ADDIS ABABA UNIVERSITY

COLLEGE OF DEVELOPMENT STUDIES

CENTER FOR POPULATION STUDIES

Assessment of trends and determinants of under-five mortality among children born to older women: Evidence from Ethiopian Demographic and Health Survey

MSc Thesis

By

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A MSc THESIS SUBMITTED TO CENTER FOR POPULATION STUDIES, COLLEGE OF DEVELOPMENT STUDIES, ADDIS ABABA UNIVERSITY FOR THE FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN POPULATION STUDIES

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This Thesis is my original work and has not been presented for a degree of masters in any other University and that all sources and materials used for the Declared by:

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Abbreviations and Acronyms

AAU: Addis Ababa University

ANC: Antenatal Care

CoDS: College of Developmental Studies

COVID: Coronavirus Disease

CSA: Central Statistical Agency

CM: Child Mortality

CPR: Contraceptive Prevalence Rate

DHS: Demographic and Health Survey

EA: Enumeration Area

EDHS: Ethiopian Demographic and Health Survey

EPHI: Ethiopian Pubic Health Institute

EPHC: Ethiopian Population and Housing Census

FMOH: Federal Ministry of Health

FP: Family Planning

GTP: Growth Transformation Plan

HBM: Health Belief Model

HH: House Hold

HMIS: Health Management Information System

IM: Infant Mortality

MDG: Millennium Development Goal

NGO: Non-Governmental Organization

NM: Neonatal Mortality

NMR: Neonatal Mortality Rate

PNM: Post Neonatal Mortality

SDG: Sustainable Development Goal

SSA: Sub-Saharan Africa

SNNPR: Southern Nation and Nationalities Region

UN: United Nation

UNICEF: United Nations International Children's Emergency Fund

U5M: Under-five mortality

WHO: World Health Organization.

Abstract

Introduction: Mortality has long been used as an indicator of the level of socio-economic development of a country. Global attention has been drawn to under-five mortality through the Sustainable Development Goals (SDGs). The burden of under-five mortality of children is still not fairly divided. Two regions account for around 80% of under-five deaths among children: sub-Saharan Africa and South Asia. Ethiopia is one of six nations that account for half of the world's under-five mortality.

Methods: The Ethiopia Demographic and Health Survey (EDHS) from the years 2000, 2005, 2011, and 2016 provided nationally representative cross-sectional data. 6,199 children born to older women within the five years prior to the study formed the data. Home interviews were used to gather demographic data, such as mother and child characteristics, socioeconomic factors, and environmental variables. Multiple-level regression analysis was utilized to get the Adjusted Odds Ratio (AOR) and its 95% confidence interval (CI).

Result: The absolute number of under five deaths is 128/1000 live births in the year 2000 which reduce to 56/1000 live births in 2016. This study identified factors contributing for under-five mortality among children of women aged 35 to 49 years old. Sex of the child (female_ 0.65 (0.53, 0.79)), late age at first birth, 31 to 4o years at first birth 0.34 (0.11, 0.98), family size, having a family size of 6 to 10 0.18 (0.14, 0.24), longer birth interval, greater than 3 years 0.35 (0.26, 0.47) and ANC visits 1 to 3 ANC vests 0.65 (0.5, 0.84) lowered the odds of under-five mortality among children of relatively elders. On the other hand, Women aged 35 to 49 years who gave a twin Birth 6.15 (3.94, 9.6)), those with number of births in the last five years having 4 children (2.64 (1.15, 6.06)), those with number of children ever born, having 9 or above children 3.79 (2.1, 6.84), those who gave birth at late age the index child, mother gave birth of the index child at late age (45 to 49) 2.13 (1.55, 2.93) had higher odds for their children experiencing child death before they celebrated their fifth birthday.

Conclusion: The absolute number of under five deaths of older women is 128/1000 live births in the year 2000 which reduce to 56/1000 live births in 2016. Female children, children born from first from elder mothers, those children residing with large family size, children born with longer birth interval and children for whom their mothers received ANC visits were found to have lower odds of mortality.

Chapter 1 INTRODUCTION

1.1 Background

Demographers, public health officials, and international development organizations frequently place under-five mortality at the top of their priority lists. They have recently garnered increased attention as part of the UN's Sustainable Development Goals (SDGs). Under-five mortality is the chance of death between the ages of birth and five (Spinozzi, 2022). Under-five mortality is one of the most important components of the population; hence demographers are very interested in tracking the trend and incidence of under-five death.

Roughly 1 million children under the age of five die each year, though mortality rates and trends vary considerably across regions and countries. Improving child survival has been a key priority for development programs over the past three decades, and significant progress has been made, with child mortality rates declining substantially and consistently in all parts of the world since 1960 (Fottrell et al., 2010). Infant and child mortality rates have long been used as indicators of the level of socio-economic development of a country.

There has been a notable improvement in child survival rates worldwide during the last three decades. Nine percent of children died before turning five years old in 1990, with 1 in 11 children dying under the age of five. By 2019, nevertheless, this rate had dropped dramatically to just 1 in 27 children, meaning that the death rate was less than 4% (WHO, 2020). The cost of child mortality varies by geographic area. Despite this astounding advancement, sub-Saharan Africa (SSA) accounted for more than half (5.2 million deaths) of all deaths among children under five, with Central and Southern Asia coming in second (Spinozzi, 2022). As a result, from 1990 to 2019, the global under-five mortality rate decreased by 59% to 38%. Even with this significant drop, promoting child survival is still a top priority due to avoidable child fatalities (Alkema et al., 2014).

Sub-Saharan Africa continues to bear the highest burden of under-five mortality worldwide. In 2019, out of the 5.2 million global under-five deaths, over 80% were reported from Sub-Saharan Africa and Central and Southern Asia. Furthermore, half

of all under-five deaths that year occurred in just five countries - Nigeria, India, Pakistan, the Democratic Republic of the Congo, and Ethiopia (Getachew & Bekele, 2019).

The United Nations Sustainable Development Goal 3 has set a target of reducing under-five mortality to at least 25 deaths per 1,000 live births by 2030. However, most sub-Saharan African countries are currently not on track to meet this SDG target for under-five mortality. Only five countries in the region - Kenya, Rwanda, Senegal, Tanzania, and Uganda - are projected to decline under-5 mortality at a pace sufficient to achieve the SDG 3.2 goal by the end of the decade (Mejía-Guevara et al., 2019).

According to recent commentary, Ethiopia has made impressive strides in reducing child mortality since the year 2000, aided by financial and technical support from global development partnerships. However, despite this progress, Ethiopia did not achieve the Sustainable Development Goal (SDG) targets for under-five mortality reduction by the end of 2019/2020. This missed target may be attributed to the disruptive impact of the COVID-19 pandemic on the country's health systems and development programs (Tefera & Ayele, 2021).

According to the 2016 Ethiopian Demographic and Health Survey, the under-five mortality rate in Ethiopia was 67 deaths per 1,000 live births. This means that approximately 1 out of every 15 Ethiopian children did not survive to their fifth birthday. However, this represents a substantial improvement over the past decades the under-five mortality rate has decreased by 60%, falling from 166 deaths per 1,000 live births in 2000 to 67 deaths per 1,000 live births in 2016 (Woldeamanuel, 2019). While Ethiopia has made meaningful progress in reducing its under-five mortality rate over the past two decades, the current rate remains high at 67 deaths per 1,000 live births. This indicates that more concerted efforts and appropriate measures are still needed for Ethiopia to reach the ambitious Sustainable Development Goal (SDG) target of 25 or fewer under-five deaths per 1,000 live births by 2030.

1.2 Statement of the Problem

Mortality rates, particularly among under-five child, have long been recognized as a key indicator of a country's level of socioeconomic development. Under-five Child

mortality has been a major focus of international development efforts, as reflected in the Sustainable Development Goals (SDGs). However, the burden of under-five deaths remains highly uneven across the globe. Approximately 80% of all under-five deaths occur in just two regions: sub-Saharan Africa and South Asia (UNICEF, 2017).

Several research have been undertaken to identify the factors that influence newborn and child mortality in both developed and developing nations. These determinants are socio-demographic, socioeconomic, and environmental, with examples including ethnicity, maternal and paternal education levels, housing conditions, congestion, toilet availability, and early cessation of breastfeeding. According to the data, 11 million children under the age of five die each year throughout the world, with more than 10 million of them in underdeveloped countries. According to the United Nations Report (2009), the global infant and child death rates were 49.3 and 73.7, respectively. Of the 187 nations, only nineteen, all in Africa, had an infant mortality rate of more than 10%, including Ethiopia.

Child mortality rates in Ethiopia have declined over time, the progress has not been as rapid as hoped. According to the 2016 Ethiopian Demographic and Health Survey (EDHS), the under-five mortality rate for the 5-year period preceding the survey was 67 deaths per 1,000 live births. This means that approximately 1 out of every 15 children in Ethiopia does not survive to their fifth birthday (CSA, 2016). This is one of the difficult issues the nation needs to solve because the rate is still high. Knowing the socioeconomic factors that contribute to under-five mortality in Ethiopia can help identify the segments of the population that require assistance in order to lower death rates more rapidly. The rate of decrease in under-five mortality is still rather high, and more work is needed to eliminate obstacles to under-five survival, even though several research have been carried out to identify variables related with under-five mortality in Ethiopia.

In order to effectively monitor progress as Ethiopia goes forward with executing its Growth and Transformation Plan II (GTP II) and works towards the Sustainable Development Goals of Agenda 2030, it will be imperative to invest in timely and accurate data. A variety of family, environmental, socioeconomic, and demographic factors may have an impact on child mortality, a crucial development indicator.

Thoroughly understanding these complex, interrelated determinants of under-five mortality will be essential for Ethiopia to identify and target the most vulnerable populations, design appropriate interventions, and accelerate reductions in child deaths (WHO, 2020). This study will investigate the primary risk factors and examine regional differences in under-five mortality among older mothers in Ethiopia, taking into consideration a variety of health, social, and environmental factors. The following research questions were developed based on the study's aims and observations acquired during the examination of relevant literature:

- What variables substantially affect under-five mortality among older women in Ethiopia?
- Are there substantial disparities in under-five mortality among older women throughout Ethiopia's regional states?
- Does the infant and child mortality of older women depend on the level of maternal education?
- Does the prolonging birth interval reduce infant mortality of older women?

1.3 Objective of the study

1.3.1 General Objective

- The main purpose of this research is to understand trends of under-five child mortality of older women and determine the major demographic, socio-economic and environmental factors that influence under five mortality of older women in Ethiopia.

1.3.2 Specific objective

- To investigate trends of under-five mortality of older women of Ethiopia.
  - ✓ To investigate trends of regional variation of under-five mortality across the Ethiopia.
- To determine which factor is affecting under-five mortality of older women of Ethiopia.
  - ✓ To determine major demographic factors that influences under-five mortality of older women in Ethiopia.
  - ✓ To determine socio-economic factors that influences under-five mortality of older women in Ethiopia.
  - ✓ To determine environmental factors that influences under-five mortality of older women in Ethiopia.
  - ✓ To investigate regional variation of under-five mortality across the Ethiopia.

