DETERMINANTS OF UNDER-FIVE MORTALITY IN ZAMBIA

A CASE STUDY OF KITWE DISTRICT

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DEDICATION

This dissertation is wholeheartedly dedicated to my beautiful daughter Mwelwa Faith Chinyimba who has been my inspiration through all the difficult moments I was facing.

DECLARATION

I, Justina Mulenga, hereby declare that this dissertation represents my own work, and that it has not previously been submitted for a degree at this or any other University. All published work or materials from sources that have been incorporated have been dully acknowledged and adequate reference thereby made.

Signature of Researcher ---------- Mulenga

Date ---------- 27/08/10

CERTIFICATE OF APPROVAL

The dissertation of **MULENGA JUSTINA** is approved as fulfilling part of the requirements for the award of the degree of **Master of Arts in Population Studies** at the University of Zambia.

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ABSTRACT

This research looks at the determinants of under-five mortality in Kitwe district in Zambia. The objective of this study was to investigate the determinants of under-five mortality in Kitwe district. Both qualitative and quantitative techniques were used in collecting data. A detailed questionnaire was administered to a sample size of 100 to collect information on the possible determinants of under five mortality in Kitwe district. The verbal autopsy provided qualitative information on the illness that led to the death of the child. One of the specific objectives was to investigate the relationship between socio-economic factors and under-five mortality. The other specific objective was to investigate the role of child care practices and use of modern health services and under-five mortality. The findings show that there is a relationship between the availability of electricity in households and under-five mortality. Households using electricity contributed only 27 percent of the under-five deaths in Kitwe district, whereas 73 percent of the deaths came from households using other means of energy for cooking. Similar findings were observed on the use of water where 65 percent of the deaths came from households that used river or well/bole water while 35 percent came from households using piped water. However, health-seeking behavior such as antenatal care, place of delivery, breastfeeding and vaccination of the child do not seem to be significant contributors to under-five mortality in Kitwe district.

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ACRONYMS AND ABBREVIATIONS

AIDS----------Acquired Immune Deficiency Syndrome

ANC----------Antenatal Care

CBoH----------Central Board of Health

CSO----------Central Statistical Office

DHS----------Demographic and Health Survey

DIU----------Development Indicator Unit

DRC----------Democratic Republic of Congo

EPI----------Expanded Programme on Immunization

FANC----------Focused Antenatal Care

HIV----------Human Immune Virus

IMR----------Infant Mortality Rate

KDHMT----------Kitwe District Health Management Team

$LMCS_s$----------Living Conditions Monitoring Surveys

MDHS----------Malawi Demographic and Health Survey

MII----------Macro International Inc

MGD----------Millennium Development Goal

MOH----------Ministry of Health

NGO----------Non – Governmental Organization

NN----------Neonatal Mortality

NFHS----------National Family and Health Survey

ORS----------Oral Rehydration Salts

PEM----------Protein Energy Malnutrition

PNN----------Post Neonatal Mortality

SPSS----------Statistical Package for Social Science

SSA----------Sub-Saharan Africa

SD----------Statistical Division

TBA----------Traditional Birth Attendant

TT----------Tetanus Toxoid

TDRC----------Tropical Diseases Research Centre

UNZA----------University of Zambia

U5MR----------Under-Five Mortality Rate

UNICEF----------United Nations International Children's Education Fund

UN----------United Nations

WHO----------World Health Organization

ZDHS----------Zambia Demographic and Health Survey

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CHAPTER ONE

Introduction

1.1: Background

Zambia is a land-locked and is one of the developing countries in Sub-Saharan Africa. It shares borders with the Democratic Republic of Congo (DRC) and Tanzania in the north, Malawi and Mozambique in the east, Zimbabwe and Botswana in the south, Namibia in the southwest and Angola in the west. The country is divided into nine provinces and seventy-two districts.

Zambia has a mixed economy consisting of a modern urban sector that, geographically, follows the rail line and a rural agricultural sector. For a long time, the modern sector was dominated by parastatal organizations, which private businesses dominated the construction and agriculture sector. 64 percent of Zambians were classified as poor (Central Statistical Office (CSO), Ministry of Health (MoH), Tropical Diseases Research Centre (TDRC) and University Of Zambia, 2009). Zambia is rated a poor country where about 68% of Zambians live below the Development Indicators Unit (DIU), Statistics Division (ST) and United Nations (UN) (2000).

Under-five mortality constitutes all deaths which occur before the fifth birthday. These deaths can be expressed in probabilities. The first is neonatal mortality, which is the probability of dying within the first month of life. The probability of dying before the first birthday is called Infant mortality. The difference between Infant and neonatal mortality is called post neonatal mortality. Child mortality is the probability of dying between the first and fifth birthday and under-five mortality is the probability of dying before the fifth birthday (Central Statistical Office, Ministry Of Health and Micro International Inc, 2003).

Globally, Infant and child mortality rates have dropped considerably during the second half of this century. In 1974, the average Infant mortality rate for the world was 156 Infant deaths per 1000 live births (Population Reference Bureau (PRB), 1976). In 1994, the rate was 63 (Population Reference Bureau (PRB), 1995). Yet wide disparities remain both among and within countries. In 1993, the Infant Mortality Rate (IMR) for developing countries was 69 deaths per 1000 live births compared with a rate of 9 deaths per 1000 live births in more developed nations.

Improvement has been slowest in Sub-Saharan Africa, where more than 1 in every 10 children born will die before their first birthday (Population Reference Bureau (PRB), 1976).

Zambia's population was estimated to be 10.3 million in 2000 and the average annual rate of growth was 3.3 percent. The population is expected to double by 2015 and reach 18 million in 2016. The under-five children constitute twenty percent of Zambia's total population while women in child bearing age constitute 22.1 percent of the total population. Central statistics Office (CSO) , Central Board of Health (CBoH) and Macro International Inc, (MII), (2000).

Traditionally, marriage in Zambia is fairly early and universal as in the case of most countries in Africa. Data from the 1996, 2001-2002, and 2007 Zambia Demographic and Health Survey indicate that the median age at first marriage among women age 20-49 has remained constant at 18 years. Early marriage is associated with high fertility which is negatively related to the level of education. Illiterate women marry earlier and bear about three more children than those with secondary education, (Ministry Of Health, 1996). The 2007 Zambia Demographic and Health Survey (ZDHS) indicate that the total fertility rate is 6.2 births per woman. (Central Statistical Office (CSO), Ministry of Health (MoH), Tropical Diseases Research Centre (TDRC) and University of Zambia (UNZA), 2009).

In Zambia, under-five mortality rate (U5MR) increased between 1975 and 1995 especially in urban areas (World Bank, 2006). For both urban and rural areas, under-five mortality comprises quite a sizeable proportion of total deaths; 132 deaths per 1000 births in the urban areas and 139 deaths per 1000 births in rural areas (Central Statistical Office (CSO), Ministry of Health (MOH), Tropical Diseases Research Centre (TDRC) and University of Zambia (UNZA), 2009). In the period 1987-1991, nearly one in five Zambian children died before their fifth birthday (Central Statistical Office (CSO), 1992). One of the most striking findings from the Zambia Demographic and Health Survey is the apparent downturn in child survival prospects over the last decade. From 1977-81 to 1987-91, under-five mortality rose by 15 percent from 152 to 191 per 1000 live births while it showed a modest increase from 191 to 197 deaths per 1000 births between 1992 and 1996 surveys (Central Statistical Office (CSO), Ministry Of Health (MoH) and Micro International Inc (MII), 2003). In 2001-2002, under-five mortality stood at 168 per 1000 live births (CSO, MoH and MII, 2003). Most recent results from the Zambia Demographic and Health Survey show that in 2007 under-five mortality was estimated at 119 deaths per 1000

live births (CSO, MoH and MII, 2009). This shows that the chances of dying among the children under the age of five are lower now (119 deaths per 1000 live births) than they were more than twenty years ago (152 deaths per 1000 live births).

1.2: Statement of the Problem

There have been a number of studies that have been carried to investigate the determinants of under-five mortality both in Zambia and elsewhere especially in developing countries. In Zambia, such studies include the 1969, 1980, 1990 and 2000 censuses, the 1992, 1996, 2001/02, 2007 Zambia Demographic and Health Surveys, the Living Conditions Monitoring Surveys (LMCSs) of 1991, 1993, 1998 and 2004. In addition to these nationally representative sources of data, there have been small-scale studies which include studies by Dzekedzeke, (1991), Chewe (1997), and Nsemukila (1996). Elsewhere, studies that have investigated determinants of under-five mortality include those by Gaisie, 1990, Lentzner and Preston, 1985, Venkatacharya, 1991, Wenlock, 1979, Caldwell, 1979, Hobcraft et al. 1984, Mosley and Chen, 1984. Operating within the traditional socio-economic and demographic framework, these and other previous studies have concentrated largely on such factors as birth intervals, birth order, traditional practices, vaccination status and other socio-economic and demographic indicators.

Undeniably, most of these studies have provided a lot of insight into the correlates of under-five mortality in respective countries. However, useful as these studies have been, the analyses have mostly been at the national and provincial levels with the exception of one study (Kapungwe, 2005) that investigated under-five mortality in two districts of Zambia. Consequently, very little is known about the situation at the micro level such as the district. This study is therefore a significant departure from most previous studies in that it investigates determinants of under-five mortality at micro (i.e. district) level which earlier studies seem to have overlooked particularly in Zambia.

1.3: General Objective

The general objective of this study was to investigate the determinants of under-five mortality in Kitwe District one of the 72 districts in Zambia.

1.3.1: Specific Objectives

In order to achieve the general objective, the following specific objectives were investigated;

i. Causes and age distribution of under-five mortality in Kitwe district of Zambia.
ii. The relationship between socio-economic and demographic factors on under-five mortality.
iii. The relationship between child health-seeking behavior and under-five mortality in the study site.

1.4: Rationale/Significance of the Study

Documentation of determinants of under-five mortality will allow a better understanding of the status of the health of children and help to identify gaps where further action is needed. The monitoring of mortality levels and establishment of determinant of under-five mortality is particularly important in children younger than five years, a group that is the main target of public health policies and the most common indicators of mortality levels in a developing country like Zambia. The findings of the research, therefore, should be of use to the Ministry of Health (MoH), the Kitwe District Health Management Team (KDHMT) and other stakeholders such as Non-Governmental Organizations (NGOs) in designing and implementing child health intervention programs and projects.

