with soap or ash after defecation and before eating, and the installation of public standpipes, tube wells or boreholes in households and communities. In Eastern and Southern Africa combined, the proportions were 56 per cent with access to improved water sources (up from 48 per cent in 1990) and 38 per cent with access to basic sanitation (a slight improvement from 35 per cent in 1990), but the increase in coverage has not kept pace with population growth. Rapid population expansion in sub-Saharan Africa translates to 54 million children under five without access to an improved drinking-water source; in Eastern and Southern Africa, the number of people without basic sanitation increased by one third between 1990 and 2004.

In a study in Kenya according to Githaiga (2005), the determinants of child mortality at national and regional level using the 1998 KDHS data at both bivariate and multivariate level, that were found to have significant influence on child mortality were; the presence of a toilet facility in Central, Coast, Eastern and Rift valley Province while maternal education was significantly associated with child mortality in Western Province.

Using the 1989 KDHS, a study by K'oyugi (1997) which looked at the impact of environmental factors at the household and community levels on the risk of death for rural children aged under five, established that three environmental variables were significantly associated with low risk of infant and child death. Children from households with modern toilet facilities, better quality housing floor materials and

with less contaminated water had significantly lowered risk of death relative to their counterparts in worse off categories.

While stressing the importance of public health in a comparative study of determinants of child survival in Kenya, Misati (2003), using the 1998 KDHS data attributed high mortality among children to poor environmental status. He suggested for campaign against disease through availability of piped water and environmental sanitation such as water and sewerage disposal.

2.5 Summary of Literature Review

After the review of various literatures, it is fair to conclude that the following issues may be associated with an increase or decrease in infant and child mortality. The education status of women, rural or urban residence, age of the mother at birth, children ever born, source of drinking water and the type of toilet used. There is general consensus in the literature that a household's socio-economic and environmental characteristics can have significant effects on child and infant mortality. This is true for studies which employ both direct and indirect techniques to estimate infant and child mortality.

As cited in the literature by Syamala (2004) and Mutunga (2007) with regard to the demographic variables, the patterns of mortality by maternal age and birth order are typically U-shaped. Children born to both relatively old and young women have higher mortality rates than others; the interpretation of the effect of maternal age at birth on infant mortality must be biological, i.e., it depends on reproductive maturity. Moreover, first and higher order births also have higher mortality rates since the birth order reflects the components of the child's biological endowment.

In agreement to Caldwell (1979) and Kravdal (2004) among others, and as observed in most studies as in Kenya, the mother's level of education is strongly linked to child survival. Higher levels of educational attainment are generally associated with lower mortality rates, since education exposes mothers to information about better nutrition, use of contraceptives to space births, and knowledge about childhood illnesses and treatment.

Larger differences have been found to exist between the mortality of children of women who have attained secondary education and above and those with primary level of education or less. While primary education in many cases is beneficial relative to no education, there are a number of areas partially related to mortality and nutrition where primary education seems not to contribute to the welfare of family. On the other hand, secondary education shows spectacular benefits. The results further show that secondary education for women has a strong positive effect on the quality of maternal and newborn health care-including immunization status and treatment when they suffer from ill health.

As observed in most studies, a household's income has a significant effect on the survival prospects of children. Higher mortality rates are experienced in low income households as opposed to their affluent counterparts.

As cited by K'oyugi (1997) and Mutunga (2007), a household's environmental characteristics such as safe source of drinking water supply has a significantly negative effect on child mortality. The same holds true for those with sanitation, which in most cases is taken to be access to a flush toilet or a ventilated improved pit latrine.

Differentials by type of place of residence have commonly been observed, with urban areas having more advantages and therefore better child survival prospects. According to MICS (2000),mortality differentials by rural-urban can be attributed to better health care services, higher levels of education for mothers and improved coverage in urban areas

2.6 Conceptual and Operational frameworks

There are a number of different analytical frameworks through which to view the effects of different determinants on under five mortality. In this study, the Mosley and Chen framework has been used as illustrated in figure 1.

Demographic research by Mosley and Chen (1984) and by Schultz (1984) made the distinction between variables considered to be exogenous or socio-economic (i.e. cultural, social, economic, community, and regional factors) and endogenous or biomedical factors (i.e. breastfeeding patterns, hygiene, sanitary measures, and nutrition).