1.4 Significance of the study

Under-five mortality (U5M) is a critical indicator of a country's socioeconomic and public health status, and identifying the key determinants of under-five mortality among older women is crucial for developing targeted health programs and policies that can help Ethiopia achieve the United Nations Sustainable Development Goal (SDG of reducing under-five mortality to 25 or fewer deaths per 1,000 live births by 2030(UNICEF, 2017). It may also be utilized to implement more cost-effective treatments and policies to reduce child mortality and improve the health and life expectancy of the general public. Specifically, the results of this investigation will:

- Provide information about the determinants and trends of under-five mortality of older women to stakeholders like Ministry of Health, Ministry of Labour and Social Development, UNICEF, WHO and other NGO's whose beneficiaries are children so as to improve the quality of child care and their health.
- Assist stakeholders with the planning, design, and implementation of policies to reduce under-five mortality.
- Provide policymakers and academics with baseline data that may be utilized in future studies on child mortality under the age of five.
- Help stakeholders make informed decisions and organize appropriate interventions.

1.5 Scope and Limitation of the Study

This study used secondary data collected by central statistical authority (CSA), i.e. the Ethiopian demographic and health survey of the year 2000, 2005, 2011 and 2016. The research aimed to understand tends of U5MR among children of older women on DHS data and build a model to identify demographic and socio-economic determinants of under five children death of older women in Ethiopian.

The research also restricted to use the socio-economic and demographic factors to develop the model. In addition, based on the model the user interface designed for the deployment of the results to reveal the knowledge. However, the major limitation of this research is, the study did not incorporate the regional socio-economic and demographical factors rather it focused at national level.

1.6 Ethical Consideration

For this study, the personal identification (name and/or ID) does not require, beside, the study anticipated fully for academic purposes for partial fulfillment of M.Sc degree of population studies. Therefore, for this studies the researchers were using EDHS 2000, 2005, 2011 and 2016 data, which is publicly available or made available when request from the following links (https://www.dhsprogram.com/). This data collected by CSA authorization level so no data collected in individual level rather the researcher used secondary CSA data. This research outcome anticipated to contribute to the health promotion and policy changes in urban and rural Ethiopia level.

1.7 Organization of the study

This research report organized into six chapters. The first chapter briefly discusses the background of the study, statements of the problem, general and specific objectives of the study, scope of the study, and Ethical clearance for the study. Chapter 2 review literatures on U5MR in the world as well as in Ethiopian, review the theories related to U5MR, review empirical evidence and conceptual framework. Chapter 3 is dedicated for the discussion of methodology of EDHS, study design and data sources, study population and sample size, sample selection and sampling procedure ,variables (dependent and independent), statistical analysis and operational definition. Chapter 4 presents the descriptive analysis, how look like the trend over the past 16 years and a multi-level logistics regression model. Chapter 5 discusses the research finding. Finally, chapter six provides conclusion of the research, and presents recommendation for future work.

Chapter 2 LITERATURE REVIEW

2.1 Literature review

Research carried out in the last few decades has repeatedly demonstrated the extent of global progress achieved in lowering the death rate of children under five. Since 2000, there has been a 49% global decline in the under-five mortality rate, saving the lives of around 50 million children. During 2000, the global under-five mortality rate has been halved in over 80 countries, including 69 developing nations. (Gebremichael & Fenta, 2020). A variety of measures, including improved healthcare, infrastructure, immunization programs, and access to basic amenities, have been implemented to lower the rate of child mortality (Bain et al., 2018).

Despite progress, there are still disparities: higher death rates are observed in low-income countries, areas affected by conflict, areas susceptible to drought, and locations with limited access to healthcare. Ethiopia is one of countries that have limited to access to health care. Research often emphasizes the significance of factors such as maternal education, socioeconomic status, and healthcare accessibility in determining child survival rates. However, it is also curial to see at older age of women and under-five mortality in since give birth at older age has an impact on health outcome of the children(Liu et al., 2000).

Older women, particularly in low- and middle-income countries, face unique health challenges related to aging such as chronic diseases, and limited access to health care (Bao et al., 2022). Limited health care service also included ANC which women at older age group could need specially attention on ANC since it is obvious that childbearing at old age has an impact on the health outcome of the children.

Gender-based violence, discrimination, and social isolation are just a few of the difficulties that older women face while a woman at old age doesn't marry or doesn't have a child (*MENT BRIEF*, 2016). This is not the case that older age women facing but also after marriage the survival of children could be an affect her on emotionality as well as her marriage. It is acknowledged that give birth at older age period has significant role in determining health outcomes mother as well as the children.

Older women in resource-constrained settings may face challenges related to caregiving responsibilities, limited access to healthcare, and economic disadvantages,

all of which can impact child health outcomes. Ethiopia as a resource constrained country the issues are more rampant, and it is impact has been reveled in high child morality especially under five children and maternal death.

Reductions in child mortality are linked to increased coverage of effective interventions to prevent or treat the leading cause of death, notably vaccines, birth spacing, and early and exclusive breastfeeding, as well as improvements in socioeconomic conditions. Despite the progress, Ethiopia has faced different challenges which provide the basis for the country's priorities to accelerate progress towards achieving MDGs and further improving child survival and development, which are as follows: low utilization of maternal healthcare services; including skilled attendants at birth; high unmet need for family planning (FP); adolescent and youth sexual and reproductive health; awareness of healthy behaviors; cultural barriers; inequalities in health service utilization; and quality of care (Gebremichael & Fenta, 2020a). Survival status of children is one of the indicators of socioeconomic development of any given country, even if most developing countries are unable to tackle the causes of child morbidity and mortality due to the availability of poor public health.

Even tough, Ethiopia has been shown a remarkable reduction on under-five mortality and maternal mortality, understanding the theoretical and evidence based about the under-five children mortality and older age women could be advantage for public health as well as demographic change on size and shape of the country. The theoretical and empirical evidence will follow accordingly in this research.

2.2 Theoretical review

The substantial correlation between under-five mortality and socioeconomic status has been repeatedly demonstrated by numerous studies. According to the socioeconomic theory, children that are born into lower socioeconomic strata have greater death rates than their wealthier peers. Recent research carried out in Africa has validated these claims (Rahman et al., 2022). The theory encompasses a range of indicators, including

income, education, occupation, and access to basic amenities such as clean water, sanitation, and healthcare.

Ethiopia is home to all of the previously mentioned variables. The influence of poverty and income disparity on child mortality is substantial. Underprivileged children are more likely to suffer from malnourishment, receive substandard medical care, and become infected with infectious diseases. Under-five mortality differentials are largely caused by disparities in access to healthcare services (Rutherford et al., 2010). It is frequently difficult for kids from low-income families to get timely, high-quality medical treatment.

In majority of the studies shows strong association between socioeconomic factors and under-five mortality. Addressing these disparities requires comprehensive and targeted strategies that consider the multifaceted nature of social determinants influencing child health outcomes. Further research is needed to explore the effectiveness of specific interventions in diverse socio-economic contexts.

The other theory that can describe under-five mortality is life course approach. The life course approach is a theoretical framework that emphasizes the importance of understanding health and development as a lifelong process influenced by various social, economic, and environmental factors. It entails examining life-course and intergenerational factors that impact menarche timing, fertility, pregnancy outcomes, gynecological illnesses, and menopause age (Elder, 1975).

Fertility at the early age has high probability to reduce morbidity of under-five children compared to the older age (Bedada, 2017). On other hand, studies employing the life course perspective in the context of child health highlight the significance of early life experiences in shaping health outcomes, including under-five mortality. Early exposures, such as maternal health during pregnancy and early childhood nutrition, are identified as critical determinants of child survival.

Furthermore, the basis of the health belief models (HBM) is that people would take action to avoid, control, or cure a health condition if they believe they are at low risk of death or morbidity (Roden, 2004). According to the Health Belief Model, people are more inclined to take action if they believe a health problem is serious. When it comes to under-five mortality, parents can think about how serious the implications are when it comes to illnesses and disorders that can be avoided. In order to lower the death rate among children under five, public health programs can take use of a variety of cues to action, making sure that parents are informed in a timely manner about health-promoting practices.

The demographic transition theory describes how a country's population changes over time as it develops economically which this can be also a theory that shows the linkage between under-five death and population growth. The demographic transition theory has five stage that shows from high death rate and low fertility to low fertility rate to low death rate. As countries develop economically, they typically invest in healthcare, education, and infrastructure, which reduce under-five mortality. This shift often accompanies a transition from high birth and death rates to lower rates.

With the context of under-five death rate Ethiopia can be considered in stage 2 which can see that death rates decline due to improvements in healthcare, sanitation, and nutrition. Under-five mortality decreases, leading to rapid population growth as birth rates remain high for the past 2 decades. In 1980-85, Ethiopia's population was growing at the rate of 2.9% per year, and increased to 3.5% in 1990-95 (UN, 2015). Since 1980s and 1990s, Ethiopia has been experiencing rapid demographic changes. The changes were the result of the country's effort in reducing fertility and mortality rates. Fertility and mortality rates have been declining; thus, population has increased by almost twofold from 48.5 million in 1990 to more than 100 million in 2016 (Sewnet minale Bahir & Sewnet Minale, 2020)

2.3 Empirical review

Due to various reasons the global U5MR were decrease one of the study conduct by UN- interagency groups shows that, the global U5MR decreased by 59% (90%

uncertainty interval [UI] 56–61) from 93·0 (91·7–94·5) deaths per live births in 1990 to 37·7 (36·1–40·8) in 2019, while the annual number of global under-5 deaths declined from 12·5 (12·3–12·7) million in 1990 to 5·2 (5·0–5·6) million in 2019 a 58% (55–60) reduction (Sharrow et al., 2022).

Not only the U5MR but also the global Neonatal Mortality Rate (NMR) decreased by 52% (90% UI 48–55) from 36·6 (35·6–37·8) deaths per 1000 live births in 1990, to 17·5 (16·6–19·0) in 2019, and the annual number of global neonatal deaths declined from 5·0 (4·9–5·2) million in 1990, to 2·4 (2·3–2·7) million in 2019, a 51% (47–54) reduction. As of 2019, 122 of 195 countries have achieved the SDG U5MR target, and 20 countries are on track to achieve the target by 2030, while 53 will need to accelerate progress to meet the target by 2030 (Sharrow et al., 2022).

In Ethiopia over the research period of EDHs, it demonstrated a considerable decline in under-five mortality, going from 166 per 1000 births in 2000 to 67 per 1000 births in 2016. Depending on their characteristics, the trends in mortality for children under-five exhibited diversities. A notable increase was noted in the majority of the variables. The biggest declines in home delivery were seen between 2000 and 2016, with a 6.5% fall, and an 8.3% decrease in deliveries to health facilities. Maternal education fell by 6.9% among mothers who had no education (Gutema et al., 2022).