1.5: Conceptual framework

The fact that more children die from poorer households than from richer ones is not due directly to their differential clustering of the biomedical factors that may produce ill-health and early deaths. There has, therefore, been an increased awareness of the need for research integrating the socioeconomic and biological factors in childhood morbidity and mortality. Various conceptual frameworks to analyze childhood morbidity and mortality have been put forward. The widely known proximate determinant framework of child survival developed by Mosley and Chen (1984) is one of these frameworks and is the one that guided this study because it allows for careful tracing of the ways through which socioeconomic factors impinge on child health and survival in the developing world. Briefly the framework presumes the following:

- Under optimal conditions, less than five percent of newborn infants will die during their first 60 months of life.
- A higher death probability in any society is due to social, economic, environmental and biological factors which necessarily operate through more basic (proximate) determinants of the risk of diseases and the outcome of disease processes.
- Specific diseases and nutrient deficiencies are biological outcomes of the operation of the proximate determinants.
- A child's death is the cumulative consequence of multiple processes including their biosocial interactions.

The framework identifies five groups of mechanisms through which socioeconomic factors act to influence the risk of mortality namely; bio-demographic factors (maternal factor such as age, parity and birth order, others such as child's sex, birth weight and previous reproduction loss); environmental contamination (air, food/water, fingers, skin and insect vectors); nutrient deficiency; personal illness control and injury (Mosley and Chen, 1984).

CHAPTER TWO

Literature Review

This chapter presents a review of literature on determinants of under-five mortality. The chapter is based on under-five mortality studies conducted in various countries including Zambia. Apart from determinants, levels and trends of under-five mortality are also discussed.

2.1: Levels and trends of under-five mortality: A general overview

The most recent estimates of under-five mortality based on the work of the Inter-agency Child Mortality Estimation Group indicate that the global number of children dying before age five has reached a record low, falling below 10 million per year to 9.7 million in 2006, down from around nearly 13 million in 1990. Of the 9.7 million children who perish each year, 4.8 million are from Sub-Saharan Africa and 3.1 million are from South Asia. The highest rates of under-five mortality are still found in West and Central African countries with 186 deaths per 1,000 live births (Ministry of Health (Egypt) et al, 2006).

Improvements in child survival have been very poor in Sub-Saharan Africa (SSA). Since the 1990s, declines in child mortality have reversed in many countries in the region; in others they have either slowed or stalled, making it improbable that the target of reducing child mortality by two thirds by 2015 will be reached by the majority of the countries in the region (Fotso, J.C et al, 2007). Under-five mortality rate (U5MR) in SSA varied from 185 per 1,000 live births in 1990 to 172 in 2003 (Fotso, J.C et al, 2007). This corresponds to an overall decline of about 7 percent or nearly 0.5 percent on an annual basis, while the Millennium Development Goal (MGD_S) on child mortality targets an average reduction of 4.3 percent per year. If the region had been on track to meeting the MGD on child mortality, U5MR would be around 105 in 2003. At current trends, mortality rate in children younger than five years will decline by less than 15 percent by 2015 from the 1990 base year, compared to the expected goal of 66.7 percent. (Fotso, J.C et al, 2007).

Numerous studies on infant and under-five mortality in developing countries indicate that most of these deaths are from preventable causes- such as diarrhea, pneumonia, measles, malaria, HIV and AIDS, and the underlying malnutrition. This suggests that the goal of reducing childhood mortality by two-thirds by 2015 could be achieved if few known and effective child survival

interventions could reach population groups that need them most (Fotso, J.C et al, 2007). These include immunization, safe water and sanitation, micronutrient supplementation, nutrition counseling. In malaria-prone areas, insecticide-treated bed nets should be provided. The task of scaling up child-health interventions to full coverage in countries with the highest mortality is within reach, and resources should be mobilized to match governments' and development partners' commitments with action (Fotso, J.C et al, 2007).

Zambia is one of the countries with relatively high Infant mortality, but showing a mix of increasing and declining trends in the last few decades. Between the 1960s and 1970s, infant mortality in Zambia declined from about 141 to 90 deaths per 1000 live births, but a reversal of this trend was noticed in the mid 1990s with infant mortality rising to about 100 deaths per 1000 live births. Evidence of worsening child health among the urban poor was reported by Madise et al, (2003), who analyzed the 1992 and 1996 Zambia Demographic and Health Survey data to identify changes in socioeconomic and demographic determinants of infant mortality. They found that in the mid 1990s, children of the urban poor had 46 percent higher probability of dying in infancy than the poorest rural children. They also reported reversal in household socioeconomic status between the two surveys and lower utilization of health care.

In Zambia, early childhood mortality rates for the three five-year periods preceding the 2007 Zambia Demographic and Health Survey (ZDHS) are represented in Table 1.

Table 1: Early Childhood Mortality Rates

Neonatal, post neonatal, infant and under-five mortality rates for five-year period preceding the survey, Zambia 2009.

Years Preceding The survey	Neonatal Mortality (NN)	Post neonatal Mortality (PNN)	Infant Mortality ($_1q_0$)	Child Mortality ($_4q_1$)	Under-five Mortality ($_5q_0$)
0-4	34	36	70	52	119
5-9	39	56	95	70	158
10-14	28	56	84	80	157

[1] Computed as the difference between the infant and neonatal mortality rates

Source: Zambia Demographic and Health Survey 2007

An examination of mortality levels across the three successive five-year periods suggests that under-five mortality decreased from 157 deaths per 1,000 births during the middle to the late 1990s (circa 1993-94 to 1997-99) to 119 deaths per 1,000 during the first half of this decade (Circa 2002-03 to 2007-08). Most of the decrease occurred outside the neonatal period (CSO, MoH and MII 2009).

Table 2 shows trends in early childhood mortality in Zambia between the 1992 ZDHS and the 2007 ZDHS. The pattern shows an increase in under-five mortality from 1992 to 1996, that is, 191 deaths per 1,000 live births in 1992 to 197 deaths per 1,000 live births in 1996. Between 1996 and 2001-2002 surveys, under-five mortality declined from 197 to 168. It further reduced to 119 deaths per 1,000 live births by 2007.

Table 2: Trends in Early Childhood Mortality Rates

Neonatal, post neonatal, infant, child and under-five mortality rates for the five-year period preceding the Survey, Zambia 1992-2009

Survey	Approximate Calendar period	Neonatal mortality (NN)	Post neonatal mortality (PNN)[1]	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality
ZDHS 2007	2003-2007	34	36	70	52	119
ZDHS 2001-2002	1997-2001	37	58	95	81	168
ZDHS 1996	1992-1996	35	74	109	98	197
ZDHS 1992	1987-1991	43	65	107	94	191

[1]Computed as the difference between the infant and neonatal mortality rates.

Source: Zambia Demographic and Health Survey

Many factors play a potential role in observed infant mortality trends and differentials. Socio-economic status and region of residence are some of the attributes of infant mortality. Sex and particularly birth weight are significant in determining whether the new born baby lives or dies. Maternal characteristics are also important. These are: age, parity and previous reproductive loss. Others are micro-environmental, nutrition, child care practices and accessibility/use of modern health services.

2.2: Demographic factors

2.2.1: Age of Mother

Age of the mother at the time of the child's birth has a strong bearing on the survival prospects of the child. As is well-established in the medical literature, the risk of complicated deliveries is high among very young and older mothers. Department of Census and Statistics (2008) indicate that in Sri Lanka, the risk of infant or child death among mothers who give birth past the age of 40 years is 3-4 times the risk among mothers who give birth between the ages of 21 and 40 years. Likewise, infant and under-five mortality rates are nearly two times as high when the mother is 20 years old or younger than when she is 21-40 years of age.

Age of the mother at birth yet adds another factor associated with under-five mortality. The offspring of teenage (19 years of age or younger) mothers have long been known to be at increased risk of infant mortality, largely because of their high prevalence of low birth weight (less than 2,500 grams) (Friede A. et al, 1980). A research done in the United States of America found that there was a strong association between young maternal age and high infant mortality and between young maternal age and a high prevalence of low birth weight (Friede A. et.al, 1980). Babies born to teenagers are known to be at increased risk of neonatal and post neonatal mortality. The earlier literature suggested that this risk is a biological effect mediated by the mother's physiological immaturity. These findings are consistent with the findings in Malawi. According to the National Statistical Office and UNICEF (2007), in Malawi, children born to younger mothers (under 20 years of age) and older mothers (over 40 years) had higher mortality than children born to mothers aged 20-39 years. Children of mothers under age 20 are especially vulnerable, particularly in the first month of life. Neonatal mortality was 68 deaths per 1,000 among children of teenage mothers, compared with 38 per 1,000 among children of women age 20-29 (National Statistical Office, 2000).

According to CSO, MoH and MII (2003), in Zambia, the relationship between mother's age at the time of birth and childhood mortality exhibits the expected curvilinear pattern. In other words, young mothers and mothers nearing the end of their reproductive lives have higher chances of infant mortality than other mothers in the reproductive age. This pattern can be observed for all mortality rates except for post-neonatal mortality, where the rate is slightly lower for women age 40-49 than of women 30-39. This pattern is most pronounced in the first month of life and much less pronounced during the 1 to 5 year age period.

2.2.2: Ethnicity of the mother

Another maternal variable that has a bearing on the survival of a child is ethnicity of the mother. Ethnicity in Africa is one of the most important factors that determine the degree of adaptation to modern behaviors including child health and nutritional practices (Gaise, 1980). In other words, ethnicity carries certain behavior and guiding norms and values that have some influence on the heath care for infants and children and consequently their survival. Particularly important in this

differentiation process are cultural beliefs and procreation, child care and causes of childhood diseases and their treatment.

A number of studies in developing countries have demonstrated the influence of ethnicity on child survival. A study by Mensch et al (1985), shows that ethnicity in a plural society is the only social variable that can compete with parental education as a determinant of child survival. A similar study in Kenya (Venkatacharya, 1991), also shows that ethnic background can largely influence the probability of dying of children. A study in rural Zambia Wenlock (1979), on social factors, nutrition and child mortality, found cultural ethnicity, rather than geographical factors to have generated more significant effect on child deaths.

2.2.3: Birth Interval

According to CSO et al, (2007), in Zambia shorter birth intervals are associated with higher mortality both during and after infancy. This is particularly true within the first month of life, where children born less than two years after a previous birth are three and half times more likely to die than babies born four or more years after the previous birth. The birth interval effect on mortality risk persists after the neonatal period, but with diminished strength. During infancy, children born less than two years after a previous birth are almost three times likely to die than their counterparts born four or more years after the previous death. These differentials suggest that mortality risks for children, particularly those born to young mothers, would be substantially reduced if birth intervals were increased, possibly through family planning (Central Statistical Office, Ministry of Health and Macro International Inc, 1992, 1996, 2003, 2007).

