

**SOCIO-ECONOMIC FACTORS AFFECTING INFANT MORTALITY IN
MOROGORO DISTRICT, TANZANIA**

**BY
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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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ABSTRACT

The study on socio economic factors affecting infant mortality was conducted in Morogoro District. In spite of measures taken by key stakeholders including the government, UNICEF, WHO, health initiatives in Tanzania infant deaths are increasing in rural populations. Socio economic factors are said to be main courses. A cross sectional study to observe the influence of socio economic factors affecting infant mortality was, therefore, conducted in Morogoro district. The ultimate objective of this study is to determine the socio economic factors influencing infant mortality. The specific objectives were as follows; to show the role of poverty on infant mortality, explore the influence of occupation on infant mortality, investigate the association between education and mortality, show the role of income on infant mortality, explore the linkage between sanitation and infant mortality, and investigate the influence of distance on infant mortality. A total of 100 respondents were included in the survey. The data were analyzed by using the Statistical Package for Social Sciences (SPSS) 12.0 version computer software program. The results showed that, education, sanitation, low income, short distance, poverty and occupation of the households associated with infant mortality. There is a need of more emphasis on rural (community) development efforts so as to improve the living standards of all people in the countryside. These efforts include: increasing of employment opportunities, quality education, improvement of sanitations, infrastructure such as roads and health facilities by providing qualitable medications and seminars to households on good care to infants.

DECLARATION

I, DEOGRATIAS KAMILIUS, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and has never been submitted nor concurrently being submitted for a higher degree award in any other University.

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Date

The above declaration is confirmed

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Date

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DEDICATION

This work is dedicated to St. Paul for his messages. “For what I want to do I do not do, but what I hate I do. And if I do what I do not want to do, I agree that the law is good. As it is, it is no longer I myself who do it, but it is sin living in me that does it” (Romans 7:15-20). Do not proud, but be willing to associate with people of low position. Do not be conceited” (Romans 12:9-16).

“If you think you are standing firm, be careful that you don’t fall! No temptation has seized you except what is common to man. And God is faithful; he will not let you be tempted beyond what you can bear. But when you are tempted, he will also provide a way out so that you can stand up under it”. (1 Corinthians 10:12-13).

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LIST OF ABBREVIATIONS AND ACRONYMS

AMMP	- Adult Morbidity and Mortality Project
DHS	- Demographic and Health Survey
GNP	- Gross National per capita income
HIV/AIDS	- Human Immune Virus / Acquired Immune Deficiency Syndrome
HMIS	- Health Management Information System
IMR	- Infant Mortality Rate
LDC	- Least Developed Countries
MDC	- More Developed Countries
MOH	- Ministry of Health
MD	- Morogoro District
NGO	- Non Government Organization
NSGRP	- National Strategy for Growth and Reduction of Poverty
PCA	- Principal Component Analysis
REPOA	- Research on Poverty Alleviation
SPSS	- Statistical Package for Social Science
SNAL	- Sokoine University of Agriculture Library
TPC	- Tanzania Population Census
UNICEF	- United Nations Children and Education Fund
UN	- United Nations
US	- United States
URT	- United Republic of Tanzania
WHO	- World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Infant mortality is known to be one of the most sensitive and commonly used indicator of the socio- economic development of a country since infants, more than any other age - group of a population; depend heavily on the socioeconomic conditions of their environment for survival. Thus, the level of infant mortality would present a measure of how well a society meets the needs of its people (Bicego and Ahmad, 1996). The determinants of infant mortality are not static, they vary with geographical location. Reductions of infant mortality in less developed countries are much less than reductions in the more developed countries.

Tanzania's total population was 34 569 232 million, estimated in 2002, growing by 2.9% per year. The country's average GNP per capita is just \$ 483 a year. Poverty reduction remains a priority of the government (URT, 2004). HIV/AIDS continues to take its grim toll on the country's youthful population. Close to 15% of Tanzania's reproductive age population (15-49) are HIV positive, while 60% new infections are in the 15- 25 age groups which cause mortality to the infants (WHO, 1998). Consequently, HIV/AIDS is the leading cause of mortality among adults age 15-49 as well as infants (WHO, 1998).

In Tanzania the infant mortality rate is 68 per 1000 live birth while under five mortality rate is 112 per 1000 live births and these rates are up from 99 and 147 per 1000 live births in 1999 (URT, 2004). Socio- economic factors such as poverty, level of parental education, distance and residence status, occupations, income and sanitation (source of drinking water and toilet used by a household) are the main causes of infant death (Madise and

Diamond, 1995). Infanticide, abuse, abandonment and neglect may also contribute to infant mortality. Even though death is a biological event mainly caused by a specific disease, this study on the determinants of mortality will concentrate on the socio-economic factors as the cause of death in early infancy. Information collected will help to improve the situation of infants, this is because infants depend heavily on the socioeconomic conditions of their environment for survival.

1.2 Problem Statement

Despite all measures that are taken by the government, UNICEF, WHO, health initiatives in Tanzania such as building dispensaries, hospitals and health centers, infant deaths are increasing especially in rural population. Probably the problem is caused by socioeconomic factors. In past times, infant mortality claimed a considerable percentage of children born, but the rates have significantly declined in the west in modern times, mainly due to improvement in basic health care (Gary and Langche, 2001). Maternal and infant mortality remain high in many villages where there are unsatisfactory / inadequate health centers and the available ones do not sufficiently meet the demand of villagers. According to the 1996 Demographic and health survey done in Morogoro district, 529 women died on average for every 100 000 live births (URT, 2004). Maternal deaths may sometimes result in deaths of infants. Studies have been conducted since 1996, but health authorities think this rate has risen, due mainly to a lack of reproductive health care in country sides. In 2000, infant mortality was estimated at 82 deaths per 1 000 live births essentially one in ten infants do not live to see his or her first birthday (URT, 2004).

Reducing infant mortality is of high priority in national public health objective in Tanzania. Infant mortality is influenced by a variety of interrelated factors such as age at marriage, education and economic status. As the relative effect of each factor differs from

one population to another, it is of interest to study their association and their contribution (singular as well as collective) in the present population of Morogoro District.

Thus, there is a need to search for reasons which result in the deaths of infants in Morogoro District. This follows the speech given by health minister who commented by saying that “we are still witnessing high rates of mortality and morbidity of the most vulnerable groups within our society. Although infant and under five-year olds mortality rates have shown a declining trend, they are still unacceptably high” (URT, 2004).

1.3 Problem Justification

Mothers and infants are among the most vulnerable members of the society to the problem; also infant mortality is a measure of a population’s health status and level of development of a country. Disparities in infant mortality by socio-economic status are an important measure of the inequalities in the society. Data on causes of infants’ mortality are considered essential for planning and policy making. The Ministry of Health of the United Republic of Tanzania (MOH) has access to statistics from several sources, but these do not provide sufficient data for essential health planning and policy making due to the fact that determinants of infants death changes over time. Thus, there is a necessity for producing such information for planning and evaluation of health services and interventions. There is also a great link of the problem with national / international policy/programmes such as; Millennium Development Goals (2000-2015) under the following goals;

- Reduce child mortality by two thirds, which will also concern with the reduction of infant mortality.
- Improve maternal mortality by three quarter which will contribute very much to the reduction of the other side of the problem.

The problem is in line with Tanzania Development Vision 2025 under the following specific targets; to eradicate abject poverty by 2025. The problem also has a link with the Child Policy, Health Policy, Conversional of child rights and National Strategy for Growth and Reduction of Poverty (NSGRP) which has the following pillars such as;

- Growth of the economy and income poverty reduction
- To raise people's livelihoods

Therefore the research is needed so that goals, targets presented above can be acquired.

1.4 Objectives of the Study

1.4.1 General objective

The ultimate objective of this study is to determine the socio- economic factors influencing infant mortality in Morogoro District. Such information will assist the government, project planners, policy makers, NGO's and other stakeholders to put in place systematic, viable and long term strategies that will improve infant health.

1.4.2 Specific objectives

Specifically the study intends to;

- Show the impact poverty on infant mortality.
- Explore the influence of occupation on infant mortality.
- Investigate the association between education and infant mortality.
- Show the role of income on infant mortality.
- Explore the linkage between sanitation and infant mortality.
- Investigate the influence of distance on infant mortality.

1.5 A Conceptual Framework

The conceptual framework details the variables that are examined and their expected relationship. It groups the variables into background, independent and dependent variable as it is shown in Fig. 1. The variables are defined in Table 1. Four variables are used to depict the background characteristics of the respondents. Six variables are used as the proximate determinants or the factors that affect infant mortality. Lastly is the infant mortality which is probably influenced by independent (six) variables.

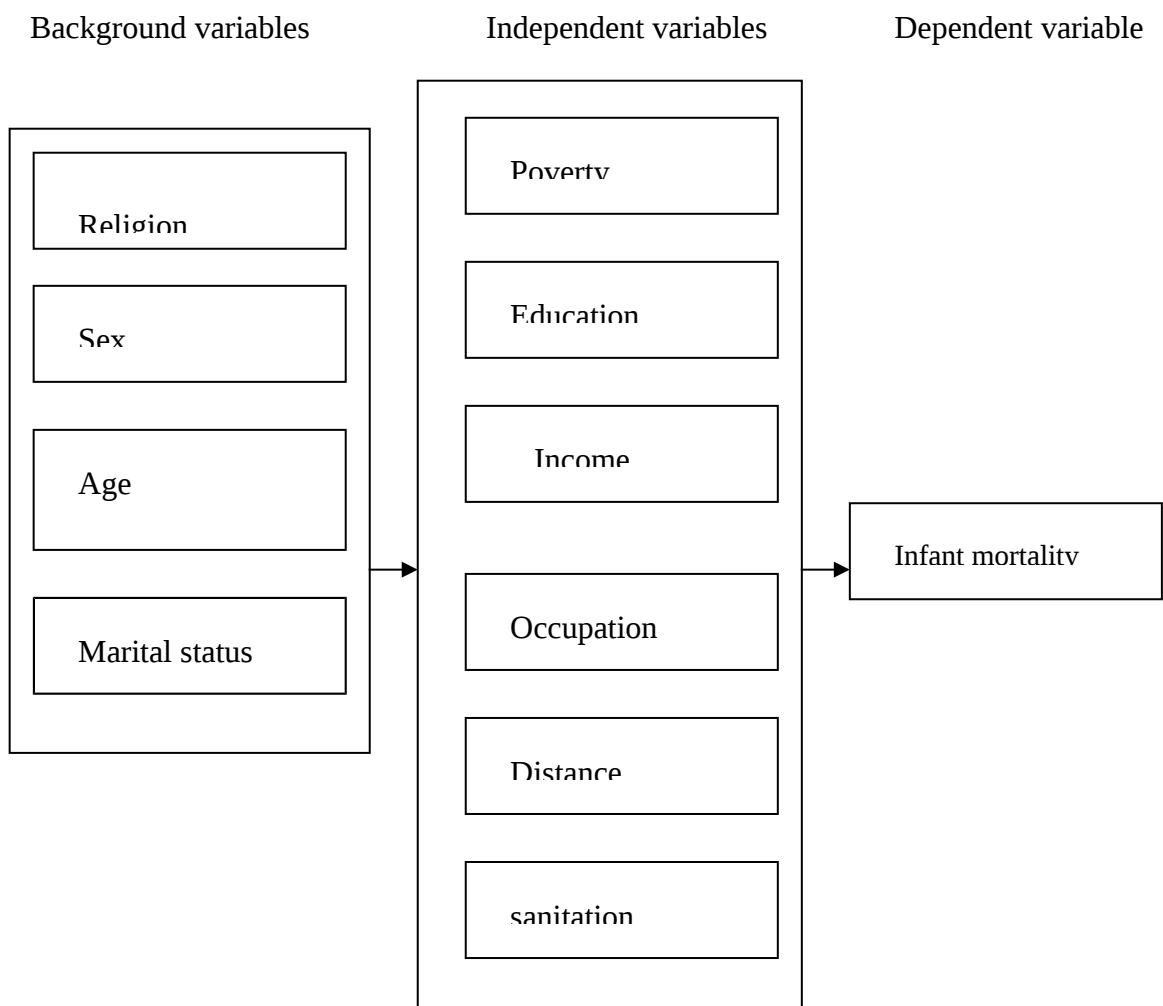


Figure 1: The conceptual framework

Table 1: Definition of key variables

Variable	Operational definition
Sex	Being a male or female in the biological sense
Religion	Relationship between God and human being
Age	Ranges in years of birth
Marital status	Being married or unmarried
Occupation	Having a job or work that produced income
Poverty	Unavailability of basic needs
Distance	Coverage that a human person takes from one point or space to another
Education	Formal education with knowledge about infant mortality
Sanitation	Availability of the type of toilet used by the household and source of drinking water.
Income	Money earned per month.

