EXAMINING THE FACTORS THAT ARE ASSOCIATED TOINFANT AND CHILD MORTALITY IN KENYA

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Chapter One
Introduction

1.1 Background of the Study

Infant and child mortality has been an issue across for many years, particularly in the Sub-Saharan African region.Sub Saharan African countries hold the highest infant mortality rates in the world, with infant mortality of 104 deaths per 1000 live births in 1990's,while the infant mortality rate for other less developed nations was 71 deaths per 1000 live births ?. ? study demonstrated that even in the 2000s the infant mortality rate in this region remained the highest in the world at 94 deaths per 1000 live births in comparison to the rest of Africa at 88 deaths per 1000 live births and 61 deaths per 1000 live births in other less developed nations.

The social-cultural and social economic factors in Sub Saharan Africa have been highlighted, amongst others, as having a significant influence on these high rates of infant mortality in various studies including ?. Social cultural factors include the vast ethnic and religious beliefs which exist in Sub-Saharan Africa, cultural practices and beliefs effect whether or not individuals seek bio-medical forms of health care during pregnancy and when their infant is in ill health ?. when viewing Many cultures women's social status is increased by her ability to bear children this also increases her chance of marriage, thus Sub Saharan African women have high fertility ?. High fertility results in women having short birth intervals between pregnancies, these short birth intervals result in compromised health outcomes for both the mother and the child ?.

When looking on the the social economic factors, women in Sub Saharan Africa have little or no autonomy (Bohmer and Williamson, 2006) and as a result they do not have the power to make decisions on there their infant's health. Also, there is a high rate of unemployment in Sub Saharan Africa which has resulted inability of parents to seek medical assistance when the infant is in ill health due to lack of capital (Schell et al, 2007). Sub Saharan Africa is a region which has vast spatial variation and every country is divided into rural and urban areas ?. Urban areas are equipped with adequate resources while rural areas lack resources including essential health facilities ?. Moreover, people in rural areas often have an anti biomedical stance ?. These factors contributes to the increased risk of mortality in rural areas. These social cultural and social economic factors highlight the important issues that result in the high infant and child mortality in Sub-Saharan Africa in comparison to other regions in the world.

In the previous study live births, respectively, experience still high even by sub-Saharan Africa standards ?. However, the main reasons for this high mortality remain largely unknown as we have no systematic analyses of the determinants of infant and child mortality in the country. This study examines in particular the socioeconomic, social cultural, bio-demographic, and household environmental factors associated with mortality among children in Kenya, and the level to which the survival results of siblings are associated net of many observed factors. This association of child survival outcomes after accounting for different known determinants of mortality has been attributed to unobserved heterogeneity or frailty ?. The analysis is conducted separately for infancy (0–11 months) and childhood (12–59 months) because the effect of factors affecting mortality among the children varies by the age of the child (? and ?).

Estimation shows that there has been a 53% reduction in Under 5-mortality globally between 1990 and 2015. The slowest reductions in U5M were observed in sub-Saharan Africa (SSA). Only 11 countries out of 48 in SSA achieved the MDG 4 target by 2015. International bench-marking of national Under five mortality developments goals has improved with time, with increasing data and improved methodologies. In recent years, new methodologies have been applied to understand within-country temporal and spatial heterogeneity in child survival. However, examples of how U5M has changed at the sub-national levels remains limited to only a few SSA countries and imperfectly described. In all countries, disease burdens are expected to be concentrated in few sub-national areas; identification of these areas and directing suitable interventions to these areas will accelerate national child mortality reduced and ensure effective and equitable resource allocation. The Sub national variations of child survival in Kenya were first described during the 1980s. Advances in spatio temporal statistics and analysis of multiple demographic data-sets have provided new opportunities to study spatial and temporal heterogeneous of child survival across Kenya. However, recent analyses have not harnessed all the available sample surveys and census data, nor have they always provided annual predictions at the sub-national units required for decentralized policy making since Kenya's independence. In addition to this, assessments of progress towards achieving global milestones and reducing inequalities in Under 5 mortality at sub-national units has not been attempted in Kenya.

1.2 Statement of the Problem

For decades, child mortality has been a social and economic problem internationally. Governments have succeeded in reducing child mortality by implementing health policies that aim at improving children's health and increase in health expenditures over the years (RoK, 2010). A reduction of infant and child mortality has been experienced in Kenya over the years. However, that decline rate is rather slow; achieving the two thirds reduction in child mortality by the year 2015 may not be a reality. Several studies; ? on causes

of child mortality in Kenya show that poverty, environmental conditions and social characteristics affect child mortality.

Biological factors, maternal factors, environmental factors, injury and health seeking behaviors have been demonstrated as major factors associated to infant and child mortality. These factors drive the key interest of this study. Literature reveals that child mortality reduction rate is quite low to derive the fourth MDG goal in Kenya. Therefore there is need to establish the factors associated to infant and child mortality using the current data set which will be more appropriate to be considered in assessing the impacts of current government interventions on child mortality. This study proposes to assess the effect of maternal, environmental and demographic variables on infant, child mortality. A lot of researches have used previous data set (KDHS 2008) hence, it is critical to assess and reevaluate these factors.

1.3 Objectives of the Study

1.3.1 Main Objective

The main objectives of this study is to examine major factors associating to infant and child mortality in Kenya.

1.3.2 specific Objectives

(i) To identify the major factors that increase child mortality rate in the study community

(ii) To obtain the age group that is mostly affected by infant and child mortality

(iii) To determine the importance Antenatal care and skilled delivery has in reducing child and infant mortality in Kenya

1.3.3 Research Questions

(i) What are the major factors that increase child and infant mortality in Kenya?

(ii) Explain the age group that is mostly affected by infant and child mortality?

(iii) Do Antenatal and skilled delivery care service has importance in reducing infant and child mortality?

1.4 Limitations of the Study

Like any survey, there are bound to be some errors in the data collected. One likely problem is sex specific omission of death. This is likely to happen especially among the traditional Kenyans who have the belief that deaths of certain children should better go unreported. These are children believed to be reincarnating and surviving barely for a year. They can be under reporting if this should happen to either of the sexes. It is difficult to avoid misreporting as many people do not have written records of vital events. Since in many households income used for child care comes from the father, his ethnic background may play a significant role in directing the mother how the child should be treated. Unfortunately the data cover only the mother's ethnic background. But this should not be a serious problem since child care is almost totally the responsibility of the mother. Also it is difficult to distinguish between matrilineal and patrilineal, since there are no separate data for lineage system. To overcome this, filtering can be used to delete some data which contain the patrilineal in the Kenya. Admittedly, this might be a bit crude, but it was the best possible way to deal with the problem.

1.5 Significance of the Study

The finding of this study will add value to the existing literature on infant and child mortality in Kenya. In addition, it will use recent demographic data, (KDHS 2014) which will be more appropriate to consider in assessing the impact of current government intervention on child mortality. Lastly, the study has been done at the initial stages and years of the implementation of the Kenya health policy plan 2010-2030 therefore policy recommendations given may be useful for the government in its effort of reducing infant and child mortality.

