

Hamburg University of Applied Sciences

Faculty of Life Sciences

**Effectiveness of Public Health Interventions for Combating
Malnutrition in Children Under Five in Sub-Saharan Africa: A
Systematic Review**

Master Thesis

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Submitted by: **Sarah Okyere**

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First Examiner: **Prof. Dr. Walter Leal**

Second Examiner: **Prof. Dr. Johanna Buchcik**

ABSTRACT

Introduction

Malnutrition in children under five is an issue which persists in SSA in spite of regional and global efforts to improve nutrition and eradicate hunger. This study systematically reviewed evidence from Ghana, Nigeria and Kenya to examine the prevalence, determinants and effectiveness of health interventions targeting malnutrition.

Method

Fifteen peer-reviewed studies between 2014 and 2025 were obtained from PubMed, Web of Science, Scopus, PsycINFO and AJOL, using the PRISMA framework and PICO model as a guide. The Effective Public Health Practice Project (EPHPP) tool was used to evaluate the quality of the study, and Critical Interpretive Synthesis was used to synthesize the data.

Results

The results showed that rural communities were disproportionately affected by high rates of stunting (18–37%), wasting (4–7%) and underweight (10–19%). Maternal education, household income, food insecurity and cultural feeding practices were identified as significant socioeconomic determinants. Inadequate monitoring systems, poor implementation and a lack of funding were found to limit the effectiveness of various malnutrition interventions such as national nutrition policies, cash transfers, community-based management of acute malnutrition (CMAM), and nutrition-sensitive agriculture. While some studies showed quantifiable gains in dietary diversity and child growth, others also pointed out enduring gaps in the impact of these interventions.

Conclusion

The review highlights the need for multi-sectoral approaches that integrate nutrition-specific and nutrition-sensitive strategies, enhance policy implementation and adapt interventions for sociocultural contexts. These findings offer evidence-based suggestions for enhancing child nutrition outcomes in SSA and achieving Sustainable Development Goal 2 (Zero Hunger).

Keywords: Malnutrition, Children under five, Sub-Saharan Africa, Nutrition Interventions.

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ABBREVIATIONS

Abbreviation	Meaning
AJOL	African Journals Online
AU	African Union
BMI	Body Mass Index
CAADP	Comprehensive Africa Agriculture Development Programme
CBGP	Community-Based Growth Promotion
CHAT	Choosing All Together (engagement tool)
CHPS	Community-based Health Planning and Services
CHV	Community Health Volunteer
CIS	Critical Interpretive Synthesis
CMAM	Community-based Management of Acute Malnutrition
DALY	Disability Adjusted Life Years
EPHPP	Effective Public Health Practice Project
FAO	Food and Agriculture Organization
GDHS	Ghana Demographic and Health Survey
GHS	Ghana Health Service
GMP	Growth Monitoring and Promotion
GSS	Ghana Statistical Service
HAZ	Height-for-Age Z-score
ICCM	Integrated Community Case Management
ITN	Insecticide-Treated Net

IYCF	Infant and Young Child Feeding
KDHS	Kenya Demographic and Health Survey
KNAP	Kenya Nutrition Action Plan
KNBS	Kenya National Bureau of Statistics
LEAP	Livelihood Empowerment Against Poverty
MAD	Minimum Acceptable Diet
MAM	Moderate Acute Malnutrition
MDD	Minimum Dietary Diversity
MDG	Millennium Development Goals
MMF	Minimum Meal Frequency
MUAC	Mid-Upper Arm Circumference
NFNSP	National Food and Nutrition Security Policy
NHGSFP	National Home-Grown School Feeding Programme
NNAP	National Nutrition Action Plan
NPC	National Population Commission
PICO	Population, Intervention, Comparison, Outcome
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomized Controlled Trial
SAM	Severe Acute Malnutrition
SDG	Sustainable Development Goals
SLR	Systematic Literature Review

SSA	Sub-Saharan Africa
SUN	Scaling Up Nutrition
UNICEF	United Nations International Children's Emergency Fund
VHTs	Village Health Teams
WASH	Water, Sanitation and Hygiene
WAZ	Weight-for-Age Z-score
WHO	World Health Organization

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

Malnutrition in children under five is a severe public health concern in Sub-Saharan Africa (SSA) that significantly affects the growth, development and survival of children (Bain et al., 2013; Arhin, 2023). This issue persists despite regional and global efforts to improve nutrition and eradicate hunger. In the battle against malnutrition, several nations, including Ghana, Nigeria and Kenya have made varying degrees of progress. However, high prevalence of stunting, wasting, underweight and micronutrient deficiencies remain a major concern for children in these countries (Bain *et al.*, 2013; Arhin, 2023).

This study systematically reviewed the prevalence of malnutrition affecting children under five in three countries in SSA particularly, Ghana, Nigeria and Kenya. The study synthesized existing literature concerning health policies and the interventions that focus on combating malnutrition in these countries, analyzed their efficacy, as well as the difficulties encountered. Chapter one of the study provides a roadmap for the systematic review, highlighting the study's context, the problem statement, its goals and questions, the importance of the research and the structure of the study.

1.1 Background of the Study

Malnutrition affects millions of children younger than five years, who reside primarily in developing nations according to World Health Organization (WHO) & United Nations International Children's Emergency Fund (UNICEF) (2020). Nearly 45% of childhood deaths worldwide are caused by malnutrition in children who are under five years of age (WHO, 2021). Chowdhury *et al.* (2019) emphasize that malnutrition forms such as stunting, wasting, underweight

and micronutrient deficiencies are still prevalent and affect growth and learning ability in children. Although, the world has committed to ending hunger and malnutrition through the set goals and targets of the United Nations Sustainable Development Goals (SDGs), with specific reference to Goal two, significant strides towards the goal have not been realized.

In Africa, the burden of malnutrition is high especially in the Sub-Saharan Africa (SSA) where a large percentage for global malnutrition exists (Bain *et al.*, 2013; Arhin, 2023). The World Health Organization (2021) has estimated that about 22% of children below five years in SSA suffer from stunting, while 6% are wasted with different levels of severity across the countries. This degree of malnutrition in the area is influenced by a number of factors. This includes poverty, hunger, infectious diseases and inadequate healthcare (Bain *et al.*, 2013).

SSA nations with high rates of malnutrition include Ghana, Nigeria, and Kenya. The prevalence of malnutrition indicators in these countries is displayed in Figure 1.1. In Ghana, 6.8% of the children below five years are wasted and 11.4% underweight (GSS, GHS & ICF 2015). In addition, about 18.8% of children below five years in Ghana are stunted (GSS, GHS & ICF, 2015). Lack of access to quality healthcare, poor baby feeding practices and poverty are the root causes. The largest country in Africa by population which is Nigeria has one of the highest rates of malnutrition (WHO, 2021). 37% of children not more than five years are stunted, 7% are wasted and 19% underweight in Nigeria (NPC & ICF, 2019). Factors such as consumption of foods with poor nutritional value, recurring illnesses and volatile political seasons have worsened the matter. In Kenya, roughly 18% of children below five years are stunted, 4% are wasted and 10% are underweight (KNBS, 2022). Even though Kenya has reduced the incidence of underweight, basic problems of poverty and food insecurity underpin malnutrition (KNBS, 2022).

A good understanding of the underlying causes, policy gaps, and the efficacy of applied remedies is necessary to combat malnutrition in these nations. Therefore, the goal of this study is consistent with identifying the factors that cause malnutrition in SSA. The study also aims to examine health policies and initiatives dealing with malnutrition in Ghana, Nigeria, and Kenya. By so doing, the study aims to provide actionable recommendations to improve child nutrition outcomes and contribute to achieving global nutrition goals.

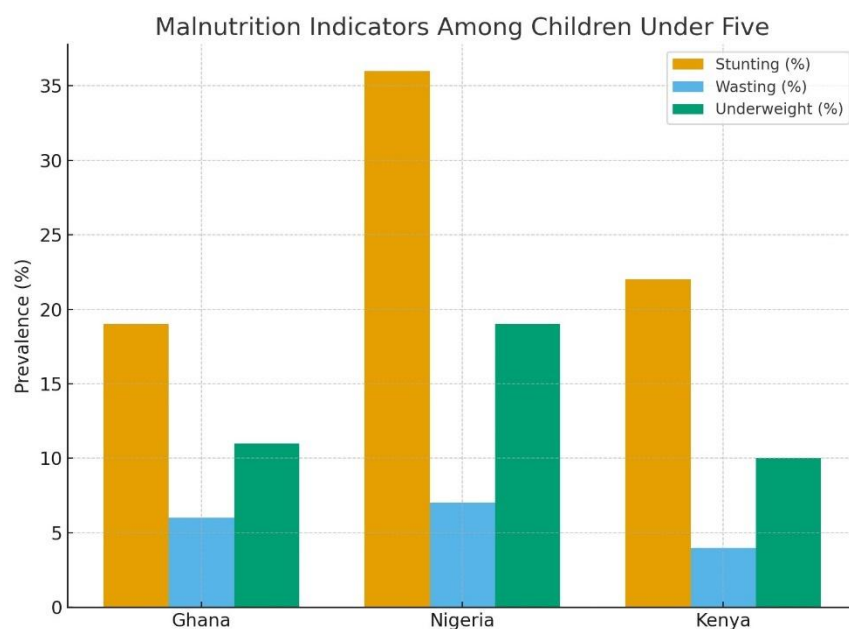


Figure 1.1: Malnutrition Indicators Among Children Under Five in Ghana, Kenya and Nigeria (WHO, 2021).

1.2 Problem Statement

In the SSA region, malnutrition among children below 5 years is high (Bain et al., 2013; Arhin, 2023), which affects their rate of growth, development, survival and educational achievements. Despite years of battling malnutrition, Africa is still bedeviled with high rates of stunting, wasting, underweight, and micronutrient deficiencies in the world (WHO, 2021). In SSA, currently the

prevalence of stunting, wasting and underweight is estimated to be about 22%, 6% and 14% respectively (WHO, 2021). This ongoing issue not only jeopardises the health of children but also makes it more difficult to achieve Sustainable Development Goal (SDG) 2 by 2030.

Malnutrition has numerous consequences that can be devastating to an individual's life and the nation at large. Children who are stunted are more prone to infections (such as parasitic and helminth infections), are less likely to be intelligent, less physically developed and ultimately become less productive adults (Black et al., 2013). The GSS, GHS & ICF (2015) report that 18.8% of children not more than five years in Ghana are stunted, 6.8% are wasted and 11.4% are underweight, which is a serious public health concern, particularly stunting as it is almost irreversible. Similarly in Nigeria, 35% of children are stunted and 19% were underweight (NPC & ICF, 2019). In Kenya 18% of children were stunted, 4% wasted and 10% were underweight (KNBS, 2022). Thus, these statistics show the need for effective interventions in these countries.

Several studies (Black et al., 2013; Bain et al., 2013; Awuuh, Appiah & Mensah, 2019; Christian & Dake, 2022; Arhin, 2023) have been done on malnutrition in SSA. These studies focused on its prevalence, causes and interventions. For instance, Black et al. (2013) pointed to poverty, food insecurity and disease as important causes of malnutrition. In a similar study conducted by Awuuh, Appiah & Mensah (2019), poor maternal education and poor feeding practices were also found to be associated with malnutrition. However, these studies are country-specific, leaving gaps in understanding regional similarities and differences. Furthermore, although there have been policies and health-related interferences like dietary supplementation and nutrition education among communities in SSA, research on their outcomes in the various SSA nations is scarce. Additionally, little research has been done to identify prevalent issues and optimal strategies in SSA.

Therefore, a systematic review of child malnutrition patterns in SSA among children under five years represents the focus of this research to address existing knowledge gaps. The comparative design of this research produces results that can be applied across the SSA region without neglecting area-specific conditions. The research adds new information to child nutrition knowledge by analyzing health policies' effectiveness and identifying barriers alongside proposing useful solutions. The findings will not only inform national strategies but also provide insights into regional and global efforts to combat malnutrition.

1.3 Research Objectives

The general objective of the study is to systematically review malnutrition affecting children below five years in Sub-Saharan Africa, with a focus on Ghana, Nigeria, and Kenya, by evaluating the prevalence, associated factors, and effectiveness of health policies and interventions to provide actionable recommendations for addressing the issue. The specific objectives are as follows;

1. To analyze and compare the prevalence and trends of malnutrition among children under five years in Sub-Saharan Africa over the last decade.
2. To identify and compare the socioeconomic determinants of malnutrition among children under five years across Sub-Saharan Africa.
3. To evaluate and compare the effectiveness of existing health policies and interventions targeting malnutrition in Sub-Saharan Africa, highlighting gaps and challenges in their implementation.

1.4 Research Questions

1. What are the similarities and differences in the prevalence and trends of malnutrition among children under five years in Sub-Saharan Africa over the last decade?

2. What are the socioeconomic determinants of malnutrition among children under five years in Sub-Saharan Africa, and how do these factors differ across countries?
3. How effective are the existing health policies and interventions targeting malnutrition in Sub-Saharan Africa, and what are the gaps and challenges in their implementation across countries?

1.5 Significance of the Study

The research findings have essential implications for policy development in the fight against childhood malnutrition affecting children below five years in Sub-Saharan Africa particularly in Ghana, Nigeria, and Kenya. The comparative nature of the study also allows professionals including healthcare providers, nutritionists and community-based organizations to obtain practical solutions for their work. By catering to nutrition programs and interventions according to the diverse socioeconomic and cultural situations in countries, it is possible to improve nutrition outcomes. For example, practitioners will understand region-specific aspects that hinder proper nutrition access and therefore will work towards achieving more practical and sustainable solutions for the community.

The study is also important for the conception of health policy and planning to address malnutrition in Sub-Saharan Africa. The findings will bring out the weaknesses within current programs and policies and offer recommendations to strengthen them. Additionally, this study will highlight effective strategies that can be applied in improving the existing nutrition policies. The study also supports SDG goals, especially SDG 2 (Zero Hunger).