1.6 The Hypotheses

1.6.1 Working hypothesis

Socio economic factors have impact on the life of infants.

1.6.2 Null hypothesis

Socio economic factors have no impact on the life of infants.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

In this chapter literature review on the proposed study is provided focusing on the factors which contribute to infant mortality. Section 2.2 reviews the definitions of some concepts on infant mortality. The general situation about infant mortality is presented in section 2.3. Section 2.4 discusses how socio economic factors affect infant mortality.

2.2 Definition of Some Concepts About Infant Mortality

The following are some concepts concerned with infant mortality, these are; infant mortality, infant mortality rate, prenatal mortality, foetal mortality, neonatal mortality, post - neonatal mortality, child mortality and child mortality rate.

2.2.1 Infant mortality

Infant mortality is the death of infant in the first year of life. It is also called the infant death. The infant mortality correlates very strongly with national development and is among the best predictors of states failure. Infant mortality is also a useful indicator of a country's level of health and development, and is a component of the physical quality of life index. As infant mortality change over time, it is plausible that the determinants of infant mortality may also change. For example, a study in Malawi using data collected in 1983 reported significant socio economic factors for infant mortality (Madise and Diamond, 1995). However, another study using similar techniques, found that socioeconomic factors were not as important as demographic factors (Manda, 1998).

2.2.2 Infant mortality rate

Infant mortality rate (IMR) is the number of newborns dying under a year of age divided by the number of live births during the year. The infant mortality rate is also called the infant death rate. The infant mortality rate is defined as number of live newborns dying under a year of age per 1 000 live births, so that IMRs from different countries can be compared (Gary and Langche, 2001). IMR is also a useful indicator of a country's level of health or development, and is a component of the *physical quality of life index*. The method of calculating IMR may vary between countries based on the way they define a live birth (Gary and Langche, 2001). The World Health Organization (WHO) defines a live birth as any born human being who demonstrates independent signs of life, including breathing, voluntary muscle movement, or heartbeat. However, some countries only count as live births cases where an infant breathes at birth, which makes their reported IMR numbers somewhat lower and raises their rates of prenatal mortality (Ansley and Judith, 1996).

2.2.3 Prenatal mortality

Prenatal mortality includes deaths between the foetal viability (28 weeks gestation or 1000g) and the end of the 7th day after delivery. Prenatal mortality, also called prenatal death, is the basis to calculate the prenatal mortality rate. Variations in the precise definition of the prenatal mortality exist specifically concerning the issues of inclusion or exclusion of early foetal and late neonatal fatalities. Thus the WHO's definition "Deaths occurring during late pregnancy (at 22 completed weeks gestation and over), during childbirth and up to seven completed days of life" is not universally accepted. The prenatal mortality is the sum of the foetal mortality and the neonatal mortality (Richardus *et al.* 1998).

2.2.4 Foetal mortality

It refers to stillbirths or foetal deaths. It encompasses any death of a foetus after 20 weeks of gestation or 500 gm. In some definitions of the prenatal early foetal mortality (week 20-27 gestation) is not included, and the prenatal may only include late foetal death and neonatal death. Foetal death can also be divided into death prior to labour, *antenatal (ante partum) death*, and death during labour, *internatal (intra partum) death*. Foetal mortality can be decreased by good preconception health among women before they get pregnant (Richardus *et al.* 1998).

2.2.5 Neonatal mortality

It only includes deaths in the first 27 days of life. *Early neonatal mortality* refers to a death of a live – born baby within the first seven days of life, while *late neonatal mortality* covers the time after 7 days until before 29 days. The sum of these two represents the neonatal mortality. Some definitions of the prenatal include only the early neonatal mortality. Neonatal mortality is affected by the quality of in – hospital care for the neonate. Neonatal mortality and post neonatal mortality (covering the remaining 11 months of the first year of life) are reflected in the infant mortality rate (Pharoah and Morris, 1979).

2.2.6 Post-neonatal death

Post neonatal death includes deaths after 28 days of life but before one year. Neonatal and post neonatal mortality are examined separately because most deaths during the neonatal period are associated with events surrounding the prenatal period and the delivery, whereas post neonatal deaths are more likely to be associated with conditions or events that arise after the delivery and, thus, reflect environmental factor. This division into neonatal and post neonatal period is not completely satisfactory, however. For example,

deaths from birth defects are common during both the neonatal and post neonatal periods, but the causes of birth defects are related to events that occur from conception to birth (Pharaoh and Morris, 1979).

2.2.7 Child mortality

Child mortality includes deaths within the first five years. About 26 000 young children die every day, mainly from preventable causes. In 2006, 9.7 million children under five died a 60% decline since 1960 (UNICEF, 2008). About half of child deaths occur in Africa. According to an estimate by UNICEF, one million child deaths could be prevented annually at a cost of \$US 1 billion per year (an average of \$US 1 000 for each child). Reduction of child mortality is the fourth of the United Nations' Millennium Development Goals (UNICEF, 2008).

2.2.8 Child mortality rate

Child mortality or under-five mortality rate is the number of children who die by the age of five, per thousand live births. In 2006, the world average was 72 (7.2%). The average in developing countries was 79 (down from 103 in 1990), whereas the average in industrialized countries was 6 (down from 10 in 1990) (UNICEF, 2008).

One in six children in Sub-Saharan Africa died before their fifth birthday. The biggest improvement between 1990 and 2006 was in Latin America and the Caribbean, which cut their child mortality rates by 50%. A child in Sierra Leone, which has the worlds highest child mortality rate (270) is almost 100 times more likely to die than one born Sweden (with rate of 3) (UNICEF, 2008).

2.3 Overview of Infant Mortality

For the world, and both less developed countries (LDCs) and more developed countries (MDC), IMR decline significantly between 1960 and 2001. World infant mortality rate decline from 198 in 1960 to 83 in 2001. In 2001, the Infant Mortality rate for LDC (91) was about 10 times as large as it was for More Developed Countries (8). For LDC, the Infant Mortality Rate is 17 times as high as it is for MDC. Also, while both LDCs and MDCs made dramatic reductions in infant mortality rates, reductions among less developed countries are much less than are reductions among the more developed countries, on average (Ansley and Judith, 1996). The high mortality levels experienced by European populations in the past (IMRs ranging from 80% to 250% by 1900) and the less developed countries (with populations still experiencing IMRs above 140%, like Guinea – Bissau, Sierra Leone or Afghanistan as estimated by the US Population reference Bureau for 1997) show some similarities, their causes of death were and are mainly of infectious origin, and the high mortality levels experienced during the first year tend to continue, although at lower levels during childhood (i.e. until five ages) (Ansley and Judith , 1996).

In developing countries like Tanzania, population censuses and demographic surveys are major sources of mortality data. Vital registration is another source of mortality data in Tanzania, but unfortunately, the information is not widely used because it is incomplete and disproportionately represents the urban population. Also, mortality information from the Health Management Information System (HMIS) does not reflect the mortality picture from a population perspective, because it is facility – based data and thus does not include deaths that occur outside of facilities.

The Adult Morbidity and Mortality project (AMMP) in Tanzania reported that 60% of child deaths in Dar-es salaam took place in a hospital. However, in Morogoro, only 20 percent of children died in hospital (Mswia *et al.* 2005). In this case, birth history information from surveys gives the most robust estimates of infant and child mortality. Estimates of mortality from the censuses employed indirect techniques that adjust reported data for expected errors, while estimates from different surveys are based on data as reported directly with no adjustments. Results from direct estimates are viewed with a certain degree of uncertainty since they can underestimate mortality rates (Barbara and Silver, 1986).

The association between socio- economic, demographic factors and infant mortality was further reinforced when improvements in overall infant mortality levels over time ran parallel with general social and economic development in most industrialized countries during the twentieth century. Since the Second World War, corroboration of the strong inverse relationship between socio-economic development and mortality rates has been found repeatedly among countries and areas within countries.

2.4 Determinants of Infant Mortality

There are cultural, demographic, socio economic and factors which contribute to infant mortality. Reducing infant is of high priority in national public health objective in Tanzania. As the relative effect of each factor differs from one population to another as it has been reported by Gwatkin *et al.* (2000), it is of interest to study their association and their contribution (singular as well as collective) in the present population of Morogoro District.

2.4.1 The socio economic determinants

The socio economic factors that are considered in this study are household socio economic status, distance and residence status, maternal education, sanitation (that is source of drinking water and type of toilet facility), occupation and income of the household and poverty (Elamin and Bhuyan, 1999).

2.4.1.1 Household socio economic status

Household socio economic status is important for child survival because it determines the amount of resources (such as food, good sanitation and health care) that are available to infants (Millard, 1994). Curtis and Steele (1996) who used DHS data from Bolivia, Peru, Kenya and Tanzania in their study of neonatal mortality, found that the level of maternal education was highly significant in all the countries except Tanzania, where rural or urban residence was more important. Lower infant mortality has been reported by Da Vanzo *et al.* (1983), in households where toilets exist, where piped water is used (Brockhoff, 1990; Brockhoff and Derose, 1996), and where there is electricity (Madise and Diamond, 1995).

However, among poorer households in urban areas, child mortality can be higher than rural households (Brockhoff, 1993; Madise and Diamond, 1995). At the individual level, significant social inequalities are repeatedly recorded, even when the overall IMR reaches very low levels (Timaeus, and Fairbairn, 1998). Links between individual level social inequalities and regional (aggregate – level) differences are partly explained by relatively high spatial concentration of the deprived and of populations of lower social class.

In contrast, (Cleland and Fegan, 1992) found that changes in mother's education and father's occupation had a modest impact on declines in childhood mortality. They used

data from 15 developing countries that had participated in both the World Fertility survey and the DHS program in the 1970s and 1980s, respectively. These findings suggest that explaining changes in childhood mortality decline is not straightforward since there could be other explanatory factors such as changes in health provision and income levels, which are not normally measured in cross sectional surveys.

2.4.1.2 Distance and residence status

Mortality differential by residence imply that infant mortality is lower in urban areas as compared to rural area (SRS,1992; Ren, 1996) suggesting that rural infants are more prone to deaths than urban infants. This is because most of the urban areas, social services are near to peoples' residences compared to rural areas. Urbanization, in general, leads to modernization and more development; higher literacy, availability or accessibility to health services, awareness about health care, more contraceptive use, a higher living standard and prevalence of nuclear families and all these factors play a significant role in lowering infant mortality (UN, 1953; De Jong, 1972; 1998/99, 2002).

The situation in some urban areas is also worthy mentioning with regard to infant mortality due to the fact that, urban areas in most developing countries are over congested and overcrowded. By this then it is possible to find more death of infants in urban areas. Although some places in urban areas have improved and well arranged, but there are some areas which are still problematic hence increase of infant mortality in town /urban (Jain, 1985). Tanzania mortality levels and trends are largely determined by what happens in the rural areas, where the majority of the population lives.

