EFFECT OF MOTHER'S MIGRATION ON EARLY- CHILD MORTALITY IN KENYA

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DECLARATION

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

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This Project is submitted for the award of a Master of Arts Degree in Population Studies with our approval as the university supervisors.

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DEDICATION

This study is dedicated to my wife, Bibian and the children; Eileen and Basil Einstein as well as to all those children and their mothers who may be subjected to migrate for one reason or another.

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Several people contributed to successful completion of this work. Foremost, I wish to express my sincere thanks to the almighty God for His grace, guidance and protection and for seeing me through the completion of this project.

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ABSTRACT

This study mainly focus on the effect of migration on under-two mortality in Kenya and a model framework is adopted to capture the socioeconomic, environmental and bio-demographic characteristics. The data used was drawn from the 2003 Kenya Demographic and Health Survey to assess the effect of maternal migration on the survival chances of children under age two between 1998 and 2003.

Results show that under-two mortality is high among migrants compared to non-migrants and consistently higher among children of urban –rural migrants. Proportional hazards model estimates reveal that the survival chances of children of migrants persist after controlling for socio-economic characteristics. The study underscores the importance of mother's education, especially beyond secondary levels, to child survival, preceding and succeeding birth interval, mother's occupation and means of fecal disposal have significant differential effects on child survival irrespective of their migration status.

The inequitable and limited distribution of health and related development programs especially those aimed at improving health and survival in many rural areas raises the question on whether rural mothers or parents can improve their children survival chances by moving from one place to the other.

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
APHRC	African Population and Health Research Centre
DHS	Demographic Health Survey
HIV	Human immune-deficiency Virus
ICPD	International Conference on Population and Development
KDHS	Kenya Demographic and Health Survey
MDGs	Millennium Development Goals
NCPD	National Council for Population Development
NRC	National Research Council
U.N	United Nations
UNICEF	United Nations Children Fund
UNPD	United Nations Population Development
USAID	United States Agency for International Development
WBDR	World Bank Development Report
WHO	World Health Organization

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CHAPTER ONE

INTRODUCTION AND STATEMENT OF THE PROBLEM

1.1 Introduction

Migration is a cumulative process with varying health effects at different stages of its progression. Differences in infant and child health may not be immediate, but may emerge as households and communities adopt and respond to the migration process. Although few studies have underscored the importance of infant survival in migration research (Brokerhoff, 1990), progress has been hampered by the recent reversals in the economies of sub-Saharan countries. In the absence of economic crises, migration can enhance survival by introducing the migrant to new job opportunities or community, good climatic region or better health services. On the other hand, given that migration involves considerable dislocation and disruption, there is a strong possibility that it can have negative effects on health and subsequently on infant and child survival, particularly during times of socio-economic and political crises (Aman, et al., 2002).

In most African countries, people still live in towns where the way of life or amenities are limited and in some instances, not available. Between urban and rural settlements, there may be very little differences in living conditions and towns sometimes have rural characteristics. Therefore, survival chances of infants and children are expected to vary greatly, given the heterogeneity of Kenya's cities and towns, in terms of population and living conditions.

1.2 Background

According to Population Reference Bureau Data sheet, 2006, the total population of Kenya by mid 2006 was 34.7 million; the rate of natural increase was 2.5 percent while Life expectancy at birth was 48 years. In 2004, Infant mortality rate was found to be 79/1000 live births and under-five mortality was 120/1000 live births (UNICEF, 2006). These were expected to reduce to 67 and 104 respectively by 2005 according to Sessional Paper No. 1 of 2000 on National Population Policy for Sustainable Development. Infant and child mortality are regarded as indices reflecting the degree of poverty and deprivation of a population. The primary causes of childhood mortality change as children age, from factors related mostly to biological conditions to factors related mostly to their environment according to Kenya Demographic and Health Survey, 2003.

Given the social structure of Kenya, infants and other early- aged children live with their mothers, at least, for the first very few years of life. The norms and values in Kenya typically and unconditionally demand that the woman take care of the newly born child, rather than the man or any other member of the extended family. Child fostering is not a viable option in Africa with children under age 5. The role of a mother thus has a community-wide meaning. This is because in a typical Kenyan tradition, child nurturing is the sole responsibility of the mother and after reaching the age of two years children attachment to mothers start diminishing as other factors take control as relying on others or probably another birth has occurred, hence not so much physically being with the mothers.

Estimates of dying by age five based on Trussell's Method showed a consistent trend from 1962 through 1989. However, between the 1989 and 1999 censuses, the rate of decline slowed drastically to the extent that there was a slight increase in child mortality for the younger mothers according to the Analytical Report on Mortality Vol.V, 2002, Kenya 1999 Population and Housing Census.

According to a study on the pattern of migration in Kenya, the majority of the migrants are young adults (20-49years). It is therefore highly possible that since the migrants are those within their reproductive ages, those mothers with children tend to move with them to join their husbands or to look for opportunities (Oucho and Odipo, 2000).

The findings by the African Population and Health Research Center on the urban poor in Kenya revealed that the urban slums may be having the worse infant and child health situation than the rural or the national level estimates the overall mortality rate was 40.21 per 1000 live births. The mortality rates for children under-one and those aged 12-24 months were about 56 and 35 per 1000 respectively. It was observed that children less than two years of age experienced higher mortality compared to the older ones .The mortality rate for children born to migrant mothers was found to be about two times higher than the one from non-migrant 97and 39 per 1000 for the two respectively (APHRC, 2004).

Child mortality as a functional outcome of household food security; maternal and childcare; health and clean water services as well as other basic causes, is affected by

insufficient community based approaches to health interventions prompting the movements of mothers with their children.

Kenya experienced some increase of internally forced migration in the 1994-2004 periods. The internal displacements were mainly attributed to natural disasters and to a lesser extent, conflicts (ICPD+10, 2004). Drought, floods, landslides and conflicts due to ethnic tensions (land clashes, banditry and cattle rustling), has become a more constant feature in Kenya and now occur more repeatedly, with alarming frequency leading to impoverishment, including pervasive food stress and increased malnutrition. During such situations, people, especially children die and communities are forced to employ traditional coping mechanisms such as migrating which also may in turn have effects on the children's health.

Migration both in its volume and composition is the traditional and effective answer to calamities or disasters that befall human beings and the most affected are children and their mothers, (Menken, 1985; Watkins, 1985). Differentials by place of residence show that the under-five mortality rate is 26 per cent higher in rural areas than in urban areas by 117 and 93 deaths per 1,000 live births, respectively (KDHS, 2003).

Given the striking trend in economic reversals in Kenya during 1980's and 1990's to date, there is need to refocus research on migration and its effect, particularly on child survival as the results from the KDHS-2003 indicate that under-five mortality increased from 110 deaths per 1,000 live births in the period five to nine years before the survey

(1993-1997) to 115 deaths per 1,000 live births for the period zero to four years before the survey (i.e., 1998-2003).

1.3 Problem Statement

People migrating to new settings in search of better opportunities or improved living conditions tend to face the same challenges or advantages enjoyed by their hosts. The prevailing situation may impact on their health status depending on how they integrate into the new settings. The most vulnerable are the children who accompany their caretakers since they are faced with new living and nutrition conditions. Throughout the developing world, migrant women in big cities are more likely than non-migrants to settle and remain in slums and shanty towns where basic amenities essential for good health and survival are unavailable (Brokerhoff, 1993). There are very few documented studies that have looked at the health conditions of these newly integrated children in their new setting in relation to their place of origin

The conventional belief is that rapid in-migration to the cities and towns of Kenya leads not only to such well known problems as shortages of housing, jobs and social services and to environmental degradation (United Nations, 1993), but also to increased threats to the health of children of migrants as well as to those of the existing resident urban population (Bogin, 1998).

The most important reasons for persistent high infant and child mortality in rural areas of many countries remain the subject of debate among researchers (WBD Report, 1993;

Desai, 1993) but probably include a variety of causes in each country. Among the most common and plausible explanations are the continued concentration of resources in large cities (UNICEF, 1994), the failure of immunization and family planning programs to achieve high levels of coverage in remote rural regions (USAID, 1991), the resurgence of HIV/AIDS, Malaria and other infectious diseases in some tropical environments (WHO, 1990; Bradley , 1991).

1.4 Research Questions

1. Does mother's migration status affect the survival chances of their children?

2. How does migration influence the health status of infants and children aged less than two years?

1.5 Objectives of the study

The overall objective is to establish the effect of mother's migration status on the survival chances of their children in Kenya. The specific objectives are: to examine whether child mortality risk differ significantly among migrants and non-migrants within different areas in relation to mother's movements and to establish the effect of selectivity, bio-demographic and environmental characteristics on under-two years child survival of rural and urban migrants.