2.2.4: Child's Sex

In Zambia, it has long been established that male children are at increased mortality risk both before and shortly after birth, presumably due to genetic factors (CSO et al, 1996). About 105 males are born for every 100 females. This is true in most countries and most groups, with little if any variation over time. However, with rare exceptions- as seen in India, death rates are higher for males at all ages (Population Reference Bureau, 1976). Female children have a lower mortality risk than males. The under-five mortality risk for males is more than 10 percent greater than that for females (CSO et al, 2003). A prospective cohort study on child survival experience of under-five children in rural Western India (Joseph, 1988) revealed that girls have a better

survival in the neonatal period compared to boys. This conforms to the biological hardiness of the girl child. However, this trend reverses in the post neonatal period. The explanation of the reversal in mortality and / or survival trends in the post neonatal period (in favor of the boy) may probably be socio-cultural and not biological.

2.2.5: Birth Order

Another child-specific factor that increases the risk of infant death is birth order. A child is of "high birth order," if the mother had previously given birth to three or more children, that is, the child is of birth order four or higher. Similarly, a child is of "low birth order," if the mother had previously given birth to two or less children. According to Department of Census and Statistics, (2008), in Sri Lanka, higher birth order children are much more likely to die prematurely than lower birth order children. What is interesting to note from the survey, however, is that birth order and sex interact with each other to produce the highest risk of premature death for higher order girls. For instance, the Infant mortality rate among girls of birth order three or higher is as high as 27 deaths per 1,000 live births, as compared to an Infant mortality rate of only 13 deaths per 1,000 live births among first-born daughters. The comparable rates for boys are 18 and 12 deaths per 1,000 live births. Thus, while all higher-order children face a greater risk of premature death, the risk is particularly large for higher-order girls. These patterns are widely observed again in other parts of Asia (Pakistan, India and Bangladesh), but their presence in Sri Lanka is surprising in view of the high-levels of female literacy and good access to health facilities for much of the population.

In general, infants of high birth order have the least favorable chances of living to their first birthday and those of first order, the best (Population Reference Bureau (PRB), 1976). CSO et al, (2003) also indicate that childhood death is higher among children of high birth order than among other children.

2.1.5: Birth Weight

Numerous British and United States studies have shown that a birth weight of 2500 grams (about 5½ pounds) or less is the strongest single correlate of infant death. National levels of neonatal mortality in particular depend in large part on the frequency of such "immature" births (Population Reference Bureau (PRB) 1976). Studies done worldwide have shown that a child's

weight at birth is an important determinant of its survival chances. In Zambia, CSO et al, (2003), reports that children who are perceived by their mothers to be smaller than average at birth experience higher mortality rates than children perceived to be average or larger, particularly in their first month of life and in infancy. This proxy for low birth weight carries a risk of Infant death 2.5 times higher than the risk for average or large birth size (World Health Organization, 2000).

2.3: SOCIO-ECONOMIC FACTORS

2.3.1: Parental Education

Childhood mortality rates by mother's level of education show the expected relationship, with children of better educated women having lower mortality rates (Central Statistical Office (CSO), Ministry of Health (MoH) and Macro International Inc (MMI), 2007). Similarly, in a study of some 3,100 infant deaths occurring among the 142,000 children born in 1968 in New York City, the Infant Mortality Rate (IMR) for infants born to women with four or more years of college education was found to be less than those of babies whose mothers failed to complete high school (Population Reference Bureau, 1976). A study done in Nigeria (Caldwell,1979) showed that children of women with primary schooling and those with post-primary schooling experience mortality levels which are 68% and 40% respectively, of the level experienced by children of women with no schooling. Father's schooling, though producing a monotonic decline in the child mortality index as its level rises, yields a weaker effect than mother's schooling, whose effect also survives control for both parents' occupational status and use of family planning. Data from Benin city in the mid west, based on a five-year birth history, also indicate that mothers' schooling produced the expected effect- women with no education experienced higher risk of child mortality, even in the presence of controls for parity, type of refuse disposal facilities, toilet facilities and timing of antenatal visits (Onyemunwa, 1988).

Two main reasons have been given for expecting the education of parents to affect the survival of their children. First, it enhances their income potential by raising their occupational status. Second, it provides them with knowledge for prevention and treatment of ill health. Caldwell, (1979), gave three main hypotheses on the mechanism through which maternal education is supposed to exert its effect on the health of children.

- *The first explanation is usually given as the only reason. that is that mothers and other persons involved break with tradition, become less "fatalistic" about illness and adopt many of alternative in child care and therapeutics that become available in the rapidly changing society.*

- *The second explanation is that an educated mother is more capable of manipulating the modern world. She is more likely to be listened to by doctors and nurses. She is more likely to know where the right facilities are and to regard them as part of her world and regard their use as a right and not a boon.*

- *There is a third explanation, which may be more important than two combined. That is, that the education of women greatly changes the traditional balance of familial relationships with profound effects on child care.*

2.3.1: Household income, wealth, parental occupation and employment status

Household income, wealth and parental occupational/employment status are variables that directly determine household's economic position. They, therefore, influence the quality and quantity of nutrient intake that can be afforded for children, and the quality of shelter and use of medical services, all of which may be expected to affect child health and survival. Studies in Nigeria (Suilaman, 1987), Senegal, Lesotho, Kenya and Northern Sudan (Hobcraft et al, 1984) found an inverse association between father's as well as mother's income and child mortality risks. For at least a century, observers have speculated on the relation of socio-economic factors to infant mortality. In Dublin in 1883-85, children of low-income service workers were found to have higher rates of infant mortality than those of professional men. Several more recent studies have carefully examined the relationship between infant mortality and social class as measured by levels of father's occupation. The inverse relationship was confirmed for infant deaths (Population Reference Bureau, 1976, CSO et al, 2009). The World Bank Report of 2000

also supported the previously documented inverse relationship between per capital income and infant mortality (WHO, 2000)

2.4: Micro-environmental factors

Micro-environmental factors include type of toilet facilities, source of household water supply, household crowding, housing quality, and methods of refuse disposal, all of which are generally thought of as determining the level of potential exposure to infectious diseases, the leading cause of child deaths in the developing world (Mosley and Chen, 1984). A study done in Sậo Paulo shows that between 1964 and 1971, the infant mortality rate rose by 26 percent, from 71 per 1,000 to 89 per 1,000. One factor that was identified to have contributed to the rise in infant mortality rates was lack of sufficient investment in water supply and sanitation (Monteiro and Benicio, 1989). Beginning in 1973, infant mortality rates began to decline in the state. Most researchers have attributed the fall to infrastructure improvements (Costa and Duarte, 1989). Brazil embarked in the 1970s on an intensive effort to improve water supply and sanitation (Merrick, 1985) which raised the proportion of households in Sặn Paulo with running water from 71.3 percent in 1973 to 98.6 percent in 1984 (Saweyer, Castilla, and Mor, 1987). Studies done in Nigeria revealed that infant mortality rate is less in areas where flush or pit toilets are used than in areas where buckets and others are used (Babatunde, 1992). The influence of area of residence on early childhood mortality may be expected because easier access to health services and other health-enhancing resource may be a result of their greater concentration in cities in most African countries (Cantrelle et al, 1986; Mosley, 1985), as well as the greater exposure of their residents to modernizing influences. Overcrowded housing was found to be associated with high infant mortality in Vienna in 1891 (Population Reference Bureau, 1976).

2.5: Child care practices

2.5.1: Use of modern health services

The steps taken by parents to prevent child illness and, when ill, to ensure a child's quick return to good health are perhaps the most directly linked to child mortality risks. This is an area where questions are raised about the relative role of parental knowledge and attitude concerning child health care and the ability to procure good health care. Under utilization of rural health services in developing countries is sometimes blamed on non-economic factors, such as unwillingness

and traditional attitudes towards use of modern facilities (Mosley, 1984). Child health programmes are also important in as far as reducing child mortality is concerned. A study done in India indicated a positive relationship between reduced under-five mortality rates and key health child interventions, such as oral dehydration therapy, care seeking for acute respiratory infections and immunization rate (World Health Organization, 2000).

2.5.2: Child immunization

According to CSO, MoH and MII (2009), it is reported that the 2007 Zambia Demographic and Health Survey collected information on immunization coverage for all children born in the five years preceding the survey. It further states that the government of Zambia has adopted the World Health Organization (WHO) guidelines for vaccinating children through the Expanded Programme on Immunization (EPI). Children are considered fully immunized when they have received a vaccination against tuberculosis (BCG), three doses each of diphtheria, pertussis, tetanus/hepatitis B/Haemophilis influenza type b (DPT-HepB-Hip), and polio vaccines, and a measles vaccination by the age of 12 months. The BCG vaccination should be given at birth or at the first clinical contact. The DPT-HepB-Hib and polio immunizations require three doses of the vaccines at approximately six, ten, fourteen weeks of age; and measles should be given at or soon after reaching nine months of age. There is need for children under the age five to receive the various vaccinations. This can reduce on the number of children dying before the age of five. A research done in Samfya and Kawambwa districts of Luapula Province in Zambia showed that overall, the proportion of children who reportedly received the necessary immunization among the dead children was below expectation (Kapungwe, 2005).

2.5.3: Nutrition Factors

Many studies have shown that severely malnourished children are at much greater risk of dying than mildly malnourished and well-nourished ones, and such children usually come from poor households headed by uneducated or poorly educated parents (Martorell and Ho, 1984). Malnutrition has been identified as the main factor retarding improvements in human development and hindering further reductions in infant mortality. Furthermore, in most urban and rural locations, the proportion of malnourished children among scheduled castes and tribes is consistently higher than the average (World Health Organization, 2000). The major nutrition

disorders are deficiencies of iron, vitamin A and iodine. Micronutrient deficiencies influence child survival and the health and development of surviving children including cognitive development.

CHAPTER THREE

Methodology

3.1: Study Site and Sample

This study was conducted in Kitwe district. Kitwe district is located on the Copperbelt Province of Zambia and it is one of the major cities in Zambia. According to the 2009 population estimate, Kitwe has a population of 568,800 (CSO et al, 2009). The economy of Kitwe is mainly dependent on copper mining. Selection of the district was based largely on consideration of the mix it provided in terms of urban and peri-urban categorization of residence which usually reflects socio-economic status of residents. Other considerations in the selection of the study site were that the researcher is familiar with the language spoken by the resident population and the fact that the study site was easily accessible. Fieldwork was conducted in ten purposively selected townships/compounds namely; Chimwemwe, Mindolo, Wusakile, Ndeke and Kwacha (urban townships). Others were Mulenga, Luangwa, Ipusukilo, Zamtan and Kapoto (peri-urban/shanty townships).

