

MAKERERE



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**COLLEGE OF BUSINESS AND MANAGEMENT SCIENCES
SCHOOL OF STATISTICS AND PLANNING
DEPARTMENT OF POPULATION STUDIES**

DETERMINANTS OF UNDER-FIVE MORTALITY IN RURAL UGANDA

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF STATISTICS AND
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DECLARATION

I NASSOZI DORCUS, I declare that this work has been composed solely by myself and that it has not been submitted before as of its kind, in whole and in any previous application for a degree. Except where states otherwise by acknowledgement or reference, the work presented is entirely my own work.

Signature 

Date: 18th August, 2026

APPROVAL

I certify that this dissertation has been submitted with my approval as the university supervisor.

Signature.....*Nankinga*.....

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DEDICATION

I dedicate my research work to my family and friends.

ACKNOWLEDGEMENT

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LIST OF ABBREVIATIONS

AOR	Adjusted Odds Ratio
ARIs	Acute Respiratory Infections
EMTCT	Elimination of Mother-to-Child Transmission
GDP	Gross Domestic Product
HMIS	Health Management Information System
ICCM	Integrated Community Case Management
IMR	Infant Mortality Rate
ITN	Insecticide-Treated Net
LBW	Low Birth Weight
MNCH	Maternal, Newborn and Child Health
MNR	Neonatal Mortality Rate
ORS	Oral Rehydration Solution
SDG	Sustainable Development Goal
SBA	Skilled Birth Attendance
UDHS	Uganda Demographic Health Survey
U5MR	Under-Five Mortality Rate
WASH	Water, Sanitation and Hygiene
PNC	Post Natal Care
CHWs	Community Health Workers

ABSTRACT

Under-five child mortality remains a critical public health challenge in sub-Saharan Africa, with rural Uganda bearing a disproportionate burden. Despite global progress in reducing child deaths, rural Uganda continue to experience high mortality rates driven by complex socio-demographic and healthcare-related factors. Understanding the determinants of under-five mortality in these settings is essential for informing targeted interventions.

The data was obtained from the 2016 Uganda Demographic and Health Survey (UDHS). This was population based cross sectional secondary study with a rural sub sample population of 8218 children born. The analysis employed both chi-square tests and multivariate logistic regression to determine the determinants of under-five mortality.

The outcome variable was under-five child mortality (child alive: yes/no). Key explanatory variables included breastfeeding status, antenatal care (ANC) visits, birth order, place of delivery, parity, wealth status, and child sex. Survey-weighted descriptive, bivariate, and multivariate logistic regression analyses were performed in Stata, accounting for the complex survey design using probability sampling weights (v005), primary sampling units (v001), and stratification (v023). Among that sample, 3.9 percent of children under five had died (weighted prevalence). The bivariate analysis revealed that maternal age group, parity, birth order, birth weight, breastfeeding status and antenatal care (ANC) attendance were associated with child survival ($p < 0.05$), while maternal education, household wealth, region, place of delivery, distance to a health facility, marital status, and employment status were not. In the multivariate model only breastfeeding status and parity remained independent predictors. Children who were never breastfed had lower odds of surviving than those ever breastfed (AOR =0.037, 95% CI: 0.025-0.054, $p < 0.001$). children born to mothers who had 2–3 children had more than twice the odds of survival (AOR=2.07, 95% CI: 1.37–3.12, $p = 0.001$), than first born children and those of parity 4–5 had 55% higher odds of survival (AOR=1.55, 95% CI: 1.01–2.37, $p = 0.046$).

In conclusion, breastfeeding and parity were the main determinants of under-five survival among rural Ugandan children. Therefore, breastfeeding promotion should be strengthened through community and health facility programs. In addition, family planning and maternal health care services should be improved to reduce under-five mortality in rural Uganda.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Under-five mortality is defined as the probability of dying between birth and exactly five years of age. It is one of the most sensitive indicators of a nation's health system performance, socioeconomic development, and overall human wellbeing. Globally, considerable progress has been made in reducing child mortality. The world under-five mortality rate fell from 93 deaths per 1,000 live births in 1990 to 38 per 1,000 in 2019 (UNICEF, WHO, World Bank, & UN DESA/Population Division, 2020). However, this progress has been deeply uneven, and sub-Saharan Africa continues to bear a disproportionate burden of under-five deaths globally.

Uganda, a landlocked East African nation with a rapidly growing population of approximately 45.9 million (UBOS, 2024), has made notable improvements in reducing under-five mortality over the past three decades. The U5MR declined from 191 deaths per 1,000 live births in 1970 to 41 per 1,000 in 2022 (Wikipedia Health in Uganda, 2024). According to the Uganda Demographic and Health Survey (UDHS 2022), the under-five mortality rate stands at 52 deaths per 1,000 live births a 19% reduction from the 64 per 1,000 reported in the UDHS 2016. Neonatal mortality fell from 27 to 22 per 1,000 live births, and infant mortality from 43 to 36 per 1,000 live births over the same period (UNICEF Uganda Annual Report, 2024).

Despite these gains, Uganda remains far from achieving the Sustainable Development Goal (SDG) 3.2 target of reducing under-five mortality to not more than 25 per 1,000 live births by 2030. The country continues to face a high burden of preventable child deaths caused by malaria, pneumonia, diarrheal diseases, neonatal conditions, and malnutrition. All of which are closely related with structural inequalities in healthcare access, poverty, education, and environmental conditions. Malaria alone accounts for the third highest global burden of malaria cases (4.8%), and Uganda accounts for 20% of malaria cases in East and Southern Africa as of 2023 (Severe Malaria Observatory, 2023).

There are also marked regional disparities in child mortality within Uganda. Children born in rural areas, and particularly in the northern and north-eastern regions such as Karamoja, face substantially higher mortality risks than those in urban centers. The global acute malnutrition rate in Karamoja increased from 11% in 2023 to 12.2% in 2024, surpassing the emergency threshold

(UNICEF Uganda, 2024). These disparities reflect the complex interplay of geographic, cultural, economic, and health system factors that shape child survival outcomes.

Rural areas face a unique confluence of determinants that elevate child mortality risk, including geographic isolation from health facilities, poor road infrastructure, limited access to clean water and sanitation, high poverty rates, low maternal literacy and education, cultural and behavioral barriers to care-seeking, and fragile health systems with insufficient human resources.

Theoretical frameworks for understanding the determinants of child mortality including the Mosley-Chen analytical framework (1984), it proposes a hierarchical model in which socioeconomic and environmental factors operate through proximate biological mechanisms to produce child mortality outcomes. These proximate determinants include maternal factors (age, parity, nutritional status), nutritional deficiency, environmental contamination (water, food, air), injury, and access to personal preventive and curative health services. This framework continues to provide a valuable lens for analyzing the multidimensional nature of under-five mortality in rural settings.

In the specific context of rural Africa, studies consistently document that the leading direct causes of under-five deaths are pneumonia, diarrheal diseases, malaria, neonatal conditions (including birth asphyxia and sepsis), and malnutrition, with the latter acting as an underlying cause contributing to more than 45% of all child deaths (Black et al., 2013; Liu et al., 2016). These causes are preventable with known, cost-effective interventions, many of which remain unavailable, unaffordable, or culturally unacceptable in rural communities.