Moreover, the study adds to the existing pool of academic literature by offering a detailed and systematic assessment of malnutrition among children not more than five years in SSA. Its

uniqueness is in offering a comparative analysis, which is missing in most studies. It will expand theoretical discussions on malnutrition by examining how socio-economic, cultural, and healthcare-related determinants interact to influence child nutrition outcomes. Furthermore, the study's findings will address gaps in literature concerning the comparative effectiveness of health policies and interventions across the three countries. By doing so, it adds to the literature on public health and nutrition in low- and middle-income countries (LMICs), which serve as the basis for future research.

1.6 Scope of the Study

The scope of the study was defined by three key dimensions: geographical, thematic and temporal considerations. The study focused on child malnutrition in Ghana, Nigeria and Kenya (Figure 1.2) because these countries struggle heavily with the problem of child malnutrition (GSS, GHS & ICF, 2015; WHO, 2021; KNBS, 2022). Also, Ghana, Nigeria and Kenya were selected because they are culturally comparable, have well-documented nutrition data and offer accessible evidence that allows for meaningful cross-country comparison within Sub-Saharan Africa.

Three fundamental thematic areas received focus during the study. The research analyzed malnutrition trends and prevalence statistics throughout the past decade in Ghana, Nigeria and Kenya. The research also evaluated the socioeconomic variables that drive child malnutrition in these countries. Further, the research examined the effectiveness of policies and interventions which target malnutrition. Additionally, it noted shortcomings and difficulties in the application of policies in Ghana, Nigeria, and Kenya.

The ten-year research period from 2015 to 2025 enabled the study to evaluate contemporary child malnutrition patterns alongside policy intervention effects that have evolved through time. A period of 10 years was suitable for analysis because it revealed long-term malnutrition patterns.

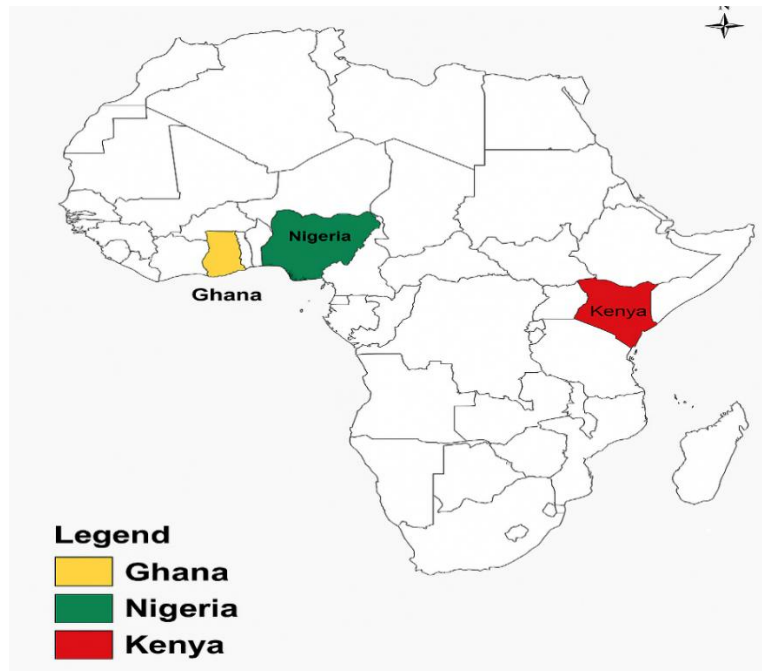


Figure 1.2: Map of Africa Highlighting Focus Countries in the Study of Child Malnutrition (United Nations Geospatial Information Section, 2025)

1.7 Methodological Approach

This study employed a systematic literature review to examine malnutrition among children under five years in Ghana, Nigeria, and Kenya. Bronfenbrenner’s Ecological Systems Theory served as the theoretical framework, offering a multi-layered perspective on how environmental factors influence child nutrition. The research followed the PICO framework and PRISMA guidelines to ensure a structured and transparent review process.

Data was sourced from databases such as Medline, Web of Science, Scopus and AJOL, using Boolean operators for refined searches. The inclusion criteria focused on studies between 2014 and 2025, addressing malnutrition-related health policies and interventions. Critical Interpretive Synthesis (CIS) was used for data analysis, enabling a thematic and comparative examination of policies and outcomes. The Effective Public Health Practice Project (EPHPP) tool assessed the study quality.

1.8 Organization of the Study

Chapter one of the study provided a detailed introduction and background of the study. It also underscored the problem statement, research objectives, research questions, significance and scope of the study. Chapter two reviewed literature with the purpose of exploring prior work done on the topic of malnutrition in children under five years in Ghana, Nigeria and Kenya. It also evaluated the current literature to establish their strengths and weaknesses which positioned the study to contribute to the existing knowledge base. The theories and concepts that are relevant to the study were also defined in this chapter. The third chapter of the study focused on the methodology, which outlined the research strategies and approaches used, methods employed for data collection and data synthesis, ethical considerations, as well as how quality assessment was done for the study.

Chapter four presented the results of the study in an organised and coherent manner. Chapter five analyzed and discussed the results against the background of the research objectives, supported by the literature to offer in-depth understanding of the issues. Finally, chapter six summarised conclusions from the study and explained the relevance of these conclusions in providing insight about the main problem of malnutrition in children under five years in rural Ghana. Recommendations for policy and practice were also provided to guide policymakers.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides a review of the current literature on malnutrition among children below five years in SSA, with a specific focus on Ghana, Nigeria, and Kenya. The chapter begins with a review of theories which are consistent with the subject matter and then selects a theoretical framework for the study. It continues by undertaking a conceptual review and then explores the determinants of malnutrition and examines policies aimed at addressing malnutrition, assessing their effectiveness and challenges in implementation. Finally, the chapter highlights some gaps in literature and implications for undertaking the study.

2.1 Theoretical Review

Various theories and models are consistent with the issue of malnutrition among children under five years in Sub-Saharan African. As such, these theories provide the basis upon which the study was done. The theories are reviewed and discussed as follows.

2.1.1 The Socio-Ecological Model (SEM)

A person and their surroundings have an impact on one another, according to the Socio-Ecological Model (Bousquet et al., 2015). This means that the individual and his environment are in an intricate relationship, in which each participant influences and affects each other. The SEM indicates that the environment is composed of various layers. Individuals, communities, interpersonal relationships, and policies are all included in this (Bousquet et al., 2015). Individual and social factors that influence people's health behaviors and outcomes are taken into consideration by the Socio-Ecological Model (SEM) (Olmos-Martínez & Ortega-Rubio, 2020).

The SEM can be used to determine how factors such as national policy, community resources, parental education, and household income affect malnutrition (Mahmudiono, Segalita, and Rosenkranz, 2019). It helps one understand how important it is to consider both behavioral and social-environmental factors. Accordingly, this model is applicable to the treatment of malnutrition on multiple levels such as the individual, interpersonal and community levels (Mahmudiono, Segalita, and Rosenkranz, 2019). According to Chatzinikolaou (2013), SEM is helpful in identifying the fundamental need for multi-level interventions. However, using the model can be difficult. This is because it necessitates complex statistical tool sets and reliable data. Getting this can be difficult, particularly when resources such as human resources are limited.

2.1.2 The Ecological Systems Theory

The Ecological Systems Theory (EST) was developed by Bronfenbrenner in 1979. The EST considers human development as an interaction between individuals and other layers of their environment (Bronfenbrenner, 1979). Regarding the theory, these environmental influences are classified into five systems, which are interconnected. They are the macrosystem, the mesosystem, the exosystem, the microsystem, and the chronosystem (Bronfenbrenner, 1979).

First, the microsystem includes immediate influence such as family, caregivers and healthcare services, and the mesosystem shows how these influences interact, for example, parents and healthcare providers (Darling, 2007). According to Bronfenbrenner (1979), the exosystem shows indirect influences such as parental employment, government food programs and community resources. In addition, the macrosystem encompasses influences at the cultural, societal and policy level. Also, it discusses national economic policies as well as health interventions. The chronosystem takes into account changes with time. They include amendments to healthcare regulations or financial crises that impact on children's nutrition (Darling, 2007).

This study is in line with Bronfenbrenner's (1979) theory which helps one to understand malnutrition as a multi-dimensional problem. Therefore, malnutrition can be thought to be a result of different factors. Malnutrition is not a problem purely of a biological nature. It is also influenced by environmental conditions such as parental education, household income, food security and healthcare service availability (UNICEF, 2003; Black *et al.*, 2013). In applying this theory, the study can examine how different factors interact to produce nutritional outcomes for children under five years.

The disadvantage of the EST is that it cannot specify which environmental components are the most related to malnutrition (Sedgwick, 2014). Additionally, the theory does not define a particular way of measuring the impact of these factors on malnutrition. The theory also fails to take proper account of genetic factors that may contribute to malnutrition (Sedgwick, 2014).

2.1.3 Health Equity Framework

According to Peterson et al. (2021), health equity is defined as belief that all people should have equal chances to get the highest level of health possible. This consists of riding health discrimination, popularly characterized by high poverty rates and how they influence an individual's capacity to secure medical care and a healthy diet (Nisbett et al., 2022). Making sure a health policy or intervention is equitable and accessible is very useful for assessing a health policy or intervention for malnutrition. Alongside this, the framework underscores that such an intervention should also affect children in SSA (Peterson et al., 2021). This idea is useful to assess to what extent the existing nutritional and health policies ensure nutritional parity.

A limitation of this is that the Health Equity Framework focuses on the equity of outcomes as opposed to the mechanics of policy implementation (Peter, 2001).

2.1.4 Social Determinants of Health

Another theory intrinsic to this study relates to the Social Determinants of Health (SDH) theory articulated by Marmot (2005). This theory emphasizes that health outcomes cannot solely be considered as the result of individual behavior or medical intervention; broader factors consistent with one's social, economic and political conditions also play a role (Marmot 2005). For example, malnutrition can be determined by income, social status, education, access to medical care, food security and living conditions.

The present study on malnutrition fits within the SDH framework. This is because it shows that nutritional outcomes can be affected by factors that lie beyond the choice of an individual (Victora et al., 2021). Policy interventions like food subsidies, maternal health education, and community-based nutrition programs are justified by SDH. This is a result of identifying malnutrition as a social issue rather than just a medical one.

SDH theory, although strong, is limited. The main concern is with the structural and social factors. These factors, however, are hard to quantify and their effect on health outcomes is difficult to quantify (Frank et al., 2020). Furthermore, it does not offer a way to evaluate how varying levels of intervention (e.g., household vs. national policy) play out in health outcomes (Frank et al., 2020).

2.1.5 Maslow's Hierarchy of Needs

Another major theory is Maslow's (1943) Hierarchy of Needs. Maslow (1943) classified the needs of humans into 5 hierarchy levels. They are the physiological needs (basic needs), safety needs, love and belongingness needs, esteem needs, and productivity needs (self-actualization, personal

growth and fulfillment). As per Maslow (1943), these needs must be met one after another in a hierarchical manner.

This theory supports this study by emphasizing the importance of food security as an essential needed for infant growth. When basic nutritional needs of children are not met, they suffer from prolonged health and cognitive impairments (Black et al., 2017). Maslow's theory indicates the idea that eradicating food insecurity should be a priority in economic and policy solutions over other general developmental issues.

However, the major criticism of Maslow's theory lies in its rigid hierarchy structure, which presupposes that needs have to be fulfilled sequentially (Wahba & Bridwell, 1976; Gagnidze, 2022). In fact, while receiving strong emotional and social support from their families, children in poor households may be experiencing food insecurity. Additionally, elements outside the model that affect health outcomes (Gagnidze, 2022) such as child malnutrition may be also important. Included in these are government regulation and economic inequality. Yet these aren't considered by Maslow's model.

2.2 Theoretical Framework

Bronfenbrenner's Ecological Systems Theory is the most suitable theoretical framework for this study, of all reviewed theories. The reason for choosing this theory is as follows. First, EST offers a multi-level approach that makes it possible to investigate the ways in which factors at the individual, family, community, and policy levels interact to affect the nutrition of children. In addition, it has relevance for interventions and policy. For this reason, it helps in developing multi-faceted interventions such as household nutrition education and national food security programs. Thirdly, it provides a far-reaching view that includes environmental and social factors impacting

child health. In this way, it is unique when compared to SDH, which places more emphasis on social structures but fails to sufficiently consider interactions between individuals and families. It is also unique in comparison to Maslow's theory, which focuses primarily on individual needs.

To investigate the ways in which environmental, economic and policy factors impact malnutrition among children under five in Sub-Saharan Africa, this study will employ Bronfenbrenner's (1979) Ecological Systems Theory.

2.3 Conceptual Framework

Bronfenbrenner's (1979) EST serves as the foundation for the conceptual framework. According to this theory, development of a child including their nutritional status is a function of a number of interacting conditions (Bronfenbrenner, 1979). These conditions reside in the child's immediate home surroundings, the neighborhood within which the child lives and even larger society. This study uses four main EST constructs, namely microsystem, mesosystem, exosystem and macrosystem to evaluate the socioeconomic factors that contribute to malnutrition. In Sub-Saharan Africa, this is also used to evaluate health policies and initiatives.

At the microsystem level, the study examines the most immediate determinants of child malnutrition. These bother on the factors within the household and direct caregiving environment. Examples are maternal education, household income and breastfeeding practices.

Moving to the mesosystem, which represents the interaction between different components of the microsystem, this study considers factors such as access to healthcare and community beliefs and practices. For example, child malnutrition rates are strongly impacted by the accessibility and cost of maternal and child health services, such as vaccination, growth monitoring, and nutrition counselling (Aryeetey *et al.*, 2022).

The next layer is the exosystem which is consistent with external structural and environmental factors that indirectly influence child nutrition. The study, at the macrosystem level considers the policies and government initiatives which affect malnutrition. The fight against malnutrition in a country largely depends on government interventions and policies. Government policies determine the nature and extent of assistance in society in combating malnutrition. These policies are usually consistent with food security, social protection programs and healthcare access.

