TITLE: "SOME DETERMINANTS OF CHILD MORTALITY IN NYAMIRA AND MIGORI DISTRICTS, NYANZA PROVINCE, KENYA"

BY

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DECLARATION

THIS RESEARCH WORK IS MY OWN WORK AND HAS NOT BEEN PRESENTED FOR A DEGREE IN ANY OTHER UNIVERSITY

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ABSTRACT

This study on determinants of child mortality in the two districts gives a brief description of the socio-economic, socio-cultural and demographic characteristics of the study population. This has been done in relation to the child variables. Estimates of infant and child mortality for both sub-locations using Coale and Trussell technique are made. The influence of socio-economic, socio-cultural, demographic, nutrition and health care factors on the proportion of children dead is ascertained. Last but not least logistic regression is used to show the major determinants of child mortality, first for those who are 2 years and under and those who are 5 years and under.

The primary data used in the study was collected from the two sub-locations, i.e., Manga/lietego and Kabuoro sub-locations in Nyamira and Migori districts respectively in December 1992. The focus was on women aged between 15-49 years who had children who were under 5 years of age. A total of 510 and 522 women were interviewed from Manga/lietego and Kabuoro sub-locations respectively using cluster sampling as a sampling design.

The major findings of the study include the fact that the life expectancy for Manga/lietego and Kabuoro sub-locations is estimated as 61.9 years and 55.9 years respectively. The q_2 for Manga/lietego and Kabuoro sub-locations is estimated to be 74.5 and 131.7 per thousand live births respectively and the estimates of q_5 for the two study areas are 68.8 and 133.7 per thousand live births for Manga/lietego and Kabuoro respectively. Women with primary level

of education have a higher proportion of children dead compared to women with none/adult literacy level of education. Religion has got inconclusive effect on child mortality in the study areas. In Manga/lietego protestant women have lower risks of their children dying compared to traditionalists while in Kabuoro sub-location the finding is the reverse of the Manga/lietego finding.

Unmarried women have a higher proportion of children dead in both Manga/lietego and Kabuoro sub-location. Education of the father is positively related to child mortality in Kabuoro sub-location. In Kabuoro sub-location, access to clean source of drinking water doesn't increase with the decrease in child mortality. The chi-square results indicate that in Kabuoro sub-location, use of paraffin/gas as source of fuel is associated with high child mortality. Use of pit latrine is negatively related to child mortality in Manga/lietego sub-location. Households that are 4km from the nearest health facility have higher child mortality compared to those that are 1 km away from the nearest health facility.

Completion of immunization vaccine is positively related to child mortality in Manga/lietego sub-location while in Kabuoro sub-location incompletion of immunization vaccine is positively related to child mortality. In Manga/lietego sub-location women who were attended to by modern trained midwives at delivery have low child mortality compared to those who were attended to by traditional midwives. Women who breast-fed their children for a period of 25-30 months had a higher proportion of children dead than those who

breast-fed for a period of 1 to 12 months. In Manga/lietego sub-location children who had a birth weight of 3.00-3.99 had higher chances of surviving than those who had a birth weight of 4 kg and above and lower than 3.00 kg. Children who were given mashed bananas/potatoes experienced higher mortality as compared to those given porridge made from "wimbi/mtama" flour and mashed ripe fruits. Children given proteinic foods once a week experienced higher mortality compared to those given these foods two or three times a day. Children given vegetables/fruits 2 or 3 times a day had higher survival chances than those never given vegetables/fruits. Children who were given beans 2 or 3 times a day had higher survival chances than those given once a week. These foods were mainly scarce in Kabuoro sub-location as compared to Manga/lietego sub-location.

The major recommendations of the study include the fact that more health centres need to be constructed and communication networks should be improved. Ante-natal clinics should be increased so as to improve accessibility to these facilities. The institution of Marriage needs to be safeguarded as much as possible since most of the married women portray a low child mortality. Probably, social workers, marriage therapists and counsellors in this case can extend their sincere services intensively on the marriage institution so as to reduce divorce and separation.

In addition women should be encouraged to have children in wedlock. Mass immunisation programmes should be conducted. Formal

education given in schools should include the cultural norms and practices especially with respect to areas pertaining health. The relationship between hygiene, nutrition and cultural practices should be emphasised. Since socio-cultural factors play an important role in determining child survival, social workers in maternal and child care departments should be conversant with socio-cultural codes of the areas they are serving. Traditional birth attendants should be encouraged and trained with necessary skills of identifying and handling emergencies. On the other hand women should be encouraged to give birth in hospitals. Afforestation should be encouraged by the government in both sub-locations so that there can be adequate provision of fuel for cooking since this is the main source of fuel for cooking in the study areas. Social workers should encourage mothers to give children a balanced diet, i.e., carbohydrates, protein, vitamin and fats. They should also be encouraged to breast-feed their children intensively in the early months of the child's life. Catholics should encourage hygienic lessons in their religious studies and traditionalists should be taught by social workers better hygienic practices.

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CHAPTER ONE

GENERAL INTRODUCTION

1.0 INTRODUCTION

The main sources of child mortality data are censuses, surveys and vital registration. However, censuses or survey data have varying limitations like incompleteness, misreporting, coverage. Hence the estimates of child mortality cannot be obtained by direct methods. Demographers like Brass, Coale and Trussell have developed indirect techniques which produce estimates of certain parameters on the basis of information that is only indirectly related to its value.

Kenya has experienced a rapid infant mortality decline since 1948 census when it was found that there were 184 infants death per 1000 live births. This rate declined to 126 deaths per one thousand live births according to the 1969 census. The 1979 census also indicated that infant mortality rate had declined further to 104 deaths per one thousand live births. Before this date the Kenya fertility survey (1977/78) had also indicated that infant mortality rate was 81 deaths per thousand live births. This finding had improved on by the results obtained from the 1989 Kenya Demographic and Health Survey (KDHS), which showed that the rate had declined to 70 infant deaths per one thousand live births. This decline could be attributed to the drastic improvement in social services and advances in the quality of life and public health.

Hauser (1979), has documented that a large part of the decline in infant and child mortality was due to control of infectious and parasitic diseases and respiratory tuberculosis. The persisted diarrhoeal diseases and the resulting mortality amongst children in the developing countries cannot be readily linked to inadequate provision of modern medical services but to the level of nutrition and living conditions.

Kenya's mortality decline in combination with fertility is said to be the major determinant of the rapid population growth. Mortality has rapidly declined especially in the last two decades due to the spread of modern science and technology that has led to improved quality of life. United Nations (1974) has indicated that the decline in mortality would not have been sustained, however, without improvements in medical technology that have occurred in the 20^{th} century. The rapid mortality decline is said to be one of the factors considered contributing to the accelerating population growth. Despite all these improvements in mortality decline, there are still persistent disparities in child mortality. Socio-economic, socio-cultural, demographic, health care and nutritional factors still play a significant role in this phenomenon.

1.1 GEOGRAPHICAL AND DEMOGRAPHIC BACKGROUND OF THE STUDY AREAS

An outline of the geographic and demographical characteristics of the study district may help identify the reasons why differentials to be discussed in the following chapters exist.

KISII DISTRICT

1.1.1 Geographic Background

Kisii district which is now divided into Nyamira and Kisii districts covers an area of 2,196 sq. km making it the smallest of the former four districts in Nyanza province. It shares common administrative boundaries with three districts Kericho to the East, Narok to the South and South Nyanza to the West. Nyamira which forms the study area lies above an altitude of 1,800m which means that this area is the most suitable for the growing of tea and pyrethrum. However, some parts of Nyamira that have lower attitudes than these are suitable for the growing of coffee, bananas and sugarcane. Food crops can be grown in all parts of the district because of fertile soils in the area.

Kisii district is mostly hilly with several ridges. Because of the rapid population growth, cultivation of the steep slopes is now becoming inevitable. As a result, soil erosion is becoming an increasing problem. The hilly terrain also makes communication difficult because during the rains, which are spread evenly throughout the year, the roads become impassable. The non-use of these roads during the rainy season makes transportation of major cash crops, especially tea very difficult.

Surface water is abundant i.e., from rivers, streams, springs and boreholes which supply clean water to human and livestock population. Though surface water is plenty in the district, there is evidence that most of this water is being polluted by affluents from coffee factories and the herbicides and fertilizers used on

tea and coffee farms. River Gucha which is the biggest in the district, is large enough to develop mini-hydro electric power stations to supply electricity.

Because the landscape in Kisii district is characterised by many hills, the large population, most of which is concentrated in the rural areas, is forced to settle on hill tops. This settlement requires pumping water to hill tops as a priority for human and livestock consumption.

About 75% of all land is composed of red volcanic soils which are deep and rich in organic matter. Kisii district has therefore, both fertile soils and reliable rainfall which are both suitable for growing cash crops like coffee, tea, pyrethrum, bananas, maize, finger millet, sorghum, groundnuts beans and several horticultural crops. The reliable climate also supports dairy farming.

Because of the need to feed the expanding population, more land has been put under maize cultivation. It is estimated that by 1987 about 40% of the total land area was devoted to maize production. More than 50% of the total land area is under food and cash crops, showing that agriculture is the main stay of the district's economy.

1.1.2 Demographic and Socio-economic Background

According to both 1969 and 1979 census data, the Abagusii have consistently constituted 98% of the total district population of 675,041 and 869,512 for the two censuses respectively. The abagusii have extremely youthful population. The proportion of

children aged between zero and 14 years was approximately 57.5% and 53.3% of the total population in 1969 and 1979 respectively, which compares unfavourably with 52.1% and 49% for all South Nyanza province.

Maize meal is still the main food for the majority of the people in the district. Most mothers breast-feed the children up to about age one. Thereafter their children are put on porridge from maize flour mixed with milk as the main supplementary food. However, there are some parts in Kisii where children have stunted growth. This is mainly due to lack of awareness among mothers regarding what constitutes a balanced diet.

Due to high enrolment levels in both primary and secondary schools, i.e., 26.8% of the total population, there is an impression of high literacy rate for the district. Electrification programme has been implemented in Irianyi, Magombo, Marani divisions and Nyamira District now.

There is a number of health facilities distributed fairly evenly in Kisii district. However, a large section of people have little access to these facilities and the services because they are far apart from each other. Moreover the bulky of these health facilities are dispensaries which have fewer services and lack more qualified manpower.

During the 1984-88 plan period the ministry of health continued offering its services to the ever increasing population. This increased population has come due to improved health services/ status and increased food production in the district. The district

has 65 health facilities. Nyamira Hospital is one of the modern health facilities. Infant mortality has been decreasing since 1980, i.e., 1980 (85.1%), 1982 (81.7%), 1983 (79.9%), 1985 (76.5%), 1986 (74.8%), 1988 (71.4%), 1989 (69.6%).

Kisii district has the lowest mortality in Nyanza province. This is partly attributed to its environmental conditions and the level of development compared to the other rural parts in the province. Kisii has a relatively better level of nutrition, cool climatic condition which reduce the incidence of malaria and a relatively better infrastructure which enables easy access to medical services.

According to 1979 census data, Kisii district had a child (in the first two years of life) mortality rate of 100 deaths per 1000 births. This child mortality is much lower than that of South Nyanza District which had 216 (in the first two years of life) deaths per 1000 live births. The general life expectancy for Kisii district is about 54.4 years and a crude death rate of 15 deaths per 1000 of the total population.

SOUTH NYANZA DISTRICT

1.1.3 Geographical Background

Migori is one of the districts that came about after the former South Nyanza district was split into Migori and South Nyanza districts.

The South Nyanza district is located in South-western Kenya, along Lake Victoria and covers an area of 7,778 sq. km. The

district borders Kisumu and Siaya districts to the North, Kisii and Narok to the East and the Republic of Tanzania to the South and the Republic of Uganda to the West.

Rainfall in the area shows considerable variations and is in many cases much lower than typical equatorial climate. Rainfall occurs almost throughout the year with a maximum during April and May. Most of the soils in this place are loam and brown clay soils, although there are some rich alluvial soils in some parts. Some of the major cash crops grown include sugarcane, tobacco, arabica coffee and cotton and subsistence crops include maize, finger millet, potatoes, bananas, cassava, sorghum, beans groundnuts and sweet potatoes. Cattle ranching and fish farming are also important economic activities of the area.

1.1.4 Demographic and Socio-economic Background

According to the 1979 population census, South Nyanza district had a total population of 817601 people.

The district has a good number of hand-dug wells, boreholes, springs and open dams. There are also a reasonable number of health facilities but which lack enough staff, equipment and housing. The infant mortality rate for the district is 130 per thousand live births whereby most (30%) neonatal deaths occur during the first 4 weeks of life compared to the national average of 80 per thousand live births. The district has one of the highest child mortality rates in the whole republic, i.e., 216 per 1000 live births compared to the national figure of 125 per

thousand by 1988. Malnutrition is very high and about 30% of the children are malnourished. The other causes of death for this group include malaria, diarrhoeal diseases, acute respiratory infection and anaemia (1979 Census).

Life expectancy at birth in the district is 49.25 years (nationally it is 57 years) and crude death rate is 19 per thousand (nationally it is 14 per thousand).

The most common diseases in the district are malaria, respiratory diseases, ear and eye infections, malnutrition and measles. The most common causes of death are anaemia, upper respiratory infections (such as pneumonia) heart diseases, diarrhoeal diseases, malaria, accidents, malnutrition and its complications, measles and cancer. Some of the specific health problems that are most serious are poor environmental sanitation, lack of safe water, low vaccination coverage and poverty, taboos and ignorance. About 15% of the children are severely malnourished and 35% manifest mild malnourishment.

Migori district which used to be part of the former South Nyanza leads in child mortality rate countrywide and is one of the worst cholera hit regions in Kenya. Migori has never had clean water for drinking. Its main sources of water-the rivers Riana Sare and Migori carry heavy affluents and industrial waste from the neighbouring Kisii district. Environmentalists estimate that 80% of Migori's water is polluted and unfit for human consumption. It is hardly surprising that diarrhoea, typhoid fever, pneumonia, cholera and all imaginable water-borne diseases wreak havoc in

almost every homestead in the district. In the past 5 months prior to the date of the interview, a cholera epidemic had left more than 40 people dead.

The district has got no government run hospital and the existing health institutions are themselves ailing. The only major hospital is the Ombo mission which has been involved in controversy since 1990 between Kisii Catholic Diocese and the government about ownership. Many fake clinics, some in dingy and filthy premises have sprung up in Migori.

1.2 PROBLEM STATEMENT

Although child mortality has declined due to the remarkable level of socio-economic and technological development in Kenya since 1948, there remains significant disparities among districts and rural-urban areas. Disparities have mainly been shown between urban and rural areas of Kenya. For instance, Manga/Lietego has relatively low infant and child mortality while Kabuoro sub-location is one of the areas that has the highest infant and child mortality in the country. This is evident from the 1979 census which indicated that infant mortality was 162 deaths per one thousand live births in South Nyanza and 82 deaths per one thousand live births in Kisii district (before it was divided into Nyamira and Kisii districts respectively). It is also evident that infant and child mortality has been declining following KDHS (1989) findings that showed that there were 70 infant deaths per one thousand live births compared to 184 deaths per one thousand live

births in 1948. These differentials could be related to socio-economic, socio-cultural, demographic, nutritional and health care factors.

The problem therefore, is: why has mortality been declining rapidly in Kenya, yet there prevails child mortality disparities in Nyanza Province?. Are there some socio-economic and socio-cultural, nutritional and health care factors responsible for these disparities especially in Manga/Lietego sub-location in Nyamira district and Kabuoro sub-location in Migori district?.

1.3 OBJECTIVES OF THE STUDY

1.3.1 Broad Objectives

1. To investigate the effect of Nutritional and Health care factors on child mortality disparities in Kabuoro and Manga/Lietego sub-locations.
2. To investigate the effect of socio-cultural and socio-economic factors on child mortality disparities in Kabuoro and Manga/Lietego sub-locations.
3. To calculate infant mortality rates for Kabuoro sub-location in Migori district and Manga/Lietego sub-location in Nyamira district respectively.
4. To estimate ${}_2q_0$, ${}_5q_0$ and the expectancy of life at birth (e_0)for Kabuoro and Manga/Lietego sub-locations respectively.

1.3.2 Specific Objectives

1. To examine and compare the influence of weaning and feeding practices on child survival in Kabuoro sub-location in Migori district and Manga/Lietego sub-location in Nyamira district.
2. To examine and compare the influence of availability of medical personnel and medical services on child survival in both Kabuoro sub-location in Migori district and Manga/Lietego in Nyamira district.
3. To investigate and compare the influence of availability of water and sewage facilities on child survival in Kabuoro in Migori district and Manga/Lietego in Nyamira district.
4. To investigate and compare the influence of type of immunisation given on child mortality in both Kabuoro sub-location in Migori district and Manga/Lietego in Nyamira district.
5. To determine and compare the influence of type of fuel used for cooking on child mortality in Kabuoro in Migori district and Manga/Lietego in Nyamira district.
6. To determine and compare the influence of birth weight on child mortality in both Kabuoro sub-location in Migori district and Manga/Lietego in Nyamira district.
7. To examine and compare the influence of breast-feeding on child mortality in both Kabuoro sub-location in Migori district and Manga/Lietego sub-location in Nyamira district.
8. To examine and compare the influence of education of the mother, education of the father, religion and marital status

on child mortality in both Kabuoro sub-location in Migori district and Manga/Lietego sub-location in Nyamira district.

1.4 JUSTIFICATION OF THE STUDY

This study of child mortality disparities will help to identify those unprevileged segments of population who experience higher mortality levels. These groups are the appropriate targets of policies and programmes for improving health conditions and survival chances.

Results of this study will be useful in improving the understanding of the determinants of mortality and their relationship on the basis of which proper policy measures for reducing mortality will be selected, developed, and improved.

This study will be useful because it will establish a solid core of empirical generalisations about the factors associated with child mortality that can be used to provide guidance for policy and programme formulation and orient future research on the subject.

Although infant and child mortality studies in Kenya have been carried out, no detailed study has been carried out to cover the nutritional and health care factors. Kibet (1981) used the Brass technique to calculate q_2 but he only limited himself to educational differentials. Kichamu (1986) carried out a study on infant mortality but he only emphasised central province.

The proposed study of Kabuoro sub-location in Migori district and Manga/Lietego in Nyamira district on child mortality intends to fill in the existing gap of knowledge in the overall mortality

studies.

Since child mortality policy is mainly explained through health requirements and programmes, knowledge of child mortality disparities will help to determine what is needed in terms of health care and improvement of nutritional habits. This will in turn lead to reduced fertility that will also lead to enhanced socio-economic development in Kenya. Furthermore, child mortality decline and improved standards of the mother, is a sign of economic development. Therefore, Knowing the variations in child mortality levels in various parts of Kenya will give us a good picture of the levels of socio-economic development and such a picture should be useful in making social and economic policies.

1.5 SCOPE AND LIMITATION

1.5.1 Scope

This study is concerned with mortality experienced by children between birth and 5 years. Thus, the probabilities of dying between age zero and two, age zero and five are estimated. However, more emphasis is on q_2 since this is the age where environmental factors have a remarkable influence on child mortality. At the same time this is where mortality in general takes a bigger toll of life. This study uses primary data that was obtained using structured and informal interviews. The households in the area of study were taken as the sampling unit. Children born to female respondents aged 15-49 years during the last 5 years as per the month and year of the interview in Manga/Lietego and

Kabuoro were given specific consideration. Five hundred households from Manga/Lietego and Kabuoro sub-locations, respectively, were interviewed.

Information on nutritional status and health care indicators for example, availability of water, sewage facilities, type of fuel used, distance to health facilities, immunisation completeness, and birth interval was obtained. The nutritional indicators that were used include breast-feeding and birth weight. The type of food eaten was also indicated. The influence of all these factors on child mortality are thereafter examined in detail. In addition to this, the influence of socio-economic and socio-cultural factors, for example, educational level of the mother, level of education of the father, religion of the mother and the marital status of the mother on the health care and nutritional factors are examined. This is because in most cases the nutritional and health care status of an individual is determined by the socio-economic and the socio-cultural aspects of his life.

1.5.2 Limitation

The first limitation of the data used in this study is that it may have sampling and non-sampling errors due to mistakes made in carrying out field activities, such as failure to locate and interview the correct households, errors in the way questions were asked, understanding of questions on the part of the interviewer or respondent and entry of data errors would not be totally eliminated.

The other limitation was transport costs, personnel requirements and the amount of time available. Because of time and personnel constraints, only one thousand respondents (i.e., five hundred respondents from Kabuoro and five hundred respondents from Manga/Lietego sub-locations) were selected using cluster random sampling method. In addition, this is what led to the exclusion of some variables like eating habits, food hygiene, food taboos and household source of income since the questionnaire would have been too long for the time allocated. Type of marriage, marriage pattern and age of the mother were also considered up to description of the study population level. Further analysis of these variables was not done because they tended to bring insignificant results. However the sample used in the study is adequate for comparative purposes of child mortality especially for the areas under study.

Portable computers which can ease data collection in the field were not available. However, many research assistants were employed to easy data collection exercise. Furthermore this study was not given enough publicity like the census since the respondents were not alerted to stay in their homes. To solve this problem, the interviewers had to make follow-up in cases where the respondent was not available during the first visit. In some cases the study involved the interpretation of english to local languages, hence errors could have arisen during the interpretation. This could have reduced the accuracy of the data.

The study was faced with the problem of some respondents being

sceptical about the whole exercise. They thought that their time was being wasted, as the study could not yield immediate benefits to them.

The data used is likely to be distorted by omission errors. Those children who are dead and those who are not living with the parents are likely to be omitted. This is mainly due to cultural reasons in most communities in Kenya, which believe that mentioning the names of children who have died is considered evil or taboo. This was highlighted in the censuses of 1969 and 1979, and the KDHS (1989).

Since these children are to be reported by the age of the mother and their ages, there was a likelihood of misreporting ages of the mother and children probably due to memory lapse. Some women could have been misclassified in terms of age hence leading to raising the number of children born in cases where there is over-reporting. This is mostly common amongst respondents who are aged 35 and above. The KDHS (1989) has also found this problem to be very common among most of the Kenyan communities. Kpedekpo (1967, 1968), Brass (1968) have also highlighted age misreporting and omission errors as common problems to mortality data in Africa.

This study was also faced with the limitation of not being able to establish the relationship between higher food consumption and higher observed changes in nutritional status. The relationship could have been confounded by other factors such as higher incomes, better child care and a more healthful environment which in turn leads to superior growth performance.

However, the interviewers tried to limit most of these errors by including probe questions and informal questions during the interview.

CHAPTER TWO

LITERATURE REVIEW AND STUDY CONCEPTUALIZATION

2.0 INTRODUCTION

The literature review presented in this chapter helps to develop the hypotheses and explanations on the effect of socio-economic, socio-cultural, demographic, nutritional and health care factors on child mortality in Manga/Lietego and Kabuoro sub-locations. Various studies have been carried out on infant and child mortality disparities. What follows is a presentation of some of the main studies carried out in various parts of the world, Kenya included. First of all, an introduction is given on the general review of infant and child mortality differentials in various parts of the world then each variable is reviewed independently.

2.1 LITERATURE REVIEW

2.1.1 Kenya

The study of mortality has long been a neglected area in almost all the countries of Africa South of the Sahara. This has been the case because of the fact that mortality data has been incomplete in many countries. Where reports are available at all, they are limited to the available census data or sample surveys taken at different points in time. However, various studies

carried out have shown that the crude death rate has declined from 22 per thousand to 13 per thousand in 1987, and life expectancy at birth has improved from 44 years to 58 years over the same period. These improvements can be attributed largely to an increase in the number of health facilities in the country. The number of hospitals increased from 148 at independence to 254 in 1987 (Government of Kenya, Socio-economic profile 1990). Studies carried out by the National Demographic Survey and integrated rural survey of 1977 have shown that infant mortality is lowest in Central, Rift Valley, Nairobi, Eastern provinces and highest in Western and Nyanza provinces and intermediate in Coast province.

Muganzi (1988) has pointed out that various mortality disparities exist in various parts of Kenya categorising Nyeri, Meru and Muranga to have lower infant mortality levels and South Nyanza, Busia, Kilifi to have the highest mortality levels.

Kibet (1982) and Kichamu (1986) have indicated that although a marked decline has been observed at the national level as far as infant and child mortality is concerned, there exists significant infant and child mortality disparities among the 42 districts of Kenya. They have pointed out that the probability of dying at age two varies from a low level of 49 deaths per one thousand live births in Nyeri district to a high value of 216 deaths per 1000 live births in South Nyanza.

Nyamwange (1983) studied the child mortality in Nairobi as a case study. The major findings in his study was that despite the medical technological achievements of Nairobi City, there still

remains mortality disparities. He pointed out that the residents in Nairobi originate from high child mortality zones in the country-side, hence in-migration has played a major role in mortality disparities experienced in Nairobi.

In Kisumu town, one of the greatest contributor of infant and child mortality is malaria. This is because this area is next to Lake victoria hence it experiences just as high mortality as the rural areas. High mortality in this area may be due to seasonal flooding which escalates breeding of mosquitoes leading to spread of malaria, cultural influence on the use of available facilities and poor road network which makes it difficult for the sick people to reach the hospitals. In Migori there is a problem of socio-economic development, for instance, most of the roads are impassable, hence sick people cannot reach the hospital fast enough, lack of clean water supply, strong cultural attachment especially the rural population, who give little chance to change in certain norms concerning sickness and food type, and poor hygienic practices (Kichamu 1986).

2.1.2 Sub-saharan Africa

In Ghana, the predisposing factors that aggregate the transmission of diseases in children include, unsanitary environments, lack of adequate water supply, poor dietary practices, inadequate food intake, overcrowding, a poor water disposal system, low literacy rates ignorance, low income (Ashitey et al 1972:268).

Many scholars have also indicated that nutritional changes in the population are associated with changes in fetal infant and child mortality. In the rural setting of the developing countries, the socio- economic programmes such as education, industrialization may significantly reduce infant and child mortality in the long run. However, the short run impact of such programmes is likely to be small. Immunization or treatment technologies developed produce immediate reduction in infant and child mortality provided the nutritional status of the population is adequate. If the population is inadequately nourished, the impact may be moderate, in part dependent in how poorly nourished the population is. In order to acquire the desired level of infant and child mortality, improvement of nutritional status of those who are malnourished beyond a critical level is a pre-requisite for effective immunization and treatment programmes. Hence feeding programmes aimed at minimising the number of low birth weight babies who have low physical growth below a critical limit along with modern health technologies have an impact on the infant and child mortality in the short run in those countries where infant and child mortality still remains high (UNICEF 1884).

2.1.3 Review of studies on selected variables

What follows is a discussion that highlights the study review on the selected variables.

2.1.3.1 Weaning and feeding practices

Mosley (1983), has argued that it is not a single episode of diarrhoea that kills but the fact that children, weakened by malnutrition continually battle disease. Thus, in his model of child morbidity and mortality, Mosley does not label diseases or "disease states" such as malnutrition as "causal factors" but instead calls them "indicator" variables. Therefore, diseases do not act in isolation to cause infant and child mortality rather they contribute heavily to the whole process of infant and child mortality.

In India nutritional differences were found not to explain the lower mortality rate in Kerala as compared to West Bengal (Nag 1981). This is probably because of the poor quality of data in the area, since studies carried out in these two regions in 1960-69 suggested that although the total protein intake per capita was lower in Kerala, the per capita intake of animal protein and fat was higher than in West Bengal. On the other hand, the data that was used in 1981 indicated that there was equitable distribution of food and per capita consumption was higher than in Kerala yet infant and child mortality was higher in West Bengal. This finding is contradictory to what most researchers have documented that nutritional levels in general tend to reduce mortality levels than just the provision of health services.

Meegema (1980) has indicated that in Sri lanka, malnutrition among mothers was one of the causes leading to large infant deaths from immaturity. Malnutrition in Sri lanka was due to shortage of

food as a result of two successive crop failures in 1973 and 1974. He also noted that infant mortality in the municipality of Colombo, was very high due to the fact that infants were weaned too early and fed on the cheapest type of condensed milk under poor sanitary conditions.

Caldwell (1979) has shown that in the absence of other variables, a child's probability of dying is inversely related to the mother's years of schooling. Anker, R., (1969) has indicated that breast milk is known to have anti-infective properties, thus if children are weaned too soon their chances of surviving decrease. Also the weaning process and supplementary feeding practices may affect survival rates. If the supplemented food is of poor nutritional quality or if the cooking and eating utensils are poorly cleaned, survival probabilities decrease. He has shown that high parity births tend to have higher mortality rates than lower or middle parity births. While there are biological reasons for this relationship, economic factors may also contribute to this relationship since larger families may put strain on family resources. He has stressed that health and nutrition go hand in hand. Better fed people are healthier and therefore are more resistant to disease. Indeed, the relatively high mortality rates in the Low developed countries compared to the developed countries are frequently due to differences in state of nutrition. He has also indicated that the more medical facilities and medical personnel there are available and the closer the major population centres, the higher the survival probabilities should be.

Winikoff (1980) has argued that a high standard of maternal nutrition especially during pregnancy has great impact on lowering child mortality through the mediating effect of birth weight. Malnutrition affects the immune responses of children which in turn renders them susceptible to infection. Children suffering from Kwashiorkor have both cell-mediated and humoral immunity. Both these responses appear normal. The household economic level and high fertility of the mother influence both these factors.

UNICEF (1884) has stated that to avoid malnutrition, children between the ages of six months and 3 years should be weighed every month. If there is no weight gain for two months, something is wrong. Breast milk alone is the best possible food for the first four and six months. By the age of four to six months the child needs other additional food. After the first six months, however, the child needs extra nutrition and research indicates that the weaning period is the most crucial period for the child. Early weaning, late weaning, inadequate and inappropriate foods are all responsible for increased infant and early child mortality (Gordon et al 1963). A child under 3 years needs food five to six times a day. All children need food rich in vitamin A.