1.2 Problem statement

The persistently elevated burden of under-five mortality in rural areas represents a critical public health crisis that undermines national and global child survival goals. While urban child mortality rates in many low- and middle-income countries have declined substantially over recent decades, rural communities have experienced slower, inequitable gains, leaving millions of children in these settings vulnerable to preventable deaths. In sub-Saharan Africa, the rural U5MR is often 1.5 to 2 times higher than that of urban areas, reflecting deep systemic inequities in healthcare access, socioeconomic conditions, and environmental health (Demographic and Health Surveys, 2020).

Despite the established global frameworks and increasing national investments in maternal and child health, rural areas continue to face multifaceted and overlapping determinants that sustain high levels of child mortality. These include, but are not limited to: inadequate access to skilled birth attendance and emergency obstetric care; low coverage of childhood immunization; high prevalence of malnutrition, malaria, and water-borne diseases; extreme poverty; low maternal education; poor access to safe water and sanitation; and weak community health systems. Each of these factors independently increases the risk of death among children under five, yet evidence-based, context-specific data from rural communities remains sparse and fragmented.

Much of the existing literature on under-five mortality determinants is derived from nationally representative surveys (such as Demographic and Health Surveys) that aggregate data across urban and rural populations, often obscuring the unique risk profiles, causal pathways, and contextual factors that operate in rural settings. Furthermore, the voice of rural communities including mothers, caregivers, community leaders, and health workers is frequently absent from the design and implementation of child survival strategies, resulting in interventions that are poorly adapted to local realities and therefore have limited impact.

This study addresses this critical gap by investigating the specific determinants of under-five mortality in rural areas through a rigorous, mixed-methods approach. By generating locally relevant, disaggregated evidence, the research aims to inform targeted policy interventions, resource allocation decisions, and community-based health promotion strategies that can meaningfully reduce child mortality in rural settings and contribute to the attainment of SDG 3.2.

1.3 Objectives of the study

1.3.1 General objective

To examine the determinants of under-five mortality in rural areas

1.3.2 Specific objectives

To establish whether malnutrition is the cause of under-five mortality

To examine the maternal factors influencing under-five mortality

To evaluate the environmental factors contributing to under-five mortality.

1.4 Research hypothesis

- There is no difference in under-five mortality between children with access to healthcare services and those without access.
- There is no significant relationship between maternal factors and under-five mortality.
- There are no significant differences in under-five mortality across different rural regions or districts of Uganda.
- There is no difference in under five mortalities between children who received full immunization and those who did not in rural Uganda.

1.5 Significance of the study

- The study will provide useful information for improving child health and reduce preventable deaths.
- The study will help healthcare providers to understand the major risk factors affecting child survival, which may improve the child health services.
- It will contribute to academic knowledge by serving as a reference for future researchers and students who may conduct studies on mortality.
- The study will help in fundings for example UNICEF, WHO, USAID need local data to fund clinics, immunization or water projects.

1.6 Lay out of the dissertation

This chapter is organized into six chapters. Chapter one deals with the background of the study, objectives, hypothesis, the conceptual framework and significance of the study.

Literature review on the determinants of under-five mortality in Uganda Is presented in chapter two. Chapter three presents the methodology that is used in study, which includes data source, study variables and data analysis. The findings of the study are discussed in chapter four. Chapter five gives summary, conclusion and recommendations, followed by reference and appendices.

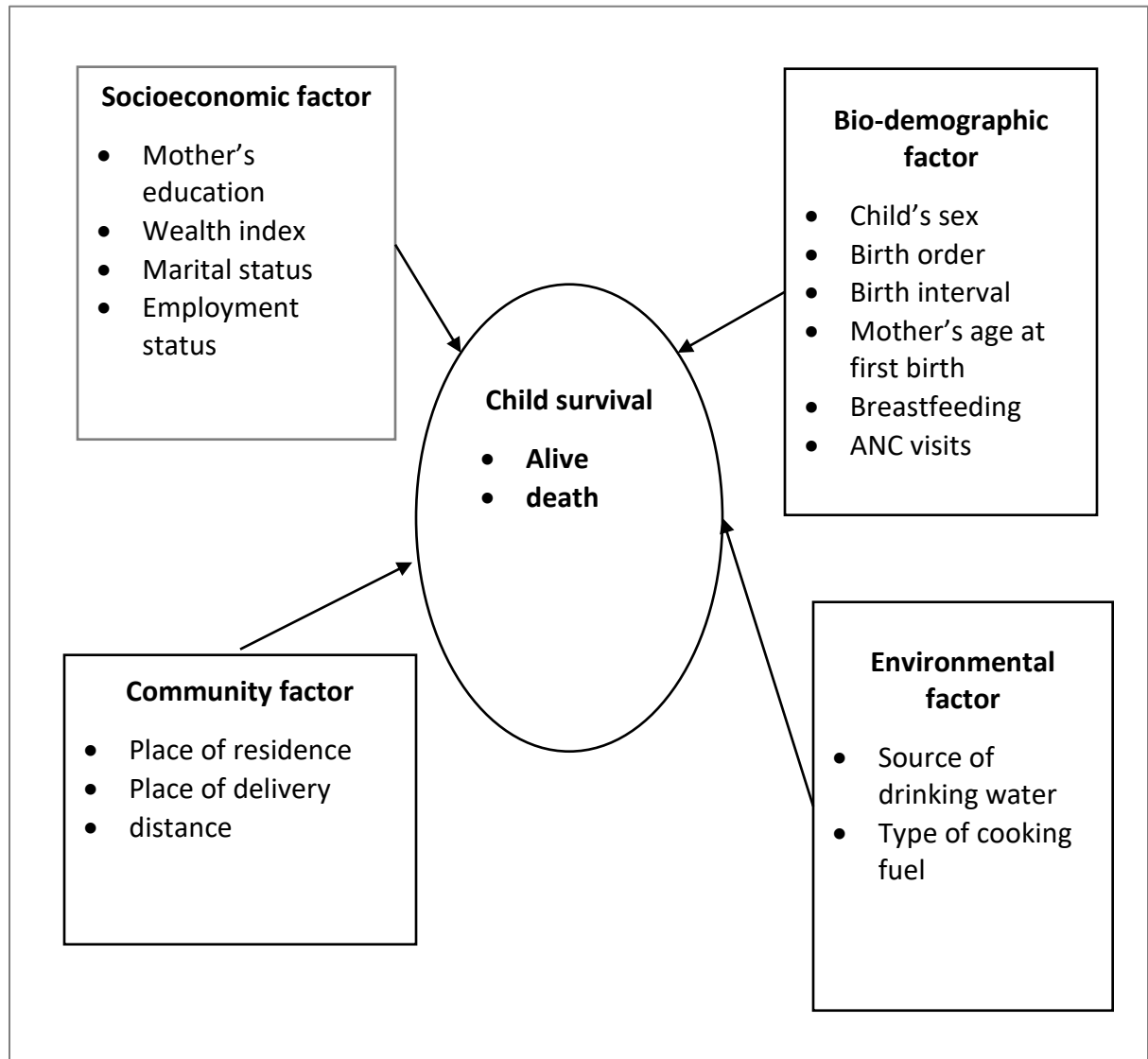
1.7 Conceptual framework

The conceptual framework shows how different factors affect under-five mortality. Like age, education, marital status, antenatal care visits, birth order, birth weight, environmental factors directly affect the child survival of under-five.