By combining these four concepts from Bronfenbrenner's Ecological Systems Theory, this study provides a comprehensive framework for examining malnutrition in SSA. The interaction of factors at the individual, environmental and policy levels clarify the complexity of malnutrition and highlights the need for multi-sectoral interventions in its treatment.

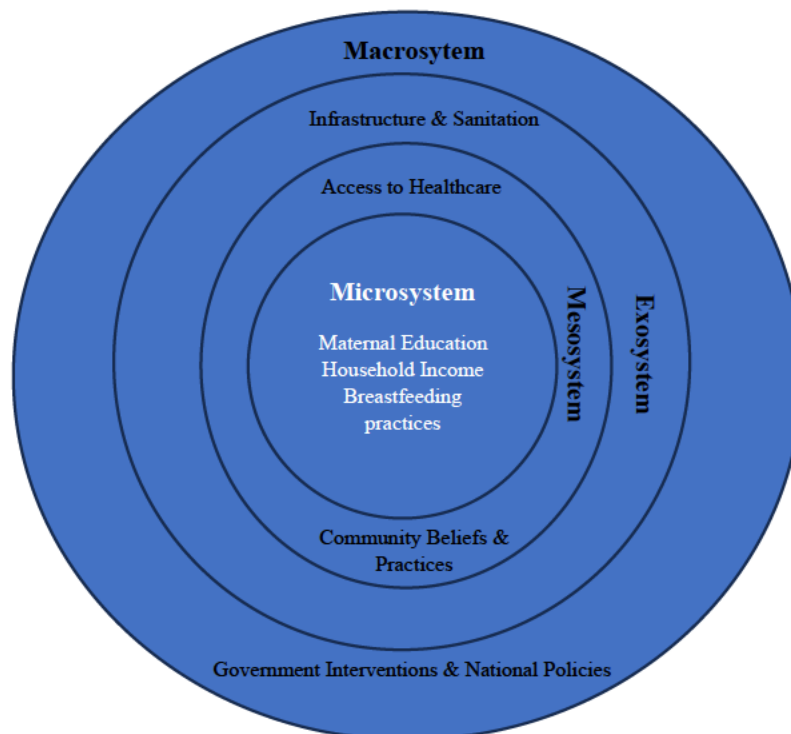


Figure 2.1: Conceptual Framework (Author's Own Construct Based on Bronfenbrenner's (1979) Ecological Systems Theory)

2.4 Conceptual Review of Malnutrition

The conceptual review treats the key concepts and variables pertaining to the subject matter of malnutrition. It provides the definitions, theoretical perspectives and the interrelationships between the core constructs, providing a basis for studying the subject matter.

2.4.1 Definition of Malnutrition

Broadly, malnutrition refers to the condition of a person with a deficiency, excess, or imbalance of nutrient intake and utilization, causing a negative health outcome. Several definitions of malnutrition have been given that throw light on various aspects of the condition.

The World Health Organization (WHO, 2021) defines malnutrition as deficiencies or excesses or imbalances of the intake of energy and/or nutrients. This definition is inclusive and as such, it is widely accepted. Yet it doesn't include socio-economic, demographic and environmental causes of malnutrition. UNICEF (2022) expands on this by stating that malnutrition affects growth, development and health outcomes and occurs when there is inadequate, excess or imbalanced nutritional intake. This definition considers the developmental aspects, but it is broad and does not factor in systemic elements like poor governance and poverty that heavily determine malnutrition rates in SSA.

Malnutrition involves prolonged failure on the part of the individual in fulfilling proper nutritional needs as far as income and food security are concerned (Smith and Haddad, 2015). Smith and Haddad (2015) have observed that the condition is mainly due to food insecurity, poor health, and socio-economic deprivation. This definition, which applies to SSA, tells the story because poverty and the poor health infrastructure, directly related to malnutrition, are an integral part of this region.

What goes missing about this definition is that it fails to take into account actual food preferences and cultural feeding practices that may or may not affect the nutritional outcome.

Malnutrition is a pathological condition resulting from the inadequate supply of macro- and micronutrients, as defined by Black et al. (2013). This condition includes stunting, wasting, underweight, and deficiencies of micronutrients, as further mentioned by Black et al. (2013). While medically, this definition is valid, it ignores some major sociopolitical factors that are responsible for causing malnutrition. Malnutrition is an acute nutrient deficiency that inhibits growth and physiological functioning with long-term developmental implications (De Onis & Branca, 2016). Under this definition, the seriousness of malnutrition can be understood. However, it does not differentiate between acute and chronic forms that need different approaches.

2.4.2 Forms of Malnutrition

The disorders associated with malnutrition can be classified into two major categories. These include undernutrition encompassing micronutrient deficiencies, stunting, wasting and underweight (Elia 2017). Chronic undernutrition, which usually starts during conception due to maternal malnutrition, is a determinant of low height for age, which is consistent with stunting (Rafique et al. 2023). The condition of stunting also leads to impaired cognitive development, increased vulnerability to chronic diseases and reduced economic productivity in adulthood (de Onis et al. 2013). Even after childhood, it becomes hard to treat and thereby, has a long-lasting bearing on one's earning potential and educational attainment. Thereafter, this cycle continues for many years to sustain poverty and malnutrition (Rafique et al., 2023).

Another serious type of undernutrition is wasting, also known as acute malnutrition, which is characterized by low weight for height as a result of inadequate nutrient intake or disease (Otit &

Allen, 2021). This condition increases the risk of morbidity and mortality, particularly in areas where children lack access to proper nutrition due to food insecurity (Black et al., 2013). Often, wasting is a sign of severe, short term nutritional deficits. With immediate and proper healthcare and adequate nutrition, this condition can be reversed (Otiti & Allen, 2021).

Children with low weight for age is a condition referred to as underweight (Manoochehri et al., 2024). It is a general indicator of acute and chronic malnutrition. It is often used as a marker of children's poor health status, in view of the chronic effects of poor nutrition (WHO, 2021). A useful broad indicator is underweight. However, it will not always distinguish the various underlying causes of malnutrition (Fishman *et al.*, 2004). For this reason, other indicators such as stunting and wasting need to be considered for a better assessment.

Apart from undernutrition in these forms, micronutrient deficiencies also contribute to child malnutrition. Poor immune systems are related to lack of essential vitamins and minerals such as iron, vitamin A, iodine, and zinc. It also causes developmental delays and increases the child's susceptibility to infections (Bhutta et al., 2013). Commonly, these deficiencies arise from limited intake of nutrient dense foods (Bhutta et al, 2013). Interventions for addressing micronutrient deficiencies include supplementation and food security interventions. These interventions are aimed at making sure that the children get the required amount of nutrients for healthy growth and development.

Overnutrition, often known as overweight or obesity, and diet-related non-communicable disorders like diabetes, heart disease, stroke, and some types of cancer, make up the other category (Elia, 2017). These conditions are increasingly becoming a double burden in many low and middle-income countries, where undernutrition and overnutrition coexist within the same communities.

They are largely driven by lifestyle changes, urbanization and increased consumption of energy-dense but nutrient-poor foods (Black et al., 2013).

2.5 Prevalence and Trends of Malnutrition Affecting Children Under Five Years

Malnutrition is a global health challenge, especially when it comes to children below five years. According to the WHO (2021), about 45 million children under five years suffer from wasting. Additionally, 149 million such children are stunted and 39 million of them are overweight. In many regions of the world, undernutrition and overnutrition coexist. Nonetheless, the condition's prevalence varies globally. For instance, in 2019, stunting rates were 34% in low-income countries, 25% in lower-middle-income countries, 12% in upper-middle-income countries, and only 3% in high-income countries (UNICEF, WHO & World Bank, 2019).

The difference in prevalence of malnutrition across different parts of the world can be attributed to factors such as poverty, food insecurity, poor maternal health, and inadequate infant feeding practices (Victora *et al.*, 2021). High-income countries have advanced in the fight against malnutrition as a result of better healthcare and nutrition programs. Nonetheless, low- and middle-income nations still face difficulties, especially in areas which are consistent with food insecurity (da Silva *et al.*, 2018).

Africa bears the highest burden of malnutrition. More than one-third of all undernourished children globally dwell on the continent (WHO, 2021). Stunting in Africa is alarmingly high, with rates reaching up to 30% in some regions. Also, about 13.6 million children in Africa are affected by wasting (WHO, 2021). This makes the region highly susceptible to mortality from common childhood diseases (WHO, 2021). Northern Africa has seen a slow decrease in malnutrition as a result of better healthcare facilities and economic expansion (Breisinger *et al.*, 2010). However,

the prevalence of the condition in SSA is still very high. According to WHO (2021), 34% of children in SSA are stunted, 6% suffer from wasting, and 24% are underweight.

Despite numerous interventions, SSA has experienced slow progress in tackling malnutrition. While global stunting rates have declined, SSA has not achieved that, according to Victora et al. (2021). Victora et al. (2021) further indicated that the reduction of malnutrition in SSA has only been marginal, from 42% in 1990 to 34% in 2020. This is a result of food insecurity, political instability and confined reach to high-quality healthcare in the area (UNICEF, WHO & the World Bank, 2019).

Hidden hunger of micronutrients is clearly a critical issue in SSA. The study of Bhutta et al. (2013) shows that deficiencies in iron, vitamin A, and iodine are common in children which impairs their growth. Higher child mortality can also be caused by such deficiencies. Additionally, while nutrition-specific interventions, including supplementation programs, have been helpful, Black *et al.* (2013) contended that they do not address the underlying causes of malnutrition.

Ghana has achieved significant strides in lowering the rate of child malnutrition, yet challenges remain. According to the GSS, GHS & ICF (2015), 11% of children under five years are underweight, 5% are wasted, while 19% of children under 5 years are stunted. Further, the GSS, GHS & ICF (2015) reveals that the Northern Region of Ghana recorded more prevalence of stunting than any other region, with a third of children not more than five years being stunted in the region. Aryeetey *et al.* (2022) found that Ghana has relatively lower malnutrition rates compared to other SSA countries. However, issues regarding economic inequalities and inadequate maternal nutrition are slowing down Ghana's fight against the condition. According to Aryeetey *et al.* (2022), although nutrition interventions have been adopted in various communities in Ghana,

their impact is limited. This is as a result of poor dietary diversity and cultural feeding practices that discourage exclusive breastfeeding.

Nigeria, Africa's most populous country, has one of the highest burdens of child malnutrition. According to the NPC & ICF (2019), about 37% of children under five suffer from stunting, while 7% are wasted. The situation is exacerbated by food insecurity, regional conflicts, and inadequate healthcare services (Otekunrin, Mukaila & Otekunrin, 2023). According to Black et al. (2013), Nigeria's malnutrition crisis is primarily exacerbated by poverty and food price inflation restricting adequate access to nutritious food. As shown by Ezeh et al. (2021), the northern region of Nigeria, in particular, has much higher rates of malnutrition than the southern regions, most notably due to political instability and low socioeconomic development. While nutrition sensitive interventions have been implemented, the absence of sound monitoring and evaluation systems have continued to undermine the efforts of the country at reducing in child malnutrition.

While we have seen some improvement in child nutrition in Kenya, malnutrition is a public health challenge. According to the KNBS (2022), 26%, 4%, and 11% of children under five years are stunted, wasted and underweight, respectively. As is the case with other SSA countries, malnutrition rates are higher in rural areas on account of poverty and restricted access to health care (Fongar, Gödecke & Qaim, 2019). The Kenyan government has tried to fight child malnutrition through National Nutrition Action Plan (NNAP). Yet, while these interventions have improved nutritional outcomes as pointed out by Cheruiyot et al. (2024), their impact on micronutrient deficiencies is insufficient. Climate change induced droughts also pose threats to food security, exacerbating the risk of malnutrition (Lolemtum, Mugalavai and John, 2017).

Despite many attempts to reduce malnutrition in SSA, the outcome has been minimal. Literature has shown that nutrition-specific interventions have been widely implemented but tend to be

reactive rather than preventive. As criticized by Bhutta et al. (2013), food security and poverty reduction programs need to be more holistic in nature and not focus on the need for nutrition supplementation programs only. Furthermore, the disparity in malnutrition among the urban and rural populations stresses the need for targeted interventions. As pointed out by Victora et al. (2021), urban areas gain access to health services and food markets that aid in the reduction of malnutrition rates. However, the rural communities often have limited access to proper healthcare, including health education to enable such communities deal with malnutrition. In addition, there has been very little literature on the efficacy of current malnutrition interventions in SSA over the long term.

2.6 Socioeconomic Determinants of Malnutrition Affecting Children Below Five Years

Socio-economic inequalities are responsible for the ongoing prevalence of malnutrition globally, with poverty being a major factor (Black et al., 2013). More often than not, stunting, wasting and micronutrient deficiencies find their places in low-income households (WHO 2021). This is the result of poor dietary diversity and poor access to food. In addition, studies have indicated how maternal education reduces malnutrition (Makoka & Masibo, 2015; Ijaiya et al., 2024). The reasoning behind this is that educated mothers are more likely to seek medical attention, as well as to practice better feeding habits. However, some critics have also indicated that maternal education alone is not effective in the fight against malnutrition (Tette et al., 2016; Bharati et al., 2020). This brings us to the purpose of complementary structural interventions along with maternal education; as elaborated on by Tette et al. (2016), Bharati et al. (2020). Examples of such structural interventions include various economic initiatives which increase food availability and decrease costs (Tette et al., 2016; Bharati et al., 2020).