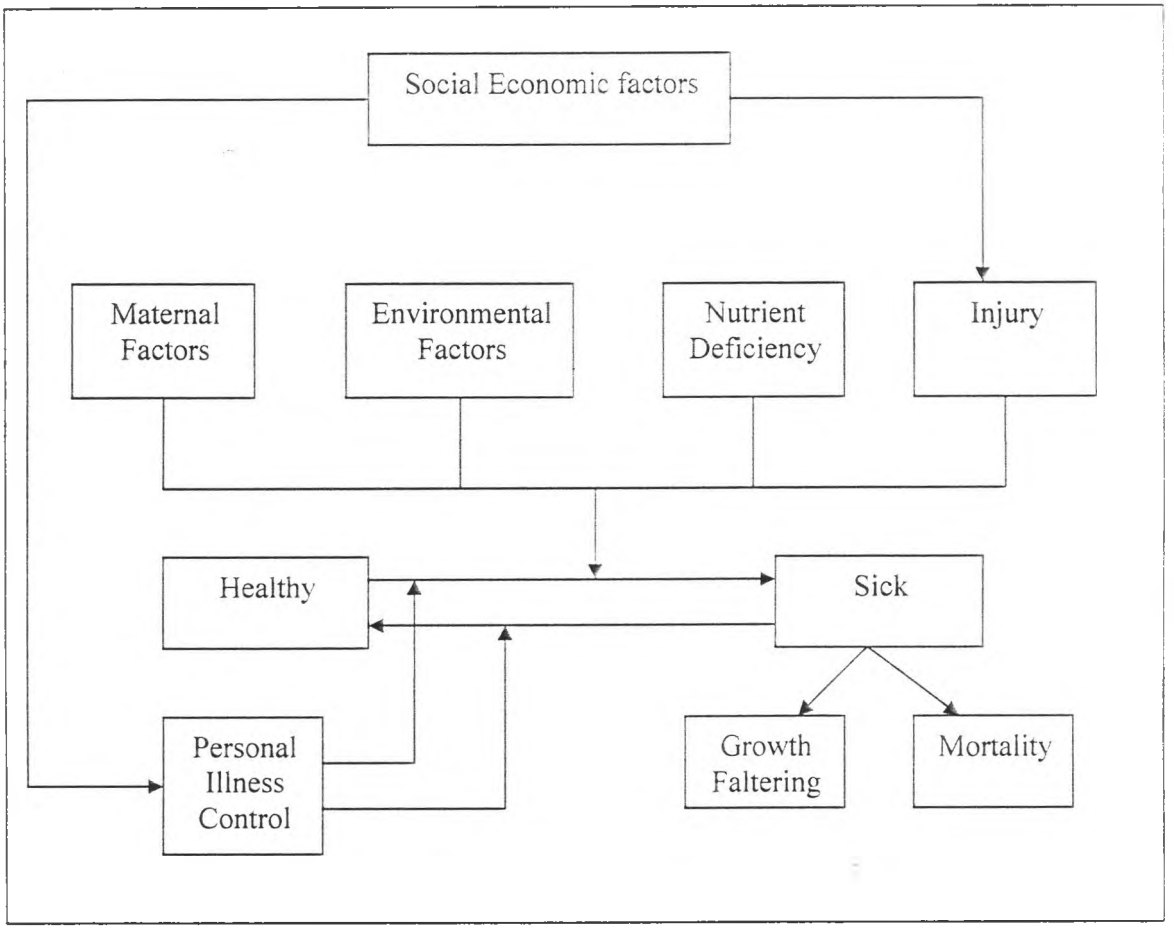
The effects of the exogenous variables are considered indirect because they operate through the endogenous biomedical factors. Likewise, the bio-medical factors are called intermediate variables or proximate determinants because they constitute the middle step between the exogenous variables and child mortality (Jain, 1988; Mosley and Chen, 1984; Schultz, 1984).

Mosley and Chen (1984) as were among the first to study the intermediate biomedical factors affecting child mortality, labeled 'proximate determinants' They distinguished fourteen proximate determinants and categorized them into four groups: maternal [fertility] factors, environmental sanitation factors, availability of nutrients to the fetus and infant, injuries, and personal illness control factors.

The operational framework demonstrates how the conceptual model is applied on the selected variables (as illustrated in figure 2). In this study independent variables are maternal education, wealth index and type of place of residence. This are considered indirect because they operate through the intermediate variables which are maternal age, number of children ever born, Source of drinking water and type of toilet facility. All these variables are then analyzed to show what effect they have on under five mortality, which is the dependent variable.