The study targeted women who had had children die before five years of age. Identification of deaths and candidates for the study was done through the use of key informants that included civic leaders and community health workers. Once the key informants gave the residential addresses of potential candidates for the study, the researcher followed households and further used snowball sampling to capture others. Snowball sampling is whereby someone gets the sample population by asking the interviewee to give the name/names of other people she/he knows who have experienced the same problem. Thus, a sample of 100 women was captured.

3.1.1 Inclusion and Exclusion criteria

On one hand, women who were residents of Kitwe , aged between 15-49 years and had had a child die aged five years and below were included in the study. One the other hand, women who were not residents of Kitwe, were not in the designated age group and had never had a child who died before the age of five were excluded. The research included women only because they are, in most cases, the caretakers of children. The age specification of between 15-49 years is cohort of young women in their reproductive age and was more likely to answer the questions accurately. These women must had had a child or children who died before the age of five so that

they were able to answer questions related to the use of modern health facilities and sickness that led to the death of the child.

3.2: Instruments

Both qualitative and quantitative techniques were used to collect data for this study. Quantitative data was collected using a pre-tested structured questionnaire that covered many variables including socio-economic status of parents or care takers of the children who died bio-demographic factors, macro environmental factors and use of modern health care facilities. For qualitative data, a non-structured verbal Autopsy/open history was used. The Verbal autopsy was part of the questionnaire and was used to collect information about the illness that led to death as was told by the mother or caretaker of the dead child. This was tape-recorded and later transcribed and analyzed.

The Statistical Package for Social Sciences (SPSS) student version 11.0 was used in entry and analysis of quantitative data while tape recorded narratives were transcribed and later analyzed using themes. Based on the collected data, frequency tables cross tabulations and narratives have been used in the presentation of study findings.

3.3 Problems Encountered

During collection of data, the researcher had difficulties to get in touch with the key informants as they were attending a seminar at the time data collection was to start. This delayed the beginning of data collection by one week. The other problem encountered was that five women refused to be interviewed as they did not want to be reminded of the experience of losing the child.

CHAPTER FOUR

STUDY FINDINGS AND ANALYSIS

4.1: Background Characteristics of Respondents

The final sample of 100 respondents consisted of women aged between 15 and 19 (4%), 20-24(42%), and 35-49 (54%). In terms of level of education, most (93%) had either primary (63%) or secondary (30%) level of education. Very few reported not having been to school (5%) or had higher than secondary education (2%). With regard to ethnicity, forty-one percent were Bemba, four percent Tonga, ten percent were from North-Western and thirty-five percent represented other ethnic groups that included Lala, Lamba and Mambwe to mention but a few. In terms of language of communication most (83%) of the respondents indicated Bemba as their language of every day communication. On religious affiliation, seventy-six percent of the respondents claimed to be Protestants, twenty-one percent Catholics and three percent were from other religions. Table 3 shows the summary of the background characteristics of the respondents.

Table 3: Background characteristics of the respondents

AGE OF MOTHER	
15-19	4
20-34	42
35-49	54
Total	100
LEVEL OF EDUCATION	
No education	5
Primary	63
Secondary	30
Higher	2
Total	100
ETHNICITY	
Bemba	41
Tonga	4
North-Western	10
Nyanja	2
Other	35
Total	100
RELIGION	
Catholic	21
Protestant	76
Other	3
Total	100

4.2: Under-five Mortality Levels and Causes

This section presents the findings of under-five mortality levels in Kitwe district and also attempts to identify probable causes of death among children who died.

4.2.1: Age at which the child died

Respondents were asked to indicate the sex of the child and age at which the child died. Results are presented in Table 4.

Table 4 : Cross tabulation of age and sex of children who died before age five

	Sex		Total Percent
	Male	**Female**	
Younger than 28 days	3	2	5
28 days or older	44	51	95
Total Percent	47	53	100

Almost all the deaths (95%) in Kitwe district occurred after 28 days of life. This is the post neonatal period. Only five percent of the deaths occurred in the neonatal period. This suggests that the causes of most of the deaths may not be biological but environmental. Table 4 also shows that more than half (53%) of the children who died were females implying higher mortality among females compared to males. This latter finding is inconsistent with most of earlier findings on the distribution of under-five mortality by gender (CSO, MoH and MII, 1996, 2003), National Statistical Office and UNICEF (Malawi), 2007).

4.2.2 Causes of Death

In order to establish probable cause of death, respondents were asked to indicate the symptoms and signs they saw in the child before death which made them feel that the child was sick.

Responses to this and responses to verbal autopsy give an indication of the probable causes of death among the 100 children who died. The results are presented in Tables 5 and 6.

4.2.3: Symptoms and Signs

Table 5: Reported Signs and Symptoms of the child who died	
Symptom	**Percentage**
Fever	42
Diarrhea	12
Convulsions	7
Headache	2
Stopped beast feeding/eating	7
Vomiting	5
Bleeding from umbilical Chord	1
Crying	3
Coughing	3
Mouth sores	1
Stomach pain/bulging	3
Swollen body	3
Burns	1
Boils	1
Weakness	1
Swollen eyes	2
Fast breathing	2
Losing weight	1
Bleeding	1
Nothing	2
TOTAL	**100**

Based on caretakers' responses, the majority (42 percent) of the children had fever which, in most cases is a symptom of malaria although it also accompanies other childhood illnesses. The next second cause of death, according to Table 5 is diarrhea which accounts for 12 percent of the

children who died. Given the fact that other signs reported such as vomiting, weakness, headache, convulsions and problems in eating could be symptoms of malaria or diarrhea, it can be argued confidently that the main causes of death among under-five children in Kitwe are malaria and diarrhea. This conclusion is supported by earlier studies on causes of under-five mortality in Zambia and elsewhere. For example, in Zambia, Malaria is reportedly endemic with seasonal and geographical variations (CSO, MoH and MII, 2009) and it accounts for up to 40 percent of all infant mortality in Zambia (MoH, 2008). Diarrhea has also been frequently reported as a major contributor to infant and child mortality in many developing countries. It accounts for four to five million deaths every year and, in many areas, is the major single most important cause of death in young children (United Nations (UN), 1986). Moreover, diarrhea contributes to an even greater share of morbidity due to associated malnutrition and impaired or retarded growth and nutritional status among those who survive.

The conclusion that malaria and diarrhea are the two major causes of under-five mortality in Kitwe and most likely elsewhere in Zambia is further supported by results (Table 6) of the analysis of verbal autopsies that was done by a pediatrician who is a practicing clinical officer.

Table 6 : Probable cause of death of under-five children who died based on mother's/caretaker's verbal autopsy	
Disease	**Percent**
Diarrhea	18.0
Malaria	21.0
Protein Energy Malnutrition	5.0
HIV/AIDS Suspected	5.0
Anemia	7.0
Septiceamia	2.0
TB	3.0
Other	17.0
Not stated	9.0
TOTAL	**100**.0

As indicated in Table 6, malaria (21%) and diarrhea (18%) combined, account for 39 percent of all the deaths captured in the study followed by anemia (7%), malnutrition (5%) and AIDS (5%). According to the medical expert who analyzed verbal autopsies the other probable causes of death that accounted for 17 percent of the deaths, include prematurity, congenital disorders, still births and burns among others.

Similar findings regarding the contribution of malaria and diarrhea to under-five mortality were reported in other two districts in Zambia (Kapungwe, 2003). Fernandez (2004) also reported similar findings. It was reported that malaria was one of the likely reasons life expectancy declines seen in several West African countries that were affected less by HIV/AIDS such as Ivory Coast, Burkina Faso, Sierra Leone, and Liberia.

4.3: Determinants

4.3.1: Socio- Demographic Determinants

This section discusses the socio- demographic determinants of under-five mortality in the study site. The main variables investigated are age of the mother, ethnicity, religion, level of education

attained and the number of times one had been pregnant before the birth of the dead child. These are presented in Table 7.

Table 7 : Percent distribution of child deaths by selected Socio-demographic characteristics of the respondents	
AGE OF MOTHER	
15-19	4
20-34	42
35-49	54
Total	100
LEVEL OF EDUCATION	
No education	5
Primary	63
Secondary	30
Higher	2
Total	100
ETHNICITY	
Bemba	41
Tonga	4
North-Western	10
Nyanja	2
Other	35
Total	100
RELIGION	
Catholic	21
Protestant	76
Other	3
Total	100
NUMBER OF TIMES PREGNANT	
1	6
2-4	24
5-6	25
7+	45
Total	100

4.3.2 Age of the mother

Table 7 shows that 54 percent of children who died were from mothers aged between 35 and 49 years old, 42 percent were from mothers aged between 20 and 34 and four percent were from mothers aged between 15 and 19 years. The pattern observed in Table 6 suggests that children

born to older women aged (i.e. those aged 35 or older) are more likely to die than those born to mothers aged below 35 years. Similar findings were reported in the Sri Lanka Demographic and Health Survey of (Department of Census and Statistics, 2000) which showed that the risk of infant and child death among mothers who give birth past the age of 40 years was 3-4 times the risk among mothers who give birth between the ages of 21 and 40 years. Likewise, infant and under-five mortality rates were nearly two times as high when the mother is 20 years old or younger than when she is 21-40 years of age. Adolescent mothers (15-19 years) contributed the least as is the case with our present findings. This does not necessarily mean that children born to mothers who are less than 20 years of age are at less risk of dying than the other children. The small number of under-five deaths in the age group 15-19 may be attributed to the possibility that children of younger mothers are often cared for by their older grandparents or older relatives whose child health care practices may be favorable to their (children's) survival or a statistical artifact.

4.3.2: Level of maternal education

In trying to explain the association between maternal education and infant and child mortality, Caldwell (1979) quoted by United Nations International Children's Education Fund (2006) reported on the effect of mother's education on reducing the child mortality. He developed a theory that a mother's education works through changing feeding and care practices, leading to better health seeking behavior and by changing the traditional familial relationships. In supporting Caldwell's explanation, Hobcraft (1993), explained that education can contribute to child survival by making women more likely to marry and enter motherhood later and have fewer children, utilize parental care and immunize their children.

Table 7 shows that the highest number of children (68 percent) who died before the age of five was from mothers with primary education, 30 percent were from mothers with secondary education, five percent were from mothers with no education and two percent were from mothers with higher education. The gap between children of mothers with secondary education and children of mothers with primary education is 33 percent. However, only two percent of the deaths were from mothers with higher education. The pattern which seems to arise is that the more educated the mother is, the less likely it is that her child will die before reaching five years of age. Evidence from studies that used census data (Tulasidhar, 1983) and demographic

surveillance systems (Bhuiyat, 1991) showed the same mortality differential by maternal education. Interestingly, only five percent of all the deaths captured in this study came from women with no education. This is counterintuitive and goes against findings from most previous studies that have examined the relationship between mother's education and under-five mortality some of which we have reported above.