1.6 Justification of the study

Few studies have focused on the health and survival of children who migrate from rural areas or are born to migrants in urban areas of developing countries, although several studies have incorporated maternal migrant status as an explanatory variable in child

mortality analyses (Fara and Preston, 1982; Mensch, et al., 1985; Brokerhoff, 1990; Milafu, 1998; Mbackz, et al., 1992).

There is evidence from the findings by the African Population Health and Research Centre in Nairobi slums, that migration is a risk factor for childhood mortality and the results shows that children from migrant mothers have a 76 percent higher mortality compared to those from resident mothers. This finding needs to be pursued by including other forms of migration in the whole country.

The limited progress of international health programs and rural development policies in improving child health and survival in many rural areas raises the question of whether rural mothers or parents can improve their children's survival chances by leaving their villages and settling in towns and cities, where modern health and social services, income-earning opportunities, superior housing, stable food supplies, and modern information on child health care are generally more available. In the absence of genuine attempts by governments to improve living conditions in rural areas, a case could be made that policies and measures implemented to restrict rural-urban migration discriminate against disadvantaged children and contradict the goals of child survival expressed at the 1990 World Summit for Children.

Examining the effects of migration on health is critical in Kenya where rural to urban migration is a long-standing tradition from many regions and stark inequalities in health outcomes are a common place (see Frenk. et al., 1989).

An understanding of the mortality risks associated with migration has the potential to influence health policy and the provision of health services through appreciation of the differential health needs of migrants relative to lifelong non-migrant groups. Migration and health are interlinked historical processes and this study is to explore the effects of migration on the key indicators of health; infant ant child mortality.

1.7 Scope and limitation.

This research covers only infants and children under the age of two years presumably because at this time, they are still attached to their mothers or primary caretaker who at any given time is bound to move with them. The coverage area is mainly Kenya and data source is Kenya Demographic and Health Survey (KDHS) 2003 using retrospective births of 5949 children aged between 0 to 59 months. The KDHS data does not contain information on frequency of moves, date and place of birth, or reasons for moving. Previous place of residence, usual place of residence and duration of stay will be used to measure migration status, (Caldwell, 1986; Du Toit, 1990).

Demographic and Health Surveys data is known to be less appropriate for time series analysis and there are very few studies with time varying factors (Becher, et al., 2004). It is worth noting that the main limitation of migration information obtained from data on place of birth is that we get the number of migrants but not the number of migrations.

CHAPTER TWO

LITERATURE REVIEW AND STUDY FRAMEWORK

2.1 Introduction

In theory, migration should enable households and communities to improve overall well being by raising standards of living and enhancing local environments (Durand, et al., 1996). In practice however, the effects may not be simple. Typically, those who migrate stay for extended periods before adapting to the places of destination. Hence it is advisable to interpret the household effects with caution while anticipating improved infant and child health as a motivating force of migration.

There are a number of different analytical frameworks through which to review the effects of different determinants on childhood mortality. Demographic research by Mosley and Chen (1984) has made the distinction between variables considered to be exogenous or socio-economic factors.

2.2 Migration and Child mortality

Migration research in sub-Saharan Africa has consistently recorded that adult migrants typically retain many norms and behaviors, occupations and living arrangements associated with rural ways of life even after many years of urban residence (Hanna and Hanna, 1981; O'Connor, 1983; Illiffe, 1987). In most cases, migrants make regular contacts with their places of origin or finally return to settle in their home villages later in life. Commitment to the village necessarily remained strong: - upholding its shared

values and practices, accommodating new arrivals into housing, social and occupational networks, making return visits and sending remittances. \

Most researches on child mortality in Kenya (Omariba, 1993; Obungu, et al., 1994; Ikamari, 2000; Kichamu, 1986; Kibet, 1981 and Ewbank, 1986) focused mainly on establishing the determinants and differentials of child mortality. However, an important yet not so much explored area of research is on the effects mother's migration on child survival. In assessing the effects of migration on child survival, one can differentiate three types of children who may be affected by their mother's migration; Those left behind by their mothers as foster-children in the care of relatives or with their fathers, those who accompany their mothers while migrating or soon follow them, children born after the migrants settle in the destination area, a large majority of who remain with the mothers through the first few years of life.

In the absence of economic crises, migrations from rural to urban areas can enhance survival by introducing the migrant to new job opportunities, community, and better health services. Previous studies indicate that people move to cities because of perceived benefits such as better education, income, and health (Caldwell, 1986; Brockerhof, 1990).

Migration of women from rural to urban areas is a strategy to escape low status and extreme poverty (Khasiani, 1995). Kavita Sing et al. (2005) while using indirect methods to understand the impact of forced migration on under-five mortality in Arua District, Uganda and Yei River District, Sudan concluded that not migrating in the face of threat

may have adverse impact on children's health. Migration is seen as a useful and desirable phenomenon leading to improved living conditions. However, empirical evidence has shown continuing migration of people despite evident deteriorating condition in these areas due to rising unemployment, industrial pollution and deteriorating standards of living.

Evidence that rural –urban migration enhances child survival requires further empirical studies in order to support and encourage the arguments of those who maintain that seasonal and long term mobility to urban areas should be allowed and in some cases facilitated as a family survival strategy or as a means to promote national economic growth (Richardson, 1989; Findley, 1992).

A prior study on Mexican migration suggests that the wealthiest and the poorest do not migrate (Arizpe, 1982), thus, migration is unlikely among persons at the ends of the socio-economic distribution. Other studies (Goldstein and Goldstein, 1981; United Nations, 1973; 1991) find that place of residence affects childhood mortality. Moreover, and perhaps, very important for health and survival reasons, migration may help to reduce mortality risks (Brockerhoff ,1990). While most of these studies give us an understanding of the wider perspective on the link between migration and childhood mortality, there is still the need to look closely at particular countries in great detail for us to fully understand how migration impacts on children.

Certainly, migration plays a role in child survival, and these studies have found evidence of both positive and negative impacts of mortality risks for children. The process of migration may directly improve child survival, even without the positive aspects of selection and adaptation, if the move involves relocating in a good climatic region or if there is equitable distribution of health services to all residents. For instance, differences in health care resources, community characteristics and the disease environment between origin and destination areas could also improve the survival prospects of migrant children (Brokerhoff, 1990; Sastry, 1996).

In theory, migration should enable households and communities to improve overall well-being by raising standards of living and enhancing local environments, (Durand et al., 1996). In practice however, the effects may not be simple.

Selection theory argues that occupation, education, and wealth explain a person's propensity to migrate (Caldwell, 1986). Rural to urban migration is related to the concept of selectivity, which in turn is beneficial to infant survival. Underlying this principle of infant survival is the recognition that rural-to-urban migration consists of people who are, more often than not, well educated, possess better occupational skills, have considerable wealth, and are mostly young compared to non-migrants.

A number of researches using data from African countries have established that educational attainment of parents is inversely related with infant and child mortality (Farah and Preston 1982). However, in Kenya, it is still not clear how much of the

relationship between education and child mortality is due to other factors correlated with education and what much is due to direct effect of education. A study in Ethiopia on migration, community context, and immunization observed that children from migrant mothers (rural-urban) had lower immunization coverage compared to those from non-migrant mothers (Kiros and White, 2004).

Mosley (1984) analyzed mortality trends and differentials in Kenya and concluded that the social and economic resources in the child's family primarily determine child survival. Jai (1985) argues that, the chances of infant survival depend upon the degree of care with which the infant is brought up.

The child survival advantages associated with urban residence in contemporary developing countries as documented in demographic literature (Behm and Vallin, 1982; Davis, 1973; Hobcraft, et al., 1984.) found that many rural residents who move to the city do so with expectations of higher earnings and an improved life cycle. However, in recent years, there has been a growing recognition that this urban advantage is misleading and inappropriate as a guide for national health strategies, in so far as it obscures enormous difference in health status and survival chances among and within urban areas of most developing countries (WHO, 1991; Harpham , et al., 1991; Brokerhoff , 1995).

The current preoccupation of international health organizations, health researchers and the popular media with the plight of recent settlers in urban slums, shantytowns and rural areas is certainly justified, given the deplorable living conditions and survival chances of

children and other vulnerable groups in many of these areas (Harpham and Stephens, 1991; WHO, 1991).

Education is a source of valuable wealth of knowledge at the disposition of the mother to take care of the health needs of the infant and/or child. Selection approach argues that occupation, education, and wealth explain a person's propensity to migrate (Caldwell, 1986). The selection hypothesis would suggest that the children of migrant women are related to migrant selection and adaptation, and thus, are more likely to experience lower infant mortality than are non-migrants because of other characteristics associated with differential mortality.