The conceptual framework illustrates how socioeconomic factors like age of a woman, marital status, education level, antenatal visits, birth weight, birth order, household wealth, environmental factors influence under-five mortality.

For example, women with high education know the importance of antenatal care visits which include immunizations and this can reduce under-five mortality. Even household wealth can also affect under-five mortality. Wealth households can easily access quality health services hence low under-five mortality compared to low-wealth households.

Figure 1: conceptual framework illustrating how socioeconomic factors influence under-five mortality.



CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a systematic and comprehensive review of the existing literature on the determinants of under-five mortality, with a particular focus on rural contexts in low- and middle-income countries. The review draws on peer-reviewed publications, reports from international health organizations, and country-level demographic surveys published predominantly between 2000 and 2023. The literature is organized thematically, beginning with the global epidemiology of under-five mortality, followed by reviews of biomedical, socioeconomic, environmental, health system, maternal, and nutritional determinants. The chapter concludes with a presentation of the conceptual framework guiding this study and a discussion of gaps in the existing literature.

2.2 Global Epidemiology of Under-Five Mortality

The global burden of under-five mortality has undergone substantial transformation over the past three decades. Between 1990 and 2022, the global under-five mortality rate fell by approximately 60%, from 93 deaths per 1,000 live births to around 37 per 1,000 live births, representing one of the most significant achievements in global public health (UNICEF et al., 2023). This decline has been attributed to a combination of improved nutrition, expanded immunization coverage, better management of common childhood illnesses, improved maternal education, and progress in poverty reduction.

However, the number of child deaths remains relatively high. In 2022, approximately 5.0 million children died before their fifth birthday equivalent to nearly 13,700 deaths per day (UNICEF, 2023). Sub-Saharan Africa accounts for the largest share of these deaths, with 56% of global under-five deaths in 2021 occurring in this region, despite sub-Saharan Africa representing only about 14% of the global population (WHO & UNICEF, 2022). Central and West Africa in particular record some of the world's highest U5MRs, with countries such as Sierra Leone, Nigeria, Chad, and the Central African Republic reporting rates exceeding 100 per 1,000 live births (IHME, 2020).

A critical and frequently underappreciated dimension of the global child mortality landscape is the urban-rural divide. Rural populations in LMICs consistently experience U5MRs that are 20–50% higher than those in urban areas. This disparity is driven by a convergence of factors including

geographic remoteness, inadequate road infrastructure, shortage of health personnel in rural facilities, lower household income, lower educational attainment among rural mothers, and poorer access to clean water and sanitation (Adewemimo et al., 2017). A systematic analysis of DHS data from 35 SSA countries by Adewemimo et al. (2017) found that rural children faced odds of dying before age five that were 1.38 times higher than urban children after adjusting for other socioeconomic factors, underscoring that geography remains an independent predictor of child mortality risk.

Neonatal deaths those occurring within the first 28 days of life now account for nearly 47% of all under-five deaths globally, representing a growing proportional burden as post-neonatal and older child deaths decline more rapidly (UNICEF, 2023; Liu et al., 2016). In rural areas, neonatal mortality is particularly severe due to low coverage of skilled birth attendance, limited access to essential newborn care (including kangaroo mother care, immediate breastfeeding, and management of birth asphyxia and sepsis), and delayed recognition of danger signs among caregivers. The leading causes of neonatal death globally include preterm birth complications, intrapartum-related events (birth asphyxia), and sepsis/infections, all of which are disproportionately prevalent in rural settings with poor obstetric care infrastructure (Liu et al., 2016).

Beyond the neonatal period, the primary causes of under-five mortality include pneumonia (accounting for approximately 13% of all under-five deaths globally), diarrheal diseases (9%), malaria (5%), and malnutrition, which acts as an underlying cause in an estimated 45% of all child deaths (Black et al., 2013; Liu et al., 2016). In rural sub-Saharan Africa, malaria deserves particular attention as a leading cause of morbidity and mortality in children under five. Despite the scale-up of insecticide-treated nets (ITNs) and indoor residual spraying, coverage remains suboptimal in many rural areas, and insecticide resistance is emerging as a growing concern (WHO, 2022).

The Lancet series on child survival and subsequent analyses have consistently demonstrated that a substantial proportion of under-five deaths are preventable with known, cost-effective interventions. The challenge in rural areas lies not in the absence of effective interventions but in the persistent failures in delivery, access, and uptake that characterize health systems in resource-constrained rural settings.

2.3 Biomedical Determinants of Under-Five Mortality

2.3.1 Birth Weight

Low birth weight (LBW), defined as a birth weight of less than 2,500 grams, is one of the most consistently documented and powerful biomedical determinants of under-five mortality. LBW infants face dramatically elevated risks of neonatal death, as well as increased susceptibility to infections, hypothermia, feeding difficulties, and long-term developmental impairment. Data from 19 countries demonstrated that LBW infants had a 6-fold higher risk of neonatal death compared to normal birth weight infants, with the risk being even higher in rural and low-resource settings where specialized newborn care is unavailable.

In rural sub-Saharan Africa and South Asia, the prevalence of LBW ranges from 10% to over 20%, driven by high rates of maternal malnutrition, anemia, malaria in pregnancy, teenage pregnancy, and inadequate antenatal care. The vicious cycle of LBW, infant stunting, and increased mortality risk perpetuates intergenerational nutritional disadvantage in rural communities. Studies from rural Tanzania, rural Uganda (Ayieko et al., 2020), and rural India have consistently confirmed LBW as an independent predictor of under-five mortality after adjusting for maternal, socioeconomic, and health service utilization factors. In addition, babies born with birth weight are more likely to have poor growth and health problems than babies born with normal with normal weight.

2.3.2 Immunization Status

Childhood immunization is among the most cost-effective public health interventions known. Vaccines against diphtheria, pertussis, tetanus (DPT), measles, polio, hepatitis B, Haemophilus influenzae type b (Hib), and rotavirus, among others, have dramatically reduced the incidence of vaccine-preventable diseases that once claimed millions of lives annually (WHO, 2020). Several studies have demonstrated a strong inverse relationship between immunization coverage and under-five mortality. A household survey in rural Nigeria found that children who had not received measles vaccination had odds of dying before age five that were 3.4 times higher than vaccinated children. Similar findings have been reported from rural Ethiopia (Muenchhoff & Bhatt, 2021), and Bangladesh.