Chapter Two
Literature Review

2.1 Theoretical Review

Many studies investigated factors that are associated with infant and child mortality by using ? the analytical frame work of child survival. The previous studies conducted in Rwanda, Uganda and Tanzania have indicated that child survival is influenced by community, social-economic and individuals (maternal and child) characteristics. For example, Musafili et al.(2010) measured impact of place of residence, maternal education attainment and household financial status on neonatal mortality and children Mortality Under five years of age in a national setting of Rwanda. They carried out a survival analysis of live births using national representative data from the Rwanda DHS. This study shows that mothers who have no formal education are significantly affect mortality rates for children <5 yrs of age. A similar study performed by Nasejje et al. in 2015. He further suggested that being a male child, female headed household and number of births (one or more births) were significantly related to mortality in children <5 yrs of age in Uganda.

The plight of children have improved dramatically over the twentieth century (see, e.g., Black et al. 2003). The Infant mortality rates, for example, has reduced globally over the past six decades and the infant death rate has declined across the countries occupying very different positions in the world system, but considerably cross national variation in infant mortality remains at the beginning of the twenty first century (CIA 2013) and child mortality reduction goals under the UN's 2015 Millennium Development Goals will not be met (UN 2014). When considered the fact that there is currently a 100 fold variation in the infant mortality rate across countries in the world system: Monaco was rated 1.81 infant deaths per live 1,000 births in 2013, while Afghanistan was rated 187.5 infant deaths per 1,000 live births (CIA 2013)

? uses data from Ethiopia DHS survey (2005) and employs cross tabulation techniques to examine the selected socio-economic, bio-demographic and maternal health factors that determine child mortality in Ethiopia. the result shows that among socio-economic variables birth interval with preceding birth and mother education have significant impact to lowering the risk of child mortality(student . paper /record/file Desta Mekonn). Two-third of disease is preventable. Malnutrition and the lack of safe water and sanitation contribute to half of all these children's disease. Research and experience shows that most of the children who die each year could be saved by low tech, evidence based, cost effective measures such as vaccines, antibiotics, micronutrients, supplementation, insecticide,

treated bed net, improved family care and breastfeeding practice, and oral rehydration therapy.(en.wikipedia.org/wiki/child. mortality).

2.1.1 The Infant Mortality

The Infant mortality has been used extensively in research as the main indicator of population health in past years ?. We undersntad these through the widespread research which has determined that an infant's well-being is heavily dependent on the social economic conditions of the environment, more than any other age group ?. Infants have a special vulnerability to poverty and the substandard living conditions, therefore the infant mortality acts as a social reflector as it reflects the social inequalities which are in existence in any society ?.As a result, even though U5M and mother's age at first birth can also be used as indicators or measures of social health, infant mortality in this study is used since it is understood as an the most significant indicator of social economic conditions in any given society.

2.1.2 Sub-Saharan Africa's Infant Mortality

Infant mortality is believed to have immense variation in and amongst nations (Frey and Field, 2000), with less developed nations indicating the highest rates of infant mortality worldwide ?. In previous years the infant mortality rate in Sub Saharan Africa showed a reducing trend. This trend slowly came to a halt and was eventually reversed, which has given evidence in the more recent infant mortality rates which indicates that infant mortality is on the rise (Schell et al, 2007). Sub Saharan Africa is a region that has a vast concern and although infant mortality has in previous years indicated a reducing trend, from 151 to 96 deaths per 1000 live births from 1960 to 1990; the infant mortality rates of recent years are still regarded to be at an unacceptably high rate in the world standards ?.

Infant and child mortality rate was highlighted as an area of concern in society and was addressed through the implementation of the United Nations Millennium Development Goals. The fourth MDG in particular addresses the issue of reducing mortality worldwide by up to two thirds in 2015 ? .Thus determinants of infant mortality needs to be known and examined in so as to undertake the goal to reduce mortality on the upcoming years. Furthermore, policies needs to be implemented to ensure the proposed programs and initiatives are directed at decreasing mortality to ensure that the targets of the Millennium Development Goals in Sub-Saharan Africa are met. The disproportionate figure of deaths among children under 5yrs of age between slums and places dwellers remains a considerable challenge, particularly in sub-Saharan Africa (SSA), including Rwanda, Uganda and Tanzania. The most recent global mortality estimates shows that the SSA region had the highest mortality rate for children under five years of age, with most of those deaths occurring in rural areas. More than half of these deaths are preventable or treatable health issues, such as malaria, the related intrapartum complications, diarrhoea, pneumonia and

preterm, which contribute to approximately 9, 12, 9, 16 and 13% of these deaths, respectively. A recent population estimate revealed that the majority people in Rwanda (84%), Uganda (75%) and Tanzania (70%) live in rural areas.3,4,5 Recent estimates show that the national mortality rates for children <5 y of age for Rwanda, Uganda and Tanzania have been substantially reduced and they are among the few countries in SSA that met the Millennium Development Goal (MDGs) 4 target.6 Despite this remarkable national decline in mortalityy rates for children <5 y of age, past evidence suggests that this improvement is boundless, but higher in urban than in rural areas, where there are likely to be a large proportion of households with higher socio-economic status and improved access to high-quality healthcare. In rural areas, however, the Demographic and Health Survey (DHS) reported higher mortality rates for children under 5 years of age of 70, 75 and 68 deaths per 1000 live births than the national average of 51, 67 and 64 deaths per 1000 live births in Rwanda, Uganda and Tanzania, respectively,3,4,7 which may be attributed to socioeconomic disparities,8 healthcare access and different approaches of intervention coverage.

Previous studies have been heavily focused on the wealth index as the main determinant of infant mortality in Sub-Saharan Africa (Hamer et al, 2003). Schell and others (2007) conducted a study in 152 countries with the aim of identifying the determinants of infant mortality; this study similar to others emphasised the importance of wealth as a determinant of infant mortality. Although the findings of this study emphasise wealth distribution as influential in infant mortality, it is not specific to Sub-Saharan Africa, which has shown different trends from other regions of the world. In addition, the study overlooks demographic determinants of infant mortality and fails to include important socio-economic factors such as education, in conducting the study.

Infant mortality rate in Africa is high when comparing to regions of the world. From the World Health Organization report in 2015, the global infant mortality rate was 32 per 1000 live births compared to the Sub Saharan Africa region rate of 56% 1000 live births. When looking on Mothers' education, a determinant of infant mortality has also been identified in numerous studies on infant mortality (Frey and Field, 2000). A cross-sectional study of 96 less developed countries was conducted to determine the impact of women's status contributing to infant mortality inclusive, but without including their education (Boehmer and Williamson, 1996). The study shows that there is an identifiable relationship between women's status and infant mortality: with increased status, the women's risk of infant mortality is significantly reduced.

Boehmer and Williamson (1996) studied factors, such as economic, political and educational factors, and included women's autonomy as an influential aspect in infant mortality. Similarly to previous studies, education emerged as a significant determinant although it was better understood in a multi-dimensional model rather than separate to other factors which make up women's status in society. Robust and representative U5MR estimates were available for these survey years. Maternal mortality was variable and available for

only two time points (2003 and 2014), and neonatal mortality did not sufficiently decline to perform a robust analysis of change.