2.4.1.3 Maternal education

Mother's education has an inverse relationship with infant and under five mortality. This conforms to the universal observation that children of educated mothers have lower mortality levels than those whose mothers are less educated. In Tanzania, 28% of the mothers of children under five years of age have never attended school, while 68% have had some primary education and 4% have a secondary or higher education. There is some variation in school attendance, for example, between urban and rural areas (Curtis and Steele, (1996). In the rural areas, 31% of the mothers have never attended school, 67% have attended primary school and 2% have gone to secondary school or higher. In contrast, only 11% of mothers in urban areas have never attended school, 77% have attended primary school, and 12% have gone to secondary school or higher (Hamdani, 2006). Like fertility therefore, infant mortality is also influenced by parent's education particularly that of mother (Caldwell, 1979; Nag, 1983; Bhasin and Kshatriya, 1990; UN, 1994) and access to medical facilities (UN, 1985; Jain, 1985; Mahadevan, 1989; Suri Babu and Bhasin, 1990; Chachra and Bhasin 1998c; Bhasin and Nag, 2002c).

2.4.1.4 Sanitation

Poor households are more likely to obtain drinking water from contaminated sources such as surface water or open wells. Without an adequate supply of good- quality water, the risks of food contamination, diarrhea disease, and malnutrition rise. Infants and children from households that do not have a private tap are at greater risk of being malnourished than those from households with this amenity. About 40% of the households in the MD use tap water; (34.8% public tap, 2.7% neighbor's tap, and 3.2 % own tap); 32.3% river or rain water; and 26.9%, wells. More than 90% as it has been reported by Mswia *et al.* (2005), use pit latrines. Less than 1% of the households in the project area use electricity or gas as the main cooking fuel. The majority (90%) use firewood and the remainder use

kerosene stoves or charcoal for cooking. Some of the villages in Morogoro as it has been reported by Mswia *et al.* (2005), have access to electricity, especially those along the main roads and those with health facilities.

A number of studies have examined the effect of changes in covariates on infant mortality over time. A study on the effect of piped water on early childhood mortality in urban Brazil between 1970 and 1976 concluded that while access to piped water had a significant impact on differences in mortality, the education of mothers and that of their husbands had the greatest total effect on childhood mortality differentials (Merrick, 1985). Similarly Da Vanzo and Habicht (1986), in their study on infant mortality decline in Malaysia, also concluded that the mother's education, which had doubled over the study period, and improvements in sanitation had contributed to the decline in infant mortality.

The type of toilet that is used by a household reflects its wealth, and poor households are less likely to have adequate toilet facilities. Inadequate sanitation facilities result in an increased risk of diarrhea diseases, which contribute to malnutrition. Infants and children from households that do not have ready access to a flush toilet are at greater risk of being malnourished than children from households with this amenity. In Tanzania, 84% of households have access to a pit latrine, less than 2% have access to flush toilet, and 14% of surveyed households have no toilet facilities (WHO, 1998).

In the past two decades there has been an unprecedented increase in the population particularly in the developing countries due to the remarkable fall in mortality. Decline in mortality rates is directly correlated to the massive investments in health, sanitation, water supply, and other associated sectors (Preston, 1978; Kshatriya *et al.* 1997).

2.4.1.5 Occupation and income of the household.

Most common sources of income for most of the people in Morogoro District are farming, employment and small income generating activities such as business, laboures and informal sectors. The income generated was generally low. The main occupation of people of all ages in the area is farming, with 45.2% of males and 52.7% females being farmers as it has been reported by Mswia *et al.* (2005). Generally those households which had employment with lower income experienced infant death than well off households.

2.4.1.6 Poverty

Infants born in rural areas have about 30% higher probability of dying in infancy than infant born in urban areas. The richest quintile has the lowest infant mortality rate. Infants born in households in the poorest quintile has a 25% higher probability of dying than those born in households in the richest quintile.

There has been very little reduction, overall, in proportion of households who are below national poverty lines. Only in Dar-es-salaam has there been a decrease in line with the 2010 targets, to reduce income poverty by a half. Elsewhere the declines are too low to reach the targets. The picture is the same for food poverty. Almost one fifth of Tanzanians remain below this line (URT, 2004).

Gender analysis of the income poverty did not show significant differences overall in poverty levels between female and male – headed households. Since female households were on average smaller than male – headed households, it is possible that the incidence of poverty might have been over – estimated in larger households, since there is a failure to take into account economies of scale within these larger households.

Poverty is one among many problems which face rural people. Due to this then, it is possible for one to indulge himself or herself into illegal activities such as prostitution, robbery and the like. This may expose one into risks of his life such as infections of HIV / AIDS. Families which are below poverty line are the ones at a great risk of experiencing infant mortality.

2.4.2 Demographic factors

The demographic and health factors include maternal age, sex differentials, short birth intervals, and the size of the child at birth and the young or old mothers. Child – level demographic factors such as birth order, the length of the preceding birth interval, and the survival status of the preceding child have been shown to be strongly associated with infant mortality in Africa as well as in Asia (Cleland and Sathar, 1984; Koenig, 1990; Madise and Diamond, 1995; Whitworth and Stephenson, 2002). First and higher order births, those born after birth intervals of less than two years, and those whose previous sibling have died appear to have high risks of dying in infancy. Some researchers have documented evidence of a reverse J- shape pattern in the association between maternal age and infant mortality, with teenage and older mothers having elevated risks of child loss (Bicego and Ahmad, 1996; Geronimus and Korenman, 1993; Manda, 1998).

2.4.2.1 Maternal age

Children born to mothers younger than 20 years of age had higher mortality rates than children born to older mothers. Paradoxically, children born to older (40-49 years) had the lowest under – five mortality (Madise and Diamond, 1995). This implies that to the mother younger than 20 years of age are mostly affected by either HIV/AIDS or other diseases and they are not ready to give birth due to their younger ages.

2.4.2.2 Sex differentials

Sex differentials in infant mortality have been observed universally. In the majority of the world regions, girls have lower mortality at least for the first few months of life (Curtis and Steele, 1996; Sastry 1997). Exceptions have been noted in some Asian countries. In India, girls are 30% more likely than boy to die before their fifth birthday and this is thought to be a result of son preference, which is manifested in lower expenditure on health for girls and higher prevalence of immunization among boys (Claeson *et al.* 2000; Timaeus *et al.* 1998). In Tanzania, male children experiences higher mortality than female children, with under-five mortality rates of 172 and 150 deaths per 1000 live births, for males and females, respectively (URT, 2004).

2.4.2.3 Short birth intervals

Short birth intervals pose a high risk for child survival both during and after infancy. As expected, first births and higher order births experience higher infant mortality. Children born less than two years after a preceding sibling are more likely to die before reaching age five than those born four or more years after a preceding sibling (195 versus 112 per1000). A similar pattern is observed for neonatal mortality, post neonatal mortality, and infant mortality (WHO, 1998).

2.4.2.4 The size of a child at birth

The size of a child at birth provides an important indicator of its survival during infancy. Mothers had been asked whether their young children were very small, small, average, large, or very large at birth. The mother's perception has been shown to correlate closely with the child's actual weight at birth, which is an important indicator for child growth monitoring (Curtis and Steele, 1996; Sastry, 1997). Newborns perceived by their mothers to be small or very small are much more likely to die in the first year of life (170 per 1000

live births) than those perceived as average or larger in size (89 per 1000 live births). A similar pattern of mortality is evident during the neonatal and post neonatal periods. The pattern shows that 28% of deaths under five occur during the neonatal period, while 40% occur during the post neonatal period and 36% of deaths occur at age's 1-4 (UNICEF, 2008).

2.4.2.5 The young or old mothers

Certain patterns of childbearing are associated with elevated levels of infant and child mortality. Typically, infants and children have a greater probability of dying early if they are born to mothers who are especially young or old, if they are born after a short birth interval, or if they are of high birth order (Claeson *et al.* 2000; Timaeus *et al.* 1998).

2.4.3 Cultural factors

Culture as a way of life tends to change from one society to another. With regards to mortality, the change may results into the omission of the deaths of babies. For Africans, omission is not something intended to, but it is natural or way of life. So omission is common to most of the African countries whereby women tend to omit the deaths of babies who died shortly after birth or deaths that occurred early in infancy. The incidence of omission or misstatement of date of birth and age at death is likely to be greater among older women, who may have more difficulty remembering events (Chachra and Bhasin, 1998).

2.4.4 Summary and the expected output

The chapter has presented the literature review whereby infant mortality has been found to be a problem that faces an individual and the whole society. At the beginning of the chapter, there is definition of some concepts concerned with infant mortality. The socio

economic factors have been reviewed from the point of view of their influence to infant mortality. The socio economic factors included in this study are income, occupation, education, sanitation, poverty as well as rural urban residences. There are also different interventions in reducing the problem. Historical studies on infant mortality brought a quite general observation that a good deal of its decline could be achieved before efficient preventive and curative medications (vaccination against measles, whooping cough, tetanus and antibiotics) was made available. The historical evidence is consistent with the view that medical interventions could have affected mortality in general and infant mortality in particular after 1930 (Sullivan and Bicego 1994).

Researchers on the historical decline of the infant and child mortality in Africa have thus identified retrospectively a wide series of determinants which are also known to explain the present – day situation in high mortality populations. Climatic and seasonal variations in mortality by diarrhea have shown the importance of ecological conditions; significant spatial correlations between regional IMRs and infant feeding practices (whether the infants were breast - fed, bottle fed, currently receiving foster care) were also abundantly documented; social factors as indicated by the excess mortality of illegitimate infants, or the striking rural urban differences observed during the industrialization process which explain the nineteenth century urban disadvantage by the urban sanitary diarrhea effect due to poor sanitation, overcrowded housing, poverty, played also an important role in Africa history; finally, the high fertility patterns we have known, did also exert an effect on infant and child survival, through shortened birth intervals, family size, etc (Gwatkin *et al.* 2000).

Measurements of the socio economic factors of Morogoro district will provide substantial information to the society. The expected recommendations will therefore be important to

policy makers such that, sustainability of the system as well as the living standard of the involved community and other communities is maintained and improved.

A study on the effect of piped water on early childhood mortality in urban Brazil between 1970 and 1976 concluded that while access to piped water had a significant impact on differences in mortality, the education of mothers and that of their husbands had the greatest total effect on childhood mortality differentials (Merrick, 1985). Similarly Da Vanzo and Habicht (1986), in their study on infant mortality concluded that parent's education particularly that of mother contributes to infant mortality. Curtis and Steele (1996) who used DHS data from Bolivia, Peru, Kenya and Tanzania in their study of neonatal mortality, found that the level of maternal education was highly significant in all the countries except Tanzania, where rural or urban residence was more important. Though socio economic factors affect infant mortality, there are other factors which influence infant mortality such as demographic factors. However, previous studies have shown that there is low infant mortality in those households with toilet facility, electricity and among the richest households with high levels of income.

Since the current study addresses the socio economic issues affecting infant mortality, it is therefore of great importance as far as the alternatives and general measures are taken into consideration for the purpose of decreasing infant deaths. This study in contrast to previous studies, and as it has been observed, the later have been presenting general pictures of the problems worldwide. Also the previous study has shown that, the independent variables in the current study have a negative effect to infant mortality. Due to inadequate addressed information of this problem, the current study is down and specific to the people of Morogoro district in order to provide the actual situation about infant mortality and come out with strategies and plausible solutions to the problem.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Overview

The purpose of this chapter is to describe the study area and methodology employed in the study. Section 3.2 describes the study location and the reason for its choice. In the following section, the research design is described and its relevance to the study, while the sampling procedure is presented in Section 3.4. Section 3.5 presents the data collection procedures with its instrumentation. Finally, the procedures and techniques used for processing and analyzing the data are presented in section 3.6.