2.6.1 Conceptual Framework

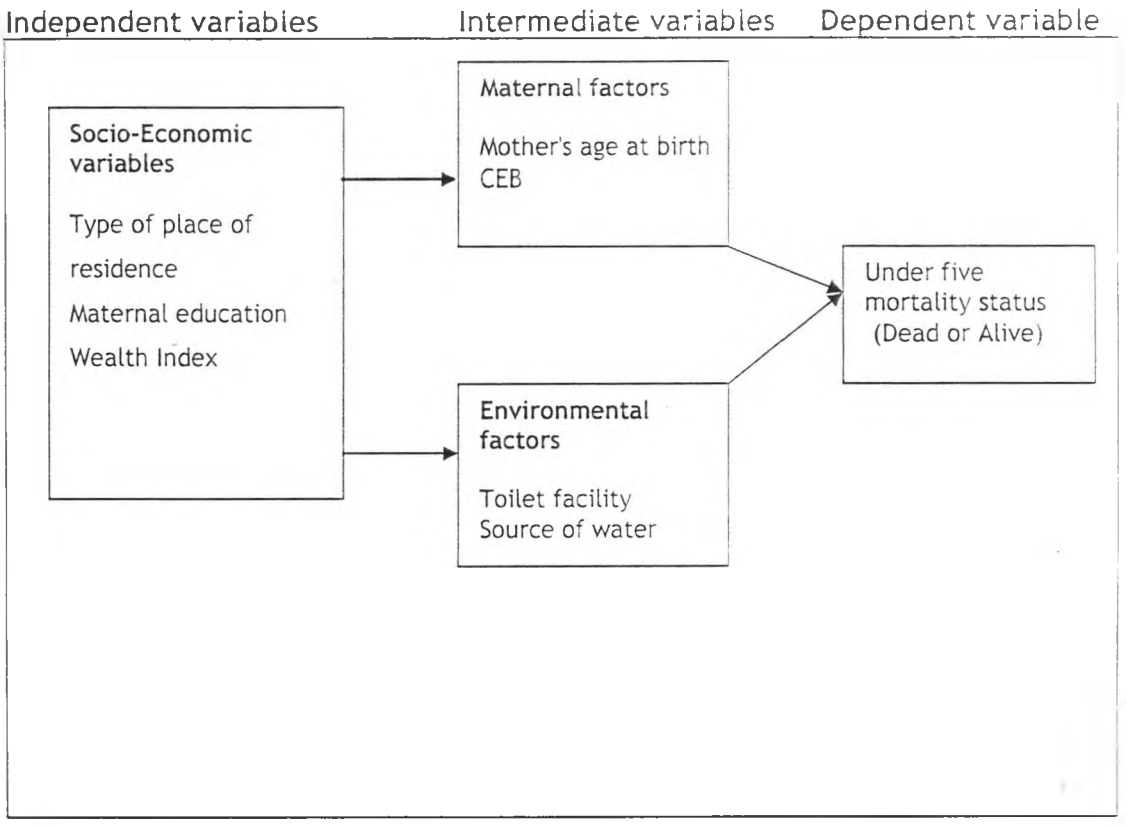
Figure 1: Illustration of conceptual framework



Source: from Mosley and Chen, 1984

2.6.2 Operational Framework

Figure 2: Illustration of operational framework



Adapted from Mosley and Chen, 1984

2.7 Operational Hypothesis

2.7.1. Maternal education has a negative effect on a under five mortality

2.7.2. Higher wealth index levels have a negative effect on under five mortality

2.7.3. Children living in rural areas are more likely to die before age five

2.7.4. Safe source of drinking water decreases under five mortality

2.7.5. Using an appropriate toilet facility decreases under five mortality

2.8 Definition of Study variables and their measurement

2.8.1 Dependent variable

Under five child mortality is the dependent variable and its measure is whether or not the index child died during the specified age under consideration. The variable is categorized as dead and alive.

2.8.2 Independent variables

Maternal age at birth: This refers to the age in years of the mother at the time of the birth of the index child. This is a proxy for the mother's physiological, mental and emotional maturity. It also measures the mothers experience with child care.

Children ever born: This refers to the number of children who are under five a woman has given birth to. The variable categorized as 1, 2-3 or 4+

Maternal education: This refers to the highest level of formal schooling attained by the mother. This is denoted as None, Primary or Secondary +

Wealth index: Refers to the level of wealth and economic status of the household. Asset ownership is the proxy for wealth and economic status. This has been denoted as Low, medium and high

Type of place of residence: Refers to where the mother resides. It is denoted as Rural or urban

Source of water: This variable denoting source of water is constructed from the mother's response to the question on the type of the source of drinking water. This variable will have two categories; piped water and unpiped water. The assumption being that safe water is that which is piped while unpiped water which includes sources such as wells, springs, streams, rivers and all others is considered to be unsafe water.

Toilet facility: This variable is used to denote whether or not a household has a toilet facility. This is constructed from the mother's response to the question on the type of toilet facility available in the household. Presence of toilet includes flush traditional pit and improved ventilated pit toilet, while absence of toilet includes bush and others. This variable is denoted as Have Toilet and No Toilet

CHAPTER III: METHODOLOGY

3.1 Introduction

This chapter presents a description of the data source, study population characteristics and the analytical methods utilized in order to come up with the necessary conclusions on a comparison of the factors affecting under five mortality.