The concept of migrant adaptation implies that contact with the urban environment will eventually lead to a change in the attitudes, motivations, and life style of migrants and partial or complete occupational and residential integration into host society. Both of these forms of adjustment are often facilitated by positive migrant selection in rural areas (Brokerhoff, 1990:602).

Migration is not always beneficial to child health. The difficulties associated with adapting to new environment and the disruption caused by the move itself are two factors that have been identified as being positively associated with child death among migrants (Brokerhoff, 1994. 1995 ; Tam, 1994). In addition, although movement from rural to urban areas is associated with improved living conditions, majority of the rural-urban

migrants live in poor crowded and dilapidated dwellings in the slum areas of the towns and cities (Brokerhoff and Brennan, 1998).

Environmental factors such as piped water; sanitary toilet facilities (flushed toilets) and place of residence are well known to have impact on infant and child survival. Availability of good drinking water and access to clear toilet facilities within the household is vital in reducing water borne diseases and other infections from unsanitary toilet conditions. Increased access to piped water contributes to mortality decline in many developing countries (Casterline et al., 1980; DaVanzo and Habicht, 1986). Environmental risk factors account for about one-fifth of the total burden of disease in low income countries according to recent estimates (World Bank, 2001; WHO, 2002) reports that among the ten identified leading mortality risks in high-mortality developing countries, unsafe water, sanitation and hygiene ranked second.

Environmental condition can lead to serious illness for the mothers and or the child and can increase the probability of death for a newborn child by a factor of ten. This is because of inadequate health care during pregnancy, poor nutrition among mothers and their infants, poor housing conditions, and decline in the level of child care (Menhard and Morn, 1987).

Poor environmental sanitation is a common situation in urban slum communities; toilet coverage is very low, only1.6 percent has access to their own toilet, there are no sewers or drainage systems and there is limited access to safe drinking water (Amayunzu and

Taffa, 2004). This is typical of nearly all slum areas in Kenya and these conditions impact dramatically on child survival especially for those who migrate to such places with the aim of improving survival status. This is because unsanitary toilet facilities and unsafe drinking water are expected to be negatively associated with survival.

In Kenya between one and two million migrants reside in cramped conditions in Nairobi's slums and other towns without proper access to sanitation or affordable clean water. Children in such areas are exposed to enormous health risks. A demographic and health survey conducted in various Nairobi slums between 2002 and 2004 by APHRC reports that infant, child, and under 5 mortality rates are about 20, 65, and 35 percent, respectively, higher in the slum communities of Nairobi compared to rural Kenya while incidence of common childhood illnesses are two to three times higher in the slums relative to rural areas. Therefore, survival chances of infants and children are expected to vary greatly, given the heterogeneity of Kenya's cities and towns, in terms of population and living conditions.

Jacoby and Wang (2003) examined the linkages between child mortality and morbidity, and the quality of the household and community environment in rural and urban China using a competing risk approach. The key findings revealed that access to safe water or sanitation reduces child mortality risks by about 34 percent in rural areas; higher maternal education levels reduce child mortality and has strong health externalities (i.e., controlling for other factors, a child living in a neighborhood with more educated mothers has about 50 percent lower mortality risk); access to safe water/sanitation and

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immunization reduce diarrhea incidences in rural areas, while access to modern sanitation facilities like flush toilet reduces diarrhea prevalence in urban areas.

Previous studies suggest that maternal child-care behaviour; the quality of household facilities and fertility (such as birth interval and birth order) is among the most important types of adaptation that are associated with infant mortality. For example, there is evidence to suggest that care of women during pregnancy has a positive effect on neonatal mortality (Hecht. and Cutright, 1979; Silverman, 1970).

In developing countries where most births take place at home (Omran and Standley, 1976) with little understanding of disease transmission among infants (Garenne and van de Walle, 1985), exposure to risk is high as compared to the urban areas where health services are more conveniently available.

Children born to adolescent mothers as well as to mother age 35 and above had the greater risk of death than the children born to young mother of age 20-34. The risk of childhood death decreases with the increase of birth interval. This is according to previous studies in Bangladesh and elsewhere (Miller, et al, 1992; Hagga, 1989; Hobcraft, 1991; Pebley and Millman, 1986).

2.3 Conceptual Framework

Related concepts attempting to explain infant and child survival in Sub-Sahara Africa can be divided into three broad categories; disruption, selection and environmental

perspectives. Previous research shows that a woman's migration has a strong association with her children's survival status. Brockerhoff (1990), Farah and Preston (1985) and Mensch, et al. (1985) suggest three factors that may help explain this relationship. First, it is argued that selection of migrants from population at origin according to education, wealth, income and age, among others, are important traits in enhancing survival of their children.

Second, differences in community characteristics in addition to disease environment between origin and destination areas are strongly related to the health status of the child. Third, it has also been argued that difficulties faced by migrants in adapting to their new environment may also affect the survival status of their children. Finally, the survival status of the children of migrants is found to be associated with the disruption caused by the move itself.

This study borrows main concepts applied in studies of migrant fertility to illustrate some mechanisms by which migration may affect child survival. These concepts are: migrant selectivity before the move; life disruption around the time of migration; and adaptation in the new environment in the period following immigration (Findley, 1982; Golstein and Goldstein, 1982; Lee and Farber, 1984).

Mosley and Chen (1984) gave five major sets of proximate determinants categorized as: maternal factors, environmental contamination with infectious agents, and availability of nutrients to the fetus and infant, injuries and personal disease control variables that

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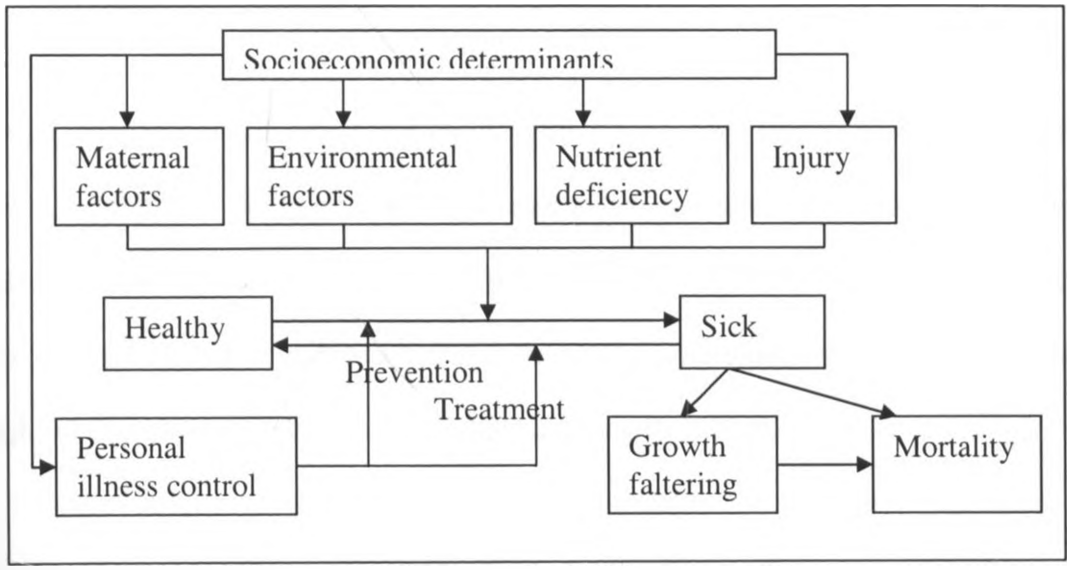
Mosley and Chen (1984) gave five major sets of proximate determinants categorized as: maternal factors, environmental contamination with infectious agents, and availability of nutrients to the fetus and infant, injuries and personal disease control variables that

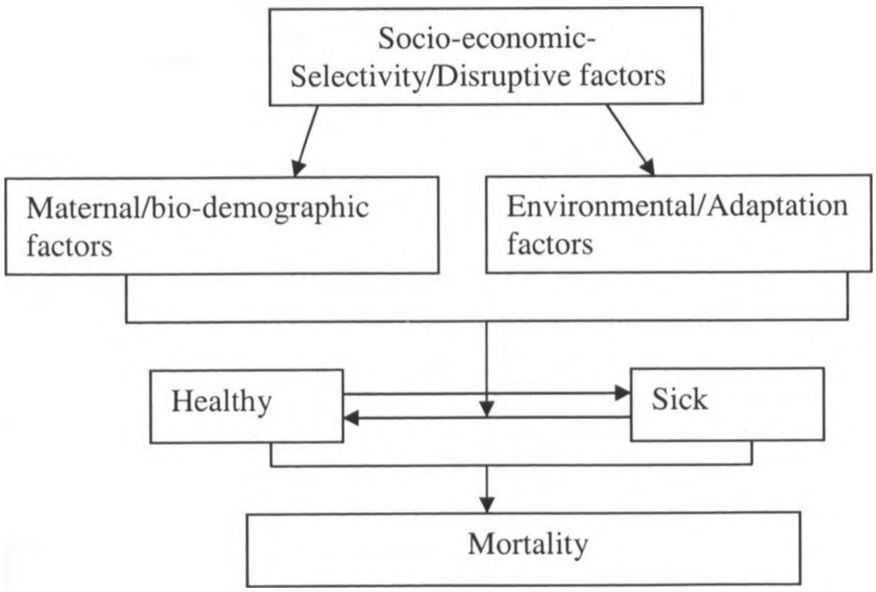
directly influence the risk of morbidity and mortality. All the social and economic determinants operate through these variables to affect the child survival.