3.2 Study Area and Justification for Selection

3.2.1 Administrative set up of the Morogoro District

The research was conducted in Morogoro district. Morogoro district is one of the six districts of Morogoro Region, Tanzania (Fig. 2). The district has six administrative divisions, which are divided into 42 wards with 215 registered villages as it has been reported by Mswia *et al.* (2005). It is bordered to the east by Coast Region (Kisarawe and Bagamoyo districts), to the west by Mvomero and Kilosa districts, to the south by the Kilombero district and to the north by the Mvomero and Bagamoyo districts (Fig. 3).

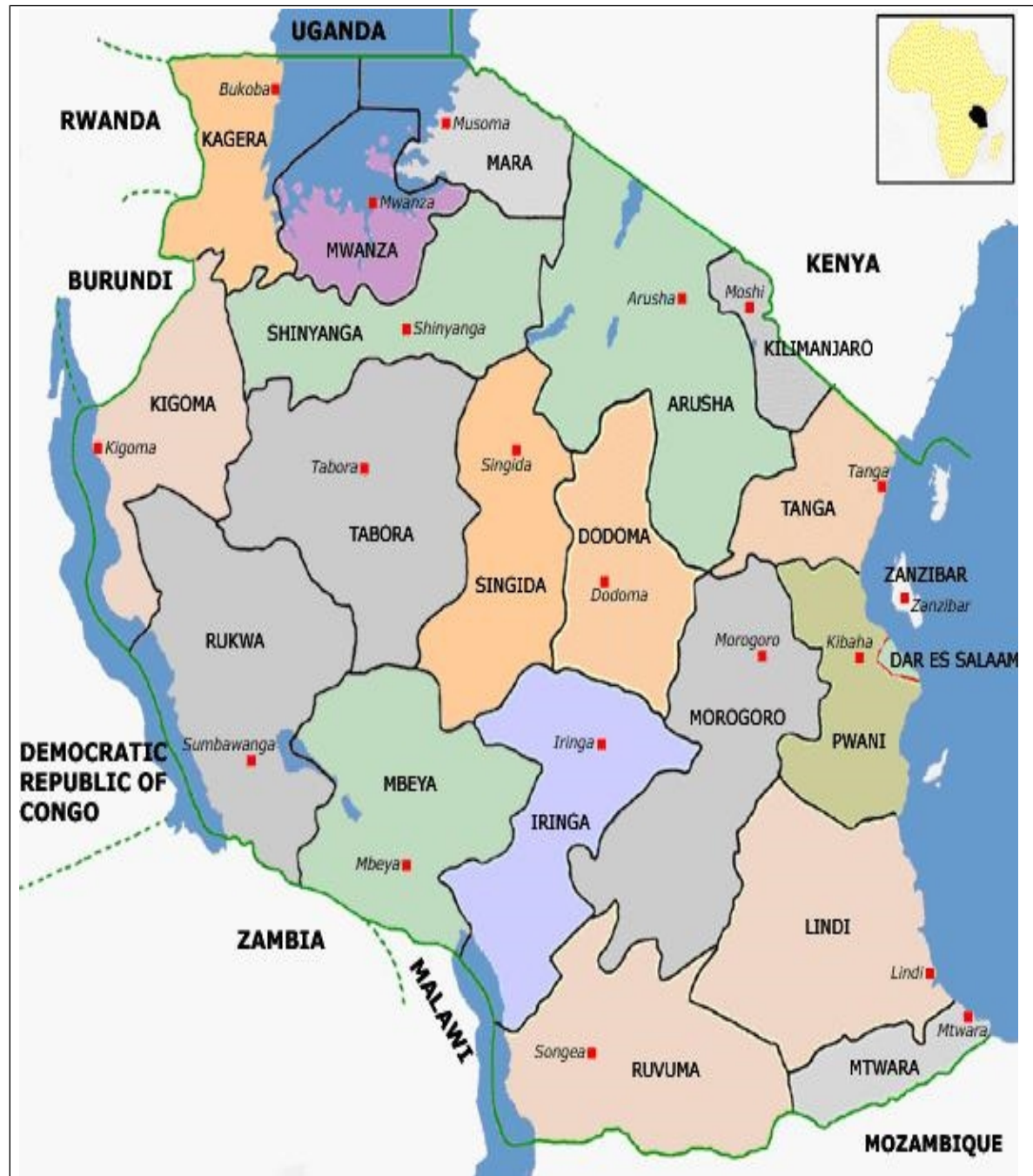


Figure 2: The map of Tanzania

Sources; en.wikipedia.org/wiki/Image:Tanzania_Regions.png

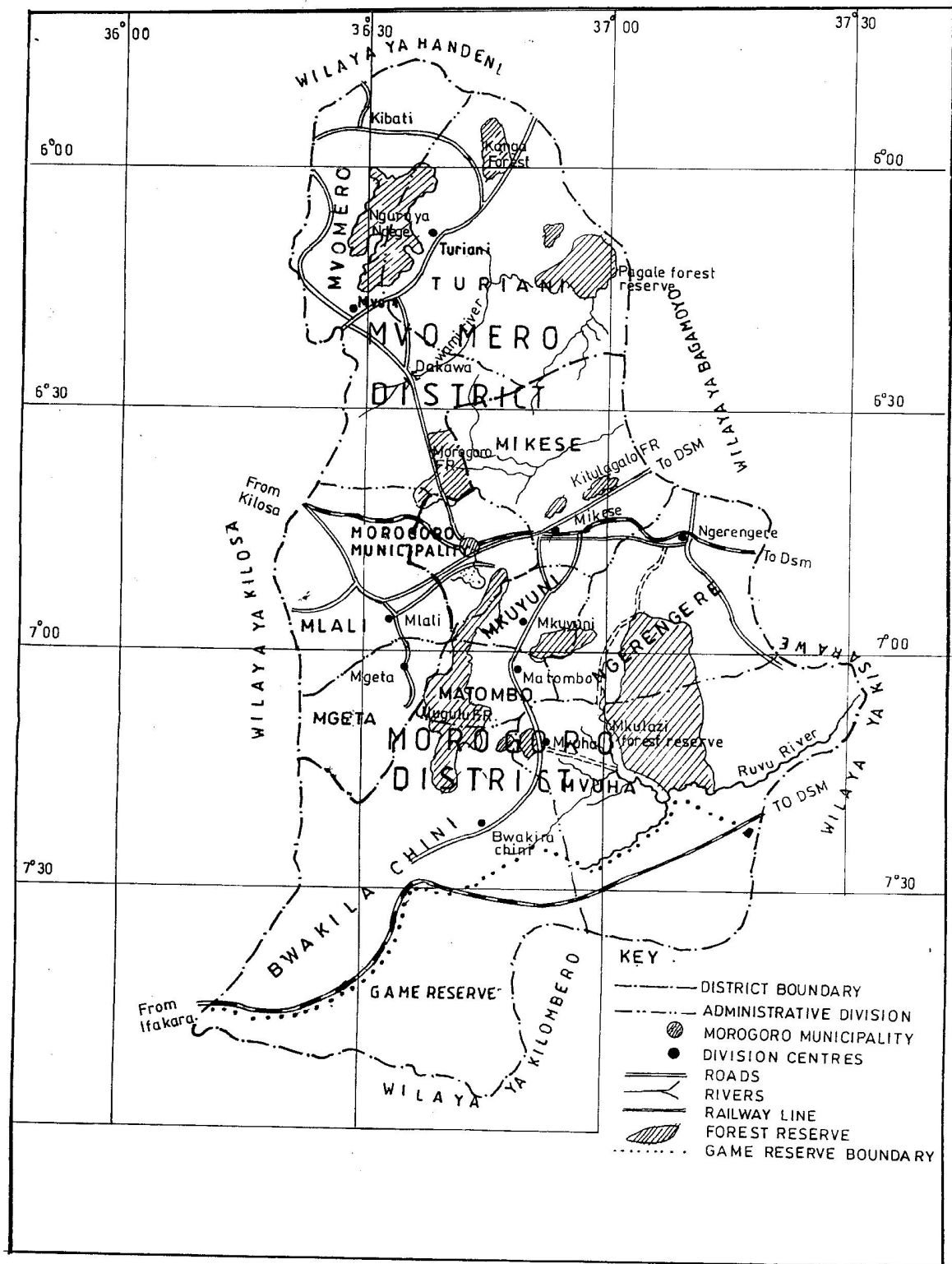


Figure 3: Location of Morogoro District

Sources: Morogoro District office (2010).

3.2.2 Geographical features of the Morogoro district

Morogoro district is situated in Morogoro Region, about 180 km from Dar-es-salaam. Morogoro has a low population density and mixed topography, which includes mountains and plains. It covers an area of 19250km². The Morogoro District lies between latitudes 6.22° and 8.00°S and longitudes 36.00° and 37.40°E. The villages cover a wide area, including the lowlands and slopes of the Uluguru mountain range, as it has been reported by Mswia *et al.* (2005).

3.2.3 Population characteristics of the Morogoro District

According to the Tanzania Population Census (2002), the population of the district was 263 920 total population whereby 129 285 males and 134 635 females. The proportions of population in the various age groups are as follows: < 1year old, 2.6%; 1-4 years old, 9.7%; 5-14 years old, 26.4%; 15-64 years old, 56.3%; and ≥ 65 years old, 5.0%. The ratio of males to females is 100:103, and the age – dependency ratio is 78.6% as it has been reported by Mswia *et al.* (2005).

3.2.4 Health issues in the Morogoro District

Morogoro district has 3 hospitals, 6 health centers, and 81 dispensaries. About 40% of the households in the Morogoro district use tap water (34.8% public tap, 2.7% neighbors tap, and 3.2% own tap); 32.3 %, river or rain water; and 26.9% wells. Over 90% of the study population in Morogoro district use pit latrines as it has been reported by Mswia *et al.* (2005).

3.2.5 Cultural issues in the Morogoro District

The main ethnic groups in the district are the Luguru, Sagara and Pogoro. The Luguru, Vidunda and Nguu people in the Morogoro District are amongst the few remaining

matrilineal societies in Africa where filiations are established through the woman. However, the population participating in surveillance comprises a wide mixture of ethnic groups. Major religious groups in the area are Muslims (57%), Christians (41%) and others (2%). The indigenous languages are commonly spoken in the villages, however the national language, Kiswahili, is widely understood and spoken as they have been reported by Mswia *et al.* (2005).

3.2.6 Socio economic status in the Morogoro District

The main occupation of people of all ages in the area is farming including 45.2% of males and 52.7% of females. The proportion of girls attending school is slightly higher than boys for all ages up to 14 years of age. From age 15 the proportion of women who have no formal education (65%) is almost twice that of men (35%) (Mswia *et al.* 2005). Less than 1% of the people in the area use electricity /gas as the main cooking fuel. The majority (90%) use firewood and the remainder use kerosene stoves or charcoal for cooking purposes. Some of the villages in the area have access to electricity, especially those along the main roads and those with health facilities as it has been reported by Mswia *et al.* (2005).

3.2.7 Justification for selection of study area

Morogoro district was selected since it contains the countryside people. Most people living or staying in the district are poor.

3.3 Research Design

A cross sectional research design was used in the study so as to allow the collection of data from different groups of respondents at relatively same time. The design was considered to be favourable because of resources limitations for data collection, it is one time survey and

the most commonly used research design. Both quantitative and qualitative methods were utilized for data collection.

3.4 Sampling Procedures

3.4.1 Sample population

The study involved all households regardless of whether in that household there is or no death. Those who were interviewed were household members. The household was preferred as the ultimate sample population, since it is the most appropriate measure when assessing the level of poverty and standards of living in a society (Blackwood and Lynch 1994).

3.4.2 Sample size

The total sample size was of 100 households. This sample size is found to be convenient since statistical computations are meaningful. Also the small sample size provides accurate data. Time, financial and human resources limitations as well, prompted the researcher to have such a sample size.