Despite the demonstrated protective effect of immunization, vaccination coverage in rural areas of many LMICs remains substantially below national targets. The reasons for low coverage in rural

settings are multifactorial, including long distances to vaccination sites, poor cold chain infrastructure, healthcare worker shortages, vaccine hesitancy rooted in cultural beliefs, missed opportunities during outreach activities, and inadequate recall and follow-up systems (Duru et al., 2016). The COVID-19 pandemic further disrupted immunization services globally, with estimated drops in DTP3 coverage of 5–10% in several African countries in 2020–2021, with rural areas disproportionately affected (UNICEF, 2021). If children are not immunized, this can make the immune weak making their bodies unable to fight diseases hence death.

2.3.3 Neonatal conditions

Death occurring within the first 28 days of life can also be a factor for under-five deaths in rural areas and it has the largest group of deaths globally. According to the UDHS 2022, neonatal mortality rate was 22 per 1000 live births nationally from 27 in 2016. Trends of all-cause mortality data from UNIPH (2025) show that neonatal sepsis (0-7 days), preterm births complications and birth asphyxia as the leading cause of mortality among children under-five in rural areas of Uganda from 2020 to 2023.

In Uganda, Mulago national referral hospital and Kawempe national referral hospital serve as the receiving centers for complex obstetric and neonatal cases across the country. There have been improvements in antenatal attendance, delayed cord clamping which has led to decline in neonatal deaths between 2016-2022. However, health system factors like inadequate staffing of neonatal units, limited availability of continuous positive airway pressure machines which limit outcomes.

Birth asphyxia which is due to failure to establish breathing at birth contributes significantly to neonatal deaths in rural areas of Uganda. Delays in emergency obstetric care and limited availability of trained birth attendants especially in rural areas increase the risk of intrapartum complications leading to birth asphyxia. The obstetric referrals from peripheral facilities to Kawempe national referral hospital there are challenges of emergency interfacility transfers, with delays and inadequate stabilization which end up leading to preventable deaths (Alaleit et al., 2023)

2.3.4 History of Illness and Concurrent diseases

Repeated or concurrent episodes of infectious illnesses particularly malaria, diarrhea, pneumonia, and HIV significantly increase the risk of under-five death, especially when compounded by malnutrition. Children who experience two or more episodes of diarrhea per month face

substantially elevated mortality risk, as does diarrheal morbidity combined with stunting. A pooled analysis by the Child Health Epidemiology Reference Group found that malnutrition increased the relative risk of dying from diarrhea, pneumonia, malaria, and measles by 2 to 9 times in children under five in LMICs, with rural children who face higher disease exposure and worse nutritional status bearing the greatest burden.

2.4 Socioeconomic Determinants of Under-Five Mortality

2.4.1 Household Wealth and Poverty

The relationship between poverty and child mortality is one of the most strongly documented associations in global health literature. Children from the poorest households in LMICs face under-five mortality rates that are consistently 2 to 3 times higher than those from the wealthiest households (Victora et al., 2003; UNICEF, 2023). In rural areas, where poverty rates are typically higher than in urban areas, the mortality penalty of poverty is even more pronounced. A DHS-based analysis across 37 LMICs demonstrated a clear wealth gradient in U5MR, with each quintile increase in household wealth associated with a 15–25% reduction in under-five mortality risk.

Poverty affects child survival through multiple pathways: reduced access to adequate food and nutrition, inability to afford healthcare costs (consultation fees, medications, transportation), poor housing conditions that increase exposure to environmental pathogens, and limited capacity to invest in education and preventive health behaviors. In rural settings, where out-of-pocket health expenditures represent a catastrophic proportion of household income for many families, the economic barrier to healthcare utilization is a critical driver of avoidable child deaths. Studies in rural Uganda, Malawi, and Tanzania consistently demonstrate that user fees and transportation costs are among the most frequently cited barriers to accessing facility-based child health services because health centers are located in un walkable distances

2.4.2 Maternal Education

Maternal education is one of the most consistently powerful socioeconomic determinants of child survival, operating through multiple mechanisms including improved knowledge of health-promoting behaviors, greater household decision-making autonomy, increased utilization of maternal and child health services, and better nutritional practices. Improvements in maternal education between 1970 and 2009 accounted for approximately 51% of the global decline in child

mortality during this period, making maternal education arguably the single most important driver of child survival progress.

In rural Africa, where female educational attainment remains substantially lower than in urban areas, the mortality differentials associated with low maternal education are particularly pronounced. Studies from rural Ethiopia (Hailemariam et al., 2016), rural Kenya, rural Nigeria, and rural Uganda consistently demonstrate that children of mothers with no formal education face under-five mortality risks 2–4 times higher than those born to mothers with secondary or higher education. Education empowers women to recognize illness danger signs earlier, make independent health-seeking decisions, negotiate with spouses and in-laws for timely care, and implement preventive practices such as safe water handling, proper food preparation, and hygiene promotion.

2.4.3 Household Size and Birth Order

Household size and birth order are additional socioeconomic factors associated with under-five mortality in rural settings. Children born to mothers of high parity (fifth child or beyond) and those born at short inter-birth intervals face elevated mortality risk due to maternal nutritional depletion, reduced parental attention and resources per child, and increased competition for household food and care. A study across rural communities in sub-Saharan Africa found that children born within 24 months of a preceding sibling had mortality odds approximately 2.5 times higher than those with inter-birth intervals of 36 months or more. Large household sizes in poor rural settings stretch limited food resources, contributing to undernutrition and increased disease susceptibility across all siblings.

2.4.4 Gender of the Child

The gender of a child has been identified as a determinant of mortality risk in some LMICs, though the direction of the relationship varies by context and culture. In South Asia, strong son preference has historically led to excess female child mortality due to discriminatory feeding practices, differential healthcare-seeking behavior, and neglect of girl children, particularly in rural areas of India, Pakistan, and Bangladesh. In contrast, in sub-Saharan Africa, male children are generally found to have higher biological vulnerability to neonatal and early childhood infections, though socially-determined factors may moderate this relationship. Studies in rural West Africa have

documented higher U5MRs among male children, consistent with the well-established pattern of greater male biological fragility in early life.

2.5 Environmental Determinants of Under-Five Mortality

2.5.1 Access to Safe Water and Sanitation

Access to safe water and adequate sanitation are other determinants of child health and survival. Unsafe water and poor sanitation are responsible for a large proportion of diarrheal disease burden globally, which in turn is a leading cause of under-five death in sub-Saharan Africa (Pruss-Ustun et al., 2019). In Uganda, only 19% of the population have access to safe drinking water services and 9% to safe managed sanitation (JMP, 2023). Central Uganda's rapidly growing peri-urban and informal settlements face contaminated water sources especially from industries caused due to waste disposal creating severe infectious disease risks for young children.