Food insecurity, poverty and deteriorating access to high-quality healthcare constitute the primary causes of malnutrition in Africa (WHO, 2021). The Comprehensive Africa Agriculture Development Programme (CAADP) of the African Union is dedicated to combating malnutrition as well as food insecurity (AU, 2003). Nonetheless, disparities in the economy still exist. According to Akombi et al. (2017), malnutrition predominantly affects rural children, situated in households with lower income and limited access to healthcare (2017). Cultural feeding practices and beliefs are other factors that account for the shortfall in supplementary feeding in Africa, which ultimately affects nutrition quality and outcomes (Lokossou et al., 2021). Critics argue that rather than focusing on addressing the socioeconomic inequalities which cause malnutrition, interventions often emphasize the quick provision of food (Kimani-Murage et al., 2014; Odoms-Young et al., 2024). Urbanization has also been linked to malnutrition as per Popkin et al. (2020). There are also cases of obesity, due to children consuming more processed meals in addition to undernutrition.

SSA has one of the highest prevalence of malnourished children in the world, with 32% of children under the age of five being stunted (WHO, 2020). There are varying causes of malnutrition in children in this region. Factors include food insecurity and inadequate finances, which are further accompanied by inadequate health services (WHO, 2021). Maternal wealth and education are some of the important determinants of childhood malnutrition in SSA (Fagbamigbe et al., 2022). Fagbamigbe et al. (2022) further found that children from low-income families are three times more likely to be stunted than children from wealthy families. Some scholars (Zembe-Mkabile, 2023; Momberg et al., 2021) from SSA have added access to clean water and sanitation, as well as social protection policies to the list of causative factors associated with malnutrition. Another

factor that has been identified is gender inequality. According to Mukuria et al. (2016), mothers from lower socioeconomic backgrounds typically have less influence over family decisions, particularly those pertaining to their children's nutrition.

In Ghana, socioeconomic disparities remain high despite the progress made in lowering child malnutrition. According to Amugsi et al. (2016), children from wealthier households are less likely to be underweight and stunted than those from poorer households. Since educated mothers typically have better nutrition outcomes for their children, maternal education is also a crucial component (Amugsi et al., 2016). Aryeetey et al. (2022) claim that improvements in healthcare access haven't addressed the high rates of malnutrition in rural areas where inadequate sanitation and healthcare infrastructure are prevalent.

In SSA, Nigeria is also plagued by a high rate of malnutrition. 37% of Nigerian children under five suffer from stunting (NPC & ICF 2019). Amusa et al. (2023) discovered that the two main causes of child malnutrition in Nigeria are poverty and food insecurity. Additionally, a mother's employment status is important because unemployed mothers find it challenging to provide their kids with wholesome meals. Child feeding practices are significantly impacted by cultural perceptions of nutrition and household decision-making, according to Allotey et al. (2022).

The National Nutrition Action Plan (NNAP) is one of the tactics Kenya has used to combat child malnutrition. Malnutrition persists despite these efforts, particularly in arid and semi-arid areas with high levels of food insecurity (Lolemum, Mugalavai & John, 2017). In Kenya, Gewa et al. (2012) found a correlation between maternal education, household income, and child nutrition. Stunting or wasting rates were higher among children from low-income families.

Furthermore, Kimani-Murage et al. (2015) discovered that malnutrition in Kenya is a result of inadequate sanitation. For instance, Kimani-Murage et al. (2014) demonstrated that inadequate sanitation and improper breastfeeding practices in urban slums exacerbate malnutrition. Climate change and frequent droughts have also made this worse. As a result, nutrition policy must incorporate climate resilience strategies (WHO, 2021).

2.7 Health Policies and Interventions Targeting Malnutrition

At the global level, the WHO, UNICEF and the Food and Agriculture Organization (FAO) have developed various frameworks to combat malnutrition. The SDGs, particularly SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being), provide a roadmap for global efforts to eradicate malnutrition (United Nations, 2023). According to the WHO (2020), various fundamental interventions help decrease child malnutrition. The WHO and UNICEF together with the FAO have developed three main strategies which include nutritional supplement programs combined with staple food fortification and support for exclusive breastfeeding practices, to combat malnutrition. Since 2010, the Scaling Up Nutrition (SUN) Movement has helped 65 nations to advance their multi-sectoral nutrition initiatives (Coile et al., 2021). The worldwide fight against malnutrition advances slowly because of economic inequalities, insufficient funding and the effects of climate change (WHO & UNICEF, 2021). The prevalence of malnutrition has increased because of the combination of humanitarian crises and ongoing conflict (Rahmat et al., 2023). Acute malnutrition affects vulnerable populations particularly among low-income country residents.

The New Partnership for Africa's Development (NEPAD) together with the African Union (AU) operate throughout Africa to combat malnutrition (Ugwu & Odo, 2014). The African Regional Nutrition Strategy (2015–2025) was created by these organizations in an effort to reduce child

malnutrition and strengthen food security. Another intervention is the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods (Mkomwa et al., 2022). This framework emphasizes nutrition-sensitive agricultural practices as a crucial tool in the fight against malnutrition through its policies. Given that several regions of Africa have stunting rates above 30%, a sizable portion of the population suffers from malnutrition (WHO & UNICEF, 2021). Inadequate health facilities, government implementation restrictions and a lack of stakeholder coordination are the main causes of these policies' implementation difficulties.

The region of SSA faces extensive malnutrition issues. The main reason for child fatalities in the sub-region originates from undernutrition (WHO & UNICEF, 2021). The Comprehensive Africa Agriculture Development Programme (CAADP) along with the African Union's Agenda 2063 promotes nutrition-sensitive policies as part of their strategy against malnutrition (AU, 2003). Multiple African nations throughout SSA use various distinct intervention strategies to address nutrition problems. Some nations within the sub-region have introduced both community-based nutrition programs and school feeding programs. Food security improvement through transfer programs has become a shared strategy among different countries. The majority of Sub-Saharan African countries encounter multiple obstacles that prevent them from addressing nutrition issues (WHO & UNICEF, 2021). The main barriers to nutrition in SSA nations stem from insufficient funding coupled with limited medical care services as well as cultural elements shaping dietary habits (Bain et al., 2013; Owolade et al., 2022).

Ghana adopted the National Nutrition Policy as part of its initiatives to manage malnutrition. The National Nutrition Policy works through multiple government departments with the goal of improving nutrition (Government of Ghana, 2016; Nwafor, 2018). Livelihood Empowerment

Against Poverty (LEAP) stands as another intervention for improving nutrition in Ghana. Vulnerable households can use the financial assistance they receive through the LEAP program to help their children eat better (Sackey, 2019). As part of their healthcare strategy to combat malnutrition, Ghana has also introduced Community-based Health Planning and Services (CHPS). By bringing medical facilities closer to rural communities, this program increases access to healthcare nutrition services (Bigool, Owusu & Frimpong, 2023). Due to regional differences, a lack of funding and poor policy implementation, malnutrition persists in the nation, despite these efforts (Bain et al., 2013; Aryeetey et al., 2022).

Kenya's efforts to combat malnutrition have improved as a result of the Kenya National Nutrition Action Plan. The policy addresses school feeding programs, micronutrient supplements, and maternal and child nutrition (FAO, 2024). Kenya has also put the National Food and Nutrition Security Policy (NFNSP) into effect. This policy's primary objective is to make food more accessible and available to those who are most in need (Mbiti 2020). Furthermore, community-based programs such as the Baby-Friendly Community Initiative (BFCI) have improved early childhood nutrition and nursing practices (Kimani-Murage et al., 2021). However, issues like food insecurity, drought and a lack of proper medical facilities in rural areas still impede development.

Nigeria has one of the highest rates of malnutrition in Sub-Saharan Africa. Over 37% of Nigerian children under the age of five suffer from stunting (NPC & ICF, 2019). The Nigerian government has implemented a number of measures to address malnutrition. The National Policy on Food and Nutrition (2016), which aims to improve nutrition for mothers and children, is one example of this (Ministry of Budget and National Planning, 2016). The National Home-Grown School Feeding Program (NHGSFP) is another. Both school attendance and child nutrition have improved as a result of this intervention (Adesanmi et al., 2021). Additionally, the Micronutrient Deficiency

Control Program places a strong emphasis on food fortification and vitamin supplements (Anjorin, Okpala & Adeyemi, 2019). However, there is still a problem with child malnutrition in Nigeria. This is because political unpredictability, high rates of poverty and inadequate policy coordination limit the efficacy of these interventions (Victora et al., 2021).

2.8 Gaps in Literature and Implications for Undertaking Study

Malnutrition in children has been extensively studied. However, the literature still has gaps that prevent a comprehensive understanding of the problem. The lack of attention paid to comparing malnutrition trends throughout SSA is one of the major gaps in literature. Malnutrition rates have been brought to light by a number of studies (Bain et al., 2013; Awuuh, Appiah & Mensah, 2019; Bharati & Bharati, 2020). However, a large number of studies for children under five years old concentrate on particular nations. Because of this, it is challenging to comprehend the patterns and trends of malnutrition among children under five throughout the continent or sub-region.

Additionally, the findings of many studies are not presented separately with regards to factors such as age, gender, and rural-urban disparities. This makes it more difficult to find vulnerable subgroups that need focused treatments. For example, there are limited studies that break down malnutrition data by age groups (for children under five years). Malnutrition affects children differently depending on their age. Infants and toddlers (0-2 years) are at a higher risk of stunting due to poor feeding practices and infections. However, older children (3-5 years) may experience wasting or underweight due to inadequate diets.

Moreover, there are divided opinions on policy effectiveness in addressing malnutrition. To reduce malnutrition, a number of interventions have been put in place. These include cash transfer programs, maternity and child health initiatives and school feeding programs (Sackey, 2019;

Bigool, Owusu & Frimpong, 2023). However, most studies do not compare these programs and interventions across multiple countries to determine their relative effectiveness.

Finally, inconsistencies in data quality and research methodologies make it challenging in understanding malnutrition trends and determinants. Many studies use varying definitions and indicators for malnutrition. This makes it difficult to compare findings across different regions. A systematic review using standardized metrics augurs well establishing a reliable evidence base for policymaking and program implementation

Given these gaps in the literature, the present study provides comparative and policy-relevant insights into child malnutrition in SSA. The study's objectives are consistent with improving the understanding of malnutrition. It also identifies key socioeconomic determinants concerning the same. The study encourages multi-sectoral methods to tackle malnutrition and assesses the efficacy of policies. Additionally, by separating data by age, gender, and location, the study highlights vulnerable groups that require targeted interventions.

The factors and interventions that have the biggest effects on child malnutrition throughout SSA are also revealed by analyzing socioeconomic determinants and interventions across several nations. Lastly, this study improves the quality of the data on the topic. This is a result of synthesizing findings from various sources. Additionally, the effectiveness of interventions for malnutrition is evaluated using standardized metrics. This contributes to the establishment of a more trustworthy body of evidence that can guide future studies and the formulation of public policy.

CHAPTER THREE

METHODS

3.0 Introduction

The third chapter of the study highlights the methodology used in conducting the study. It emphasizes the research philosophy, paradigm, design, strategy and methods used in the study. Further, the chapter also outlines the procedure employed in quality assessment of the studies used in the SLR as well as the ethical considerations upon which the study was built.

3.1 Research Philosophy

Research philosophy can be said to be the beliefs that guide the undertaking of a research or study (Mbanaso, Abrahams & Okafor, 2023). There are three types of research philosophies that can underpin a study. They are axiology, ontology, and epistemology. Ontology can be defined as the nature of reality and the researcher's perception of it (Sol & Heng, 2022). Epistemology deals with what is the nature of knowledge as well as the origin of knowledge (Mbanaso, Abrahams & Okafor, 2023). Additionally, it highlights the essence and role of ethics in conducting research (Sol & Heng, 2022).

These fundamental philosophies guided the current study. The following section discusses the research paradigm through which these philosophies were applied.

3.2 Research Paradigm

Mbanaso, Abrahams, and Okafor (2023) defined research paradigm as the presumptions that influence the manner in which research work is conducted. Research paradigm affects how the data or information from a study is interpreted and analyzed. The four main types of research

paradigm are positivism, constructivism, interpretivism and pragmatism. Positivism is consistent with the belief that reality can be assessed in an objective manner, whilst interpretivism deals with understanding human experiences based on the context (social, cultural or historical) within which these experiences were had. Constructivism emphasizes the subjectivity of reality based on individual experiences (William, 2024; Pretorius, 2024). Pragmatism is a blend of the positivism and interpretivism research paradigms.

Interpretivism is used as the research paradigm for the study. This is because the interpretivist paradigm's foundation is that reality is socially constructed and is based on context. Malnutrition is a complex social issue shaped by contextual factors and how these factors interact in different settings (such as Ghana, Kenya, Nigeria). Instead of using a universal explanation, interpretivism throws light on the country-specific interpretations that mirror the experiences in the various countries or contexts that the study focuses on.

3.3 Research Approach

Creswell and Creswell (2018) describe research approach as the systematic manner in which the researcher carries out the research work. This systematic approach directs the research right from coming up with the research problem to collecting and analyzing the data. The two research approaches are inductive and deductive research approaches. The inductive approach draws insights from qualitative observations (Azungah, 2018). Azungah (2018) further reiterates that with the inductive research approach, researchers collect data first, look for patterns, and then develop theories or explanations. On the other hand, regarding the deductive research approach, researchers begin with an existing theory, derive hypotheses and then design studies to confirm or reject these hypotheses (Creswell and Creswell, 2018).

The study was founded on an inductive research approach. The reason for this is that the study aimed to understand the patterns, themes and contextual factors that shape malnutrition affecting children under five years in SSA based on data collected, rather than testing a predefined hypothesis.

3.4 Research Design

Research design can be defined as methodical steps that guide the researcher in conducting the study (Abutabenjeh and Jaradat, 2018). The study used a systematic literature review (SLR) as its research design. The factors that influenced the choice of SRL are that this approach is comprehensive, transparent and structured in manner for identifying, appraising and synthesising available research on malnutrition among children under five in Sub-Saharan Africa. Also, because the study's objectives require gathering data from different countries and contexts, an SLR was appropriate.

3.5 Research Strategy

The PRISMA guidelines and the PICO framework were both adhered to by the research strategy. PICO is an internationally recognized framework used in systematic reviews that represents Population, Intervention, Comparison, and Outcome (Cumpston et al., 2020). It offers a framework for formulating a research question and outlining the literature search strategy. The constructs under the PICO framework are described as follows.