In the Meantime, Under-five mortality in the Afar region was 2.280 times more likely Compared to Children born in Tigray Region (AOR =2.280 95% CI = 1.137–4.568). Under-five mortality in Gambella Region was 2.004 times more likely Compared to children in Tigray Region (AOR =2.004, 95% CI =1.089–3.687). Under-five mortality in Dire Dawa city was 3.012 times more likely as compared to children born in Tigray Region (AOR = 3.012,95% CI = 1.165–7.785). Under-five Mortality in Rural residences was 1.908 times more likely as Compared to Urban Residence (AOR = 1.908, 95% CI = 1.257–4.539). Under-five mortality in Poorer index Households was 0.343 times Less likely as compared to children born in the poorest index Household (AOR = 0.343,95% CI = 0.128–0.910). Under-five mortality those who Separated were 0.165 times less likely as Compared to never union family (AOR = 0.165, 95% CI = 0.037–0.741) (Yemane, 2022).

Meanwhile Mothers' age at first birth (below and above sixteen years) shows a significant difference between the presence and absence of under-five mortality. Nine of twenty children were born from mothers whose first birth was given sixteen and below years old. Mothers had given first birth earlier than 16 years results in 25% of the death of their children, while 19.60% were survived. On the other hand, in mothers had given first birth above 16 years old, 24.20% of children died, while 31.20% were alive (Gebremichael & Fenta, 2020).

Another study done in Keresa using health facility surveillance data shows a total of 18,759 newborns in the surveillance sites, of which 1,602 died of children under 5 years of age, and the total mortality rate for children under 5 years of age was 85 per 1000 live births. Under-five mortality is higher than EDH 2016. This can tell indicated that further study was required.

One of the study conducted in Ethiopia using EDH 2016 shows that, religious belief of Muslim (AOR=1.20; 95% CI: 1.02–1.41); users of contraceptive method (AOR= 0.80; 95% CI: 0.71–0.90); vaccinated child (AOR=0.52; 95% CI: 0.46–0.60); family size of4–6 (AOR= 0.74; 95% CI: 0.63–0.86) and mother's age group: aged 30–39 (AOR= 16.29; 95% CI: 12.66–20.96), and aged 40 and above (AOR= 55.97; 95% CI: 42.27–74.13) are significant determinant factors of under-five mortality in rural settings (Gebremichael & Fanta, 2020). This clearly shown that older women are more exposed for a probability of death occurrence of children before under-five.

Study conducted in SNNPR about risk related to U5MR shows that there is a high risk of under-five mortality was also significantly associated with a family size of five or more (OR = 3.397, 95% CI: (1.702, 6.782)) as compared to the family size of less than five; smaller size at birth (OR = 1.714, 95% CI: (1.120, 2.623)) as compared to larger size at birth (Gobebo, 2021). The indication is having more family size could possibly lead to an increase in U5MR.

Furthermore, the findings showed that children whose mothers had no formal education were 2.59 times more likely to die than children whose mothers had formal education [AOR: 2.59(1.12–5.99)] (Tibebu et al., 2022). This also revealed that the education is one of the factors that contributed to U5MR.

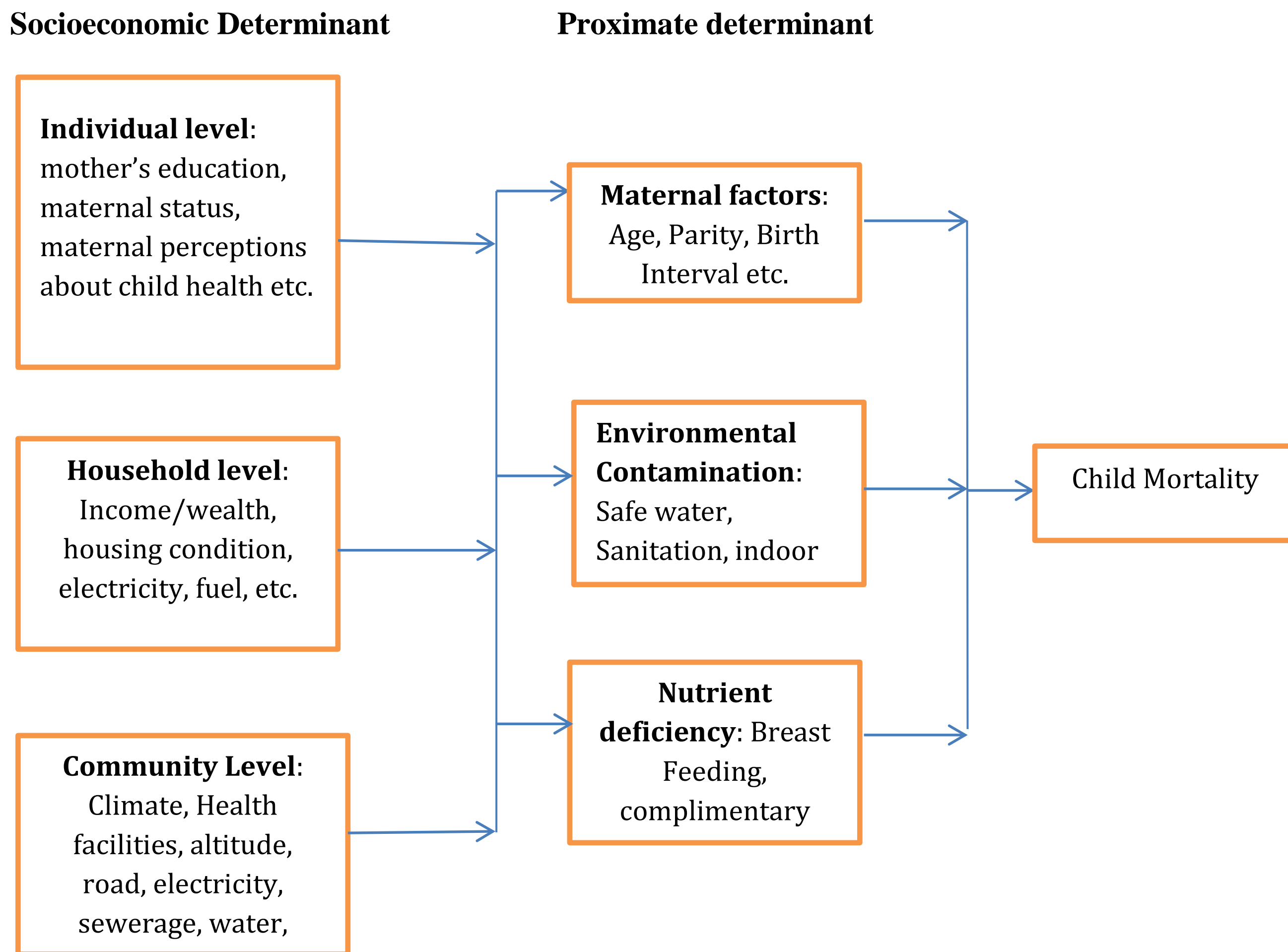
2.4 Conceptual Framework

Many researchers have established various conceptual or analytical frameworks to investigate the factors influencing childhood mortality. Mosley and Chen (1984) presented an analytical framework based on the assumption that all social and economic factors of child mortality must operate through a shared set of biological mechanisms, or proximal determinants, in order to have an influence on mortality. They organized the proximal determinants into five groups. These are

1) Maternal factors (age, parity, birth- interval) ,
2) Environmental contamination,
3) Nutrient deficiency,
4) Socioeconomic determinants such as maternal education, income/wealth and health system are also believed to exert a substantial impact on child survival through the proximate determinants.
5) Injury.

Mosley and Chen's (1984) model has been a standard reference for academics studying childhood mortality, and the current study uses this framework with minor modifications.

Figure 1: Conceptual framework of under-five mortality.



Chapter 3 METHODOLOGY

3.1 Study design and Data Sources

Ethiopia is a large, diverse country located in the Horn of Africa, with a population of over 120 million people as of 2023, making it the second most populous nation in Africa after Nigeria (World Bank, 2023) The country is known for its rich cultural heritage, ancient history, and varied geography, which ranges from the rugged Simien Mountains in the north to the Great Rift Valley running through the center of the country (Britannica, 2023). Ethiopia has a primarily agricultural economy, with coffee, livestock, and crops like teff, wheat, and corn being major exports (World Bank, 2023). The climate varies from the cool, humid highlands to the hot, arid lowlands, the rainy season occurs from June to September (National Geographic, 2023). Ethiopia is the site of numerous ancient archaeological discoveries and is home to diverse ethnic groups, each with their own distinct languages, traditions, and ways of life, creating a vibrant cultural tapestry across this large and geographically complex East African nation (UNESCO, 2023).

This study used data from four successive Ethiopia Demographic and Health Surveys (EDHS) performed in 2000, 2005, 2011, and 2016. These EDHS surveys were implemented by the Central Statistical Agency (CSA) of Ethiopia, in conjunction with the Federal Ministry of Health (FMoH) and the Ethiopian Public Health Institute (EPHI). ICF International provided technical assistance, while development partners offered financial and technical support. The goal of these surveys was to collect reliable, accurate, and up-to-date data to measure the progress of Ethiopia's national development agenda, including the Growth and Transformation Plan II and the Sustainable Development Goals. The most recent 2016 EDHS was carried out from January 18 to June 27, 2016, using a nationally representative sample to provide estimates at the national, regional, and urban/rural levels (CSA, 2017).

The Ethiopia Demographic and Health Surveys of 2000, 2005, 2011, and 2016 were aimed to produce estimates for the following domains: Ethiopia as a whole; urban and rural areas (each as a separate domain); and 11 geographic administrative regions (nine regions: Tigray, Affar, Amhara, Oromiya, Somali, Benishangul-Gumuz, Southern Nations, Nationalities and Peoples (SNNP), Gambela, and Harari regional states, and two city administrations: Addis Ababa and Dire Dawa) (CSA, 2017).

3.2 Study population and sample size

The Ethiopia Population and Housing Census (EPHC) carried out by the Central Statistical Agency (CSA) in 1994 for the first two surveys and in 2007 for the last two, serves as the sample frame for the EDHS data for the years 2000, 2005, 2011, and 2016. Two steps went into stratifying and choosing the 2016 EDHS sample. Twenty-one sample strata were produced by stratifying each region into urban and rural areas. EA samples were chosen in two steps, individually, for each strata Twenty-one sample strata were produced by stratifying each region into urban and rural areas. EA samples were chosen in two steps, individually, for each strata. A total of 645 EAs—202 in urban areas and 443 in rural areas were chosen independently in each sample stratum and with a probability corresponding to the size of the EA (based on the 2007 EPHC) in the first step of the process. The newly formed household listing was used to pick a set number of 28 homes per cluster using an equal probability systematic selection process in the second stage of selection. For the sample, 18,008 homes in total were chosen, of which 17,067 were inhabited. 16,650 of the inhabited homes were successfully contacted for interviews, resulting in a 98% response rate (CSA, 2017).