3.2 Description of data source

The data used in the analysis was obtained from the Kenya Demographic and Health Survey (KDHS) 2003. The KDHS provides information on fertility, mortality, health issues, socio-economic and environmental conditions. The KDHS 2003 is a nationally representative sample of 8,195 women aged between 15 to 49 and 3,578 men aged 15 to 54 selected from 400 clusters (sample points) throughout the eight Provinces in Kenya. As is often the case with data on child mortality; information comes from surveys among women.

A special survey questionnaire for women called the women's questionnaire is administered to capture data on women's birth history. For each live-born child the month of birth is recorded and whether or not the child is still alive at the time of the interview. If a child died during the observation period, the age at which the child died is asked. The age of death is observed within intervals, in case a child died within a month after birth, the age of death is recorded in days, if the child died between one month and two years, it is recorded in months, and otherwise it is recorded in years. Because we are only interested in child mortality until age five, we will artificially right-censor at this age. Right-censoring can also occur if a child is alive at the moment of the interview and younger than five years old.

The KDHS data is recorded retrospectively and can therefore suffer from misreporting, for example a child who died at a very young age might not be reported. According to Jacoby and Wang (2003) as cited in Mutunga (2007),several DHS studies show evidence of downward bias in reporting child deaths, that is, the longer the recall period, the more likely the possibility of the respondents to misreport the case.

The quality of mortality estimates calculated from retrospective birth histories depends upon the completeness with which births and deaths are reported and recorded. Potentially the most serious data quality problem is the selective omission of the birth histories of those who did not survive, which can lead to underestimation of mortality rates. Other potential problems include displacement of birth dates, which may cause a distortion of mortality trends, and misreporting of the age at death, which may distort the age pattern of mortality.

3.3 Study Population Characteristics

The study is confined to children born to the sample of women in five years preceding the survey. The sample population is made up of 1429 children who are under five, 730 from Central Province and 699 from Coast Province. The study seeks to examine how selected bio- demographic, socio-economic and environmental factors affect under five mortality in the two areas. Central Province presents a low mortality region, whereas Coast Province presents a high mortality region.

3.4 Data analysis

This study will use frequencies to describe the distribution within the variables. Logistic regression will show the relationship between under five mortality and the selected variables. In addition, multivariate logistic regression it will be used to establish the extent of association of the variables on under five mortality.

3.4.1 Frequency distributions

Descriptive statistics were used to show the percentages and distributions of the births according to the various categories of the study variables. The frequencies give the preliminary findings of the study.

3.4.2 Logistic regression

In this study logistic regression is used because the dependent variable is dichotomous, that is an index child is either alive or dead. According to Githaiga (2005), from a mathematical point of view, logistic regression is an extremely flexible and easily used function which lends itself to a biologically meaningful interpretation.

In addition logistic regression is an efficient tool to institute the necessary controls when dependent variables are recorded in a dichotomous scale. The dependent variable is under five mortality.

Logistic regression is derived from the principle of odds ratio. That is, the ratio of the probability that an event will not occur (1-P) is called odds. Thus logistic regression is often expressed in a basic form:-

$$\text{Logit } (P) = \text{Ln}\{P/(1-P)\}$$

$$= a + B_1X_1 + B_2X_2 + B_3X_3 + \ldots..B_nX_n€$$

Where

P = The probability that an event will occur

Ln = Is the natural logarithm

1-P = Probability that an event will not occur

a = Is the constant or intercept of the model

B_s = Logit coefficient

X_s = Are the explanatory variables

€ = Is the error term

The statistical package for social sciences (SPSS) will be used to run logistic regression. The logistic coefficients will be obtained at different point in time and their differences tested using significance tests.

Description of the variables included in the logistic regression models and their hypothesized relationship with the outcome variable. The outcome variable is child mortality which is binary; dead or alive denoted by 1 =Dead and 0 = Alive.

This variable is derived from the information on child survival status at the time of the survey and the age at death, (months imputed) which was drawn from the complete birth histories of women in the sample. The explanatory variables include socio-economic, demographic and environmental factors; namely, type of residence,

maternal education, household income level, mother's age at birth, children ever born, source of drinking water and type of toilet.

In interpreting the output results of the logistic regression beta (B), significance (sign) and exponential B (Exp.B) otherwise known as the odds ratio were used. A negative and positive sign of beta indicate a reducing or an increasing effect of the variable in question on the outcome variable. Regarding the independent variables, the categories with the highest risk of mortality was selected as the reference category.