4.3.3: Ethnicity of the mother

Among the most often used indicators of cultural influences on child survival in the literature is ethnicity (UN, 1991; Caldwell and Caldwell, 1991; Barbieri, 1991; Tabutin and Akoto, 1992). Consequently, this study used ethnic identification as a proxy for the influence of culture on child survival. Although there are many ethnic groupings in Zambia, they can be classified into a reduced number of groups on the basis of similarities in cultural practices and language (Venkatachary, 1991, Gaise et al, 1993).

Based on the results in Table 7, it can be argued that under-five mortality is lowest (two percent) amongst the Nyanja and highest (41%) among the Bemba speaking people. Other ethnic groups that contributed substantially to under-five deaths in Kitwe were those from North-Western province (10%). Implied in the data presented in Table 7 is that children of mothers from other ethnic groups other that the Bemba speaking also contributed substantially (35%) to the under-five mortality in the study sites. Overall, these findings indicate that culture, as measured by ethnicity, has an influence on children's survival chances.

4.3.4: Religion

Since religion carries with it a number of values and norms which govern the behavioral, physiological and psychic level of believers and may reflect on openness to western influences and/or adherence to customs, some studies stress the importance of these differentials (Tabutin and Akoto, 1992).

With regard to religion, results of this study (Table 7) suggest that under-five mortality is highest (76 percent) amongst the "Protestants" than other religious groups. 21 percent of under-five deaths came from "Catholic" women. Perhaps, one of the reasons for increased risk of dying amongst children of Catholic mothers is the association between child spacing and the use of

contraceptive. Not only are the use of contraceptives associated with improved child spacing patterns, but it also works as proxy for health service utilization especially in rural areas and peri-urban areas where contraception is largely supplied by public health institutions (Nsemukila 1996). The policy of the Catholic Church on the use of contraception and its role on child spacing may indirectly influence utilization of maternal and child health services and hence under-five mortality. Mortality was lowest in the category "other" (three percent).

4.3.5: Reproductive History

One aspect of reproductive history is the number of times a woman has previously been pregnant. High order births have been found to be at relatively higher risk of death than low-order births (CSO, MoH and MII, 2003 (Zambia); Department of Census and Statistics, 2008 (Sri Lanka)). Results in Table 7 confirm these earlier findings. As results indicate, women who had previously been pregnant once contributed only 6 percent to the deaths in the study site. This is in stark contrast to women with more previous pregnancies who contributed the most deaths. For example, 25 percent of the deaths came from mothers who had previously been pregnant between two and four times. Most conspicuous is the finding that 45 percent of the deaths captured came from women who had previously been pregnant seven or more times.

Table 8 shows respondents' birth history.

Table 8: Birth history of mothers		
Variable	**N=100**	**Percent**
Number of living children		
0	12	12
1-3	29	29
4-6	44	44
7+	15	15
Number of times the mother has been pregnant		
1	6	6
2-4	24	24
5-6	25	25
7+	45	45
Number of children who died		
1	58	58
2-5	38	38
6+	4	4

It is evident from Table 8 that the majority (44 percent) of the respondents had between four and six living children, 29 percent had between one and three living children, while 15 percent had seven or more living children. Approximately 12 percent had no living children. Close to two-thirds (58%) of the respondents had lost one child, 38 percent had lost between two and five children as compared to four percent who reported having lost six or more children.

Table 9 shows the distribution of deaths over a period of 10.

Table 9: Distribution of deaths		
Period in which the child died	**frequency**	**Percent**
1998-2004	53	53
2005-2008	47	47
Total	100	100

Table 9 shows that more than half (53%) of the children died between 1998 and 2004 while the remainder (47%) died between 2005 and 2008.

4.3.6: Socio-economic Determinants

Infant mortality rate (IMR) is one of the most important sensitive indicators of the socio-economic and health status of a community. This is because more than any other age-group of a population, infant's survival depends on the socio-economic conditions of their environment (Madise, 2003). It is one of the components of United Nations Human Development Index (UNHDI), (UN, 2007). Hence its description is very vital for evaluation and planning of public health strategies. The following discussion, therefore, gives the relationship between socio-economic and health status and under-five mortality in the study site. The main proxies used for socio-economic and health status are source of energy and water for the household in which the dead child lived, as well as of type of toilet facility. Table 10 shows the contribution of each of these indicators of status to under-five mortality in the study site.

Table 10: Source of energy and water for the households	
Main source of:	**Percent /frequency contribution to total deaths**
Energy for cooking	
Electricity	27
Paraffin/kerosene	1
Wood	10
Charcoal	60
Coal	2
Total	**100**
Energy for lighting	
electricity	29
Paraffin/kerosene	10
Candle	60
Other	1
Total	**100**
Source of water for the household	
Piped water inside the house	13
Piped water outside the house	22
River/stream	3
Well/borehole	62
Total	**100**
Type of toilet facility	
Flush	32
Pit latrine	66
Other	2
Total	**100**

Table 10, shows that Households using charcoal as the main source of energy for cooking contributed more (60 percent) to the number of under-five children who died while households that used electricity contributed 27 percent. On the other hand, 10 percent and two percent of the deaths were accounted for by households in which wood and paraffin/kerosene, respectively, were the main sources of energy for cooking. In short, households that used other sources of energy for cooking other than electricity contributed more (73%) to children who died before age five than households that used electricity. A similar pattern is observed with regard to main source of energy for lighting. Whereas households using electricity for lighting contributed 29 percent to the total deaths captured households using other sources of energy contributed the rest (71%). Similar findings were reported in Sri Lanka. According to the Department of Census and Statistics (2008), in households having no access to electricity, infant mortality was more than three times as high (25.7 versus 7 deaths per 1,000 live births) and under-five mortality is more than two times as high (23.8 versus 11.6 deaths per 1, 000 live births) as in households having access to electricity. What these findings indicate is that availability of electricity in a household is critical to the survival of children under the age of five years.

Availability of water is vital in determining household hygiene and exposure to water-borne infections. Table 8 shows that more than two-thirds (62 percent) of the deaths came from households that used well/borehole water while 22 percent and 13 percent of the deaths came from households that used piped water from outside and inside the house, respectively. What results in Table 10 suggest is that households that had water drawn outside the house whether piped or not contributed 87 percent of all the deaths studied. The high percentage of deaths from households using water from outside the house may be attributed to the fact that the water drawn outside the house is usually stored and if not covered properly may be contaminated with germs. This water may cause diarrhea in children. Another notable result in Table 10 is that most (66%) of the deaths in the study site were accounted for by households that depended on pit latrines as toilet.

4.4: Health-Seeking Behavior

This section presents findings on various dimensions of health-seeking behavior by looking at where the child died from, antenatal care, tetanus toxoid up-take, place of delivery, assistance during delivery, breastfeeding and child immunization

4.4.1: Place of death

Table 11 shows that 53 percent of the children died at the hospital/clinic while 14 percent were reported to have died on the way to the hospital or other health centre and three percent died from other places. Nearly a third (30 percent) of the deaths in the district occurred at home.

Table 11: Place of death of the child

Place	Frequency	Percent
Home	30	30
Other	3	3
On the way to the hospital or other health centre	14	14
Hospital/clinic	53	53
Total	**100**	**100**

The large proportion of deaths occurring at home may be attributed to many factors that may include parents' inability to recognize the seriousness of an illness and, distance to a health facility both of which may result in delay in seeking professional help.

4.4.2: Antenatal Care

Antenatal care is very important to a pregnant woman. There are classes which are carried out during antenatal visits that are aimed at helping the women to prepare physically and emotionally for the birth of her baby. Antenatal classes help the pregnant woman to prepare physically and emotionally for the birth of her baby. At the classes, one can ask questions and explore the different ways in which one can give birth. Antenatal care is the key to healthy mothers and babies and it is very important one attends one's appointments.

The number of pregnant women in developing countries receiving antenatal care during pregnancy has increased significantly since 1990 (UNICEF Media, 2000). This signals that an untapped opportunity exists to reach poor women with a whole package of life-saving health services.

"The advantages of receiving regular antenatal care cannot be stressed enough" said Carol Bellamy, Executive Director of UNICEF, (UNICEF Media 2000:27). "If a woman comes for antenatal care early in her pregnancy, there is time for early diagnosis and treatment of infections

in the mother, and an opportunity to prevent low birth weight and other conditions in the newborn. These findings have enormous significance for maternal health and child survival" (UNICEF Media, 2000:27).

The UNICEF Media study highlighted nations that have begun to see antenatal care visits as a unique opportunity to provide the pregnant woman with a vaccination to prevent tetanus, an insecticide-treated bed-net to prevent malaria, screenings for anemia, enrolment in Prevention of Mother to Child Transmission of HIV services, and with counseling for a safe delivery- all factors that help ensure that the mother remains healthy through childbirth and gives her child the best start in life.

Antenatal care also increases the likelihood of a skilled attendant being present at the birth. A skilled attendant is a doctor, midwife, nurse, or other health care providers with equivalent skills, who can detect and manage complications at birth. This can often mean the difference between life and death for both the mother and baby (UNICEF Media, 2000).

More than half of women in the developing world are getting at least four antenatal visits during their pregnancy, which is in line with the World Health Organization recommendation that antenatal care for normal pregnancies should be a minimum of four visit (World Health Organization, 2000).

In Zambia, the traditional approach to the provision of antenatal care recommends at least 12 Antenatal Care (ANC) visits (CSO, MoH and MII, 2009). The first visit should take place during the first trimester, and visits should continue on a monthly basis through the 28th week of pregnancy, and every two weeks thereafter up to the 36th week, and then every week until delivery (CSO, MoH, MII, 2009). The assumption is that more visits result in better care for the pregnant woman.

However, the newest World Health Organization approach to promoting safe pregnancies recommends that a woman without complications has at least four Antenatal Care visits (instead of 12) (CSO, MoH and MII, 2009). This is an updated approach called Focused Antenatal Care (FANC), which emphasizes quality of care during the visits over the quantity of visits. Another key Focused Antenatal Care (FANC) strategy is for each visit to be conducted by a skilled health

provider (MoH, 2005). Zambia has included some of the key Focused Antenatal Care approaches in the National Health Strategic Plan (MoH, 2005).

In Zambia, ANC provisions are transitioning from the traditional to the FANC approach (CSO, MoH and MII, 2009). Scheduling of visits for Focused Antenatal Care is a minimum of four visits, especially for pregnancies progressing normally. The schedule of the visits is as follows: the first visit should occur by the end of 16 weeks of pregnancy; the second visit is between 24 and 28 weeks of pregnancy; the third visit is scheduled at 32 weeks; and the fourth visit is at 36 weeks (CSO, MoH and MII, 2009). However, women with discomforts, special needs, or conditions beyond the scope of basic care (or other problems) may require additional visits.