1) Population (P):

Children in Ghana, Nigeria and Kenya under the age of five make up the study's population of interest. This makes it possible for the review to focus on the population that is at risk of malnutrition and is relevant to achieving the study's goals.

2) Intervention (I):

Some health policies and interventions that address malnutrition are covered in this review. It includes, among other things, food security campaigns, breastfeeding advocacy, and nutritional supplement programs that have been implemented in SSA (Ghana, Nigeria and Kenya).

3) Comparison (C):

By contrasting these health policies and interventions with those in other regions or nations outside of SSA, such as Ghana, Nigeria, and Kenya, the comparison component assesses the efficacy of these initiatives.

4) Outcome (O):

The rates of malnutrition, which include stunting, wasting, and underweight in children under five, are the main outcomes of interest. Additionally, the study was conducted in accordance with Page et al.'s (2020) PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Particularly, these guidelines included;

1. The research question: The review first entailed finding out the research question since all subsequent steps were derived from the answer to the research question.
2. Determining the pertinent studies: This step entailed determining the pertinent studies by a rigorous and methodical search of electronic databases for these studies. The search method followed the methods that could answer the research question.
3. Screening and selection of the studies: The research topic's inclusion and exclusion criteria were used to screen the studies. This involved looking through the full texts, abstracts, and titles of relevant papers that addressed the research question.

4. Extracting data: These contained pertinent information such as study design, sample size, intervention details, study endpoints, and findings from the chosen studies.

5. Assessing quality: The Effective Public Health Practice Project (EPHPP) tool was used for quality assessment (Appendix 1). Selection bias, research design, confounders, blinding, data collection methods, withdrawals and dropouts are the six criteria that the EPHPP tool used to evaluate the studies.

6. Data Synthesis: The data synthesis was a combination of quantitative and qualitative approaches depending on the type of data and the research question.

The utilization of the PRISMA guidelines by Page *et al.* (2020) and the PICO framework made it possible to conduct a thorough, organized, and effective systematic review.

3.6 Inclusion and Exclusion Criteria

Based on the PICO framework, plus other relevant metrics, the systematic review established its inclusion and exclusion criteria. These criteria ensured that the review was focused, comprehensive, and was able to answer the research question(s) effectively. Details of the inclusion and exclusion criteria are presented in Table 3.1.

Table 3.1: Inclusion and Exclusion Criteria

Parameter	Inclusion Criteria	Exclusion Criteria
Population	1. Studies must be related to children below five years.	Studies relating to populations above the age of five years.
	2. Studies must be conducted in Ghana, Nigeria and Kenya.	Studies conducted outside Ghana, Nigeria and Kenya.

	3. Studies must be related to children who are affected by malnutrition.	Studies that are not consistent with malnutrition.
Intervention	Studies must be consistent with health interventions aimed at addressing malnutrition.	Studies focusing on interventions unrelated to malnutrition.
Comparison	Studies that compare the effectiveness of nutrition interventions in SSA (Ghana, Nigeria and Kenya) to other areas or countries.	Studies that do not include baseline measures for evaluating the effectiveness of interventions in Ghana, Nigeria and Kenya to other countries or areas.
Outcome	Studies must report on the rates of malnutrition, including stunting, wasting, and underweight.	Studies that do not report on malnutrition-related outcomes.
Language	Studies published in English	Studies not published in English
Year of Publication	Studies published between 2014 to 2025.	Studies published before 2015.
Type of Publication	Original primary studies/peer-reviewed primary studies	1. Non-peer reviewed articles 2. Reviews and Editorials

3.7 Search Strategy

To ensure comprehensive coverage of relevant literature, a structured search strategy was employed across multiple academic databases and platforms. This was carried out from 15th April 2025 to 10th May 2025. The electronic databases used included Publisher Medline, Web of Science, Scopus, PsycINFO and African Journals Online (AJOL). These databases were chosen

due to their extensive repositories of scholarly and peer-reviewed journals in fields relevant to this study, namely health, nutrition, and public policy. The search strategy was guided by the PICO framework which helped to formulate precise and relevant research terms. Keywords were developed for each component of the research question and synonyms, and closely related terms were also included to widen the search scope. Search terms also included MeSH (Medical Subject Headings) terms. Boolean operators were used to link search terms effectively:

- “AND” was used to combine different concepts
- “OR” was used to include synonyms or related terms
- “NOT” was used to exclude unrelated topics where necessary.

Where available, filters were applied to limit the search to:

- Articles published between 2014 to 2025
- Peer-reviewed journal articles and primary academic thesis
- Studies in English
- Human studies
- Open access, where possible

Each database had a tailored search syntax based on its indexing system, but consistent terms and structure were maintained across platforms to ensure reliability and reproducibility. The primary search was conducted using MEDLINE via PubMed, and similar strategies were applied across other databases. The keywords used in the context of PICO framework are shown in Table 2.

Table 3.2: Key Search Words Based on PICO Framework

Parameter	Key Word(s)
Population	“children under five”, “infants”, “young children”, “pre-school children”, “Sub-Saharan Africa” and “Ghana, Nigeria, Kenya”
Intervention	“nutrition interventions”, “health policies”, “nutritional programs”, “breastfeeding advocacy”, “public health programs” and “nutritional supplements”
Comparison	“malnutrition trends and determinants in SSA vs. other developing or developed regions”, “policy implementation challenges in SSA vs. other developing or developed regions”
Outcome	“malnutrition”, “stunting”, “wasting” and “underweight”, “undernutrition”, “micronutrient deficiencies”

The search process for the systematic review involved the following steps;

1. Initial Search: The initial search was based on broad keywords to encompass a breadth of studies.
2. Refinement: Based on the results obtained in the first step, keywords and Boolean operators were refined to improve specificity.
3. Screening: One other criterion for reviewing journals study materials was screening the study titles and abstracts.

4. Full-Text Review: All the selected articles' texts were downloaded and scored against predetermined inclusion and exclusion criteria.
5. Hand Searching: Additionally, a manual search for the relevant review articles and the reference lists of the studies included were done to find more relevant research.

3.8 Data Extraction

A summary table of the relevant studies was generated using a standard data extraction form created in Microsoft Excel, based on the research questions and PICO framework. Descriptive data from the studies, such as the country, sample size, study design, cohort description, participants' demographic information, comparison groups, intervention, comparison techniques, outcome measures, statistical methods used, year of publication, and authors were included in the data extraction form.

The researcher manually extracted the information and to reduce mistakes, the researcher reviewed all entries twice. Discrepancies were resolved after cross checks and further reviews by the researcher. This made the process of extracting data from the studies effective. It also provided a clear audit trail for how decisions were made regarding inclusion, categorization and interpretation of findings.

3.9 Data Items

In line with the PRISMA 2020 guidelines, the data items chosen for this systematic review corresponded to the study's main objectives. To address the first objective, data were extracted on the prevalence of key forms of malnutrition, specifically stunting, wasting, underweight, and, where applicable, dietary diversity scores. For the second goal, the researcher looked into socioeconomic and demographic factors that contribute to malnutrition from the examined studies. Because confounding variables were considered in adjusted tests, they were preferred compared to tests that did not account for them.

While reviewing the effectiveness of interventions or policies as enshrined by Objective 3 of the study, the review examined data on cuts in malnutrition, the program's implementation success and any difficulties or obstacles noted. They were also evaluated using qualitative evidence on what made policy enactment easy or difficult.

Only the most important, current and straightforward outcomes were taken for every study included. Where researchers used several time points or measurement methods, the review gave priority to the final follow-up results unless the authors mentioned a specific main study point. Where possible, results were based on standardized measurements to ensure that study findings could be compared (example; WHO growth standards or validated dietary diversity tools). This approach to data extraction ensured that the analysis focused only on outcomes needed for the review and maintained a clear, transparent and standard process for organizing evidence.

3.10 Quality Assessment

The Effective Public Health Practice Project (EPHPP) tool was utilized in conducting the quality assessment of the studies on which the current review is based (Appendix 1). The EPHPP tool evaluates six areas from which the results can be used to determine a study's internal validity. It

was created with the intention of applying it to public health studies. Selection bias, research design, confounders, blinding, data collection procedures, withdrawals, and dropouts were among the domains used to evaluate the studies.

Selection bias has to do with how participants were chosen and whether they represent the target population, whereas research design deals with whether the study was randomized, observational, or experimental. The “confounders” aspect speaks to whether there were confounding variables that may have influenced outcomes. Blinding deals with whether participants of the studies were blinded to reduce bias. Data collection procedures under the EPHPP tool assess the rigor and clarity of data collection procedures. Participants who leave the study ahead of time are referred to as those who have withdrawn or dropped out. Large numbers of dropouts or unreported dropouts sometimes make the research results less accurate and reliable, mainly if the people who quit are very different from those who stay.

3.11 Data Synthesis

With regards to how to synthesize the data for the systematic review, the Critical Interpretive Synthesis (CIS) was deemed appropriate. CIS is the merging of both narrative synthesis and thematic synthesis (Flemming, 2010). It is especially helpful when discussing a wide variety of factors and policies related to malnutrition.

The CIS was consistent with identifying recurring themes and concepts and interpreting how they related to one another. These themes and concepts were continuously refined and reframed in light of new data, ensuring that they were grounded in evidence provided by the data. Ultimately, the CIS process aimed to build a synthesizing argument which is consistent with a coherent theoretical framework made up of interconnected constructs and the relationships among them. This

framework facilitated the understanding of the trends and multifaceted drivers of malnutrition, as well as the effectiveness of existing health policies and interventions targeting malnutrition in SSA.

Critical Interpretive Synthesis was particularly appropriate for this study for the following reasons. Above all, CIS offers a thorough examination of the phenomena of malnutrition while accounting for social, economic, cultural, and health-related viewpoints. Secondly, in order to ascertain the efficacy of various health policies and interventions as well as the contextual elements that contribute to their success or failure, CIS synthesises a variety of evidence. Furthermore, it enhances the process of producing new theoretical knowledge, which is necessary to clarify the mechanisms underlying malnutrition and to define suitable policies and measures to counteract it.

3.12 Ethical Considerations

Several ethical issues were considered whilst undertaking the systematic literature review. These ethical considerations are discussed as follows;

1. Respect for Authors and Giving Due Credit

In the course of conducting the study, the researcher ensured that all the sources used were acknowledged to avoid any acts of plagiarism. Further, the researcher was also mindful of the placement of direct quotes and the treatment of paraphrased material. During the review, the researcher ensured to cite all referenced information and data with a consistent academic referencing system. The authors were given full credit by including their work both in the text and in the bibliography. In paraphrasing, the researcher made sure to change the words but still mentioned the arguments presented by the original source.

2. Avoiding Plagiarism

In order to prevent any plagiarism, the researcher made sure to separate their own thoughts from the original ideas of the authors during the literature review. All ideas, arguments and findings from other sources were cited and nothing was reproduced without first acknowledging the source. The researcher supported high ethical standards by documenting the source for every idea or thought, no matter if it was quoted or paraphrased.

3. Reduction of Bias and Objectivity

In order to avoid selection bias, the researcher followed a detailed and clear search process based on the PICO framework. This required checking several well-known databases using the same keywords and Boolean operators. Studies were only selected if they fit within the set criteria and met the goals of this review. During the review, decisions were made following established protocols to avoid bias. Viewpoints and findings from the selected studies, regardless of the author, were shared fairly during the synthesis to ensure no results were biased

4. Use of Data in an Ethical Way

The review guaranteed that the data extracted from the included studies was used responsibly. This was achieved by ensuring that data extracted from the studies was not misrepresented, overstated or selectively used to distort the results of the primary research. Also, the contexts of the studies were respected and results or data extracted from the studies were not applied beyond their scope.

5. Welfare of Participants and Informed Consent

The researcher made sure to only use studies that had been ethically reviewed. Research conducted with humans had to be approved by a review board or its equivalent before it was used in this review. While reviewing the studies, particular importance was given to how both children and other subjects were cared for. It included checking if participants were informed about the purpose

of the study and their consent and safety was secured. As a result, the review did not unintentionally support or share scientific research that was not ethical.

6. Conflicts of Interest

To maintain the review's credibility, it is imperative to make sure that there are no obvious conflicts of interest. In this sense, the study listed any conflict of interest that would jeopardise the review's objectivity. Additionally, the researcher tried to avoid letting any conflicts affect how the literature was analyzed and synthesized. Intellectual integrity was maintained throughout the critical interpretive synthesis, guaranteeing that all viewpoints were fairly taken into account, regardless of whether they agreed with or disagreed with the review's conclusions.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the results of the systematic literature review (SLR). The chapter begins with a detailed account of the PRISMA flow diagram. This diagram outlines the number of records identified, screened, excluded and ultimately included in the final synthesis. Following this, the characteristics of the included studies are presented in tabular form. Also, the studies included in the review are presented based on their setting, study design or methodological approach, sample size, intervention/control measures key findings, and stated limitations.

4.1 Prisma Flow Diagram

Figure 4.1 displays the PRISMA diagram which describes the stages the researcher followed to determine the included studies in the SLR. The diagram illustrates a rigorous and transparent approach that ensures the credibility and replicability of the review findings.

The first part of the process involved searching five main databases: Medline, Web of Science, Scopus, PsycINFO and AJOL. This resulted in 197 records. Prior to performing the screening, 31 records were removed. This included duplicate entries, as well as 18 records deemed ineligible by automation tools and 12 removed for other reasons. This resulted in 162 records for screening.

In the screening phase, the titles and abstracts of the 162 records were assessed for relevance. This led to 119 records being excluded because they did not meet the preliminary inclusion criteria. The remaining 43 reports were sought for full-text retrieval. However, 8 of these reports could not be retrieved, and therefore, only 35 studies progressed to the eligibility assessment stage. At the eligibility phase, the researcher reviewed the full texts of the studies using the inclusion and

exclusion criteria to see if they were eligible. Twenty studies were excluded for specific reasons: 7 were secondary studies, 4 were pilot studies, 2 were not in English, and 7 did not meet the inclusion criteria.