CHAPTER IV

DETERMINANTS OF CHILDREN UNDER FIVE MORTALITY IN CENTRAL AND COAST PROVINCE

4.1 Introduction

This chapter examines the results of the analysis carried out on the factors that are associated with children under five mortality in Central and Coast Province of Kenya using the 2003 KDHS. Central Province presents a low mortality region whereas Coast Province presents a high mortality region. The chapter is divided into two parts with the first part presenting the findings and the second part discussing the results of the study.

4.2 Preliminary results

As demonstrated in Table 4.1, the study was confined to children born to the sample of women in five years preceding the survey. The sample population was made up of 1429 children who are under five, 730 from Central Province and 699 from Coast Province. In Coast Province, over 39% of the mothers, had four or more children, whereas among the women in Central Province majority had at most given birth to three children (39.1%). In Coast Province, most of the women (74%) with children under five were aged from 20 to 34, similarly in Central Province 72% of the women are aged 20 to 34.

This study revealed that while 4.5 percent children under five died in Central Province, 7.4 percent died in Coast Province. In the study area, majority of the children under five reside in rural areas. In Central Province, 85% of the children under five resided in households in rural areas while 66% of the children under five in Coast Province resided in rural areas.

Most of the children under five in the two areas had mothers with primary level education, at 67% and 50% in Central and Coast respectively. Central had only 1 percent under fives with uneducated mothers while Coast had about 18% children under five whose mothers were uneducated. Central Province had over 31% of under fives with mothers with secondary education and beyond, while Coast had only about 13% under fives with mothers who had secondary education and beyond.

In Central Province, about 17% under age five were in the low wealth index, while in Coast about 45% of under fives were in the low wealth index. Majority (about 45%) of the study population falls in the low wealth index in Coast Province whereas most (about 53%) of the study population in Central Province falls within the high wealth index

While only about 27% of under fives in Central Province lived in households with access to piped water, about 47% of the study population in Coast Province had access to piped water.

The study population indicates that about 97% of Central Province had access to a toilet facility while only about 52% of the population in Coast Province had access to a toilet.

Table 4.1: The basic characteristics of the study population

	Variable Name	Central		Coast	
1		Number	Percent	Number	Percent
	Under five mortality	697	95.5	647	92.6
	0=Alive	33	4.5	52	7.4
	1=Dead				
		730	100	699	100
2	Type of Place of residence				
	1=Urban	113	15.5	237	33.9
	2=Rural	617	84.5	462	66.1
3	Maternal education				
	1= None	7	1	256	36.6
	2= Primary	490	67.1	353	50.5
	3=Secondary +	233	31.9	90	12.9
4	Wealth Index				
	1= Low	123	16.8	313	44.8
	2= Middle	224	30.7	117	16.7
	3= High	383	52.5	269	38.5
5	Maternal age at birth				
	1= < 20	96	13.2	130	15.8
	2= 20-34	541	74.1	494	72.4
	3= 35+	93	12.7	75	11.8
6	Children Ever Born				
	1= 1	229	31.4	175	25
	2= 2-3	290	39.7	251	35.9
	3= 4+	211	28.9	273	39.1
7	Source of drinking water				
	1=Piped	200	27.4	327	36.9
	2= Not piped	530	72.6	372	63.1
8	Type of toilet				
	1= Have toilet	710	97.3	366	52.4
	2= No toilet	20	2.7	333	47.6

4.3 Discussion of Results

Results on under five mortality in Coast and Central Province were both similar and contrasting in many aspects. Some results were as expected while others were contrary to the expectations.

The logistic regression results for Central Province using all the selected factors as in Table 4.2 show that all the factors considered had no significant effect on under five mortality. While results for Coast Province in Table 4.3 show that toilet availability and maternal education are statistically significant and have an effect on under five mortality.

Maternal education was statistically significant in Coast Province with a 90% level of confidence. Under fives born to mothers who had primary education were 0.5 times less likely to experience a child's death as compared to those under fives born to mothers who had no education at all, while those with secondary education or more were 0.6 times less likely to have their children die than those of women without any education. The results support the hypothesis that the risk of child death varies with the level of formal education. The higher the level of education, the better the child health care practices.

The presence of a toilet was found to be highly significant in Coast Province at a confidence level of 95%. However, contrary to hypothetical expectations, findings were that children in households with no toilet were 0.3 times less likely to die than those in households with toilets. This was a rather unusual finding. However, it conforms to findings by Esrey and Habicht (1986) as cited by Frans van Poppel and Cor van der Heijden (1997); the beneficial health effects following improvements in water and sanitation appeared to be dependent on the type of intervention, the level of environmental contamination, the presence or absence of certain risk factors and the health indicator used. The attitudes and behavior related to health practices and personal hygiene, which are considered to be greatly affected by education may be more important than physical facilities.