This study investigated the number of antenatal visits by respondents of children who died before age five. The results are presented in Table 12.

Table 12: Antenatal Care

Attendance of antenatal clinic	**Frequency**	**Percent**
Ever attended antenatal care	**97**	**97**
Number of times the mother attended antenatal care:		
1-3	24	24
4+	71	71

According to Table 12 nearly all (97 percent) of the mothers received antenatal care during their pregnancy of the dead child (ren). Of those who attended, 24 percent attended between one and three times and 71 percent attended for 4 and more times. In short, most of the women not only attended antenatal care but did so according to the recommended number of visits. However, in examining the results reported here, it should be kept in mind that some respondents may have lied on attendance of antenatal clinic as no evidence was produced. The possible consequence of lying on attendance could lead to an overestimate of the overall attendance. Consequently, the information presented here should, at best, be regarded as an approximate indicator of the overall level of coverage and the interpretation based on such information should be taken with caution.

4.4.3: Tetanus Toxoid up-take

Closely linked to antenatal care is tetanus toxiod up-take. Tetanus (lockjaw) is caused by the toxin of a bacterium called clostridium tetani (Viswanathan, 2008). These bacteria can enter the body even through a tiny prick or scratch. They generally prefer deep puncture wounds, cuts, burns, ulcers, bites, surgery sites, injection sites and umbilical cord stumps. Tetanus bacteria are commonly found in soil, dust and manure. In general, tetanus causes muscle stiffness, twitching and spasms in various regions of the body, jaw stiffness and difficult in swallowing, restlessness, fever and headache and, in severe cases, seizures and paralysis (Viswanathan, 2008).

Neonatal tetanus is a leading cause of neonatal deaths in developing countries where a high proportion of deliveries are conducted at home or in places where hygienic conditions may be poor. Although adequate information is lacking on Africa and Latin America, several community-based surveys conducted in other parts of the world have demonstrated that the neonatal death rate can range from as low as under five per 1,000 live births to as high as 67 deaths per 1000 live births in some areas (Stanfield and Galazka, 1985). According to the WHO (2000), approximately 700,000 children die from neonatal tetanus annually. Tetanus Toxoid (TT) injections are given to women during pregnancy to prevent deaths from maternal and neonatal tetanus which can result when sterile procedures are not followed in cutting the umbilical cord after delivery (CSO, MoH and MII, 2009).

In Zambia, an infant is considered fully protected if any of the following criteria are met (CSO, MoH and MII, 2009):

1. The mother had two tetanus toxoid injections during the pregnancy.
2. The mother had two lifetime injections, with the last injection received within three years of the last birth.
3. The mother had three lifetime injections, with the last injection received within five years of the last birth.
4. The mother had four lifetime injections, with the last injection received within 10 years of the last birth; or
5. The mother had at least five lifetime injections.

In this study, respondents were asked to indicate the number of doses of tetanus injection they had received during pregnancy of the dead child. To complement doses of tetanus injection received, a question on additional doses the mother received was asked. The results are presented in Table 13.

Table 13: Tetanus Toxoid uptake

Variable	N=100	Percent
Doses of tetanus injection received		
Zero	4	4
One	14	14
Two	28	28
Three	24	24
Four	9	9
Five	21	21
Additional doses of tetanus injection received		
Zero	37	37
One	20	20
Two	18	18
Three	14	14
Four	7	7
Five	4	4

Table 13 shows that only 4 percent of the respondents reported not to have received any single tetanus toxoid injection during their life time suggesting therefore that tetanus toxoid injection up-take is a widely accepted practiced preventive-seeking behavior among expectant mothers in Kitwe district. However, as in the case of immunization, these figures must be interpreted with extreme caution given the possibility that respondents may not only have recall problems but they may also confuse tetanus toxoid injection with other injections. The possible consequence of this problem could be an underestimate of the proportion of births which are protected against tetanus. On the hand, confusing tetanus toxiod injection with other injections could lead to an overestimate of the level of coverage. In as far as it is hard to evaluate the extent to which either of these biases exists in this data, the information presented here should, at best, be regarded as an approximate indicator of the overall level of coverage and the interpretation based on such information should be taken with caution.

4.4.4: Place of delivery

Another important thrust of the Reproductive and Child Health Programme is to encourage deliveries in proper hygienic conditions under the supervision of trained health professionals. According to the National Family and Health Survey 3 (NFHS-3) done in India, several factors are likely to contribute to a positive relationship between antenatal care visits and delivery in the health facility. Antenatal care providers may advise pregnant women to give birth in an institution. Conversely, women who register with a health facility for delivery may be called for regular antenatal check-ups by the facility. Another important factor may be pregnancy complications, because women with pregnancy complications are more likely than other women to have antenatal check-ups and to deliver in a health facility.

Increasing the number of births delivered in health facilities is an important factor in reducing deaths arising from the complications of pregnancy. The expectation is that if a complication arises during delivery, a skilled worker can manage the complication and/or refer the mother to the next level (CSO, MoH and MII, 2009).

In our study, respondents were asked to state the place of delivery of the dead child and the results are shown in Table 12. Evidently, a good percentage of women (73 percent) delivered either from a hospital or a clinic or a health centre. Nearly a quarter (23 percent) of the mothers delivered at home. Four percent delivered at the midwife's place.

Table 14 :Percent distribution of children who died by place of delivery

Place of delivery:	Frequency	Percent
Home	23.0	23.0
Hospital/health centre/clinic	73.0	73.0
Midwife's place	4.0	4.0

4.4.5: Assistance during delivery

Closely linked to place of delivery is the assistance received at birth of the child. This is an important variable that influences the birth outcome and the health of the mother and infants. Obstetric care from a trained provider during delivery is recognized as critical for reduction of maternal and neonatal mortality. Births delivered at a health facility are more likely than births

delivered at home to be assisted by a health professional National Family and Health Survey-3 (NFHS-3). The skills and performance of the birth attendant determine whether or not he or she can manage complications and observe hygienic practices. The strict definition of skilled health worker according to the (WHO) is "an accredited health professional-such as a midwife, doctor, or nurse- who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postpartum period, and in the identification, management and referral of complications in women and newborns" (WHO, 2008:12). Birth attendants (TBAs), trained or untrained, are excluded from the category of skilled health workers. In this context, the term TBA refers to traditional, independent (of the health system), non-formally trained and community- based providers of care during pregnancy, childbirth, and the postnatal period. In Zambia, a skilled provider includes doctor, clinical officer and nurse/midwife (CSO, MoH and MII, 2009).

Table 15: Person who assisted during delivery		
Nurse/Doctor/mid-wife	74.0	74.0
Traditional Birth Attendant	12.0	12.0
Family/Relative	5.0	5.0
Other	9.0	9.0
Total	**100.0**	**100.0**

Respondents were asked to state the person who assisted during delivery of the dead child and the results are illustrated in Table 15. Evidently, almost three-quarters of the births (74 percent) were assisted by either a nurse or doctor or a midwife, 12 percent were delivered by Traditional Birth Attendants, five percent were assisted by family/relative and 9 percent were delivered by other persons.

4.4.6: Breastfeeding

The pattern of infant feeding has important effects on both the child and the mother. Feeding practices are the underlying determinant of children's nutritional status. Appropriate feeding practices are of fundamental importance for the survival, growth, development of the children and for the well being of mothers. Poor nutrition in young children exposes them to greater risk of illness and death. Early initiation of breastfeeding is encouraged for a number of reasons.

First, mothers benefit from early sucking because it stimulates breast milk production and facilitates the release of oxytocin, which helps the contraction of the uterus and reduces postpartum blood loss (CSO, MoH and MII, 2009). Second, the first breast milk contains colostrums, which is highly nutritious and has antibodies that protect the new born from diseases. Third, early initiation of breastfeeding also fosters bonding between mother and child (CSO, MoH and MII, 2009).

The United Nations International Children's Fund (UNICEF) and WHO recommend that children be exclusively breastfed during the first six months of life and that children be given solid or semi-solid complementary food in addition to continued breastfeeding from 6 months until age 24 months (or more) when the child is fully weaned (WHO/UNICEF, 1998). Exclusive breastfeeding is recommended because breast milk is uncontaminated and contains all the nutrients necessary for children in the first few months of life. In addition, the mother's antibodies in breast milk provide immunity to diseases (CSO, MoH and MII, 2009). Early supplementation is discouraged for several reasons. First, it exposes infants to pathogens and increases their risk of infection. Second, it decreases infants' intake of breast milk production. Third, in low-resource setting, supplementary food is often nutritionally inferior (CSO, MoH and MII, 2009).

In the present study, three questions related to breastfeeding of the dead child were asked and results are shown in Table 16.

Table 16 : Percent distribution of under-five deaths who were breastfed, number of months the child was breastfed and age at which the child stopped breastfeeding		
	Frequency	**Percent**
Children ever breastfed:	95	95
Children never breastfed	5	5
Number of months child took breast milk only:		
Never breastfed	5	5
Less than 1 month-one month	8	8
2 months – 6 months	86	86
7 months-12 months	1	1
Age at which child stopped breastfeeding:		
Never breastfed	5	5
Less than 1 month	3	3
2 months- 6 months	18	18
7 months-12 months	17	17
13 months-24 months	52	52
25 months-36 months	5	5

As results in Table 16 indicate nearly all of the children who died before five years of age had been exclusively breastfed and most of them beyond minimum recommended duration of six months.

4.4.7: Child Immunization

Universal immunization of children against the six vaccine-preventable diseases (namely tuberculosis, diphtheria, whooping cough, tetanus, polio, and measles) is crucial to reducing infant and child mortality (Bicego et al, 2007). Differences in vaccination coverage among subgroups of the population are useful for programme planning and targeting resources to areas most in need. Additionally, information on immunization coverage is important for monitoring and evaluation of the Expanded Programmes on Immunization (EPI).

Immunization protects children from dangerous sicknesses. The child should get his/her first immunization at the clinic or hospital when it is born. After that, the baby is to be taken to the clinic as shown in Table 17.