Data from the Ethiopia Demographic and Health Survey (EDHS) in the years 2000, 2005, 2011, and 2016 are used in this study's research. During these four survey rounds, 43,029 children were born from interviewed women between the ages of 15 and 49 out of this only 6,199 of them were from older women, 35–49 year-old (CSA, 2017). In this study, the EDHS data from 2000, 2005, 2011, and 2016 are utilized to describe the trend of under-five mortality in Ethiopia, as well as to investigate the determinants and variance of under-five mortality among older mothers based on background factors.

3.3 Sample selection and sampling procedure

3.3.1 Sampling frame

The sampling frame for the 2000 and 2005 EDHS was derived from the population enumeration areas (EAs) of the 1994 census, whereas the sampling frame for the 2011 and 2016 EDHS was derived from the 2007 Population and Housing census, which was carried out by the CSA. (CSA, 2017).

3.3.2 Sampling technique and procedure

In the census framework, each of the 11 administrative areas is split into zones, and each zone into weredas, which are then subdivided into kebels, which are further subdivided into census enumeration areas (EAs).chosen population census enumeration areas (EAs) were used as primary sampling units, with chosen homes serving as secondary samples. Household members were observation or study units (CSA, 2017).

A comprehensive household listing operation was carried out in all of the selected EAs to provide a sampling frame for the second-stage household selection. To avoid an uneven sample allocation among regions, the sample was allocated by region in proportion to the square root of the region's population size rather than proportional sample allocation, which resulted in a distribution where 80 percent of the sample came from just three regions (CSA, 2017).

3.4 Data Collection

This study's data sets are from the measure DHS project (www.dhsprogram.com). During the appropriate data collecting period for the fourth EDHS surveys, information on demographics, wealth, nutrition, and sexual behavior, among other topics, was gathered by going door-to-door and conducting in-person interviews.

3.5 Variables

3.5.1 Dependent (Outcome) Variable

The Dependent (Outcome) variable for this study is under-five child mortality of older women. Under-five mortality is defined as the probability of dying before completing the fifth birthday. Thus, the outcome variable is the child event before reaching five years of age, which is dichotomous and coded as 1 if the child died in the five years before the survey and 0 if alive.

- Under-five death (0=Yes, 1= No)

3.5.2 Independent Variables

This study's explanatory factors are drawn from the Mosley and Chen (1984) framework for developing nations' determinants of childhood illness and death, as well as existing data and insights from related research that have been examined

before. The main predictor variables of under-five child mortality explored include Demographic, Socioeconomic and Environmental factors.

The demographic variables/factors include:-

- Sex of child (1=male and 2= female)
- Age of child in month _______
- Type of birth (0=Single birth and 1=Multiple birth)
- Birth order number (1= first birth, 2= between 2-4, 3= above 5)
- Preceding birth interval in month (0= First birth, 1=below 24 months, 2=between 24-35 months and 3= above 36 months)
- Age of mother at first birth (1=under 20 years, 2= between 21-30 years and 3= 31-40 years, 4= above 41 years)
- Family size (Number of HH members) (1= between 1-5, 2=between 6-10 and 3= above 11)
- Breastfeeding status (1=ever breastfeed and 2= never breast feed).

The socioeconomic variables/factors include:-

- Mothers' education level (0= No formal education, 1=primary education, 2=secondary education and above)
- Wealth index (economic status of HH) (1=Poor, 2=Medium and 3=Rich)
- Region(1=Tigray,2=Afar,3=Amhara,4=Oromia,5=Somali,6=Benshangule-Gumuz, 7=SNNP, 8=Gambella,9=Harari,10=Addis Ababa and 11=Dire Dawa)
- Cluster (1= Mainly Agrarian (Tigray, Amhara, Oromia and SNNP Region), 2= Mainly Pastoralist (Afar, Benshangule-Gumuz and Somali Region), 3= Mainly Urban (Addis Ababa, Dire Dawa and Hareri Region)
- Place of residence (1=Urban and 2=Rural).

And the variables that are classified as environmental variables include:-

- Availability of toilet facility (0=improved facility and 1=unimproved facility and 2=no toilet facility).
- Source of drinking water (0=protected source and 1=unprotected source)
- Place of delivery (0=at home and 1=at health center)

3.6 Statistical Analysis

After the data has been reviewed for inconsistencies, missing values, and outliers, it was analyzed using STATA version 17.0 statistical software. Variables were calculated and recoded to meet the goals of this study.

The data were analyzed using multilevel binary logistics. First, the individual women's sample weight were computed by dividing v005 by 1,000,000. The plan analysis was then prepared by entering the stratum, main sampling units, and sample weight for each data set, as complicated sample analysis necessitates the construction of an analysis plan for the data set prior to executing the analysis. STATA's complicated sample commands were utilized to specify the stratum, main sampling unit, and sample weight. This was done so that STATA did not assume the data came from simple random sampling, and thus ignored stratification and clustering, which increased the significance and decreased the standard error of point estimates. It is worth noting that whether or not complicated sample analysis is utilized in stratified cluster sampling, the point estimates remain identical.

The absolute counts, percentages, and odds ratios used in this study were all weighted for sample probabilities. The research population's frequencies and proportions in respect to chosen socio-demographic characteristics were described using sophisticated sample frequency and descriptive analysis. The results were presented in the form of tables and figures.

To investigate the relationship between U5MR and selected socio-demographic factors [age, wealth index, marital and educational status, parity, location of residence, and employment], a complex sample bivariate and multivariate logistic regression model was utilized. The findings were presented in the form of odds ratios (OR) with 95% confidence intervals.

3.7 Data Quality Control and Management

After obtaining the data sets, the data was analyzed to identify missing values and outliers. The completeness of the data was confirmed using the running frequency. The EDHS complete reports provide detailed documentation on the data quality control and management used in the surveys. Briefly, data were obtained by visiting families and performing face-to-face interviews using pretested questionnaires after

intensive training was given to data collectors (CSA, 2017).

3.8 Ethical Considerations

The study was carried out after receiving ethical approval from Addis Abeba University and agreement from the Measure DHS initiative. Because this thesis is based on secondary data, the letter of permission to use the data sets was received from the Measure DHS project (ORC Macro).

3.9 Operational Definition

- Under-Five Mortality Rate :- The under-five mortality rate is typically expressed as the number of deaths of children under the age of five per 1,000 live births in a given year or period (UNICEF, 2019).
- Older Women: - Women aged between 35-49 years (WHO, 2015).

3.10 Dissemination of results

The results of this study were disseminated to College of Development Studies (CoDS), Center of Population Studies and Addis Ababa University as partial fulfillment of Master's degree in population studies (Reproductive Health). It will also be communicated to the Ethiopian Federal Ministry of Health and Measure Demographic and Health Survey project. Finally it will be sent for publication in peer reviewed journals and effort will also be made to disseminate findings in scientific conferences.

Chapter 4 RESULT

4.1 Descriptive

4.1.1 Demographic Distribution of women

Among women in the age category 40 to 44 years 46.7%, 45.1%, 47.4% and 44.3% of the samples accounted for the year 2000, 2005, 2011 and 2016 respectively. Likewise, among those households headed by women close to 1 in 7 household (14.8%,16.7% and 15.5%) were female in gender for the 2000, 2011 and 2016 year surveys respectively were headed by women while one in 10 (12.8%) of households were women headed for the 2005 year. In a similar fashion, the proportion of women with family size up to 5 of less was 17.2%, 11.8%, 12.7 and 14.8% for the respective survey years among sample of women in this category among those reported a family size of 5 or less.

Regarding the number of children ever born, women reported that four in ten women; 40.9% for 2000 survey year, 40.2 for 2005 43.0 for 2000 reported that their number of live births is 7 or less while one in 2 women reported same number in the year 2016. The maximum number of births in last 5 years was reported 4 in all survey years, accordingly 44.5%,43.3%,46.1% and 40.1% of women reported that they had a couple of births in the last 5 years for the respective survey years. Concerning age at first birth, 6 in 10 women reported that they gave birth at age 20 years or before in the later 3 survey, while 69.4% for the 2000 year survey.

Table 1: Demographic Distribution of the Women aged 35 to 49 at the birth of index child.

	Survey Year			
	2000	**2005**	**2011**	**2016**
Variable	**N(%)**	**N(%)**	**N(%)**	**N(%)**
Total	**2124**	**1746**	**1657**	**1632**
Age				
35-39	740 (34.9)	592(33.9)	599(36.2)	669(41.0)
40-44	991(46.7)	787(45.1)	785(47.4)	723(44.3)
45-49	393(18.5)	367(21.0)	272(16.4)	239(14.7)
Sex of house hold				

head				
Male	1,809 (85.2)	1,523 (87.2)	1,380 (83.3)	1,379 (84.5)
Female	314 (14.8)	223 (12.8)	277 (16.7)	2523 (15.5)
Family Size				
<=5	366 (17.2)	208 (11.9)	211 (12.7)	243 (14.8)
6-10	1,586 (74.7)	1,403 (80.5)	1,334 (80.5)	1,270 (77.8)
11-15	164 (7.7)	129 (7.36)	106 (6.4)	109 (6.7)
>=16	7 (0.4)	7 (0.4)	7 (0.4)	10 (0.6)
Age At first Birth				
<=20	1,474 (69.4)	1,098 (62.9)	1,042 (62.9)	998 (61.2)
21-30	621 (29.2)	613 (35.1)	571 (34.5)	575 (35.3)
31-40	28 (1.3)	34 (1.8)	44 (2.7)	58 (3.6)
Total Children Ever Born				
<=7	868 (40.9)	703 (40.2)	712 (43.0)	806 (49.4)
>=8	1,256 (59.1)	1,044 (59.8)	945 (57.0)	825 (50.6)
Birth in the last 5 years				
1	996 (46.9)	833 (47.7)	764 (46.1)	836(51.3)
2	944 (44.5)	760 (43.5)	762 (46.0)	655 (40.1)
3	159 (7.5)	137 (7.9)	114 (6.9)	131 (8.0)
4	25 (1.2)	16 (0.9)	15 (0.9)	10 (0.6)

4.1.2 Demographic Distribution of Child

Among newborns, one in two new born were female in gender for the respective years (46.5%, 51.8%, 47.2% and 50.2%). Similarly, less than one in 25 new born was twins in the respective surreys. Among those new borns who died before celebrating their first birth day more than ¾ (79.6%, 82.6%, 85.9% and 87.5%) of newborns contributed from each survey years. Likewise, nearly one third 32.5% in 2000, 29.0% in 2005, 28.7% in 2011 and one in 4 (25.9%) in 2016 were born 24 to 46 months after the preceding child.