From the study which was conducted in Malawi, spatial variation was examined as a major contributor to infant and child mortality. when looking on Infant mortality in Malawi in the early 1990's it was at an alarming rate of 154 deaths per 1000 live births (Kalipeni, 2003). Thus infant mortality was a major problem there during this period. This study's main interest was the impact the type of residence has on infant mortality in Malawi, and discovered the huge impact that environmental factors have on child survival, with region as the single most important determinant of infant mortality in Malawi (Kalipeni's, 2003). Although this study identified other influential factors, it focused on an aspect of infant mortality that many demographic studies have found to be less influential in the Sub Saharan African context rather than other determinants, like demographic factors.

Similarly, Macassa and others (2003) proofed that in Mozambique whether the mother resided in an urban or rural area had an effectt on child survival, with infant mortality in rural Mozambique reported to be 145 deaths per 1000 live births comparing to 125 deaths per 1000 live births in urban Mozambique. Although this study had similar results to the study in Malawi, this study was conducted in a period of conflict and therefore fails to look at residence in relation to other factors and thus could overestimate the relationship between rural and urban residence when relating to infant mortality in Mozambique.

When comparing to the regions of the world, Africa has the highest infant mortality rate . According to WHO report in 2015, the global infant mortality rate was 32 per 1000 live births compared to the Sub Saharan Africa region rate of 56 per 1000 live births. Infant mortality rate in Ethiopia marked to be one of the highest in Africa. According to the 2016 Ethiopian DHS report, infant mortality was 48 per 1000 live births. Nevertheless, the infant mortality rate in Ethiopia has shown a 50% reduction in the last 16 years.

Kenya demographic health survey (KDHS), demonstrated that, proper care during pregnancy and delivery is important for both mother and baby. The WHO recommends four antenatal visits during a woman's pregnancy for effective decrease in perinatal, neonatal, and infant mortality (KDHS 2014). Maternal and neonatal health trend in Kenya is a replica of other sub-Saharan African countries. In Narok less 50% of women, attend the recommended number of four ANC visits (Mugo, 2013). The under five mortality is 52 deaths per 1000 live births meaning that at least 1 in every 19 children born in Kenya dies before their 5th birthday. However, the infant mortality rate is 39 deaths per 1000 live births; this has slightly changed over the last decade. This is basically an attribute towards achieving the millennium development goal 4 and 5, within put of extra resources for maternal and child survival. Immunization coverage stands 80%, while Basic vaccination coverage has declined since 2008-09, from 77 percent of children with all basic vaccinations to 71 percent in 2014. (KDHS, 2014).

The extensive studies that have been conducted illustrate that Sub-Saharan Africa has the highest infant mortality rates in the world (Kalipeni, 2000). The determinants are non-static as they are constantly changing with changing environments. The current high rates of infant mortality in Africa are largely preventable (Frey and Field, 2000) and lowering infant mortality is possible, this is evident within the more developed countries. This underlies the importance for new and up-to-date studies on infant mortality in Sub-Saharan Africa, which identify the main determinants in order to be able to combat this pressing issue. Furthermore, identifying determinants of infant mortality will assist in achieving the fourth Millennium Development Goal to decrease infant mortality in the world by two thirds by the year 2015 (Hamer et al, 2003).

2.1.3 The Childhood Mortality in Kenya

A standing progress has been realized in reducing childhood mortality. In the worldwide, a 53% decline in U5M mortality rate was recorded between 1990 and 2015 (UNICEF et al, 2015). Sub Saharan Africa managed to decrease its U5M by 54% (UNICEF et al, 2015). Kenya had a 52% decline in its under-five years mortality compared with 70% and 71% for Tanzania and Uganda respectively. This meant that while Tanzania and Uganda met and surpassed their millennium Developments Goal targets, Kenya did not meet its target.

The Neonatal mortality is becoming increasingly important both because of the raising share of neonatal deaths in under five deaths and an appreciation that health interventions to deal with neonatal mortality differ from those needed to address other <5 yrs deaths (UNICEF et al, 2014). Studies indicate that between 2016 and 2030 half of the 60 million child deaths will occur during the neonatal period with the share of neonatal deaths in <5 yrs deaths increasing from 45% in 2015 to 52 percent in 2030 (UNICEF et al, 2015). This therefore, means that effort and attention need to be put in place to neonatal mortality if the recent decrease in child mortality witnessed globally is to be sustained. The Neonatal mortality rate refers to the number of deaths occurring during the first 28 days of life per 1,000 live births in a given year or any other period while post-neonatal mortality refers to the number of deaths from day 28 of life until the first birthday per 1,000 live births per year or other given period (WHO, 2011). U5M rate is the probability of a child born in a specific period or year dying before 5 years of age if the age-specific mortality rate for that period or year are subjected to them (WHO, 2011).

2.1.4 Mosley-Chen framework

Mosley and Chen (1984) position framework of child survival on the assumption that all social and economic factors that are affecting child mortality operate through a set of intermediate factors. According to this framework, about 97% of children born are likely to survive until their 5th birthday. However, the influences of socioeconomic, biological and environmental factors are the driving forces behind reduction in survival probabilities.

2.1.5 Age at First Birth

After controlling for demographic associates as maternal age before every delivery, mortality rates are distinctly decreased (Kabir & 2006; Bocqueir & Gunther, 2012). Rustein (2008), in a monetary observation based on the sector fertility (WFS), statistics are drawn components of growing nations, confirmed that the age of the mom parity and toddler mortality relationship had a U-fashioned pattern framework. Mortality risks were maximum among children born to very young mothers and those born to older mothers.

2.1.6 Child Mortality

Childhood mortality in Kenya has remarkable progress has been made in reducing childhood mortality. Globally, a 53% decline in under-five mortality rate was recorded between 1990 and 2015 (UNICEF et al, 2015). Sub-Saharan Africa managed to reduce its under-five mortality by 54% (UNICEF et al, 2015). Kenya had a 52% decline in its under-five mortality compared with 70% and 71% for Tanzania and Uganda respectively. This meant that while Tanzania and Uganda met and surpassed their MDG targets, Kenya did not meet its target.

Neonatal mortality is becoming increasingly important both because of the rising share of neonatal deaths in under-five deaths and an appreciation that health interventions to deal with neonatal mortality differ from those needed to address other under-five deaths (UNICEF et al, 2014). Projections indicate that between 2016 and 2030 half of the 60 million child deaths will occur during the neonatal period with the share of neonatal deaths in under-five deaths increasing from 45% in 2015 to 52% in 2030 (UNICEF et al, 2015). This, therefore, means that effort and attention need to be devoted to neonatal mortality if the recent decrease in child mortality witnessed globally is to be sustained. Neonatal mortality rate refers to the number of deaths occurring during the first 28 days of life per 1,000 live births in a given year or any other period while post-neonatal mortality refers to the number of deaths from day 28 of life until the first birthday per 1,000 live births per year or other given period (WHO, 2011). Under-five mortality rate is the probability of a child born in a specific period or year dying before five years of age if the age-specific mortality rate for that period or year are subjected to them (WHO, 2011).