Table 17: Immunization Timetable

Immunization for newborn babies

Vaccine	Minimum age at first dose
BCG	Birth
Polio (OPV_0)	Birth___14 days
Polio (OPV_1,2,3)	6 weeks, 10weeks, 14 weeks
+OPV 4 if OPV 0 was missed	9 months
DPT +Hib	6 weeks, 10 weeks, 14 weeks
Measles	9 months
Vitamin A	At 6 months every 6 months until the child i5 years old

Source: Kwatu Magazine

According to the guidelines developed by WHO, children are considered fully vaccinated when they have received vaccination against tuberculosis (BCG), three doses of the diphtheria, whooping cough (pertussis), and tetanus (DPT) vaccine, three doses of the poliomyelitis (polio) vaccine, and one dose of the measles vaccine by the age of 12 months. The Government of Zambia has adapted the WHO guidelines for vaccinating children through the EPI. Every month, mothers, or caretakers of young children, are required take their children for vaccination and for growth monitoring to under-five clinics where information on the child's weight, height and type of immunization given is recorded on the card of each child. Each large community in Zambia, particularly in urban centers, has an under-five clinic.

In this study, information on vaccination status of children was solicited in two ways: from child immunization cards shown to the researcher for those who had the cards and from mothers' verbal reports for those mothers who did not have the cards. If the cards were available, the researcher copied the vaccination dates directly onto the questionnaire. When there was no vaccination card for the dead child or if a vaccination had not been recorded on the card, the respondent was asked whether the vaccine was given to the child and given at stated time; the

resulting information is from mother's recall. Therefore, in examining the results reported on child vaccination, it should be kept in mind that some respondents may have laid especially those who had no under-five cards. The possible consequence of lying on vaccination could lead to an overestimate of the overall number of children who were successfully vaccinated. Consequently, the information presented here should, at best, be regarded as an approximate indicator of the overall level of vaccination and the interpretation based on such information should be taken with caution. Every mother of the child aged less than five years old is supposed to have the under-five card. Respondents were asked if they had the under-five card for the dead child.

Analysis of the results shows that most (72%) respondents did not have under-five cards for their dead children. The main reason given was that the cards were discarded after the death of the child. In other instances (16%), the respondent did not know whether the card was available or not.

Table 18: Availability of under-five card

	Frequency	Percent
Yes	12	12
no, or don't have the card	72	72
don't know if have the card	16	16
Total	100	100

The results that are presented in Table 19 are therefore largely based on the respondent's ability to remember.

Table 19; Number and percent of children who received various vaccinations as reported by the mother or care taker of the dead child				
Vaccine	Given		Proportion given at stated time	
	frequency	Percent	frequency	Percent
BCG	93	83	92	92
DPT1	89	89	89	89
DPT2	89	89	89	89
DPT3	85	85	83	83
DPT booster	79	79	77	77
Measles	64	64	60	60
OPV1	88	88	87	87
OPV2	88	88	87	87
OPV3	86	86	85	85
OPV4	77	77	73	73
Vitamin A supplement	72	72	70	70

Although a substantial proportion of the respondents (72 percent) could not produce under- five cards for their children, it is encouraging to note that between 64 percent and 92 percent of the dead children had reportedly received the recommended number of immunizations. The highest number was for BCG mainly because this is given at birth and most children were reportedly born at a modern health facility and the lowest (64%) was for measles vaccine and at recommended ages.

CHAPTER FIVE

Summary, Conclusion and Recommendations

This study investigated the determinants of under-five mortality in Kitwe district. The following is the summary of the findings, the conclusion and the recommendations.

5.1: Summary of the findings

The research was carried out in Kitwe district in Zambia. Ten compounds were purposively selected namely; Chimwemwe, Mindolo, Wusakile, Ndeke and Kwacha (urban townships). Others were Mulenga, Luangwa, Ipusukilo, Zamtan and Kapoto (peri-urban/shanty townships). The study involved 100 women who were residents of Kitwe and aged between 15-49 years. These were selected purposively. Both qualitative and quantitative techniques were used in data collection. Structured questionnaires and verbal autopsy were used to get the required information.

Looking at the findings in general, it was found that most (95 percent) of under-five deaths occurred after 28 days of life and that there were more female children (53 percent) who died than male children (47 percent). Other findings from the research show that mothers aged between 35 and 49 contributed the highest (54 percent) number of under-five children who died. It also shows that the major causes of death are malaria (21 percent) and diarrhea (18 percent).

One of the objectives of this study was to investigate the relationship between socio-economic factors and under-five mortality. Results of this study show that households using sources of energy other than electricity for cooking and lighting contributed more (about 3 times) to the number of under-five deaths captured in the study. Similarly, households that relied on water from rivers or bore holes contributed more (66) to the deaths captured as did households that used pit latrines for toilets compared to households that used electricity and flush toilets.

Findings on health-seeking behavior show that nearly all (97%) of the mother of the dead children had received antenatal care and almost an equivalent proportion (96%) had received at least one dose of tetanus toxoid injection. Additionally, nearly all (95%) the children who died had been breastfed and most of them beyond the recommended minimum duration.

Also worthy highlighting is the finding that more than three quarters (73%) of the children who died had been delivered at a modern health facility and delivery was assisted by skilled medical personnel. On child immunization, the study has also demonstrated appropriate health-seeking behavior by the mothers as evidenced by the fact that most of the children who died had reportedly received the recommended vaccinations and at recommended ages.

5.2 Conclusion

The main conclusion that can be inferred from the study findings highlighted above is that paying more attention to improving the socio-economic status of households and the environment in which children are raised rather than focusing exclusively on changing individual health-seeking behavior and practices has great potential to contribute significantly to the reduction of the number of children who died before their fifth birthday in Zambia.

5.3 Recommendations

The findings of this study pose considerable challenges to policy makers, particularly on the health of children. The following, therefore, are the recommendations:

1. There is need to intensify the teachings on prevention of malaria to mothers and households at large through the media in English and in local languages. Such teachings should include promotion of use of insecticide treated mosquito nets especially where malaria is the main problem. Government policy, therefore, should be to further reduce tax on mosquito nets so that people can afford and to do indoor spraying frequently in all households.

2. The government of Zambia should ensure that safe water and proper sanitation is provided in households. Coupled with this should be campaigns to educate communities on the importance or benefits of boiling or chlorinating drinking water as well as keeping their environment clean. This is particularly important in areas where diarrhea is prevalent. The policy aimed at subsidizing the cost of chlorine is therefore necessary.

3. The government of Zambia should empower the local people so as to raise the socio-economic and financial status of the people. This can be done by enabling people make decisions on issues affecting their welfare. This will enable most households to have electricity in their homes and flush toilets which they can afford to pay bills for.

4. The government should ensure that hospitals and clinics are manned by qualified staff while at the same time improving existing health workers' skills especially in the integrated management of childhood diseases, through staff development. There is also need for hospitals and clinics to be constantly supplied with adequate and right drugs. This recommendation is based on the finding that a significant number of children died at a modern health facility. This suggests the possibility of wrong diagnosis of disease and consequently wrong treatment resulting in death. Inadequate supply of the right drugs for treatment of child diseases could also have contributed to the large number of children who died at modern health facilities in the study site.

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APPIDENCIES

APPENDIX A

QUESTIONNAIRE ON DETERMINANTS OF UNDER-FIVE MORTALITY IN KITWE DISTRICT

SECTION A

1. Name of the child who died _____
2. Sex of the child

   Male----------1

   Female---------- 2

3. Age at time of death
   a) In completed days if less than 28 days----------1
   b) In completed months if more than 28 days----------2
4. What was your relationship to _____

   Mother----------1

   Grandmother----------2

   Aunt----------3

   Other female (specify) ---------- 4

5. Who was _____'s usual caretaker

   Mother----------1

   Father----------2

   Grandmother----------3

   Grandfather----------4

   Aunt----------5

   Uncle----------6

   Other male (specify) ----------7

   Other female (specify) ----------8

6. **If mother is not the respondent**, is mother still alive?