At multivariate stage, this could explain the greater socio-economic factors, which are considered to be closely related to attitude and behavior, than by differentials by dwelling characteristics.

Although wealth index was not statistically associated with the risk of under five mortality in both Central and Coast Province, it is worth noting that in Coast Province, under five mortality was less likely in high wealth index than in middle wealth index households, while Central Province under five mortality was more likely in the high wealth index than in the middle wealth index households. This is contrary to expectations, as observed in most studies; a household's income has a significant effect on the survival prospects of children. Higher mortality rates are experienced in low income households as opposed to their affluent counterparts.

In this study, rural and urban differentials were not significant in Central and Coast Province respectively. Coast on the contrary to most findings, had children under five residing in rural areas less likely to die than those in urban areas.

Bio-demographic factors that included maternal age at birth and children ever born did not have a significant effect on the under five mortality in both Coast and Central Province. Results were as expected with children born to women aged 20-34 being less likely to die as compared to those born by women who were below age 20. In addition, children born to women who were 35+ were more likely to die than those who gave birth when aged below 20. In the case of children ever born, in Central Province, the more the under fives were born to a woman, the higher their chances of death while in Coast the more births of children under five to a woman had the less likely their mortality.

4.3.1 Central Province

Table 4.2: Results of multivariate logistic regression showing the effects of independent variables on under five mortality in Central Province

Variable Name	B	S.E	df	Sig.	Exp (B)
Bio-demographic factors					
Maternal age					
< 20®	.000		2	.599	1.000
20-34	-.220	.669	1	.742	.802
35+	.296	.875	1	.735	1.345
CEB					
1®	.000		2	.547	1.000
2-3	.535	.553	1	.333	1.708
4+	.669	.644	1	.299	1.952
Socio-economic factors					
Type of place of residence					
Urban®	.000				1.000
Rural	.280	.561	1	.618	1.323
Maternal education					
None®	.000		2	.925	1.000
Primary	18.248	15040.235	2	.999	84106639.427
Secondary +	18.079	15040.235	1	.999	71060161.444
Wealth Index					
Low®	.000		2	.357	1.000
Medium	-.255	.566	1	.653	.755
High	.376	.515	1	.465	1.457
Environmental factors					
Drinking water					
Piped®	.000				1.000
Not piped	.776	.522	1	.137	2.173
Type of toilet					
Have toilet®	.000				
No toilet	.875	.807	1	.278	2.173

NB: ® = Reference category = P <0.1; ** = P< 0.05; ***= P<. =0.01

4.3.2 Coast Province

Table 4.3: Results of multivariate logistic regression showing the effects of independent variables on under five mortality in Coast Province

	B	S.E	df	Sig.	Exp (B)
Bio-demographic factors					
Maternal age					
< 20®	.000		2	.907	1.000
20-34	-.022	.447	1	.961	.979
35+	.202	.668	1	.763	1.223
Children ever born					
1®	.000		2	.661	1.000
2-3	-.332	.409	1	.417	.718
4+	-.397	.479	1	.408	.673
Socio-economic factors					
Type of place of residence					
Urban®	.000				1.000
Rural	-.034	.438	1	.939	.967
Maternal education					
None®	.000		2	.113	1.000
Primary	-.590	.350	1	.092*	.481
Secondary +	-.465	.515	1	.367	.628
Wealth Index					
Low®	.000		2	.324	1.000
Medium	-.864	.592	1	.144	.421
High	-.236	.520	1	.649	.790
Environmental factors					
Drinking water					
Piped®	.000				1.000
Not piped	.363	.401	1	.366	1.437
Type of toilet					
Have toilet®	.000				1.000
No toilet	-1.121	.446	1	.012**	.326

NB: ® = Reference category

* = P <0.1; ** = P< 0.05; ***= P<. =0.01

CHAPTER V: SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter highlights the summary of the study, conclusions made with regard to it and recommendations made with reference to its findings.

5.2 Summary

The study had a sample of 1429 children who were under five with 85 deaths. Central Province had 697 surviving children under five with 33 children dead while Coast had 647 surviving children under five with 52 children dead.

The general objective of the study was to carry out a comparative study of the determinants of under five mortality in Central Province (low mortality region) and Coast Province (high mortality region). The specific objectives were to establish the effects of bio-demographic, socio-economic and environmental factors on under five mortality in Coast and Central Province.

In order to achieve the objectives of this study, the appropriate variables from the KDHS 2003 were sought in order to carry out the necessary analysis. Variables were recoded and combined as required. For the socio-economic factors the variables used were maternal education, wealth index and type of place of residence. The bio-demographic factors included the variable of maternal age and children ever born, while the environmental factors included were toilet availability and source of drinking water.