Finally, 15 studies out of the total number met the inclusion criteria. As such, these studies were included in this systematic review. Relying on the PRISMA guidelines allowed the review to be transparent and trustworthy by clearly documenting the process of selecting the final publications.

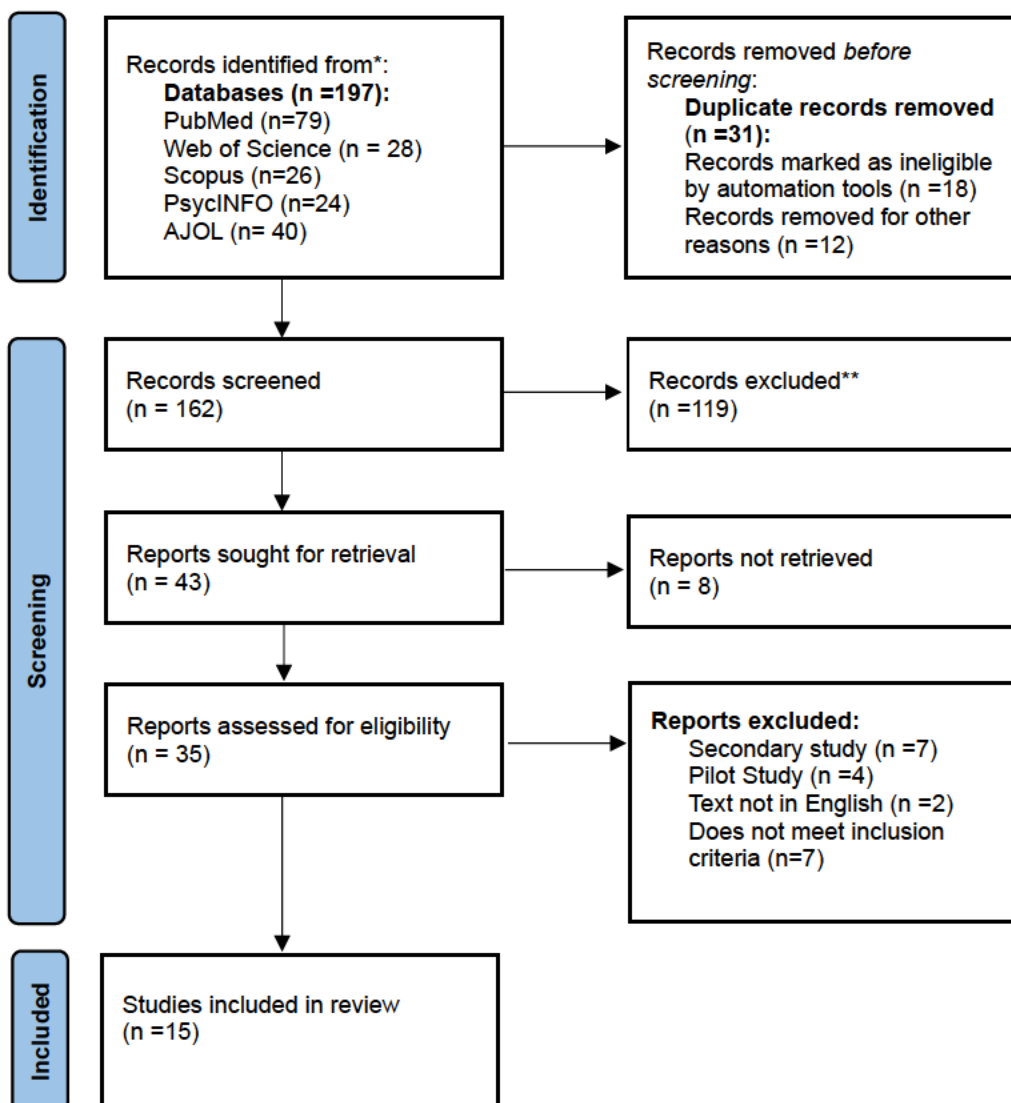


Figure 4.1: PRISMA Diagram for the SLR (Author's Own Construct)

4.2 Characteristics of Included Studies

Table 4.1 displays the characteristics of the studies. Various studies from Ghana, Nigeria and Kenya make up the reviewed literature on malnutrition among children under five years in Sub-Saharan Africa. The articles cover a time span from 2015 to 2024. From the studies analyzed, there were only 2 conducted in 2015 and 2017, right at the beginning of this period. One study was published in 2019 and 8 out of the 15 studies were published during the years 2020 to 2022. There were four studies carried out in 2024.

The majority of the studies constituting 53% (8 studies) were found in Publisher Medline. Additionally, 33% (5 studies) were found in African Journals Online (AJOL), whereas 1 study each was found in Web of Science and Scopus.

Five studies each were performed in Ghana, Nigeria and Kenya. From the 15 studies analyzed, it was found that 12 of them (80%) were done in rural or peri-urban areas, which is because these locations often have higher malnutrition rates. 20% of the studies (4 in total) took place in urban areas.

A majority of the studies (11 out of 15 or 73%) employed either descriptive or analytical cross-sectional designs. Studies included in the review had sample sizes that ranged from 53 to 24,529 individuals. All 15 studies found a high prevalence of malnutrition, particularly in rural areas. The most common limitation across studies included the use of cross-sectional designs (75%), which hinder the ability to infer causality.

Table 4.1: Characteristics of Included Studies

Characteristic	Number of Studies	Percentage of Studies
Database		
PubMed	8	53%
AJOL	5	33%
Web of Science	1	7%
Scopus	1	7%
Country		
Ghana	5	33%
Kenya	5	33%
Nigeria	5	33%
Year of Publication		
2015-2017	2	13%
2019	1	7%
2020-2022	8	53%
2024	4	27%
Setting		
Urban	12	80%
Rural	3	20%
Study Design		
Cross-sectional	12	80%
Experimental	3	20%

Table 4.2: Results from Included Studies

Author	Setting	Study Design	Database	Sample	Intervention/Control	Finding	Limitation
Anin et al. (2020)	21 districts of the Northern Region of Ghana	Analytical, cross-sectional study design	PubMed	600 mothers of children between the ages of 6 and 23 months.	Intervention: Complementary Feeding Programme	1) Prevalence of child malnutrition (stunting: 33.2%, wasting: 14.1%, underweight: 27%). 2) Stunting was found to be significantly ($p < 0.05$) associated with the following factors: number of occupants per household, mother age, religion, tribe, child age group, maternal height, number of postnatal care (PNC) visits, and use of insecticide-treated nets (ITN). 3) The variables religion, marital status, tribe, child gender, child age group, mother BMI, and the utility power source utilised to illuminate homes were significantly associated ($p < 0.05$) with wasting. 4) Higher IYCF compliance did not significantly reduce stunting or wasting, indicating policy implementation gaps and limitations in current strategies.	1) The study's limitations include its cross-sectional design, which prevents establishing causality. 2) The 24-hour food recall method used could be affected by recall bias, which could have a bearing on data accuracy. 3) Additionally, not all relevant variables and confounders may have been considered.
Dallman et al. (2022)	Rural communities in Upper Manya Krobo District	Randomized Control Trial (RCT)	PubMed	245 mother-child pairs in rural Ghana in the intervention clusters and 213 in the control clusters	Intervention: Nutrition-Sensitive Agriculture support (economic support) and nutrition education Control: The control group did not receive the intervention(s).	1) 23% were stunted, 6% were wasted and 10% were underweight. 2) Compared to the control group, children of caregivers who got the intervention had considerably superior growth in terms of length and height and were three times as likely to eat eggs. 3) Socioeconomic factors that influence malnutrition include	Groups with little or no involvement had insufficient statistical power since the Nutrition Links (NL) trial's initial design did not take participant levels into consideration when evaluating effects. Because the results for these groups were inconclusive, it was challenging to draw solid

						educational attainment and financial resources.	conclusions about the consequences of varying levels of involvement.
Dalaba <i>et al.</i> (2022)	Kassena-Nankana East and West Districts of the Upper East Region of Ghana	Exploratory Cross-sectional design and a mixed method approach	PubMed	53 community members	Intervention: Choosing All Together" (CHAT), an instrument for deliberative engagement that aids rural people in comprehending and prioritizing nutrition interventions.	1) Stunting prevalence is reported at 22.4% and wasting prevalence is 9.0% 2) Economic circumstances, poverty, and the impact of household decision-making dynamics on maternal and child nutrition are among the socioeconomic determinants of malnutrition. 3) The community was able to comprehend and rank nutrition treatments with the use of the CHAT tool. Micronutrient supplementation and livelihood empowerment were among the community's top priorities. 4) The main nutritional interventions and programmes identified are Livelihood Empowerment and micronutrient supplementation.	1) Potential translation issues 2) Furthermore, the findings' generalizability may be limited by the small sample size of six groups, which might not accurately reflect the larger population.
Apenkwa et al. (2022)	Ahafo Ano South	Mixed cross-sectional study	Scopus	A quantitative survey of 497 mothers/caregivers and children under five was conducted, and a qualitative assessment of 40 mothers/caregivers and 25 service providers was conducted.	Community-based Management of Acute Malnutrition (CMAM)	1) Severe Acute Malnutrition (SAM) was found to be 52% in urban (Kumasi Subin Sub-Metropolis) and 36% in rural (Ahafo Ano South) areas. 2) Low program coverage in both districts: 40.9% in urban vs. 9.8% in rural (field data). Treatment coverage was 9.6% in urban and 30.4% in rural areas (field data), suggesting inconsistent implementation and success. 3) The socioeconomic determinants of malnutrition include the occupation of mothers and their	1) Difficulty in determining period coverage from primary data. 2) Cross-sectional survey design limited the ability to determine causal effects.

						education level.	
Agbozo, Colecraft and Ellahi (2015)	Nsakina and Dom Sampaman, both rural communities in the Ga West municipality of the Greater Accra region	Cross-sectional	PubMed	108 caregiver-child pairs (0–24 months) and 124 caregiver-child pairs (0–24 months) getting child welfare services from GMP and CBGP, respectively.	Intervention: Community-based Growth Promotion programme (CBGP) Control: Traditional Growth and Monitoring Programme (GMP)	1) The socioeconomic determinants of malnutrition were the number of children by caregivers, educational levels of caregivers, and overall knowledge of infant and young child feeding (IYCF) practices 2) Within the study sample, underweight prevalence was 8.1% in the CBGP group and 13.9% in the GMP group. 3) Compared to GMP caregivers, CBGP caregivers reported higher rates of exclusive breastfeeding (CBGP: 73% vs. GMP: 56%, $P = 0.001$), early breastfeeding beginning (CBGP: 54% vs. GMP: 28%, $P < 0.0001$), and timely supplemental feeding (CBGP: 72% vs. GMP: 49%, $P = 0.014$). 4) More CBGP caregivers (77%) achieved minimum dietary diversity than their GMP counterparts (61%) ($P = 0.035$)	1) There was no evaluation of the nutrition knowledge of the health workers or volunteers delivering the interventions. 2) The cross-sectional design limits the ability to draw causal inferences.
Akombi et al. (2017)	All six geopolitical zones in Nigeria (North East, North West, North Central, South East, South, South West)	Cross-sectional study.	PubMed	24,529 children aged 0–59 months		1. Prevalence of wasting was 18%, severe wasting was 9% and 29% of children were underweight. 2. Socioeconomic determinants of malnutrition were low maternal and paternal education, household poverty, rural living, low maternal BMI and limited access to healthcare.	1. Cross-sectional design limited causality inference. 2. Possible residual confounding due to unmeasured factors like detailed dietary patterns and physical activity.
Awoyemi and Abaniwonda (2019)	Urban and rural areas of Ekiti State, Nigeria	Cross-sectional study.	AJOL	152 children aged 0–59 months (77 urban, 75 rural)		1. Moderate acute malnutrition based on height-for-age (HAZ) was 20.8% in urban areas and 80% in rural areas, severe HAZ was 16.9%	1. Limited to one state (Ekiti), so findings may not generalize.

						urban and 42.7% rural, moderate weight-for-age (WAZ) was 42.9% urban and 60% rural, severe WAZ was 5.2% urban and 18.7% rural, and moderate acute malnutrition based on mid-upper arm circumference (MUAC) was 40.3% in urban areas and 56% in rural areas. 2. Key socioeconomic determinants identified include parental marital status (with children of polygamous parents more likely to be malnourished), parents' occupation (unemployed parents linked to higher malnutrition, while wage employment reduced it), higher maternal income in rural areas lowering risk, smaller birth size increasing malnutrition likelihood, rural residence significantly raising risk, larger household size increasing malnutrition in urban areas, and lack of fruit availability in children's diets correlating with higher malnutrition risk in rural settings.	2. Cross-sectional design cannot establish causality. 3. Potential for recall bias in self-reported data.
Raji et al. (2020)	Sokoto Metropolis, North-West Nigeria	Cross-sectional descriptive study	AJOL	347 mothers of under-five children.		1. The study identifies that Sokoto State has a 20% prevalence of wasting. 2. The study finds the determinants of malnutrition among children under five years to be low maternal education, poverty and low household income, large household size, cultural beliefs and misconceptions, improper weaning practices and poor access to health services and health information.	1. The study relies on questionnaire-based responses from mothers, which are subject to recall bias, social desirability bias, or misreporting. 2. Because the study is cross-sectional, the ability to establish causality between knowledge and malnutrition outcomes is limited.