In some countries such as Chad, Ethiopia and Sudan, many people have died due to lack of adequate food that has led to malnutrition kwashiorkor, marasmus and other malnutrition related diseases.

The inhabitants (dominated by Luo ethnic group) in Kabuoro sub-location are generally characterised by a pastoral-

agricultural-fishing economy. Subsistence crops form the main part of the Luo diet. Livestock is used for providing milk and butter. Fish is also obtained from lake victoria. Meat is mainly eaten on ceremonial occasions, for instance, when sacrificing to the ancestral spirits (Ocholla Ayayo, 1976). However most of the fish is now being exported to the neighbouring countries hence it has become scarce for consumption and very expensive to buy.

Morbidity due to diarrhoeal diseases tends to peak during the second half of infancy and persists into the second year of life before it begins to decline. Repeated and chronic diarrhoea attacks are associated with growth faltering (Unicef 1989) and may influence the nutritional status of the child. In Kwale district, infection and nutrition disorders still play an important role in morbidity and mortality of children. The major contributors to hospital admission of the under fives and their mortality are anaemia, diarrhoea, respiratory infection and malnutrition.

2.1.3.2 Medical personnel availability

Untrained midwives or commonly known as traditional midwives tend to use unsterilized instruments to cut the umbilical cord, thus causing a number of infant deaths due to neonatal tetanus. Premature births may be saved if trained birth attendants are present or the high risk deliveries are done in the hospitals. In Sri lanka, the presence of trained midwives or birth attendants and use of sterilized equipment to cut the umbilical cord and similar measures to improve sanitation were found to result in lower

neonatal mortality (Meegama 1980).

2.1.3.3 Accessibility and Availability of medical services

Morio Shinsuke and Takahashi (1989), have documented that in Japan, mother's education is one of the most important factors in child mortality differentials. This is because the knowledge of primary health care is highly correlated with child mortality. For instance, if the sanitation and medical facilities are highly utilised in a community, differences in mortality among individuals may be related to the level of the mother's knowledge of primary health care.

As far as the availability and utilisation of health services are concerned, Moni Nag(1981) has documented that people in Kerala use the available health services more than those in West Bengal. This is because the medical facilities in Kerala are more accessible than in West Bengal. In addition to this, there is significantly greater utilisation of preventive and curative medical facilities in rural Kerala compared to rural areas in West Bengal. People in Kerala live closer to health centres and have better transportation facilities for visiting these centres.

Kerala also has lower infant mortality because of its higher female literacy which has contributed greatly towards higher utilisation of maternal and child health services. While in West Bengal, it is only the people in the urban areas who belong to the noble class who have access to education facilities and opportunities who portray low infant mortality. Higher literacy in

Kerala along with a few other favourable conditions, has contributed to higher political participation of the rural poor, which, has forced the state government in the post-independence era to cater for their health needs among other needs.

Lack of ante-natal and post-natal clinics can have an effect on mortality due to the fact that the anaemic woman or one who suffers from special problems, for instance RH factor, or a woman who needs a caesarian would benefit by attendance of antenatal clinics since their disease can be diagnosed and treated.

United Nations (1974) has indicated that in Peru, the place of medical attention during the last birth is considered to be an indicator of the type of facilities the family usually use for medical care, since the type of health care facility a woman chooses to use during pregnancy and childbirth may not be different from that for cure and prevention of diseases. This indicator is only a proxy for the major health care facility that is used by the family.

United Nations (1974) has also documented that in Nigeria the child mortality is inversely related to the accessibility of health care facilities. That is, for those living eight or more miles away from the nearest hospital or dispensary in rural areas, child mortality is nearly 30 per cent greater than for those who have both hospital and dispensary within the community. Anker (1977) in his study of mortality differentials in Kenya has documented that, the more medical facilities and medical personnel available, and the closer these facilities are to major population centres,

the higher the survival probabilities should be. However, he has noted that over time changes in medical facilities and medical personnel are partly a function of growing income levels as well as government policy. The higher the income levels in the country, the more the political governments can afford to provide to the people.

Ebrahim (1982) has suggested that not more than a third of the pregnant women in developing countries received any form of pre-natal care from health services and that not more than a fifth of all births occurred under qualified supervision (this information refers to the 1970's experience as indicated in this article).

Ondimu (1987) found that attendance at antenatal clinic by the mother was important single factor in explaining the variation in child mortality.

2.1.3.4 Availability of Water

Anker (1977) has indicated that on a micro level, children born in households that use piped water and water from wells have higher survival rates than those born in households using river or lake water.

Moni Nag (1981) has documented that there is low infant and child mortality in Kerala state than in West Bengal state in India. This is because people in Kerala state, particularly those of higher socio-economic strata, maintain a traditional practice of boiling water for drinking purposes, sometimes adding jiram (cumin seeds) to it, and poor people in the state drink a lot of kanji

(boiled rice water) which is more hygienic than ordinary water. For these reasons, people in kerala may be less susceptible to potentially fatal diarrhoeal disease than those in West Bengal. In addition to this Kerala has more running water in the streams that provide much of its population with reasonable clean water for drinking and washing purposes. The availability of water and the tradition of cleanliness among the people of Kerala are reported to exert an effective check on epidemics. West Bengal has more tanks, but due to lack of proper maintenance, the water in these tanks is not hygienic. This contributes to high infant and child mortality in the state.

Julie De Devance and Jean-Pierre Habitch (1986) carried out studies on the relative roles of prenatal care, child health services and infant feeding in reducing infant mortality in Malaysia between 1946-1975 and documented that, improvements in water and sanitation contributed to infant and child mortality decline especially for babies who do not breast-feed. Piped water in the household is likely to be of more direct benefit in lowering child mortality by contributing to better hygiene and eliminating bacteriological contamination that will reduce the risk of infection through intake. Lack of adequate water supply makes it difficult for households to prevent diseases such as diarrhoea, dysentery and many other skin infections.

Thomas Merrick (1981) showed that piped water in urban Brazil also reduces infant mortality for those who use it.

In Kwale more than a half of the house holds use water from

unclean sources, the intensity of such use being greater during the wet season when there is an increased reliance on unprotected wells and dams. More than a half of the population of Kwale therefore is exposed to water-borne and water related diseases (Unicef 1989).

2.1.3.5 Immunisation Completion

According to a study by Kasongo project team (1981), measles was identified as taking the heaviest toll of deaths attributed to immunizable diseases. Furthermore the study noted that the amelioration of mortality rates through measles vaccine has been difficult to achieve even when analyzing cause-specific mortality.

The Ministry of Health in Kenya (1987), has reported that 83% of the women reported in the national survey for the Kenya Expanded Programme on Immunisation (K.E.P.I.) had a tetanus infection during either of their last two pregnancies.

The KDHS (1989) has indicated that 77% of the mothers who had given birth during the preceding five years, had seen a doctor or trained nurse/midwife to check the pregnancy and 87% of them had a tetanus toxoid injection. As a cause of death, measles ranked third in the post-neonatal period, and first at ages 1-4 years. The case fatality rate was 2-4% for children under 5 but 6.2% in the first epidemic (Ware, 1974-76) Registration data from Nyeri shows much lower measles mortality, 5.7% at infancy and 15.5% at ages 1-4 years in 1982.

UNICEF (1988) studies in Kwale have indicated that measles cause 10% of Post-neonatal mortality, 24% of toddler mortality

(ranked first) and 22% of mortality at ages 3-4 years (second after diarrhoea).

UNICEF (1984) has indicated that immunization is a factor of crucial importance to the growth and survival of children. Without immunization, an average of 3 out of every 100 children born will die from whooping cough. One more will die from tetanus. And out of every two hundred children born one will be disabled by polio. However, when the services are not available, many of the infants who need it are not brought for the full course of immunization. Unicef has further indicated that in Kwale district, low rate of immunization is due to marked drop out from the second and third doses of Polio and Dpt. The low rate persists between the third dose of Dpt and measles vaccination. Primary immunization is a major intervention for child survival and development. It is not only a means of reducing morbidity and mortality but also a means of enhancing growth by breaking disease and malnutrition cycle.

Scotney (1976) carried out a research on immunization in Kenya for African Medical Research Foundation and has argued that the importance of attending the clinic three times at the right intervals for Polio or triple (DPT) vaccine is not understood. People must understand the natural built up of resistance (antibodies), which is the objective of the DPT strategy and also the different strains of Polio virus to be protected against. Generally health education on these points has not been sufficiently thorough.

Measles and tetanus have been found to be the major

determinants of infant and child mortality (Lewenburg et al, 1987). Ondimu (1987) also found that attendance at antenatal clinic by the mother was the most important single factor in explaining the variation in child mortality.

Lincoln and Chen, et al (1981) in their paper have documented how modern medical technologies can reduce infant and child mortality in developing countries through immunization and treatment programmes. The authors present empirical data from Bangladesh which show that immunization of the mother against tetanus during pregnancy can prevent the deaths caused by tetanus during the neonatal period and reduce overall deaths by half.

2.1.3.6 Availability of Sewage Facility

In Sri Lanka, Meegama (1980) has indicated that insanitary lavatories or the absence of lavatories leads to the breeding of flies which contaminate food taken by infants. Insanitary condition can lead to contamination of drinking water. This is especially so in those parts of rural Asia where drinking water is drawn from wells which are just protective walls.

Geographers have conducted studies that indicate that, in many urban areas, sanitation is poorer than in the rural areas. In urban communities of Ghana, toilet facilities are poor and drainage and pipe-borne water system are not dependable (Prothero and Davenport 1986).

Lack of proper toilet facility may contribute toward the presence of insect vectors such as the housefly and mosquitoes and

spread of such diseases as hookworm and other intestinal diseases.

2.1.3.7 Type of Fuel Used

The United Nations (1974) has indicated that in China shortage of firewood has contributed to increasing number of diarrhoeal cases due to food eaten when it is not adequately ready for eating. Shortages of in firewood have come about because of increasing population growth rate that has led to increasing deforestation

2.1.3.8 Birth Weight

Birth weight is mainly associated with maternal malnutrition during pregnancy. Low birth weight has been commonly observed in Kwale district where most of the children born are less than 2.5 kg which is considered as low birth weight (Kwale District HIS Annual Report 1988). Birth weight has been found to be the major determinant of child survival in the early stages (Devanzo et al 1983).

2.1.3.9 Breast-feeding

The prevalence of breast-feeding during the first week after birth in most countries especially in developing countries, is found to confer bacterial and vital immunity against gastrointestinal infection (Winikoff 1983). This contributes to lower mortality under 6 months and, to some extent lower mortality in the post-neonatal stage.

The role of breast-feeding is very important in the post-

neonatal period. Mothers' milk not only provides complete nutritional requirements for the child in the 1st six months but also defence against infection.

Meegema (1986) has noted that breast-feeding in most cases was limited since most mothers were badly paid workers who had no time to breast-feed their infants regularly. Infants were weaned too early and fed on the cheapest condensed milk. In addition to this most of these children were not well taken care of since these mothers left their babies with "maids" during working hours if the mother was employed in the modern sector (UNESCO 1990).

Unicef (1989) has found that there is a general decrease in the duration of breast-feeding with the educational level of the mother. The national estimated average length of breast-feeding according to the third rural nutritional survey of 1987 is 18 months.

2.1.3.10 Educational Level of the Mother.

There is a general concurrence that increasing educational attainment is associated with declines in mortality among infants and young children (Caldwell, 1979, Brass 1979, Anker Knowles, 1977, Mott 1979). Caldwell attributes the inverse relationship between mother's educational attainment and infant/or child mortality to many causes. These include the likelihood that more education is linked to breaks in traditional family raising habits, less fatalism about illness, more effective child care and medical alternatives, better utilisation of available food, more personal

and intensive attention by the mother with more of the family resources spent on the child. In addition, education changes both the familial and the maternal factors and reduces malnutrition and infection among infants, i.e., educated mothers may give up traditional cultural practices and may employ traditional birth attendants at the time of delivery. Food preparation and feeding procedures for the infant may be safer with respect to infections. More educated mothers are less likely to practice detrimental food taboos, either during the illness of their infants or during pregnancies. However educated mothers tend to breast-feed less frequently, which may again expose the infants to malnutrition and infection.

Caldwell (1979) has also argued that if the mother is educated, she may adopt alternative improved child care arrangements and play a larger role in family decision making with respect to preventive and curative health care that benefits the child. If females are educated they may contribute greatly toward lower infant and child mortality by the mothers ability to break with tradition or become less 'fatalistic' about illness. An increase in female education may reduce fertility (or increase in the birth interval) which in turn tends to reduce mortality.

2.1.3.11 Religion

A direct relationship between religion and health occurs when an individual is predisposed to accept or reject certain health practices on the grounds of faith and when parents refuse

inoculation or immunisation of their children because of a particular religious affiliation.

King and Funkenstein (1958), in their study, have documented a correlation between the structures of religious beliefs and physiological responses to illness. They have argued that patterns of religious practices can affect the health of the family group and can contribute to individuals responses and modes of seeking traditional and modern health care.

Some traditionalists believe in the fact that sexual taboos and abstinence can be observed to prevent sickness in suckling child. Some believe that the child has been looked at with a bad eye hence their disease prevention is done by certain practitioners. Some believe that expectant mothers are not supposed to eat meat and eggs yet these are some of the most nutritious foods for the body.

2.1.3.12 Marital Status

Kichamu (1986) has documented that child mortality for widowed mothers is highest, followed by the divorced and the separated.

Mumbi machera (1992) has indicated that infant mortality in Embu district is highest for the widowed category, followed by the divorced and separated. The married category has the least infant mortality.

2.1.3.13 Level of Education of the Father

Paternal education is more important in cities where education produces more effectively better health because of availability of basic goods and services: food, clothing, medical care, housing, sanitation and other health related items. Fathers therefore who are not educated are more likely to be unemployed, hence their families eat poor quality food and have poor quality health care (Mosley and Chen 1981).

2.1.4 Summary

In summary, the above literature review has shown that the following variables, contribute to high or low infant and child mortality in Kenya in particular and in different parts of the world at large;

(i) Weaning practices and feeding practices
(ii) Availability of medical personnel
(iii) Accessibility and availability of medical facilities
(iv) Availability of water
(v) Immunization completion
(vi) Availability of sewage facility
(vii) Type of fuel used
(viii) Birth weight
(ix) Breast-feeding
(x) Educational level of the mother
(xi) Religion of the mother
(xii) Marital status

(xiii) Father's level of education

In conclusion it is apparently clear that none of the studies carried out above have covered the study areas. Furthermore, socio-economic, socio-cultural, demographic, nutritional and health care indicators as they relate to child mortality have not yet been covered in detail. Thus, it is important to fill in the gap in knowledge on child mortality in these areas.

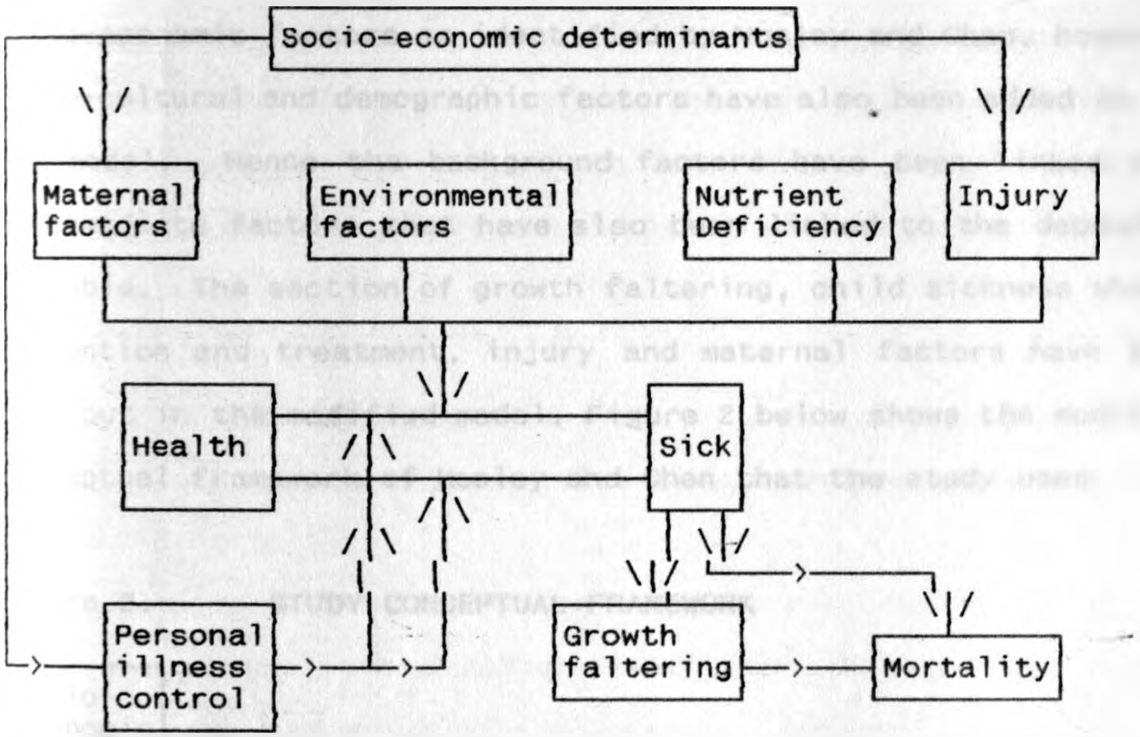
From the Literature review above, it is also important to note that several socio-economic, socio-cultural, demographic, nutritional and health care indicators have been found to affect child mortality.

2.3 CONCEPTUAL FRAMEWORK

The conceptual statement for this study is as follows; "Socio-economic, Socio- cultural, Demographic, Health indicators and nutritional indicators are likely to affect child mortality". A change in socio-economic or health care indicators is likely to affect the behaviour of child mortality.

This study has used the modified analytical framework developed by Mosley and Chen for the study of child survival(see description and illustration on page 40. Figure 1 below show operation of groups of proximate determinants of child health as developed by Mosley and Chen.

Figure 1. **Mosley and Chen framework.**

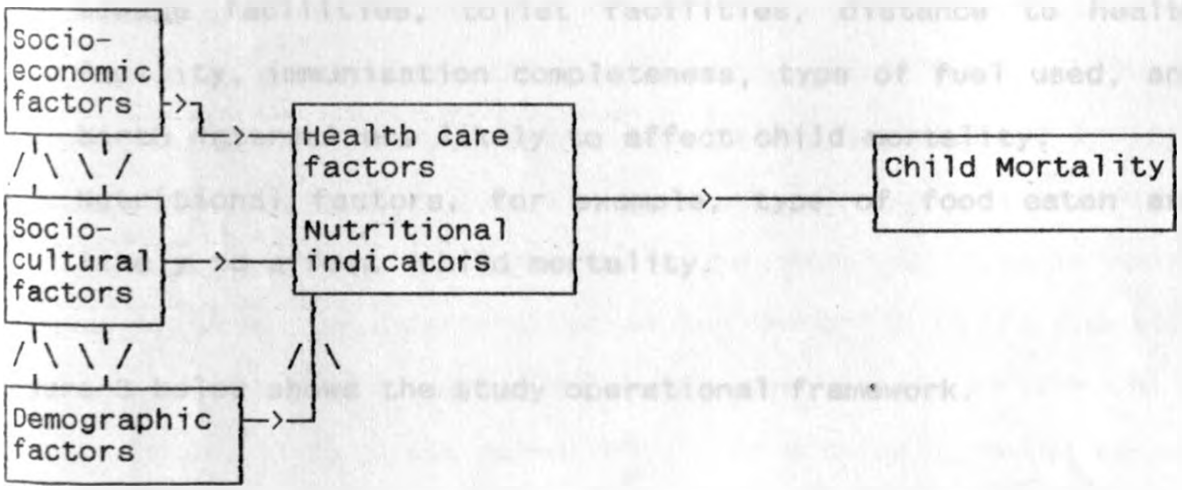


Source: population and Development Review supplement to vol.10, Page 29.

In their model, Mosley and Chen identified five groups of proximate determinants of infant and child mortality, i.e., maternal factors, personal illness control factors, nutrition factors, injury and environmental factors. In this case socio-economic factors may determine the nutritional status of the child which will in turn affect child mortality. Among the factors in Mosley and Chen model, this study concentrates on Health care indicators (i.e. environmental and personal illness) and also nutritional indicators both as factors affecting child mortality

in the study areas. There are also some background variables that influence health care and nutritional factors so as to affect child mortality. Among these factors, this study concentrates on socio-economic factors as identified by Mosley and Chen, however, socio-cultural and demographic factors have also been added in the new model. Hence the background factors have been linked with intermediate factors that have also been linked to the dependent variable. The section of growth faltering, child sickness status prevention and treatment, injury and maternal factors have been left out in the modified model. Figure 2 below shows the modified conceptual framework of Mosley and Chen that the study uses.

Figure 2. STUDY CONCEPTUAL FRAMEWORK



Modified conceptual framework of Mosley and Chen

Figure 2 shows that socio-economic factors, socio-cultural factors and demographic factors affect the nutritional indicators and the health care factors so as to affect child mortality. The study conceptual model has been modified from Mosley and Chen model

in the sense that the concept infant and child mortality is now presented as child mortality (defined by the study as children aged between 0 and 5 years). Injury as one of the determinants in Mosley and Chen model has also been left out because of time factor. Furthermore the relationship between the independent variables and child sickness (morbidity has not been looked at, and also the relationship between the dependent variable and child morbidity has been left out.

2.4 CONCEPTUAL HYPOTHESIS

1. Socio-economic and socio-cultural factors are likely to affect child mortality.
2. Health care indicators, for example, availability of water, sewage facilities, toilet facilities, distance to health facility, immunisation completeness, type of fuel used, and birth interval are likely to affect child mortality.
3. Nutritional factors, for example, type of food eaten are likely to affect child mortality.

Figure 3 below shows the study operational framework.

Figure 3. STUDY OPERATIONAL MODEL

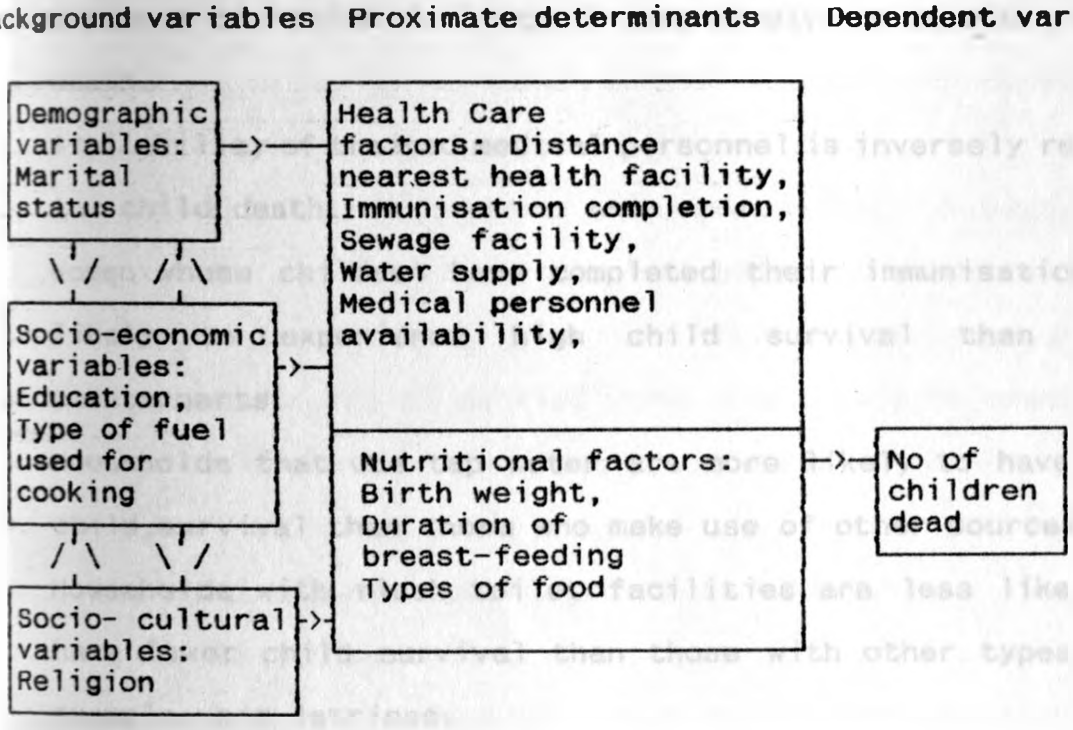


Figure 3 shows that marital status of the mother may determine if she is economically able to provide enough food for the children or book hospital beds so that she is attended by a modern trained midwife when she is giving birth. This will in turn determine her child's survival chances. Education of the mother may also increase her knowledge on the importance of taking the child to the hospital for immunization which will also reduce the chances of the child dying. The religion of the mother will also determine on the stress on the importance of the use of modern medicine.

2.5 OPERATIONAL HYPOTHESIS

1. Distance to health facility is positively related to child death.
2. Availability of trained medical personnel is inversely related to child death.
3. Women whose children have completed their immunisation are likely to experience high child survival than their counterparts.
4. Households that use tap water are more likely to have high child survival than those who make use of other sources.
5. Households with flash toilet facilities are less likely to have lower child survival than those with other types, for example, pit latrines.
6. Households that feed their children with more carbohydrates are more likely to experience lower child survival than those who give more proteinic and vitamin food to their children.
7. Households that use gas/paraffin as a source of fuel are less likely to experience lower child survival than those who use other sources.
8. Children whose birth weight is 3 kg and above are more likely to have a higher child survival than their counterparts.
9. Mothers who breast-feed their children for more than 12 months are more likely to experience a higher child survival than those who breast-feed for shorter period of time.
10. Mothers with secondary level of education are more likely to experience higher child survival than women with lesser

literacy levels of education.

11. Fathers with primary level of education are more likely to experience higher child survival than fathers with none/adult literacy level of education.
12. Mothers who are Protestant are more likely to experience higher child survival than those who belong to other religious groups.
13. Children belonging to married women are likely to experience higher child survival than unmarried women.

2.6 DEFINITION AND MEASUREMENT OF KEY CONCEPTS

2.6.1 Health indicators

Health has been defined as a state of complete physical, mental and social well-being and not merely an absence of disease and infirmity. Environmental health comprises of several components, i.e., sanitation, provision of safe water, food quality control communicable diseases and control of disease vectors. Health care indicators included in the study are; distance to the nearest health facility, availability of medical personnel, immunisation completion, availability of water and adequacy of sewerage facilities.

2.6.2 Distance to the nearest health facility

This variable is defined as accessibility to the health facility. It is measured in terms of kilometres from the nearest health facility.

2.6.3 Medical personnel availability

This variable is defined as the attendants of pregnant mothers at child delivery. It is measured in terms of traditional midwives and modern trained midwives.

2.6.4 Immunisation completion

This variable is defined in terms of whether one had taken the child to be immunised for one BCG, three polio dose, three DPT and one measles. It is measured in terms of which injection one has been given for what disease prevention. The clinic cards were checked for confirmation.

2.6.5 Availability of water

This variable is defined in terms of accessibility to clean water. It is measured in terms of tap water, water from the river, well or any other source of water.

2.6.6 Availability of sewage facilities

This variable is defined as the type of toilet facility available. It is measured in terms of whether it is pit latrine, flash toilet or bush.

2.7. Nutritional indicators

In this study, the nutritional indicator included is: birth weight, duration of breast-feeding and the type and how often food is given to the child.

2.7.1 Birth weight

This is an indicator of nutritional status of the mother when she was expectant of the child under consideration in the present study. This variable is measured in terms of weight of the child in kilograms at birth. This information was obtained from the clinical cards since the children under consideration were expected to have been born in the hospital or taken to the hospital.

2.7.2 Type of food

This variable is defined in terms of the type of food given to the child in terms of quality and quantity. The specified food groups included in the study are cereals (i.e., maize millet and sorghum), potatoes, cassava, bananas, beans, vegetables, proteinic foods (meat/fish/eggs and animal milk). These were measured in terms of the frequencies given per day (week, rarely or never. This has been converted into monthly rates. The frequencies are only approximated for broad food categories since some respondents could include snacks and ignore some main meals. The quantity and nutrient composition was not included since this kind of information requires different orientation in terms of scale. Note that eating habits, food hygiene and food taboos have not been included because of inadequate time and capital.

2.7.3 Duration of breast-feeding

This variable is defined as the number of months the child was breast-fed. It is measured in terms of whether the child was

breast-fed for 1-6 months, 7-12 months, 13-18 months, 19-24 months, 25-30 months or 31+ months. It is important to note that the children considered for this variable were those who had stopped breast-feeding.

2.8 Socio-economic factors

This concept is presented in terms of educational level of the mother and father of the children under consideration and type of fuel used for cooking. Source of income for the household has been left out because of its was very difficult to measure especially in the area of study.

2.8.1 Level of education

This variable is measured in terms of whether one had attained secondary, primary or none/adult literacy level of education.

2.8.1 Type of fuel used

This variable is defined as the type of fuel used for cooking. It is measured in terms of whether one is using charcoal, firewood, paraffin, gas or electricity.

2.9 Socio-cultural factors

This concept is defined in terms of religion of the mother, type of marriage, marriage pattern. However, marriage pattern and type of marriage have only been considered up to description of study population section (chapter 4). To this level there is an

indication that further analysis would have brought insignificant results hence the variable has been left out.

2.9.1 Religion

This variable is defined as the denomination the respondent belonged. It is defined as whether one is protestant, catholic or traditionalist.