2.1.7 The Association of Place of Residence with Child mortality

Many researchers indicate that child mortality in urban area is smaller than rural areas. This variations is occurred due to unequal distribution of socio-economic factors and health facilities, for example in rural area the distribution of health resource more likely limited than urban areas because of the lack of modernization and limited health facilities, rural areas are expected to have higher risk of child mortality in Kenya. Using 2014 Demographic and Health Survey data, this study (1) examines the effects of individual- and community-level characteristics on infant/child mortality in Kenya. The idea that perceptions of reducing infant and child mortality and (or) increased surviving resulting from the early stages of mortality transitions (from high mortality to low) that have taken place around the world influenced individuals to have fewer children holds a central though uncorroborated place in most theories of the demographic transition (from high fertility and high mortality to low fertility and low mortality). Although early work attempted to measure perceptions of infant mortality as an explanation for fertility and family building behaviour, little research has investigated how that perceptions are made-and updated. Perhaps because of the challenge in measuring perceptions and those early efforts' lack of success still another line of research attempted to bypass subjective perceptions altogether in analyses of how contextual levels of mortality measured at the aggregate level were associated directly with fertility behaviours

2.1.8 Maternal Health Care Services in Kenya

In Kenya the beginning of maternal health care services can be traced back to the integrated maternal and child health (MCH) programme in 1972, although specific programmes to reduce maternal mortality and improve health of the mother were only established after the launch of the Safe Motherhood Initiative in 1987 in Nairobi. The programmes mainly concentrated on training traditional birth attendants (TBAs) to screen for complications in high risk pregnancies. Efforts are now directed towards ensuring that during pregnancy and child birth women have access to skilled care (that does not include TBA). Various strategies and policies have been formulated to this end such as the National Reproductive Health Strategy of 1997 and the National Reproductive Health Policy. More recently, in 2013, the Government of Kenya initiated free maternity services in all public facilities. This was to ensure that as many women as possible are able to access skilled delivery care. The First Lady of the Republic of Kenya added to the agenda of improving maternal health by launching the "Beyond Zero Campaign". The campaign seeks to ensure no new HIV infections in children and that women have access to prenatal and post-natal care.

Maternal health services are provided at every level of the Kenyan health care system by health facilities. The lowest levels of facilities in the public health sector are dispensaries and health centres that provide mainly prenatal care, diagnose and treat simple pregnancy

complications such as anaemia, and sometimes perform normal deliveries. The next level is district hospitals which, besides providing the services provided by dispensaries and health centres, also perform caesarean sections. The higher level is provincial hospitals and then referral or national hospitals all of which provide maternal health services for both simple and complicated cases. Doctors, clinical officers, and registered and enrolled midwives and nurses comprise the skilled attendants. Utilization of maternal health services in Kenya has improved over time. Statistics show that in 2014 many women in Kenya (96%) made at least one antenatal visit the proportion having increased from 92% in 2008/2009 (KNBS et al, 2015)). WHO recommends that women make at least four antenatal visits during pregnancy and that the first antenatal visit should occur within the first four months of pregnancy.

In our Kenya, in 2014, only 58% of women made at least four antenatal visits, an increase from 47% in 2008/2009 (KNBS et al, 2015). Further, only 20% of women made their first antenatal visit before the fourth month of pregnancy which is a five percentage points increase from the 2008/2009 figures (KNBS et al, 2015). Skilled assistance during delivery (also referred to as skilled delivery care) is considered important in reducing childhood and maternal mortality. It refers to care given to a woman by a skilled attendant during labour, delivery and early postpartum

2.1.9 Reduction of Child Mortality

The world health organization targets that between 1990 and 2015 the U5M would be reduced by two thirds. Globally the number of children <5 yrs of age fell from 12.7 million to 6.3 in the year 1990 to 2013 respectively. In the year 2013 44% of <5 yrs deaths occurred during the neonatal period. In evaluating of MDGs in reduction of child mortality requires rapid scale of key effective, affordable interventions (WHO 2015).

2.1.10 Under Five Mortality

Much has been done globally to increase child survival in the past few decades, and millions of children have improved survival chances than in 1990-51 in 26 children died before reaching age five in 2018, compared to 1 in 11 in 1990. Globally, the U5M decreased significantly from 216 deaths per 1000 live births in 1950 to 38·9 deaths per 1000 live births on 2017. Disparities exist in said reduction across countries. According to estimates from the Global Burden of Disease (GBD) 2017 SDG Collaborators, many Nations are on track for achieving the target of at least 25 deaths per 1000 live births by 2030.

2.1.11 Antenatal Care

The term Antenatal care may be defined as the care provided by skilled health care providers to pregnant women and adolescent girls in order to ensure the best health conditions

for both mother and baby during pregnancy. Researchers examining the effectiveness of Antenatal Care interventions on maternal and newborn health outcomes have provided conflicting results. In two recent systematic reviews conducted in both high and low economic countries, it was shown that there is insufficient evidence of the effect of antenatal care on the reduction of newborn mortality. Both of these reviews, conducted only among socially disadvantaged and vulnerable women and compared lower number of Antenatal care with the standard model (depending on the number of visits). However, in studies conducted in India and Indonesia, positive effects of Antenatal care in preventing newborn deaths were indicated. These studies used interventions such as supplementation of iron tablets during pregnancy. ANC interventions must be integral to any quality improvement in outcomes for both mothers and newborns. Antenatal Care addresses the most prevalent health issues that affect mothers and newborns. For instance, Antenatal Care helps health care providers to identify diseases such as hypertension, haemorrhage and diabetes mellitus, and treat conditions that could affect the well being of the mother and baby.

In a recently published document, the World Health Organisation (WHO) now recommends a minimum of eight Antenatal Care visits to improve neonatal outcomes and to provide a more positive and women-centred experience for pregnant women [18]. It is estimated that Antenatal Care alone reduces neonatal mortality by 10–20%, though the utilization of those services in Sub-Saharan Africa is inadequate. Thus, considering the different and conflicting results concerning the effect of ANC on neonatal mortality in SSA, there is a need for assessing studies from SSA, where most maternal and newborn morbidity and mortality occur. A systematic review and meta-analysis is therefore necessary to critically evaluate relevant studies to provide up to date evidence about the effect of Antenatal Care on neonatal mortality. The aim of this systematic review and meta-analysis was to determine the pooled impact of Antenatal Care on neonatal mortality in sub-Saharan Africa.

Chapter Three
Research Methodology

3.1 Introduction

This chapter is mainly concerned with formulating the models that will be used to model the infant and child mortality data in Kenya. Understanding the model formulation, parameters and validation.

3.2 Logistic Regression

A logistic regression is technique for making predictions when the dependent variables is dichotomous and the independent variables may be categorical and mix of continuous and categorical. Binary or binomial logistic regression is the form of regression which is used when the dependent variable is dichotomous and independent variables are any type (discrete and continuous).

3.3 Model of Logistic Regression

One of the statistical techniques for this study was binary logistic regression and the model for logistic regression. Since the model is used to test the association of the two variables, we used odd ratio:

$$log(\frac{p}{1-p}) = exp(\beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k) \tag{3.1}$$

where by:

P= is probability of Infant death.

1-P= is probability of Infant living.

$\beta_1, \beta_2, \cdots, \beta_k$ is the coefficient of independent variables

e= 2.718

The ratio of probability of event of interest to probability of failure in that event is $(\frac{P}{1-P})$ is the odd ratio

$$\frac{p}{1-P} = exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k) \tag{3.2}$$

means that $\exp(\beta_j)$ is a factor by which the odds of occurrence of success change by a unit increase in the j^{th} independent variable. If we take the natural logarithm of odd ratio obtain estimated model given by;

$$Z_i = ln(\frac{p}{1-p}) = Z_i = \beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k \tag{3.3}$$

3.4 Assumption of logistic regression

Logistic regression doesn't make of the assumption of linear regression and general linear models that are based on ordinary least squares algorithm particularly regarding linearity, normality, Homoscedasticity, and measurement level

i. It does not need a liner relationship between the dependent and independent variables.
ii. Outcome variables are dichotomous in case of binary logistic regression.
iii. It requires large number to be accurate.
iv. Logistic regression does not make the key assumptions of linear regression and GLM that are based on ordinary least square algorithms.
v. Logistic regression can handle ordinal and nominal data as independent variables.