Findings of the analysis were as hypothetically expected while others were unique in character. The first objective was set on establishing the effects of bio demographic factors on under five mortality. Findings are that, neither maternal age nor the number of children ever born is significantly associated with under five mortality in both Central and Coast Province.

In line with the second objective of the study, it can be concluded that under five mortality is significantly associated with only maternal education at a 0.9 confidence level in Coast Province. The maternal education variable was intended

to capture the knowledge level of child care with the underlying assumption that the higher the level of education the better the child health care practices. The results of this study support the hypothesis that the risk of child death varies with the level of formal education.

The variable wealth index was intended to capture the effects of resources available for the child's health care. The results of this study do not show any significant effect of wealth index on under five mortality in both Central and Coast Province.

Type of place of residence did not have a significant association with under five mortality in both areas.

The third objective sought to examine the effect of environmental factors in relation to under five mortality. While the source drinking water was not significant in both Central and Coast Province, the availability of toilet facility is highly significant in Coast Province. However, contrary to expectations, presence of toilet is associated with increased under five mortality in Coast Province.

In response to the research question, results suggest that indeed there are differences in the determinant of under five mortality in Coast and Central Province. Relatively, factors that affect mortality in low mortality regions are different from those affecting under five mortality in high mortality regions. The factors that seemed to most importantly influence the risk of under five mortality were maternal education and presence of a toilet in Coast Province, while none of the selected variables significantly affected under five mortality in Central Province.

5.3 Conclusion

This study suggests that while some explanatory variables are associated with under five mortality others are not. However, there seems to be more associations in the high mortality region, than in the low mortality region. Thus the argument that, there is a complex web on how different factors affect under five mortality and that differences in socio-economic development and climatic/ecological conditions of the two Provinces also play are role in the variations.

The link between the level of maternal education and the risk of under five mortality cannot be stressed enough. As has been confirmed by many other studies (Ikamari, 1996 and Omariba, 2005), higher educated women have children with increase survival rates. Education today is recognized world wide as a prerequisite for development. As stated by the UN Secretary General in the Millennium Report, "Short changing girls is not only a matter of gender discrimination; it is bad economics and bad social policy. Experience has shown, over and over again that investments in girls' education translate directly and quickly into better nutrition for the whole family , better health care, declining fertility, poverty reduction and better overall economic performance". Children do not necessarily become sick because their mothers are less educated but mainly because such mothers rarely practice better hygiene and nutrition.

As has been mentioned earlier, although several attempts to evaluate the conclusions of studies describing the effectiveness of water and sanitation intervention on the incidences of morbidity and childhood mortality in developing countries has been in favor of positive effects of one or more components of water supply and sanitation, these reviews have also provided contradictory and often confusing results and conclusions. The beneficial health effects following improvements in water and sanitation appeared to be dependent on the type of intervention, the level of environmental contamination, the presence or absence of certain risk factors and the health indicator used. The attitudes and behavior related to health practices and personal hygiene, which are considered to be greatly affected by education may be more important than physical facilities.

At multivariate stage, this could explain the greater socio-economic factors, which are considered to be closely related to attitude and behavior, than by differentials by dwelling characteristics.

Type of intervention as well as the presence of risk factors was explicitly taken into account by Esrey and Habitcht (1988) who investigated whether the availability of piped water and presence of toilets provided different protection to infants of literate mothers compared to those of illiterate mothers. This reviews concur to the findings in Coast Province, the significant positive association of presence of toilets with under five mortality actually demonstrates the relationship between maternal education and under five mortality. Regardless of having toilets, there is need for change in behavior and hygiene practices, which is mainly disseminated through education.

Geographical location, in this case Province, in terms of whether low mortality region or high mortality region, has emerged as an important factor influencing under five mortality; it is desirable to carry out investigations at the level of Province to enable identification of Province specific factors determining under five mortality. This provincial analysis is needed because of the differences in the level of socio-economic development. In addition there is need to increase the sample size of future demographic surveys so as to permit better analysis of under five mortality.

This study concurs with similar regional studies conducted, according to Muganzi (2000), studies done in Kenya show that present socio economic structures are deeply entrenched in historical socio-economic and political administration in a country established by former colonial authorities that maintained separate and distinct development policies for themselves and Africans and between various regions of the country.

Ethnic distribution of population in the country follows distinct geographical boundaries within which exist variations in climate and physical features was well as unique social and cultural practices that tend to differentiate on region from another. Nutritional and other socio-cultural studies in Kenya have pointed to the high incidence of malnutrition resulting from food taboos observed and practiced in various ethnic groups, particularly in high mortality areas.

Thus the socio-cultural factors in combination with differential in socio economic development have and continue to sustain the observed mortality differentials in Kenya.