2.5.2 Indoor Air Pollution

Household use of solid fuels for cooking and heating which causes indoor air pollution and also a risk factor for acute respiratory infections (ARI), which are a leading cause of under-five mortality. According to WHO household air pollution from solid fuel use is responsible for approximately 3.8 million premature deaths annually (WHO, 2018). In Uganda, biomass fuels including wood and charcoal are the energy source for over 90% of households, and exposure to associated indoor air pollution common in rural and low-income urban areas. (UBOS, 2022). Studies in Uganda found an association between household solid fuel use and childhood pneumonia mortality. These fuels produce smoke inside the house, especially where there is poor ventilation, children breathe in this smoke and damage their lungs hence death Integrated approaches that promote the adoption of improved cookstoves and clean cooking fuels have shown promise in reducing child mortality, though uptake in rural communities has been limited by cost, cultural preferences, and supply chain constraints.

2.5.3 Housing Conditions and Malaria Transmission

The physical quality of housing including roof material, floor type, and wall construction is a composite indicator of household living standards and environmental risk exposure. Children living in poor-quality housing are more vulnerable to vector-borne diseases, respiratory infections, and diarrheal diseases.). Studies from rural Uganda have demonstrated that improved housing with

closed eaves, screened windows, and durable walls is significantly associated with reduced malaria parasite prevalence and anemia in children under five. The relationship between housing quality, malaria burden, and child mortality underscores the importance of addressing structural poverty not just health behavior as a determinant of child survival in rural areas.

2.6 Health System Determinants of Under-Five Mortality

2.6.1 Access to Health Facilities

Physical distance to health facilities is a critical determinant of healthcare utilization and child health outcomes in sub-Saharan Africa. Distance to the nearest health facility has been consistently associated with lower antenatal care attendance, lower rates of skilled delivery, delayed care-seeking for sick children, and higher child mortality. Uganda's rural districts including Gomba, Kiboga, and Nakaseke have notably sparse health facility networks, creating substantial access barriers that partially explain intra-regional mortality differentials. The closer people live to the health facility, the more likely they are to use healthcare services, and the better their health will be.

2.6.2 Skilled Birth Attendance and Emergency Obstetric Care

Delivery by a skilled birth attendant (SBA) and access to emergency obstetric care are critical for reducing neonatal and early infant mortality. In Uganda, approximately 73% of births occurred in health facilities in the UDHS 2022, up from 57% in 2011, but coverage remains below the 90% target and is significantly lower in rural and low-income communities. Postnatal care (PNC), which enables early detection and management of neonatal complications, is particularly underutilized: only 52% of newborns received a postnatal check within two days of birth (UBOS, 2024). Studies across sub-Saharan Africa consistently demonstrate that children born without skilled attendance and without postnatal care face substantially elevated mortality risks. Skilled birth attendance detects complications like postpartum hemorrhage, obstructed labor and neonatal asphyxia are detected and managed well. These are among the causes of maternal and neonatal deaths and managing them on time improves survival outcomes.

2.6.3 Antenatal Care Utilization

Antenatal care utilization, Antenatal care (ANC) attendance provides opportunities for early identification and management of pregnancy complications, tetanus immunization, malaria

prophylaxis through intermittent preventive treatment (IPTp), iron and folic acid supplementation, HIV testing and counseling, and birth preparedness counseling. WHO recommends a minimum of eight ANC contacts during pregnancy, but the four-visit model (ANC4+). In Uganda, 70% of pregnant women attended at least four visits in the UDHS 2022 (UBOS, 2022). Multiple studies in sub-Saharan Africa have found that higher ANC utilization is associated with improved birth outcomes and reduced infant and child mortality, largely through the preventive and curative services delivered during ANC visit. Good antenatal care improves the health of both mother and child reducing child mortality.

2.6.4 Community Health Workers and Integrated Community Case Management

The deployment of community health workers (CHWs) as frontline providers of basic maternal and child health services has emerged as a critical strategy for extending health service coverage to remote rural communities. CHW programs have demonstrated effectiveness in improving coverage of childhood immunization, promoting exclusive breastfeeding, managing acute malnutrition, treating uncomplicated malaria and diarrhea through integrated community case management (ICCM), and facilitating timely referral of sick children to facilities.

Despite the demonstrated effectiveness of CHW programs, they face significant challenges in rural settings including high attrition due to low or, inadequate supervision and mentorship, insufficient medical supply chains, and role overload. The sustainability and scale-up of CHW programs in rural areas requires strong government commitment, community ownership, and integration with formal health systems.

2.7 Maternal Factors and Under-Five Mortality

2.7.1 Maternal Age at First Birth

Maternal age at childbearing is an important determinant of under-five mortality, with adolescent mothers (aged below 18 years) and older mothers facing elevated child mortality risks relative to mothers aged 20–34 years. Adolescent pregnancies are associated with higher rates of obstetric complications (obstructed labor, eclampsia, obstetric fistula), LBW, preterm birth, and neonatal mortality, as the adolescent pelvis may not be fully developed and access to quality antenatal and delivery care is often limited (Nove et al., 2014). In rural communities of sub-Saharan Africa where

early marriage and teenage pregnancy remain prevalent, adolescent childbearing contributes disproportionately to neonatal and under-five mortality (WHO, 2020).

In rural communities where social norms, limited educational opportunities, and poverty drive early marriage and early childbearing, addressing adolescent reproductive health is inseparable from reducing child mortality.

2.7.2 Maternal Nutritional Status and Anemia

Maternal nutritional status including pre-pregnancy body mass index (BMI), gestational weight gain, and micronutrient status directly influences birth outcomes and child survival. Maternal undernutrition, particularly deficiencies in iron, folate, zinc, iodine, and vitamin A, are associated with increased risks of LBW, preterm birth, and impaired immune function in newborns. Maternal anemia prevalent in approximately 40% of pregnant women in rural sub-Saharan Africa significantly elevates the risk of LBW and neonatal mortality, and is itself driven by malaria.

2.8 Nutritional Determinants of Under-Five Mortality

2.8.1 Malnutrition

Malnutrition involves undernutrition as well as micronutrient deficiencies. This is the most risk factor for child mortality in low-income countries, underlying an estimated 45% of all under-five deaths globally. In Uganda, approximately 29% of children under five are stunted, 4% are acutely wasted, and 11% are underweight (UDHS, 2022). Rates in Uganda vary by district, with rural districts recording rates exceeding 30%. Severe acute malnutrition (SAM) is associated with a mortality risk nine times higher than that in well-nourished children. Malnutrition increases vulnerability to infectious diseases, impairs immune function, and slows recovery from illness, creating infection and malnutrition that drives excess mortality. In addition, malnutrition is a major contributor of under-five mortality since it weakens the immune system, makes it easy for the children to get infections and leads to weight loss, underweight, which reduces the child's chances of survival.