3.5 Chi-Square test of Independence

Chi-square test is one of the most appropriate ways to use with categorical variables; it is non parameter test method (distribution free). It is uses to determine the significant association between the two variables .it used to test the hypothesis test that the row and column variable are independent or not. Chi-square is also a function of its degree of freedom. The test statistics is given by

$$\chi^2 = \frac{\sum_{i=1}^{r}\sum_{j=1}^{c}(O_{ij} - E_{ij})^2}{E_{ij}} \sim \chi^2_\alpha((r-1)(c-1)) \tag{3.4}$$

Where:
E_{IJ}- is the expected frequency corresponding to $(i,j)^{th}$

O_{IJ}- is observed frequency

$(r-1)(c-1)$= Degree of freedom

r- Number of rows c- Number of columns

The test statistics χ^2 has (r-1) (c-1) degree of freedom and α level of significance.

Decision rule: reject H_0 if the calculated value is greater than the tabulated value (the significance level $\alpha = 0.05$) or reject H_0 if p-value is less than $\alpha = 0.05$.

Chi-square use for different purpose among those the most important are the following.

i. To test goodness of fit
ii. To test independent
iii. To test homogeneity

1
Assumption of chi-square

i. All individual observation in the sample should independent.
ii. Sample must be drawn from the population interest.
iii. Each cell and every individual objective is independent of each other.
iv. Each number qualifies for one and only one cell in the table.
v. It his required sufficiently large expected frequency for each cell.

Chapter Four
Data Analysis

4.1 Introduction

This chapter delves into examining the major factors that are associated to infant and child mortality in Kenya. In addressing the factors, it identifies those major factors, indicate the age group of mothers mostly affected and determine the importance of Antenatal care plus skilled delivery in reducing child and infant mortality in Kenya. Thus, it will entail the response rates, Demographic information, factors associated to Child mortality, factors considered for Child Mortality, major factors that increase Child Mortality rate in Nairobi County, age group affected by infant and Child Mortality, importance of ANC and skilled delivery in reducing infant and child mortality and model specification. Overly, it will also provide a summary of the findings respective to the objectives of the study.

4.2 Response Rate

The KDHS 2014 survey was distributed according the previous 8 regional jurisdictions of Kenya. This study was only interested in Nairobi region. As is illustrated in Table 1, Nairobi region had 1569 respondents who fully responded to the survey, contributing to 1.9% of the total sample of the study.

Table 1. Regions

Region	Frequency	Percent	Cumulative Percent
Coast	10350	12.4	12.4
North Eastern	5738	6.9	19.2
Eastern	13109	15.7	34.9
Central	6678	8.0	42.9
Rift Valley	25367	30.3	73.3
Western	8145	9.7	83.0
Nyanza	12635	15.1	98.1
Nairobi	1569	1.9	100.00
Total	83591	100.00	

Nairobi region was further sub-divided to 56 area units where not more than 50 or less than 10 respondents were to be surveyed in each of the regions. However, two area units (unit 34 and 35) got 9 and 8 respondents respectively. Table 2 indicates the distribution of respondents in each of the area units.

Table 2. Ultimate Area Units

Area unit	frequency	percent	area unit	frequency	percent	area unit	frequency	percent
1	23	1.5	21	25	1.6	41	41	2.6
2	34	2.2	22	37	2.4	42	30	1.9
3	39	2.5	23	28	1.8	43	37	2.4
4	24	1.5	24	28	1.8	44	35	2.2
5	29	1.8	25	35	2.2	45	23	1.5
6	28	1.8	26	15	1.0	46	21	1.3
7	13	.8	27	49	3.1	47	48	3.1
8	33	2.1	28	20	1.3	48	43	2.7
9	23	1.5	29	29	1.8	49	16	1.0
10	33	2.1	30	37	2.4	50	35	2.2
11	47	3.0	31	32	2.0	51	32	2.0
12	21	1.3	32	22	1.4	52	44	2.8
13	28	1.8	33	15	1.0	53	32	2.0
14	13	.8	34	9	.6	54	35	2.2
15	18	1.1	35	8	.5	55	12	.8
16	18	1.1	36	19	1.2	56	22	1.4
17	26	1.7	37	21	1.3			
18	45	2.9	38	13	.8			
19	18	1.1	39	31	2.0			
20	43	2.7	40	34	2.2			
Total							1569	100.0

From all the respondents who were surveyed, 1569 of them were valid, having satisfactorily completed the scheduled interviews as represented in the table below.

Table 3. Result of Individual Interview

Frequency	Percent	Valid percent	Cumulative Percent
1569	100.0	100.0	100.0

4.3 Demographic information

In terms of the ages of the female respondents, on average, the female respondent was approximately 33 years old, with the oldest being 49 years while the youngest was 15 years old. The median age was 32 years and the modal age was 30 years old.

Table 4. Respondents' current Age

Mean	32.77
Median	32.00
Mode	30
Std Deviation	7.237
Variance	52.373
Skewness	.272
Kurtosis	-.672
Range	34
Minimum	15
Maximum	45

Their distribution in age groups showed that most of the females were between 25 to 34 years, with very few at 15 to 19 years (1.1%) and 45 to 49 years (8.3%). Table 5 below indicates the distribution of females in the child bearing bracket of 15 to 49 years.

Table 5. Age in 5-year groups

Age group	Frequency	Percent
15-19 years	18	1.1
20-24 years	186	11.9
25-29 years	374	23.8
30-34 years	379	24.2
35-39 years	292	18.6
40-44 years	190	12.1
45-49 years	130	8.3
Total	1569	100.0

Considering the number of births in the past 5 years, 41.1 per cent of the female in the child bearing ages had no births, 40.6% had one birth, 16.% per cent had two births and

only 2 per cent of them had 3 births. Figure 1 below shows the proportion of births in the last five years.