Fig 1: **Conceptual Framework**.



N/B: Conceptual framework by Mosley and Chen (1984).

Figure 2: **The Conceptual framework as adopted and modified from Mosley and Chen (1984)**



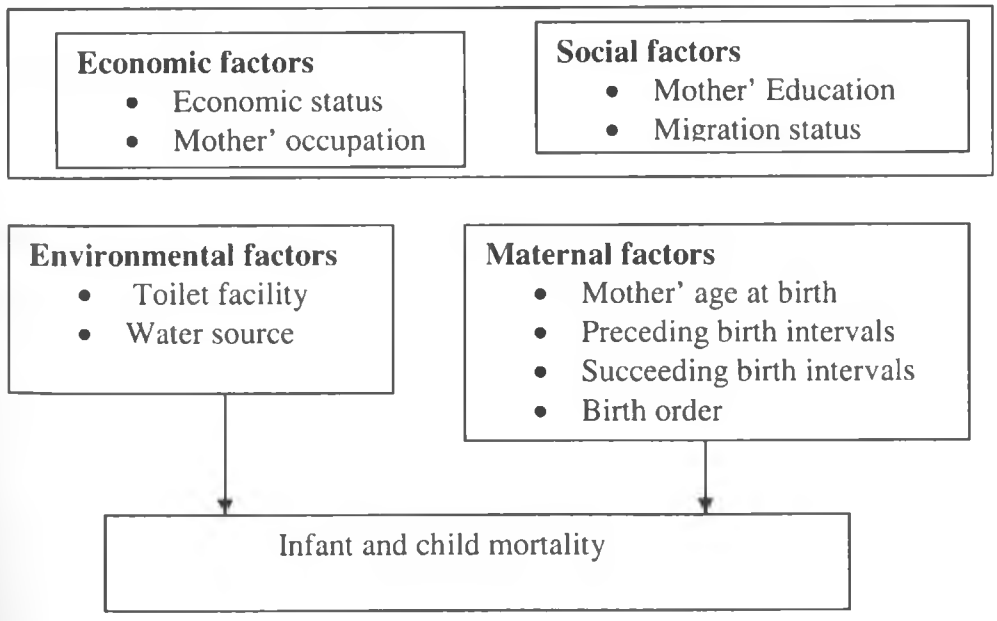
2.4 Operational Framework

Survival of the child in the rural areas depends on the rural characteristics such as; the level of development in terms of health facilities and infrastructure, ecology, and the individual socio-economic status.

Although determinants of infant and child mortality are very complicated, they can be roughly divided into socio-economic, demographic and environmental factors. This operational framework clarifies the distinction on the conceptual level between the effects of migration on child survival and parental background variables that operate through subsequent socio-economic variables and the effects that do not.

Migration as a process is viewed as selective in terms of education, region, age, income, marital status etc. These factors in turn affect mortality differentials (Hill and Hill, 1988; Owino, 1988; Anker, et al., 1987; Makotku, 1989; Kichamu et al 1986; Mutai, 1987).

Figure 3: Operational model explaining under-two mortality, adopted from Mosley and Chen (1984)



2.5 Definition of terms

Migration

This is the movement of people across a specified boundary for the purpose of establishing a new or semi- permanent residence.

Residence

This defines the state of being physically present in a given residential unit for a defined threshold of life.

Duration of Residence

Residence is the period spent in a particular area as opposed to other areas. This ignores the multiple moves.

Urban Areas

For the purposes of this study, an urban area is determined by; number of people, services provided and productive activities available. The term "urban" as used in this study refers to settlements in which there are 5,000 or more residents (UN, 1994).

Rural Area

This refers to any place of or like countryside or with village life.

Urban-rural: Between urban and rural settlements lies an area with lifestyles of neither rural nor urban patterns, in which a town may sometimes have rural characteristics. Alternatively this may refer to the movement of people from urban to rural areas.

Selectivity

Migrants are usually selected from place of origin according to personal or household characteristics that increase or lower their children's likelihood of dying in the place of origin. Certain Traits determine migration behavior.

Adaptation

This depends not only on the behavior and socio-economic mobility of the migrant mother or family, but also on the receptivity of the existing population of destination and the conditions underlying migration. This depends on the migrant's adjustment in the new place.

Disruption

The magnitude of disruptive effects on child Survival is likely to depend on the type of migration involved and the way lifestyle may be interrupted; materially, ecologically or socially.

2.6 Study hypotheses

1. Duration of residence in the place of destination has an effect on the child survival relationship such that those with longer duration of residence have better child survival chances

2. Migrant mothers are selected according to personal e.g. level of education or household characteristics such as economic or wealth status that increases their children's survival probabilities.

3. The risks of under- two mortality is associated with mother's migration.

CHAPTER THREE

DATA AND METHODS OF ANALYSIS

3.1 Data Source

The data for this study is drawn from the Kenya Demographic and Health Survey of 2003 which provide detailed information on maternal and child health, mortality, birth histories and characteristics of eligible women ages 15-49 and their spouses.

This study uses data on birth histories to examine infant and child mortality disparities among migrants and non migrants. A total of 5949 infants and children born five years before the survey are used in the analysis. These births are analyzed according to the following migration typologies; Urban-urban, Rural-rural, rural-urban, urban-rural, urban non-migrants and rural non-migrants.

It is important to note that the measure of migrant and non-migrant include migration status, early urban exposure and socio-economic characteristics. Although urban residents may have survival advantage over rural residents, rural-urban migrants may be at a disadvantage, in spite of the expected benefits to be derived from health services (for example, their proximity to doctors, nurses and health services).

3.2 Explanatory Variables

In this study, the four sets of factors expected to influence mortality include; migrants' status, socio-economic characteristics, environment and bio-demographic characteristics. As noted, the variables include measures of disruption, selection and adaptation.

Individual socioeconomic characteristics and fertility related variables contribute to measures of selection and adaptation.

In order to gain a better idea of how migration affects mortality, this study examines infant and child mortality among migrants and non-migrants.

The explanatory variables are chosen to capture the effects of selection and adaptation, within the context of migration, on infant and child mortality. First, because of the presumed advantages enjoyed by migrants, children of rural-urban migrants are more likely to survive than non-migrants. Residential background is one of the important measures of selection and adaptation. The use of residential background is predicated on the assumption that earlier exposure to urban living may facilitate migrant selection and quick adaptation to urban environment than first time rural-urban migrants.

These factors are thought to enhance infant and child survival. Selectivity and adaptation will be measured using respondents' socio-economic characteristics. To isolate the impact of migration induced disruption on child health, we have to control for the selective characteristics of migrants, the time they have had to adapt and the differences in access to infrastructure that exists between origin and destination areas Availability of good drinking water and access to good toilet facilities within the household is vital in reducing water borne diseases and other infections from unsanitary toilet conditions. Increased access to piped water contributes to mortality decline in many developing countries (Casterline, et al., 1980; DaVanzo and Habicht, 1986).

Finally, the bio-demographic control variables are; - mother's age at birth, preceding and succeeding birth interval, and birth order. Mother's age at birth is measured in single years ranging from 13 to 49. Birth intervals are dichotomous dummy variables measured as; first and last births, less than 18 months, 18-23 months and 24 months or more. Birth order is categorized into three groups: 1; 2- 3; 4-5, and 6 or higher.