2.8.2 Breastfeeding Practices

Breastfeeding, especially breastfeeding for the first six months of life, is a protective factor against infectious disease, morbidity and mortality in infancy. Breast milk provides essential nutrients, boosts immunity, and reduces risks of malnutrition that are particularly critical in environments

with limited access to clean water for formula preparation. In Uganda, exclusive breastfeeding rates under six months stand at approximately 68%, which, while above the regional average, marks significant variation between urban and rural areas and across wealth quintiles (UDHS, 2022). Early stopping of breastfeeding in rural areas due to poverty to provide themselves with food and return to jobs in case they work from urban areas

2.9 Infectious disease burden

Malaria is the leading cause of morbidity and the second leading cause of under-five mortality in Uganda which is approximately 30–40% of outpatient visits and a significant proportion of child deaths (MoH Uganda, 2021). Uganda is classified as having one of the highest malaria transmission intensities in the world, with continuous transmission in most regions including rural areas. Studies conducted in rural areas have found under-five malaria mortality rates substantially higher in rural districts with limited access to insecticide-treated nets (ITNs). The Uganda Malaria Indicator Survey (UMIS) and DHS data consistently show associations between lower ITN use, non-use of indoor residual spraying, and higher child mortality from malaria. The emergence of partial artemisinin resistance in parts of East Africa represents a growing concern for malaria control in the region. Since young children have weak immunity, they are likely to suffer from severe illness and death due to exposure to malaria and drug resistance especially to people in tropical regions hence under-five mortality.

They both lead to approximately 25% of under-five deaths in Uganda (GBD 2019 Child Mortality Collaborators, 2020). Pneumonia is the single leading infectious cause of under-five death globally, responsible for approximately 14% of all child deaths (UNICEF, 2023). In Uganda, risk factors for pneumonia mortality in children under five include malnutrition, lack of vaccination (Hib and pneumococcal vaccines), indoor air pollution, and delayed care-seeking for acute respiratory illness. Diarrheal diseases, principally caused by rotavirus, enterotoxigenic *E. coli*, *Cryptosporidium*, and other enteropathogens, are particularly deadly in malnutrition and limited access to oral rehydration therapy. According to Nankinga et al. (2019) she says that delayed care-seeking for diarrhea and pneumonia, driven by distance to health facilities and out-of-pocket costs, significantly increased case fatality rates in children under five. Reducing under-five mortality needs investing in fighting pneumonia and diarrhea since by focusing on these two diseases alone could help save many young lives.

2.10 Cultural practices and behavioral factors

Health-seeking behavior including timely recognition of illness, decision to seek care, and choice of provider is a critical intermediate determinant of child survival. In sub-Saharan Africa, significant proportions of childhood illness are managed at home without formal healthcare consultation, leading to delayed treatment and increased case fatality. In rural areas, studies have found that care-seeking for high body temperature illness in children under five is influenced by perceived severity, cultural beliefs about causation of illness, household economic resources, and previous experiences with the health system. In rural areas, the co-existence of biomedical and traditional medicine systems means that families may seek traditional healers or use herbal remedies before or instead of formal healthcare, particularly for conditions perceived as having spiritual causation. This may delay seeking medical care allowing common childhood illness to become severe hence death.

Cultural practices and beliefs surrounding pregnancy, childbirth, and child care can significantly influence under-five mortality. Gender norms that limit women's autonomy in health decision-making can delay care-seeking for sick children, particularly where husbands' permission is required before accessing health service. Community-level norms around contraceptive use, breastfeeding, and child spacing also play important roles in shaping the biodemographic risk profile for child mortality. In addition, food taboos may limit children's access to nutritious foods hence malnutrition. These practices increase the risk of severe illness and death among children.

The literature on male involvement in maternal and child health has grown substantially over the past decade. Paternal support including accompaniment to ANC visits, provision of resources for healthcare, and decision-making support is associated with improved maternal and child health outcomes (Tokhi et al., 2018). Qualitative studies in Uganda have found that male disengagement from child health is common, driven by social norms that position child care as primarily a female domain. This disengagement can limit women's access to resources for healthcare, reduce the quality of decision-making in health emergencies, and undermine recommended child health practices such as immunization and malaria prevention. Male involvement helps in reducing under-five mortality since fathers help in providing financial support and making health care decisions.

2.11 Summary

Under-five mortality in rural areas is due to different factors. The most direct causes of death are malaria, neonatal conditions, malnutrition, pneumonia, diarrheal disease, and HIV/AIDS are themselves driven by structural factors including low maternal education, household poverty, rural slum environments, and health system weaknesses.

The 2022 Uganda Demographic and Health Survey provided evidence of national progress on under-five mortality which fell from 64 to 52 per 1,000 live births, neonatal mortality from 27 to 22, and maternal mortality from 336 to 189 per 100,000 live births between 2016 and 2022. These changes show effects of investments in malaria control, immunization, skilled birth attendance, and community health worker programs. However, Uganda remains far from the SDG 3.2 target of 25 under-five deaths per 1,000 live births by 2030, and the rate of improvement must increase.

Uganda being characterized by landlocked Ness, rapid population growth, informal settlement expansion, and health system resource constraints increase risks for children. Addressing this requires many sectors that work on the health sector alone, education, social protection, housing, urban planning, water and sanitation, and economic development. Overall, these findings highlight the need for interventions on Uganda-adapted child health in informal settlements.

Only through programming, and equitable resource allocation can rural areas of Uganda achieve the goal of preventable child death elimination and achieve the Sustainable Development Goals for its youngest and most vulnerable citizens.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter covers the data source that was used in the current study and study variables.

3.1 Data source

The study used secondary data from the Uganda Demographic and Health Survey (UDHS) 2016 which was conducted by the Uganda Bureau of Statistics (UBOS). Authorization to use this data (accessed from the DHS Program website) was obtained upon providing a brief description of our study. It included questions on socio-demographic characteristics of individuals, their health issues for example maternal and child health, nutrition and access to health services.

3.2 Target population

This study focused on children born within the five years of the survey to women aged 15-49 years of reproductive age in rural areas of Uganda from households, including visitors who stayed in the household the night before the survey. The study focused on children born within the five years preceding the survey.

3.3 Study area

This study focused on Uganda, which is divided into regions like northern, eastern, western and southern. Specifically, the study focused on rural areas.

3.4 Study Variables

The study used under-five mortality (1=dead, 0=alive) as the dependent variable and this will measure the number of children who were dead and alive. This was based on the question: what are the determinants of under-five mortality in rural areas of Uganda? To capture the outcome variable of “under-five mortality”, this question was asked to women who gave birth in the last five years of preceding survey. The independent variables include, maternal age, maternal education level, marital status, wealth index, place of residence, household size, sex of the child, birth order, birth interval, antenatal care visits, place of delivery, access to healthcare services.

3.5 Data analysis

The data was analyzed at three levels including univariate, bivariate and multivariate using statistical software like Stata. Univariate analysis in the form of frequencies and percentages will

be used to summarize variables in the study. Chi-square tests were done to establish if there is any relationship between variables. The dependent variable was cross tabulated with the independent variable to find out if they have any statistical significance. The level of significance is 0.05 but that is at a confidence interval of 95%.

Bivariate analysis was done to examine the relationship between each independent variable and under-five mortality. Lastly the multivariate logistic regression analysis was performed to identify the independent determinants of under-five mortality controlling other variables. The strength of association was presented using odds ratios with 95% confidence intervals, and statistical significance was considered at $p < 0.05$. If an odds ratio is greater than 1, the factor increases the likelihood of the number of under-five mortality while OR less than 1 suggests a protective effect.