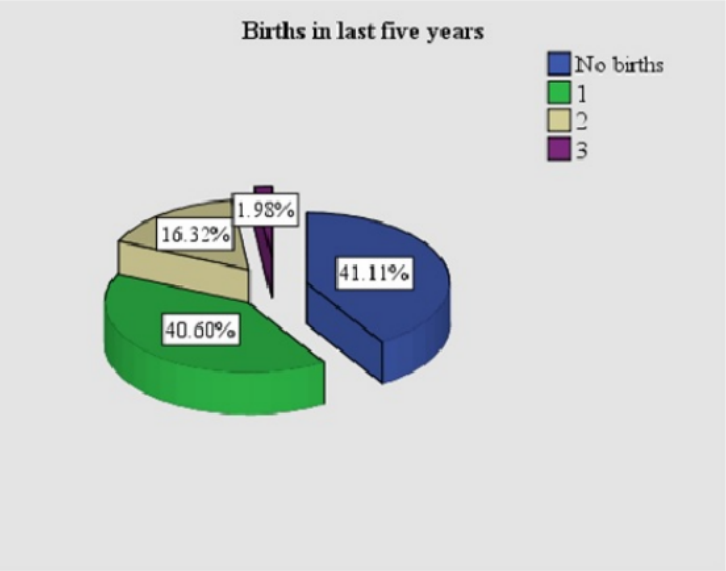

Figure 1. Births in last five years

Table 6. Prenatal: traditional birth attendant

Prenatal: traditional birth attendant		
	Frequency	**percent**
valid NO	427	27.2
valid YES	1	.1
Missing system	1141	72.7
Total	1142	72.8
Total	1569	100.0

With regards to the duration of breastfeeding, two females did not breastfeed at all, 11.8% breastfeed between 1 to 6 months, 17.4 percents breastfed between 7 to 12 months, 31.3% breastfed between 14 to 24 months and only 4.7% of them breastfed above 2 years. Table 9 indicates the duration in which infants were breastfed before weaning. Overly, those who were breastfeeding during the time of study were 31.2%. Table 9 indicates the duration breastfeeding among the women who have ever gave birth to a child.

Table 7. Duration of Breastfeeding

Month	Frequency	percent	Valid percentage	Cumulative percentage
Never breastfeed	9	.5	2.8	2.8
1	1	.1	.4	1.2
2	2	.1	.8	2.0
3	2	.1	.8	2.8
4	2	.1	.8	3.6
6	.3	1.5	9.1	12.6
7	3	.2	1.2	13.8
8	5	.3	2.0	15.8
9	10	.6	4.0	19.8
10	3	.2	1.2	20.9
12	23	1.5	9.1	30.0
14	5	.3	2.0	32.0
15	5	.3	2.0	34.0
16	3	.2	1.2	35.2
17	4	.3	1.6	36.8
18	21	1.3	8.3	45.1
19	3	.2	1.2	46.2
20	6	.4	2.4	48.6
21	2	.1	.8	49.4
22	1	.1	.4	49.8
24	29	1.8	15.5.8	61.3
26	2	.1	.8	62.1
27	2	.1	.8	62.8
28	2	.1	.8	63.6
29	1	.1	.4	64.0
30	1	.1	.4	64.4
32	2	.1	.8	65.2
36	1	.1	.4	65.6
38	1	.1	.4	66.0
Still breastfeeding	79	5.0	31.2	100.0
Total	253	16.1	100	
System	1316	83.9		
Total	1569	100.0		

From the 26.8% women who responded to timing of first ANC check, 1 percent of them went for the ANC check before the lapse of the 1st month. More than half (53.2%) had their first check at the 5th or less month, while 46.8% had their first ANC check from the 6th month. Table 10 indicates the timings of the 1st ANC check in months.

Table 8. Timing of 1st antenatal check (months)

	Frequency	percent	Valid percentage	Cumulative percentage
0	4	.3	1.	1.0
1	25	1.6	5.9	6.9
2	37	2.4	8.8	15.7
3	62	4.0	14.7	30.4
4	96	6.1	22.8	53.2
5	99	6.3	23.5	76.7
6	86	4.3	16.2	92.9
8	3	.2	.7	99.8
9	1	.1	.2	99.8
Total	421	26.8	100	
missing System	1148	73.2		
Total	1569	100.0		

Considering the number of ANC visits during pregnancy, 17.5% of the women attended 3 or less ANC clinic visits during their pregnancy period. 24.8% attended the WHO recommended ANC visits throughout their pregnancy, while 48.6% percent attended more than 4 visits. Overly, 50.7% of them attended 4 or less ANC visits in their pregnancy.

Table 9. Number of Antenatal visits during pregnancy

	Frequency	percent	Valid percentage	Cumulative percentage
No antenatal visits	7	.4	1.6	1.6
1	8	.5	1.9	3.5
2	21	1.3	4.9	8.4
3	75	4.8	17.5	25.9
4	106	6.8	24.8	50.7
5	73	4.7	17.1	67.8
6	45	2.9	10.5	78.3
7	40	2.5	9.3	87.6
8	26	1.7	6.1	93.7
9	14	.9	3.3	97.0
10	3	.2	.7	97.7
12	6	4	1.4	99.1
14	1	.1	.2	99.3
Don't know	3	.2	.7	100.0
Total	428	27.3	100.0	
missing System	1141	72.7		
Total	1569	100.0		

Of the 33.8% who disclosed their places of delivery, 16.3% had their deliveries in government hospital, 7.4% delivered in private hospitals and Clinics while 2.7% delivered in homes.

Table 10. Place of Delivery

	Frequency	percent	Valid percentage	Cumulative percentage
Respondent Home	43	2.7	8.1	8.1
Other home	8	.5	1.5	9.6
Government hospital	208	13.3	39.2	48.8
CS Government health professional	43	2.7	8.1	56.9
Other public sector	1	.1	.2	58.9
Private hospital/clinic	116	7.4	21.8	80.8
32	86	5.5	16.2	97.0
33	6	.4	1.1	98.1
Other private sector	4	.3	.8	98.9
Other	6	.4	1.1	100.0
Total	531	33.8	100.0	
99	1	.1		
Missing System	1038	66.1		
Total	1038	66.2		
Total	1569	100.0		

Of the 33.8% who had deliveries in the past, 20.7% underwent a cesarean section while 79.3% had a normal delivery.

Table 11. Delivery BY Cesarean

	Frequency	percent	Valid percentage	Cumulative percentage
NO	422	26.9	79.3	79.3
YES	110	7.0	20.7	100.0
Total	532	33.9	100.0	
Missing System	1037	66.1		
Total	1569	100.0		

From the 254 birth weights recorded, most infants born were of average weight (57.5%), a substantial number had larger than average weight (21.7 percent) and only 5.1% had a very large weight. However, 12.2% recorded a smaller than average weight and 2% had a very small weight.

Table 12. Size of Child at Birth

	Frequency	percent	Valid percentage	Cumulative percentage
Very Large	13	.8	5.1	5.1
Large than Average	55	3.5	21.7	26.8
Average	146	9.3	57.5	84.3
Small than Average	31	2.0	12.2	96.5
Very Small	5	.3	2.0	98.4
Don't know	4	.3	1.6	100.0
Total	254	16.2	100.0	
Missing System	1315	83.8		
Total	1569	100.0		

4.4 Factors considered for Child Mortality

So as to identify the major factors associated with child/infant mortality, a chi-square relational coefficient, as indicated in Table 15, shows the significance of the associations. Among the factors considered to have a cause-effect relation, 5 factors were significant at 95percentage level of confidence. These factors were number of births in the last five years ($p_{value} = 0.001$), number of births in the past one year ($p_{value} = 0.009$), months taken during breastfeeding ($p_{value} = 0.012$), the number of ANC visits during pregnancy ($p_{value} = 0.012$) and the ANC services offered by the government dispensaries ($p_{value} = 0.038$). The table below shows the considered factors Cross tabulation with infant survival, where their p-values indicate whether there is evidence of significance or not.