Yes----------1

No----------2

Don't know----------3

7. What is your / _____'s mother's age?

15_____19----------1

20_____ 24----------2

25_____ 29----------3

30_____ 34----------4

35_____39----------5

40_____44----------6

45_____49----------7

8. What is your/_____' mother's educational background?

Illiterate----------1

Primary----------2

Secondary----------3

Higher----------4

Don't know----------5

9. What is your/ _____ mother's occupation?

Journalist----------1

Secretary----------2

Cashier----------3

Plumber----------4

Sales Manager----------5

Travel Agent----------6

Carpenter----------7

Teacher----------8

Statistician----------9

Bank Teller----------10

Medical Officer----------11

Artisan----------12

Accounts Clerk----------13

Driver----------14

Sales Representative----------15

Waitress----------16

Petrol Attendant----------17

Librarian----------18

Accountant----------19

Other (specify) _____ ----------20

10. What is your/ _____ mother's main source of livelihood?

Formal employment----------1

Self-employed----------2

Husband----------3

Other (specify) ----------4

11. How many times have you / _____'s mother been pregnant?

One----------1

Two----------2

Three----------3

Four----------4

Five----------5

Six----------6

More than six----------7

12. How many times have you / _____'s given birth (including _____)?

One----------1

Two----------2

Three----------3

Four----------4

Six----------5

Above six----------7

13. How many living children do you / _____'s mother have now?

Zero----------1

One----------2

Two----------3

Three----------4

Four----------5

Five----------6

Six----------7

More than six----------8

14. How many of your / _____'s mother's children have died (including_____)?

One----------1

Two----------2

Three----------3

Four----------4

Five----------5

Six----------6

More than six----------7

15. How many children did you / _____'s mother have before the birth of _____?

Zero----------1

One----------2

Two----------3

Three----------4

Four----------5

Five----------6

Six----------7

More than six----------8

16. How old is / was _____'s father?

Less than 20 ----------1

21 ____ 30----------2

31 ____ 39----------3

40 ____ 49----------4

50 ____ 59----------5

Above 60 ----------6

Don't know ----------7

17. What is your /_____' father's educational background?

Illiterate----------1

Primary----------2

Secondary----------3

Higher ----------4

Don't know----------5

18. What is/was _____'s father's occupation?

Journalist----------1

Secretary----------2

Cashier----------3

Plumber----------4

Sales Manager----------5

Travel Agent----------6

Carpenter----------7

Teacher----------8

Statistician----------9

Bank Teller----------10

Medical Officer----------11

Artisan----------12

Accounts Clerk----------13

Driver----------14

Sales Representative----------15

Waitress----------16

Petrol Attendant----------17

Librarian----------18

19. Who did _____ live with?

Both parents ----------1

Mother only ----------2

Father only ----------3

Others (specify) ----------4

20. What is the language most spoken in the household where_____ lived?

English----------1

Icibemba----------2

Lozi----------3

Tonga----------4

Lunda----------5

Luvale----------6

Kaonde----------7

Nyanja----------8

Other (specify) ----------9

21. What is your / _____'s mothers religion?

Catholic----------1

Protestant----------2

Muslim----------3

Other (specify)_____ ----------4

22. What is your / _____'s mother's ethnic group?

Bemba----------1

Tonga----------2

North-Western----------3

Barotse----------4

Nyanja----------5

Mambwe----------6

Tumbuka----------7

Other (specify) _____ ----------8

23. What material was the house made of where _____ lived?

Burnt bricks----------1

Unburnt/mud bricks----------2

Concrete blocks/ slab----------3

Stone----------4

Iron sheets----------5

Asbestos/hard board/wood----------6

Pole and dagga/ mud ----------7

Grass----------8

Others----------9

24. What material was the roof of the house made of where _____ lived?

Concrete----------1

Asbestors sheet----------2

Iron sheet/corrugated iron----------3

Grass/thatch----------4

Tiles----------5

Other----------6

26. What is/was the floor made of where _____ lived?

Concrete/cement----------1

Mud----------2

Wood/not wooden tiles----------3

Marble----------4

Other----------5

27. Other than the kitchen and bathroom, how many rooms are/were in the house_____ lived?

Number of rooms----------

28. Type of toilet facility used by the household members where _____ lived?

Flush----------1

Bucket----------2

Aquaprivy----------3

Pit latrine----------4

Other----------5

29. What is the main source of energy used for cooking in the household where_____lived?

Electricity----------1

Gas----------2

Paraffin/Kerosene----------3

Wood----------4

Charcoal----------5

Coal----------6

Cow dung----------7

Other----------8

Not stated/answered----------9

30. What is/was the main source of energy for lighting in the house where_____lived?

Electricity----------1

Gas----------2

Paraffin/kerosene----------3

Candle----------4

Firewood----------5

Others----------6

Not stated/answered----------7

31. What is the source of water for the household where _____ lived?

Piped water inside the house----------1

Piped water outside the house----------2

River/stream----------3

Well/borehole----------4

Lake----------5

Other----------6

Not stated/answered----------7

32. Which of the following do you own?

(a) Bed

Yes----------1

No----------2

(b) Mattress

Yes----------1

No----------2

(c) Chairs

Yes----------1

No----------2

(d) Bicycle

Yes----------1

No----------2

(e) Car

Yes----------1

No----------2

(f) Radio/television

Yes----------1

No----------2

(g) Sofa/easy chairs

Yes----------1

No----------2

(h) Sewing machine

Yes----------1

No----------2

33. What is the name of the health facility where _____ was usually taken? _____.

34. How long does it usually take to reach there?

Less than 30 minutes----------1

30min ___ 1hr----------2

1hr ___ 2hrs----------3

2hr ___ 3hrs----------4

More than 3hrs----------5

Information about the child

35 What was _____'s date of birth?

_____ / _____ / _____

dd mm yy

36. Where was _____ born?

Home----------1

Hospital----------2

Others (specify) ----------3

Don't know----------4

37. How many children did you / _____'s mother have before _____ was born?

Zero----------1

One----------2

Two----------3

Three----------4

Four----------5

Five----------6

Six----------7

More than six----------8

38. Can I please see _____'s health card?

Yes----------1

No, or don't have the card----------2 (Go to Q42)

Don't know if have the card----------3 (Go to Q42)

39. Immunization status of the Dead Child (tick as appropriate)

VACCINATION	WAS IT GIVEN?
a). BCG	Yes----------1
	No----------2
b). DPT 1	Yes----------1
	No----------2
c). DPT 2	Yes----------1
	No----------2
d). DPT 3	Yes----------1
	No----------2
e). DPT Booster	Yes----------1
	No----------2
f). MEASLES	Yes----------1
	No----------2
g). OPV 1	Yes----------1
	No----------2
h). OPV 2	Yes----------1
	No----------2
i). OPV 3	Yes----------1

	No----------2	
j). OPV 4	Yes----------1	
	No----------2	
k). VITAMIN A SUPPLEMENT	Yes----------1	
	No----------2	

40a. Was **BCG** given at the stated time? (at birth or soon after birth)

Yes----------1

No----------2

40b. Was **DPT 1** given at the stated time? (at 4 weeks)

Yes----------1

No----------2

40c. Was **DPT 2** given at the stated time? (at 6 weeks)

Yes----------1

No----------2

40d. Was **DPT 3** given at the stated time? (at 10 weeks)

Yes----------1

No----------2

40e. Was **DPT Booster** given at the stated time?

Yes----------1

No----------2

40f. Was **MEASLES** given at the stated time? (at 9 months)

Yes----------1

No----------2

40g. Was **OPV 1** given at the stated time? (at 4 weeks)

Yes----------1

No----------2

40h. Was **OPV2** given at the stated time? (at 6 weeks)

Yes----------1

No----------2

40i. Was **OPV 3** given at the stated time? (at 10 weeks)

Yes----------1

No----------2

40j. Was **OPV 4** given at the stated time?

Yes----------1

No----------2

40K. Was **VITAMIN A SUPPLEMENT** given at the stated time?

Yes----------1

No----------2

41. Record the last weight from the card_____ kilograms

42 Record the date of the last weight----------_____/_____/_____

43. Was _____ ever breastfed?

Yes----------1

No----------2 (Go to Q45)

Don't know----------3 (Go to Q45)

44. If yes, for how many months did s/he drink only breast milk?

Less than 1month----------1

1month ____6months----------2

7months ___ 1yr----------3

1yr _____ 2yrs----------4

More than 2yrs----------5

45. How old was _____ when s/he stopped breast feeding?

Less than 1 month----------1

1month ____ 6months----------2

7months ____ 12months----------3

13months __ 24months----------4

25months __ 36months----------5

More than 36 months----------6

46. What was the date of _____s death? _____/_____/_____

dd mm yy

47. How many days long was the illness that led to _____'s death?

Less than 1 month----------1

1 months_____6months----------2

6months_____1yr----------3

More than 1yr----------4

48. During the illness that led to death, was care for _____ sought outside the home?

Yes----------1

No----------2 (Go to Q50)

Don't know----------3 (Go to Q50)

49. If answer to the above question is "yes" where or from whom did you seek help/advice?

a. traditional healer

Yes----------1

No----------2

Don't know----------3

b. religious leader

Yes----------1

No----------2

Don't know----------3

c. hospital

Yes----------1

No----------2

Don't know----------3

d. health/center/clinic

Yes----------1

No----------2

Don't know----------3

e. Private physician

Yes----------1

No----------2

Don't know----------3

f. pharmacy/drug seller/store/market

Yes----------1

No----------2

Don't know----------3

g. another provider

Yes----------1

No----------2

Don't know----------3

h. someone outside the household

Yes----------1

No----------2

Don't Know----------3

50. How many days was _____ill before you first sought care at a hospital or other health facility? _____days

Less than 7 days----------1

7_____14 days----------2

14_____21 days----------3

21_____28 days----------4

More than 28 days----------5

51. What signs/symptoms made you feel that_____feel sick?

_____

52. During the illness that led to _____'s death was any home treatment given

Yes----------1

No----------2 (Go to 53)

Don't Know----------3 (Go to 53)

53. If answer to the above question is "yes", what type of treatment was administered

_____1

Don't know ----------2

54. How many days were _____ ill before you first sought care at a hospital or other health facility?

_____ days ----------1

Don't know----------2

Never sought help from hospital/health centre/clinic----------3

55. On the day _____ died, did you seek help from

		Yes	No
a.	Traditional healer	1	2
b.	Religious leader	1	2
c.	Hospital/health/centre/clinic	1	2
d.	Private physician	1	2
e.	Private physician	1	2
f.	Another provider	1	2
g.	Any one outside the household	1	2

56. When you were (mother was) pregnant with _____ did you/she receive an injection to protect the baby against tetanus (convulsions after birth)?

Yes----------1

No----------2 (Go to 58)

Don't remember/don't know----------3 (Go to58)

57. If answer to the above question is "Yes", how many doses did you receive before _____ was born? (_____doses)

58. How many more additional doses did you (she) receive thereafter? _____

59. Where was _____ delivered?

At home ----------1

Midwife's place ----------2

Hospital/health centre/clinic----------3

At traditional healer's place----------4

Elsewhere----------5

59. Who assisted during delivery_____?

Nurse----------1

Tradition Birth Attendant (TBA) ----------2

Doctor----------3

Family----------4

Midwife----------5

Relative----------6

Other (specify) ----------7

60. During _____'s pregnancy did the mother receive antenatal care?

Yes----------1

No----------2 (Go to 63)

Don't Know----------3 (Go to 63)

61. If answer to the above is "yes" how old was the pregnancy at that time of the first antenatal visit?

Less than 1 month----------1

2months_____ 3months----------2

3months_____4months----------3

4months_____5months----------4

5months_____6months----------5

More than 6 months----------7

62. How many times did the mother receive antenatal care when she was pregnant with_____?

None----------1

1___3----------2

4+ ----------3

Don't know----------4

Where did_____die?

Home----------1

Other health facility----------2

On the way to the hospital or other health centre----------3

Other specify_____/----------4

INJURY

63. Did _____die from an injury, bite, burn, poisoning or drowning?

Yes----------1

No----------2

64. If yes, what kind of injury?

Motor vehicle accident----------1

Fall----------2

Drowning----------3

Poisoning----------4

Bite/sting by venomous animals----------5

Burn----------6

Violence----------7

Birth injury----------8

Other injury (specify) _____/----------9

65. Did_____die within 24 hours of this injury?

Yes----------1 (Go to social autopsy)

No----------2 (Go to 67)

Age Determination

66. Record the child's date of birth from question 35----------_____/_____/_____.
Day Month Year

67. Record the child's date of death from question 45
Determine the age: mark the child's age in months at the time of death: (subtract the birth date in question 35 from the date of death in question 45)

68. I calculated that_____was_____days/months/years he/she died. Is it correct?
Yes----------1
No----------2
Don't know----------3

APPENDIX B

SECTION B

Social Autopsy (open history)

Questions:

Tell me briefly about your child's illness that led to his/her death.

Was there anything else?

Tick the condition(s) which the respondent mentions spontaneously during her/his narration.

CONDITION	LOCAL TERM(s)
Diarrhea	_____.
Cough	_____.
Fever	_____.
Rash	_____.
Injury	_____.
Comma	_____.
Convulsion	_____.
Stiff neck	_____.
Tetanus	_____.
Measles	_____.
Kwashiorkor	_____.
Marasmus	_____.
Difficult breathing	_____.
Fast breathing	_____.
Wheezing	_____.
Complicated delivery	_____.
Malformation	_____.
Multiple birth	_____.
Very small at birth	_____.
Very thin	_____.
Born early (premature)	_____.
Pneumonia	_____.

Malaria _____.

Jaundice _____.

Other specify _____.

THANK YOU FOR THE INTERVIEW.