Table 2: Demographic Characteristics of Index Child

Variable	Survey Year			
	2000 N(%)	2005 N(%)	2011 N(%)	2016 N(%)
Total	**2124**	**1746**	**1657**	**1632**
Sex of index Child				
Male	1,137 (53.5)	842 (48.2)	875 (52.8)	813 (49.8)
Female	987 (46.5)	905 (51.8)	781 (47.2)	819 (50.2)
Types of Birth				
Single	2,072 (97.6)	1,679 (96.2)	1,619 (97.7)	1,568 (96.1)
Twin	52 (2.4)	67 (3.8)	38 (2.3)	63 (3.9)
Birth Order of Index Child				
1st birth	6 (0.3)	6 (0.3)	15 (0.9)	8 (0.5)
2nd birth	12 (0.6)	17 (0.9)	32 (1.9)	25 (1.5)
3-4 births	115 (5.4)	103 (5.9)	99 (6.0)	163 (10.0)
5 and above Births	1,991 (93.8)	1,621 (92.8)	1,511 (91.2)	1,436 (88.0)
Age of index Child(Years)				
0 Years	371 (20.0)	389 (24.6)	412 (26.7)	325 (21.1)
1 Years	343 (18.5)	289 (18.3)	247 (16.0)	341 (22.2)
2 Years	336 (18.1)	274 (17.3)	287 (18.7)	290 (18.8)
3 Years	418 (22.6)	310 (19.6)	301 (19.5)	283 (18.4)
4 Years	385 (20.8)	319 (20.2)	293 (19.0)	301 (19.5)
Age at Death				
Within the first 12 Months	216 (79.6)	136 (82.7)	100 (85.9)	80 (87.5)
13 - 24 Months	37 (13.6)	17 (10.1)	13 (11.3)	5 (5.5)
After 25 Months	18 (6.8)	12 (7.3)	3 (2.8)	6 (7.0)
Preceding Birth Interval				
Up to 23 Months	274 (12.9)	225 (13.0)	212 (12.9)	254 (15.6)
24-36 Months	689 (32.5)	504 (29.0)	471 (28.7)	421 (25.9)

More than 37 Months	1,156 (54.6)	1,011 (58.1)	958 (58.4)	949 (58.5)

4.1.3 Socio Economic Distribution of the Mothers and Index Child by Survey Year

Among women with no education 95% were from 2000 year survey while 90.5%, 79.4% and 82.6% were from the later surveys respectively. Concerning marital status among those widowed, divorced and no longer living together categories less than 1 in 25 women accounted for each year of survey respectively. Of those residents of highland regions More than 90% (96.1%, 93.0%, 93.2% and92.0%) of respondents were resident these areas of the country for the respective survey years. Among Orthodox religion followers 1 in 4 (46.5%, 41.8% and 41.1%) of women were from the later three survey while 52.0. % were from 2000 years sample. More than 90% of the sample comes from the rural clusters of the country.

Table 3: Socio Economic Distribution of the Mothers and Index Child by Survey Year

Variable	Survey Year			
	2000 N(%)	**2005 N(%)**	**2011 N(%)**	**2016 N(%)**
Total	2124	1746	1657	1632
Highest Education Level				
No formal education	2,017 (95.0)	1,580 (90.5)	1,315 (79.4)	1,346 (82.5)
Primary	82 (3.9)	132 (7.6)	320 (19.3)	240 (14.5)
Secondary	21 (1.0)	28 (1.6)	13 (0.8)	27 (1.7)
Higher	4 (0.2)	6 (0.3)	9 (0.5)	17 (1.04)
Marital Status				
Never in union	2 (0.1)	4 (0.2)	1 (0.04)	2 (0.2)
Married	1,946 (91.6)	1,625 (93)	1,448 (87.4)	1,544 (94.6)
Living with partner	25 (1.2)	20 (1.2)	78 (4.7)	12 (.8)
Widowed	62 (2.9)	53 (3.0)	67 (4.1)	35 (2.2)
Divorced	56 (2.6)	22 (1.3)	46 (2.8)	27 (1.7)

No longer living together	32 (1.5)	21 (1.2)	15 (0.9)	12 (0.7)
Region				
Urban	26 (1.2)	22 (1.3)	18 (1.1)	33 (2.1)
Mainly Agrarian	2,042 (96.1)	1,624 (93)	1,544 (93.2)	1,501 (92)
Mainly Pastoralist	56 (2.6)	101 (5.8)	94 (5.7)	97 (6)
Place of Residence				
Urban	145 (6.8)	88 (5.0)	175 (10.6)	128 (7.9)
Rural	1,979 (93.2)	1,658 (95.0)	1,482 (89.4)	1,503 (92.1)
Religion				
Orthodox	1,105 (52.0)	813 (46.5)	693 (41.8)	6,701 (41.1)
Catholic	13 (0.6)	30 (1.7)	17 (1.1)	25 (1.5)
Protestant	278 (13.1)	328 (18.7)	332 (20.0)	334 (20.4)
Muslim	647 (30.5)	530 (30.4)	545 (32.9)	567 (34.7)
Other	80 (3.8)	46 (2.7)	70 (4.3)	36 (2.2)

4.1.4 Environmental and Health Related Distribution of the Women aged 35 to 49 and child

Among the total who delivered at heath facility, 3.4% were from the 2000 sample, while 3.5%, 6.4% and 21.3% were from the 2005, 2011 and 2016 samples. Form those who started ANC follow up 3 month or less after conception one in 4 women (24.8% and 23.6%) were from the 2000 and 2011 sample while one in 6 (16.1% were from the 2005 and 3 in 10 (31.5%) of women were from the lasted EDHS survey. Regarding their FP use among those who reported who used contraceptive 6.7%, 11.2%, 18.2% and 27.7% were form the respective samples.

Table 4: Environmental and Health Related Distribution of the Women aged 35 to 49 and child parts by Independent variables

	Survey Year			
	2000	**2005**	**2011**	**2016**
Variable	**N(%)**	**N(%)**	**N(%)**	**N(%)**

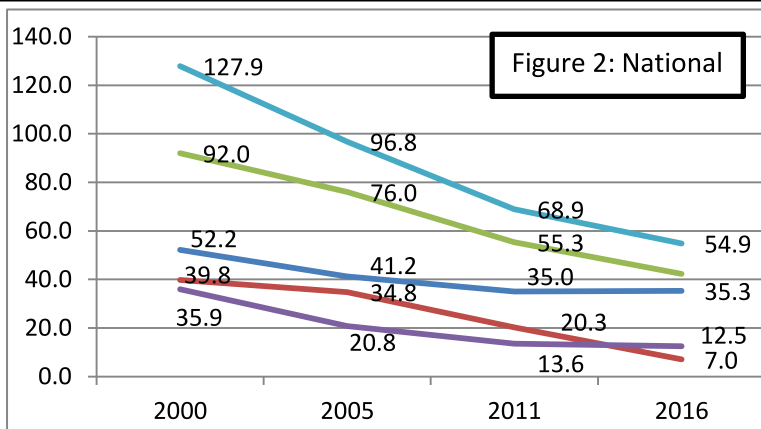
Total	2124	1746	1657	1632
Source of Drinking Water				
Piped	190 (8.9)	264 (15.1)	399 (24.1)	376 (23.0)
Tube Well	1211 (57.0)	198 (11.3)	68 (4.1)	214 (13.1)
Dug	678 (31.9)	715 (41)	203 (12.2)	204 (12.5)
Spring	0 (0.0)	554 (31.7)	926 (55.9)	785 (48.1)
Other	44 (2.1)	14 (0.8)	62 (3.7)	53 (3.2)
Types of Toilet facility				
No Facility	1885 (88.8)	1211 (69.3)	686 (41.4)	637 (39.0)
Flush	3 (0.2)	16 (0.1)	27 (1.7)	28 (1.7)
Pit latrine	191 (9.0)	511 (29.4)	840 (50.7)	930 (57)
Other	44 (2.1)	9 (0.5)	104 (6.3)	36 (2.2)
Place of Delivery				
Health Facility	71 (3.4)	61 (3.5)	107 (6.4)	347 (21.2)
Home	2053 (96.7)	1686 (96.5)	1550 (93.6)	1285 (78.7)
1st ANC check up				
0-3 Months	89 (24.8)	53 (16.1)	115 (23.6)	222 (31.5)
After 3 months	272 (75.2)	273 (83.9)	371 (76.4)	481 (68.5)
Number of Antenatal Visit				
No Antenatal Visit	1289 (78.1)	1065 (76.6)	823 (62.9)	624 (47.0)
Up To 4 Visit	267 (16.2)	241 (17.3)	384 (29.4)	527 (39.8)
More than 4 Visit	93 (5.7)	85 (6.1)	101 (7.7)	175 (13.2)
FP Current use				
No Method	1982 (93.3)	1550 (88.8)	1358 (81.8)	1180 (72.3)
Use FP Method	142 (6.7)	196 (11.2)	299 (18.0)	4527.7)

4.2 Trend

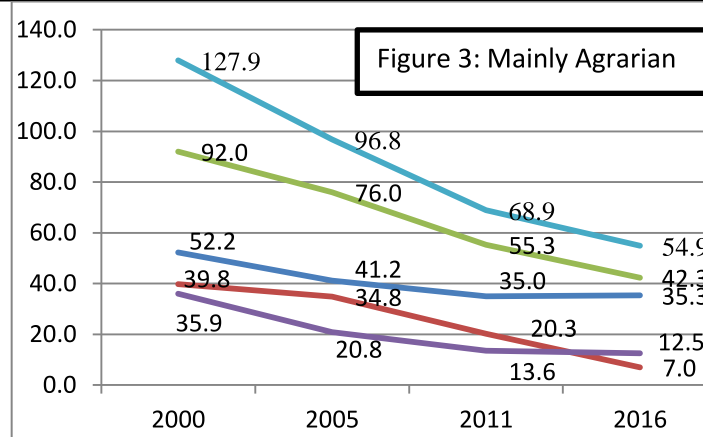
The overall under five mortality trend has shown a decreasing trend over the 16 years period from 127/1000 live births in 2000 to 56 /1000 live births in 2016 which is the reflection for the decrement in infant mortality form 91/1000 live births to 44/1000 live births over the same period which in turn is likely to be resulted from the corresponding decrease in neonatal mortality from 51/1000 live births to 36/1000 live births (Fig 2). The mainly agrarian (Amhara Oromia Tigiray and SNNPR) under five mortality trend over the last one and half decade is more or less similar with the national trend at least in absolute terms . On the contrary the mainly urban comprising the three metropolis namely: Addis Ababa Harar and Dire Dawa was found a bit higher than the national average under five mortality pattern while the mainly Pastoralists :-(Afar Brnshangul gumuz Gambella and Somali) under five mortality showed a lower trend from both over the 16 years period at least in terms of absolute count (Fig 3).

The overall mainly agrarian region under five mortality trend and desegregated trends are more or less similar with the respective national figures (Fig 3).The overall urban under five mortality trend has shown a decreasing trend over the last 16 years from 62/1000 live births to 13 /1000 live births which is the reflection for the decrement in neonatal mortality form 52/1000 live births to 35/1000 live births over the same period resulted from the decrease in infant mortality 144/1000 live births to 14/1000 live births (Fig 4).