Otekunrin et al. (2022)	Ogun and Oyo states, South-West Nigeria.	Analytical cross-sectional design	PubMed	140 under-five children.	Nutrition-sensitive intervention programs	1. Only 48.6% of the children met the minimum dietary diversity threshold (consumption of at least 4 food groups). The mean dietary diversity score was 3.28, which is below the recommended level for optimal growth and development. 2. The study identifies interrelated determinants of malnutrition, including child's age, mother's age, distance to farm and household food expenditure. 3. Interventions are poorly targeted in these rural communities.	The study was conducted only in cassava-farming households in Ogun and Oyo states, which may not represent other farming systems or non-farming households in Nigeria.
Samuel, Akintayo and Eyinla (2021)	Oyo State, Nigeria.	A quasi-experimental design involving a pre- and post-intervention approach.	AJOL	50 caregivers from 8 orphanage homes.	The intervention was a one-day nutrition education session using adapted national counseling materials and visual aids.	1. The study reveals a high risk of malnutrition among children aged 6–24 months in orphanages, with only 37.5% meeting minimum meal frequency (MMF), 52.5% meeting minimum dietary diversity (MDD), and 35% meeting minimum adequate diet (MAD) as per WHO indicators. 2. Caregiver education and knowledge were identified as major determinants. 3. The study's nutrition education intervention significantly improved caregiver knowledge and feeding practices, raising MMF to 62.5%, MDD to 80%, and MAD to 60%. While effective, it revealed policy gaps, emphasizing the need for structured national caregiver training and sustained policy support in vulnerable settings across Sub-Saharan Africa.	Short duration of the intervention, lack of control group and limited generalizability beyond orphanage settings.
Ilboudo et al. (2024)	Turkana County in Kenya	Cluster Randomized Controlled Trial (cRCT)	PubMed	Intervention group: 492 children.	Intervention: Treatment of MAM using an integrated community model	1. The baseline prevalence of moderate acute malnutrition (MAM) in Turkana County was 19.7%, which is high by global standards.	The analysis focused only on moderate acute malnutrition (MAM) due to small sample sizes for

		comparing an intervention group supported by Community Health Volunteers (CHVs) and a control group		Control group: 365 children	involving CHVs alongside health facility care. Control: Standard facility-based treatment without CHV support	2. Socioeconomic determinants of malnutrition were distance from health facilities and lack of trained personnel limited access to treatment. 3. Community-based care involving CHVs led to a higher recovery rate (69.8% vs. 55.7%), lower default rate (10.4% vs. 24.5%), and reduced cost per child recovered and per DALY averted compared to facility-based care. These results suggest that integrating MAM treatment into the iCCM strategy through CHVs is more cost-effective and enhances treatment access and outcomes, particularly in underserved areas.	severe acute malnutrition (SAM), limiting targeted recommendations. Additionally, the intervention's effectiveness may be underestimated because recovery rates applied from trial sites didn't fully reflect facility-based treatment results.
Gudu et al. (2020)	Busia County, Western, Kenya.	Case-Control Study	Web of Science	375 children (94 cases, 281 controls), aged 6–59 months		1. Among the 94 malnourished (case) children, 84% were undernourished, 34% were underweight, 26% were stunted and 24% were wasted. 2. The socioeconomic determinants of malnutrition were parental education, parental employment and household size. 3. Existing health interventions are not reaching or effectively influencing behavior among at-risk families in this setting.	1. Study was hospital-based so results are not generalizable to the broader community. 2. Recall bias due to self-reported data. 3. Cannot establish causality due to case-control design.
Musimenta and Onyango (2024)	Kenya	Descriptive cross-sectional study using quantitative methods	AJOL	100 caregivers of children under 5 years		1. The study found a moderate prevalence of malnutrition in Kihenda village: 7% stunted, 6% underweight, and 9% wasted, with 78% of children reported as normal. 82% of malnourished children resided in rural areas. 2. Socioeconomic determinants of malnutrition were teenage motherhood, parental occupation	The study had a small sample size and was limited to a single rural community, which restricts generalizability; there was also potential recall bias from caregiver-reported responses.

						and time availability and knowledge of caregivers. 3. The presence of Village Health Teams (VHTs) contributed to higher awareness of exclusive breastfeeding (86%).	
Chui, Osero & Mugo (2024)	Kitui County, Kenya	Analytical cross-sectional study.	PubMed	420 mother-child pairs (children aged 6–59 months), selected through multistage sampling		1. The prevalence of stunting in the study area (Kitui Central Sub-County) was 26.6%, higher than the national average of 18% 2. The study identified several significant predictors of stunting: maternal education, maternal undernutrition, household income, multiple children under five and early complementary feeding (before 6 months), and partial immunization were also associated with higher stunting odds	Study relied on self-reporting by caregivers, which may have introduced recall bias, affecting the accuracy of the information collected.
Wakhungu et al. (2024)	Kenya	Mixed cross-sectional method	AJOL	Infants (6–11 months) and toddlers aged 12–48 months (n = 161), and women of reproductive age (15–49 years) (n = 161).	Nutritional resilience interventions.	1. The study highlights high prevalence of micronutrient deficiencies (e.g., iron, zinc, folate, selenium) among children under five and women of reproductive age across all farming systems (pastoral, agro-pastoral, and mixed). Children aged 6–48 months showed overconsumption of energy and carbohydrates, but deficiencies in essential nutrients, particularly in rural and livestock-keeping communities. 2. Cultural dietary practices and limited maternal education contributed to insufficient micronutrient consumption. Farming systems (pastoral, agro-pastoral, and mixed) significantly influenced dietary intake due to differences in food access, education levels, and occupation.	The study noted variability in context-specific implementation and limited data availability for some indicators.

						3. Integrating nutrition into animal health programs was seen as an effective approach to improve dietary diversity and food access in livestock-dependent communities. Interventions that addressed both livestock health and human nutrition (e.g., through improved milk availability or income from livestock) were more sustainable and impactful than siloed efforts.	
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4.3 Quality Assessment

Appendix A presents the detailed quality assessment of the 15 studies included in this systematic literature review. A summary of the results of the quality assessment is presented below in Table 4.3.

Table 4.3: Results of Quality Assessment

Quality Rating	Number of Studies	Percentage (%)	Comments
Strong	5	32%	Represents a minority of high-quality studies with robust methodology.
Moderate	7	47%	Largest portion; studies of acceptable quality but with some limitations.
Weak	3	21%	Studies with methodological weaknesses; limit causal inference.
Total	15	100%	Reflects the overall distribution of study quality in the review.

CHAPTER FIVE

ANALYSIS AND DISCUSSION

5.1 Introduction

This chapter consists of analysis and discussion on the effectiveness of public health interventions in addressing malnutrition among children under five in Sub-Saharan Africa. The findings are analyzed and discussed according to the study objectives. The analysis compares the similarities and differences in the data extracted from all studies and presents the analysis based on themes extracted. The discussion section also discusses the findings of the study within the context of existing literature as well as the theoretical framework.

5.2 Analysis of Findings

5.2.1 To analyze and compare the prevalence and trends of malnutrition among children under five years in Sub-Saharan Africa over the last decade

Among the 15 studies, 11 (73%) provided direct information on trends and prevalence of malnutrition indicators (stunting, wasting, underweight and micronutrient deficiencies) among children under five years. The other studies (27) also concentrated more on determinants and interventions but still had some baseline data in terms of prevalence.

All findings in Ghana, Nigeria, and Kenya suggest that malnutrition is deeply ingrained in Sub-Saharan Africa, especially in rural and poor areas. Stunting continues to dominate as the most critical form of malnutrition. Wasting and underweight though persistent are declining slightly, while micronutrient deficiencies remain underreported but severe. Trends from data extracted from the studies indicate a slight increase in prevalence of malnutrition in Nigeria performing as compared to Ghana and Kenya.

a) Stunting

Stunting was mentioned by 8 out of 15 studies (53%). To provide an example, Chui, Osero & Mugo (2024) identify the prevalence of stunting at 26.6% in the Kitui County of Kenya compared to a national average of 18%. On the other hand, prevalence of stunting in Ghana is reported by Anin *et al.* (2020), Dallman *et al.* (2022) and Dalaba *et al.* (2022) to be between 22% and 33%. Akombi *et al.* (2017) found the prevalence of stunting in Nigeria to be about 37%, suggesting that Nigeria has the highest prevalence of stunting.

b. Wasting

Wasting was the most frequently reported indicator and reported in 9 studies (60%). Prevalence ranged between 9% to 24% for Kenya (Gudu *et al.*, 2020; Musimenta & Onyango (2024), 18% to 20% for Nigeria (Akombi *et al.*, 2017; Awoyemi & Abaniwonda, 2019; Raji *et al.*, 2020) and 6% to 14% for Ghana (Agbozo, Colecraft & Ellahi, 2015; Anin *et al.*, 2020; Dalaba *et al.*, 2022; Dalmann *et al.*, 2022).

c. Underweight

Underweight was reported in 53% of all studies and its prevalence varied more widely: 8% to 27% in Ghana as against 29% to 60% in Nigeria. In Kenya, underweight recorded in the studies was 6% to 34%. In Ghana, underweight was emphasized by Anin *et al.* (2020), Dallman *et al.* (2022), Apenkwa *et al.* (2022), and Agbozo *et al.* (2015), whilst in Nigeria, Akombi *et al.* (2017) and Awoyemi & Abaniwonda (2019) highlighted the phenomenon. In Kenya, Gudu *et al.* (2020) and Musimenta & Onyango (2024) reported on it.

d. Micronutrient Deficiencies ("Hidden Hunger")

Reported in 3 studies (20%) (Agbozo, Colecraft & Ellahi, 2015; Dalaba *et al.*, 2022; Wakhungu *et al.*, 2024), micronutrient deficiencies disproportionately affected rural and pastoral communities. This was exacerbated by cultural feeding practices and low maternal education. Wakhungu *et al.* (2024) observed deficiencies on a larger scale with regards to iron, zinc, vitamin A and iodine in Kenya. Agbozo, Colecraft & Ellahi (2015) and Dalaba *et al.* (2022) reported that lack of dietary diversity was linked to micronutrient deficiencies among children under five in Ghana.

e. Geographical and Rural–Urban Disparities

8 studies (53%) of the studies were consistent with geographical and rural-urban disparities. In Ghana, this theme was highlighted by Dallman *et al.* (2022), Anin *et al.* (2020) and Apenkwa *et al.* (2022) and Dallman *et al.* (2022), whilst in Nigeria, this was consistent with studies by Awoyemi & Abaniwonda (2019) and Raji *et al.* (2020). In Kenya, this theme was in tandem with studies by Musimenta & Onyango (2024) and Wakhungu *et al.* (2024).

Rural disadvantage is especially notable in Nigeria, where severe stunting rates stood at 42.7% in rural Ekiti as compared to 16.9% in urban localities (Awoyemi & Abaniwonda, 2019). Urban vulnerability is particularly evident in Ghana, where Kumasi had 36% severe acute malnutrition, compared to 52% in rural Ahafo Ano South (Apenkwa *et al.*, 2022). Kenya also exemplifies rural inequality with 82% of the children with malnutrition in Kihenda village (Musimenta & Onyango, 2024) and pastoral populations being found to have higher hidden hunger.

Table 5.1 Themes Recorded Across Studies for Objective 1

Author (Year)	Stunting	Wasting	Underweight	Micronutrient Deficiencies	Geographical / Rural–Urban Disparities
Anin et al. (2020)	✓	✓	✓		✓
Dallman et al. (2022)	✓	✓	✓		✓
Dalaba et al. (2022)	✓	✓		✓	✓
Apenkwa et al. (2022)			✓		✓
Agbozo et al. (2015)		✓	✓	✓	
Akombi et al. (2017)	✓	✓	✓		
Awoyemi & Abaniwonda (2019)	✓	✓	✓		✓
Raji et al. (2020)		✓			✓
Gudu et al. (2020)	✓	✓	✓		
Musimenta & Onyango (2024)	✓	✓	✓		✓
Chui, Osero & Mugo (2024)	✓				
Wakhungu et al. (2024)				✓	✓

5.2.2 Objective 2: To identify and compare the socioeconomic determinants of malnutrition among children under five years across Sub-Saharan Africa

All 15 studies were aligned with socioeconomic causes of malnutrition. The most commonly reported determinants included maternal education, household income/poverty, parental employment as well as cultural practices. Others were household size, rural-urban gaps, access to healthcare and environmental factors and maternal age.