3.4.3 Sampling methods

The study employed a combination of purposive and multistage sampling methods beginning at the ward and ending at the household level. The wards such as Mkambarani, Mikese and Kiroka were selected randomly. Villages visited during the survey were purposively selected. The selection of the villages took into consideration their population sizes and accessibility. The first stage was to group the villages into their population sizes and accessibility. The second stage was the selection of villages from their accessibility and population sizes. The multistage method is convenient for studying a large and diverse population as well as those populations whose list of the actual individuals to be studied is

hardly available (Fowler, 1993). The technique reduces the amount of traveling for interview and hence the corresponding costs (Casley and Kumar, 1988). The target population for the proposed study was all household heads hence the purposive selection. Data in Table 2 show distribution of wards, villages and households surveyed.

Table 2: Distribution of households in wards and villages

Wards	Village	No. households
Mkambarani	Kisinga	12
	Mkambarani	18
Mikeese	Fulwe A	22
	Fulwe B	18
Kiroka	Bamba	14
	Mahembe	16
Total		100

3.5 Data Collection Procedures

3.5.1 Primary data

This study was subjected to quantitative (more in numbers) and qualitative (more in words) data collection methods. Quantitative data was obtained through interviews (face to face) and those who provided information were members of the household. Qualitative technique was employed for collection of data through key informants' discussion that is the head of household. Face to face interview under close – ended questions were administered to the respondents of both sexes in the households so as to answer the questions of socio economic factors influencing infant in Morogoro District (See appendix II). Information collected shows that; 32% of the household surveyed experienced deaths and 68% did not experience deaths.

3.5.2 Secondary data

Secondary data was obtained from existing information/ literature, published and unpublished reports. This includes different reports from some health centers within Morogoro district, REPOA, research reports from various institutions, such as Sokoine National agriculture Library (SNAL) and non - governmental organizations dealing with health. The study used secondary data so as to support findings.

3.6 Data Processing and Analysis

Data processing and analysis were done at Sokoine University of Agriculture, in Morogoro Tanzania. Data from the respondents were verified, complied coded and summarized before analyzed by using Statistical Package for Social Science (SPSS) window software so as to make realistic inferences based on the study sample. In this Statistical package, descriptive statistics particularly frequencies and percentages were used to show the linkages between independent variables and dependent variable. The Principal Component Analysis (PCA) has been employed to generate poverty quintiles. Cross tabulations involving Chi- square tests were used to test the linkage between independent variables and dependent variable. Cross tabulation is both powerful way of communicating information and the common way of data presentation (Casley and Kumar, 1988).

Binary logit model was employed to analyze data.

$$Y_i = \beta_1 X_1 + \beta_2 X_2 + \beta_n X_n \dots\dots\dots \mu_i$$

Where by Y_i = dependent variable,

Note $Y = 1$ when infant mortality occurs and 0 otherwise

β_0 = column vector or constant

$\beta_1 = 1, 2, 3, \dots, n$ is the regression coefficient of parameters

$X_i = 1, 2, 3, \dots, N$ refers to independent variables.

μI = Error term.

This model is applicable when there is one dependent variable and several independent variables (more than two). Through this model, it is possible to observe the correlation or relationship between independent variables and dependent variable and also to observe most variable factors influencing the problem of infant mortality.

3.7 Data Quality Control

3.7.1 Pre-testing of the interviews schedule

Pre-testing of the interview was done before actual collection to determine their clarity and relevance to the objective of the study. Pre-testing is done for the purpose of controlling quality of interview, and information which were obtained. The interview for pre-testing was administered to respondents drawn from the population that is in the survey prior to the commencement of the study.

3.8 Measuring Poverty

As it has been mentioned before, income is usually very difficult to measure. It has neither been efficient to measure poverty. Filmer and Pritchett (1998) used wealth statuses to measure household economic status inquiring about the household ownership of various assets and characteristics of the household's dwelling. This was so since the information on household consumption expenditures or household income were not available. Poverty as a variable was used to create a socio economic index to proxy for household wealth.

The index contains domestic assets such as; hand hoe, bush knife, axe, bicycle, bed, charcoal stove, foam mattress, chicken, torch, small oil lamp, radio, string bed, sisal mattress, kerosene lamp, mobile phone, goats, television, refrigerator, motorcycle and

camera. The Principal Component Analysis (PCA) has been applied to prepare the strata. This is a form of factor analysis used to reduce a large number of variables into few ones. In total, there were 20 variables used. The formula is applied to construct the household socio economic values as suggested by Filmer and Pritchett, (1998).

$$A_j = f_1 * (a_{j1} - a_1)/(S_1) + \dots + f_N * (a_{jN} - a_N)/(S_N).$$

Where: The Eigenvalue have been used to detect the amount of variation brought by each item contributed in the community.

A_j = index for each household

F_1 = scoring factor determined by the procedure.

A_{j1} = the j th household value of the first variable.

A_1 & S_1 are the mean and standard deviation respectively.

The computations were automatically done using the SPSS 12.0 version.

3.9 Summary

This chapter described the study area and presented the methodology used for collecting and analyzing the data. The survey design and the technique used in sampling the households were presented. Then the methods used for measuring and determining poverty among the households were described.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

In this chapter the results of the study are presented and discussed. The chapter is divided into nine sections; the first section is the overview of the chapter and the background characteristics of the respondents where six variables are used to show their influence or affection on infant mortality is presented in the second section. The third section is the determination of infant mortality followed by presentation of the linking between poverty and infant mortality in the fourth section. The linking of education and infant mortality is showed in the fifth section. The sixth section will relate occupation and infant mortality. The influence of residence status and infant mortality is shown in the seventh section. The eighth section is the linking of sanitation and infant mortality followed by the linking of income and infant mortality in the ninth section. The last section that is the tenth section is the application of binary logistic regression in observing how independent variables affect dependent variable and to what extent.

4.2 Background Characteristics of the Respondents

The background characteristics included in the study were age, sex, marital status and religion. The summary is presented as follows sex (Table 3), age (Table 4), marital status (Table 5), mother's religion (Table 6), and father's religion (Table 7).

Table 3: Sex of respondents (%)

Variable (N=100)	Percent
Male	39.0
Female	61.0
Total	100.0

Table 4: Age categories (%)

Variable (N=100)	Percent
15-19	7.0
20-24	15.0
25-29	24.0
30-34	10.0
35-39	13.0
40-44	13.0
45-49	8.0
50-54	8.0
65 and above	2.0
Total	100.0

Table 5: Respondent's marital status (%)

Variable (N=100)	Percent
Single	10.0
Married	76.0
Divorced	6.0
Separated	6.0
Widowed	2.0
Total	100.0

Table 6: Mother's religion (%)

Variable (N=100)	Percent
Christian	31.9
Muslim	68.1
Total	100.0

Table 7: Father's religion (%)

Variable (N=100)	Percent
Christian	36.5
Muslim	63.5
Total	100.0

4.2.1 Sex

The males made 39.0% of the respondents surveyed, while females made 61.0% of the respondents surveyed (Table 3). Males' percentage is smaller than females' percentage because during the survey those who were found in the household were females and most of males were not around; they went to do other activities, because in most households, men are responsible for providing everything for consumption. Women were found around because they have the responsibility of taking care of children and other activities around their houses. However the population doesn't reflect the actual number of men.

4.2.2 Age

The study revealed that almost nearer to a quarter of the population surveyed had the range of the age between 25 to 29 years old. Below and above the range of 25 to 29 years old, there is a small percentage of population (Table 4). This implies that most of the households surveyed had the household heads of the age between the ranges of about 25 to 29 years old. The mean age of respondents surveyed is 34.93.

4.2.3 Marital status

The study showed that the majority of the populations (76.0%) were married. The majorities are married due to religious convictions; this is because, all of the respondents surveyed are either Christians or Muslims (Table 5). Also by being together, life or other activities become easier rather than being single, divorced, separated or widowed. There is also a small percentage of divorced (6.0%), separated (6.0%) and widowed (2.0%).

4.2.4 Religion

The study revealed that 31.9% of mothers are Christians while 68.1% of them are Muslims (Table 6). Also 36.5% of fathers are Christians while 63.5% of them are Muslims (Table 7).

4.3 Determination of Infant Mortality

In this study, mortality was measured by using the following questions; “has there been any death in the past 12 months in the household? How old was she or he at the time death? What was the place of his or her death?” From these questions then the study revealed that small percentage (32.0%) of the household surveyed had death (Table 8). Infant mortality takes about one third (31.3%) out of two third (32.0%) of household deaths (Table 9). The remaining percentage that is two third is deaths which occur to other ages. Half of these deaths occur at hospital or dispensary, two fifth of the death occurs at home and 3.1% occurs to other places (Table 10).

Most of women from the surveyed area reported that, infants normally die because of different factors, that is the ones which I had and other factors such as; “you may find a woman deliver or bear a baby, but after few days it dies. So the death of this baby is not only due to the socio economic factors rather it is due to the evil spirit or a devil (mashetani) that mother or a woman possesses or had. Her evil spirit or a devil does not like this mother to bear or deliver a baby that is why they kill a baby.

Table 8: Mortality for the surveyed population (%)

Variable (N=100)	Percent
Occurrence of death in past 12 months	32.0
Non occurrence of death in past 12 months	68.0
Total	100.0

Table 9: Age at his/her death (%)

Variable (N=100)	Percent
1-11 months	31.3
1-10 years	12.5
11-20 years	12.5
21-30 years	12.5
31-40 years	9.4
41-50 years	12.5
61-70 years	3.1
71-80 years	6.3
Total	100.0

Table 10: Place of death (%)

Variable (N=100)	Percent
At the hospital/dispensary	50.0
At home	46.9
Other place	3.1
Total	100.0

4.4 Poverty and Infant Mortality

4.4.1 Housing condition for the surveyed population

Poverty was measured by using the following questions; “housing conditions, household physical assets and ownership of land.” From this then the study revealed that majority of the population (68.0%) own house (Table 11). They own house simply because a house is among the three basic needs such as shelter, clothes and food. Under Tanzania cultural and social values everyone in the society who is grown up is expected to possess a house. Most of these houses had enough rooms which made ventilation sufficient. (Table 12).

More than a half of these houses had cemented floors, and below a half of these houses had mud floors and only 2.0% had tiles (Table 13). People in the surveyed area had cemented floor due to the fact that, they believe that cemented floor makes the house look better than that of mud floor. Most of the houses which had mud floor, had also been built by using mud with trees or mud bricks.

More than a half of these houses were built by using burnt bricks. More than one fifth of these houses were built by using mud with trees and almost below one fifth of these houses were built by using mud bricks (Table 14). They use burnt bricks to build their houses simply because; cemented blocks are very expensive due to the rise of the price of cement. Also they use burnt bricks because they are cheaper.

Moreover, most of surveyed population propagated that, burnt bricks take longer time to perish. They take about one hundred years to perish. Those of burnt bricks were somehow well off compared to others. Others used mud bricks and mud with trees.

Three quarter of these houses were covered by using iron sheets and a quarter of these houses were covered by using grass and trees (Table 15). This implies that even houses which were built by using mud with trees and mud bricks were sometimes found having iron sheets.

Table 11: Housing condition for the survey population (%)

Variable (N=100)	Percent
Owning house	68.0
Not Owning house	32.0
Total	100.0

Table 12: Number of bedrooms (%)

Variable (N=100)	Percent
One bedroom	2.0
Two bedrooms	10.0
Three bedrooms	40.0
Four and above bedrooms	48.0
Total	100.0

Table 13: House floor (%)

Variable (N=100)	Percent
Cemented	53.0
Mud floor	45.0
Tiles	2.0
Total	100.0

Table 14: House walls (%)

Variable (N=100)	Percent
Burnt bricks	55.0
Mud with trees	21.0
Mud bricks	19.0
Cemented blocks	4.0
Stones	1.0
Total	100.0

Table 15: House roof (%)

Variable (N=100)	Percent
Covered with iron sheet	75.0
Covered with grass, trees, mud	25.0
Total	100.0

4.4.2 Assets ownership by the household surveyed

Results showed that the common assets to the population surveyed are hand hoe, bush knife, axe bed, bicycle and radio to mention a few. They own these assets simply because they are cheap that every one can afford to buy. The unpopular assets to the household surveyed are camera, motorcycle, refrigerator and television to mention a few. Most of them do not own these gears because they are very expensive, lack of electricity to operate them and they are also delicate (Table 16).