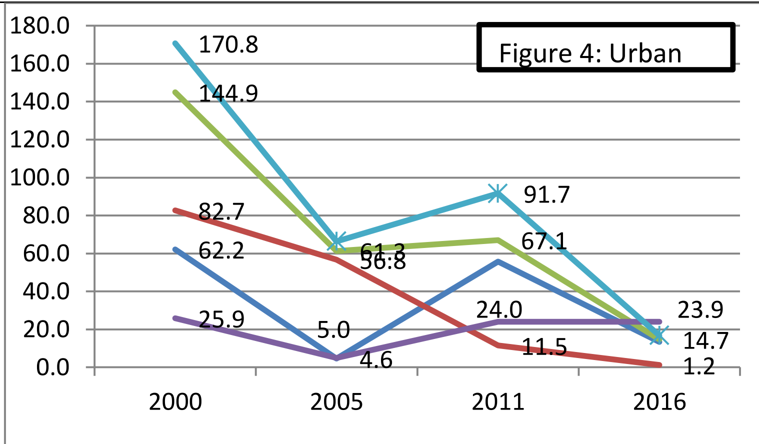
Contrary to the national, urban and mainly agrarian regions the mainly pastoral region does not shows substantial decrement in absolute terms in under-five mortalities while neonatal and infant shown increment, at least in absolute terms. Accordingly, The overall mainly pastoral region under five mortality trend has shown a decreasing trend over the last 16 years from 101/1000 live births to 93 /1000 live births Infant mortality increased form 59/1000 live births to 81/1000 live births over the same period while neonatal mortality increased 33/1000 live births to 67/1000 live births (Fig 5).



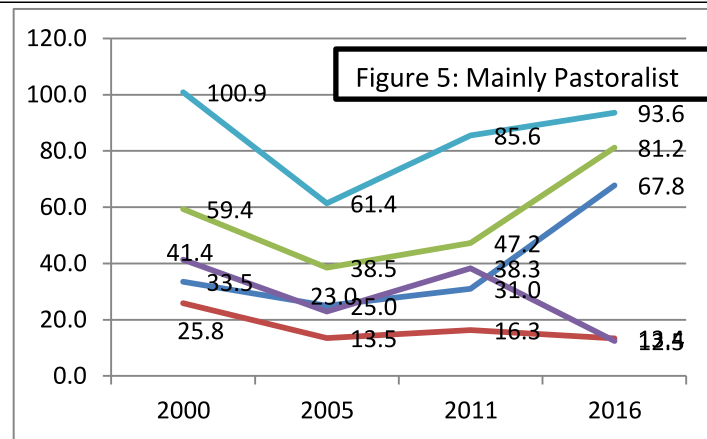
a. National



b. Mainly Agrarian



c. Mainly Urban



d. Mainly Pastoralist

Neonatal Postneonatal Infant Child U5MR

4.3 Multivariable Multilevel Logistics Regression

4.3.1Model Selection

The intra cluster correlation coefficient (ICC) for the null model was 29.7% which indicates the contribution of the variation among EAs in which women reside for under five children death before celebrating their birth day while the individual characteristic difference accounted for the remaining variation. This contribution reduced to 28.8% after accounting both individual and EA level variables. Moreover, 3.1% of the variation in under-five children of women aged 35 to 49 years mortality is explained by both the individual and EA-level variables as indicates in the final model (model III where both the individual and group level variables are included). The best fitted model is model IV which has lowest AIC and higher log likelihood (Table 6).

4.3.2 Multivariable Multilevel Logistics Regression

At multivariate multilevel analysis, this study identified factors contributing for under-five mortality among children of women aged 35 to 49 years old and found factors that positive and negatively statistically significant factors. Accordingly, Sex of the child (female children), children born first from elder mothers (31 to 40 years), children residing in family with large size (HH having a family size of 6 to 10 members), children born with longer birth interval (greater than 3 years) and children for whom their mothers received ANC visits (1 to 3 ANC vests) were found to have lower odds of mortality among children of relatively elders (Table 5).

On the country, for women aged 35 to 49, women aged 35 to 49 years, who gave a twin birth, to those with number of births in the last five years (having 4 children), those with number of children ever born (having 9 or above children), those who gave birth of their the index child at late age (mother gave birth of the index child at late age 45 to 49) had higher odds for their children experiencing child to die before celebrating their fifth birthday (Table 5).

The study showed that compared to male children under-five children with female gender had 35% lower AOR: 0.65 (0.53, 0.79) of being died before celebrating their

5th birth day. In addition, Mothers who gave birth of their first birth at late age, 31 to 40 years at first birth had 65% lower AOR: 0.34 (0.11, 0.98) odds for their children experiencing child to die before celebrating the their fifth birthday compared with those who gave birth early. Similarly, as compared with children from households with smaller family size, this odds for children residing in household with larger family size, having a family size of 6 to 10 was reported 80% AOR: 0.2 (0.15, 0.26) lower. Moreover, children born with longer birth interval, greater than 3 years and those whose mothers received ANC visits, 1 to 3 ANC visits ANC visits for the index child had AOR: 0.35 (0.26, 0.47) and AOR:0.65 (0.5, 0.84) lowered odds experiencing mortality respectively compared with their counterparts (Table 5).

This study also identified set of factors that exacerbate under-five mortality. On the contrary, women aged 35 to 49 years and who gave twin births recently had AOR: 6.15 (3.94, 9.6)) higher likelihood for their children to experiencing mortality before celebrating their 5th birth day compared children of women who gave birth singleton birth. Similarly, children born from mothers who gave birth of 4 children in the last four years and those born from mothers with high birth order (having 9 or above children) AOR: (2.64 (1.15, 6.06) and AOR: 3.79 (2.1, 6.84) higher odds of death respectively compared with their counter parts. Moreover, mother gave birth of the index child at late age 45 to 49 AOR: 2.13 (1.55, 2.93) had higher odds of for their children experiencing death before celebrating their fifth birthday compared with children who gave birth the index child by the age 35 to 39 Years (Table 5).

Table 5: Multivariate Logistics Regression on Factors Contributing Under five mortality among children of women aged 35 to 49 In Ethiopia, Evidence from EDHS.

Variables	Category	Alive	Dead	Model l COR 95% CI	Model ll AOR 95% CI	Model lll AOR 95% CI	Model lV AOR 95% CI
Sex of Child	Male	3286	381	1	1		1
	Female	3228	264	0.71 (0.59, 0.85)***	0.65 (0.53, 0.79) ***		0.65 (0.53, 0.79) ***
Birth Type	Single	6364	575	1	1		1
	Twin	151	69	5.67 (3.88, 8.26) ***	6.43 (4.11, 10.04) ***		6.41 (4.1, 10.02) ***
Marital Status	Currently in union	6122	578	1	1		1
	Not in union	392	67	1.9 (1.38, 2.62) ***	1.34 (0.86, 2.11)		1.34 (0.85, 2.1)
Births in the last 5 Years	1	3182	3429	1	1		1
	2	2824	297	1.39 (1.14, 1.69) ***	1.33 (1.05, 1.7) *		1.33 (1.05, 1.7) *
	3	462	80	2.24 (1.62, 3.08)***	1.53 (1, 2.33) *		1.53 (1, 2.33) *
	4	46	19	4.61 (2.26, 9.39)***	2.54 (1.1, 5.86) *		2.56 (1.11, 5.9) *
Age at 1st Birth	<20	4183	429	1	1		1
	21-30	2174	205	0.87 (0.71, 1.06)	0.83 (0.65, 1.06)		0.83 (0.65, 1.06)
	31-40	156	10	0.73 (0.36, 1.51)	0.36 (0.12, 1.04)		0.35 (0.12, 1.03) *
Sex of HH head	Male	5569	523	1	1		1
	Female	945	121	1.48 (1.17, 1.89) ***	0.94 (0.67, 1.31)		0.94 (0.68, 1.32)
Total Children Everborn	up to 4 child	518	27	1	1		1
	5 up to 8 Child	3561	291	1.43 (0.93, 2.21)	1.98 (1.16, 3.39) *		1.99 (1.16, 3.42) **

	9 and above child	2434	326	2.53 (1.64, 3.91) ***	3.53 (1.97, 6.35) ***		3.56 (1.97, 6.43) ***
Family Size	Up to 5	839	188	1	1		1
	2. 6-10	5155	438	0.33 (0.26, 0.41)***	0.2 (0.15, 0.26) ***		0.2 (0.15, 0.26) ***
	3. >=11	520	18	0.11 (0.06, 0.19)***	0.04 (0.02, 0.07) ***		0.04 (0.02, 0.07) ***
Preceding Birth Interval	<24 Months	808	156	1	1		1
	24 - 36 Months	2074	221	0.56 (0.44, 0.72) ***	0.59 (0.45, 0.78) ***		0.59 (0.45, 0.78) ***
	>=37	3601	262	0.35 (0.28, 0.45) ***	0.34 (0.26, 0.46) ***		0.34 (0.26, 0.46) ***
Age at birth of index Child	35-39	2437	164	1	1		1
	40-44	2954	332	1.81 (1.46, 2.25) ***	1.65 (1.29, 2.1) ***		1.65 (1.3, 2.1) ***
	45-49	1122	149	2.08 (1.6, 2.69) ***	2.09 (1.52, 2.88) ***		2.09 (1.52, 2.88) ***
Mother's Education Level	No Education	5681	577	1	1		1
	Primary	718	57	0.81 (0.59, 1.11)	1.16 (0.81, 1.66)		1.15 (0.8, 1.66)
	Secondary and above	115	11	1.03 (0.51, 2.08)	1.32 (0.53, 3.3)		1.28 (0.49, 3.36)
Total ANC visit	No ANC visit	3504	297	1	1		1
	Up To 4 Visit	1665	131	0.75 (0.57, 0.99) *	0.73 (0.56, 0.95) *		0.73 (0.56, 0.95) *
	More than 4 Visit	467	44	0.96 (0.62, 1.48)	1.46 (0.96, 2.23)		1.45 (0.94, 2.22)
Survey Year	2000	1852	271	1	1		1
	2005	1582	165	0.7 (0.54, 0.9) **	0.76 (0.57, 1)		0.76 (0.57, 1) *
	2011	1541	116	0.55 (0.42, 0.73) ***	0.6 (0.44, 0.82) *		0.6 (0.44, 0.82) **
	2016	1540	92	0.39 (0.29, 0.53) ***	0.46 (0.33, 0.65) *		0.47 (0.33, 0.65) ***
Region	Urban	91	8	1		1	1

	Highland	6104	607	1.17 (0.53, 2.56)		1.12 (0.48, 2.61)	0.83 (0.32, 2.11)
	Lowland	319	28	1.1 (0.45, 2.67)		1.06 (0.42, 2.69)	0.79 (0.28, 2.21)
Place of Residence	Urban	491	45	1		1	1
	Rural	6023	599	1.08 (0.73, 1.59)		1.05 (0.69, 1.6)	1.02 (0.62, 1.66)

***=p value<0.05 **=p value<0.01 ***= p value<0.001**

Table 6: Model selection Regression on Factors Contributing Under five mortality among children of women aged 35 to 49 In Ethiopia, Evidence from 2016 EDHS.