2.9.2 Demographic factors

This concept is defined in terms of marital status of the mother and age of the mother. However, age of the mother has only been considered up to description of study population section (chapter 4). To this level there is an indication that further analysis would have brought insignificant results hence the variable has been left out.

2.9.3 Marital status

This variable is defined as whether one is married or not. The unmarried included the divorced, separated, widowed and singles.

2.9.4 Infant and child mortality

The concept infant mortality refers to deaths amongst children under one year and child mortality refers to deaths amongst children aged between exact one year and under five years per thousand live births. In the current study infant and child deaths have been grouped together under the concept child mortality

CHAPTER THREE

METHODOLOGY AND CHARACTERISTICS OF THE STUDY POPULATION

3.0 INTRODUCTION:

In this section, the study methodology and the characteristics of the study population are presented. The main methods of data collection, that is, use of questionnaires, formal interviews and secondary information are discussed. Methods of Data analysis such Coale-trussell mortality estimation technique, cross tabulation, chi-square tests and regression analysis are also presented. In addition to this the household characteristics, mother's characteristics, the child's characteristics and the father's characteristics are discussed.

3.1 SAMPLE DESIGN

This study used cluster random sampling technique to select enumeration areas covered by the Central Bureau of Statistics in the 1989 population census. This method involved listing of the enumeration areas in the sub-locations under study. After which five enumeration areas were chosen randomly. Each enumeration area had approximately 100 households. The next step involved listing the households (i.e., listing the names of the heads of households) in each of the selected enumeration areas. Further to this, households were identified where there were eligible women to be interviewed. Finally all eligible women were interviewed in

detail.

This sampling technique was chosen because it gave a more representative sample of the total population in the area under study. This method was further chosen because it was easy and convenient. It gave every member in the sample an equal chance of being selected.

This research study was done in December 1992. Two sub-locations were covered, that is, Kabuoro sub-location in Migori district and Manga\lietego sub-location in Nyamira district, Nyanza province. In this study every woman of reproductive age who had children who were under five years was interviewed. The household was taken as the sampling unit and the wife or wives (depending on the type of marriage i.e polygamous or monogamous) was the main respondent. Five hundred and ten households were interviewed in Manga/lietego sub-location and five hundred and twenty-two households were interviewed in Kabuoro sub-location. The above number of households per area was considered large enough to yield reliable results for generalisations about the determinants of child mortality in the study areas. As pointed out by Prewitt (1975:42) both the costs of the study and homogeneity of the population were considered in deciding on the size of the sample.

3.2 DATA COLLECTION PROCEDURES

3.2.1 Structured questionnaire

This was the central method used in the study. Before going to the field, a structured questionnaire was designed to cover

every respondent in the study area. The structured questions were mainly closed ended questions. The following background information was included: age, marital status, religion, education of the mother and father. Information on proximate determinants was also collected from the field. This included data on toilet facility, type of fuel used for cooking, source of drinking water, distance from the nearest health facility, birth spacing, birth attendant, where child was born, birth weight, duration of breast-feeding, age when the 1st semi-solid food was given to infants; frequency at which proteinic, carbohydrates and vitamin foods were given to children, type of immunisation given and finally why the immunisation schedule was incomplete?.

In closed ended questions the respondents were confined to giving specific answers to specific questions. This was particularly important in revealing information on children ever born, children dead, number of live births, number of women by their age and the age of the children.

In addition to this, there were 50 interviews held to pre-test the adequacy of the questions and the time allocated for each interview.

3.2.2 Formal interviews

As Prewitt (1975:42) observes in the interview approach, that as the researcher or the interviewer interacts directly with the respondents, questions are asked and answers are recorded person to person level. The interview provides the researcher with some

measure of control over the research setting.

3.2.3 Documentary information

Kenya National censuses and surveys were made use of to obtain documentary information on Nyamira and Migori districts. In particular, information was obtained on the birth rates and death rates in the past two to three decades from KDHS (1989), 1979 census and 1969 census.

3.3 METHODS OF DATA ANALYSIS

Five techniques of data analysis have been used, i.e,

(i) Cross tabulations.

(ii) Chi-square tests.

(iii) Coale-Trussell technique of estimating infant and child mortality.

(iv) Multiple regression analysis.

(v) Logistic regression analysis.

3.3.1 Cross tabulation

This is one of the quantitative methods used to analyze data from the two study areas. Cross tabulation helped to show the relationship between the background variables and the proximate determinants. They were also used to show the relationship between the dependent variable (proportion of children dead) and the independent variables, for example, type of toilet facility available and source of drinking water. Cross tabulation has also

been used to show how women in the sample are distributed by various categories of the variables under study. Given that the actual deaths may be too general in trying to show how the child's death was affected by the prevailing environmental factors, use of the proportions dead has been preferred since this refers to an individual woman and how her household characteristics affected her child's survival.

This method was chosen because it is easier to compute and understand since it doesn't require a lot of computations. This method is also very relevant and most appropriate to comparative studies.

3.4 The chi-square statistic:

The chi-square characteristic is the most appropriate and useful technique to be used to analyze this data because the column and row percentages for the cross tabulations do not allow for quantification and testing of the relationship between variables. This statistic has been used to test the association between two variables in the cross tabulation tables,i.e., the chi-square test measures the hypotheses that the two variables of a cross tabulation are independent of each other. The Chi-square distribution provides a model from which one can calculate the probability of the observed values deviating from the expected values by a particular amount. If this probability is large, greater than a selected alpha level, then there is a good possibility that the deviation of the observed from the expected

values occurred by chance alone. In this case, the alpha level selected is 0.05. If the observed significance is less than 0.05 then there is an association between the dependent and the independent variable. But if the observed significance is greater than 0.05 then there is no association between the dependent and the independent variable.

The formula for the chi-square statistic is:

$$X^2 = \text{SUM OF } \frac{(O-E)^2}{E}$$

According to the formula shown above, the expected value for a cell are subtracted from the observed value for the cell, square the difference and divide the result by the expected value of the chi-square for the table. The reason for squaring the difference is to get rid of the minus signs, otherwise the differences would sum to zero. The squared differences are divided by the expected value for the cell to control for differences in the number of observations in the cells (Herzon and Hooper 1976).

3.4.1 Conditions of application of Chi-square

1. Experimental data must be independent of each other.
2. Sample data must be drawn from target population.
3. Data must be expressed in original units.
4. Sample must contain at least 50 observations.
5. There should be no less than 5 observations in any cell.

and B(i) are regression coefficients according to Brass. According to Sullivan (1972) also;

$$K(i) = A(i) + B(i) * P(2)/P(3) \text{----------(5)}$$

where A(i) and B(i) are regression coefficients of the model and P(2) and P(3) are average parities for age group 20-24 and 25-29 respectively.

According to Trussell (1975);

$$K(i) = a(i) + b(i) * P(1)/P(2) + c(i) * P(2)/P(3) \text{-----(6)}$$

where a(i), b(i) and c(i) are regression coefficients obtained by Trussell.

3.5.1 Assumptions involved in the use of this method

1. That the proportions of children surviving and dead classified by five year age group of mothers or the duration of marriage can provide estimates of the probabilities of dying between birth and various childhood ages.
2. That fertility and mortality conditions have remained constant for quite a long time hence making it possible to estimate the proportions who survive to age 1,2,3,5,10,15,20,25,35,....75. from the proportion reported as surviving among children ever born to mothers in different child bearing ages.
3. That the risk of death is a function only of age of the child and not other factors such as child's birth order and mothers age. This is a serious limitation for in practice it has been found that mortality risks among infants and children are higher among young mothers which suggests that the age of the

mother is a crucial child mortality determinant. This is why q(1) values of women aged 15-19 years are disregarded as they tend to be higher. q(10) is also neglected because older women tend to forget long past experiences and hence their responses may not give the true picture of mortality. In essence q(1) and q(10) imply that the age of the mother is an important mortality determinant and if it is left alone to operate in any analysis of child mortality it is likely to mask the importance of other equally important variables that determine mortality behaviour. For these reasons q(2), q(3), q(5) values are preferred because they are considered more reliable. We have decided to use q(2) and q(5) values in this study as indicators of child mortality.

4. That the relationship between the proportions dead D(i) and life table mortality measure q(x) is primarily influenced by age pattern of mortality because it is this pattern that determines the distribution of children of women by length of exposure to the risk of dying.

3.6 Multiple Regression Analysis

Regression analysis deals with the description of the nature of the relationship between independent (endogenous) and independent variable(s) to estimate the value of the dependent variable when the values of the independent variables are known. Ordinary least squares multiple regression analysis could have been used in this study. However the result that will be given by this

method will have a limitation of having not controlled for age of the mother hence cannot be used to draw reliable conclusions in this study. Therefore the focus can be on the child and not the mother. This is the reason why the study has emphasized on logistic regression where the focus is on the child.

3.7 LOGISTIC REGRESSION

To establish the relationship between the independent variable and child mortality per each child age group it is convenient to use logistic regression since it is the most suitable method of regression analysis that can analyze data of small samples. This method has been chosen because it is the most appropriate for the prediction of results, for instance, by how much is the independent variable likely to influence the dependent variable. This method can also be used to explain the effect of certain independent variables on the dependent variable. In this case control variables are also included in the model. In the logistic regression forward stepwise regression is used to select the most significant variable to be entered into the equation first.

3.7.1 LOGISTIC REGRESSION MODEL

Logistic regression model is a form of log-linear models. In log-linear models, the response is the logarithm of the measure of interest. It is thus a multiplicative model where the resulting estimated effect from it is expressed in terms of Odds ratios . This form of regression examines the relationship between the

independent variable and a dichotomous outcome variable. The fact that the response variable is dichotomous makes the use of ordinary least squares (OLS) method inadequate for estimating the outcome variable whose nature is assumed to be continuous in OLS method.

Logistic regression has been found suitable as a method of analysis as it attempts to determine the probability of an event occurring. Its application in this study is suitable given the fact that, the major response variable in this study, that is, survival status of a child is binary. This variable takes a value of one if the child is dead or zero if he/she is not.

The strength of logistic regression model from a mathematical perspective lies in its flexibility and easy use. Furthermore, it lends itself to both a statistical and biological meaningful interpretation.

Logistic regression model is quite similar to the linear regression model except that the outcome variable for the logistic regression is binary.

In a single variable, the logistic model used is expressed as:

$$\frac{1}{1 + e^{-(\beta_0 + \beta_i X)}}$$

Where:

β_0 and β_i are coefficients estimated from the data.

X = independent variable

e = base of the partial log = 2.714 (natural logarithm)

It is worthy noting that the major aim of the logistic regression analysis is to estimate the constant and the regression

coefficients i.e β_1 , β_2,... β_i. where the constant is also the intercept and represents the log odds when all the explanatory variables are zero.

3.7.3 Assumptions of logistic regression

For any statistical model, the regression coefficients' confidence intervals and p-values are only correct if the model assumptions are correct.

1. This method is undertaken when the dependent variable does not satisfy the assumption of the ordinary least squares, i.e., the dependent variable is normally distributed.
2. This method can only be applied in a situation where the event has occurred or not occurred, i. e., the child is dead and the child is not dead. In this case it assumes that the dependent variable has a binomial distribution.
3. Another assumption of logistic regression analysis is that the effect of each explanatory variable is the same regardless of the effect of any other variable unless interaction terms are introduced.

Note that the binomial, not the normal distribution describes the distribution of the error and will be the statistical distribution upon which the analysis is based. In general, the principles guiding linear regression analysis will also apply in logistic regression analysis.

3.7.4 Fitting the logistic regression model

To fit the logistic regression model to a set of data given that there are n observations of the pair $(X_i\ Y_i)$ where i = 1, 2, ...n

y_i = value of the dichotomous outcome variable

X_i = value of the independent variable for the i subject and given that y is coded as 0 or 1.

To fit the above equation, we first estimate the values of β_0 and β_i, i.e th unknown parameters.

In least squares method β_0 and β_i values are chosen to be those that minimize the sum of squared deviations of the observed values of y from the predicted values based upon the model. The inefficiency of this method is shown by its possibility of bringing about heteroscedasticity i.e non-constant error term or variance.

Due to this shortcoming, the logistic regression model uses the maximum likelihood method to estimate β_0 and β_i the unknown parameters in a dichotomous outcome.

The maximum likelihood method of estimation yields values for the unknown parameters which maximize the probability of obtaining the observed set of data, i.e the coefficients that make our observed results most 'likely' are selected.

This method is applied only after constructing the likelihood function, (B) which expresses the possibility of the observed data as a function of the unknown parameters.

The maximum likelihood estimators of β_0 and β_i are those values which maximize the likelihood function. Thus the resulting

estimators are those which agree most closely with the observed data. Note that since logistic regression model is non-linear, parameter estimation is done by an iterative algorithm method.

3.7.5 TESTING FOR THE SIGNIFICANCE OF THE COEFFICIENTS

An assessment of the significance of the variables in the fitted model is necessary after estimating the coefficients.

The assessment is done by formulating and testing of a statistical hypothesis to determine whether the independent variables in the model are significantly related to the outcome variable.

When considering a single independent variable, first determine whether the model that includes the variable in question tells us more about the variable than does a model that does not include that variable.

The determination is done by comparing the observed value of the response variable to those predicted by each of the two models i.e first with variable, second without variable in question (Hauck and Donner, 1977).

The variable in question is significant if the predicted values with that variable in the model are better or are sensible than when that variable is excluded.

3.8 MAJOR PROBLEMS ENCOUNTERED IN THE FIELD

The problems that were faced in the field related to the actual interview and reaching the target population in particular

the eligible women for interview. These problems included the following:

1. There were difficulties in collecting information on ages and deaths of the children and the respondents. Some of the respondents could not remember their ages and the year their children died.
2. Non-response errors, for instance, about 5 women sampled out at Chep Ng'ombe(one of the enumeration areas in Manga/lietego) were left out because they were not found at home during the time of the interview even after several visits had been made to their homes.
3. Some respondents refused to talk to the interviewers about their dead children and sometimes they claimed they were too busy to talk to the interviewers.
4. The research operation encountered weather problems. The research was carried during an unexpected rainy season which made it difficult for the interviewers to reach most of the residents in time as the distance between the various respondents was large due to the spatial distribution of settlement. This led to the data collection research taking a longer period, an extra three weeks over the three months, that it was expected to take.
5. The physical geography of some areas made some clusters inaccessible by vehicles. The occurrence of rains in these districts during the survey period hampered quick movement in the field. A number of enumerators, complained of muddy roads

and difficult communication.

6. Incidences of inter-tribal insurgence in some parts of Manga/lietego between the Kalenjins and the Gusiis negatively affected the rate of responses. These problems denied the enumerators in the affected areas access to the sub-sampled households. Such circumstances of insecurity explained the high number of demolished and vacant structures and clusters. In general, fieldwork was quite effective and successful. Most of the respondents were cooperative.

3.9 CHARACTERISTICS OF THE STUDY POPULATION

3.9.1 Household Characteristics

In Manga/lietego most of the households were two kilometres from the nearest health centre. A good number were also three kilometres from the nearest health centre. This is an indication that health centres are readily available. Very few, about 12 % of the total households were five kilometres from the nearest health facility. Kabuoro sub-location on the other hand had a greater number of households being three kilometres from the nearest health facility. The percentage distribution of the distance of the households from the nearest health centre was as follows: 27% were three kilometres from the nearest health centre, 22% reported that their households were 1 kilometre from the nearest health centre.

Most of the households used charcoal/firewood as their main source of fuel in Manga/lietego sub-location (i.e.,94.1%).

Paraffin and gas were rarely used. This household characteristic was also found true in Kabuoro sub-location since 78.2% of the total number of households used firewood/charcoal. Those using gas constituted 5% only.

In Manga/lietego sub-location a majority of the households used river/stream as their main source of drinking water. This is evident from the fact that 64.9% were using river/stream as their main source of drinking water, 20.4% were using borehole with no pump and 7.8% used piped water. As far as Kabuoro sub-location was concerned, the main sources of drinking water was borehole/well with no pump. This source of drinking water was accessible to 44.4% of the households. Forty percent of the households were using river/stream water and 5% had access to piped water.

Majority of the households in Manga/lietego used pit latrine as their main type of sewage disposal facility. Generally, the distribution of the toilet facilities that were available was as follows: 94% used pit latrine, 3.9% used flush toilets and the remaining percentage used bush. This characteristic was generally true for Kabuoro sub-location where users of pit latrine constituted 84.7%, users of bush as toilet facility were 12.5% and flush toilet users were 2.9%.

About 42.2% of the total women interviewed in Manga/lietego sub-location had used the current toilet facility for a period of 5 years, on the other hand most of the women (70%) in Kabuoro sub-location reported that they had used their toilet facilities for a period of 5 years.

3.9.2 Mothers characteristics

The number of women interviewed in Manga/lietego sub-location was 510 while in Kabuoro sub-location the number interviewed was 522. In both cases these women were of reproductive age. Their age distribution was as follows:

TABLE 3.1: The number and percentage distribution of women by age

Age	Manga\lietego sub-location		Kabuoro sub-location	
	No.	%	No.	%
15-19	44	8.6	51	9.8
20-24	128	25.1	161	30.8
25-29	155	30.4	121	23.2
30-34	89	17.5	84	15.7
35-39	52	10.2	37	7.1
40-44	32	6.3	62	11.9
45-49	10	2.0	6	1.5
TOTAL	510	100%	522	100%

Age groups 20-24, 25-29 formed the majority of all women interviewed in both sub-locations. Majority of the women interviewed in both study areas were married, i.e, 79.9% and 74.4% for Manga/lietego and Kabuoro sub-locations respectively.

Table 3.2 below shows the distribution of the children according to the various reproductive age-groups of the women in the study areas.

TABLE 3.2: The number and percentage distribution of children by age of the mother

Age	Manga\lietego sub-location		Kabuoro sub-location	
	No.	%	No.	%
15-19	78	3.7	118	6.3
20-24	317	15.0	451	24.0
25-29	569	27.0	433	23.0
30-34	499	23.7	365	19.4
35-39	301	14.3	165	8.8
40-44	261	12.4	318	16.9
45-49	81	3.8	35	1.9
TOTAL	2106	100.0	1881	100.0

In Manga/lietego sub-location the age groups 25-29 and 30-34 tended to be the leading in terms of the children ever born. This is possible because these are the age-groups that have recently been married and have also reached the peak of their reproductive period. In Kabuoro sub-location, the age-groups with the greatest number of children are 20-24 and 25-29. This is also an indication of early marriages in this area, that is why the groups concerned have given birth to at least 4 to 5 children per individual woman.

Another important characteristic to note about the women interviewed is that, in Manga/lietego sub-location most of the women were protestants i.e., 65.9%, followed by Catholics who were 30%. The rest of the population comprised of moslems and traditionalists. On the other hand Kabuoro sub-location had very few catholics and protestants. Women of Kabuoro sub-location were mainly of others religions such as Roho Israel, Legion maria, Dini ya musambwa, the Coptic church and traditionalists. Both Catholics and Protestant population comprised of 42.3% of the total

population of women under study.

In Manga/lietego sub-location a majority of women were generally highly educated. This is evident from the fact that 47.8% of the total number of women under study had attained secondary level of education. Only 9% had adult literacy. This finding is a contrast from what was found in Kabuoro sub-location where most of the women had upper primary and secondary education.

In Manga/lietego sub-location, 53.3% of the women had never used any contraceptive method while in Kabuoro sub-location 61.5% had never used any contraceptive method. This shows that the proportion of users of contraceptives is relatively higher in Manga/lietego sub-location as compared to Kabuoro sub-location. Because of this kind of phenomenon women aged 20-24 and 25-29 in both study areas, were having the greatest number of children, at least, 6 or 7, an indication of no contraception as a mechanism of birth-spacing. As far as current use of contraceptives is concerned, there were 57% non-users in Kabuoro sub-location and 55.2% non-users in Manga/lietego sub-location. Few used the pill and a majority used natural safe period abstinence in Kabuoro sub-location. In Manga/lietego sub-location a majority of the women used the pill and injection.

Most of the women (i.e.,89%) in Kabuoro sub-location had been given a tetanus injection. In Manga/lietego sub-location 91% of the total population of women interviewed had also received a tetanus injection when they were pregnant. This shows a very small difference between Kabuoro and Manga/lietego sub-locations as far

as giving of tetanus injection is concerned.

In both study areas majority of the women had been attended to by modern trained midwives, that is, 80.4% and 85% in Kabuoro and Manga/lietego respectively.

It was also reported by most (81.8%) respondents in Manga/lietego sub-location that they belonged to monogamous marriages, while in Kabuoro sub-location there were 66.7% in monogamous marriages. It is also important to note that in monogamous marriages couples tend to have many children because of the fact that there are no separate sleeping arrangements. This is why in fact there were very many children per individual woman in Manga/lietego sub-location. The more the children are, the more the demand for food becomes, hence such children are likely to be malnourished which may increase child mortality. However, mortality on the other hand may not be high in Manga/lietego because of availability of food and health facilities. Monogamous marriages are common in this area because of the respondents religion. The dominant religious group in Manga/lietego sub-location is protestant which discourage polygamous marriages.

3.9.3 Fathers characteristics

In Manga/lietego sub-location, the fathers of households under study had on average secondary level education (64.3%). 47.7% had none/adult literacy and 27.9% had primary level of education. The fathers of households in Kabuoro sub-location were having almost the same characteristics as those of Manga/lietego as far as level

of education is concerned. Most of the fathers under consideration had secondary level of education. The distribution of the fathers of households in Kabuoro sub-location as far as education is concerned was as follows: 4.1% had none/adult literacy level of education, 31.2% had primary level of education and 66.7% had secondary level of education.

As far as employment of the male head of the household in Kabuoro sub-location is concerned, 62% were employed away from their homes, mainly as casual labourers in Awendo sugar factory. In Manga/lietego sub-location, a few of the fathers of households were employed away from their homes. Only 40% of all households heads in this study area were employed and most of these were primary and secondary school teachers. Others were employed as carpenters, drivers, excetra. Hence employment was not a very important factor of child mortality in Manga/lietego sub-location since most of the jobs outside ones home did not have good income as such and most of the food eaten for example was locally produced not bought except for some households in Kabuoro sub-location.

3.9.4 Child characteristics

The total number of children covered in Manga/lietego sub-location was 1008 aged 5 years and under. In Kabuoro sub-location the number of children covered was 1151 aged 5 years and under. The children's age distribution was as follows:

TABLE 3.3: The distribution of children born 5 years ago by age

Age in years	Manga/lietego sub-location No.	%	Kabuoro sub-location No.	%
0.00	147	14.6	157	13.6
1.00	150	14.9	208	18.1
2.00	175	17.4	218	18.9
3.00	198	19.6	212	18.4
4.00	171	17.0	191	16.6
5.00	167	16.6	165	14.3
Total	1008	100.0	1151	100.0

In Manga/lietego sub-location, most of the deaths of the children were reported to have been as a result of other causes as witchcraft which contributed 57.7%. This was followed by pneumonia that took a toll of 15% of all causes of death. Prevalence of pneumonia is possible in the area because of the cold climate experienced in the Kisii highlands. Kwashiorkor did not seem to have contributed much. This possibly is because of improved nutritional habits and plenty of food, owing to the fact that Manga/lietego is situated in a geographical location that has very fertile soils favourable for food-crop farming.

Information collected from Kabuoro sub-location indicates that most of the deaths were as a result of diarrhoea, pneumonia and measles. Prevalence of these diseases in the area are possible because of the fact that there is inadequate water supply hence dirty food and environment that makes diarrhoeal cases many. Measles is also possible because of the fact that the people in the area are still culturally traditional hence do not believe in modern medicine.

In both study areas, majority of the children were born in the hospital: since 79% of all women gave birth in the hospital in Kabuoro sub-location and 85% gave birth in the hospital in Manga/lietego sub-location.

Most of the children in Manga/lietego had an average birth weight of 3 Kg and above while the children of Kabuoro sub-location had an average birth weight of 3 Kg and below. This indicates that the mothers of Manga/lietego must have fed well when expecting their children.

In Kabuoro sub-location a majority of the children who had stopped breast-feeding were breast-fed for a duration of 1-12 months while those of Manga/lietego were breast-fed for a period of 12-24 months. This difference in duration of breast-feeding is likely to lead to high child mortality in Kabuoro sub-location and low child mortality in Manga/lietego sub-location.

The first semi-solid food given to infants is porridge that is both fermented and not fermented in Kabuoro sub-location. This was also the case in Manga/lietego sub-location though in most cases in Manga/lietego sub-location, this porridge was mixed with milk. Eggs cerelac, mashed ripe fruit were rarely given. Hence, those children with poor health, would be suffering from malnutrition.

In Manga/lietego sub-location, most of the respondents (67.1%) reported that they gave food to infants 2 or 3 times a day. However, a reasonable proportion (27.4%) reported that they gave on demand. This finding is almost similar for Kabuoro sub-location. However the degree to which a certain type of food is given varies,

for instance, in Manga/lietego sub-location, 42% women gave food 2 or 3 times a day and in Kabuoro sub-location it was 38.9% of the total population of women who gave food 2 or 3 times a day to their infants.

In Manga/lietego most of the children were given cereals (maize, millet and sorghum) 2 or 3 times a day. A few gave once a day. However, the findings indicate that there were plenty of cereals and that they were adequately given. In Kabuoro sub-location cereals were given to children mainly once a day.

Cassava and potatoes were given once a week in Manga/lietego sub-location. This could be due to the fact that the population in the study area doesn't consider cassava and potatoes as staple food. Their staple food is "ugali" prepared from maize hence cassava and potatoes are rarely grown and when eaten they are eaten as snacks. In Kabuoro sub-location cassava and potatoes were also rarely given. The women who rarely gave potatoes and cassava were 41.3% of the total population of women interviewed.

A majority of the children in Manga/lietego were given bananas once a week. This mainly depended on whether the household had grown bananas or not. Those who grew bananas gave their children at least once a day or once a week. In Kabuoro sub-location bananas were rarely given to children.

Information collected from Manga/lietego showed that beans were given to children once a week by most of the respondents. This is an indication of insufficient provision of this type of food. In Kabuoro sub-location beans were rarely given which was

much worse compared to Manga/lietego where they gave once a day

Vegetables were mainly given once a day in Manga/lietego sub-location. At least in every meal there are vegetables like 'sukuma wiki', traditional vegetables (spider flowers) and cabbage. A majority of the women in Kabuoro sub-location gave vegetables once a day.

Meat/fish and eggs were mainly given once a week in Manga/lietego sub-location. This is also an indication of insufficient provision of these foods to the children. On the other hand women in Kabuoro sub-location gave these foods rarely to their children. Hence the children of Manga/lietego were relative better placed as far as the provision of meat/fish and eggs was concerned. A majority of the respondents from Manga/lietego reported that animal milk was given 2 or 3 times a day. This can be attributed to the fact that animal milk (cow's milk) is used with 'ugali'. 'Ugali' is eaten at least 2 times a day and the tea prepared every morning has milk. Hence the children end up eating ugali 2 or 3 times a day. In Kabuoro sub-location, most women gave their children animal milk once a day. However, this pattern of the food provision would also depend on the quantity given.

Most of the children in Manga/lietego sub-location had not been sick in the last two weeks prior to the date of the interview. For the few who were sick they were suffering from colds/coughs malaria and Pneumonia. In Kabuoro sub-location most of the women reported that their children had been sick in the last two weeks. These children were mainly suffering from skin rashes, measles,

diarrhoea and vomiting. It was also reported by women from both study areas that most of the children who became sick were taken to the hospital or given modern medicine i.e., 27% and 33.7% for Manga/lietego and Kabuoro sub-locations respectively.

As far immunisation of the children is concerned in Manga/lietego sub-location, majority of the children (75.4%) were given all the immunisation dosages. This was a contrast to Kabuoro sub-location where only 44.5% of the women interviewed had their children given complete immunisation dosages.

For children whose immunisation was incomplete in Manga/lietego, the respondents reported that their children were under one year. Some said that their children had not been given complete immunisation because the mother was sick, and that there was no time for the mother to take the child to be immunised. As far as Kabuoro sub-location is concerned most of the children did not receive complete immunisation because of the fact that the clinic was too far. Below is a table showing the distribution of the type of immunization given to each children in the study areas.

TABLE 3.4: The distribution of type of immunization given by children aged 5 and under.

Manga/lietego sub-location			Kabuoro sub-location	
Immunization given	No.	%	No.	%
BCG	25	2.6	41	4.0
DPT	27	2.8	30	2.9
POLIO	67	6.9	147	14.4
MEASLES	4	0.4	22	2.2
ALL	724	75.4	454	22.5
N/A	125	12.9	327	32.1
Total	1008	100.0	1151	100.0

In both study areas it was reported that the child's growth was monitored, for instance, the growth curve on the clinic card of the child was properly drawn and that the weights were properly recorded. However, in cases where the child's growth was not monitored it was reported by the respondents that it was the fault of the mother.

3.10 SUMMARY OF THE MAJOR FINDINGS

3.10.1 Socio-economic Socio-cultural and Demographic characteristics

In both study areas most of the women interviewed belonged to 20-24 and 25-29 age groups. Most of the children in Manga/lietego belonged to women in the age groups 25-29 and 30-34 whereas in Kabuoro sub-location most of the children belonged to women in the age-groups 20-24 and 25-29. In both sub-locations under study, a majority of the women interviewed were married. In both study areas most of the women under consideration were not currently

using any contraceptive method and for those who were using contraceptives the Pill and Injection were the main contraceptive methods. In Manga/lietego sub-location, majority of the women interviewed had upper primary and secondary level of education whereas in Kabuoro sub-location majority of the women interviewed had secondary level of education. Majority of the fathers under consideration in Manga/lietego sub-location had primary level of education while in Kabuoro sub-location majority of the fathers had secondary level of education. Majority of the women interviewed were protestants by religion.