Specific variables used and their categorization is shown in the table 1 below;

Table 1: Definition of covariates used in the study

Variables	Categories
Migration	
Migration status	0. Rural Non-migrants; 1. Urban Non-migrant 2. Urban-Urban; 3. Urban-Rural 4. Rural-urban; 5. Rural-rural
Socio Economic	
Mother's Education	1. No/Pre.; 2.Primary; 3. Secondary/Higher
Mother's occupation	1. No work; 2.Agriculture/Others; 2. Professional-office.
Economic Status	1. Poor; 2. Middle class; 3. Rich
Environmental	
Type of toilet facilities / Fecal disposal	1. Open surface/Others ;2.Pit latrine/toilet; 3. Flush
Sources of water	1. Piped water; 2. Well; 3. Other sources
Bio-demographic	
Mother's age at birth	1= <19; 2. 20-34 ; 3=35 and above
Preceding birth interval	2= less than 17; 3= 18-23; 4= 24+; 1. First births
Succeeding birth interval	1= less than 17; 2=18-23; 3=24+; 4= last births
Birth Order	1=1; 2=2-3; 3=4-5; 4= 6+;

3.3 Method of analysis

The proportional hazards model used in this study as developed by Cox (1972), allows one to estimate the effects of individual characteristics on survival time without having to assume a specific parametric form for the distribution of time until the event occurs.

Cox proportional hazard model is used to assess the relative effect of the migration status (migrant or non-migrant) of the mother on infant and child survival rates (Valsecchi et

al., 1996). It is also used to estimate the relation between migration and other explanatory variables (such as socio-economic and demographic characteristic of mothers) and infant and child survival in order to allow for the censoring. The dependent variable is a time dependent stochastic variable (Age of child at death) with censored observations (Child is alive at the time of survey). In testing the level of significance and to compare the relationship between the two variables, the chi-square distribution test is used.

In the analysis, the variable of interest is migration status and its effect on child survival status. Migration status is an inclusive measure of child and maternal characteristics specifically constructed to take into account selection effects. Because migration is a general indicator of mother's movement and the number of years lived in an area, there is concern about mortality risk differentials of children born in certain areas and exposed to risks in other areas, compared to children with mixed rural-urban exposure.

In this study, migration status will be analyzed as follows: urban non-migrants; rural non-migrants; rural-urban-migrants; urban-rural; urban–urban and rural-rural migrants. I demarcate those who are rural non-migrants as the reference category.

3.4 Analytical Strategy

One reason for including explanatory variables in a survival model is simply to make predictions that are more accurate; the existing literature suggests quite clearly that individual characteristics, previous experiences, selectivity, and environmental factors help to predict child mortality (Brockerhoff, 1990; Mensch, et al., 1985).

Any infant mortality disadvantage of urban migrants relative to urban non-migrants should be obvious when selection and adaptation characteristics are held constant. As such, it might be expected that socioeconomic and demographic variables included in the models should account for much of the infant and child mortality differential among rural and urban natives.

The dependent variable is the risk of death during the first two years of life. Death indicates the time from birth until death measured in months. The censoring variable equals 1 if the child died during the first 23 months and equal zero otherwise. The analysis will be a series of Cox proportional hazard regression equations including in sequence migration status, socio-economic, environmental and demographic factors. This will allow for an assessment of the direction and magnitude of the pattern of infant and child mortality by migration status, including the extent to which selection and adaptation help to account for variability in infant or child mortality.

The proportional hazard model that assumes a hazard rate of the form gives the form of the model used in this study:

$$\ln [h(t)] = p_1 D + q_1 S + r_1 E + v_1 M1 + v_2 M2;$$

Where

$\ln[h(t)]$ is the risk of death

$\ln(h)$ is the unspecified baseline hazard

h= hazard of dying at time t

D= a set of demographic-related predictors of child mortality (length of preceding & succeeding birth interval, birth order, mother's age at birth),

S =Selectivity related predicators;- denotes a set of socio-economic characteristics of migrants thought to be causally related to infant and child mortality;

E= Environment –related factors (Toilet facility, Source of water); and

M= a set of dummy variables for duration of stay in a place by a mother (if <5 or > 5 years- whether migrant or non migrant; by typology)

Such that

M1= 1 if 0-23 months after move, 0 otherwise and

M2= 1 if more than 24 months after move, 0 otherwise;

And

The vectors p1, q1, r1, n1, v1...v2 are parameters to be estimated and also show the direction of effect of the various elements.

The dummy variables represented by M indicate whether migrants' children were exposed to mortality in rural or urban environments between ages one month and 23 months. Respectively, they are proxies for exposure after migration (M1), or to areas of destination conditions longer after migration (M2).

Where

0=Non -migrants and 1= Migrants; M1 and M2 are static variables, in that child born during these stages of migration are presumed to have been exposed to only one type of environment. The independent variables included in the model, other than stage of migration, are chosen on the basis of their well-documented relationship with early child mortality in low- income settings (Hobcraft et al., 1984. 1985).

The analysis is also constrained to use explanatory variables that are known to have applied to children or their mothers at specific stages of migration. The dummy variable for urban non-migrant status is of particular interest insofar as it provides a purer measure of the early child survival advantage of urban children by excluding urban migrants, so that it is not biased by their possible exposure to mortality in rural environments.

CHAPTER 4

DIFFERENTIALS AND DETERMINANTS OF EARLY-CHILD MORTALITY

4.1 Introduction

In what follows, the study investigates whether there is any difference between under-two child mortality among migrants and non-migrants. It is important to note that the measure of migrant and non-migrant include migration status, rural or urban exposure and socioeconomic characteristics. Although urban residents may have survival advantage over rural residents, rural-urban migrants may be at a disadvantage, in spite of the expected benefits to be derived from health services and other socio economic factors. This is because urban residents and migrants are greatly affected by the economic difficulties than rural residents.

Migration status is an inclusive measure of child and maternal characteristics specifically constructed to take into account bio-demographic, socio-economic and environmental effects. Because migration is a general indicator of a person's movement and the number of years lived in an area, there is concern about mortality risk determinants of children born in certain areas and exposed to different life conditions elsewhere. Migration status in this study is categorized as follows: urban natives, rural natives, rural-urban-migrants, urban-rural migrants and rural-rural migrants.

4.2 Presentation of the study variables

According to information in Table 2, out of the 5949 children which formed the total study population, about 8 percent of them died within their first two years of life while

0.7 percent died between age two and five years. This means that more children die within their early childhood.

About 48 percent of the total births were born to rural women who never migrated with each of the rest of the migration status categories having less than 20 percent of the children. About 58 percent of mothers had primary level of education while those with no education or pre-school and secondary and higher education almost at the same level of about 20 percent each.

Mothers in professional employment were less than 20 percent with about 38 percent unemployed while 43 percent were in agriculture or other menial jobs. Concerning the economic status of the mother, a reasonable number of about 44 percent was poor; 38 percent rich while below 20 percent leading an average life.

Regarding household environmental conditions, 54 percent of births were in households that use water from unsafe surface and other sources; about 27 percent had piped water while almost 20 percent use water from protected wells.

In terms of fecal disposal, 64 percent of households had access to pit toilets or latrine

The results show that majority of births were from mothers in their prime reproductive ages of 20-34 years. About 15 percent of children were born when their mothers were still very young while about 13 percent when their mothers were more than 35 years old.

Out of the 5959 births, of the previous births, 7 percent were below 17 months; there is also an indication that birth intervals are relatively long in Kenya with over 50 percent of the children being born 24 months after their preceding sibling birth. In the succeeding birth intervals, the majority were last births, 68 percent while the rest were below 20 months.

The majority of births were of birth order 2-3; 25 percent of the births were first order births with birth orders of six and above at almost 20 percent.

Table 2: Percentage Distribution of Study Variables

Covariates	**Number**	**Percent** *%*
Age of Child		
0-23 months- dead	462	7.8
24-59 months-dead	40	.7
Alive	5447	91.6
Migration Status		
Rural non Migrants	2863	48.1
Urban non Migrants	741	12.5
Urban-urban Migrants	434	7.3
Urban-rural Migrants	377	6.3
Rural-urban Migrants	359	6.0
Rural-urban Migrants	1175	19.8
Socio-economic		
Mother's education		
No education/Pre school	1210	20.3
Primary	3456	58.1
Secondary/Higher	1283	21.6
Mother's Occupation		
No work	2260	38.0
Agric/Dom/Manual/Others	2561	43.0
Professional	1128	19.0
Economic Status		
Poor	2616	44.0
Middle class	1077	18.1
Rich	2256	37.9
Bio-demographic		
Mother's age at birth		

Table 2 continued.....