5.4 Recommendation for Policy

As pointed out in the results, maternal education and presence of a toilet are a significant factor in determining the health and survival status of a child. Education programs in Coast Province must be stepped up at all levels.

It has been demonstrated in the results, that there is need for programmers to refocus more 'software' than 'hard ware'. Physical facilities i.e. Construction of toilets is not good enough to reduce under five mortality, there is need for change in attitude and hygiene practices among the coastal communities so as to make a positive difference and reduce under five mortality.

In addition, the need to increase literacy programs especially among rural women is clearly crucial to any further mortality decline. It has been documented widely that children born to educated women have higher chances of survival. Maternal education is very important since other programmes geared toward the improvement of child health depend on the extent to which the family can effectively utilize available resources. It is true that survival of the child depends very much on the efforts made by the mother in terms of childcare, provision of food and treatment among others. Advocating for the girl child education in Kenya to ensure the future mothers acquire the basic hygiene practices and become more knowledgeable on child health care.

As experienced with some of the findings in this study, there is need to increase the sample size of future demographic surveys so as to permit better analysis of under five mortality at a lower level.

Effort should be made to provide a greater proportion of the population with basic needs. One of the major problems in programming is lack of accurate data on which to base appropriate, well thought out decisions affecting the lives of people. While censuses and surveys have provided useful data, it is important to emphasize the utilization of qualitative methods that could, for example provide answers as to why some regions are still experiencing high mortality.

On the whole, while it is not possible to isolate one factor that would contribute to further mortality decline, it is nevertheless crucial to state that a re-examination of the whole process of socioeconomic development in terms of the various aspects is a requirement.

5.5 Recommendation for further research

Some of the findings in this study were contrary to expectations and no valid explanation could be found for them. For example, although the toilet facility was found to be significant in Coast Province, under five children were less likely to die in households where there were no toilets, than those in households with toilets. This is an unusual phenomena and a qualitative study is recommended so as to have an in depth understanding of the population dynamics .

Secondly, a study that includes some socio-cultural variables should be conducted to enable a better understanding of the socio-cultural dynamics of the communities within Coast Province as this would be a beginning to understanding confounding elements in the study.

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APPENDICES

Model 1: All study variables in the Equation for Central Province (Low Mortality Region)

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	MATERNAL AGE			1.021	2	.600	
	MATERNAL AGE(1)	-.220	.669	.109	1	.742	.802
	MATERNAL AGE(2)	.296	.875	.115	1	.735	1.345
	CEB			1.207	2	.547	
	CEB(1)	.535	.553	.937	1	.333	1.708
	CEB(2)	.669	.644	1.079	1	.299	1.952
	RESIDENCE (1)	.280	.561	.249	1	.618	1.323
	EDUCATION			.156	2	.925	
	EDUCATION (1)	18.248	15040.235	.000	1	.999	84106639.427
	EDUCATION (2)	18.079	15040.235	.000	1	.999	71060161.444
	WEALTH			2.060	2	.357	
	WEALTH(1)	-.255	.566	.203	1	.653	.775
	WEALTH(2)	.376	.515	.533	1	.465	1.457
	toilet2(1)	.875	.807	1.175	1	.278	2.398
	WATER(1)	.776	.522	2.209	1	.137	2.173
	Constant	-22.596	15040.235	.000	1	.999	.000

a Variable(s) entered on step 1: MATERNALAGE, CEB, RESIDENCE, EDUCATION, WEALTH, toilet2, WATER.

Model 2: All study variables in the equation for Coast Province (High Mortality Region)

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	MATERNAL AGE			.196	2	.907	
	MATERNAL AGE(1)	-.022	.447	.002	1	.961	.979
	MATERNAL AGE(2)	.202	.668	.091	1	.763	1.223
	CEB			.827	2	.661	
	CEB(1)	-.332	.409	.658	1	.417	.718
	CEB(2)	-.397	.479	.684	1	.408	.673
	RESIDENCE (1)	-.034	.438	.006	1	.939	.967
	EDUCATION			2.850	2	.240	
	EDUCATION (1)	-.590	.350	2.840	1	.092	.554
	EDUCATION (2)	-.465	.515	.814	1	.367	.628
	WEALTH			2.251	2	.324	
	WEALTH(1)	-.864	.592	2.134	1	.144	.421
	WEALTH(2)	-.236	.520	.207	1	.649	.790
	toilet2(1)	-1.121	.446	6.316	1	.012	.326
	WATER(1)	.363	.401	.816	1	.366	1.437
	Constant	-1.411	.701	4.055	1	.044	.244

a Variable(s) entered on step 1: MATERNALAGE, CEB, RESIDENCE, EDUCATION, WEALTH, toilet2, WATER.