Table 16: Assets ownership by the households surveyed (%)

Item owned (N=100)	Percent
Hand hoe	99.0
Bush knife	99.0
Axe	99.0
Bed	96.0
Charcoal stove	95.0
Foam mattress	94.0
Chickens	94.0
Torch	92.0
Bicycle	91.0
Small oil lamp	90.0
Radio	90.0
String bed	85.0
Sisal mattress	80.0
Kerosene lamp	79.0
Mobile phone	67.0
Goats	14.0
Television (TV)	8.0
Refrigerator	3.0
Motorcycle	3.0
Camera	1.0

4.4.3 Land ownership by the household

The study showed that nearer to seven tenth of the population surveyed owned land (Table 17). Three tenth of household had 4 to 6 hectares, a quarter of household had 1 to 3 hectares, a tenth had 7 to 12 hectares and less than a fifth of household had 13 and above hectares. Below three tenth of the household borrowed land (Table 18). More than half of the households borrowed the land between 1 to 3 hectares, more than a quarter borrowed about 7 to 12 hectares and less than one fifth borrowed about 4 to 6 hectares (Table 19). The people surveyed consider land as the main source of crops in which food accessibility and availability is possible. Also their main activity is farming, so many are expected to possess land.

The study revealed that less than a tenth for last year harvested one suck and less than that. Nearer to one fifth harvested two suck and about four fifth harvested three and above sucks (Table 20).

The study also showed that some people within the surveyed population engage themselves in other activities in order to make the better living. Over a half of surveyed population engages in business, below a half of them engage in labourers and less than a tenth engaged in farming and employment (Table 21).

Table 17: Ownership of land in the household surveyed (%)

Variable (N=100)	Percent
Own land	69.0
Not Own land	31.0
Total	100.0

Table 18: Land ownership (%)

Variable (N=100)	Percent
Hectare 1-3	29.0
Hectare 4-6	30.0
Hectare 7-12	27.5
Hectare 13 and above	13.0
Household borrowing land	33.0
Total	100.0

Table 19: Land borrowed per year (%)

Variable (N=100)	Percent
Hectare 1-3	54.3
Hectare 4-6	17.1
Hectare 7-12	28.6
Total	100.0

Table 20: Total harvest for last year (%)

Variable (N=100)	Percent
-------------------------	----------------

Less than on sack	3.0
One sack	7.0
Two sacks	19.0
Three and above sacks	71.0
Total	100.0

Table 21: Other activity in getting food (%)

Variable (N=100)	Percent
Business	52.0
Labourers	45.0
Farming	2.0
Employment	1.0
Total	100.0

4.4.4 The Principal Component Analysis and Poverty index

The Principal Component Analysis (PCA) has been applied to prepare the poverty index. As described earlier in Chapter 3, PCA is a form of factor analysis used to reduce a large number of variables into few ones. The formula is applied to construct the household poverty. $A_j = f_1 * (a_{j1} - a_1) / (S_1) + \dots + f_N * (a_{jN} - a_N) / (S_N)$.

For example; if the household had the following characteristics; 1= owned a house, 3 hand hoes, 2 bush knife, 1 axe, 2 beds, 1 charcoal stove, 2 foam mattresses, 5 chicken, 1 torch, 1 bicycle, 2 small oil lamps, 1 radio, 0 string bed, 2 sisal mattresses, 1 kerosene lamp, 0 mobile phone, 0 goats, 0 television, 0 refrigerator, 0 motorcycle, 0 camera, then using the figure in Table 16, the household poverty is obtained as shown in the appendix I. Thereafter, using the PCA equation, A_j values for each household were obtained using all the 20 variables presented in Table 16. Basing on the A_j values of the households, the centiles (20, 40, 60 and 80) were used to categorize the households into five quintiles. The uncategorized index values are retained to be used in various correlations.

Table 22: The poverty quintiles (%)

Quintiles	Lower limit	Upper limit
First	Min	5.969152715
Second	5.969152716	8.333424218
Third	8.333424219	9.909880654
Fourth	9.909880655	11.6603664
Fifth	11.6603665	max

In Table 23, the first quintile presents the poorest category while the fifth presents the least poor (better off) group. The second, third and fourth quintiles lie according to the trend.

Table 23: The relationship between household poverty index and household assets

% Household owning item	Poverty Quintiles				
	First	Second	Third	Fourth	Fifth
House owing	22.1	16.2	16.2	23.5	22.1
Cement floor	24.5	18.9	17.0	15.1	24.5
Mud floor	15.6	22.2	17.8	28.9	15.6
Cemented blocks wall	0.0	0.0	25.0	25.0	50.0
Burnt bricks wall	27.3	18.2	20.0	12.7	21.8
Mud bricks wall	42.1	26.3	21.0	0.0	0.0
Mud with trees wall	33.3	23.8	23.8	19.1	0.0
Iron sheet roof	18.7	18.7	20.0	20.0	22.7
Grass, trees roof	28.0	24.0	20.0	16.0	12.0
Hand hoe	19.2	20.2	19.2	21.2	20.2
Bush knife	19.2	20.2	19.2	21.2	20.2
Axe	19.2	20.2	19.2	21.2	20.2
Bed	19.8	19.8	19.8	19.8	20.8
Charcoal stove	18.9	20.0	18.9	21.1	21.1
Foam mattress	19.1	19.1	20.2	20.2	21.3
Chickens	16.0	21.3	20.2	22.3	20.2
Torch	20.7	20.7	18.5	19.6	20.7
Bicycle	20.9	18.7	20.9	19.8	19.8
Small oil lamp	21.1	21.1	18.9	20.0	18.9
Radio	18.9	17.8	21.1	21.1	21.1
String bed	21.2	20.0	20.0	20.0	18.8
Sisal mattress	21.3	21.3	20.0	18.8	18.8

Kerosene lamp	19.0	16.5	20.3	20.3	24.1
Mobile phone	17.9	19.4	19.4	20.9	22.4
Goats	14.3	14.3	35.7	28.6	7.1
Television (TV)	0.0	12.5	25.0	25.0	37.5
Refrigerator	0.0	0.0	33.3	33.3	33.3
Motorcycle	0.0	0.0	0.0	33.3	66.7
Camera	0.0	0.0	0.0	0.0	100.0

Data in table 23 show that, most of the poorest households had no cemented blocks compared to the better off households. Most of the poorest households use burnt bricks to build their houses because burnt bricks are cheaper. The better off household use iron sheet roofs while the poorest households use grass and tree roofs. There is a slight difference between the better off and poorest households with regard to the ownership of some gears due to the fact that, they are cheap such that the better off and poorest households can afford to possess them. But televisions, refrigerators, motorcycles, and cameras are possessed by better off households due to their expensivity to handle them.

4.4.5 The linking of poverty and infant mortality

With regard to infant deaths, the data show that, those people who are poorer experience more infant deaths than the better off (Table 24). This observation conforms with Karl *et al.* (2008) where by the index made of this entities (poverty index) appeared to be suprising sensitive in detecting inequalities in access to health interventions and to health outcomes in apparently homogeneous, small area populations. From these then, it is possible to conclude that, infant mortality has a link with poverty.

Table 24: Poverty index and infant mortality (%)

Poverty index	Infant death (1-11 months)
First	40.0
Second	20.0
Third	30.0
Fourth	10.0

Fifth	0.0
Total	100.0

4.5 The linking of the level of education and infant mortality

Data on the level of education of father is presented in Table 25 and mother is presented in Table 26. Over the majority of men surveyed (76.5%) are primary school attendants. Almost nearer to one fifth of men are secondary education attendants and below one fifth are in post secondary and university.

Table 25: Father's level of education (%)

Variables (N=100)	Percent
Primary school	76.5
Secondary education	18.8
Post secondary non university	1.2
University	3.5
Total	100.0

Table 26: Mother's level of education (%)

Variables (N=100)	Percent
No formal education	4.3
Primary school	84.0
Secondary education	11.7
Total	100.0

For the females, majority (84.0%) attended primary school and below one fifth of them attended secondary school. The data show that, the great number of males continues with secondary education and females remain behind though there is a slight change. At the university level only males who seem to reach that level of education (Table 25). This is due to social and cultural values that females should be married after completing primary

school. Many believe that, to educate a girl or a woman is just wastage of money because she may or not accomplish secondary school.

The data on association between infant mortality and the level of education is presented in Table 27 and 28. The study showed that, most of infants' death occurs in the household where females and males attended only the primary schools. Those households with male household heads who attended university and post secondary school non university had no infant mortality (Table 27). Those mothers who attended primary school are more prone to the problem of infant mortality than those who attended secondary school and those who had no formal education (Table 28). The analysis here shows what was not expected with regard to informal education, simply because informal education was expected to increase infant mortality but here it is vice verse. So there is a need to search on why informal education does not lead to infant mortality and primary education lead to infant mortality.

Table 27: Father's level of education (%)

Variable (N=100)	Infant mortality (1-11months)
Primary school	87.5
Secondary education	12.5
Post secondary non university	0.0
University	0.0
Total	100.0

Table 28: Mother's level of education (%)

Variable (N=100)	Infant mortality (1-11months)
No formal education	20.0
Primary school	70.0
Secondary education	10.0
Total	100.0

4.6 The linking of occupation and infant mortality

Data on occupation of the father is presented in Table 29 and mother is presented in Table 30. The study showed that, more than a half of fathers are farmers, above one fifth of

fathers are businessmen and below one fifth (14.2%) of them are employed. The small percentage covers informal sectors and others (Table 29). Of all these, three fifth of the mothers are also farmers while three tenth of them do business and only 2.5% are employed (Table 30). In this regard then, women took a great percentage as farmers and small percentages as employed compared to men. Most of the population surveyed had self employment (farming) due to the reason that, majority attended only primary education, and primary education is not valuable for employment now days. Those who can get employment are the ones with at least secondary education. So education for most of them hinders them to be employed in government or other sector where education is more valuable. Thus farming is the back born of the surveyed population.

Table 29: Father's occupation (%)

Variables (N =100)	Percent
Farming	61.9
Business	22.1
Employment	14.2
Informal sector	0.9
Others (specify)	0.9
Total	100.0

Table 30: Mother's occupation (%)

Variables (N =100)	Percent
Farming	66.1
Business	31.4
Employment	2.5
Total	100.0

The data on the influence of occupation to infant mortality is shown on Table 31. The study revealed that most of the infants' deaths occur to the laborers who are also farmers (Table 31).

Table 31: Other activity to get food (%)

Variables (N =100)	Infant death (1-11 months)
Laborers	70.0

Business	30.0
Total	100.0

4.7 The Linking of Sanitation and Infant Mortality

Sanitation was measured by using the following variables; major source of drinking water and types of toilet facility. The data on sanitation is presented in Table 32. The study revealed that above a half of the population surveyed use public water tap as their source of drinking water. More than two fifth of them use shallow wells and only 4.0% use spring water source for drinking.

Table 32: Major source of drinking water for surveyed population (%)

Variables (N =100)	Percent
Public water tap	55.0
Shallow well	41.0
Spring	4.0
Total	100.0

The data on the linkage between sanitation and infant mortality is shown in Table 33. This study showed that most of infant deaths occur in the household where public water taps are used as a source of drinking water, followed by shallow wells (40%) and spring water (10%).