3.10.2 Health Care Characteristics

In Manga/lietego sub-location a majority of the households under study were 2 to 3 Km away from the nearest health facility whereas in Kabuoro sub-location a majority of the households were 3 to 4 Km away from the nearest health facility. In both study areas majority of the women had received a tetanus injection when they were expectant of the children under consideration. In both study areas most of the women interviewed were attended to by a modern trained midwife. In Manga/lietego sub-location majority of the households used river/stream as the main sources of drinking water whereas in Kabuoro sub-location,majority of the households had boreholes as their main sources of drinking water. In both sub-locations under study, a greater proportion of women gave birth to the children under consideration in the hospital. Majority of the households in both study areas used charcoal as

their main sources of fuel for cooking. In both study areas the households under study used pit latrines as their main sewage disposal facility. In Manga/lietego most of the children had not been sick in the last two weeks prior to the date of the interview. However for those whose children were sick they were suffering from colds and coughs. Whereas in Kabuoro sub-location most of the children had been sick in the last two weeks prior to the date of the interview and most of these children were suffering from malaria and skin rashes. In both study areas the children who became sick were taken to the hospital. Most of the children under consideration in the both study areas had their health cards available, given complete immunization dosages and had their growth monitored.

3.10.3 Nutritional Characteristics

Most of the women (77.8%) in Manga/lietego sub-location breast-fed their children for a duration of 12-24 months whereas in Kabuoro sub-location most of the children were breast-fed for a duration of 1-12 months. Most of the infants (67.5%) under study were given porridge mixed with milk as their first semi-solid food in Manga/lietego sub-location whereas in Kabuoro sub-location it is plain porridge that was mainly given. Most of the children (56.4%) under consideration in Manga/lietego sub-location had a birth weight of 3 kg and over whereas in Kabuoro sub-location most of the children had a birth weight of 3kg and below. In both study areas infants were given food 2 to 3 times a day. In both Manga/lietego

sub-location cereals, for instance, maize millet and sorghum were given to children two to three times a day whereas in Kabuoro sub-location cereals were given to children once a day. In Manga/lietego bananas were mainly given once a day whereas in Kabuoro sub-location they were mainly given once a week. Beans were given once a week in Manga/lietego sub-location whereas in Kabuoro sub-location beans were rarely given. Cassava and potatoes were given once a week in Manga/lietego sub-location whereas in Kabuoro sub-location they were rarely given. In Manga/lietego vegetables were given to children two or three times a day whereas in Kabuoro sub-location these foods were given to children once a day. Meat/fish/eggs were given once a week to children in Manga/lietego sub-location whereas in Kabuoro sub-location these foods were rarely given to children. Animal milk in Manga/lietego sub-location was given to children two to three times a day while in Kabuoro sub-location it was given once a day.

CHAPTER FOUR

BACKGROUND FACTORS AND PROXIMATE DETERMINANTS OF CHILD MORTALITY.

4.0 INTRODUCTION

In this section we examine the influence of selected socio-economic, socio-cultural and demographic factors (background variables) on selected proximate determinants of child mortality. Cross tabulations have been used since they are the most appropriate for comparative purposes. The definition of this method, why it has been chosen and its applicability has been presented in chapter 3 of this document. The background variables selected include marital status and religion of the mother, the educational level of the mother and father. The proximate determinants are mainly the child variables like where the child was born, who attended to the mother when the child was born, was the child immunized or not, excetra. The study of this kind of relationship is important because it enables the researcher to identify the most influential variables that may influence child mortality so that the regression analysis that follow can emphasize these factors.

4.1 Place of Child Birth and Mothers Educational Level:

As shown on table 4.1, majority of the respondents gave birth in the hospital/clinic in Manga/Lietego sub-location. However, it is important to note that the use of hospital/ clinic as delivery

points tended to increase by level of education. This is evident from the fact that 67.3% of women with none/adult literacy, 66.3% of women with primary level education and 83.9% of women with secondary level of education gave birth in the hospital. Among those who gave birth at home, the proportions also decreased with the increase in the level of education. This shows that the use of a modern health facility increases with the level of education.

Table 4.2 shows that in Kabuoro sub-location, level of education did not seem to have a significant effect since all the educational categories for the study had 80% of women indicating that they had given birth in the hospital. However, as far as those who gave birth at home are concerned, majority of women with primary level of education gave birth at home compared to women with other educational background.

4.2 Birth Weight and Mothers Educational Level:

As shown in table 4.1, it is evident that in Manga/Lietego sub-location, the percent of women whose children had a birth weight of between 3.00 and 3.99 Kgs increased with the level of education of the mother so that 52.2% were of women with primary level of education, 53.2% of women with secondary level of education and 50% of women with none/adult literacy level of education.

Table 4.2 shows that in Kabuoro sub-location, mothers educational level increased with the children who had a birth weight of 3.00-3.99 Kgs. The following is the proportions of the

distribution of women who had children with a birth weight of 3.00-3.99 kgs: 50% were of those with none /adult literacy and 73.1% were of women with secondary level of education.

4.3 Birth attendant and level of Education of the mother

It is evident from tables 4.1 and 4.2 that as the level of education tended to increase, the use of a modern trained mid-wife also increased in both Kabuoro and Manga Lietego sub-location. For instance, in Manga/Lietego sub-location, 63% of women with none/adult literacy education were attended to by modern trained mid-wives, 73.1% of women with primary level of education were attended to by modern trained mid-wives and 85.4% of those with secondary level of education were attended to by a modern trained mid-wife. In Kabuoro sub-location, those attended to by modern trained mid-wives were as follows; 62.5% of those with none/adult literacy, 81.5% of those with primary level of education and 84.3% of those with secondary level of education.

On the other hand, the percentage attended to by traditional mid-wives decreased with the increase in the level of education of the mother for both sub-locations under study.

4.4 Duration of Breast-feeding and Mothers Educational Level:

In Manga Lietego sub-location, breast-feeding did not increase with the level of education of the mother after primary level of education. For instance, among those who breast-fed for 13-18 months, only 18.5% were with adult literacy, 35.9% had primary level of education and 35.2% were with secondary level of

education(see table 4.1). Even among those who breast-fed for 12-24 months, breast-feeding didn't increase with the level of education i.e. 40.7% had none/adult literacy education, 31.3% were among those with primary level of education and 33% had secondary and above level of education. This is probably because these women with secondary level of education go for further studies or resume their jobs hence do not breast-feed for a long period of time.

In Kabuoro sub-location, contrasting findings were obtained. The proportion of women who breast-fed for 1-6 months by education level were: 35% were of the none/adult literacy, 34.5% were of those with secondary level of education and lastly 24.4% were of those with primary level of education. Among those who breast-fed for 13-18 months, women breast-feeding increased with the level of education of the mother, i.e., 35% of the women with none/adult literacy, 37.8% of the women with primary level of education and 41.4% of women with secondary level of education (see table 4.2).

4.5 First Semi-Solid Food Given and Mothers Educational Level:

It is evident from tables 4.1 and 4.2 that in both Manga Lietego and Kabuoro sub-locations, the first semi-solid food given was mainly porridge irrespective of mothers level of education. In Kabuoro sub-location, 77.3% of the mothers gave porridge as the first semi-solid food to their children while in Manga Lietego 91.6% gave porridge as the first semi-solid food to their infants. However, in Manga/Lietego sub-location, most of the women indicated

that the porridge given to the infants was mixed with milk that made it more nutritious. Mashed ripe fruit was given by a very small number of women so that at least in Manga/Lietego, the provision of this type of food increased with the level of education but in Kabuoro it did not. Eggs were hardly given in both sub-locations.

4.6 Proteinic foods are Given and Educational Level of the Mother:

It is evident from table 4.1 that giving of these types of food increased with the increase in the level of education of the mother. In Manga/Lietego sub-location 3.7% of women with none/adult literacy gave these foods once a day, 18.1% of women with primary level of education and 18.2% of women with secondary level of education gave the foods once a day. Table 4.2 suggests that in Kabuoro sub-location, those who gave these foods once a day decreased with the increase in the level of education of the mother i.e., 21.1% of the none/adult literacy level of education women, 18.3% of the women with primary level of education and 14% of the women who had secondary level of education had given these foods once a day. This could be one of the reasons why there is high mortality in Kabuoro sub-location since majority of the women are not using their education to improve the diet of their children.

4.7 Cereals, Cassava, Potatoes were Given and Mothers Educational Level:

These foods were mainly given 2 or 3 times a day and once a week. For those who gave once a week, the frequency of giving of these foods increased with the level of education of the mother i.e., 11.1% of those with none/adult literacy level of education, 17.6% had primary level of education and 21.1% had secondary level of education. For those who gave two or three times a day the distribution was: 81.4% of those with none/adult literacy level of education, 61.1% of those with primary level of education and 61.1% of those with secondary level of education (see table 4.1).

Table 4.2 shows that in Kabuoro sub-location, majority of the women gave these foods once a day as opposed to Manga/Lietego where they gave 2 or 3 times a day. However, those who gave 2 or 3 times a day increased with the increase in the level of education such that 42.1% were with none/adult literacy, 48.9% were with primary level of education and 51.7% were with secondary level of education.

4.8 Vegetables/Fruits were Given and Mothers Educational Level:

Table 4.1 shows that women with secondary level of education were the majority (32.5% of the total population of women with secondary level of education) among those who gave these foods 2 or 3 times a day, followed by those with none/adult literacy level of education who were 29.6% of the total population of women with

none/adult literacy. Among those who gave 2 or 3 times a day, women with primary level of education were the majority leading by 74.4% of the total population of women that had primary level of education. Table 4.2 shows that in Kabuoro sub-location, women with primary level of education also led by 42.9% of those with primary level of education, among the women who gave these foods to their children once a day. This is because of the fact that these women have learnt the basics of bringing up children and that those with secondary level of education are not around i.e at home to feed their children hence they are not fed as much as those born to women with primary level of education.

4.9 Type of Immunization Given and Education Level of Mother:

Table 4.1 shows that immunization rate of children increased by level of education in Manga/Lietego sub-location despite the fact that there was a significant proportion of women with none/adult literacy who had children who had completed their immunization schedule as compared to those born to women with primary level of education. The distribution was as follows:- 85.2% of those who had none/adult literacy level of education, 80.6% of those who had primary level of education, 90.9% of those who had secondary level of education. This is possible because modern health facilities are readily available in this sub-location. As shown on table 4.2 it is evident that in Kabuoro sub-location, a higher percent of women with primary level of education (52.6%) had children who had received complete immunization

schedule. These were closely followed by children born to those with secondary level of education (50%) and the none/adult literacy women (44.7%).

TABLE 4.1 **The Distribution of Women by Educational level of the Mother and some Proximate determinants in Manga/Ietego Sub-location.**

PROXIMATE DETERMINANTS	EDUCATIONAL LEVEL OF THE MOTHER							
	None/adult literacy		Primary		Secondary and plus		Total	
	No.	%	No.	%	No.	%	No.	%
WHERE CHILD BORN								
Hospital/clinic	37	(64.9%)	122	(66.3%)	224	(83.9%)	383	(75.4%)
Home	20	(35.1%)	62	(33.7%)	43	(16.1%)	125	(24.6%)
Total	57	(100%)	184	(100%)	267	(100%)	508	(100%)
BIRTH WEIGHT								
2.00 - 2.99	6	(1.1%)	10	(5.5%)	26	(9.8)	42	(8.4%)
3.00 - 3.99	20	(37%)	95	(52.2%)	141	(53.2%)	256	(51.1%)
4.00 - 4.99	28	(51.9%)	66	(36.3%)	94	(35.5%)	188	(37.5%)
5.00 +	-	-	11	(6%)	4	(1.5%)	15	(3%)
Total	54	(100%)	182	(100%)	265	(100%)	501	(100%)
BIRTH ATTENDANT								
Modern Trained Midwife	30	(63%)	136	(73.1%)	228	(85.4%)	394	(78.5%)
Traditional Midwife	16	(37%)	50	(26.9%)	39	(14.6%)	105	(21.6%)
Total	46	(100%)	186	(100%)	267	(100%)	499	(100%)

TABLE 4.1 Continued

PROXIMATE DETERMINANTS	MOTHER'S EDUCATIONAL LEVEL			
	NONE/ADULT LITERACY	PRIMARY EDUCATION	SECONDARY EDUCATION	Total
	No. %	No. %	No. %	No. %
DURATION OF BREAST-FEEDING(in months)				
1 - 6	4 (3.7%)	19 (13.8%)	18 (6.7%)	41 (7.7%)
7 - 12	14 (25.9%)	27 (13.8%)	57 (21.3%)	98 (19.4%)
13 - 18	10 (18.5%)	70 (35.9%)	94 (35.2%)	174 (34.4%)
19 - 24	22 (40.7%)	61 (31.3%)	88 (33%)	171 (33.8%)
25 - 30+	6 (11.1%)	8 (4%)	10 (3.7%)	24 (2.8%)
Total	56 (100%)	185 (100%)	267 (100%)	508 (100%)
1ST SEMI-SOLID FOOD GIVEN				
Porridge	50 (92.6%)	172 (92.3%)	242 (90.6%)	464 (91.6%)
Mashed bananas/ Potatoes	- -	6 (3.2%)	4 (1.5%)	10 (2%)
Cerelac	2 (3.7%)	2 (1.1%)	13 (4.9%)	17 (3.4%)
Mashed ripe fruit	2 (3.7%)	4 (2.2%)	4 (1.5%)	10 (2%)
Others	- -	2 (1.1%)	4 (1.5%)	6 (1.2%)
Total	54 (100%)	186 (100%)	267 (100%)	507 (100%)
PROTEINIC FOODS				
Once a day	2 (3.7%)	33 (18.1%)	48 (18.2%)	83 (16.6%)
2 or 3 times a day	- -	11 (6%)	11 (4.1%)	22 (4.4%)
Once a week	34 (63%)	94 (51.6%)	169 (63.8%)	297 (59.3%)
Rarely	18 (33.3%)	44 (24.2%)	31 (11.7%)	93 (18.6%)
Never	- -	- -	6 (3%)	6 (1.2%)
Total	54 (100%)	182 (100%)	265 (100%)	501 (100%)

Table 4.1 continued				
CEREALS/CASSAVA /POTATOES				
Once a day	4 (7.4%)	24 (13.2%)	23 (8.7%)	51 (10.2%)
2 or 3 times a day	44 (81.4%)	111 (61%)	162 (61.1%)	317 (63.3%)
Once a week	6 (11.1%)	32 (17.6%)	56 (21.1%)	94 (18.8%)
Rarely	- -	7 (3.8%)	18 (6.8%)	25 (5%)
Never	- -	8 (4.4%)	6 (2.3%)	14 (2.8%)
Total	54 (100%)	182 (100%)	265 (100%)	501 (100%)
VEGETABLES /FRUITS				
Once a day	16 (29.6%)	39 (21.7%)	86 (32.5%)	141 (28.3%)
2 or 3 times a day	337 (67.5%)	34 (63%)	134 (74.4%)	169 (63.8%)
Once a week	4 (7.4%)	3 (1.7%)	6 (2.3%)	13 (2.6%)
Rarely	- -	4 (2.2%)	- -	4 (0.8%)
Never	- -	- -	4 (1.5%)	4 (0.8%)
Total	54 (100%)	180 (100%)	265 (100%)	499 (100%)
TYPE OF IMMUNISATION GIVEN				
BCG	- -	2 (1.1%)	5 (1.9%)	7 (1.4%)
DPT	- -	9 (4.8%)	- -	9 (1.8%)
Polio	- -	21 (11.3%)	7 (2.6%)	28 (5.6%)
Measles	- -	2 (1.1%)	- -	2 (0.4%)
All	46 (85.2%)	150 (80.6%)	241 (90.9%)	437 (86.9%)
N/A	8 (14.8%)	2 (1.1%)	12 (4.5%)	20 (4%)
Total	52 (100%)	186 (100%)	265 (100%)	503 (100%)

TABLE 4.2 The Distribution of Women by Educational level of the Mother and some Proximate determinants in Kabuoro Sub-location

PROXIMATE DETERMINANTS	EDUCATIONAL LEVEL OF THE MOTHER			
	None/adult literacy	Primary	Secondary and plus	Total
	No. Percent	No. Percent	No. Percent	No. %
WHERE CHILD BORN				
Hospital/ clinic	33 (82.5%)	231 (80.8%)	135 (84.9%)	399 (80.2%)
Home	17 (17.5%)	55 (19.2%)	24 (15.1%)	96 (19.8%)
Total	50 (100%)	286 (100%)	159 (100%)	495 (100%)
BIRTH ATTENDANT				
Trained Mid-wife	25 (62.%5)	233 (81.5%)	134 (84.3%)	392 (81%)
Traditional	15 (37.5%)	51 (18.5%)	26 (15.7%)	92 (18.1%)
TOTAL	40 (100%)	284 (100%)	160 (100%)	484 (100%)
BIRTH WEIGHT				
2 - 2.99	16 (40%)	59 (20.9%)	31 (20.3%)	106 (22.3%)
3 - 3.99	20 (50%)	206 (73.1%)	110 (71.9%)	336 (70.7%)
4 - 4.99	4 (10%)	17 (6%)	12 (7.8%)	33 (6.9%)
Total	40 (100%)	282 (100%)	153 (100%)	475 (100%)
DURATION OF BREAST-FEEDING (IN MONTHS)				
1 - 6	14 (35%)	66 (24.4%)	50 (34.5%)	130 (28.6%)
7 - 12	14 (35%)	102 (37.8%)	60 (41.4%)	176 (38.7%)
13 - 18	6 (15%)	18 (6.7%)	17 (11.7%)	41 (9%)
19 - 24	2 (5%)	48 (17.8%)	8 (5.5%)	58 (12.7%)
25 - 30+	4 (10%)	36 (13.3%)	10 (6.8%)	50 (11%)
Total	40 (100%)	270 (100%)	145 (100%)	455 (100)

Table 4.2 continued				
1ST SEMI-SOLID FOOD GIVEN.				
Porridge	36 (90%)	218 (76.2%)	119 (75.8%)	373 (77.3%)
Mashed bananas/ potatoes	2 (5%)	10 (3.5%)	18 (3.7%)	6 (3.8%)
Cerelac		44 (15.4%)	22 (33%)	66 (13.6%)
Mashed ripe fruit		4 (1.4%)	7 (14%)	11 (2.3%)
Others	2 (5%)	10 (3.5%)	3 (1.9%)	15 (3.1%)
Total	40 (100%)	286 (100%)	157 (100%)	485 (100%)
PROTEINIC FOODS				
Once a day	8 (21.1%)	49 (18.3%)	22 (14%)	79 (17.1%)
2 or 3 times a day	8 (21.1%)	29 (10.8%)	23 (15.6%)	60 (13%)
Once a week		44 (16.4%)	22 (14%)	66 (14.3%)
Rarely	18 (47.4%)	130 (48.5%)	79 (50.3%)	227 (49%)
Never	4 (10.5%)	16 (48.5%)	11 (7%)	31 (6.7%)
Total	38 (100%)	268 (100%)	157 (100%)	463 (100%)
CEREALS/ CASSAVA/ POTATOES				
Once a day	16 (42.1%)	132 (48.9%)	78 (51.7%)	226 (49.2%)
2 or 3 times a day	4 (10.5%)	60 (22.2%)	35 (23.2%)	99 (21.6%)
Once a week	4 (10.5%)	16 (5.9%)	8 (5.3%)	28 (6.1%)
Rarely	33 (12.2%)	8 (21.1%)	21 (13.9%)	62 (13.5%)
Never	6 (15.8%)	29 (10.7%)	9 (6%)	44 (9.6%)
Total	38 (100%)	270 (100%)	151 (100%)	459 (100%)
VEGETABLES/FRUITS				
Once a day	13 (34.2%)	114 (42.9%)	61 (40%)	188 (41%)

Table 4.2 continued				
2 or 3 times a day	11 (28.9%)	70 (26.3%)	54 (35.1%)	135 (29.5%)
Once a week	2 (5.3%)	27 (10.2%)	13 (8.4%)	42 (9.2%)
Rarely	8 (21.6%)	39 (14.7%)	15 (9.7%)	62 (13.5%)
Never	4 (10.5%)	16 (6%)	11 (7.1%)	31 (7%)
Total	38 (100%)	266 (100%)	154 (100%)	458 (100%)
TYPE OF IMMUNISA-TION GIVEN				
BCG	- -	12 (4.2%)	13 (8.1%)	25 (5.1%)
DPT	- -	14 (4.9%)	4 (2.5%)	18 (3.7%)
Polio	5 (14.7%)	65 (22.7%)	17 (10.6%)	87 (19.5%)
Measles	2 (5.8%)	10 (3.5%)	6 (3.7%)	18 (3.7%)
All	15 (44.7%)	141 (52.6%)	80 (50%)	236 (48.5%)
N/A	12 (35.2%)	19 (6.6%)	33 (20.5%)	64 (13.1%)
Total	34 (100%)	261 (100%)	153 (100%)	448 (100%)

4.10 Where Child Born and Level of Education of the Father:

Table 4.3 shows that fathers level of education in Manga/Lietego sub-location did not seem to influence the place where the child was born as was the case in Kabuoro sub-location. However, majority of the children were born in the hospital i.e 74.8%. It is evident from table 4.4 that in Kabuoro sub-location, use of a modern health facility tended to increase with the increase in the level of education of the father. For instance, 52.9% fathers with none/adult literacy had their wives give birth

in the hospital. 73.7% of fathers with primary level of education and 85% of those with secondary level of education. This to some extend does not help to explain why there is high child mortality in Kabuoro sub-location as opposed to Manga Lietego sub-location.

4.11 Birth attendant and Father's Level of Education

Tables 4.3 and 4.4 show that in both sub-locations, fathers level of education increased with the increase in modern trained mid-wife attendance and decrease of traditional mid-wife attendants. This is possible because as ones education increases, one tends to realise the importance of using modern health facilities and in the process are attended by modern trained mid-wives. The instruments used by modern trained mid wives are sterilised and more hygienic than those used by a traditional mid-wife especially when cutting the umbilical cord.

The only difference between Manga Lietego and Kabuoro birth attendance is that there are more women attended to by traditional mid-wives in Kabuoro sub-location than in Manga Lietego sub-location.

4.12 First Semi-Solid Food Given and Level of Education of the Father:

Table 4.3 shows that giving of mashed ripe fruit decreased with the increase in the level of education of the father in Kabuoro sub-location. Porridge was however most important semi-solid food given in both sub-locations. This is what could be

contributing to high mortality in Kabuoro sub-location since at least in Manga/Lietego sub-location, this porridge is mixed with milk. Giving of cerelac also increased with the level of education of the father since they are the ones who can afford to buy. However, this should not be the case, educated fathers should be able to know that cerelac has very little nutritious food value hence may make the child weak.

4.13 Proteinic foods Given and Level of Education of the Father:

Majority of the households gave their children these protein foods once a week. But as far as the male heads of the households in Manga/Lietego are concerned, giving of these foods decreased with the increase in the level of education. For instance, for those who gave these foods once a week, the distribution was as follows, 77.8% of those with adult literacy, 69.7% of those with primary level of education and 56.9% of those with secondary education and above (see table 4.3). Most of those with secondary level of education gave their children these foods once a day. In Kabuoro sub-location, these foods were rarely given irrespective of the level of education of the male head of the household.

4.14 Cereals, Potatoes, Cassava were Given and Level of Education of the Father:

Table 4.3 shows that majority of the population gave these

types of foods 2 or 3 times a day in Manga/Lietego sub-location. However, giving of these foods decreased with the increase in the level of education of the father. For instance, among those who gave 2 or 3 times a day, 83.3% were of those who had none/adult literacy level of education, 67.7% were of those who had primary level of education and 63% were of those who had secondary level of education.

In contrast to Manga/Lietego, these foods were mainly given once a day by women in Kabuoro sub-location probably because they are not readily available. Giving of these foods increased with the increase in the level of fathers education up to primary level after which it declined i.e. 23.5% were those with none/adult literacy level of education, 52.8% were those who had primary level of education and 50% were of secondary level of education(see table 4.4).

4.15 Vegetables/Fruits were Given and Fathers Level of Education:

As indicated on table 4.3, giving of these types of foods increased with the level of education of the male head of household especially for those who gave 2 or 3 times a day. For instance, 33.3% of fathers with none/adult literacy gave these foods to their children 2 or 3 times a day, 65.1% of fathers who had primary level of education and 69.6% of fathers who had secondary level of education.

This trend was not found in Kabuoro sub-location. Here the

proportion that gave 2 or 3 times a day among the none/adult literacy was higher than the proportion of those with primary level of education. This was also the case with those who gave once a day in Kabuoro sub-location: 47.1% of those who had none/adult literacy level of education, 34.6% of those who had primary level of education and 42.2% of those who had secondary level of education (see table 4.4).

TABLE 4.3 The Distribution of Women by Level of Education of the Father and Some Proximate Determinants in Manga/Ietego Sub-location.

PROXIMATE DETERMINANTS	LEVEL OF EDUCATION OF THE FATHER							
	None/adult literacy		Primary		Secondary and plus		Total	
	No.	%	No.	%	No.	%	No.	%
WHERE CHILD BORN								
Hospital/ clinic	16	(50%)	82	(63%)	247	(83%)	345	(74.8%)
Home	14	(50%)	49	(37%)	50	(17%)	113	(25.2%)
Total	30	(100%)	131	(100%)	297	(100%)	458	(100%)
BIRTH ATTENDANT								
Modern Trained Midwife	26	(56%)	84	(64.1%)	251	(88.1%)	361	(77.9%)
Traditional Midwife	18	(44%)	47	(35.9%)	34	(11.9%)	99	(22.1%)
Total	44	(100%)	131	(100%)	285	(100%)	460	(100%)
1ST SEMI-SOLID FOOD GIVEN								
Porridge	13	(76.5%)	135	(86%)	216	(76.1%)	364	(62.8%)

Mashed bananas/ potatoes	2 (11.8%)	- -	16 (5.6%)	18 (4.1%)
Cerelac	- -	20 (12.7%)	37 (13%)	57 (13%)
Mashed ripe fruit	2 (11.8%)	- -	4 (1.4%)	6 (1.4%)
Others	- -	2 (1.3%)	11 (3.9%)	13 (3%)
Total	17 (100%)	157 (100%)	284 (100%)	458 (100%)
MEAT/FISH/ ANIMAL MILK EGGS/BEANS				
Once a day	- -	11 (9.2%)	56 (19%)	67 (14.6%)
2 or 3 times a day	2 (5.6%)	7 (5.9%)	13 (4.4%)	22 (4.8%)
Once a week	28 (77.8%)	83 (69.7%)	168 (56.9%)	279 (60.7%)
Rarely	6 (16.7%)	28 (23.5%)	52 (17.6%)	86 (18.7%)
Never	- -	- -	6 (2%)	6 (1.3%)
Table 4.3 continued				
Total	36 (100%)	129 (100%)	295 (100%)	460 (100%)
CEREALS/ CASSAVA/ POTATOES				
Once a day	2 (5.6%)	12 (9.4%)	32 (10.8%)	46 (10%)
2 or 3 times a day	30 (83.3%)	86 (67.7%)	187 (63%)	303 (65.9%)
Once a week	4 (11.1%)	24 (18.9%)	54 (18.1%)	82 (17.8%)
Rarely	- -	5 (3.9%)	14 (4.7%)	19 (4.1%)
Never	- -	- -	10 (3.4%)	10 (2.2%)
Total	36 (100%)	127 (100%)	297 (100%)	460 (100%)
VEGETABLES/ FRUITS				
Once a day	18 (50%)	41 (31.8%)	78 (26.6%)	137 (29.9%)
2 or 3 times a day	12 (33.3%)	84 (65.1%)	204 (69.6%)	300 (65.5%)
Once a week	6 (22.2%)	3 (2.3%)	4 (1.4%)	13 (2.8%)

Rarely	- -	1 (0.7%)	3 (1%)	4 (0.9%)
Never	- -	- -	4 (1.4%)	4 (0.9%)
Total	36 (100%)	129 (100%)	293 (100%)	458 (100%)

TABLE 4.4 The Distribution of Women by Level of Education of the Father and Some Proximate Determinants in Kabuoro Sub-location.