<19	872	14.7
35 & above	766	12.9
20-34	4311	72.5
Preceding birth intervals		
<17	427	7.2
18-23	624	10.5
>24	3400	57.2
First births	1498	25.2
Succeeding birth intervals		
<17	318	5.3
18-23	420	7.1
>24	1166	19.6
Last birth	4045	68.0
Birth Order		
1	1488	25.0
4-5	1184	19.9
6 & above	1172	19.7
2-3	2105	35.4
Environmental		
Water Source		
Well	1139	19.1
Surface/others	3183	53.5
Pipe	1627	27.3
Fecal disposal		
Pit toilet/Latrine	3823	64.3
Non/Others	1583	26.6
Flush	543	9.1

Source: KDHS-2003

4.3 Infant and Child risk of death as per the life table

From the life table, the calculation is done for deaths in months for each of the nine age segments chosen for this study. The analysis from the life table is to enable the study summarize the age specific risk of death shown in table 3.

Table 3 below presents the results of the observed risk of death in each of the nine age intervals and the equivalent life table values. The obtained instantaneous risk of death in each of the age intervals show that the risk is highest in the age segment 0-3 months at

217 out of about 462 deaths in the ages 0-23 months under study. After the first three months, the hazards decrease sharply with increase in age of the child. This may be due to biologically related problems associated with the neonatal deaths. The risk is lowest within one and a half first years of life but increases a bit due to environmental and socio-economic influence over the child as reliance on the mother reduces and the child is subjected to contamination and other injuries as stated by Mosley and Chen in their 1984 model.

The computed life table values for the probabilities of dying before the specified ages show that infant mortality rate based on the sampled 5949 births in the 1998-2003 period is about 60 per thousand live births while about 77 out of 1000 live births die before attaining age of two years. These results do not differ very much from estimates of 61 and 79 per thousand live births for rural and urban Kenya respectively as contained in the KDHS 2003.

Table 3: Empirical risk of death before the age of two-years

Interval in months	Total deaths	Risk of death	Age (x)	$_xS_n$	l_x	$_xq_0$
0-<3	217	.0124	0	.9635	1.000	-
3<6	78	.0046	3	.9864	.9635	.0365
6-<9	53	.0031	6	.9906	.9504	.0496
9-<12	33	.0020	9	.9941	.9415	.0585
12-<15	31	.0019	12	.9944	.9360	.0637
15-<18	7	00004	15	.9987	.9307	.0693
18-<21	16	.0010	18	.9971	.9296	.0704
21-<24	25	.0014	21	9955	.9269	.0731
24+	-	-	24	-	.9227	.0773

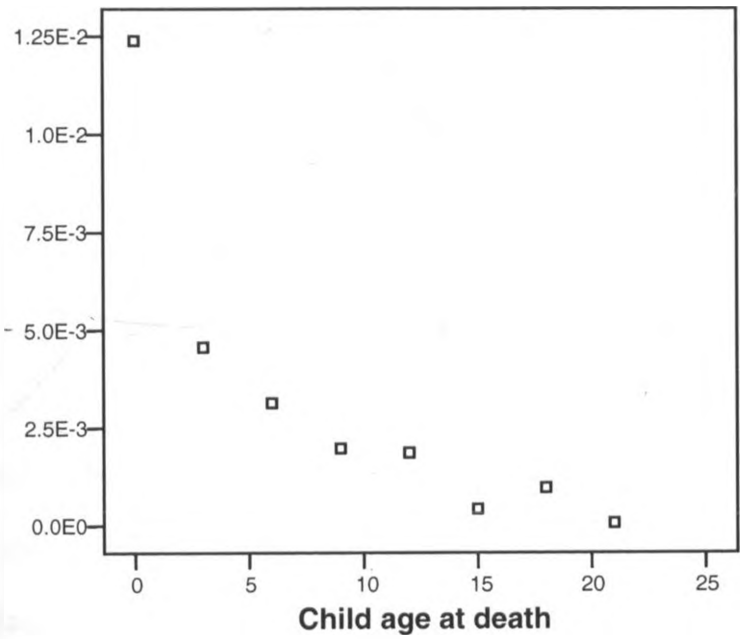
Source: KDHS-2003. This table is based on the mortality of the children population of Kenya as per the life-table computation in the years between 1998-2003

Key: $_xS_n$:- Survival probability in age interval x to x+n

l_x:- Probability of surviving at age x. $_xq_o$: Probability of dying by age x

The results in table 3 above conform to the expected reversed J-shaped age specific mortality pattern at early periods of life when children experience higher risks of death, which declines as the child age and picks up later in life as shown in figure 4 below;

Figure 4: Hazard distribution as per the life table



4.4 Association between the Risk of Dying and Independent Variables

The Cox Proportional hazards model is used to analyze the chance of dying between ages zero month and 23 months in the five years preceding the survey. Since migrant mothers may have moved at any time in the ten years, their calendar period for exposure to risk of child mortality is roughly similar to that of non-migrants.

This study can not distinguish the types of urban or rural locations in which migrant child reside due to lack of information on whether migrants moved between types of rural or urban locations after leaving the place of origin.

A series of Cox- models are fitted to estimate the relative risk of a child dying within age of two, in the five-year period preceding the survey. The hazard model is preferred for this study because it allows for the simultaneous incorporation of all the used age intervals and also allows for the utilization of both censored and uncensored survival cases in the data set.

4.5 Bivariate Cox Regression Parameters:

In the bi-variate analysis, each control variable is evaluated along the dependent variable, which is under-two mortality. The intention is to find if there is any significant gross effect of the variable of interest on child mortality by controlling only for one correlate at a time in order to realize independent observation as per the major assumption of the hazard models.

Results in table 4 show that the risk of dying are consistent with results from other studies and are not surprising. In this case, the goodness of fit of the model is better in the migration status and the succeeding birth intervals models.

Lifelong urban and rural residents experience significantly lower chances of dying than their migrant counterparts, the children most at risk are those of urban-rural migrants whose relative risk of death is about 90 percent higher than those of rural non-migrants. There is however no significant difference between children within the other migration typologies apart from those of urban non-migrants and rural-rural migrants who show a weaker association compared with those of rural non migrants.

The risk of early child mortality is moderately low at a bout 14 percent when the mother has some level of primary education and greatly declines by 40 percent when the mother has secondary or higher education as compared to when the mother has no education or pre school level.

In terms of mother's work status, children of unemployed mothers and those in nonprofessional jobs experience a weaker relationship with those in professional employment. This may be due to the fact that a mother's engagement elsewhere has very little difference in the survival status of the child.

The mortality risk is also insignificant when it comes to a mother's economic and work status though negatively associated with the risk in child mortality. This means that with some income and improved living conditions the risk of dying goes down.

There is a difference between sources of water for use by the household. Those using well water have a slightly significant lower mortality risk of about 22 percent compared to those using surface water.

Regarding the type of toilet facility, those using pit latrines or toilets are likely to experience a reduced child mortality risk by 40 percent as compared to those using open places or other unsanitary types of toilet facilities.

There are some significant mortality differentials by length of preceding birth intervals as observed. Relative to first births, the study has found a higher risk of death of about 60 percent for children born within 18-23 months after their preceding sibling while those of below 17 months have a higher risk of mortality by 2.4 times.

Succeeding birth interval provides a strong evidence of the risk of death. Shorter birth interval increase the risks of infant and child mortality; the effect is strong when the birth interval, for example, is lower than 17 months, where the risk of death is increased by 6 times and is 2.7 times higher in the interval, 18-23 as compared to those of last births which may be longer, children of birth order 6 and above are more likely to experience high mortality risk than those of order 2-3 by a margin of almost 40 percent as compared to those of first order births.

Table 4: Bivariate Cox Proportional Hazard Model

	Bivariate Model				
Covariates	**Relative risk of death for children, aged 0-23 months**				
	B	**SE**	**Sig.**	**Exp. (B)**	**-2Log likelihood**
Migration Status					**7981.676**
Rural non migrants (ref)				1.000	
Urban non migrants	-.104	.159	.512	.901	
Urban-urban migrants	.186	.176	.290	1.205	
Urban-rural migrants	.653	.155	.000*	1.921	
Rural-urban migrants	.168	.192	.382	1.183	
Rural-rural migrants	-.048	.130	.714	.953	
Mother's education					**7989.450**
No education/Pre School (ref)				1.000	
Primary	-.157	.112	.161	.855	
Secondary/Higher	-.490	.150	.001**	.613	
Mother' work Status					**7997.802**
No work (ref)				1.000	
Agriculture/others	-.040	.106	.706	.961	
Professional	.176	.125	.160	1.192	
Economic Status					**7998.807**
Poor(ref)				1.000	
Middle class	-.108	.130	.408	.898	
Rich	-.145	.104	.161	.865	
Source of Water					**7995.542**
Surface/others (ref)				1.000	
Well	-.240	.142	.091	.786	
Piped	.015	.121	.903	1.015	
Fecal disposal					**7995.399**
Open place/others (ref)				1.000	
Pit latrine/Toilet	-.401	.194	.039	.670	
Flush toilet	.048	.105	.647	1.049	
Preceding birth intervals					**7958.989**
First births (ref)				1.000	
<17 months	.893	.158	.000*	2.442	
18-23 months	.463	.159	.004***	1.588	
>23 months	.013	.120	.916	1.013	
Succeeding birth intervals					**7806.020**
Last births (ref)				1.000	
<17 months	1.835	.121	.000*	6.267	
18-23 months	1.011	.143	.000*	2.749	
>23 months	.173	.132	.189	1.189	
Birth Order					**7985.850**
1(ref)				1.000	
2-3	.093	.128	.467	1.098	
4-5	.043	.148	.773	1.044	
6+	.470	.134	.000*	1.601	

Table 4 continued.....