CHAPTER FOUR: RESULTS AND DISCUSSION OF RESULTS

4.0 Introduction

This chapter covers the findings of the study at univariate, bivariate, and multivariate levels. At univariate level, the count and percentage distribution of the study variables are presented. It is based on the data extracted from the Uganda Demographic and Health Survey restricted to the rural subsample. Overall, 8218 observations were utilized with a weighted population size of 7806. Bivariate analysis looked at the association between each independent variable and the dependent variable. Furthermore, multivariate analysis presented the determinants of under-five mortality. The overall weighted under-five mortality prevalence in the sample was 3.9%, meaning approximately the majority of children (96.1%) were alive at the time of the survey.

4.1 Background characteristics of the respondents

Mothers were evenly distributed across the three age groups, with the largest group (41.8%) aged 25-34. The northern region contributed to highest number of births (29.9%), consistent with higher rural fertility in that region. Most mothers had only primary education (66.1%) and were currently in union (82.3%). Household wealth was almost evenly divided between low-income (49.8%) and high-income (50.2%) categories. The large majority of births (71.1%) occurred at health facility. Most mothers had ANC attendance fewer than the recommended 8 times “inadequate” (1-7 visits, 95.9%), with very few mothers achieving the WHO-recommended 8+ visits (1.9%). Almost all mothers had breastfed their children (97.5%).

Table 1: Frequency distribution of respondents by background characteristics

Variable	Category	Frequency(n)	Percent (%)
Under-five mortality	Dead (No)	303	3.9
	Alive (yes)	7504	96.1
Mother's age group	16-24 years	2764	35.4
	25-34	3261	41.7
	35-49	1781	22.8
Education level	No education	931	11.9
	Primary	5161	66.1
	Secondary	1401	17.9
	Higher	314	4.0

Variable	Category	Frequency(n)	Percent (%)
Marital status	Never in union	408	5.2
	Currently in union	6422	82.2
	Formerly in union	976	12.5
Household wealth status	Low income	3888	49.8
	High income	3918	50.1
Employment status	Not working	1447	18.5
	Working	6360	81.4
Sex of child	Male	4025	51.6
	Female	3781	48.4
Breastfeeding	Breastfed	7610	97.4
	Never breastfed	197	2.5
ANC visits	No ANC	166	2.1
	Inadequate ANC (1-7)	7490	95.9
	Adequate ANC (8+)	151	1.9
Birth weight	Low birth weight(<2500g)	463	5.9
	Normal birth weight(>2500g)	7344	94.0
Place of delivery	Home/other	2254	28.8
	Health facility	5553	71.1
Distance to health facility	Big problem	3549	45.4
	Not a big problem	4258	54,5
Region	Central	1588	20.3
	Eastern	1822	23.3
	Northern	2335	29.9
	Western	2062	26.4
Parity	1 child	1426	18.2
	2-3 children	2485	31.8
	4-5 children	1747	22.3
	6+ children	2149	27.5
Birth order	First birth	1426	18.2
	2-3 births	2485	31.8
	4+ births	3895	49.8
Total		7806	100.00

4.2 Relationship between under-five mortality and independent variables

This section showed the results of bivariate analysis of the dependent variable under-five mortality and the independent variables. P-values and chi-square tests are presented as shown in Table 2.

Results of the study show that more children (5.2%) whose mothers were aged 35-49 years and those whose mothers were aged 16-24 years (4.0%) in comparison to children whose mothers belonged to the age group 25-34 years. Results show a significant relationship between age of the mother and survival status (p-value =0.0004)

Birth order was significantly associated with child survival status (p-value =0.0003). Showing more first births and fourth or higher birth order (4.8% and 4.3% respectively) were reported dead than the second and third birth.

Breastfeeding was significantly associated with under-five mortality (p-value<0.005). Children who were never breastfed formed a higher proportion of deaths (44.8%) compared to those who were breastfed (2.8%).

The findings showed that under-five mortality was highest among children whose mothers had no ANC visits (9.8%). Mortality was lower among mothers with inadequate ANC visits (3.7%) and lowest among those with adequate ANC visits (3.3%). ANC was statistically associated with under-five mortality (p-value=0.0007).

The results showed that children born to mothers with six or more children had the highest proportions of under-five death (5.4%), followed by mothers with one child (4.8%). Children born to mothers with four to five children had a mortality proportion of (3.0%), while the lowest proportion of deaths (2.5%) was observed among children whose mothers had two to three children. Parity was statistically associated with child survival (p-value<0.05)

According to the education level, more children (4.8%) whose mothers had no education were reported dead in comparison with 3.9 percent whose mothers had primary education. And those who had secondary and higher education were reported as (3.2% and 2.9% respectively);

Approximately equal proportions of dead children (3.8%) were reported in low-income households and high-income households.

Table 2: Relationship between under-five mortality and the independent variables

Variable	Dead%	Alive%	Chi square	P-value
Mother's age group				
16-24 years	4.0	95.9	18.5642	0.0004
25-34	2.9	97.0		
35-49	5.2	94.7		
Education level				
No education	4.8	95.1	3.7269	0.4062
Primary	3.9	96.0		
Secondary	3.2	96.7		
Higher	2.9	97.0		
Wealth status				
Low income	3.8	96.1	0.0005	0.9831
High income	3.8	96.1		
Birth order				
First birth	4.8	95.1	20.1273	0.0003
2-3 births	2.5	97.5		
4+ births	4.3	95.6		
Sex of child				
Male	4.2	95.7	3.3226	0.0967
Female	3.4	96.5		
Marital status				
Never in union	2.5	97.4		
Currently in union	3.9	96.0	2.3276	0.3848
Formerly in union	4.1	95.8		
Birth weight				
Low birth weight	6.4	93.5	9.3529	0.0046
Normal birth weight	3.7	96.2		
Breastfeeding				
Breastfed	2.8	97.1	956.7563	0.0000
Never breastfed	44.8	55.1		
ANC visits				
No ANC visits	9.8	90.1	17.1476	0.0007

Variable	Dead%	Alive%	Chi square	P-value
Inadequate ANC visits	3.7	96.2		
Adequate ANC visits	3.3	96.6		
Region				
Central	4.7	95.2	4.6303	0.3545
Eastern	3.5	96.4		
Northern	3.5	96.5		
Western	3.9	96.0		
Place of delivery				
Home/other	4.1	95.9	0.3291	0.599
Health facility	3.8	96.2		
Distance to health facility				
Big problem	3.7	96.2	0.1918	0.7005
Not a big problem	3.9	96.0		
Employment status				
Not working	3.7	96.2	0.0424	0.8552
Working	3.8	96.1		
Parity				
1 child	4.8	95.1	35.4751	0.0000
2-3 children	2.5	97.5		
4-5 children	3.0	96.9		
6+ children	5.4	94.5	35.4751	0.0000
Total	3.9	96.1		

More male under five mortality (4.2%) cases were reported compared to female (3.4%). Results did not show any statistical significance between sex and child survival status.

Results of the study show that children born to mothers who were formerly in union had higher deaths (4.1%), followed by those currently in union (3.9%). The lowest proportions of deaths were among children whose mothers had never been in union. Results were however not statistically significant.