	Null	**Individual**	**Group**	**Final**
ICC	0.2973	0.2886	0.29747	0.2880
PCV	Reference	0.0294	-0.0005	0.0314
AIC	4100.8520	3621.5720	4106.5770	3627.3680
BIC	4114.3160	3796.4050	4106.5770	3822.3740
Variance	1.39	1.33	1.39	1.33
logLikelihood	-2048.4259	-1784.7859	-2048.2884	-1784.6838

Chapter 5 DISCUSSION

Under five mortality rates is one among the mile stones that indicate a countries health services access and coverage as well as economic development. This is why the MoH of Ethiopia and the international community make it a top agenda in the national essential newborn care service, community based management of childhood illness polices and strategies as well as the MDGs targets and the current SDG running till 2030. The save motherhood initiative, the Almata Primary health care declaration and all other health programs and polices make this target the center. Similarly, Under five mortality is the core the research direction of the country, to mention the national EDHs surveys and national projects such as PMA as well the core indicator of passive surveillance under the routine HMIS/DHIS2. To this evidences also showed that the deaths more pronounced among children born elder women.

In midst of such high level government commitment and half in the SDG era measuring the level of under-five mortality and identifying its correlates among children born from mothers aged 35 to 49 years will provide actionable evidence for the ministry and relevant actors. Hence, this study reported the level of under-five mortality and its correlates among children elders mother aged 35 to 49 years using the recent full scale EDHS data.

This decrement in under-five mortality over the last one a half decade might be result the success of accomplishment of MDG goals while rigorous activities being implemented to sustain in the SDG period (United Nations, Department of Economic and Social Affairs, 2015), the Ethiopian government commitment to reduce by articulating, implementing, monitoring and evaluation strategies and polies essential new born care (Ethiopian Public Health Institute (EPHI), 2021; Muhe, 2023) and Integrated management of child hood illness (Meremikwu & Ehiri, 2009; Miller et al., 2014) along with the success of HSTP II (FMOH., 2020). It can be also resulted from maternal and new born health service access, provision of delivery free of charge to mention few (Alebachew et al., 2023; FMoH, 2020), increased and access to contraceptive commodities to space pregnancies (UN, 2020), the effective ness of the health extension program at community level care (Assefa et al., 2019) the expansion health facilities notably primary health care unit (14, 15) in terms of increase in primary hospitals along with building capacities of existing facilities such NICU

department (FMOH., 2020; FMoH, 2016), expansion of emergency and obstetrics surgery programs, specialty nursing programs such neonatal nurse (Demissie, 2023; Premji et al., 2013) and the ministry of health effort to increase quality of care (FMOH, 2019).

This study is not spared of limitations: trend was determined using a four time point cross section data, since at least a 10 time point data is needed to observe an overall clear pattern if at all linear data is not available.

The finding that the odds of under-five mortality lowered with year of survey can be attribute to the commitment of the Ethiopia Government to achieve the success of millennium development goals in the SDG era (United Nations, Department of Economic and Social Affairs, 2015) as well as the government's commitment to increase quality and primary health care services expansion (FMoH, 2016; FMoH, 2019) as the well as the articulation and implementation of essential new born and integrated management of childhood illness polices and strategies (Miller et al., 2014; Muhe, 2023).

The finding that higher birth order increase odds of under-five mortality was In line with (Woldeamanuel, 2019; Zewudie et al., 2020) Higher birth order increased odds in line (Girma et al., 2023) While a study based on Ghana show that higher birth order lowered (Aheto, 2019) unlike our study the finding form a study (Berelie et al., 2019) that higher birth order lowers odds of under-five mortality. The discrepancy between factors might related with the socioeconomic status and health coverage between Ethiopian and Ghana, this might related with sociocultural difference between countries and related with male dominance in fertility (Gebretsadik & Gabreyohannes, 2016).

The finding that the odds of under-five mortality increased with the number of birth 5 years preceding the survey was not in line (Aheto, 2019) a study based on Ghana demographic survey show that number of birth in the last five years lowered the odds of under-five motility

The finding that giving twin birth increased the odds of under-five mortality in line with (Ayele et al., 2022; Zewudie et al., 2020), the While a study based on Ghana show twin birth lowered (Aheto, 2019) while studies (Berelie et al., 2019;

Woldeamanuel, 2019) reported singleton birth has lower odds of under-five motility. The difference in study setting between Ethiopia and Ghana might explain it.

The finding 1 to ANC visits lower the odds of under-five mortality in this study while a study (Girma et al., 2023) reported that receiving the recommended ANC increase the odds of child mortality before celebrating their fifth year birth day. Regardless of the discrepancy in the finding this finding is in line with the WHO recommendation on ANC and continuum of care resulted better pregnancy and delivery outcome (WHO, 2015).

Wider birth interval lowered the odds in line with (Ayele et al., 2022) while finding from (Ayele et al., 2022) reported that longer birth interval increased odds while a study (Woldeamanuel, 2019) reported that shorter birth interval increases odds of under-five mortality

Large family size increased the odds of under-five mortality as reported in a study (Ayele et al., 2022; Berelie et al., 2019; Zewudie et al., 2020) increase odds of under-five mortality Unlike our study finding which reported large family size lowers the odds of under-five mortality

Being female child lowered the odds of under-five mortality is in line with (Yemane et al., 2022) While a study based on Ghana show that female children had increased (Aheto, 2019) being female increase odds in line with (Girma et al., 2023) unlike ours this studies (Girma et al., 2023; Zewudie et al., 2020) reported male children are at increased while (Ayele et al., 2022) reported not significant a study (Woldeamanuel, 2019) reported that sex of the child has no effect on the odds of under-five mortality.

Unlike the finding from a study (Ayele et al., 2022) breast feeding, source of drinking water, and income of mother were not found significant in this study. Education and residence were not found to either negatively or positively influence death under of children before celebrating their 5th birth day which is in line (Ayele et al., 2022; Girma et al., 2023) while a study reported (Woldeamanuel, 2019) children born from women with no education had high odds of death before their fifth birth day

For delivery modality via CS not in line with (Girma et al., 2023) which lower under five mortality While in line with (Girma et al., 2023) contraceptive use, private facility delivery and marital status increase odds of mortality unlike in our study.

Unlike our study this study (Zewudie et al., 2020) reported that rural residence and not breast feeding increase of odds of under-five death. unlike finding from our study the finding a study (Berelie et al., 2019) reported that children from urban communities and severed from protected water source had lower odds of dying before celebrating their fifth birth day. While this same study reported that children were born at home had higher odds of delivery unlike our study.

Unlike ours finding a study (Woldeamanuel, 2019) reported that that age at first birth and region of residence increase the odds of under-five mortality.

Chapter 6 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

In the year 2000, the under-five mortality rate in Ethiopia was alarmingly high, reaching an astounding 128 deaths per 1,000 live births. This deeply concerning statistic painted a grim picture, indicating that a staggering proportion of children were not surviving to reach their fifth birthday. However, over the subsequent 16-year period, Ethiopia has made remarkable and commendable progress in reducing its child mortality rates. By the year 2016, the under-five mortality rate had dropped dramatically to just 56 deaths per 1,000 live births. This substantial and impressive decline is a testament to the country's sustained and unwavering efforts, as well as its steadfast commitment to addressing this critical public health challenge.

The in-depth analysis of the factors influencing child mortality in Ethiopia has provided invaluable insights. Several protective factors were identified, which shed light on the approaches that have proven effective in safeguarding the lives of children. These include: Female children were found to have lower odds of mortality compared to their male counterparts. Children born to older mothers were observed to have higher odds of mortality. Children residing in smaller families were discovered to have lower odds of mortality. Children with longer birth intervals (time between births) were found to have lower odds of mortality. Children whose mothers received antenatal care (ANC) visits were determined to have lower odds of mortality. These findings underscore the critical importance of targeted interventions that prioritize the needs of vulnerable populations. Such interventions may include promoting maternal and child health services, educating families on the benefits of optimal birth spacing, and ensuring widespread access to quality antenatal care. Conversely, the analysis also identified certain risk factors that increased the likelihood of child mortality, which warrant attention and strategic interventions.

These risk factors include: Children born to mothers who had twin births. Children with higher birth orders (e.g., third or fourth child). Children born to mothers at a later age. These risk factors highlight the complex interplay of socioeconomic, demographic, and health-related factors that contribute to child mortality. Comprehensive strategies that address these multifaceted challenges will be crucial in

further reducing child mortality and promoting sustainable progress in maternal and child health outcomes.

The substantial decline in Ethiopia's under-five mortality rate over the past 16 years is a remarkable and commendable achievement, demonstrating the country's unwavering commitment to safeguarding the lives of its youngest citizens. However, the ongoing challenges and the persistent need to address the identified risk factors underscore the importance of continued efforts and a steadfast resolve to further improve maternal and child health in Ethiopia. With sustained focus and effective interventions, the country can continue its remarkable progress and ensure that every child in Ethiopia has the opportunity to thrive and reach their full potential.

6.2 Recommendations

The statistic that approximately 1 in 11 children in Ethiopia died before their fifth birthday in the period under study is a stark reminder of the significant public health challenge facing the country. This alarming mortality rate among young children calls for immediate and concerted action by the Ministry of Health (MOH) and other relevant stakeholders to address this pressing issue.

Strengthening essential newborn care services is a crucial step in improving child survival. This includes ensuring access to quality antenatal care, skilled birth attendance, and postnatal care for both mothers and newborns. By providing comprehensive and continuous care during the critical perinatal period, the risk of complications and preventable deaths can be significantly reduced.

Implementing the integrated management of childhood illness (IMCI) approach is another key strategy to address under-five mortality. IMCI involves a holistic and systematic approach to identifying and managing the leading causes of child deaths, such as pneumonia, diarrhea, malaria, and malnutrition. By equipping healthcare providers with the necessary skills and tools to promptly diagnose and treat these common childhood illnesses, the overall quality of care can be enhanced, leading to improved health outcomes.

Increasing access to skilled delivery services is also crucial in reducing child mortality. Ensuring that all women have access to well-equipped healthcare facilities and trained birth attendants can significantly improve the chances of a safe delivery and the survival of both the mother and the newborn. This requires investments in infrastructure, workforce development, and the promotion of facility-based deliveries.

Efforts to promote birth spacing, encourage intended pregnancies, and advise women on the optimal reproductive timeline to have children can also play a significant role in reducing under-five mortality. By empowering women with information and access to family planning services, the risks associated with closely spaced pregnancies and unintended births can be minimized, contributing to improved maternal and child health outcomes.

Educating women on the importance of seeking skilled care during pregnancy, including facility-based deliveries, is another essential component of this multifaceted approach. Improving health literacy and addressing cultural barriers that may hinder women from accessing essential maternal and child healthcare services can significantly enhance the utilization of these critical services.

By addressing the identified risk factors and implementing comprehensive strategies that target the holistic well-being of mothers and children, Ethiopia can continue to make significant strides in reducing under-five mortality and ensuring a healthier, more resilient future for its population.