Maternal age at birth					**7995.850**
<19 years (ref)				1.000	
20-34 years	-.071	.133	.592	.931	
35+ years	.226	.167	.175	1.254	

Note: Ref= reference category; Standard errors are in parenthesis; Factor significant levels: - *= p<0.000; **=0.01; ***= 0.05.

4.6 Covariates of Infants and Under-two Mortality

Log-odds coefficients and their respective significance levels from the three level hazard analysis of infant and under-two mortality are shown in Table 4. The four columns (models 1-4) display different explanatory models to compare the additive effects of migration measures and overall predictive power Model 5 specifies the full model, in which the average early child mortality in Kenya is conditional upon the two-year period. For early child mortality, these models demonstrate the impact of socioeconomic, environmental and maternal factors and their association with mortality and migration status.

In general, the goodness of fit of the model becomes better with increasing number of covariates. Model-4 which includes all the considered covariates appear to have the best fit (log like hood =7715.840) compared to the other 3; (Model-1 =7958.630; model-2=7951.550 and model 3= 7721.497). The direction of the effect of the factors considered was maintained in most of the models.

Model 1 display the risk of dying by migration status and socio economic characteristics while models 2, 3 and 4 test whether migrants' and non migrants' differentials in mortality remain significant after controlling for the proximate determinants.

In model-1 table5, socioeconomic characteristics are controlled for and results show higher risk of under-2 mortality among the urban-urban migrants who are likely to experience a high mortality risk of 50 percent while children of urban-rural migrants significantly experience an increased risk of death by more than 2 times as compared to the rural non migrants.

In model 2, the risk of mortality among migrant children increase with those of urban-urban migrants, 73 percent; urban-rural, 2.1 times higher; while rural-urban, about 50 percent as compared to those children of rural non migrants.

In model 3, which controls for socio-economic and bio-demographic factors, the results show a persistent increase in mortality risk with hazard ratios of 1.62 for urban-urban migrants, 2.4 for rural-urban migrants and 1.45 for rural-urban migrants as compared to children of rural non-migrants.

Results from Model 4 show that children from migrant mothers still have worse survival as compared to those from non migrants with increased mortality risk of 85 percent for urban-urban migrants, 56 percent for rural-urban migrants while those children of urban-

rural migrants are likely to experience the highest risk of a bout 2.4 times compared to children from non migrant mothers.

This is consistent with other findings (Behm and Vallin, 1982; Davis, 1973; Hobcraft , et al., 1984) that many rural residents who move to the city do so with expectations of higher earnings and an improved life cycle. However, in recent years, there has been a growing recognition that this urban advantage is misleading and inappropriate as a guide for national health strategies, in so far as it obscures enormous difference in health status and survival chances among and within urban areas of most developing countries (WHO, 1991; Harpham , et al, 1991; Brokerhoff , 1995).

The findings contradict Khasiani's, (1995) argument that, migration of women from rural to urban areas is a strategy to escape low status and extreme poverty. This is because majority of migrants end up settling in a more similar or even worse off condition than that of their previous residence.

The investigations of other covariates show that mother's education, water source, mother's work status, type of toilet facility, birth intervals and birth order have significant effects on childhood survival.

Children of mothers with no or primary education are likely to experience higher risk of mortality of about 88 and 50 percent respectively as indicated in models 1 and 2 when

only socio economic related variables are controlled for, while in models 3 and 4, the average odds of child survival were about 40 percent higher for children of mothers with no education and those with primary level of education compared to those with secondary education and above. Palloni (1981) study underscored the importance of social circumstances in which the mother lives and concluded that in poorer settings, the less or uneducated mothers were far greater disadvantaged with respect to survival chances of their children compared to more educated.

Selection theory argues that occupation, education, and wealth explain a person's propensity to migrate (Caldwell, 1986). This means that parents with higher education tend to move to utilize their academic skills in terms of opportunities for gainful purposes, which in turn enhance survival chances of their children.

In Kenya, it is still not clear how much of the relationship between education and child mortality is due to other factors correlated with education and how much is due to effect of education. A review of work on education factor as one of the determinants of child mortality in Kenya contained in the United Nation (1986) publication indicate that education variable is a key social determinant yet its impact is confusing.

The study found that there was some significant difference in child mortality rates between unemployed and other occupational categories. However, due to difficulties in gathering accurate data on occupation in developing countries not many comparative investigations have been conducted on the effects of occupation on infant and child

mortality apart from the few studies such as the one done by Hobcraft et al., (1984) using World Fertility Survey from ten developing countries including Kenya. The effect of mother's employment outside home on child mortality has not been explored in Kenya but there is a possibility that this variable could affect child survival through difference it may cause in income, child-feeding practices and in use of medical care. Children of employed mothers are likely to experience a decrease in risk of mortality by average odds of about 25 and 23 percent for those in professional and agricultural and other menial employment respectively compared to those with no jobs.

In the study, mother's wealth status did not show any significant relationship with the child's survival status.

Results in model 2 show that Source of water used by the household has a significant difference in child mortality. Water from wells increases an infant and child's odds of survival by approximately 30 percent higher than the pipe borne water. This is because source of water may not necessarily determine the safeness of the same. The quality of water intake depends on conditions of use such as whether the families boil water before using it.

The study found that there was insignificant difference in child mortality rates in terms of type of toilet facility as a means of fecal disposal. This confirms finding by Baker (1999) which observed that in Malawi, owning a toilet does not have a significant effect on child mortality. She concluded that this variable is not a good measure of sanitation environment and has many limitations. Just because a household has sanitation facilities does not mean that it will be used hygienically or effectively by all members of the

households especially the children who must in most cases be assisted and consequently lead to much fecal contamination.

In model 4, children of mothers using open places and other unsanitary means of fecal disposal are likely to experience a higher risk of mortality by about 45 percent compared to those using flush toilets. These results support the gradual convergence of migrant and non migrant behaviors and living conditions implied by such concepts as migrant assimilation and adaptation in areas of destination (Brokerhof, 1995).

Model 3 presents mortality risk parameter estimates and coefficients for the standard hazard model that adds bio-demographic factors to socioeconomic, factors in preceding models. Generally, the pattern of effect of bio-demographic factors is consistent with the hypothesized expectations. Children from older mothers have better survival compared to those from very young mothers. However in this study, mother's age at birth of the child depicted unexpected relative insignificant difference in mortality risk.

There are significant differences by length of the preceding and succeeding birth intervals and birth order. Relative to first births, children born less than 17 months are 28 percent less likely to die in childhood. Children born within 18-23 months are also likely to experience a reduced risk of mortality by about 50 percent.

The risk of death within five years of birth is reduced by about 43 percent when there was a birth in less 17 months, compared to the last births and the risk is even lower in the

intervals between 18-23 and more than 23 months by about 80 and 84 percent compared to last births.

This finding provides support to the idea that demographic factors, such as birth interval can also explain the association between migration status and child mortality. The findings by previous research on birth intervals confirm the effects of the survival status of the preceding child particularly on infant death (e.g. Das Gupta, 1990; Sastry, 1996; 1997; Ikamari, 2000).

Gribble (1993) has noted that short birth intervals affect child survival due to sibling competition because, with the birth of each additional child, the average allocation decreases and so closely spaced children face higher competition among each other for familial resources.

One of the specific objectives of this study was to examine whether child survival differ significantly among the migrants and non-migrants in Kenya. This is tested in model-4 by controlling for all the variables of the study irrespective of migration status. The results indicate that, compared to the children of non-migrants, children of migrants have a higher risk of under-2 mortality. Results presented in model 4 show that the effect of environmental, bio-demographic and socio-economic factors on mother's migration status was highly significant and the risk of mortality is very high for children of migrant mothers compared to cases in models 1 and 2. This may be due to integration and adaptation problems owing to the duration of stay in a new place.

Results from model 4 after controlling for all the variables of the study, show that the risk of death is higher for migrants, those with no or primary education, those using open places as their toilet facility and those of birth order 4-5 as compared to their respective reference categories. However, risk of under-two mortality significantly decreased with mother's work status and type of birth interval.