PROXIMATE DETERMINANTS	LEVEL OF EDUCATION OF THE FATHER			
	None/adult literacy	Primary	Secondary and plus	Total
	No. %	No. %	No. %	No. %
WHERE CHILD BORN				
Hospital/ clinic	9 (52.9%)	101 (73.7%)	240 (84.5%)	350 (79.9%)
Home	8 (47.1%)	36 (26.3%)	44 (15.5%)	88 (20.1%)
Total	17 (100%)	137 (100%)	284 (100%)	438 (100%)
BIRTH ATTENDANT				
Trained Midwife	9 (52.9%)	103 (72.3%)	242 (85.8%)	354 (80.8%)
Traditional	18 (47.1%)	32 (23.7%)	40 (14.2%)	80 (19.2%)
Total	17 (100%)	135 (100%)	282 (100%)	434 (100%)
PROTEINIC FOODS				
Once a day	2 (11.8%)	25 (19.4%)	50 (18.5%)	77 (18.5%)
2 or 3 times a day	6 (35.3%)	13 (10.1%)	34 (12.6%)	53 (12.7%)
Once a week		15 (11.6%)	32 (11.9%)	47 (11.3%)
Rarely	9 (52.9%)	60 (46.5%)	141 (52.2%)	210 (50.5%)
Never		16 (12.4%)	13 (4.8%)	29 (7%)
Total	17 (100%)	129 (100%)	270 (100%)	416 (100%)
CEREALS/ CASSAVA/ POTATOES				

Table 4.4 continued				
Total	17 (100%)	129 (100%)	270 (100%)	416 (100%)
CEREALS/ CASSAVA/ POTATOES				
Once a day	4 (23.5%)	67 (52.8%)	133 (50%)	204 (49.5%)
2 or 3 times a day	5 (29.4%)	17 (13.4%)	65 (24.3%)	87 (21.1%)
Once a week	- -	8 (6.3%)	18 (6.7%)	26 (6.3%)
Rarely	6 (35.3%)	17 (13.4%)	33 (12.3%)	56 (13.6%)
Never	2 (11.8%)	18 (14.2%)	19 (7.1%)	39 (9.5%)
Total	17 (100%)	127 (100%)	268 (100%)	412 (100%)
VEGETABLES/ FRUITS				
Once a day	8 (47.1%)	44 (34.6%)	114 (42.2%)	166 (40.1%)
2 or 3 times a day	5 (29.4%)	36 (28.3%)	85 (31.5%)	126 (30.4%)
Once a week	4 (23.5%)	13 (10.2%)	18 (6.7%)	35 (8.5%)
Rarely	- -	18 (14.2%)	40 (14.8%)	58 (14%)
Never	- -	16 (12.6%)	13 (4.8%)	29 (7%)
Total	17 (100%)	127 (100%)	270 (100%)	414 (100%)

4.16 Birth Attendant and Religion:

As shown on table 4.5, majority of the women in Manga/Lietego sub-location were attended to by modern trained mid-wives irrespective of their religion. The distribution of the women attended to by modern trained mid-wives was as follows:- proportion of the catholics was 80.4%, protestants was 77.8% and traditionalists was 80%. However the variations were not

the traditional values and practices of traditional medicine.

4.17 Birth Weight and Religion:

Table 4.5 suggests that in Manga/Lietego sub-location, the traditionalists were the greatest proportion (80%) of those who had their children with a birth weight of 3.00-3.99 Kgs compared with the protestants who had 46.5% with children with similar birth weight. On the other hand in Kabuoro sub-location, 72.2% of the traditionalists had children with a birth weight of 3.00-3.99 Kg and 70.5% of the protestants had children with similar birth weight (see table 4.6). In this case the protestants are more disadvantaged in both sub-locations since their children had a lower birth weight. This is possible because the protestants do not allow one to take several kinds of food and drinks, for instance tea. Hence since a majority of them cannot afford cocoa they end up taking porridge. They sometimes do not allow their people to eat meat. This could be the reason for the low proportion of those with children weighing 3.00 to 3.99 Kgs (that was considered to be the appropriately healthy birth weight).

4.18 Duration of Breast-feeding and Religion:

Table 4.5 indicates that in Manga Lietego sub-location, majority of the women breast-fed their children for a period of between 13-24 months. Among the religious groups under study, the catholics breast-fed their children longer than any other group. For instance, among the Catholics, 37.3% breast-fed for 19-24

months, among the protestants, 32.7% breast-fed for 19-24 months and among the traditionalists 7.1% breast-fed for the same period. Among those who breast-fed for 13-18 months, the proportions were as follows: the Catholics (40.5%), the Protestants (33%) and the Traditionalists (14.3%).

In Kabuoro sub-location, majority breast-fed their children for 1 to 12 months (see table 4.6). Among those who breast-fed for 1-6 months, the traditionalists breast-fed their children longer than any other religious group; e.g. traditionalists had a proportion of 36.3%, protestants (26.6%) and Catholics (17.9%). Among those who breast-fed their children for 7 and 12 months, protestants were the majority i.e 45.3% of all protestant population under study , they were followed by the catholics who had a proportion of 37.4% and the traditionalists whose proportion was 35.3%.

4.19 Proteinic were given and Mother's Religion:

Table 4.5 shows that in Manga/Lietego, majority of the Catholic and protestant women gave their children fish/eggs/animal/milk/beans once a week i.e., 61.1% catholics, 60.4% protestants and 13.3% traditionalists. Those who had never given proteinic foods to their children, 1.8% of the protestants. This is because most of these protestants are seventh day adventists who do not eat meat. They are vegetarians. They do not take tea. hence prefer to take porridge since cocoa and other beverages are very expensive.

Table 4.6 shows that in Kabuoro sub-location, majority of those who rarely gave proteinic foods were traditionalists by religion. This could be because they do not understand the nutritional importance of these foods.

4.20 Vegetables/Fruits were Given and Mother's Religion:

As shown on table 4.5, vegetables/fruits were mainly given 2 or 3 times a day in Manga/Lietego sub-location. The percent of those who gave 2 or 3 times a day was highest among the Catholics (81.9%), followed by the protestants (63.5%) and traditionalists (26.7%). In Kabuoro sub-location, majority of the women gave their children these foods once a day and the distribution of the proportions of the women for each of the religious categories was as follows:- 33.6% catholics, 32.8% protestants and 50.5% traditionalists (see table 4.6). This indicates inadequate provision of these foods in Kabuoro sub-location hence this could be one of the reasons for high mortality in Kabuoro as opposed to Manga Lietego sub-location.

TABLE 4.5 The Distribution of Women by Religion and Some Proximate Determinants in Manga/lietego Sub-location.

PROXIMATE DETERMINANTS	RELIGION					
	Catholic		Protestant		Traditional/muslim	Total
	No.	%	No.	%	No. %	No. %
BIRTH ATTENDANT						
Modern Trained Midwife	123	(80.4%)	259	(78%)	12 (80%)	394 (78.6%)
Traditional Midwife	30	(19.6%)	74	(22%)	3 (20%)	107 (21.4%)
Total	153	(100%)	333	(100%)	15 (100%)	501 (100%)
BIRTH WEIGHT						
2.00 - 2.99	7	(4.7%)	34	(10.3%)	1 (6.6%)	42 (8.5%)
3.00 - 3.99	84	(56.4%)	154	(46.5%)	12 (80%)	250 (50.5%)
4.00 - 5.00	58	(38.9%)	143	(43.2%)	2 (13.3%)	218 (41%)
Total	149	(100%)	331	(100%)	15 (100%)	495 (100%)
DURATION OF BREAST-FEEDING (IN MONTHS)						
1 - 6	12	(7.8%)	21	(6.3%)	6 (42.9%)	39 (7.8%)
7 - 12	16	(10.5%)	75	(22.5%)	5 (35.7%)	96 (19.2%)
13 - 18	62	(40.5%)	110	(33%)	2 (14.3%)	174 (34.8%)
19 - 24	57	(37.3%)	109	(32.7%)	1 (7.1%)	167 (33.4%)
25 - 30+	6	(3.9%)	18	(4.2%)	- -	24 (3.8%)
Total	153	(100%)	333	(100%)	14 (100%)	500 (100%)
MEAT/FISH/ ANIMAL MILK EGGS/BEANS						
Once a day	27	(33.3%)	52	(15.7%)	2 (13.3%)	81 (16.4%)
2 or 3 times a day	7	(4.7%)	14	(4.2%)	1 (6.7%)	22 (4.4%)
Once a week	91	(61.1%)	20	(60.4%)	2 (13.3%)	293 (59.2%)

Table 4.5 continued				
Rarely	24 (16.1%)	59 (17.8%)	10 (66.7%)	93 (18.8%)
Never	- -	6 (1.8%)	- -	6 (1.2%)
Total	149 (100%)	331 (100%)	15 (100%)	495 (100%)
VEGETABLES/ FRUITS				
Once a day	23 (15.4%)	104 (31.6%)	10 (66.7%)	137 (27.8%)
2 or 3 times a day	122 (81.9%)	209 (63.5%)	4 (26.7%)	335 (68%)
Once a week	1 (0.6%)	12 (3.6%)	- -	13 (2.6%)
Rarely	3 (2%)		1 (6.7%)	4 (0.8%)
Never	- -	4 (1.2%)		4 (0.8%)
Total	149 (100%)	329 (100%)	15 (100%)	493 (100%)

TABLE 4.6 The Distribution of Women by Religion and Some Proximate Determinants in Kabuoro Sub-location.

PROXIMATE DETERMINANTS	RELIGION			
	Catholic	Protestant	Traditional/muslim	Total
	No. %	No. %	No. %	No. %
BIRTH ATTENDANT				
Modern Trained Midwife	101 (79.5%)	121 (87.1%)	171 (78.1%)	393 (81%)
Traditional Midwife	26 (20.5%)	18 (12.9%)	48 (21.9%)	92 (18%)
Total	127 (100%)	139 (100%)	219 (100%)	485 (100%)
BIRTH WEIGHT				
2 - 2.99	34 (28.6%)	31 (22.3%)	41 (19%)	106 (22.4%)
3 - 3.99	81 (68.1%)	98 (70.5%)	156 (72.2%)	335 (70.7%)
4 - 4.99	04 (34%)	10 (7.2%)	19 (88%)	33 (7%)
Total	119 (100%)	139 (100%)	216 (100%)	474 (100%)

Table 4.6 continued								
DURATION OF BREAST-FEEDING (IN MONTHS)								
1 - 6	22	(17.9%)	4	(26.6%)	74	(36.3%)	130	(28.2%)
7 - 12	46	(37.4%)	58	(45.3%)	72	(35.3%)	176	(38.7%)
13 -18	20	(16.3%)	14	(10.9)	7	(3.4%)	41	(9%)
19 - 24	21	(17.1%)	10	(7.8%)	27	(13.2%)	58	(12.7%)
25 - 30+	14	(11.4)	12	(9.4%)	24	(11.7)	50	(11%)
Total	123	(100%)	128	(100%)	204	(100%)	455	(100%)
MEAT/FISH/ EGGS/ ANIMAL MILK								
Once a day	25	(21%)	14	(10.5%)	40	(19%)	79	(17.1%)
2 or 3 times a day	19	(16%)	25	(18.8%)	16	(7.6%)	60	(13%)
Once a week	25	(21%)	25	(18.8%)	16	(7.6%)	66	(14.3%)
Rarely	42	(35.3%)	61	(45%)	124	(58.8%)	227	(49%)
Never	8	(16.7%)	8	(6%)	15	(7.1%)	31	(6.7%)
Total	119	(100%)	133	(100%)	211	(100%)	463	(100%)
VEGETABLES/ FRUITS								
Once a day	40	(33.6%)	43	(32.8%)	105	(50.5%)	188	(41%)
2 or 3 times a day	33	(27.7%)	53	(40.5%)	49	(23.6%)	135	(29.5%)
Once a week	11	(9.2%)	16	(12.2%)	15	(7.2%)	42	(9.2%)
Rarely	27	(22.7%)	13	(9.9%)	22	(10.6%)	62	(13.5%)
Never	8	(6.7%)	6	(4.6%)	17	(8.2%)	31	(6.8%)
Total	119	(100%)	131	(100%)	208	(100%)	458	(100%)

4.21 Place of Child Birth and Marital Status:

A majority of the married women (78%) gave birth at the hospital/clinic. This is possible because as suggested earlier, this category of women have husbands who can boost their economic status hence can afford to book hospital beds. Only 65% of the unmarried gave birth in the hospital/clinic. For those who gave birth at home, 22.5% were married while 33.7% were unmarried. This is plausible because most of the unmarried women do not attend clinics because the traditional culture does not approve of unmarried women getting pregnant, so they fear exposing themselves to ridicule in the clinics where they are likely to interact with the married pregnant women, hence end up giving birth at home. Similar findings were obtained in Kabuoro sub-location where majority of the unmarried women gave birth at home and majority of the married gave birth in the hospital/clinic.

4.22 Birth Attendant and Marital Status:

As far as birth attendant is concerned, majority of the married women were attended by modern trained mid-wives and a greater proportion of the unmarried were attended by traditional midwives in both Manga/lietego and Kabuoro sub-locations. This is possible because most of the unmarried women are not as much supported financially by their parents as the married women who are supported by their husbands.

4.23 **Birth Weight and Marital Status:**

Table 4.7 shows that in Manga/Lietego sub-location, the distribution of women who had children with a birth of 3.00-3.99 kg was as follows:- 48.9% of the married and 58.8% of the non-married. As for Kabuoro sub-location, the distribution of women who had children with similar birth weight as above was 72.2% among the married and 65.8% among the unmarried (see table 4.8). Overall, married women were more advantaged than other women since their children tended to be with an average birth weight that indicated good health and especially in Manga/Lietego where most of the children were 3kgs and over. In Manga/Lietego, this was possible because of plenty of food found in the area hence most of the women were well fed when they were expectant.

4.24 **Proteinic foods were Given and Marital status:**

Generally, it can be observed from table 4.7 that in Manga/lietego sub-location, these types of food were given to children once a week, especially by married women. This is in contrast to what most people had found that married women are the ones that should give these foods more often than the unmarried since they have the support of their husbands. However, it is possible that they do not understand the importance of these foods as far as nutrition status of their children is concerned.

Table 4.8 shows that in Kabuoro sub-location, at least there were some women who gave fish/eggs/animal milk and beans 2 or 3 times a day i.e. 11.4% as far as unmarried women were concerned.

However, it is important to note that these foods were generally rarely given which was a worse situation than Manga/Lietego. Majority of those who never gave these types of food were unmarried. This could be due to lack of money to buy these types of foods which are generally expensive.

TABLE 4.7 The Distribution of Women by Marital Status and Some Proximate Determinants in Manga/lietego Sub-location.

PROXIMATE DETERMINANTS	MARITAL STATUS					
	Married		Non-married		Total	
	No.	Percent	No.	Percent	No.	Percent
BIRTH WEIGHT						
2.00 - 2.99	36	(9%)	6	(5.9%)	42	(8.4%)
3.00 - 3.99	195	(48.9%)	61	(58.8%)	256	(51.1%)
4.00 - 4.99	160	(40.1%)	26	(25.5%)	186	(37.5%)
5.00 +	8	(2%)	5	(4.9%)	13	(3%)
Total	399	(100%)	102	(100%)	501	(100%)
PROTEINIC FOODS						
Once a day	64	(21.4%)	20	(19%)	84	(16.6%)
2 or 3 times a day	20	(6.7%)			20	(4.0%)
Once a week	237	(79.3%)	61	(59.8%)	298	(59.3%)
Rarely	72	(24.1%)	21	(20.6%)	93	(18.6%)
Never	6	(2%)	-	-	6	(12%)
Total	399	(100%)	102	(100%)	501	(100%)

TABLE 4.8 The Distribution of Women by Marital Status and Some Proximate Determinants in Manga/Ietego Sub-location in Kabuoro Sub-location.

PROXIMATE DETERMINANTS	MARITAL STATUS					
	Married		Non-Married		Total	
	No.	Percent	No.	Percent	No.	Percent
BIRTH WEIGHT						
2 - 2.99	77	(21.8%)	29	(24.2%)	106	(22.4%)
3 - 3.99	255	(72.2%)	79	(65.8%)	334	(70.6%)
4 - 4.99	21	(5.9%)	12	(10%)	33	(7%)
Total	353	(100%)	120	(100%)	473	(100%)
PROTEINIC FOODS						
Once a day	70	(20.1%)	9	(7.9%)	79	(17.1%)
2 or 3 times a day	47	(13.5%)	13	(11.4%)	60	(13%)
Once a week	39	(11.2%)	27	(23.7%)	66	(14.3%)
Rarely	180	(51.9%)	45	(39.5%)	225	(48.8%)
Never	11	(3.2%)	20	(11.5%)	31	(6.7%)
Total	347	(100%)	114	(100%)	461	(100%)

4.24 SUMMARY OF THE MAJOR FINDINGS

4.24.1 Health Care factors in relation to Background Variables

Use of hospitals/clinics as delivery points in Manga/lietego sub-location tended to increase by level of education whereas in Kabuoro sub-location there was an equal distribution in the proportion of women who gave birth in the hospital. Father's level of education in Manga/lietego sub-location did not influence the place where the child was born whereas in kabuoro sub-location use of modern health facility increased with the level of education of the father.

In both study areas a greater proportion of the unmarried women were mainly attended to by traditional midwives whereas most of the married women were attended to by modern trained midwives. In Kabuoro sub-location, Catholics and traditionalists were mainly attended to by traditional midwives whereas in Manga/lietego sub-location, religion of the mother did not seem to influence selection of birth attendants. The percentage attended to by traditional midwives decreased with the increase in the level of education of the mother for both study areas. In both sub-locations, modern trained mid-wife attendance increased with father's level of education. Immunization rate of children did not increase with the level of education of the mother in Kabuoro sub-location as it did in Manga/lietego sub-location.

4.24.2 Nutritional factors in relation to Background Variables

Most of the married women had children with an average birth weight of 3 kg and above (which is considered as the standard measure for health children for the study purposes) whereas the unmarried women tended to have children with an average birth weight of less than 3 Kg. Among the women whose children had a birth weight of 3.00-3.99 Kg, the children whose mothers were traditionalists tended to be a majority compared to the children whose mothers were protestants. In both sub-locations birth weight increased with mother's level of education. In Manga/lietego sub-location birth weight did not increase with the level of education of the father as it did in Kabuoro sub-location.

In Manga/lietego catholics breast-fed their children longer than the other religious groups while in Kabuoro sub-location traditionalists breast-fed longest. In Manga/lietego sub-location, duration of breast-feeding did not increase with the increase in level of education as it did in Kabuoro sub-location. Provision of mashed ripe fruit as the first semi-solid food given to infants did not increase with the increase in the level of education of the mother in Kabuoro sub-location as it did in Manga/lietego sub-location. Giving of mashed ripe fruit as the first semi-solid food decreased with the increase in the level of education of the father in both sub-locations under study. In stead porridge was the main first semi-solid food given to infants in these study areas.

In both sub-locations, the unmarried women rarely gave proteinic foods to their children. The protestants gave proteinic

foods once a week in Manga/lietego sub-location whereas in Kabuoro sub-location Catholics tended to be the majority of those who gave these foods to their children once a week. Giving of proteinic foods to children did not increase with the level of education of the mother in Kabuoro sub-location as it did in Manga/lietego sub-location. Giving of proteinic foods decreased with the increase in father's level of education in Manga/lietego sub-location. In Kabuoro sub-location, the level of education of the father did not influence the frequency at which these foods were given.

Giving of cereals/cassava/potatoes to children did not increase with the level of education of the mother in Manga/lietego sub-location as it did in Kabuoro sub-location. Giving of cereals/cassava/potatoes to children did not increase with the increase in level of education of the father in Manga/lietego sub-location as it did in Kabuoro sub-location.

Traditionalists gave vegetables/fruits more often to their children in Kabuoro sub-location whereas in Manga/lietego sub-location the catholics gave these foods more often than the other religious groups. In both sub-locations women with primary level of education gave vegetables/fruits more than any other religious category of women. Giving of vegetables/ fruits did not increase with the level of education of the father in Kabuoro sub-location as it did in Manga/lietego sub-location.

CHAPTER FIVE

CHILD MORTALITY ESTIMATES

5.0 Introduction.

The insufficiency and unavailability of accurate data to compute mortality indices through direct techniques has led demographers to develop indirect techniques for computing infant and child mortality rates. This effort is important especially for countries faced with problems of data, for effective planning of provision of health and other social services. Although these techniques do not improve the quality of the data, they however, yield fairly good estimates that can reflect the mortality conditions of the country.

This study has used the trussell's technique developed in 1975 as a modification of Brass method developed in 1968 to analyze census data. The definition of this method, why it has been chosen and its applicability has been presented in chapter 3 of this document. The brass method has been used in many censuses and studies in Kenya yielding fairly good and reliable estimates of infant and child mortality.

5.1 Brass Method

Brass was the pioneer of the procedure of converting proportions dead of children ever born reported by women in age groups 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49 into

estimates of the probability of child dying before attaining a certain exact age.

5.2 Definition of some important notations used in the application of this method.

1. D(i) denotes the proportions dead among children ever born to women in successful 5-year age groups. This is the value that Brass used to develop a procedure to convert D(i) values into q(x) estimates. D(i) is calculated using the formula D(i) = CD/CEB, where CD is the total number of children dead and CEB is the total number of children ever born.

2. q(x) is the probability of dying between birth and exact age x. To estimate q(x) one uses a multiplier K(i) which is selected according to the values of P(1) and P(2). P(1) and P(2) represent average parity of women aged 15-19 and 20-24 respectively and are good indicators of fertility conditions at young ages. The formula for calculating P(i) is CEB/FPOP, where CEB is the children ever born and FPOP is the female population. The formula for calculating q(i) is q(i) = K(i) * D(i).

K(i) is the multiplier which adjusts the value of D(i). The formula for calculating K(i) is = a(i) +b(i) * P(1)/P(2) + c(i) P(2)/P(3).

5.3 Trussell Technique

This method is a modification of Brass technique for the estimation of infant and child mortality. Trussell used model fertility schedules developed by coale and himself to come up with multipliers used for mortality estimation.

In this study Trussell's multipliers for North and West models have been used. The North model has been chosen because it is mostly applicable in Africa (where Kenya is a case in point) where infant and child mortality are high with longer breast-feeding periods. The West model has also been chosen because of its generality and conformity to the standard model. Since this study is a comparative one the use of the West model is expected to give better results than the North model. Life expectancy at birth is also estimated for each sub-location in addition to estimates of q_2 and q_5.

Trussel's technique uses the following data for mortality estimation:-

1. Children ever born (CEB) classified by 5-year age group of the mother.
2. Children dead (CD) classified by 5-year age group of the mother.
3. Total female population (FPOP) classified by 5-year age groups.

5.4 Computation procedure

Step 1: Calculation of average parity per woman (P(i)).

P(i) = CEB(i)/FPOP(i)

For example, the P(i) referring to age group 15-19 is calculated as follows:-

Manga/lietego sub-location: P(1) = 78/44 = 1.772727.

Kabuoro sub-location: P(1) = 118/51 = 2.313725.

Step 2: Calculation of proportion of children dead for each age group of the mother(CD(i)).

This is defined as the ratio of reported children dead to reported children ever born. Thus, D(i) = CD(i)/CEB(i), where CD(i) is the number of children dead reported by women in age group (i). Using the data collected from the field for illustration, D(i) value referring to age group 15-19 is:-

Manga/lietego sub-location: D(i) = 11/78 = 0.141025.

Kabuoro sub-location: D(i) = 18/118 = 0.152542.

Step 3: Calculation of multipliers

The North and West model life table coefficients provided in Manual X have been used in the equation:-

K(i) = a(i)+b(i)*P(1)/P(2)+c(i)*P(2)/P(3).

Using the North model coefficients for illustration, K(2) values for the sub-locations covered were:-

Manga/lietego sub-location:

K(2) = 1.239+-0.6865*0.715801+-0.2745*0.674634 = 0.562415.

Kabuoro sub-location:

K(2) = 1.239+-0.6865*0.825964+-0.2745*0.782795 = 0.457098.

Using the West model and the coefficients in manual 10 the corresponding values for Manga/Lietego and Kabuoro sub-location are 0.693226 and 0.605425 respectively. The North is the best model for Kenya hence the West is used only for compulsion purposes.

Step 4. Calculation of q(x)

This is the probability of dying at exact age x. It is calculated using K(i) and D(i) i.e., K(i) is the multiplier for a specific age group and D(i) is the proportion dead at a specific age group. Therefore q(x) = D(i)*K(i). Using data collected from the field and the North model coefficients for illustration, q(x) values the areas covered were:-

Manga/lietego sub-location: q(2) = 0.132492*0.562415 = 0.074515.

Kabuoro Sub-location: q(2) = 0.288248*0.457098 = 0.131757.

Manga/lietego sub-location: q(5) = 0.066132*1.040415 = 0.068805.

Kabuoro sub-location: q(5) = 0.131506*1.012696 = 0.133176.

Using the West model coefficients and the values for Manga/Lietego and Kabuoro sub-locations the q(2) for the areas covered were 0.091847 and 0.174512 respectively. The q(5) values were 0.069529 and 0.135576 for Manga/lietego and Kabuoro sub-location respectively.

5.5 Calculation of mortality level and construction of life table:

A statistical model used to measure mortality of a hypothetical population is known as a life table. A life table also provides a description of the most prominent aspects of the state of human mortality (Kpedekpo 1982). It can be used to estimate the infant and child mortality rate and the life expectancy at birth which is used as a measure of mortality level of a society. The first step in constructing a life table is to calculate the mortality levels corresponding to the values of q(x) obtained above.

q(2), q(3) and q(5) have been used to construct a life table for Manga/lietego and Kabuoro sub-location respectively. First of all P(x) values are computed and these are the values used in the construction of the life table. P(x) is the probability of surviving at a given age. It is the opposite of q(x) that is the probability of dying. P(x) =1-q(x).

Step 1:

P(x) values for age groups between 15 and 49 have been calculated using the formula P(x) = 1-q(x). Using this formula and the North model, the following table shows the q(x) and P(x) values obtained for Manga/lietego sub-location using:

	Manga/lietego sub-location		Kabuoro sub-location	
x	q(x)	p(x)	q(x)	p(x)
2	0.074515	0.0925484	0.131757	0.868242
5	0.068805	0.931194	0.133176	0.866823

Using the West model coefficients the q(2) and P(2) are 0.091847 and 0.908152 respectively and the q(5) and P(5) are 0.069529 and 0.930470 respectively. For Kabuoro the q(2) and P(2) are 0.174512 0.825487 respectively and the q(5) and P(5) are 0.135576 0.864423 respectively.

Step 2:

By using Coale-Demeny life tables, North model and West model, lower and upper levels of P(x)'s were obtained. The sex ratio here is taken as 1.05 both sexes combined. For Manga/lietego and Kabuoro sub-locations the figures from the Coale and Demeny North model life tables were as shown below:

TABLE 5.1: Lower and upper levels of P(x)'s from Coale and Demeny life tables.

	Manga/lietego sub-location			Kabuoro sub-location		
x	P(x)	lower level	upper level	P(x)	lower level	upper level
2	0.925484	0.9246	0.93682	0.868242	0.86841	0.883229
3	0.935730	0.92985	0.94304	0.903469	0.90101	0.91585
5	0.931194	0.91987	0.93537	0.866823	0.84904	0.86818

Using the Coale and Demeny West model life tables and the same formula as above, the P(2) values obtained were 0.81963 and 0.839

for Lower and Upper level respectively for Kabuoro sub-location. The P(2) values for Manga/lietego sub-location were 0.90584 and 0.92058 for Lower and Upper level respectively.

Step 3:

This involved the use of interpolation to obtain implied level of mortality as shown below:-

$$IL = \text{Lower level} + \frac{\text{Actual } P(x) - \text{lower } P(x)}{\text{Upper } P(x) - \text{Lower } P(x)}$$

The interpolated mortality levels using the North model for Manga/lietego and Kabuoro sub-locations are as follows:

Manga/lietego sub-location

Using the formula as above the interpolated mortality level for Manga/lietego is 18.07237, 19.44585 and 19.73064 for q(2), q(3) and q(5) respectively. The interpolated mortality level for Kabuoro sub-location is 13.98867, 17.16572 and 15.92912 respectively.

Using the formula as above the interpolated mortality level for Manga/lietego is 17.15691, 18.99145 and 19.36814 for q(2), q(3) and q(5) respectively. The interpolated mortality level for Kabuoro sub-location is 12.30237, 16.65684 and 15.63779 respectively.

From table 5.3 the average mortality level using the North model of Coale-demeny's life tables for Manga/lietego and Kabuoro sub-locations were:-

$$\text{Manga/lietego} = \frac{18.07237+19.44585+19.73064}{3} = 19.08295$$

$$\text{Kabuoro sub-location} = \frac{13.98867+17.16572+15.92912}{3} = 15.69450.$$

Using the West model of Coale-demeny's life tables the average mortality levels were 18.50550 and 14.86567 for Manga/lietego and Kabuoro sub-locations respectively.

Step 4 :

This involved getting the interpolated P(x) by obtaining levels from coale and Demeny North model life table for both sexes 5-year survivorship probabilities from manual X. The formula for calculating this was:

$$\text{Inter. } P(x) = \text{Lower } P(x) + \frac{\text{Average level} * (\text{upper } l(x) - \text{lower}(lx)}{\text{upper level} - \text{lower level}}$$

Using the North model the P(1) for Manga/lietego was:-

$$P(1) = 0.94668 + \frac{0.08295(0.95555-0.94668)}{20-19} = 0.947415.$$

and for Kabuoro sub-location was:-

$$P(1) = 0.9175 + \frac{0.69450(0.92764-0.9175)}{17-16} = 0.924542.$$

Using the West model the P(1) for Manga/lietego and Kabuoro sub-locations were 0.938099 and 0.900888 respectively

5.6 Construction of the life tables

Other values of the life table were obtained using the interpolated p(x) values. It is important to note here that the

North model values have been used for illustration in this section. The West model doesn't seem to be behaving well hence we have decided to proceed with the North model to construct the life tables for the study areas. The West model is not behaving well probably because of the small number of cases used and also because of mis-reporting of cases especially for the 15-19 and 20-24 age groups of women as far as parities and total number of children dead are concerned.

a) L(x)=P(x)*l(x-n) This is the number of survivors to exact age x. It is obtained by multiplying the number of survivors at preceding age with P(x). Usually, the number of survivors at age 0 are assumed to be 100,000 as a base for deriving the survivors in other ages.

Using the North model the l(x)'s for the areas under study were as follows:

Manga/lietego sub-location l(1)= 0.972282*100,000 = 94741.57

Kabuoro sub-location l(1) = 0.952671*100,000 = 92454.22

(b) ndx= l(x) - l(x+n). This is the number of deaths at ages between x and x+n

Using the North model

Manga/lietego's 1d4= 94741.51-92115.57=2626.004

(c) nLx is the person years lived between exact ages x and x+n. It is calculated according to the various age groups.