Table 33: Sanitation and infant mortality (%)

Variables (N =100)	Infant death (1-11 months)
Public water tap	50.0
Shallow well	40.0
Spring	10.0
Total	100.0

4.8 The Linking of Distance and Infant Mortality

Distance was measured by using the distance coverage and the experience of the researcher on the area concerned. Data on the distance covered by the household to

hospital and health centre are show in Table 34. There is a great distance from the household to the hospital and health centre. A half of the population surveyed covers 30 kilometers to reach the hospital and health centre, while a quarter of them cover 20 to 15 kilometers to reach a health centre and hospital.

The mean distance from the households to hospital and health centre is 23.7 km, to the dispensary is 379.50m, to the weather road is 416.00m, to a source of water is 340.70m, to a primary school is 304.50m and to a secondary school is 336.80m.

Table 34: Distance covered by the household (%)

Variables (N =100)	Distance from the household to	
	Hospita	Health centre
Less than 15km	1	
16km-20km	25.0	25.0
21km-30km	25.0	25.0
	50.0	50.0
Total	100.0	100.0

Data on distance covered by the household to dispensary, weather road, and source of water, primary and secondary school are presented in Table 35. Over a half of the households surveyed use less than 300 m to dispensary, nearer to two fifth to weather road, more than half to the source of water, primary school and secondary school. Less than two fifth of the households surveyed use 301m to 600m to the dispensary, more than half to the weather road, near to two fifth to the water source, a quarter to a primary school and more than quarter to a secondary school. A tenth of the households surveyed use 601m to a dispensary, less than a tenth to a weather road, source of water, primary school and secondary school.

Table 35: Distance covered by the household (%)

Variables (N =100)	Distance from the household to				
	Dispensary	Weather	Source of	Primary	Secondary
		road	water	school	school
Lessthan300m	54.0	39.0	56.0	66.0	62.0
301m-600m	36.0	56.0	38.0	25.0	29.0
601m-1000m	10.0	5.0	6.0	9.0	9.0
Total	100.0	100.0	100.0	100.0	100.0

The data on the influence of distance to hospital and health centre and infant mortality are shown in Table 36. Distance has a link with infant mortality. Household members who cover more than 20km to hospitals and health centre experience more death of infants than the household members who cover less than 21 km.

Table 36: Influence of distance on infant mortality (%)

Distance	Infant death (1-11 months)	
	Hospital	Health centre
Less than 15km	25.0	10.0
16km-20km	25.0	30.0
21km-30km	50.0	60.0
Total	100.0	100.0

The data on the influence of distance and infant mortality is presented in Table 37. The data show that, those people staying nearer to the social services such as dispensaries, all weather roads, source of drinking water, primary schools and secondary schools, are the ones experiencing more infant deaths than peoples who are far away from these social services. This was not expected and it has brought a big difference between the distance in kilometers and metres in view of infant mortality. The expectation was to find out that, those household members who are near to social services do not experience infant mortality but the reverse was the case. So there is a need to make a research on why those who are near to social services experience more death of infants.

Table 37: Influence of distance on infant mortality (%)

Variables (N= 100)	Infant death (1-11 months)				
	Dispensary	Weather road	Source of water	Primary school	Secondary school
Lessthan300m	55.0	60.0	50.0	70.0	60.0
301m-600m	45.0	30.0	40.0	10.0	40.0
601m-1000m	0.0	10.0	10.0	20.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

4.9 The Linking of Income and Infant Mortality

The data on the income and infant mortality is presented in Table 38. Over three fifth of the people studied are fathers who seem to be major income earners and below one fifth

are mothers. Mothers are in the second category of the major income earners. Most of the households surveyed, the father was the head of the household.

Traditional and cultural values of these people seem to regard a man as a controller of everything in the household, so it makes sense for man to be a major income earner. The mode for father's income is 4000 and the mean is 24 589 and the range is 339 600 (Table 40). The mode for mother's income is 1000 and the mean is 9021 and the range is 149 800 (Table 39).

Table 38: Major income earner in the household (%)

Variables (N=100)	Percent
Father	67.0
Mother	18.0
Both	15.0
Total	100.0

Table 39: Mother's income (%)

Variables (N=100)	Percent
Less than 1000	30.9
1001-10000	56.4
10001-20000	2.1
20001-30000	3.2
30001-40000	2.1
50001-150000	5.5
Total	100.0

Table 40: Father's income (%)

Variables (N=100)	Percent
Less than 1000	17.6
1001-10000	57.6
20001-30000	4.7
30001-40000	3.5
40001-50000	1.2
60001-70000	2.4
70001-90000	2.4
90001-100000	3.5
100001-120000	2.4
120001-340000	4.8

Total	100.0
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Furthermore, the data on the role of income and infant mortality is accessible in Table 41 and 42. The study revealed that mothers who earn income between the ranges of below 20 000/= Tanzania shillings (Tshs) are prone to the problem of infant mortality (Table 41). Also the fathers who earn below 70 000/= Tshs are affected by infant mortality (Table 42).

Table 41: Mother's income (%)

Variables (N= 100)	Infant mortality (1-11 months)
Less than 1000	70.0
1001-10000	20.0
10001-20000	10.0
20001-30000	0.0
30001-40000	0.0
5001-60000	0.0
70001-80000	0.0
80001-90000	0.0
Total	100.0

Table 42: Father's income

Variables (N= 100)	Infant mortality (1-11 months)
Less than 1000	50.0
1001-10000	37.5
20001-30000	0.0
30001-40000	0.0
60001-70000	12.5
90001-100000	0.0
120001-130000	0.0
140001-150000	0.0
Total	100.0

4.10 Binary Logistic Regression Analysis

In chapter three (3) it was reported that Binary logistic regression was also used for analysis. Logistic regression is used to predict a categorical (usually dichotomous) variable from a set of predict variables. Logit analysis is usually employed if all of the

predictors are categorical; and logistic regression is often chosen if the predictor variables are a mix of continuous and categorical variables and / or if they are not nicely distributed (logistic regression makes no assumptions about the distributions of the predictor variables) (Karl, 2008).

A simple (bivariate) logistic regression was employed in this study so as to check if independent variables affect dependent variables. Before analyzing, households with no infant deaths were coded '0' and 1 was used for occurrence of infant mortality as indicated in Table 43. Ten (10) covariate variables were entered such as; your house, activity to get food, education to father, education to mother, source of drinking water, distance from household to hospital, distance from household to dispensary, distance from household to primary school, amount of income earned by father and amount of income earned by mother.

Table 43: Covariate variable with scores

Variables (N= 100)	Scores	
	Yes	No
Your houses	1	0
Activity to get food	1	0
Education to father	1	0
Education to mother	1	0
Source of drinking water	1	0
Distance from household to hospital	1	0
Distance from household to dispensary	1	0
Distance from household to primary school	1	0
Amount of income earned by father	1	0
Amount of income earned by mother	1	0

The regression model predicted the logit, that is, the natural log of the odds of having made one or the otherwise. From the above table, that is the table of covariate variables with scores, the analysis continued and the results are shown in Table 44.

Table 44: Classification table

Observed	Predicted Infant mortality (1-11 month)		
	No death	1-11 month	Percent correct
Step 0 infant mortality (1-11 Month) no death	70	0	100
1-11 month (infant death)	8	0	0
Overall percentage			89.7

4.10.1 Classification table

Data on Table 44 show that, the output is for a model that includes only the intercept (which SPSS calls the constant). Given the base rates of the two decision options (70/78=89.7% there is no infant deaths, 10.3 there is infant deaths), and no other information, the best strategy is to predict, for every case, that there is no infant mortality. Using that strategy, it will be correct 89.7% of the time.

4.10.2 Variables in the equation

Under variables in the Equation the intercept – only model is $\ln(\text{odds}) = -2.169$. If the exponentiations of both sides of this expression is made, then it is found that the predicted odds $[\text{Exp}(B)] = 0.114$. That is, predicted odds of occurrence of infant mortality are 0.114. Since 8 of our subjects showed occurrence of infant mortality and 70 no occurrence of infant mortality, our observed odds are $8/70 = 0.114$ (Table 45).

Table 45: Variable in the equation

		B	S.E	Wald	df	Sig.	Exp (B)
Step 0	Constant	-2.169	0.373	33.778	1	0.000	0.114

4.10.3 Omnibus tests of model coefficients

Data on Table 46 show that omnibus tests of model coefficients gives us a Chi- Square of 20.336 on 10 *df*, significant above 0.001. This is a test of the null hypothesis that socio economic factors have no impact on the life of infants.

Table 46: Omnibus tests of model coefficients

		Chi- square	df	Sig.
Step 1	Step	20.336	10	0.026
	Block	20.336	10	0.026
	Model	20.336	10	0.026

4.10.4 Model summary

Under Model summary shown on Table 47, the -2 Log likelihood statistics is 31.250.

This statistic measures how poorly the model predicts the decisions (the smaller the statistic the better the model). Although SPSS does not give the statistic for model that had only the intercept, the statistic is 51.586. Adding the covariate variables reduced the -2Log Likelihood statistics by $51.86 - 31.250 = 20.336$, the χ^2 statistic. The Cox & Snell R^2 can be interpreted like R^2 in a multiple regression, but cannot reach a maximum value of 1. The Nagelkerke R^2 can reach a maximum of 1.

Table 47: Model summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	31.25	0.230	0.474

4.10.5 Hosmer –Lemeshow

Data on Table 48 show the Hosmer – Lemeshow which tests the null hypothesis; that there is a linear relationship between the predictor variables and the log odds of the criterion variable. Cases are arranged in order by their predicted probability on the criterion variable. These ordered cases are then divided into ten groups (lowest decile [prob<.1] to highest decile [prob >.9]). Each of these groups is then divided into two groups on the basis of actual score on the criterion variable.

This results in a 2 x 10 contingency table. Expected frequencies are computed based on the assumption that there is a linear relationship between the weighted combination of the

predictor variables and the log odds of the criterion variable. For the outcome = no (non occurrence of infant mortality) column, the expected frequencies will run from high (for the lowest decile) to low (for the highest decile). For the outcome = yes (occurrence of infant mortality) column the frequencies will run from low to high. A chi –square statistic is computed comparing the observed frequencies with those expected under the linear model. A non – significant chi- square indicates that the data does not fit model well.

Table 48: Contingency table for Hosmer and Lemeshow test

		No death of 1-11months		1-11 months mortality	
		Observed	Expected	Observed	Expected
Step 1	1	8	7.999	0	0.000
	2	8	7.995	0	0.004
	3	7	7.981	1	0.019
	4	8	7.957	0	0.042
	5	8	7.879	0	0.121
	6	8	7.734	0	0.266
	7	8	7.451	0	0.549
	8	8	6.929	0	1.071
	9	6	5.607	2	2.393
	10	1	2.466	5	3.534

4.10.6 Variables in the equation

Under variables in the Equation we are given regression coefficients and odds ratios.

Table 49: Variables in the equation

		B	Wald	df	Sig.	Exp (B)	95.0% C.I for	
							EXP (B)	
							Lower	Upper
Step 1	Yourhouse	2.895	3.166	1	0.075	18.09	0.745	439.034
(a)								
	Activitytogetfood	-0.798	2.039	1	0.153	0.450	0.151	1.346
	Eductofather	-2.236	0.753	1	0.385	0.107	0.001	16.67
	Educatomother	-2.848	1.378	1	0.240	0.058	0.000	6.731
	Sourceofwater	-0.236	0.169	1	0.681	0.790	0.256	2.435
	Housetohospital	-0.220	1.387	1	0.239	0.802	0.556	1.157
	Housetodispensary	-0.001	0.078	1	0.78	0.999	0.992	1.006
	Housetopr.school	-0.009	2.973	1	0.085	0.991	0.982	1.001
	Howmuchyouearn	0.000	0.105	1	0.746	1.000	0.999	1.000
	Howmuchincome	0.000	0.474	1	0.491	1.000	1.000	1.000
	Constant	14.22	2.534	1	0.111	1497884		

The Wald Chi- square statistic, which tests the unique contribution of each predictor, in the context of the other predictors (that is, holding constant the other predictors and eliminating any overlap between predictors) notice that each predictor does not meet the conventional .05 standard for statistical significance.