In general, the study results as per the 4 models shows that mortality risk was higher among children of migrant mothers (urban-urban, urban-rural and rural-urban) while there is a relatively weaker relationship among those of rural-rural as compared to the children of non-migrants. This is in conformity with findings from a study on the effect of Mother's Migration on Childhood Mortality in the informal Settlements of Nairobi which established a persistent disadvantage of children born to migrant mothers irrespective of the length of stay in the receiving zone. (Adama, et al., 2004). This may be due to the difficulties for mothers to develop socio-economic network outside their area of origin.

Table 5: Multivariate Cox Proportional Hazards Models

Covariates	Relative risk of death for children, aged 0-23 months			
Migration status	Model 1	Model 2	Model 3	Model 4
Rural non migrants -ref	1.000	1.000	1.000	1.000
Urban non migrants	1.026(.025)	1.143(.134)	.989(-.011)	1.101(.096)
Urban-urban migrants	1.494(.401)***	1.732(.549)**	1.622(.483)***	1.852(.616)*
Urban-rural migrants	2.154(.767)*	2.121(.752)*	2.407(.879)*	2.385(.869)*
Rural-urban migrants	1.382(.323)	1.505(.409)***	1.451(.372)***	1.555(.442)***
Rural-rural migrants	.990(-.010)	.989(-.011)	1.185(.169)	1.180(.166)
Maternal education				
Secondary/Higher-ref	1.000	1.000	1.000	1.000
No education/pre school	1.882(.632)*	1.880(.631)*	1.466(.383)***	1.447(.369)***
Primary	1.519(.418)**	1.461(.379)**	1.408(.342)**	1.358(.306)***
Mother's occupation				
No work-ref	1.000	1.000	1.000	1.000
Professional	.746(-.292)***	.745(-.295)***	.751(-.287)***	.755(-.281)***
Agriculture/others	.769(-.263)***	.752(-.285)***	.805(-.217)	.791(. -234)***
Economic status				
Rich-ref	1.000	1.000	1.000	1.000
Poor	1.161(.150)	1.074(.071)	.967(-.033)	.897(-.108)
Middle class	1.111(.106)	1.038(.038	1.001(.001)	.940(-.062)
Water source				
Piped-ref		1.000		1.000
Surface/others		1.193(.176)		1.107(.102)
Well		1.279(.246)***		1.203(.185)
Type of toilet facility				
Flush toilet-ref		1.000		1.000
Open place/others		1.389(.328)		1.448(.370)
Pit latrine/toilet		1.261(.232)		1.387(.327)
Maternal age at birth				
<19 years-ref			1.000	1.000
20-34 years			1.012(.012)	1.034(.033)
35+ years			.863(-.147)	.881(-.127)
Preceding birth intervals				
First births-ref			1.000	1.000
<17 months			.720(-.328)***	.715(-.335)***
18-23 months			.504(-.685)*	.498(-.697)*
>23 months			.001(-6.802)	.001(-6.785)
Succeeding birth intervals				
Last births-ref			1.000	1.000
<17 months			.427(.-851)*	.429(-.846)*
18-23 months			.199(-1.616)*	.198(-1.620)
>23 months			.164(-1.810)*	.165(-1.804)*
Birth order				

Table 5 continued.....

6+			1.000	1.000
1			431.707(6.068	422.876(6.047)
2-3			1.148(.138)	1.136(.128)
4-5			1.619(.482)*	1.587(.462)**
-2 log likelihood	**7958.630**	**7951.550**	**7721.497**	**7715.840**
X^2	**45.578**	**52.395**	**414.609**	**419.667**
Df.	**11**	**15**	**22**	**26**
Sig.	**0.000**	**0.000**	**0.000**	**0.000**

Note: Ref= reference category; Standard errors are in parenthesis; Factor significant levels: - *= p<0.000; **=0.01; *= 0.05; Figures in ()-brackets are for Coeffients (B)**
Source: Study data-KDHS, 2003

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

All the models of the study confirm that children from migrant mothers have worse survival chances compared to those of non-migrant mothers. There is clear evidence from the findings that migration is a risk factor for childhood mortality but by considering the integration factors of the mother in the host community and the adaptation of the child to the new conditions I would expect the difference in mortality risk between the migrants and non-migrant child to diminish with the duration of stay. This in actual sense confirms the objectives and questions of this study on whether migration can influence the health status of a child in its early life or not.

Improved child survival following migration of the mother with the child, which may be main intention of this study, that is, successful adaptation, depends not only on the behavior and socio-economic mobility of the migrant mother or family, but also on the receptivity of the existing population, the institutions in place, and the conditions underlying migration: the reasons for the move and intended duration of stay. Hence, a migrant woman may radically alter her behavior in ways favorable to child survival but still not experience improvements if, for instance, she faces discrimination in access to social services or severe competition for limited income-earning opportunities, or if she has settled under conditions of extreme duress.

leads to the conclusion that in Kenya, migration of mothers in most regions does not significantly lead to improved children survival chances.

The results of the study further support the hypotheses that the risk of death declines with the increase in the level of education. However, the results do not support the premise that migration leads to improved child health or that the wealth position or the type of toilet facility of the household is associated with a higher standard of living which leads to low risk of infant and child deaths.

5.3 Recommendations

Indeed, my understanding of the effects of socio-economic, environmental and demographic factors on infant and child mortality is far from complete. The behavioral link between migrants and non-migrants; and individual socio-economic and bio-demographic related characteristics of migration behavior, and the effects on infant and child mortality, are issues that remain to be addressed before any firm conclusions may be drawn.

More studies should be directed towards understanding the mechanisms affecting migrant child survival as well as to explore why urban-rural migration tends to be a major risk factor in child health as demonstrated by this study. It should be noted that most studies have not proved conclusively that migrants improve their children's survival chances, or change their behavior, or improve their standard of living, as a result of changing

To enhance child health and survival, migrants and their children must often overcome numerous personal and situational obstacles which can be categorized as environmental; socio-economic and maternal. Results of this study generally confirm the hypotheses of migrant selectivity, life disruption and adaptation used to explain behavior of migrants and the consequent effects on them.

5.2 Conclusion

The findings from the study suggest that migration status is an important predictor of and a risk factor for under-two child mortality. The analysis shows consistent effect of survival advantage among children of non-migrants compared to migrants. It is reasonable enough to conclude that children who settle in new environments are suddenly exposed to threats that they would not have experienced had they remained in their places of origin: new infectious disease agents; temporary residence in more unfavorable conditions where contaminants are easily spread and competition for resources may be strong; changes in care giving relationships if, for example, the mother seeks work outside the home; a termination of breastfeeding at the time of the move as the mother adjusts to new economic and social constraints; and the failure of the mother or caregiver to quickly familiarize herself with and adjust to the prevailing conditions.

The general results shows that children of migrant mother especially those of urban-rural migrants face a higher mortality risk compared to those of non-migrant mothers. This

locations, since it is not known what mortality patterns migrants would have experienced had they remained at their former location.

5.4 Policy implication

The underlying efforts to improve child and maternal health in Kenya, is that of urban and rural poor particularly for mothers who migrate with the intention of improving the survival status of their children. Physical and urban planners should be concerned about the rapidly expanding urban centers and the concentration of perhaps disaffected migrants in unfavorable settlements. The study results highlight the need to target migrant groups within urban areas in the provision of health care services and other social services. The available evidence suggests that more effective public actions than in the past will be necessary to accelerate the progress in attaining the MDGs with respect to child mortality and maternal health.

The millennium Development Goals call for reducing under-5 and child mortality by two-thirds and maternal mortality ratios by three-quarters, using 1990 as a benchmark and 2015 as the target date. The Government of Kenya is aware of the importance of the MDGs and should re-affirm its commitment to improve the health and social well being of women and children by strengthening maternal and child health services through decentralization of the same by adopting policies and programs to achieve the goals.

These findings from the study shows that short birth intervals and very young and old age at birth may have negative effects on survival status of the child have important implication for child survival program through promotion of longer birth spacing and

prevention of adolescent childbearing in high mortality settings like amongst the poor or in rural areas where large families are still preferred.

The eventual improvement in child survival resulting from maternal migration in most regions may be sufficient cause to modify policies in favor of less forceful, unrestrictive, or promoting measures on socio- political institutions, economic growth and the quality of the living environment that must be considered in developing and implementing appropriate migration and spatial policies.

Policy makers must therefore realize the need for policies that address in a responsible manner the presence of migration and the related health implications in a country. At the same time policymakers can assume their commitment to developing and improving health care services, female education and environmental conditions in the rural and slum areas.

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