(i) For age group 0-1 is 1L0=0.5*(L(0)+L(1). For Manga/lietego sub-location, 1L(0)=0.5(100,000+94741.57) =96319.10

(ii) For age group 1-4 up to 74 it is 5L(x)=2.5(l(x)+l(x+n)). For

Manga/lietego 5L(1)=2.5*(94741.57+92115.57) = 371876.

iii) For age group 75+, i.e, L75 =l(75) log10 l(75). For Manga/lietego L72=43287.66 log10(43287.66)=200697.3.

d) T(x) is the total person years lived after exact age x. It is calculated by summing up the person years lived below the age group.

e) e(x) is the life expectancy at exact age x. It is obtained by the formula:- T(x)/l(x).

For manga/lietego life expectancy at birth is:-

$$e^0 = 6188896/100000 = 61.88896.$$

5.7 **Child mortality levels in Manga/lietego and Kabuoro sub-locations**

Several indices are used as indicators of child mortality in most studies of mortality differentials.

1. q(1), the probability of dying before age 1.
2. q(2), the probability of dying before age 2.
3. q(3), the probability of dying before age 3.
4. q(5), the probability of dying before age 5.
5. q(10), the probability of dying before age 10.
6. $_1q^0$, the probability of dying between age zero and one.
7. $_4q^1$, the probability of dying between age 1 and 5.

Although all these indices can depict mortality conditions of an area only q(2), q(3) and q(5) are considered as reliable. In this study q(2) and q(5) are utilised to compare and explain the mortality differences between Manga/lietego and Kabuoro sub-locations.

5.8 DISCUSSION OF RESULTS: USING THE NORTH MODEL

In manga/Lietego sub-location, the q(2) value shows that there are 74.5 deaths per thousand live births, while the q(5) values shows that there are 68.8 deaths per thousand live births. This finding is not expected because normally early childhood mortality tends to be higher than late childhood. This finding can be attributed to the fact that there could have been under-reporting of children who died between age zero and five and over-reporting of children who died between age zero and two years. Under-reporting is mainly due to cultural reasons, since in the society in which the research was being undertaken sometimes people who have died are not supposed to be mentioned by their names or just generally talk about them. Otherwise they can haunt the living. However, on the other hand one would argue that child mortality tends to decrease with the increase in the age of the child which means that environmental factors tend to play a relatively less significant role in increasing child mortality compared to the weaning habits that are normally manifested at age two. On the other hand in Kabuoro sub-location, the q(2) value shows that there were 131.7 deaths per thousand live births and the q(5) value show that there were 133.7 deaths per thousand live births. This indicates that the mortality level for Manga/lietego is lower than for Kabuoro sub-location.

Another contrasting feature in the q(2) and q(5) values for Kabuoro from that of Manga/lietego sub-location is that, q(5) value tend to be higher than the q(2) value which may be taken to imply

that environmental factors tend to play a relatively more influencing role on child mortality than child weaning factors. The life expectancy at birth for Manga/lietego is 61.9 years compared to 1979 finding that indicated that life expectancy at birth was 54.4 years for Kisii district whereas that of Kabuoro sub-location is 55.9 years compared to 1979 census finding that indicated that life expectancy at birth is 49.25 for South Nyanza district. The infant mortality on the other hand is 52.6 compared to 85.1 (1979 census finding for Kisii district) and 75.5 compared to 162 (1979 census finding for South Nyanza district) infant deaths per thousand live births for Manga/lietego and Kabuoro sub-locations respectively. In the overall Manga/lietego has higher life expectancy and higher child survival than Kabuoro sub-location.

TABLE 5.2 Summary table for values of q2, q5, and eo for the study areas:

Areas of study	q2, q5 and eo values		
	q_2	q_5	e_0
Manga/lietego sub-location	75.4	68.8	61.9
Kabuoro Sub-location	131.7	133.7	55.9

The trend for Manga/lietego sub-location tends to be inconsistent with what is expected of the q(2) and q(5) ,i.e., they should be increasing. This irregularity could be due to the fact that the sample size was not big enough to give demographically reliable results.

CHAPTER SIX

CHILD MORTALITY DIFFERENTIALS

6.0 Introduction:

In this chapter cross-tabulation results of the influence of various selected independent variables on the proportion of children dead per woman are presented. The independent variables in question include marital status, religion, educational level of the mother and the father, distance to the nearest health facility, frequency and type of food given to the infants and children, type of fuel used, source of drinking water, immunisation completion, birth weight of the child, duration of breast-feeding of the child, birth attendant and place of birth of the child. The chi-square tests have also been done so as to find out whether there is any association between the dependent and independent variables. The definition of this method, why it has been chosen and its applicability has been presented in chapter 3 of this document. Note that the results we have should be interpreted with a lot of caution since we have not controlled for the age and parity of the mother. Also the sign * used in the following tables presented in this chapter indicate that the chi-square of the variable concerned is significant.

6.1 Proportion of Children dead and Marital status

Table 6.1 shows that in Manga/Lietego sub-location, unmarried women had a higher proportion of children dead(47%) of those who had lost 30% and over of their children compared to 27 per cent of married women who had lost a similar proportion. Similar characteristics were observed among the unmarried in Kabuoro sub-location whereby 76.1% of this group of women had 30% plus of their children mortality (see table 6.2). This finding supports the hypothesis that married women are more likely to have lower child mortality than unmarried women. The chi-square results also confirm this finding. The calculated values of chi-square are significant at 5% percent significance level. The probable reason for this finding is that married women tend to be given more support especially from their husbands hence they are able to maintain reasonably better standards of living, for example, adequate food for the children which increases child survival. This result is similar to what Kichamu's (1986) finding that married women tend to have lower infant and child mortality compared to unmarried women.

6.2 Proportion of Children dead and Religion

Table 6.1 shows that in Manga/Lietego, there was unequal distribution of the proportion of children dead in the dominant religious groups, for instance, 28.3% of the Catholics, 29.6% of the protestants and 35.7% of the traditionalists had 0.3 proportion of children dead. Apparently, children born to women belonging to

the traditional faith were exposed to higher mortality. However, in Kabuoro sub-location, the proportion of children dead was also almost equally distributed. This is evident from the fact that 57.3% of the catholics, 57.1% of the protestants and 52.5% of the traditionalists/other religions had 0.3 proportion of children dead (see table 6.2).

The chi-square results also shows that religion of the mother was not significant factor in child mortality behaviour in both Kabuoro and Manga/Lietego sub-locations where the observed significance were 0.1222 and 0.6981 respectively. These values were greater than the 0.05 level of significance. Hence the null hypothesis that the catholics are more likely to have lower child mortality than protestants is not supported. This finding is in contrast to what King and Funkenstein (1958) found, that is, patterns of religious practices can affect the health of the family.

6.3 Proportion of Children Dead and Educational level of the Mother

In Manga/Lietego sub-location, the percent of women who had 0.2 proportions of children dead increased with the level of education. This is shown on table 6.1 where; 32.1% of the none/adult literacy had lost between 20 percent and over of their children, 66.2% of those with secondary level of education and above had lost 0.2 and less 0.3 proportion of children dead and 79.2% had lost similar proportions of children. This finding

supports the hypothesis that increase in level of education is positively related to child mortality. This is probably because the women who have secondary level of education are involved in jobs that are demanding in terms of being away from home which results to neglect and contributes to high child mortality.

Similar characteristics were observed in Kabuoro sub-location where the percentage of women who had experienced 0.2 proportion of children dead increased with the level of education. This is shown by the following distribution; 55% of the none/adult literacy women, 87.6% of the primary level of education women and 99.1% of women with secondary level of education (see table 6.2).

The chi-square results for both study areas indicate that education of the mother had a strong relationship with child mortality since both study areas have 0.000 significance in terms of education at 0.05 level of significance. This finding is not supported by what Caldwell (1979) had found, that is, increased educational attainment is associated with declines in mortality among infants and young children. Probably, the house maids who are left with the children to feed them when the mother is away from home fed children without washing their hands or used dirty utensils. Other factors like sharing of the same plate sharing of blankets and poor ventilation facilities would have contributed to this phenomenon. It would have also been possible that the number of women who had secondary level of education was too small compared to those with primary level of education hence this inflated the number of deaths for their children.

6.4 Proportion of Children Dead and Level of Education of the Father

There is a clear indication on table 6.1 and 6.2 that the proportion of children dead increased with the level of education of the father in Kabuoro and Manga/lietego sub-locations. This is evident from the fact that among those that had 0.2 proportion of children dead; 72.2% were among those that had none/adult literacy, 75% were among those that had primary level of education and 83% were among those that had secondary level of education in Kabuoro sub-location and 40%, 56% and 80% respectively in Manga/lietego sub-location.

The chi-square results in Manga/Lietego indicate that education of the father has an independent effect on proportion of children dead. The reverse is the case in Kabuoro sub-location.

6.5 Proportion of Children Dead and Type of Fuel used for cooking

In Manga/Lietego sub-location, women who had 0.2 proportions of the children dead tend to be the majority. 69.8% of women who used Charcoal/firewood as fuel had 0.2 or less proportions dead compared to 45.5% of the households that used paraffin/gas. In Kabuoro sub-location, contrasting trends are observed. Households which had 0.3 proportion of children dead were the majority. A greater proportion of women, i.e., 72.2% of those who had used paraffin /gas for cooking had 0.3 proportion of children dead

compared to 50.2% who had used charcoal/paraffin as source of fuel for cooking. However, the chi-square test indicates that in Wanga/Lietego, the type of fuel used was independent of the proportions of children dead meaning that there was no association (0.1023 significance). In Kabuoro sub-location, there is a perfect association (0.000) between type of fuel used and proportion of children dead. However, there were no fuel shortages in these study areas due to high population growth rates just as the United Nations had found in China.

TABLE 6.1 The Distribution of the Proportion of Children Dead by Selected Background Factors in Manga/Lietego Sub-location.

BACKGROUND FACTORS	PROPORTION OF CHILDREN DEAD				
	0.1 and under	0.11-<0.3	0.3+	Total	X^2 D.F
	No. %	No. %	No. %	No. %	
MARITAL STATUS					8.91* 2
Married	50 (30.7%)	69 (42.3%)	44 (27%)	163 (100%)	
Unmarried	12 (37.5%)	5 (15.6%)	15 (46.9%)	32 (100%)	
Total	62 (31.8%)	74 (37.8%)	59 (30.3%)	195 (100%)	
RELIGION					2.21* 4
Catholic	14 (26.4%)	24 (45.3%)	15 (28.3%)	53 (100%)	
Protestant	43 (34.4%)	45 (36%)	37 (29.6%)	125 (100%)	
tradition-alists	5 (35.7%)	5 (35.7%)	5 (35.7%)	14 (100%)	
Total	62 (32.1%)	74 (38.3%)	57(29.5%)	193 (100%)	
MOTHERS' EDU. LEVEL					22.03 2
None/Adult Literacy	19 (67.9)	9 (32.1%)		28 (100%)	
Primary	24 (33.8%)	47 (66.2%)		71 (100%)	
Secondary	20 (20.8%)	76 (79.2%)		96 (100%)	
Total	63 (32.3%)	132 (67.7%)		195 (100%)	
LEVEL OF EDUCATION OF THE FATHER					18.55* 2
None/adult literacy	12 (60%)	8 (40%)		20 (100%)	
Primary	23 (44.2%)	29 (55.8%)		52 (100%)	
Secondary	22 (19.8%)	89 (80.2%)		11 (100%)	
Total	57 (31.1%)	12 (68.9%)		183 (100%)	

TABLE 6.2 The Distribution of the Proportion of Children Dead by Selected Background Factors in Kabuoro Sub-location.

BACKGROUND FACTORS	PROPORTION OF CHILDREN DEAD				
	0.1 and under	0.11-<0.3	0.3+	Total	χ^2 D.F
	No. %	No. %	No. %	No. %	
MARITAL STATUS					27.04* 2
Married	63 (22.3%)	86 (30.5%)	133 (47.2%)	282 (100%)	
Unmarried	13 (11.9%)	13 (11.9%)	82 (76.1%)	109 (100%)	
Total	76 (19.4%)	99 (25.3%)	216 (55.2%)	391 (100%)	
RELIGION					7.27 4
Catholic	23 (25.8%)	15 (16.9%)	51 (57.3%)	89 (100%)	
Protestant	17 (14.3%)	34 (28.6%)	68 (57.1%)	119 (100%)	
tradition-alists	36 (19.9%)	50 (27.6%)	95 (52.5%)	181 (100%)	
Total	76 (19.5%)	99 (25.4%)	214 (55%)	389 (100%)	
MOTHERS' EDU. LEVEL					34.38 4
None/Adult Literacy	18 (45%)	22 (55%)	- -	40 (100%)	
Primary	46 (21.4%)	149 (87.6%)	- -	215 (100%)	
Secondary	12 (9%)	122 (91.1%)	- -	134 (100%)	
Total	175 (44.9%)	99 (25.4%)	- -	389 (100%)	
LEVEL OF EDUCATION OF THE FATHER					8.54 4
None/adult literacy	5 (27.8%)	13 (72.2%)	- -	18 (100%)	
Primary	26 (24.5%)	80 (75%)	- -	106 (100%)	
Secondary	37 (17%)	181 (83%)	- -	218 (100%)	
Total	68 (19.9%)	274 (80.1%)	- -	342 (100%)	

Key:

D.F. = Degree of Freedom

χ^2 = Chi-Square value

* = Chi-Square value is significant

6.6 Proportion of Children Dead and Source of Drinking Water

In Table 6.3, there is a clear indication that in Manga/lietego sub-location, the users of river/stream had a higher percentage of children dead (20%+). This is shown by the following distribution:- 31.6% used tap water as source of drinking water, 44% used river/stream, 27.9% used borehole for the same purpose and 29.4% used rain water. However, the percentage differences among the various categories of women on the basis of source of drinking water did not vary much. Table 6.4 shows that in Kabuoro sub-location, those who had 0.3 and plus proportion of children dead were the majority as is shown by the following distribution:- 33.3% used tap water, 49.1% used river/stream and 63% used boreholes and 54.5% used rain water. Those that used borehole had the greatest proportion of children dead. This, as suggested earlier could be due to poor maintenance of these boreholes. However, according to the chi-square results, there was no relationship in Manga/Lietego between source of drinking water and proportion of children dead as was the case in Kabuoro sub-location where the observed significance of source of drinking water was 0.0194 which is less than 0.05 level of significance. In Manga/Lietego, the observed significance was 0.1114 which is greater than 0.05. This finding agrees with what Anker (1977) had found, that is, households that have piped water and water from wells have higher survival chances than households that use river or lake water.

6.7 Proportion of Children Dead and Type of Toilet

Facility

In Manga/Lietego sub-location, a greater proportion of women i.e 69.7% who used pit latrine had 0.2 or less proportion of children dead than those who used flush toilets. There is also a clear indication from the findings that in Kabuoro sub-location, the distribution of the proportion of women who used flush toilets and pit latrines were generally equal, indicating that type of toilet facility did not have a significant influence on the proportions of children dead. For instance, 54.4% of those who used flush toilets had 0.3 proportions of children dead and 55.3% of those who used pit latrines had 0.3 proportion of children dead. The chi-square results support this finding since none of the observed significance of the independent variable (toilet facility) was less than 0.05 in both sub-locations. The observed significance was 0.1466 and 1.000 for Manga/Lietego and Kabuoro sub-location respectively. It could be possible that the toilet facility as a factor cannot operate alone to influence child mortality behaviour. There are other factors that may make it become influential like maintenance of these toilets. Probably the pit latrines available were kept clean hence did not contribute significantly to prevailing mortality differentials. Studies carried out by Meegama (1980) indicate that insanitary lavatories lead to breeding of flies and contamination of drinking water.

6.8 Proportion of Children Dead and Distance to the Nearest Health Facility

As shown on table 6.3 there is a clear indication that in Wanga/Lietego sub-location, the percentage of women who had 0.3 the proportion dead also increased with the household distance from the nearest health facility increased. However, those women whose households were 4 km from the nearest health facility tended to have a lower percentage of those that had 0.3 proportion of children dead. The distribution of those that had 0.2 proportion of children dead was as follows: 34.3% households were 1 km from the nearest health facility, 38.9% were 2 km from the nearest health facility, 39% had their households 3 km from the nearest health facility and 34.6% had their households 4 km from the nearest health facility. Those whose households were 3 km had the greatest proportion of children dead. This may be due to the fact that some children were not taken to hospital because the clinic was too far. Table 6.4 shows that in Kabuoro sub-location, the percentage of the households that had 0.3 proportion of children dead increased with the distance from the nearest health facility. For example, 57.5% of women in households that were 1 km from the nearest health facility had 0.3 proportion of children dead compared to 72.3% of women in households that were 3 km from the nearest health facility.

In Nigeria, similar findings were obtained by United Nations (1974), that is, child mortality was inversely related to

accessibility of health facilities. The chi-square results also support this view.

6.9 Proportion of the Children Dead and Birth attendant

Table 6.3 shows that in Manga/lietego sub-location women who were attended by traditional midwives had a bigger proportion of those who had 0.1 and under proportion of children dead. This is portrayed by the percent (48.9%) of those attended by traditional midwives compared to 26.8% of those that were attended by modern trained midwives. Table 6.4 shows that in Kabuoro sub-location women who had been attended to by traditional midwives had a bigger proportion of 0.3 and over proportion of children dead compared to those who were delivered by modern trained midwives. This is shown by from the fact that 55.8% of those who were attended to by modern trained midwives had 0.3 proportion of children dead compared to 86.1% of those who had been attended to by traditional midwives. Studies carried out in Sri lanka have shown that the presence of trained midwives as birth attendants and use of sterile equipment to cut the umbilical cord resulted in lower neonatal mortality(Meegama 1980).

The chi-square statistic results shows that in both study areas there was an association between birth attendant and the proportions of children dead. However the association tends to be stronger in Manga/Lietego sub-location where the observed significance was 0.0064 compared to 0.0506 of Kabuoro sub-location.

6.10 Proportion of Children Dead and Place of Child Birth

Tables 6.3 and 6.4 show that in both sub-locations, most of the women who had 0.3 proportions of children dead had given birth at home. For example, 63.9% of those who gave birth at home in Kabuoro sub-location had 0.3 proportions of children dead. It is possible that the instruments used at delivery at home were unhygienic and that is why most of the mothers lost their children. The chi-square results indicate that place of birth was highly associated with the proportion of children dead. This is evident from the fact that the chi-square was significant at 0.05 level of significance.

6.11 Proportion of Children Dead and Type of Immunization given

Table 6.3 shows that in Manga/Lietego the women whose children had not been given any immunization had a smaller proportion of children who had died. The distribution of women who had 0.3 proportion of children dead was as follows:- 27.8% of those who had never taken their children for any immunization and 29% of those who had taken their children for complete immunization. In Kabuoro sub-location, there are contrasting results since women who had never taken their children for immunization had a greater proportion (0.3) children dead, i.e., 69.8% compared to 51.7% of the women who had taken their children for complete immunization.

The chi-square results also indicate that there was no association between type of immunization given to children and the proportion of children dead in Kabuoro sub-location. In

Manga/Lietego the chi-square results indicate that complete immunization is closely associated with lower child mortality. This finding is in agreement with what Lewenburg et al (1987) found, that is, measles and tetanus are major determinants of infant and child mortality when they are not immunized.

TABLE 6.3 The Distribution of the Proportion of Children Dead by Health Care Factors in Manga/lietego sub-location:

HEALTH CARE FACTORS	Proportion of children				
	0.1 and under	0.11-< 0.3	0.3+	Total	X^2 O.F.
	No. %	No. %	No. %	No. %	
SOURCE OF DRINKING WATER					10.10* 2
Tap Water	5 (26%)	6 (32%)	8 (42%)	19 (100%)	
River/ Stream	37 (32%)	51 (44%)	28 (24%)	116 (100%)	
Borehole	15 (35%)	12 (28%)	16 (37%)	43 (100%)	
Rain Water	5 (30%)	5 (29%)	7 (41%)	17 (100%)	
Total	62 (32%)	74 (38%)	59 (30%)	195 (100%)	
BIRTH ATTENDANT					10.10* 2
Modern Trained Midwife	40 (26.8%)	64 (43%)	45 (30.2%)	149 (100%)	
Traditional Midwife	22 (48.9%)	9 (20%)	14 (31.1%)	45 (100%)	
Total	62 (32.0%)	73 (37.6%)	59 (30.4%)	194 (100%)	
PLACE OF BIRTH					8.89* 2
Hospital	40 (28.4%)	62 (44%)	39 (27.7%)	141 (100%)	
Home	22 (41.5%)	11 (20.8%)	20 (37.7%)	53 (100%)	
Total	62 (32%)	73 (37.6%)	59 (30.4%)	194 (100%)	
TYPE OF IMMUNIZATION GIVEN					15.00* 4
BCG/Polio/ measles	- -	10 (58.8%)	7 (41.2)	17 (100%)	
All	- -	115 (70.9%)	47 (29%)	162 (100%)	
Not given	- -	13 (72.2%)	5 (27.8%)	18 (100%)	
Total	- -	138 (70.1%)	59 (29.9%)	197 (100%)	
DISTANCE TO NEAREST HEALTH CENTRE					15.40* 8
1 km	10 (29%)	12 (34%)	13 (37%)	35 (100%)	
2 km	24 (44%)	21 (39%)	9 (17%)	54 (100%)	
3 km	20 (34%)	23 (39%)	16 (27%)	59 (100%)	

4 km	8 (15%)	18 (35%)	21 (40%)	52 (100%)	
Total	62 (32%)	74 (38%)	59 (30%)	195 (100%)	

TABLE 6.4 The Distribution of Women by Proportion of Children Dead and Health Care Factors in Kabuoro Sub-Location:

HEALTH CARE FACTORS	Proportion of children				
	0.1 and under	0.11-< 0.3	0.3+	Total	X^2 D.F.
	No. %	No. %	No. %	No. %	
SOURCE OF DRINKING WATER					15.11* 6
Tap Water	5 (28%)	7 (39%)	6 (33%)	18 (100%)	
River/ Stream	35 (25%)	39 (27%)	66 (48%)	140 (100%)	
Borehole	31 (16%)	43 (21%)	126 (63%)	200 (100%)	
Rain Water	5 (15%)	10 (30%)	18 (55%)	33 (100%)	
Total	76 (20%)	99 (25%)	216 (55%)	391 (100%)	
BIRTH ATTENDANT					5.97* 2
Modern Trained Midwife	53 (17.5%)	81 (26.7%)	169 (55.8%)	303 (100%)	
Traditional Midwife	13 (22%)	7 (11.9%)	39 (66.1%)	59 (100%)	
Total	66 (18.2%)	88 (24.3%)	208 (57.5%)	362 (100%)	
PLACE OF BIRTH					7.13* 2
Hospital	51 (16.9%)	81 (26.9%)	169 (56.1%)	301 (100%)	
Home	15 (24.6%)	7 (8%)	39 (63.9%)	61 (100%)	
Total	66 (18.2%)	88 (24.3%)	208 (57.5%)	362 (100%)	
TYPE OF IMMUNIZATION GIVEN					8.95 4
BCG/Polio/ measles	- -	49 (46.2%)	57 (53.8)	106 (100%)	
All	- -	83 (48.3%)	89 (51.7%)	172 (100%)	
Not given	- -	26 (30.2%)	60 (69.8%)	86 (100%)	
Total	- -	158 (43%)	206 (57%)	364 (100%)	

DISTANCE TO NEAREST HEALTH FACILITY					37.72* 6
1 Km	16 (20%)	18 (23%)	46 (57%)	80 (100%)	
2 Km	13 (17%)	24 (32%)	39 (51%)	76 (100%)	
3 Km	6 (6%)	25 (22%)	81 (72%)	112 (100%)	
4 Km	41 (33%)	32 (26%)	50 (41%)	123 (100%)	
Total	76 (20%)	99 (25%)	216 (55%)	391 (100%)	

Key:

D.F. : Degree of Freedom

χ^2 : Chi-Square value

* : Chi-Square value is significant

6.12 Proportion of children Dead and Birth weight

Table 6.6 shows that in Kabuoro sub-location, the proportion of women who had 30 per cent of their children dead tended to decrease with the increase in birth weight. This is shown by the fact that 66.3% were of those with children with a birth weight of 2.00-2.99, 56.3% were of those with children with a birth weight of 3.0-3.9 and 51.5 were of those with children with a 4.0-4.9 birth weight. This was the reverse for Manga/lietego where birth weight of children increased with the increase in 0.3 proportion of children dead, for instance, 33.3% were of those with children with a birth weight of 2.00 - 2.99, 37.9% were of those who had children with a birth weight of 3.00 - 3.99 and 51.6% of those with 4.00 - 4.99 birth weight (see table 6.5).

The chi-square results for both sub-locations indicate that the independent variables did not have any association with the dependent variable. This is evident from the finding that the observed significance was greater than the critical significance, 0.05 used to test the chi-square. The observed significance of birth weight in Kabuoro sub-location was 0.3207 and Manga/Lietego it was 0.0700. This is in contrast to what Devanzo et al (1983) had found, that is, birth weight is highly correlated with child survival in the early ages.

It is also important to note that tables 6.7 and 6.8 have been added to show the significance of birth weight as one of the variables that may influence child mortality. They are different from tables 6.5 and 6.6 because they are not affected by the contribution of the total number of live births that were used to compute the proportion of children dead per individual woman in figure 6.7 and 6.8. Hence they are more reliable in terms of the variable birth weight since they give the actual deaths per individual woman and also the conditions under which a particular child was born may vary for one child to the other. In this case therefore, birth weight was found to have no association in Manga/lietego sub-location when actual deaths were used since the observed significance was 0.7165 as opposed to results obtained when the proportion of children death was used as a dependent variable. In Kabuoro sub-location there was a close association between birth weight and the actual deaths ,i.e., 0.0003 as opposed to figure 6.6 results where there was no association when the

proportion of children dead was used as the dependent variable.

6.13 Proportion of Children Dead and duration of Breast-feeding

Table 6.5 shows that in Manga/Lietego, the proportion of women who had 30 percent of children dead did not seem to have a systematic pattern in relation to duration of breast-feeding, for instance, 30.8% of those who breast-fed for 7-12 months had 0.3 proportion dead while 45.71% of those who breast-fed for 13-18 had the same number of proportion of children dead and 13.7% of those who breast-fed their children for 19-24 had similar proportion of children dead. Table 6.6 shows that in Kabuoro sub-location, those who had 0.3 proportions dead had the following proportions: 63.6% of those who breast-fed for 19.00 to 24 months and 13.4% of those who breast-fed for 25.00 to 30.00 months.

The chi-square test indicates that there was a very strong association between duration of breast-feeding and proportion of children dead and those who breast-fed for longer periods. The observed significance for the dependent variable in Kabuoro sub-location is 0.0002 and 0.000 for Manga/Lietego sub-location respectively. This finding agrees with what Winikoff (1983) found, that is, has documented that children breast-fed in the 1st 6 months to some extent have lower mortality in the post-neonatal stage.

It is also important to note that figure 6.7 and 6.8 have been added to show the significance of breast-feeding as one of the

variables that may influence child mortality. They are different from 6.7 and 6.8 because they are not affected by the contribution of the total number of live births that were used to compute the proportion of children dead in figure 6.7 and 6.8, hence they are more reliable in terms of the variable breast-feeding since they give the actual deaths per individual woman. Therefore breast-feeding doesn't seem to be as perfectly correlated when the actual deaths are used as it is the case when the proportion of children dead is used for both sub-locations under study.

6.14 Proportion of children dead by first semi-solid food given to infants

Table 6.5 shows that in Manga/lietego sub-location the distribution of women in terms of provision of the first semi-solid food and 0.3 proportion of children dead was as follows: 25% of those who gave their children porridge, 32.3% of those who gave their children porridge made from "wimbi/mtama"/maize and 42.9% of those who gave their children mashed ripe fruit. This indicates that women who gave mashed ripe fruit had a greater percentage of those with 0.3 proportion children dead compared to those who gave porridge made of mtama/wimbi flour with similar proportion of children dead. It can be observed from table 6.6 that in Kabuoro sub-location, the distribution of women in terms of the provision of the first semi-solid food was as follows: 51.6% were of those who gave their infants porridge made of "Mtama/Wimbi", 78.4% were of those that gave infants mashed ripe fruit.

However, on the other hand the chi-square results indicated that in both Manga/Lietego and Kabuoro sub-locations, 1st semi-solid food was closely associated with the proportion of children dead. This finding agrees with what Anker found, that is, survival probabilities decrease if supplementary food is of poor nutritional quality.

6.15 Proportion of Children Dead and how Many Times Cereals were Given to Children

Table 6.5 indicates that in Manga/Lietego sub-location women who gave cereals (millet, maize and sorghum) once a week had the greatest proportion of children dead. The same is true in Kabuoro sub-location where women who gave cereals once a week had the greatest proportion of children dead i.e. 60.6 percent had 0.3 proportion of children dead compared to 52.4% of those who gave these foods once a day. This is shown on table 6.6. Therefore in both Manga/Lietego and Kabuoro sub-locations frequent provision of cereals decreased the proportion of children dead.

Looking at the chi-square results there is a very strong association between the proportion of children dead and the frequency at which cereals were given. This finding agrees with what Meegama (1980) found, that is, malnutrition among expectant mothers in Sri lanka led to mothers giving birth to children who suffer from immaturity and debility.