Therefore, by using the binary logistic regression model in analyzing socio economic factors affecting infant mortality, it can be concluded that , socio economic factors do not affect infant mortality due to the fact that, each predictor do not meet the conventional 0.05 standard for statistical significance and the small sample size affected the modal.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Overview

In the previous chapter the major finding of the study were presented and discussed. In this chapter a summary of the major findings of the study is presented, followed by conclusions, recommendations and suggestions for further studies.

5.2 Summary of Major Findings

The study aimed at determining how socio economics factors in Morogoro district affecting infant mortality. The study employed PCA method, which is a form of factor analysis reducing the number of variables to few ones. After that, the relationships between socio economic factors and infant mortality have been determined.

5.2.1 Socio economic characteristics

The study showing that, the relationship between socio economic variables and infant mortality were found to exist.

5.2.1.1 Income

Analysis of income of the household has revealed existing association with infant mortality. Mothers who earn their income between the ranges of less than 20 000/= Tanzania shillings (Tshs) are prone to the problem of infant mortality. Also the fathers who earn below 70 000/= Tshs are affected by infant mortality.

5.2.1.2 Poverty

The findings showed that there is a linkage between poverty prevailing in the household and infant mortality. The poorest households have more infant mortality than the better off households.

5.2.1.3 Education

The analysis showing that, education has association with infant mortality. Most of infant deaths occur in the household where parents have attended only the level of primary schools. Those households with household heads who attended university have no infant mortality. Mother's education has an inverse relationship with infant mortality.

5.2.1.4 Sanitation

There is a linkage between sanitation and infant deaths. Most of the infant deaths occur in the households where public water taps are used a source of drinking water.

5.2.1.5 Distance

The analysis of distance has revealed existing association with infant deaths. Those household members who cover more than 20km to hospital and health centre have more infant death than the households which cover less than 21km. Those household which cover less than 600m to other social services centers are affected by infant mortality.

5.3 Conclusions

The following conclusions were drawn from the finding of the study:-

- (a) According to the study, there exist inverse relationship between poverty and infant mortality.
- (b) The households with low income were found to have infant mortality and the reverse exists within the households with high income. Health services were found to be available or near to the countryside residents though among the residents who live near health services are the ones who die most compared to those who live far away from health services.

- (c) The study also revealed that, those households engaged in farming and other activities such as labourers and business are the ones most affected by infant mortality.
- (d) Infant mortality was not found in the better off households
- (e) Households' education and employment status have been found to affect infant mortality. Household with low education level and self employed are more vulnerable to infant mortality.
- (f) Availability of water which was mainly obtained from springs, shallow wells and taps sources was more or less the same to all people. This explained the fact that water is a basic need for human beings as they are equally distributed along the water sources.
- (g) Infant mortality is a reliable indicator of health status and well being of children. Besides, it reflects the socio –economic development of the population.

5.4 Recommendations

The whole community living in Morogoro district, the government, project planners policy makers, NGO's and stakeholder are responsible for the health of infants. On the basis of the findings of this study, the following recommendations are made to each level.

5.4.1 The policy and programme makers

(a) Since mortality as well as infant mortality has been closely related to socio economic factors, there is a need of deliberate efforts to improve the living standards of the rural residents.

(b) There is a need of more emphasis on rural (community) development efforts.

Among which are:-

- I. Increase of employment opportunities for the local communities in rural residents is highly encouraged. This will influence the people living in rural areas to have various sources of income and educate them on how to use income in order to raise their living standard hence reduction of poverty.
- II. Income earned by heads of the households should be not less than 70,000/= Tshs.
- III. Quality education which is concerned with standard of life and health care is needed for most of the rural residents. The education from primary to other level should not only be of knowing how to read and write but rather how to tackle existing problems in the society. Also the use of available social services needs to be put into emphasis by education.
- IV. The community at large should be educated on giving girls more education because they are the most valuable with regard to caring of a family and this follows the slogan which states that “to educate women or girls is to educate the society”.
- V. Countryside people should be given affordable loans so that they can be effectively self employed.
- VI. There should be on going research on socio economic factors in order to come up with different solutions to different problems that face community in general.

- VII. With regard to the reason that, many of the household surveyed possess radios, the strategies and ways of reducing infant mortality should be broadcasted by radios.
- VIII. The gears for cultivation should be of high technology with low cost so as most of the farmers can be able to buy it and increase production.
- IX. There should be hospitals or health centre closer to countryside residences.
- X. The analysis of socio economic factors affecting infant mortality by using binary logit regression should use a large sample size.

5.4.2 Morogoro District residents

They should be ready to collaborate with the relevant organs from planning to implementation of various activities that lead to the reduction of mortality specifically mortality.

5.5 Area for Future Research

Further researchers that will be conducted in Morogoro District should concentrate on the following areas;

- a. The study on why those who are near to social services are still prone to the problem of infant mortality.
- b. The study on who dies mostly between a girl or baby boy in Morogoro district.
- c. The study on specific independent variable and infant mortality.
- d. The current research has found that, most of the populations surveyed do have radios, but do they real listen to different programmes.
- e. The study on why most of girls do not go further with regard to educational matters.
- f. The study on cultural factors affecting infant mortality.

- g. The study on demographic factors influencing infant mortality.
- h. The study on religious factors affecting infant mortality.
- i. The study on the efficiency of health facilities in Morogoro District.

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APPENDICES

Appendix 1: Household members structured questionnaire

SOCIO ECONOMIC FACTORS AFFECTING INFANT MORTALITY IN MOROGORO DISTRICT.

SECTION A: General Information

- 1 (i) Name /title of person completing the questionnaire.....
- (ii) Date of interview.....
- (iii) Village.....
- (iv) Ward.....
- (v) Division.....
- (Vi) District.....
- (Vii) Region.....

SECTION B: Background variables

2. Household characteristics

(i) Name of respondent.....

(ii) Sex

1. Male.....
2. Female.....

(iii) Age.....

(iv) Marital status.

1. Single
2. Married
3. Divorced
4. Separated ()
5. Widowed
6. Other (specify)

(v) Religion**Mother.**

-What is your Religion?

1. None
- 2 Christian
3. Muslim ()
4. Traditional
5. Others (specify).....

Father.

-What is your Religion?

1. None
- 2 Christian
3. Muslim ()
4. Traditional
5. Others (specify).....

SECTION C: Socio economic factors affecting infant mortality.

(i) Level of education.

Level of education to father

3. What is your highest level of education?

1. No formal education
2. Primary school
3. Secondary education
4. Post secondary non university ()
5. University
6. Others (specify)

Level of education to mother

4. What is your highest level of education?

1. No formal education

2. Primary school
3. Secondary education
4. Post secondary non university ()
5. University
6. Others (specify)

(ii) Occupation.

Occupation to father.

5. What is your occupation? (Tick in the bracket)

1. (i) Employment ()
(ii) What kind of an employment? (Mention).....
2. (i) Business ()
(ii) What type of business? (Mention).....
3. (i) Farming ()
(ii) Which kind of farming? (Mention).....
4. (i) Informal sector ()
(ii) What kind of informal sector? (Mention).....
5. Others (specify).....

Occupation to mother

6. What is your occupation? (Tick in the bracket)

1. (i) Employment ()
(ii) What kind of an employment? (Mention).....
2. (i) Business ()
(ii) What type of business? (Mention).....
3. (i) Farming ()
(ii) Which kind of farming? (Mention).....
4. (i) Informal sector ()

(ii)What kind of informal sector? (Mention).....

5. Others (specify).....

.....

For question in the column iii to v, fill the answered number or numbers in the bracket.

(iii) Housing Conditions.

7. What is the major source of water for drinking for the Household?

1. Public water tap

2. Unprotected well

3. Protected well

4. Spring ()

5. Pond, river, stream

6. Shallow well

7. Others (specify).....

8. What type of toilet facility is available in the Household?

1. Traditional pit

2. Ventilated pit ()

3. No facility

4. Others (specify)

.....

9. What is the distance from your house to the following social services?

- Hospital
- Health centre
- Dispensary.....
- All weather road.....
- Water source.....
- Primary school
- Secondary school

(iv) Income.

10. Who is the major income earner in the household?

1. Mother
2. Father ()
3. Both

Mothers' income.

11. Do you earn income per;

1. Month
2. Week ()
3. Day

If she earns per month, skip the week and day on question 12 and do it vice versa if necessary.

12. How much do you earn per.

1. Month.....
- ...
2. Week.....
3. Day.....

Fathers' income.

13. Do you earn income per;

1. Month
2. Week ()
3. Day

If he earns per month, skip the week and day on question 14 and do it vice versa if necessary.

14. How much do you earn per.

4. Month.....
- ...
5. Week.....
6. Day.....
- ...

(v) Poverty.**Household physical assets. (Tick)**

15. Is this your house?

1. Yes ()
2. No ()

16. How many bedrooms are here in?

1. One bedroom
2. Two bedrooms ()
3. Three bedrooms
4. Four and above bedrooms

17. (i) **House - Floor** - 1.Cemented ()

2. Mud floor ()

3. Tiles ()

4. Wood ()

5. Others (mention).....

- **Walls** – 1. Cemented blocks ()

2. Burnt bricks ()

3. Mud bricks ()

4. Mud with trees ()

5. Stones ()

6. Thatched grass, cardboard ()

7. Others (mention).....

- **Roof** - 1. Covered with iron sheet ()

2. Covered with grass, trees, mud ()

3. Cemented tiles ()

3. Others (mention).....

For the below question, tick Yes if the answer is Yes and tick No if the answer is No.

TYPES OF ASSETS	1. YES	2. NO
(ii)Electrical Gears		
- Radio		
- Television set		
- Camera		
- Mobile phone		
- Refrigerator		
(iii)Transport Facilities		
- Motorcar		
- Motorcycle		
- Bicycle		
(iv)Livestocks		
- Cows		
- Goats		
- Chickens		
- Pigs		
- Sheep		
(v)Farm Implements.		
- Ox plow		
- Ox cart		
- Hand hoe		
- Bush knife		

- Axe		
- Tractor		
(vi)Other Gears		
- Kerosene lamp		
- Torch		
- Charcoal stove		
- Local kerosene lamp		
- Chair/Table set		
- Foam mattress		
- Local foam mattress		
- Bed		
- Local bed		
- Bucket		

18. (i) Do you own land? (tick)

1. Yes ()

2. No ()

(ii) If yes, how much land do you own?.....acres/ha

1. Hectare 1-3

2. Hectare 4-6 ()

3. Hectare 7-12

4. Hectare 13 and above

(iii) Does your household borrow land?

1. Yes ()

2. No ().

(iv) If yes, how much land do borrow per year.....acres/ha

1. Hectare 1-3

2. Hectare 4-6 ()

3. Hectare 7-12

4. Hectare 13 and above

19. How much food crop products did you harvest in the last year/this year?.....

1. Less than one sacks

2. One sack ()

3. Two sacks

4. Three and above sacks

20. Which other activity helps you to get food different from land owning?

1. Laborers

2. Employment ()

3. Business

4. Farming

(vi) Mortality.

21. Has there been any death in the past 12 months in the household? (Tick)

1. Yes ()
2. No ()

22. How old was she or he in his or her time of death? (Mention).....

1. 1-11 months
2. 1-3 years old ()
3. 4 and above years.

23. What was the occasion of his or her death? (Mention).....

1. At home
2. At the hospital/dispensary
3. Other place. ()

THANK FOR YOUR COOPERATION