The findings and recommendations outlined in this report provide a roadmap for policymakers, healthcare providers, and community-based organizations to prioritize and tailor their interventions to effectively address the complex challenges that contribute to child mortality in Ethiopia. Through sustained commitment, evidence-based decision-making, and collaborative efforts, the country can work towards achieving its goals of improving child health outcomes and, ultimately, creating a more equitable and prosperous society.

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Annex

Table 7 Binary Logistics Regression on Factors Contributing Under five mortality among children of women aged 35 to 49 In Ethiopia, Evidence from EDHS.

Variable With Category	Odds ratio	Std.Err	Z	P>z	95% CI for OR		U5M Status		Odds Ratio + CI
					Minimum	Maximum	Allive	Dead	
Sex of Child (Male= Ref.cat)							3286	381	
female	0.71	0.07	-3.75	0	0.59	0.85	3228	264	0.71 (0.59, 0.85) ***
Birth Type (Single =Ref.cat)							6364	575	
Twin	5.67	1.09	9.01	0	3.88	8.26	151	69	5.67 (3.88, 8.26) ***
Birth order (1st Birth = ref.cat)							30	5	
2nd up to 4th birth	0.37	0.22	-1.69	0.091	0.12	1.17	533	32	0.37 (0.12, 1.17)
5 and above births	0.59	0.33	-0.94	0.348	0.2	1.78	5951	607	0.59 (0.2, 1.78)
Martial Status (In union = Ref.cat)							6122	578	
not in union	1.9	0.31	3.92	0	1.38	2.62	392	67	1.9 (1.38, 2.62) ***
Birth in the last 5 Years (1=Ref.cat)							3182	3429	
2	1.39	0.14	3.24	0.001	1.14	1.69	2824	297	1.39 (1.14, 1.69) ***
3	2.24	0.36	4.94	0	1.62	3.08	462	80	2.24 (1.62, 3.08) ***
4	4.61	1.67	4.2	0	2.26	9.39	46	19	4.61 (2.26, 9.39) ***
Age at first Birth (Lessthan 20=Ref.cat)							4183	429	
21-30	0.87	0.09	-1.37	0.172	0.71	1.06	2174	205	0.87 (0.71, 1.06)
31-40	0.73	0.27	-0.84	0.402	0.36	1.51	156	10	0.73 (0.36, 1.51)
Sex of HH Head (Male= Ref.cat)							5569	523	
Female	1.48	0.18	3.21	0.001	1.17	1.89	945	121	1.48 (1.17, 1.89) ***
Total Children Ever Born (<=4 = Ref. Cat)							518	27	
5-8	1.43	0.32	1.62	0.106	0.93	2.21	3561	291	1.43 (0.93, 2.21)
>=9	2.53	0.56	4.18	0	1.64	3.91	2434	326	2.53 (1.64, 3.91) ***
Family Size (1-5 = Ref.cat)							839	188	
6-10	0.33	0.04	-9.79	0	0.26	0.41	5155	438	0.33 (0.26, 0.41) ***
>=11	0.11	0.03	-8.11	0	0.06	0.19	520	18	0.11 (0.06, 0.19) ***
Preceding Birth interval (<24 Months = Ref.cat)							808	156	
24-36 months	0.56	0.07	-4.52	0	0.44	0.72	2074	221	0.56 (0.44, 0.72) ***
>36 months	0.35	0.04	-8.42	0	0.28	0.45	3601	262	0.35 (0.28, 0.45) ***
Age at birth (35-39= Ref.Cat)							2437	164	
40-44	1.81	0.2	5.4	0	1.46	2.25	2954	332	1.81 (1.46, 2.25) ***
45-49	2.08	0.28	5.49	0	1.6	2.69	1122	149	2.08 (1.6, 2.69) ***
Mothers Education Level (No education = Ref.Cat)							5681	577	
Primary	0.81	0.13	-1.33	0.184	0.59	1.11	718	57	0.81 (0.59, 1.11)
Secondery and above	1.03	0.37	0.07	0.941	0.51	2.08	115	11	1.03 (0.51, 2.08)
Region (Urban = Ref.Cat)							91	8	
Highland	1.17	0.47	0.38	0.701	0.53	2.56	6104	607	1.17 (0.53, 2.56)
Lowland	1.1	0.5	0.21	0.837	0.45	2.67	319	28	1.1 (0.45, 2.67)
Please of Residence (urban = Ref.Cat)							491	45	
Rural	1.08	0.21	0.37	0.708	0.73	1.59	6023	599	1.08 (0.73, 1.59)
Wealth Index(Poor= Ref.Cat)							3174	315	
Middle	0.91	0.12	-0.73	0.463	0.71	1.17	1251	111	0.91 (0.71, 1.17)
Rich	1.08	0.12	0.7	0.487	0.87	1.34	2089	218	1.08 (0.87, 1.34)
Please of Delivery (Institutional = Ref.Cat.)							533	51	
Home	0.95	0.16	-0.3	0.767	0.68	1.33	5981	593	0.95 (0.68, 1.33)
1st ANC check up (Before 3 Months = Ref.cat)							449	29	
After 3 months	1.06	0.31	0.19	0.85	0.59	1.89	1303	93	1.06 (0.59, 1.89)
Total ANC Visit (No Visit = Ref. Cat)							3504	297	
Up to 4 visit	0.75	0.11	-2	0.045	0.57	0.99	1665	131	0.75 (0.57, 0.99) *
morethan 4 visit	0.96	0.21	-0.18	0.854	0.62	1.48	467	44	0.96 (0.62, 1.48)
Current FP Use (No Method = Ref.Cat)							5522	548	
Use FP Method	1.07	0.14	0.51	0.609	0.83	1.38	992	96	1.07 (0.83, 1.38)
Survey Year (2000= Ref.Cat)							1852	271	
2005	0.7	0.09	-2.8	0.005	0.54	0.9	1582	165	0.7 (0.54, 0.9) **
2011	0.55	0.08	-4.13	0	0.42	0.73	1541	116	0.55 (0.42, 0.73) ***
2016	0.39	0.06	-6.01	0	0.29	0.53	1540	92	0.39 (0.29, 0.53) ***

*=p value<0.05 **=p value<0.01 ***= p value<0.001

Table 8 Independent Variables Coding

Variable Category	Variable	Variable Code STATA Data	Question & Responses		Categories	New Variable Code (After Recode)
			Item	Response		
Demographic Variable	Family Size	v136	Number of HH Member	1-19	1 = <=5 2 = 6-10 3= >=11	V136R3
	Ever Born Childeren	V201	Total Children ever born	1-14	1= <= 4 2 = 5-8 3 = >= 8	v201R3
	Sex of HH Head	v151	Sex of HH head	1= Male 2= Female	1= Male 2= Female	v151 Use it as it is
	Age Of 1st Birth	v212	Age of 1 st birth	1- 40	1 = <=20 2 = 21-30 3 = 31-40 4 = >= 41	v212R4
	Birth in the last 5 Year	v208	birth in the last 5 Year	1- 5	1 - 5	v208 Use it as it is
	Martial Status	v501	Martial Status	0= Never in union 1=married 2= living with partner 3= Widowed 4= divorced 5= No longer living together	1= Currently in union 2= Not in union	v501R2
	Birth Order Number	bord	Birth Order Number	1 - 14	1 = 1st Birth 2= 2nd upto 4th 2 = >= 5th birth	bordR3
	Child is twin	b0	Child is twin	0 = Single Birth 1= 1st of Multiple 2= 2nd of Multiple	0= Single 1= Twin	twin
	sex of Child	b4	sex of Child	1= Male 2= Female	1= Male 2= Female	b4 Use it as it is
	Child is alive	b5	Child is alive	0= No 1 = Yes	0= No 1 = Yes	b5 Use it as it is
	Age at Death in Months	b7	Age at Death in Months	0-48	1= <=12 2 = 12-24 3 = >= 25	b7R3
	Current Age of Child in Year	b8	Current Age of Child	0-4	0=0 1=1 2=2 3=3 4=4	b8R3
	Preceding Birth Interval	b11	Preceding Birth Interval	7-213	1= First Birth 2 = <24 3 = 24-35 4 = >36+	b11R4
	Current Age of Child in Months	b19	Current Age of Child in Months	0-59		
	Duration of Pregnancy	b20	Duration of Pregnancy	7,8,9,10	1 = Pre Term (< 9 Months) 2 = Term (> = 9 Months)	b20R2
	Respondants Current Age	v012	Respondants Current Age	15- 49	1 = 35-39 2 = 40-44 3 = 45-49	v012R3
Socio-economic	Highest Education	v106	Highest Education Level of Mothers	0 = No Education 1 = Primary 2= Secondery 3= Higher	0 = No Education 1 = Primary 2= Secondery and above	v106R3
	Region	v024	Place of Residence(Region)	1= Tigray 2= Afar 3= Amhara 4= Oromia 5 = Somali 6= Benshangul 7 = SNNPR 8= Gambella 9 = Hareri 10= Addis Ababa 11= Dire Dawa	1= Mainly Urban (Addis Ababa, Dire Dawa, Hareri) 2 = Mainly Agrarian (Oromia , Amhara Tigray and SNNPR) 3 = Mainly Pastorialist (Pastorial :- Afar, Benshangul, Gambella and Somali)	v024R3
	Place of Residence	v025	Place of Residence	1= Urban 2 = Rural	1= Urban 2 = Rural	v025 Use it as it is
	Wealth Index	v190	Wealth Index	1= Poorest 2= Poorer 3= Middle 4 = Richer 5= Richest	1= Poor 2 = Middle 3 = Rich	v190R3
Health	1st ANC Check Up	m13	Timing of 1st ANC Check up	0-9	1 = 0-3 (Within the first 3 Months) 2 = 4-9 (After 3 Months)	m13R2
	Total Number OF ANC Visits	m14	Total Number OF ANC Visits	1-20	0= No ANC 1 = Upto 4 ANC 2 = Morethan 4 ANC	m14R3
	Place of delivery	m15	place of delivery	**HOME** 11 = HER HOME 12 = OTHER HOME **PUBLIC SECTOR** 21 = GOVERNMENT HOSPITAL 22 = GOVERNMENT HEALTH CENTER 23 = GOVERNMENT HEALTHPOST 26 = OTHER PUBLIC SECTOR **NGO** 31 = HEALTH FACILITY 36 = OTHER NGO HEALTH FACILITY (SPECIFY) **PRIVATE MEDICAL SECTOR** 41 = PRIVATE HOSPITAL 42 = PRIVATE CLINIC 46 = OTHER PRIVATE MEDICAL SECTOR (SPECIFY)	0= Institutional Delivery 1 = Home Delivery	hdel
	Current Use by Method Type	v313	Current Use by Method Type	0= No Method 2= Traditional Method 3= Modern Method	0= No Method 1= Use FP method	v313R2
	Year	year	Year of EDHS Survey	2000=2000 year 2005= 2005 Year 2011= 2011 Yearr 2016= 2016 Year	2000=2000 year 2005= 2005 Year 2011= 2011 Yearr 2016= 2016 Year	2000=2000 year 2005= 2005 Year 2011= 2011 Yearr 2016= 2016 Year