6.16 Proportion of Children Dead and Frequency at which Beans were Given to Children

Tables 6.5 and 6.6 show that in both sub-locations no clear pattern emerges as far as the provision of beans to children and mortality are concerned. In Manga/Lietego, for instance, 45% of those who gave beans 2 or 3 times a day had 0.2 proportions of children dead while 38.3% of those who gave these foods once a week had 0.2 proportions dead. In Kabuoro sub-location those who gave these foods twice a day had the highest proportion of children dead, for instance, 70.4 of those who gave these foods twice a day had 0.3 proportion of children dead compared to 56.5% of those who gave these foods once a week.

The various chi-square tests for the two study areas indicate that in Manga/Lietego there was no association between the proportion of children dead and the frequency at which proteinic foods were given. While in Kabuoro sub-location there is a close association, so that the frequency at which beans were given is dependent of the proportion of children dead.

6.17 Proportion of Children Dead and How Many Times Proteinic foods were Given to Children

Table 6.5 suggests that in Manga/Lietego sub-location women who never gave Proteinic foods had the highest proportion of children dead. This is evident from the fact that 45% of those who never gave these foods had 0.1 proportions dead compared to 13.3% of those who gave these foods once a day. However, in the other proportions of children dead i.e. 0.3 the proportion of children

dead did not increase with the decrease in the frequency at which these foods were given to children. For, instance 31.1% of those who gave these foods once a day had 0.3 proportion of children dead and 12.5% of those who never gave these foods had similar proportion of children dead. Table 6.6 shows that in Kabuoro sub-location the proportion of children dead increased with decrease in the frequency of provision of meat/eggs/fish/milk. This was mainly shown among the women that had 0.3 proportions of children dead. This is shown by (45.9%) of those who gave once a day and 72.5% of those who gave these foods once a week. It therefore appears that these are rare foods in both study areas hence they are not given in adequate quantities.

The chi-square results indicate that there is a close association between the proportion of children dead and frequency at which Proteinic foods were given to children. In India, similar findings were obtained by Moni nag (1981) who showed that there was low mortality in Kerala than in West Bengal because of higher protein intake per capita in Kerala than in West Bengal

6.18 Proportion of Children Dead and The Frequency at which Vegetables/Fruits were Given to Children

Provision of vegetables/fruits in Manga/Lietego was closely associated with the proportion of children who died per woman. For instance, those who had 0.3 proportion of children dead, 23.9% were among those who gave these foods 2 or 3 times a day and 35.2% were of those who gave these foods once a day. In Kabuoro sub-location, there is an association among those who had 0.3 proportions dead

and the frequency at which fruits/vegetables were given. For instance, 55.4% gave once a week and 59.1% never gave these foods.

The chi-square statistic shows that there is an association between the proportions dead and how many times these foods were given in Kabuoro sub-location.

TABLE 6.5 The Distribution of Proportion of Children Dead by Nutritional Factors in Manga/lietego sub-location:

NUTRITIONAL FACTORS	Proportion of children				
	0.1 and under	0.11-(0.3	0.3+	Total	X^2 D.F.
	No. %	No. %	No. %	No. %	
BIRTH WEIGHT					8.66 4
2.00 - 2.9	5 (33.3%)	5 (33.3%)	5 (33.3%)	15 (100%)	
3.00 - 3.9	29 (30.5%)	30 (31.6%)	36 (37.9%)	95 (100%)	
4.00 - 4.9	28 (35.9%)	36 (46.2%)	97 (51.6%)	78 (100%)	
Total	62 (33%)	71 (37.8%)	55 (29.3%)	188 (100%)	
DURATION OF BREASTFEEDING					37.58* 8
1.00 - 6.9	5 (50%)	- -	5 (50%)	10 (100%)	
7.00 - 12	18 (69%)	- -	8 (31%)	26 (100%)	
13 - 18.00	38 (54%)	- -	32 (46%)	70 (100%)	
19.00 - 24	63 (86%)	- -	10 (14%)	73 (100%)	
25.00 - 30	8 (57%)	- -	6 (43%)	14 (100%)	
Total	131 (38%)	- -	61 (32%)	193 (100%)	
FIRST SEMI-SOLID FOOD GIVEN					20.57* 4
Porridge/ fermented/not fermented	39 (48.8%)	21 (26.3%)	20 (25%)	80 (100%)	
Porridge/ Wimbi/Mtama/ maize	18 (19.4%)	46 (49.5%)	30 (32.3%)	93 (100%)	
Mashed ripe fruit	5 (23.8%)	7 (33.3%)	9 (42.9%)	21 (100%)	
Total	62 (32%)	73 (37.6%)	59 (30.4%)	194 (100%)	
HOW MANY TIMES CEREALS WERE GIVEN TO CHILDREN					18.76* 4
Once a day	11 (40.7%)	8 (29.6%)	8 (29.6%)	27 (100%)	
2 or 3 times a day	47 (41.2%)	37 (32.5%)	30 (26.3%)	114 (100%)	
Once a week	5 (10.6%)	28 (59.5%)	15 (31.9%)	47 (100%)	
Total	63 (33.5%)	72 (38.3%)	53 (28.2%)	188 (100%)	

Table 6.5 continued					
TIMES BEANS GIVEN TO CHILDREN					4.63 4
Once a day	5 (33.3%)	5 (33.3%)	5 (33.3%)	15 (100%)	
2 or 3 times a day	6 (30%)	9 (45%)	5 (25%)	20 (100%)	
Once a week	51 (33.1%)	59 (38.3%)	44 (28.6%)	154 (100)	
Total	62 (33%)	73 (38.8%)	53 (28.2%)	188 (100%)	
FREQUENCY AT WHICH PROTEINIC FOODS WERE GIVEN					23.76* 4
Once a day	6 (13.3%)	25 (55.6%)	14 (31.1%)	45 (100%)	
Once a week	37 (35.9%)	31 (30.1%)	34 (33%)	103 (100%)	
Never	19 (45%)	17 (42.5%)	5 (12.5%)	40 (100%)	
Total	62 (33%)	73 (38.8%)	53 (28.2%)	188 (100%)	

TABLE 6.6 The Distribution of Proportion of Children Dead by Nutritional Factors in Kabuoro Sub-location:

	Proportion of children				
NUTRITIONAL FACTORS	0.1 and under	0.11-< 0.3	0.3+	Total	X^2 D.F.
	No. %	No. %	No. %	No. %	
BIRTH WEIGHT					4.63 4
2.00 - 2.9	9 (10.8%)	19 (22.9%)	55 (66.3%)	83 (100%)	
3.00 - 3.9	48 (20.2%)	56 (23.5%)	134 (56.3%)	238 (100%)	
4.00 - 4.9	7 (21.2%)	9 (27.3%)	17 (51.5%)	33 (100%)	
Total	64 (18.1%)	84 (23.7%)	206 (58.2%)	354 (100%)	
DURATION OF BREASTFEEDING					23.75* 8
1.00 - 6.9	44 (41%)	- -	62 (59%)	105 (100%)	
7.00 - 12	66 (52%)	- -	60 (48%)	126 (100%)	
13 - 18.00	15 (45%)	- -	18 (55%)	33 (100%)	
19.00 - 24	12 (36%)	- -	21 (64%)	33 (100%)	
25.00 - 30	6 (13%)	- -	46 (87%)	52 (100%)	
Total	143 (42%)	- -	201 (32%)	344 (100%)	
FIRST SEMI-SOLID FOOD GIVEN					33.45* 6

Table 6.6 continued					
Porridge/ fermented/not fermented	43 (16.1%)	74 (28.8%)	134 (52.1%)	257 (100%)	
Porridge/ Mabi/Mbanz/ maize	9 (23%)	6 (15.4%)	15 (51.5%)	31 (100%)	
Mashed rice fruit	8 (10.3%)	8 (10.3%)	58 (78.4%)	74 (100%)	
Total	56 (16.2%)	88 (19.2%)	209 (57.8%)	362 (100%)	
HOW MANY TIMES CEREALS WERE GIVEN TO CHILDREN					24.95* 6
Once a day	22 (13.1%)	58 (34.5%)	88 (52.4%)	168 (100%)	
2 or 3 times a day	18 (27.3%)	11 (16.7%)	37 (56.1%)	66 (100%)	
Once a week	24 (23.1%)	17 (16.3%)	53 (50.5%)	104 (100%)	
Total	64 (18.9%)	86 (25.4%)	188 (56%)	338 (100%)	
TIMES BEANS GIVEN TO CHILDREN					22.06* 4
Once a day	16 (30.8%)	21 (40.4%)	15 (28.8%)	52 (100%)	
2 or 3 times a day	8 (14.8%)	8 (14.8%)	38 (70.4%)	54 (100%)	
Once a week	42 (18.1%)	59 (25.4%)	131 (56.5%)	232 (100%)	
Total	65 (19.5%)	88 (25%)	184 (54.4%)	338 (100%)	
FREQUENCY AT WHICH PROTEINIC FOODS WERE GIVEN					11.86* 4
Once a day	21 (21.4%)	32 (32.5%)	45 (45.9%)	98 (100%)	
Once a week	5 (9.8%)	9 (17.6%)	37 (72.5%)	51 (100%)	
Never	40 (21.2%)	47 (24.9%)	102 (54%)	189 (100%)	
Total	66 (19.5%)	88 (25%)	184 (54.4%)	338 (100%)	

Key:

D.F. = Degree of Freedom, X^2 = Chi-Square value, * = Chi-Square value is significant

TABLE 6.7 The Distribution of Total Number of Children Dead by

TABLE 6.7 The Distribution of Total Number of Children Dead by Nutritional Factors in Manga/lietego sub-location:

NUTRITIONAL FACTORS	Total number of children dead.							
	1		2+		Total		X^2	D.F.
	No.	%	No.	%	No.	%		
Birth Weight							0.67	2
2.00 - 2.9	12	(92.3%)	1	(7.7%)	13	(100%)		
3.00 - 3.9	89	(91.8%)	8	(8.2%)	97	(100%)		
4.00 - 4.9	71	(94.9%)	4	(5.1%)	78	(100%)		
Total	175	(93.1%)	13	(6.9%)	188	(100%)		
Duration of Breast-feeding							4.72	4
1.00 -6.9	8	(80%)	2	(20%)	10	(100%)		
7.00 - 12	25	(96%)	1	(4%)	26	(100%)		
13 - 18.00	66	(94%)	4	(6%)	70	(100%)		
19.00 - 24	69	(94%)	4	(6%)	73	(100%)		
25.00 - 30	12	(86%)	2	(14%)	14	(100%)		
Total	180	(93%)	13	(7%)	193	(100%)		

TABLE 6.8 The Distribution of Total Number of Children Dead by Nutritional Factors in Kabuoro sub-location:

NUTRITIONAL FACTORS	Total number of children dead.							
	1		2+		Total		X^2	D.F.
	No.	%	No.	%	No.	%		
Birth Weight							16.3	2
2.00 - 2.9	57	(67.4%)	27	(32.6%)	84	(100%)		
3.00 - 3.9	205	(72%)	34	(14.5%)	239	(100%)		
4.00 - 4.9	21	(66.7%)	10	(33.3%)	31	(100%)		
Total	283	(79.4%)	71	(23.7%)	354	(100%)		

Duration of Breast-feeding				13.1 4
1.00 - 6.99	76 (72%)	30 (28%)	106 (100%)	
7.00 - 12	104 (79%)	27 (21%)	131 (100%)	
13.00 - 18	25 (76%)	88 (24%)	33 (100%)	
19.00 - 24	29 (88%)	4 (12%)	33 (100%)	
25.00 - 30	44 (16%)	2 (4%)	46 (100%)	
Total	278 (80%)	71 (20%)	349 (100%)	

6.19 SUMMARY OF FINDINGS

6.19.1 Proportion of Children Dead in Relation to Background Variables.

In both sub-locations under study married women had low proportion of children dead than unmarried women. Religion of the mother had little influence on child mortality in both sub-locations. In both sub-locations education of the mother had a negative relationship with the proportion of children dead since as the level of education of the mother increased, there was a decrease in the proportion of children dead. In Manga/lietego sub-location, the proportion of children dead increased with the level of education of the father. In Kabuoro sub-location, father's level of education was not associated with the proportion of children dead.

6.19.2 Proportion of Children Dead in Relation to Health Care Factors

In Manga/lietego sub-location, there was no relationship between source of drinking water and the proportion of children dead but in Kabuoro sub-location, use of clean drinking water was accompanied with decreased proportion of children dead. Toilet facility did not have any association with the proportion of children dead in both study areas. In Manga/lietego sub-location, type of fuel used for cooking was independent of the children dead while in Kabuoro sub-location there was a perfect relationship between the proportion of children dead and the type of fuel used for cooking, i.e, in Kabuoro sub-location use of a paraffin/gas as cooking fuel increased with the increase in the proportion of children dead. Distance to the nearest health facility is positively related to the proportion of children dead. The longer the distance, the more the proportion of children dead in both study areas. In both study areas there was an association between the proportion of children dead and birth attendant. Proportion of children dead was less when delivery was by modern birth attendant. In both study areas use of hospital as place of birth of the child under consideration reduced the proportion of children dead. In Kabuoro sub-location, immunization completion is independent of the proportion of children dead while in Manga/lietego sub-location completion of immunization vaccine increases with decrease in proportion of children dead.

6.19.3 Proportion of Children Dead in Relation to Nutritional Factors.

Birth weight was independent of the proportion of children dead in both study areas. Women who breast-fed longer had lower proportions of children dead than those who breast-fed for shorter periods in both study areas. Women who gave their children "mtama/wimbi" porridge as 1st semi-solid food had lower proportion of children dead in Kabuoro sub-location. In Manga/lietego provision of mashed ripe fruits reduced the proportion of children dead.

Provision of cereals, e.g., sorghum and maize, increased with the decrease in the proportion of children dead in both sub-locations. The frequency at which beans were given to children increased with the decrease in the proportion of children dead in Kabuoro sub-location. In Manga/lietego sub-location, the frequency at which these foods were given was independent of the proportion of children dead. Proportion of children dead increased with the decrease in the provision of meat/fish/eggs/ milk in both sub-locations. In Manga/lietego sub-location, giving of fruits/vegetables was independent of the proportion of children dead while in Kabuoro sub-location, giving of these foods increased with the proportion of children dead.

CHAPTER SEVEN

DETERMINANTS OF CHILD MORTALITY

7.0 INTRODUCTION

The definition of this method, why it has been chosen and its applicability has been presented in chapter 3 of this document. A micro-level analysis has been carried out using data collected from household survey in Kabuoro and Manga/lietego sub-locations. The results obtained refer to the conditions prevailing in the last five years before the survey (Dec 1987 to Dec 1992). The next section presents the logistic regression results for the two study areas. First of all variables used in the regression will be defined. Below is a table showing the definition of variables used in regression analysis.

TABLE 7.1 Definition of Variables in Regression

VARIABLE	ITS DEFINITION
Marital status	Married (reference category) Unmarried(unmarrie)
Religion	Catholics(reference category) Protestants(protest) Traditionalists(traditio)
Education level of mother	None/adult literacy (reference category) Primary(primarm) Secondary(Secomdam)
Education level of father	None/adult (reference category) Primary(primarf) Secondary(secondarf)
Source of drinking water	River and others Borehole Tap (reference category)
Type of toilet facility	Flush (reference category) Pit and others
Type of fuel used for cooking	Charcoal (reference category) Paraffin, gas and electricity
Distance to nearest health facility	1 km (reference category) 2 km 3 km 4 km and over
Birth attendant	Modern Traditional(reference category)
Place of birth	Hospital(reference category) Home

TABLE 7.1 CONTINUED

VARIABLE	ITS DEFINITION
Birth weight	2.00 - 2.99 Kg(reference category) 3.00 - 3.99 Kg 4.00 - 4.99 Kg
Duration of breast-feeding	1-6 Months (reference category) 7-12 Months 13-18 Months 19-24 months 25-30+ months
1st semi solid food given to infants	Others Maize porridge (reference category) "Mutama/wimbi" porridge Mashed ripe fruits Mashed potatoes/bananas
Provision of cereals	Once a day Two or three times a day Once a week Rarely Never Given (reference category)
Potatoes/cassava	Once a day Two or three times a day Once a week Rarely Never Given (reference category)
Bananas	Once a day Two or three times a day Once a week Rarely Never Given (reference category)
Beans	Once a day 2 or 3 times a day (reference category) Once a week Rarely Never Given
Vegetables/Fruits	Once a day 2 or 3 times a day (reference category) Once a week Rarely Never Given

TABLE 7.1 CONTINUED

VARIABLE	ITS DEFINITION
Meat/Fish/Eggs	Once a day 2 or 3 times a day Once a week Rarely Never Given (reference category)
Animal milk	Once a day 2 or 3 times a day Once a week Rarely Never Given (reference category)
Immunization	Partial immunization (reference category) Completed immunization Never immunized

7.1 DEFINITION OF VARIABLES USED IN LOGISTIC REGRESSION

The categories defined below were found to significantly influence child survival status when compared with the reference categories in Manga/lietego and Kabuoro sub-locations respectively.

MANGA/LIETEGO SUB-LOCATION

1. BW4 - This refers to children who had a birth weight of 4.00-4.99kg.
2. PROTEST - This refers to protestant women.
3. ONEW7 - This refers to children who were given cow's milk once a week.
4. TWICE7 - This refers to children who were given cow's milk 2 or 3 times a day.
5. PIT - This refers pit latrine as sewage facility available.
6. MODERN - This refers to modern trained midwife attendants.

KABUORO SUB-LOCATION

1. TRADITIO - This refers to traditionalist women by religion.

2. KM4 - This refers to households that were 4 km from the nearest health facility.

3. NEVER3 - This refers to children who have never been given vegetables/fruits.

4. RARELY3 - This refers to children rarely given vegetables/fruits.

5. RARELY4 -This refers to women who rarely gave their children beans.

6. PRIMARF - This refers to Primary level education of the father.

7.2 LOGISTIC REGRESSION RESULTS DISCUSSION FOR CHILDREN AGED TWO AND UNDER

FIRST MODEL:

In this model Socio-economic, Socio-cultural and Demographic variables have been regressed against the dependent variable.

In this model, the 1st most important variable that was selected was traditionalist religion. As shown on table 7.2 children who belonged to mothers that were traditionalists by religion had 23 times higher risk of dying compared to those that belonged to catholic mothers. This is possible because traditionalist mothers may have not felt the impact of modernity as

to change their traditional ways of feeding children and also take them to hospital when they are sick.

When the variable traditionalist religion was removed from the rest of the variables, it is important to note that the variable protestant religion turned out to be the second most significant variable among the socio-economic, socio-cultural and demographic variables. Children who belonged to protestant mothers had higher chances of survival compared to those that belonged to catholics(see illustration on table 7.2). This finding may be attributed to the fact that the catholics in most cases encourage polygamous marriages, hence wives in these marriages compete for children. It is believed that the wives who have the greatest number of children are allocated the greatest amount of wealth. This makes women give birth to very many children whom they are not able to take care of hence some die.

In Kabuoro sub-location when the socio-economic, socio-cultural and demographic factors were regressed against child survival status, none of the variables was significant, possibly in the presence of some health care and nutritional variables, these socio-economic, socio-cultural and demographic factors become significant. It is also possible that none of the variables was significant because the number of children dead(aged two and under) was very small, i.e., 98 only.

SECOND MODEL

In this model health care factors were added to the

independent variables so as to determine how socio-economic, socio-cultural and demographic factors(background factors) behave in the presence of health care factors. In this case, the variable traditionalist religion was chosen as the first significant variable that is positively related to child mortality. Table 7.2 shows that children whose mothers were traditionalists stood 23.1 times higher risk of dying compared to those whose mothers were catholics. This is possible because in most cases traditionalist do not believe in western medicine. Some of them do not encourage immunization of their children or even when sick they are given traditional medicine instead of being taken to hospital.

In the next regression when traditionalist religion variable has been used, the second most significant variable was added to the equation in Manga/lietego sub-location, i.e., use of pit latrine. Table 7.2 shows that pit latrine was negatively related to child mortality. Children whose households used pit latrine as their main sewage disposal had 0.0002 times higher chances of surviving than those whose households used flush toilets (see table 7.2). This is possible because in the rural areas sometimes there isn't enough water to keep flush toilets clean. And because of this poor sanitary condition, the users usually develop diarrhoea that contributes a lot to child deaths. It is also important to note that modern facilities may be available but the awareness on their utilisation might be inadequate. Contrasting finding had been found in Sri lanka by Meegama(1981) that absence of insanitary lavatories leads to breeding of flies that lead to transmission of

diseases.

When socio-economic, socio-cultural, demographic and health care factors were regressed against child survival status for children aged 2 and under in Kabuoro sub-location, none of the variables was significant. Probably in the presence of nutritional factors some of these variables may become significant. It is also possible that, as noted earlier none of these variables was significant because of the small number of deaths in this age group.

THIRD MODEL

In this model Socio-economic, Socio-cultural, Demographic and Nutritional variables have been regressed against the dependent variable. Here the variable traditionalist religion was selected as the first most important variable that was positively related to child mortality. From the results in table 7.2 it is evident that children of the traditionalist women had 23 times higher risk of dying compared to children of the catholics. This is possibly because of the unhygienic feeding practices of traditionalists as opposed to the catholics.

The second most important variable added to the equation was protestant religion whose children had 0.0006 higher chances of survival compared to children of the traditionalist religion(see table 7.2). This factor holds on the strength of what has already been suggested that protestants regard cleanliness second to Godliness.

In Kabuoro sub-location, the first most significant variable entered into the equation was children never given vegetables/fruits. Table 7.3 shows that children who were never given these foods had 100+ times risk of dying compared to those that were given 2 or 3 times a day. As suggested earlier these are essential foods for protection against diseases which should be given more frequently than not. Moni Nag (1981) supports this finding by indicating that better nutritional status in Kerala led to low infant and child mortality compared to West Bengal which had high mortality due to poor nutritional status.

After this variable, children never given vegetables/fruits was removed from the equation and the rest were regressed. As a result, fathers primary level of education became the second most important variable to be entered into the equation. This is shown on table 7.3 where children belonging to fathers with primary level of education had 8.9 times risk of dying compared to children of fathers with secondary level of education. It is possible that fathers with primary level of education may not be financially able to support their children as well as fathers with secondary level of education. At least those with secondary level of education stand a higher chance of being employed in the modern sector hence can economically support their families which in one way or another contributes to low death rates. Mosley and Chen (1984) support this view by contending that educated fathers get employment and that helps to improve the quality of health care of the family, food provision and even clothing.

In the next regression fathers with primary level of education and children who have never been given vegetables/fruits variables were left out. The variable protestant women was the third most significant variable. This implies that children whose mothers were protestants had 10 times higher risk of dying compared to the catholic children (see table 7.3). This finding is in contrast to what was found in Manga/Ietego where protestants had higher chance of survival rates than the Catholics. In the case of Kabuoro it could be possible that the protestant children died more than the Catholics because, this is one of the areas where fanatic protestant denomination of the seventh day adventist church dominates. This denomination prohibits eating of certain types of foods like meat which to a greater extent contribute to nutrient deficiency amongst children. It is also possible that since the protestants encourage monogamous marriages which do not encourage sleeping arrangements so that some wives are safe on the most fertile days, some of these women have very many children with very little birth spacing. This leads to early weaning. At this point it is also important to note that most of the respondents in the current study area strongly believe in having many children so as to prove their fertility irrespective of their religion.

In the next regression and after variables; protestant religion, primary level of education of the father, never given vegetables had been removed from the rest of the variables, it was only the variables rarely given beans that became significant. However, this variable was not strong enough compared to the rest

of the variables used to form the fourth equation.

FOURTH MODEL

In this model Socio-economic, Socio-cultural, Demographic, Nutritional and Health care variables have been regressed against the dependent variable.

The variable traditionalist religion turned out to be the first most significant in determining child mortality behaviour. Table 7.2 shows that children whose mothers were traditionalists by religion had 23.1 times higher risk of dying compared to those whose mothers were catholics when all variables are controlled. This is possible because this religious group might have unconsciously employed fatalistic traditional forms of feeding their children hence most of them end up dying. When the traditional religion had been removed from the equation, the second most significant variable entered into the equation was use of pit latrine as a toilet facility. In this case the children of the users of pit latrine had 0.0002 times chances risk of surviving with respect to the reference category. This is shown on table 7.2. Most of the pit latrines in Manga/Ietego as mentioned earlier were easily kept clean because of the way they were constructed. Therefore pit latrine was the second most important variable after traditionalists religion that contributed to child mortality differentials in this study area.

In Kabuoro sub-location, the variable NEVER3 (i.e., never given vegetables/fruits) was selected as the first most significant

variable in relation to the risk of child's death. This means children who have never been given vegetables/fruits stood 100 times higher risk of dying compared to those who were given these foods one or two times a day. This is shown on table 7.3. These are very important foods for protection against diseases. If they are rarely given, children stand a high risk of dying.

When the variable never3 was removed the second most significant variable entered into the equation was primary level of education of the father. Table 7.3 shows that children belonging to fathers with primary level of education had 8.9 times higher risk of dying compared to those with secondary level of education. This is possible because, first, fathers with primary level of education may be lacking the knowledge on the importance of giving their children balanced diet and taking them to the hospital when they are sick. Second; this category of fathers may not be in a position to provide adequate financial support to their families.

When the term Never3 and primary level of education of the father (primarf) were removed from the equation, the third most significant variable entered into the equation was protestant religion. Table 7.3 shows that children belonging to protestant women had 10 times relative risk of dying compared to children belonging to catholics. For the protestants the higher risk of dying is possible because as suggested earlier, this category of women prohibit their families from eating most of the essential proteinic foods, for instance, meat. This contributes to very poor

nutritional status which in turn may contribute to high risks of dying amongst their children.

After the variables protestant religion, primary level of education of the father and never given vegetables, the fourth most important variable was rarely4 (rarely given beans). Children who are rarely given beans have higher chances of dying than those that are given 2 or 3 times a day.

TABLE 7.2 LOGISTIC REGRESSION EQUATION FOR MANGA/LIETEGO SUB-LOCATION FOR CHILDREN AGED TWO AND UNDER:

Variable	Model 1		Model 2		Model 3		Model 4	
	B Values	Expl(B)	B Values	Expl(B)	B Values	Expl(B)	B Values	Expl(B)
Traditio	2.8332	23	11.2029	23.0587	2.8332	23.05	11.2029	23.1
Protest	-7.3696	0.006			-7.3696	0.0006		
Pit			-8.5067	0.0002			-8.5067	0.0002
Constant	-2.8332		-2.6962		-2.8332		-2.6962	
Model X^2	13.725		18.246		13.725		18.246	

TABLE 7.3 LOGISTIC REGRESSION EQUATION FOR KABUORO SUB-LOCATION FOR CHILDREN AGED TWO AND UNDER:

Variable	Model 1		Model 2		Model 3		Model 4	
	B Values	Expl(B)	B Values	Expl(B)	B Values	Expl(B)	B Values	Expl(B)
Never3					12.4510	100+	12.4510	100+
Primarf					2.5437	8.91	2.5437	8.9
Protest					2.3026	10	2.3026	10
Constant					-4.2485		-4.2485	
Model X^2					31.865		31.865	

7.3 LOGISTIC REGRESSION RESULTS DISCUSSION FOR CHILDREN AGED FIVE AND UNDER

FIRST MODEL

In this model, the variable protestant religion became the first most important significant variable that influences mortality behaviour in this area of study. As indicated on table 7.4 it is evident from the results of this study that children belonging to protestant women had 0.29 times higher chances of surviving compared to those that belonged to catholics. The most probable reason for this phenomenon would be as suggested earlier the fact that traditionalist may not have felt the impact of modernity as to change their traditional attitude of feeding their children.

When the socio-economic, socio-cultural and demographic variables were regressed for Kabuoro sub-location, it was only traditionalist religion that was significant so that children whose mothers were traditionalists had 2.3 times higher risk of dying compared to those whose mothers were catholics (see table 7.5). Traditionalists sometimes do not take their children to the hospital when they are sick they instead give them traditional medicine(Mosley and Chen 1981).

SECOND MODEL

When all health care and background variables were regressed in Manga/lietego sub-location, Protestant religion variable was the first most significant variable entered into the equation. Table 7.4 shows that children for the protestant women had 0.29 times chance of surviving compared to the catholics children. Protestant women as noted earlier do not encourage polygamous marriages which in most cases leads to competition for many children as this determines allocation of wealth. Consequently these polygamous families suffer from financial constraints especially in provision of adequate food which in turn contributes to high death rates. In addition some protestants believe that cleanliness is second to Godliness hence in trying to observe these values, the children end up living in clean environment which reduces child mortality in one way or another.

After the variable protestant religion had been removed from the rest of the variables, the second most important variable entered into the equation, was modern trained midwife. Modern trained midwife attendant variable was negatively related to child mortality. In other words children whose mothers were attended to by modern trained midwives when they were being born had 0.24 higher chances of surviving compared to those that were born to mothers attended to by traditional midwives. This is shown on table 7.4. This is possible because in most cases the instruments used at delivery by modern trained midwives are more hygienic which increases child survival chances. This view has been supported by Meegama(1981) who has indicated that premature births may be saved

if trained midwives are present.

In Kabuoro sub-location only one variable that became significant, i.e., KM4 (households that were 4 km from the nearest health facility). It can be observed from table 7.7 that children who belonged to households that were 4 km away from the nearest health facility had 3.1 times risk of dying compared to those that were less kilometres away. This is possible because when most of the respondents were asked why they had not taken their children for immunization they said that the few health facilities available were too far from their households. It is also important to note that there are no good transportation facilities in this area due to poor road networks. Hence walking to these hospitals is a critical problem. As a result most of the children are not taken to the hospital when sick. This significantly contributes to high death rates.

THIRD MODEL

When the first regression was done protestant religion variable was the most significant. As shown on table 7.4, children whose mothers were protestant had 0.29 times higher chance of surviving compared to children born to Catholic women.