Birth weight was significantly associated with under-five mortality. Children with low birth weight experienced a higher proportion of deaths (6.4%) compared to children with normal birth weight (3.7%).

The results showed that the central region had the highest proportion of under-five deaths (4.7%), followed by the western region (3.9%). The eastern region and northern region each recorded the lowest proportion of deaths (3.5%).

Children delivered from home or other non-health facility locations had a slightly higher proportion of deaths (4.1%) than those delivered in a health facility (3.8%).

The study found that children whose mothers reported distance to a health facility as a big problem had slightly lower proportion of deaths (3.7%) compared to those who reported it as a big problem (3.9%).

The results showed that children whose mothers were not working had slightly lower deaths (3.7%) than children whose mothers were working (3.8%).

4.3 Factors associated with under-five mortality

This section presented a multivariate analysis of under-five mortality. Results report odds ratio of the likelihood of under-five mortality and the P-value at the 95% confidence level.

Table 3: Determinants of under-five mortality.

Under-five mortality	Odds ratio	P>Z	95% confidence interval
Place of delivery			
Home/other (rc)	1.0000		
Health facility	0.8856	0.461	0.6409-1.2236
ANC visits			
No ANC visits (rc)	1.0000		
Inadequate ANC visits	1.6908	0.248	0.6922-4.1298
Adequate ANC visits	2.3463	0.197	0.6422-8.5716
Breastfeeding			
Breastfeeding (rc)	1.0000		
Never breastfed	0.0369	0.000	0.0251-0.0543
Parity			
1 child (rc)	1.0000		
2-3 children	2.0704	0.001	1.3738-3.1200
4-5 children	1.5465	0.046	1.0084-2.3719
6+ children	0.9781	0.1794	0.6820-1.4026
Wealth-status			
Low income (rc)	1.000		
High income	0.9719	0.828	0.7515-1.2569
Child sex			
Male (rc)	1.0000		
Female	1.2461	0.103	0.9562-1.6238
Age group			
16-24 (rc)	1.0000		
25-34	1.5590	0.029	1.0466-2.3222
35-49	1.4759	0.175	0.8409-2.5905
Cons	15.0936	0.000	5.9675-38.1765

rc: reference category

After controlling place of delivery, ANC visits, breastfeeding status, parity, wealth status, and child sex, only breastfeeding status and parity remained statistically significant independent predictors of under-five survival. Never-breastfed children had lower odds of survival than ever-breastfed children (AOR=0.04, 95% CI: 0.03–0.05, $p<0.001$). Children born to mothers who had 2–3 children had more than twice the odds of survival (AOR=2.07, 95% CI: 1.37–3.12, $p=0.001$), than first born children and those of parity 4–5 had 55% higher odds of survival (AOR=1.55, 95%

CI: 1.01–2.37, $p=0.046$). Delivery at a health facility, ANC attendance (inadequate or adequate versus none), household wealth status, and child sex were not significant independent predictors (all $p>0.05$). The overall model was highly statistically significant ($p<0.001$), confirming that the set of predictors jointly explains meaningful variation in under-five survival.

4.3.1 Discussions

This study identified breastfeeding as statistically significant factor of under-five mortality. Specifically, children who were never breastfed had higher odds of dying before age five compared to those who were breastfed. This suggests that not breastfed maybe linked with under-five mortality, due to weaker immune system since breast milk contain anti bodies that help babies from not getting infections (Victoria et al., 2016).

Parity was also statistically significant predictor in the multivariate model, with 2-3 children had higher odds of under-five survival compared to women with one child. Similarly, women with 4-5 children had higher odds of under-five survival. This is due to maternal experience with mothers who have 2-3 children. They know the dangers, signs, feeding and when to go to the hospital. (Mosley Chen, 1984). On the other hand, frequent pregnancies lead to maternal depletion, which may elevate risk for both mother and child (Conde-Agudelo, Rosas-Bermudez, & Kafury-Goeta).

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter provided a summary of the findings, conclusions, recommendations, and suggestions for further research.

5.1 Summary of the findings

This study analyzed a rural subsample from the Uganda Demographic and Health Survey (2016), applying survey-weighted logistic regression to identify the determinants of under-five child mortality.

At the bivariate level, under-five mortality was significantly associated with maternal age group, parity, birth order, birth weight, breastfeeding status, and number of ANC visits (all $p < 0.05$).

Maternal education, household wealth status, child sex, marital status, region, distance to a health facility, and maternal employment status showed no significant bivariate association with under-five mortality in this rural subsample.

In the multivariable survey-weighted logistic regression model, breastfeeding status and parity were the only statistically significant independent predictors of under-five survival after adjusting for place of delivery, ANC visits, wealth status, and child sex.

Children who had never been breastfed had markedly lower odds of survival than breastfed children (AOR = 0.037; 95% CI: 0.025-0.054; $p < 0.001$).

Compared with children whose mothers had one child, children whose mothers had two to three children (AOR = 2.07; $p = 0.001$) and four to five children (AOR = 1.55; $p = 0.046$) had significantly higher odds of survival, while those with six and above showed no significant difference.

Children of mothers in age group 25-24 years had 1.56 times higher adjusted odds of under-five survival compared to age group 16-24 years (AOR = 1.56, 95% CI: 1.05-2.32, $p = 0.029$). On the other hand, children in age group 35-49 years had 1.48 times higher adjusted odds of under-five survival compared to age group 16-24 years but it was not statistically significant (AOR=1.48, 95% CI: 0.84-2.59, $p = 0.175$)

Place of delivery, ANC visits, household wealth status, and child sex were not statistically significant independent predictors of under-five survival in the fully adjusted model.

5.2 CONCLUSIONS

In this study, the multivariate analysis showed parity, breastfeeding, and age of the mother which had an association with the prevalence of under-five mortality in rural areas, and this rejects the null hypotheses. This analysis shows that respondent's age, wealth status, employment status, birth weight, region, place of delivery, sex of child, are less likely to influence the prevalence of under-five mortality in rural areas.

5.3 RECOMMENDATIONS

Based on the multivariate analysis, efforts to reduce under-five mortality should focus on strengthening maternal and child health interventions. In addition, breastfeeding promotion programs should be strengthened through maternal education and counselling during pregnancy and after delivery given the significant association between breastfeeding and child survival. Furthermore, special attention should be given to women with higher birth orders through targeted child health interventions and monitoring to ensure optimal care and survival of young children. Overall, strengthening maternal and child health services and increasing awareness of recommended childcare practices may contribute significantly to reducing under-five mortality.

5.4 FURTHER RESEARCH

An important area for further research is to explore the understudied contextual and emerging factors. Future studies should investigate the role of climate variability and water insecurity on child survival, given increasing droughts and floods in rural Uganda. There is also limited evidence on how digital health interventions, community health workers coverage, male involvement in maternal/ child health influence mortality outcomes. Longitudinal cohort studies are further recommended to establish causal relationships and track how changes in poverty, education, and health system access translate into long term reductions in under-five mortality.

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