Table 13. Chi-Square Relational Coefficient

	Chi-Square test	for Association
Identified factors versus Child/infant survival cross Tabulation	Pearson Statistic	p_{value}
Age in 5 years group	6.969	.324
Highest Education Level	2.637	.451
Birth in last five years	16.208	.001
Birth in past year	9.408	.009
Last birth a cesarean sec	.044	.835
BMI Categories(Underweight, Normal weight, Overweight and Obese)	5.531	.237
Current marital status	3.940	.558
Prenatal Doctor	.201	.654
Prenatal: CS health professional	3.609	.057
Assistance: Nurse/midwife	.315	.574
Assistance: Traditional birth attendant	2.795	.095
Assistance: community health workers	.069	.793
Assistance Relative/friend	1.056	.304
Duration of breastfeeding	.6.567	.682
Months of breastfeeding	27.073	..012
Timing of 1st antenatal check(months)	6.567	.682
Number of antenatal visits during pregnancy	27.073	.012
Delivery by cesarean section	.180	.671
Size of child at birth	7.770	.169
Respondent's checkup after delivery	.675	.411
Antenatal care - government dispensary	4.292	.038
Baby postnatal check within 2 months	3.136	.077

From the study, 101 infant deaths were captured. 13.9% died on the day of birth, 41.6% died before the tenth day and more than half died before the first month elapsed (51.5%). Cumulatively, 81.2% of the total deaths occurred before the infants could turn one year old. The table below indicate the day, month and year when the children died.

Table 14. Age at death

	Frequency	percent	Valid percentage	Cumulative percentage
Died on day of birth	14	.9	13.9	13.9
Days: 1	9	.6	8.9	22.8
Days: 2	6	.4	5.9	28.7
Days: 3	3	.2	3.0	31.7
Days: 5	1	.1	1.0	32.7
Days: 6	1	.1	1.0	33.7
Days: 7	7	.4	6.9	40.6
Days: 9	1	.1	1.0	41.6
Days: 11	1	.1	1.0	42.6
Days: 12	1	.1	1.0	43.6
Days: 14	5	.3	5.0	48.5
Months:1	3	.2	3.0	51.5
Months:2	4	.3	4.0	55.4
Months:3	5	.3	5.0	60.4
Months:4	1	.1	1.0	61.4
Months:5	3	.2	3.0	64.4
Months:6	3	.2	3.0	67.3
Months:7	2	.1	2.0	69.3
Months:8	2	.1	2.0	71.3
Months:9	2	.1	2.0	73.3
Months:10	1	.1	1.0	74.3
Months:11	2	.1	2.0	76.2
Months:12	5	.3	5.0	81.2
Months:13	1	.1	1.0	82.2
Months:17	1	.1	1.0	84.2
Months:18	1	.1	1.0	84.2
Months:19	1	.1	1.0	85.1
Months:21	1	.1	1.0	86.1
Year: 1	2	.1	2.0	88.1
Year: 2	4	.3	4.0	92.1
Year: 3	2	1	2.0	94 1
Year: 4	3	.2	3.0	97.0
Year: 5	1	.1	1.0	98.0
Year: 9	1	.1	1.0	99
Year: 10	1	.1	1.0	100.0
Total	101	6.4	100.0	

4.5 Major Factors that Increase Child Mortality Rate in Nairobi County

As identified in Table 14 above, the number of births in the last five years, the number of births in the past one year, months taken during breastfeeding, the number of ANC visits during pregnancy and the ANC services offered by the government dispensaries appeared to determine the survival of infants in Nairobi County. This study further investigated the infant fatality rates when the mother had in the past 5 years had given birth to children, in the past one year had given birth, the number of months taken to breastfed before the death occurred, the number of ANC visits and accessing government dispensary for ANC services. More deaths were recorded for women who had no births in the past five years, giving a fatality rate of 34.7%. Followed closely by those who had only one birth at 32.7%, then those who had two births at 27.7%. For the women who had three births in the past five years, the fatality rates were very low at 5 percent.

Table 15. Cross tabulation for Births in the last five years versus Child Mortality

		Child is alive		Total
		NO	YES	
Births in last five years	**No birth**	35(34.7%)	610	645
	1	33(32.7%)	604	637
	2	28(27.7%)	228	256
	3	5(5%)	26	31
Total	101	1468	1569	

With respect to births in the past one year, those women who had no births also recorded a high fatality rate at 85.1%. While those with one birth had a fatality rate of 12.9%, those with more than 1 birth outcome had the lowest fatality rate of 2 percent. The birth outcome is as represented in Table 16 below.

Table 16. - Cross tabulation for Births in the past one year versus Child Mortality

		Child is alive		Total
		NO	YES	
Births in past years	**No birth**	86(85.1%)	1264	1350
	1	13(12.9%)	201	214
	2	2(2%)	3	5
Total		101(100%)	1468	1569

Considering the number of months taken for breastfeeding, number of ANC visits and whether the women utilized Antenatal care services from government dispensaries the respondents to these questions were few, thereby providing unclear information with regards to child mortality.

4.6 Age group affected by infant and Child Mortality

On the age group of women in the child bearing ages most affected by infant and child mortality, those at the ages between 25 years to 29 years contributed to 22.8% of all the child deaths. Those women of the ages between 30 to 34 years contributed to 21.8% of the total child deaths, while the women of ages between 20 to 24 years, 35 to 39 years, 40 to 44 years contributed to 18.8%, 12.9 percent and 13.9% respectively. Moreover, those of ages between 15 to 19 years and 45 to 49 years recorded very low fatalities of 1 percent and 8.9% respectively. However, these comparison was not significant at 95% confidence ($p_{value} = 0.32$).

Table 17. Age in 5-years group x Child is alive Cross-tabulation

		Child is alive		Total
		NO	YES	
Age in 5 years groups	15-19	1%	17	18
	20-24	19(1%)	167	186
	25-29	23(18.8%)	351	374
	30-34	22(22.8%)	357	379
	35-39	13(21.8%)	279	292
	40-44	14(13.9%)	176	190
	45-49	(98.9%)	121	130
Total		101(100%)	1468	1569

4.7 Model Specification

From the significant factors identified in section 4.3.2 above, a binary logistic regression model appropriately relates the likelihood of infant mortality to the number of births in the last 5 years, the number of births in the past one year, the number of ANC visits during pregnancy and ANC services provided by the government dispensaries.

$$ln(\frac{P}{1-P}) = \beta_0 + \beta_1 BL5(\frac{C=2}{C\leq 1}) + \beta_2 BL5(\frac{C=3}{C\leq 1}) + \beta_3 BP_y(\frac{C=1}{C=0}) + \beta_4 BP_y(\frac{C=2}{C=0}) + \beta_5 MB_f + B_6 ANC_v + B_7 ANC_G d(\frac{Yes}{No})$$

Equation 1 - Binary Logistic regression Model

Where; P the probability of Infant death,

$1-P$ the probability of Infant living/surviving,

C represents children,

ln is the natural log link function for the regression equation,

β_5 to β_7 are the coefficients of the respective independent variables,

BL5 is the number of births in the last 5 years,

BP_y is the number of births in the past one year,

MB_f is the number of months for breastfeeding,

ANC_v is the number of Antenatal care visits during pregnancy and

ANC_{Gd} is the use of Government dispensaries for the utilization of Antenatal care services.