In the next regression and after protestant religion had been removed from the rest of the variables, the variable given milk 2 or 3 times a day became the second most significant variable. Table 7.4 shows that children given milk 2 or 3 times a day had 0.4 times higher survival chances compared to children who were never

given milk.

In the next regression and after the two variables given milk 2 or 3 times a day and protestant religion have been removed from the equation, the variable given milk once a week was selected as the third most important variable to be entered into the equation in step 3. Children given milk once a week had 0.005 times higher chances of survival compared to those that were never given milk.

In the next regression children who had a birth weight of 4.00-4.99kg variable was selected as the fourth most significant variable. Children who had a birth weight of 4.00-4.99 kg had 2.18 times higher risk of dying compared to those that had 3.00-3.99kg (see table 7.3).

In Kabuoro sub-location, the variable never given vegetables/fruits became the most significant variable. Children who had never been given vegetables/fruits had 76.5 times higher risk of dying as compared to those given 2 or 3 times a day. This is shown on table 7.5.

In the next regression the second most important variable selected was rarely given vegetables/fruits. These children had 4.2 times higher risk of dying compared to those that were given these foods 2 or 3 times a day. This is shown on table 7.5.

When the next regression was done the third most significant variable chosen was traditionalist religion. Children born to these mothers had 2.6 times higher risk of dying compared to those children whose mothers were catholics. This is illustrated on table 7.11. Possible reasons for this behaviour have already been

suggested above in section 7.5.

In the next regression the only significant variable was rarely given beans. This is the fourth most significant variable added to the equation. As shown on table 7.5, these children had 2.4 times risk of dying compared to those who were given beans once or two times a day.

FOURTH MODEL

When all variables were regressed together in Manga/lietego sub-location, the first most important variable entered into the equation was protestant religion. Table 7.4 shows that children belonging to protestant women had 0.3 times relative chance of surviving compared to the catholics. This is mainly attributed to the fact that most of the catholics as opposed to the protestants, encourage polygamous marriages where women compete for children since this is as a guarantee of sharing greatest amount of wealth from their husbands. Hence they are not able to adequately take care of these children leading to relatively high death rates.

When the variable protestant religion had been removed from all variables and regression done the second most significant variable entered into the equation was twice7 (given milk 2 or 3 times a day). These children who were given milk two or three times a day had 0.4 relative chance of surviving compared to those who never gave milk to their children at all. It is important to note here that milk is a very nutritious food especially for body building. Hence if not adequately given, the children in question

may suffer from Kwashiorkor and possibly die in the long run. Table 7.4 shows the B and exponential(B) values estimated at this stage.

After this step all the variables were again regressed with the exclusion of the variable twice7 and protestant religion. In this regression, the third most significant variable entered into the equation was ONEW7 (given milk once a week). As shown on table 7.4, children who were given milk once a week had 0.0005 chance of surviving compared to those that were never given. However, it is also important to note here that giving of milk once a week is not adequate for the health and growth of the child. This implies that there must have been other factors that increased child survival, for instance , availability of health facilities and medical personnel.

After this all the variables were once more regressed with the exception of the variables, protestant religion, given milk 2 or 3 times a day and given milk once a week. In this regression only BW4 (a birth weight of 4.00-4.99 and over) was significant. When stepwise regression method was employed the children who had 4.00-4.99 kg and over birth weight had 2.2 higher risk of dying compared to those that had 3.00-3.99kg. This is shown on table 7.4. Children with a birth weight of 4.00kg and over are over-weight and sometimes suffer from certain deformities or abnormalities hence they have higher risks of dying.

When all variables were regressed together in Kabuoro sub-location, the first most important variable entered into the

equation was Never3, that is, children who had never been given vegetables/fruits. These children had 76.5 times risk of dying compared to those who were given these foods 2 or 3 times a day when all variables were controlled(see table 7.5).

When the next regression was done after the variable never3 (never given vegetables) had been removed from the equation the variable that turned out to be the second most significant was rarely given vegetables/fruits. These children had 4.24 times higher risk of dying compared to those who were given vegetables/fruits 2 or 3 times a day. This is shown on table 7.5. The other factors did not contribute much.

In the absence of rarely given vegetables and never given vegetables further regression was done and in this case the variable, religion was chosen as the third most significant variable. As shown on table 7.5, children belonging to traditionalist women had 2.6 times higher risk of dying compared to catholics' children. This as has been explained earlier is possible because of the poor feeding habits that may prevail among the traditionalist women.

In the next regression Never given vegetables/fruits, rarely given vegetables/fruits and traditionalist religion variables were removed from the rest of the variable rarely given beans became the fourth most significant variable. This means that children who were rarely given beans had 2.4 times relative risk of dying compared to those that were given 2 or 3 times a day (see table 7.5).

With the exclusion of the variables traditionalist religion, rarely given vegetables/fruits, never given vegetables/fruits and rarely given beans, further regression was done, only KM4(households four km from the nearest health facility) was significant.

When the stepwise regression was used in the fifth step, KM4 was chosen as the fifth most significant variable that influenced child mortality. In this case, children born in households that were 4km from the nearest health facility had 2.8 times higher risk of dying compared to those who were born in households that are one km away from the nearest health facility (see table 7.5). Moni Nag (1981) had similar findings in India where he found that availability of health facilities in Kerala contributed to low infant and child mortality compared to West Bengal where there was high infant and child mortality due to inadequate health facilities.

TABLE 7.4 LOGISTIC REGRESSION EQUATION FOR MANGA/LIETEGO SUB-LOCATION FOR CHILDREN AGED FIVE AND UNDER

Variable	Model 1		Model 2		Model 3		Model 4	
	B Values	Expl(B)	B Values	Expl(B)	B Values	Expl(B)	B Values	Expl(B)
Protest	-1.2379	0.2900	-1.2154	0.29	-1.2518	0.29	-1.2518	0.29
Modern			-1.4154	0.24				
Twice7					-1.5621	0.3954	-1.5621	0.395
Onew7					-7.7549	0.005	-7.7549	0.0005
Bw4					0.7786	2.18	0.7786	2.18
Constant	-2.6391		-2.47		-1.6055		-1.6055	
Model X_2	9.175		14.705		26.219		26.219	

TABLE 7.5 LOGISTIC REGRESSION EQUATION FOR KABUORO SUB-LOCATION FOR CHILDREN AGED FIVE AND UNDER:

Variable	Model 1		Model 2		Model 3		Model 4	
	B Values	Expl(B)	B Values	Expl(B)	B Values	Expl(B)	B Values	Expl(B)
Traditio	0.8377	2.3111			0.9087	2.6	0.5413	2.6
KM4			1.1338	3.1			1.0349	2.8
Never3					5.5384	76.5	5.4739	76.5
Rarely3					1.1250	4.24	1.0853	4.24
Rarely4					0.8769	2.4	1.1055	2.4
Constant	-2.8267		-2.8303		-3.9289		-4.1336	
Model X^2	4.537		7.163		43.335		47.288	

7.14 SUMMARY OF LOGISTIC REGRESSION RESULTS.

Experience of Children aged 2 and under in the study areas.

The first model showed that children of protestant women had higher survival chances compared to children of the Catholics. Children born to traditionalist mothers had higher risks of dying than children born to the catholic mothers. In the second model, children of traditionalist mothers had higher risks of dying compared to the children of the protestant mothers. Pit latrine as

the main sewage disposal was positively related to child mortality.

In the third model, children born to protestant women experienced lower mortality where as those born to traditionalist mothers experienced higher mortality. In the fourth model, children whose mothers were traditionalists had higher chances of surviving compared to those that whose mothers were catholics. Pit latrine use was negatively related to child mortality.

In Kabuoro sub-location the third model showed that, children born to protestant women experienced higher mortality than those born to catholic mothers. Primary level of education of the father was positively related to child mortality. Children never given vegetables/fruits had higher risks of dying compared to those that were given 2 or 3 times a day. In the fourth model, children whose mothers were traditionalists, whose fathers had primary level of education and who were never given vegetables/fruits were exposed to high mortality.

Experience of Children aged 5 and under in the study areas.

The first model showed that, in Manga/lietego/sub-location, Children of protestant mothers had higher survival chances than children of traditionalists. This finding was the reverse for Kabuoro sub-location. The second model showed that children born to mothers who belonged to protestant religion had higher mortality than those born to mothers who belonged to catholic religion. Children delivered by modern trained midwives experienced lower mortality than those delivered by traditional birth attendants.

Children born in households that were 4km and over experienced high mortality than those born in households that were 1 km from the nearest health facility mortality.The third model showed that children with a birth weight of 4.00-4.99kg had higher risks of dying than children with a birth weight of 3.00-3.99kg. Children given cow's milk 2 or 3 times a day had higher survival chances than those who were given once a week. Children who were given milk once a week had higher survival chances than those who were never given. Children who belonged to traditional women, who were rarely given vegetables/fruits, who were never given vegetables/fruits and who were rarely given beans were exposed to high mortality.

The fourth model showed that children whose mothers were protestants by religion, who were given milk 2 or 3 times a day and who were given milk once a week experienced high mortality. Children who had a birth weight of 4.00-4.99 kg had higher risk of dying compared to those that had a birth weight of 3.00-3.99kg. Children whose mothers were traditionalist by religion, whose households were 4km from the nearest health facility, were never given vegetables/fruits, were rarely given vegetables/ fruits and were rarely given bean were exposed to high mortality.

CHAPTER EIGHT

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1 SUMMARY

This study sought to find out how socio-economic, socio-cultural, demographic, nutritional and health care factors influence child mortality in Manga/lietego and Kabuoro sub-locations. This involved a comprehensive description of the study population, estimation of q_2 and q_5 mortality levels and life expectancy at birth for Kabuoro and Manga/lietego sub-locations.

Cross tabulation and chi-square statistic were used to show the degree of association between the dependent variable (proportion of children dead) and the selected independent variables. Linear multiple regression was also used to test the combined effect of the independent variables on the proportion of

children dead per woman. Finally logistic regression was used to test the influence of selected independent variables on child mortality. This was mainly employed to show the contribution of weaning and environmental related factors on child survival in both Kabuoro and Manga/lietego respectively.

It is important to point out that there were several problems encountered in the collection of data. For instance, some women were not at home in Kabuoro sub-location because of the nature of their work, i.e., business. While in Manga/lietego some were cultivating at their sambas. However, this problem was overcome by making follow-ups 2 or 3 times to their homesteads. There were also problems related to memory lapse such that the total number of children dead and the age of the mother would not be renumbered. This problem was solved by asking probing questions.

The following are the major findings of the study;

1. The life expectancy for Manga/lietego and Kabuoro sub-locations was 61.9 years and 55.9 years respectively. The estimates of infant mortality rate in Manga/lietego and Kabuoro sub-location was 52.6 and 75.5 respectively. This finding fulfils the fourth study broad objective.
2. The estimates of q_2 for Manga/lietego and Kabuoro sub-locations were 74.5 and 131.7 per thousand live births respectively and the estimates of q_5 for the two study areas were 68.8 and 133.7 per thousand for Manga/lietego and Kabuoro respectively. Probability of dying at age five doesn't reflect what is expected probably because of miss-reporting of the

number of deaths of the children under this category which as already suggested earlier is linked to the cultural beliefs of the population under study. This finding fulfils the fourth study broad objective.

3. The results derived by using chi-square and multiple regression techniques indicated that mothers' level of education was positively related to child mortality. Mothers who had secondary level of education had higher risks of their children dying compared to those that had primary level of education. This is at variance with our hypothesis and other studies (Caldwell 1976). Apparently, mothers with secondary level of education tend to get employment away from home which makes them leave their children under the care of housemaids who hardly take care of these children. Women with primary level of education had also a higher proportion of children dead as compared to women with none/adult literacy level of education. This is probably because women with primary level of education are still strongly attached to the traditional cultural values which encourage giving birth to many children whom they are not able to take care of. The little education they acquire enables them to maintain certain standards of hygiene which increases survival chances of their children. However, these children become too many for them to support in terms of subsistence hence some end up suffering from malnutrition. This finding does not also support the study hypothesis that mothers with primary level of education are

likely to have low child mortality than those with lower educational levels. However on the other hand, it fulfils the eighth study specific objective.

4. The logistic result indicate that religion has got a diversified effect on child mortality in the study areas. In Manga/lietego, protestant women have lower risks of their children dying compared to traditionalists while in Kabuoro sub-location the finding was a reverse. Protestant women in Manga/lietego sub-location usually regard cleanliness second to Godliness hence most of the children are brought up in clean environment. The protestants of Kabuoro sub-location are on the other hand Seventh Day Adventists who restrict children from most of the proteinic foods, e.g., meat, hence their children suffer from nutrient deficiency problems. This finding is in line with the study hypothesis that Protestants are likely to have lower child mortality than Catholics as far as Manga/lietego sub-location is concerned. This finding fulfils the eighth study specific objective.

5. The chi-square results indicated that unmarried women had a higher proportion of children dead in both Manga/lietego and Kabuoro sub-location while multiple regression indicated that this relationship was mainly significant in Kabuoro sub-location. The fact that married women had lower child mortality compared to unmarried is possible because normally married women are supported by their husbands financially thereby helping to increase their children's survival compared

to the children of unmarried women. This fulfils the study hypothesis that married women are likely to have low child mortality than unmarried women. It also fulfils the eighth study specific objective.

6. The chi-square results showed that fathers' level of education was positively related to child mortality in Manga/lietego as opposed to Kabuoro sub-location. The logistic regression analysis on the other hand showed that children born to fathers with primary level of education were exposed to higher mortality as opposed to those born to fathers with no formal education in Kabuoro sub-location. This is possible because this group of fathers have very little education that can help them get a white-collar job or to get self-employed so that they can economically support their families. This finding contradicts the study hypothesis that increased educational level of the father is likely to negatively influence child mortality. However, this finding fulfils the eighth study specific objective.

7. In Kabuoro sub-location, the chi-square results indicated that use of water from boreholes had a positive effect on child mortality. This is because the boreholes are not normally well maintained. This confirms the study hypothesis that use of tap water is likely to negatively influence child mortality as opposed to use of water from other sources. This finding also fulfils the third study specific objective.

8. The chi-square results indicated that in Kabuoro sub-location

use of paraffin/gas as source of fuel was associated with high child mortality. While in Manga/lietego the multiple regression indicated the same results. This suggests that there must be other variables that influence the effect of this variable. For instance, in Manga/lietego most of the people who use paraffin as a source of fuel are the squatters, hence in some cases they do not afford to buy enough paraffin. This results in cooking inadequate food. Sometimes users of paraffin are not conversant or knowledgeable with the applicability of these types of fuel for cooking hence most of their children are burnt by flames. This increases the risk of mortality for these children. This finding contradicts the study hypothesis that use of a more non-pollutant type of fuel is likely to contribute to low child mortality. However, this finding fulfils the fifth study specific objective.

9. Using logistic regression pit latrine was found negatively related to child mortality in Manga/lietego sub-location. This is plausible because, most of the pit latrines in this area are kept clean, are well constructed for easy maintenance and are far away from homesteads. This finding contradicts the study hypothesis that users of flash toilets are more likely to have low child mortality than users of pit latrine as their main sewage disposal. However, this finding fulfils the third study specific objective.

10. Using the chi-square test, multiple and logistic regression,

distance of households from the nearest health facility was positively related to child mortality. Women in households that were 4km from the nearest health facility had higher child mortality as compared to those that were 1 km away from the nearest health facility. This suggests that these health facilities were not easily accessible to respondents. This supports the study hypothesis that distance of household from the nearest health facility is likely to positively influence child mortality. This finding also fulfils the second study specific objective.

11. The chi-square and multiple regression results indicated that completion of immunization vaccine was negatively positively related to child mortality in Manga/lietego sub-location while in Kabuoro sub-location incomplete immunization was positively related to child mortality. This is in line with the study hypothesis that women whose children have completed immunization vaccine are likely to experience low child mortality as compared to those whose children have not. This finding also fulfils the fourth study specific objective.

12. Results from Logistic regression indicated that in Manga/lietego sub-location women who were attended to by modern trained midwives experienced low child mortality as compared to those who were attended to by traditional midwives. This is possible because the instruments used by modern midwives are more hygienic. This is in line with the study hypothesis that availability of medical personnel is

likely to influence child mortality. This finding also fulfils the second study specific objective.

13. Women who breast-fed their children for a period of 25-30 months had a higher proportion of children dead than those who breast-fed for a period of 1 to 12 months. This is possible because environmental factors play a major role in determining child mortality behaviour in the childhood ages compared to the infancy stages of the child's life. This finding contradicts the study hypothesis that women who breast-feed their children for more than 12 months are likely to experience a lower child mortality than those who breast-feed for shorter periods. However, this finding fulfils the seventh study specific objective.

14. In Manga/lietego sub-location children with a birth weight of 3.00-3.99 had higher chances of surviving than those who had higher birth weights. Children with lower than 3.00 birth weight normally suffer from stunted growth while those with a higher than 3.99 birth weight suffer from various abnormalities. This is in line with the study hypothesis that mothers with children whose birth weight is 3.00-3.99 are likely to have a lower child mortality as compared to mothers whose children have a birth weight of more than 3.99 or less than 3.00 kg at birth. However, this finding fulfils the sixth study specific objective.

15. Infants who were given mashed bananas/potatoes experienced higher child mortality as compared to those who were given

porridge made from "wimbi/mtama" flour or mashed ripe fruits. Children who were given meat/fish/eggs/fish once a week experienced higher mortality than those who were given these foods once a week. Children who were given animal milk two or three times a day had higher survival chances than those never given milk. Children who were given vegetables/fruits 2 or 3 times a day had higher survival chances than those not given vegetables/fruits. Children who were given beans 2 or 3 times a day had higher survival chances than those given once a week. These foods were mainly scarce in Kabuoro sub-location as compared to Manga/lietego sub-location. Thus, confirms the study hypothesis that children who were given a balance diet are more likely to experience low child mortality as compared to those that did not give their children a balanced diet is supported. However, this finding fulfils the first study specific objective.

8.2 CONCLUSION

Overall the estimates of q2 and q5 values derived from the data collected from the two study sub-locations indicate higher child mortality in Kabuoro sub-location than in Manga/lietego sub-location. This concurs with other studies which have been done in the two districts for instance the Kenya Demographic and Health Survey.

The most important demographic and socio-economic variables that influence child mortality in both sub-locations are mothers

level of education and marital status. The more educated mothers had high proportion of children dead compared to the less educated mothers. As already noted this is possible because these children are neglected as their mothers advance their studies and also take up jobs away from home. Children whose mothers were married on the other hand had higher survival chances than children whose mothers were not. This is possible because married women are normally supported by their husbands.

It is important to note that there were some variables that were playing a major role in enhancing high risks of dying in Kabuoro sub-location. These were mainly source of drinking water, distance to the nearest health facility and incompletion of immunization vaccine. Children whose households used borehole as the main source of drinking water had higher risks of dying compared to those whose households used other sources of drinking water. This was not applicable in Manga/lietego because the water drawn from the river/stream as the main source of drinking water was boiled before drinking. In Kabuoro sub-location, children born in households that were 4 km from the nearest health facility experienced higher child mortality than those born in households that were nearer to health facilities. In Manga/lietego available health facilities are evenly distributed. In Kabuoro sub-location incompletion of immunization dosage was positively correlated with child mortality while in Manga/lietego completion of immunization dosages was negatively related to child mortality.

There were also some factors that played a significant role in

enhancing high survival chances of children. These factors include: use of pit latrines, children with a birth weight of 3.00-3.99, children whose mothers were attended to by modern trained midwives and children whose mothers were protestants. The toilet facilities in Manga/lietego are well maintained with clean cemented floors and plastered walls. Children who had a birth weight of 3.00-3.99 had higher survival chances because their mothers had fed well when they were expecting them hence were born when they were healthy. Modern trained midwives who attended to mothers of Manga/lietego sub-location when giving birth to their children used sterilised equipments. The children of protestant women had also high survival chances because their mothers/households maintained high hygienic standards as part of the demands of their religious teachings. Infants who were given mashed bananas/potatoes experienced higher child mortality as compared to those who were given porridge made from "wimbi/mtama" flour or mashed ripe fruits. Children who were given meat/fish/eggs/fish once two or three times a day, given animal milk two or three times a day, given vegetables/fruits 2 or 3 times a day, given beans 2 or 3 times a day had higher survival chances than those who were given once a week. These foods were mainly scarce in Kabuoro sub-location as compared to Manga/lietego sub-location.

8.3 RECOMMENDATION FOR POLICY MAKERS

1. Education for women in Nyamira and Migori districts should be encouraged in all sub-locations since the level of education

a woman attains contributes to a significant drop in child mortality. Education on improved feeding habits to expectant mothers should be encouraged. Education should also be given about sanitation and water use. Fathers should be encouraged to pursue higher education so as to increase their income earning capacity that will be used to improve the standards of living of their families which in turn will help reduce child mortality.

2. More health centres need to be constructed for handling emergencies. On the other hand women should be encouraged to give birth in clinics or hospitals.

10. Afforestation should be encouraged by the government in both sub-locations so that there can be adequate provision of fuel for cooking since this is the main source of fuel for cooking in the study areas.

11. Social workers should encourage mothers to give children a balanced diet, i.e., carbohydrates, protein, vitamin and fats. They should be also encouraged to breast-feed their children intensively in the early months of the child's life. Food policy should also be strengthened to avoid shortage and malnutrition. Cultivation of food crops should be encouraged especially where cash cultivation is emphasized.

12. Catholics should encourage hygienic lessons in their religious studies and traditionalists should be taught in public barazas and adopt to western mode of practices especially hygiene.

13. The study population should be encouraged to dig more pit

latrines because there is no piped water in these areas.

8.4 RECOMMENDATION FOR FURTHER RESEARCH

1. Research should be carried out at sub-location level to identify the main factors affecting child survival. Studies at sub-location level are recommended because they can help identify problems peculiar to specific areas which can be solved within the limited resources available.
2. Research should be carried out at sub-location level to evaluate the success of the frequent visits by socio-workers, agricultural officers, training of traditional midwife attendants.
3. It is important to note that because of time and financial constraints this study was not able to cover such aspects as contribution of fertility and migration to child mortality in the two study areas. This study therefore recommends further studies in these areas.
4. The study suggests that further studies in these two areas should include such variables as current height and weight of the children, eating habits, food hygiene, food taboos and household income since these are important determinants of child's nutritional status.
5. Other important aspects of child mortality be included in future research are:- socio-economic factors such as income, employment status of the mother and father, demographic factors such as age of the mother, parity and birth order, and

socio-cultural factors such as type of marriage and ethnicity. All these are very important background factors through which the intermediate factors operate to influence child mortality.

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APPENDIX 1

RESEARCH QUESTIONNAIRE ON CHILD HEALTH AND NUTRITION

RESPONDENT'S INFORMATION

1. Age
   1=15-19
   2=20-24
   3=25-29
   4=30-34
   5=35-39
   6=40-44
   7=45-49

2. (a) Marital Status

   1=Married
   2=Single
   3=Divorced
   4=separated
   5=Widowed

2. (b) If married, when were you married to your current husband?
   month=
   Year=

3. In which type of marriage are you?
   1=Monogamous
   2=Polygamous

4. What is your religion?
   1=Catholic
   2=Protestant
   3=Others specify

5. Can you read any passage in English or swahili or mother tongue?
   1=Yes
   2=No

6. What is your educational level ?
   1=None
   2=Adult literacy only
   3=Primary 1-6
   4=Primary 7-8
   5=Secondary-No. of years:1,2,3,4,5,6.
   6=Post-secondary (specify)_____

7. Where does your household get most of its water for drinking, hand washing and cooking most of the year? ☐
   1=Tap water (piped)
   2=River/stream
   3=Borehole/well with pump
   4=Borehole/well without pump
   5=Pond
   6=Rain water
   7=Others (specify)

8. What kind of toilet facility does your household have? ☐
   1=Flush toilet
   2=Pit latrine
   3=Bucket
   4=Bush
   5=Others specify

9. How long has such a facility been available and used?
   (Answer in years) ----------

10. What type of fuel do you mostly use for cooking? ☐
    1=charcoal
    2=paraffin
    3=gas
    4=electricity

11. How many kilometres are there between your home and the nearest health facility? ☐
    1=1 km
    2=2 km
    3=3 km
    4=4 km
    5=others specify

12. (a) Have you ever heard of family planning? ☐
    1=Yes
    2=No

12. (b) If yes, have you ever used any method of family planning? ☐
    1=Yes
    2=No

12 (c) If yes, when did you start using family planning method? ☐
    Month ---------
    Year --------

13. (a) Are you currently using any contraceptive method with your partner to delay pregnancy? ☐
    1=Yes
    2=No

13. (b) If yes, which one?
1=Pill
2=Coil
3=Barrier method
4=Tubal ligation
5=Injection
6=Natural/safe period/abstinence
7=Breast-feeding
8=Others specify

14. How long have you lived in this sub-location?
Years -------

15. Now I would like to talk to you about all of your births you have had throughout your life time, whether still alive or not. (INTERVIEWER START WITH THE FIRST LIVEBIRTH)

NAME OF CHILD	SEX 1=M 2=F	DATE OF BIRTH (Record month and year) month year	STILL ALIVE 1=Yes 2=No	IF DEAD: when did he or she die? record in month or year. month year	Record cause of death	Tick if Child was born after october 1987
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

KEY TO CODING:
CAUSE OF DEATH:

1=Malaria	6=whooping cough
2=diarrhoea	7=tuberculosis
3=pneumonia	8=polio
4=measles	9=kwashiorkor
5=tetanus	10=Others specify

Summary
TOTAL NO. OF LIVEBIRTHS: MALES ----- FEMALES------ TOTAL-----
TOTAL NO. OF DEAD CHILDREN: MALES ----- FEMALES ------ TOTAL--

INFORMATION REGARDING MALE HEAD OF HOUSEHOLD

15. Age of the head ----------

16. Can the head read any passage in English or swahili or mother tongue?
1=Yes
2=No

16. What level of education has the head attained?
1=None
2=Adult literacy only
3=Primary
4=Secondary
5=Post secondary

18(a) Is the male head of household employed away from home?
1=Yes
2=No

(b)If yes, specify type of job ----------

19.(a) Has the father ever heard of family planning?
1=Yes
2=No

19.(b) If yes, has he ever used any contraceptive method to delay you becoming pregnant again?
1=Yes
2=No

20. CHILD'S INFORMATION

NAME OF THE CHILD	1	2	3	4
(a) When you were pregnant (Child's name) were you given any injection to prevent the baby from getting tetanus? 1=Yes 2=No				
(b) Who attended you when giving birth to this 1= Modern trained midwife 2= Traditional midwife				
(c) Where was the child born? 1=Hospital/clinic 2=home 3=Other (specify)				
(d) Birth weight				
(e) Current weight of the child 99=NA (CHILD DEAD)				
(f) Current height of the child 99=NA (CHILD DEAD)				
(g) Is the child breast-feeding 1=Yes 2=No				
99 =NA (CHILD DEAD)				
(h) How long did you breast-feed this child? (answer in months)				

CHILD'S INFORMATION CONTINUED	1	2	3	4
(i) What was the first semi-solid food given or the first semi-solid food you intend to give to your baby? 1=Porridge - Fermented 2= " - Not fermented 3= " - Wimbi/mtama 4= " - Maize/cassava 5=Mashed bananas/potatoes 6=Cerelac 7=Mashed ripe fruit (e.g. bananas, avocado etc) 8=Egg 9=Others (specify) 10=N/A (j)How many times do you usually give food to your infants per day 1=once a day 2= 2 or 3 times a day 3=once a day 4= once a week 5=on demand				
(k) How often do you give the following food to your children? Cereals i.e maize, millet and sorghum				
Cassava or potatoes				
bananas				
beans				
vegetables				
Meat, fish or eggs				
animal milk				

CHILD'S INFORMATION	1	2	3	4
Converted times per a month				
1= Once a day 2= 2 or 3 times a day 3= Once a week 4= Rarely 5=Never				
(l) Has the child been sick in the last two weeks? 1=Yes 2=No 99= NA (CHILD DEAD)				
(m)If yes, what was the problem? 1=Colds/coughs 2=Malaria 3=Diarrhoea and vomiting 4=Pneumonia 5=Measles 6=Worms 7=Skin rashes 8=Others (specify) 99=NA (CHILD DEAD)				
(n)What was the duration of the last sickness? (No.of days) 99=N/A				
(o) What action did you take to cure the sickness? 1=Took to hospital 2=Took to private doctor 3=Took to traditional healer 4=Gave modern medicine at home 5=Gave herbs at home 6=Nil 99= NA (child dead)				
(p)Is the child health card available? 1=Yes 2=No 99=NA (Child dead)				
(q) What immunization has this child had?				

CHILD'S INFORMATION CONTINUED	1	2	3	4
1=BCG (Date and Scar) 2=DPT Dose 1st 2nd 3rd 3=POLIO Dose 1st 2nd 3rd 4=MEASLES Date given 5=ALL 6=N/A				
(r)If immunization schedule is incomplete, why so? 1=Child sick 2=Mother sick 3=Lack of time 4=Clinic too far 5=Impolite staff/sent away from the health unit 6=Previous immunization produced bad effects 7=Vaccine out of stock 8=Child less than one year 9=Others (specify)				
Is the child 's growth being monitored? 1=Yes 2=No 99= NA (Child dead) Note: Child growth is being monitored if the following are done: - Weight is properly recorded - Plotted dots are joined to make a growth curve - Feedback is given to mother - There are comments on the card on growth and other matters.				

21. If growth is not monitored, whose fault
    1=Mother
    2=Health staff
    3=Both
    99= NA (Child dead)

Location Of Districts