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Table 18. Variables in the Equation

		B	S.E	Wald	df	Sig.	Exp.(B)	95% C.I for EXP.(B)	
								Lower	Upper
	V208			.935	2	.627			
	v208(1)	-1.396	1.444	.935	1	.334	. 248	.015	4.193
	v208(2)	37.049	17695.127	.000	1	.998	1230.544×10^{13}	.000	
STEP 1	v209			3.491	2	.175			
	v209(1)	-3.270	1.750	3.491	1	.062	.038	.001	1.174
	v209(2)	-25.786	12512.344	.000	1	.998	.000	.000	
	M5	**-.074**	**.037**	**4.048**	**1**	**.044**	**.929**	**.864**	**.998**
	M14	**-.113**	**.058**	**3.867**	**1**	**.049**	**.893**	**.797**	**1.000**
	M57G(1)	**-3.557**	**1.792**	**3.940**	**1**	**.047**	**.029**	**.001**	**.956**
	Constant	8.654	2.261	14.653	1	.000	5730.193		

a. Variable(s) entered on step 1: v208, v209, M5, M14, M57G

$$ln(\frac{P}{1-P}) = 8.654 - 1.3961BL5(\frac{C=2}{C\leq 1}) + 37.049BL5(\frac{C=3}{C\leq=1}) - 3.270BP_y(\frac{C=1}{C=0}) - 25.786BP_y(\frac{C=2}{C=0}) - 0.074MB_f - 0.113ANC_v - 3.557ANC_{Gd}(\frac{Yes}{No})$$

Equation 2 - Child mortality binary logistic regression model

In terms of odds ration, a child is 92.9% less likely to die for a unit increase in the number of months taken to breastfeed, 89.3% less likely to die for every unit increase in number of ANC visits and 2.9% less likely to die after utilizing Government dispensaries for Antenatal care services.

Chapter Five
Summary, Recommendation and Conclusion

5.1 Introduction

This chapter presents the summary, conclusion and recommendations of the study in line with the objectives of the study.

5.2 Summary

The aim of this study was to examine those factors associated to infant and child mortality in Kenya. In getting the factors, Nairobi County was randomly chosen and data on infant and child mortality from KDHS 2014 data repository for the identified County was extracted. It comprised of 1,569 respondents from 56 area units surveyed, where each unit was limited to between 10 and 50 respondents. However, two units (unit 34 and 35) got 9 and 8 respondents respectively. Further, this study focused on responses from females aged between 15 and 49 years that is considered as the child bearing ages. The female respondent, on average was approximately 33 years old, with their median age being 32 years and 30 years modal age. Most of them were between 25 to 34 years, with very few at 15 to 19 years and 45 to 49 years. In regards to the number of births in the past 5 years, almost half of the women in the child bearing period had no births, slightly more than a quarter had one birth and less than the remaining quarter had 2 or more births. Of importance to note is that majority of the women were married, attended to by a traditional birth attendant and breastfed between 14 to 24 months. In addition, most of them went for the ANC check from the 5^{th} month. However, more than half of them attended 4 or less ANC visits in their pregnancy.

5.2.1 Child Mortality in Nairobi County

During the time of conducting the 2014 KDHS survey, 101 infant and child deaths were recorded for Nairobi County. Of the 101 captured, 14% died on the day of birth, 42% died before the tenth day and more than half died before the first month elapsed. Cumulatively, 81% of the total deaths occurred before the infants could turn one year old. Although a majority of the respondents did not respond on their places of delivery, 16% had their deliveries in government hospital, 7% delivered in private hospitals and Clinics while 3% delivered at home. On one hand, a majority of those who delivered in a hospital environment had a normal delivery but a substantial number (21%) underwent a caesarean

section. On the other, most infants born were of average weight (58%), a substantial number had larger than average weight (22%) and only 5% had a very large weight. However, 12% recorded a smaller than average weight and 2% had a very small weight. Among the factors that were under investigation included; current marital status, prenatal care especially those attended by a traditional birth attendant, duration of breastfeeding, timing of the first antenatal check, number of ANC visits during pregnancy, place of delivery, whether the delivery was through Caesarean section and size of the child at birth.

5.2.2 Age group affected by Child Mortality

On the age group of women in the child bearing ages most affected by infant and child mortality, those at the ages between 25 years to 29 years contributed to almost a quarter of all the child deaths. Those women of the ages between 30 to 34 years contributed to 22% of the total child deaths, while the women of ages between 20 to 24 years, 35 to 39 years, 40 to 44 years contributed to 18%, 12% and 14% respectively.

5.2.3 Odds of Children and Infants Survival in Nairobi County

A child is 92.9% less likely to die for a unit increase in the number of months taken to breastfeed, 89.3% less likely to die for every unit increase in the number of ANC visits and 2.9% less likely to die after utilizing Government dispensaries for Antenatal care services.

5.3 Recommendation

In our study 10.7% of children are more likely to die for every unit decrease in ANC visits. 7.1% of children who are denied exclusive breastfeeding are more likely to die in their infancy. Additionally,ANC services provided by the government play a significant role in reducing infant and child mortality. Therefore, the prior proportion implies that additional emphasis still needs to be placed on promoting ANC, exclusive breastfeeding and pregnant mothers should be encouraged to utilize maternal cares provided by public health facilities.

Evidence from the Kenya Demographic and Health Surveys conducted in 2008 indicates that while urban areas still fare better in some child health related outcomes, they fare worse in others. There is higher prevalence of delivery at a health facility in urban areas like Nairobi (75%) compared with rural areas (35%). Additionally, there is a lower prevalence of malnutrition in children aged less than five years in Nairobi county (26%) compared with other areas (37%). Breastfeeding practices seem to be worse in Nairobi county compared with other areas. For example, the median duration of exclusive breastfeeding is 0.6 months in Nairobi county compared with 1.0 months in rural areas. A similar proportion of children in Nairobi areas are born with low birth weight as that in other areas (6% vs. 5%, respectively). Although a slightly higher proportion of children 12–23 months in

urban areas (81%) and are reported to have received all basic vaccinations compared with rural areas (76%), a substantially higher proportion of children in rural areas (75%) have a vaccination card compared with urban areas (55%) (Kenya National Bureau of Statistics (KNBS) and ICF Macro, 2009). Poor health outcomes have been documented among the urban poor. Evidence has shown that urban poor children have a higher prevalence of diarrhea (31%) compared with their rural counterparts (17%). Again, urban poor children are less likely to be fully immunized (44%) compared with their rural counterparts (64%) (African Population and Health Research Center, 2002).

5.4 Conclusion

Births in the last five years was significantly influencing a child survival outcome, child spacing is crucial in their survival. Specifically, for mothers who had more than three births in the past five years, the current child's survival probability is minimal. Findings obtained from this study could assist health administrators and public health researchers, as well as government policymakers, to re-evaluate and revitalize existing intervention strategies to accelerate the reduction of mortality in children <5 years of age in Nairobi county and other areas with similar characteristics. The narrowing gap of the factors that are associated with Infant and child mortality in Kenya, Nairobi area may be attributed to the deplorable living conditions in urban slums.

5.5 Areas for Further Studies

To reduce childhood mortality, extra emphasis is needed on the urban slums. Also there is need for a comprehensive study on the impact of climatic variability on the malnutrition of under-five children in Kenyan slums. This is an environmental aspect that was not particularly studied at length yet it is an important phenomenon that has not been widely studied by several scholars.

EXAMINING THE FACTORS THAT ARE ASSOCIATED TOINFANT AND CHILD MORTALITY IN KENYA

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