The distribution indicates that poverty and maternal education are the two most consistent predictors across the three countries and poor WASH conditions, and cultural practices were identified as context-dependent secondary predictors. Income and maternal education inequalities are the strongest determinants in Ghana. In Nigeria, poverty, unemployment and cultural feeding perceptions prevail. In Kenya, malnutrition is significantly influenced by rural location, maternal

age and farming system context. Generally, although the determinants are common in SSA, they are influenced by local cultural and structural factors which necessitate country-specific policy responses.

a. Maternal Education as a Key Determinant

Maternal education was strongly predictive of child nutrition outcomes in 7 out of 15 studies (47%). In Ghana, Anin *et al.* (2020) and Agbozo *et al.* (2015) highlighted the impact of the level of maternal education on stunting and feeding behavior of children, and Apenkwa *et al.* (2022) connected maternal education with outcomes related to SAM. In Nigeria, Akombi *et al.* (2017) and Raji *et al.* (2020) indicated that the wasting and underweight risks increased among children whose mothers were less educated. In Kenya, Gudu *et al.* (2020) and Musimenta & Onyango (2024) reiterated that lack of caregiver education and knowledge were key factors informing malnutrition among children.

b. Household Income and Poverty

In 8 studies (53%), poverty was the primary cause of malnutrition. The most prevalent factor was poverty and unstable livelihoods. In Ghana, Dallman *et al.* (2022) found that financial resources directly impact growth outcomes and Dalaba *et al.* (2022) found poverty and household decision-making to be central to nutrition intervention. Apenkwa *et al.* (2022) also identified a significant association between occupation of the mother and severe acute malnutrition. Nigerian research (Akombi *et al.*, 2017; Awoyemi & Abaniwonda, 2019; Raji *et al.*, 2020) revealed that poverty and unemployment intensified malnutrition, whereas in Kenya, Wakhungu *et al.* (2024) demonstrated that the use of pastoral farming systems limited income, which exacerbated the hidden hunger.

c. Maternal and Child Factors

This theme was consistent with 40% of the studies. Maternal BMI, age, parity and child's birth weight characteristics were significant predictors. In Ghana, maternal age, height and BMI were found to be associated with stunting and wasting (Anin *et al.*, 2020). The weight of a child and maternal income were identified by Awoyemi & Abaniwonda (2019) as the determinants in Nigeria. In Kenya, Chui, Osero, and Mugo (2024) discovered that maternal undernutrition, early supplemental feeding, and having more than five children under five were significant predictors of stunting, while Musimenta & Onyango (2024) demonstrated that teenage motherhood increased vulnerability to malnutrition.

d. Household Size and Crowding

In 33% of the studies, this theme was present. Overcrowding and large household sizes were associated with poor outcomes. In a study by Anin *et al.* (2020) in Ghana, household occupancy influenced stunting, which was also reported by Raji *et al.* (2020) and Gudu *et al.* (2020) in Nigeria and Kenya respectively. Larger households in the urban Ekiti area increased the risk of malnutrition, especially in areas where food was scarce, according to a 2019 study by Awoyemi and Abaniwonda.

e. Cultural Feeding Practices and Decision Practices

This theme coincided with four studies (27%). Feeding practices were influenced by household and cultural norms. According to Dalaba *et al.* (2022), household decision-making is crucial in Ghana. Furthermore, cultural beliefs and misconceptions hindered proper feeding in Nigeria, according to Raji *et al.* (2020) in Sokoto. Wakhungu *et al.* (2024) observed that cultural dietary practices in pastoral households in Kenya resulted in inadequate intake of micronutrients.

f. Healthcare Access and Environmental Factors

Malnutrition outcomes were also influenced by limited health access, as noted by 27% of the studies. Anin et al. (2020) found that using insecticide-treated nets (ITNs) and postnatal visits were associated with better results. Akombi et al. (2017) found that higher rates of malnutrition were linked to households in rural Nigeria having limited access to healthcare. In Kenya, Musimenta & Onyango (2024) talked about the role of Village Health Teams in promoting breastfeeding awareness, while Ilboudo et al. (2024) highlighted the lack of trained personnel and the distance to facilities as treatment-limiting factors.

Table 5.2 Themes Recorded Across Studies for Objective 2

Author (Year)	Parental Education / Knowledge	Household Income / Poverty / Occupation	Household Size / Crowding	Maternal / Child Factors	Cultural Practices / Decision-Making	Health Services / Environmental
Anin et al. (2020)	✓		✓	✓		✓
Dallman et al. (2022)		✓				
Dalaba et al. (2022)		✓			✓	
Apenkwa et al. (2022)	✓	✓				
Agbozo et al. (2015)	✓					
Akombi et al. (2017)	✓	✓				✓
Awoyemi & Abaniwonda (2019)		✓	✓	✓		
Raji et al. (2020)	✓	✓	✓		✓	
Otekunrin et al. (2022)		✓				
Samuel et al. (2021)	✓					
Ilboudo et al. (2024)						✓
Gudu et al. (2020)	✓	✓	✓			
Musimenta & Onyango (2024)	✓			✓		✓
Chui, Osero & Mugo (2024)		✓		✓		
Wakhungu et al. (2024)		✓			✓	

5.2.3 Objective 3: To evaluate and compare the effectiveness of existing health policies and interventions targeting malnutrition in Sub-Saharan Africa, highlighting gaps and challenges in their implementation

Among the 15 studies selected, 12 (80%) assessed the effectiveness of public health interventions and nutrition policies directly in Ghana, Nigeria and Kenya. The nutrition-specific interventions analysed were community-based growth promotion (CBGP), community management of acute malnutrition (CMAM), micronutrient supplementation, therapeutic feeding and nutrition education.

Nutrition-sensitive interventions analysed included agriculture support, livelihood empowerment and integrated community health approaches. The evidence indicates that nutrition-specific approaches (example: CBGP, CMAM, caregiver education) positively affected short-term outcomes including exclusive breastfeeding, dietary diversity, and recovery among malnutrition cases. They were however not always sustainable and consistently covered, with urban areas even performing below rural ones in certain cases (example: CMAM in Ghana). In contrast, nutrition-sensitive interventions (such as livelihood empowerment, agricultural support, Community Health Volunteer-led integrated Community Case Management (CHV-led iCCM) in Kenya) addressed underlying determinants and showed cost-effectiveness, but were hindered by uneven implementation, resource gaps, and limited scalability.

In Ghana, CBGP improved breastfeeding practices, complementary feeding and dietary diversity, while CMAM supported treatment of severe acute malnutrition, though both interventions faced challenges with coverage and consistent implementation. In Nigeria, nutrition education of caregivers during orphanage care promoted better knowledge and feeding, but significant barriers of poverty, cultural traditions and ineffective monitoring systems restricted the large-scale

programs. In Kenya, Community Health Volunteer (CHVs) and Village Health Teams (VHTs) showed a significant improvement in recovery rates and a decrease in treatment costs, and nutrition resilience interventions underlined the need to connect food systems with nutrition.

a. Community-based interventions

This theme was consistent with 40% of the studies. Facility-linked and community-led programs were widely researched. In Ghana, Agbozo *et al.* (2015) compared Community-Based Growth Promotion (CBGP) with traditional Growth Monitoring and Promotion (GMP) and showed that CBGP had a higher effect on exclusive breastfeeding, timely supplementary feeding and dietary diversity. Apenkwa *et al.* (2022) also measured Community-based Management of Acute Malnutrition (CMAM) coverage and found that it is variable, with severe acute malnutrition being higher in rural Ahafo Ano South (52%) as compared to urban Kumasi (36%). However, the treatment coverage was better in rural areas.

In Kenya, Ilboudo *et al.* (2024) demonstrated that the addition of community health volunteers to facility-based care increased recovery rates (69.8% vs. 55.7) and reduced default rates when compared to facility-based care alone. According to Musimenta and Onyango (2024), Village Health Teams are associated with raising awareness of exclusive breastfeeding. Gudu *et al.* (2020) observed that in Busia County, vulnerable households were not being reached by the available interventions. On the whole, community-based models were successful, albeit inconsistently applied.

b. Nutrition-sensitive agriculture & livelihood empowerment

13% of the studies expounded on this theme. A study by Dallman *et al.* (2022) in Ghana revealed that nutrition-sensitive agricultural support and nutrition education affected growth and dietary

diversity positively, and children were three times more likely to consume eggs in the intervention group. Dalaba *et al.* (2022) also reported that rural communities ranked high on livelihood empowerment interventions, which is associated with addressing poverty in the context of child nutrition.

c. Nutrition education & caregiver training

This theme was emphasized in 13% of the studies. A single nutrition education session in orphanages in Nigeria raised the Minimum Meal Frequency (MMF) from 37.5% to 62.5%, according to Samuel *et al.* (2021). Minimum Dietary Diversity (MDD) rose from 52.5% to 80% as a result of the same nutrition education intervention (Samuel *et al.*, 2021). In a similar vein, Agbozo *et al.* (2015) in Ghana claimed that caregiver knowledge was the primary factor influencing the effectiveness of CBGP interventions. These results show that feeding behaviors can be changed with inexpensive, short-term training or educational interventions.

d. Micronutrient supplementation & dietary diversity

This theme was present in 20% of the studies. The Ghanaian rural population ranked micronutrient supplementation as one of the most effective nutrition interventions (Dalaba *et al.*, 2022). In Ghana, CBGP participants had greater dietary diversity (77% vs. 61% in GMP), according to Agbozo *et al.* (2015). According to Wakhungu *et al.* (2024), micronutrient deficiencies remained in all Kenyan farming systems, indicating the necessity of integrating human and animal nutrition interventions.

e. Policy and program gaps

This theme ran through 47% of the studies. A number of studies noted policy and implementation shortcomings. Studies conducted by Anin *et al.* (2020) reported that the extent of adherence to

Infant and Young Child Feeding (IYCF) practices did not reduce stunting/wasting, which reflects the ineffectiveness of policies. Apenkwa *et al.* (2022) demonstrated low CMAM coverage in urban (9.6%) and rural (30.4%) Ghana. Raji *et al.* (2020) identified limitations to policy reach due to poor access to healthcare and cultural barriers, which they reported in Nigeria. Gudu *et al.* (2020) also identified that existing programs in Kenya were not attractively efficient to alter household behaviors. As shown by Samuel *et al.* (2021), there are policy gaps in caregiver training, which highlights the absence of national programs. Wakhungu *et al.* (2024) demonstrated that there was variation in implementing micronutrient programs, and it depended on the farming systems.

Table 5.3 Themes Recorded Across Studies for Objective 3

Author (Year)	Community-Based Interventions	Agriculture / Livelihood Empowerment	Nutrition Education / Caregiver Training	Micronutrient Supplementation / Dietary Diversity	Policy & Program Gaps
Anin et al. (2020)					✓
Dallman et al. (2022)		✓			
Dalaba et al. (2022)		✓		✓	
Apenkwa et al. (2022)	✓				✓
Agbozo et al. (2015)	✓		✓	✓	
Raji et al. (2020)					✓
Otekunrin et al. (2022)					
Samuel et al. (2021)			✓		✓
Ilboudo et al. (2024)	✓				
Gudu et al. (2020)					✓
Musimenta & Onyango (2024)	✓				
Wakhungu et al. (2024)				✓	✓

5.3 Discussion of Finding

5.3.1 To analyze and compare the prevalence and trends of malnutrition among children under five years in Sub-Saharan Africa over the last decade.

a) Stunting

Stunting emerged as the most persistent form of undernutrition in the reviewed studies, with eight out of fifteen (53%) directly reporting on its prevalence. Studies from Kenya, Ghana and Nigeria included in this SLR highlights both the parallels and differences between how this challenge is emerging in Sub-Saharan Africa. Although national averages indicate progress in certain nations, the localised research from the studies included in the SLR shows the existence of hotspots where little has been done.

Chui, Osero and Mugo (2024) registered a stunting prevalence of 26.6% in their study in Kitui County in Kenya, significantly higher than the 18% national prevalence of stunting in the Kenya Demographic and Health Survey (KDHS) (2022). Such a disparity emphasizes the need to analyze sub-national data. Despite consistent national improvement regarding stunting in Kenya, with the prevalence of 35% to 18% from 2003 to 2022, the improvement has not been enjoyed equally by all counties. In arid and semi-arid areas in Kenya, this figure is consistently higher, usually exceeding 25%, as a result of frequent drought, food security and poverty (Chui, Osero and Mugo, 2024). Therefore, though the national trend is promising, persistent inequalities at the county level prove that implementation of interventions on a case-by-case basis is necessary in addition to aggregate gains.

Results in Ghana also show improvement as well as disparities. The prevalence of stunting was 22 to 33% (Anin et al., 2020; Dallman et al., 2022; Dalaba et al., 2022). These estimates are higher

as compared to the previous Ghana Demographic and Health Survey (GDHS) (2022). The difference between the national average and the higher figures reported in individual studies can be attributed to the focus of many localised studies on younger children (6–23 months) or on rural populations, where stunting is often more pronounced. This implies that even though Ghana is experiencing a persistent decline, the problem of stunting among the impoverished and those living in rural areas needs to be addressed.

However, when compared to the other two nations, Nigeria continues to have the highest prevalence of stunting. According to Akombi et al. (2017), about 37% of people are stunted, which is consistent with the 2018 Nigeria Demographic and Health Survey. Nigeria has been making less progress than Ghana and Kenya, and the country's stunting rates continue to be consistently higher. Additionally, the Nigerian studies that were part of the SLR (Akombi et al., 2017; Awoyemi and Abaniwonda, 2019; Raji et al., 2020) revealed significant regional differences, which is consistent with other research on the prevalence of stunting in Nigeria. According to John et al. (2023), for instance, the prevalence of stunting in Nigeria varies from 7% in the southern states to over 60% in the northern ones. Stunting is more common in Nigeria and there are notable regional differences because of underlying structural problems like chronic food insecurity, maternal malnutrition, limited access to healthcare and the effects of conflict and displacement in some areas.

The consensus between studies used in the SLR from the three countries is that stunting is the biggest malnutrition burden in Sub-Saharan Africa. This is in tandem with other studies (Tamir et al., 2024; Olakunle, 2024). The highest prevalence is in Nigeria and the trend in Ghana and Kenya is encouraging at the national level. Nevertheless, the difference between national survey data and localised studies is also a noticeable one. The more recent DHS statistics, especially in Ghana and Kenya, show lower national averages than what are reported in some of the analyzed studies, but

local surveys still show a substantial prevalence in areas. Such a tendency proves that national averages may obscure the reality of the high burden of malnutrition in localized areas and among vulnerable populations.

b) Wasting

Wasting, a manifestation of acute undernutrition, was the most common indicator among the reviewed studies. Research (Ilboudo et al., 2024; Musimenta and Onyango, 2024) indicates that in Kenya, the rate of wasting is reported to be between 9-24%. This is larger than the last national average of 5% recorded in the 2022 Kenya Demographic and Health Survey but aligns with other arid and semi-arid counties where wasting is most intense when there is a drought and food shortage. The asymmetry that is hidden beneath the national average is highlighted by the fact that counties such as Turkana, Garissa, and Mandera have continuously reported double-digit wasting rates (Ilboudo et al., 2024). This implies that even though Kenya has made significant progress in combating wasting, the problem persists in some rural and localized areas of the nation.

According to Akombi et al. (2017), Awoyemi and Abaniwonda (2019) and Raji et al. (2020), wasting rates in Nigeria range from 18% to 20%. These are significantly higher than the national average of roughly 7% found in the Nigeria Demographic and Health Survey of 2018. The reason for the discrepancy is that the study focused on high-risk areas, particularly the northern war-torn states, where acute malnutrition is made worse by food insecurity and displacement. According to these studies, wasting rates in some northern regions continue to exceed emergency levels, particularly during the lean season, even though the national average is regarded as moderate. This is an indication that there is unequal national progress with regards to wasting and that localized and contextual strategies are vital in reducing high wasting levels in the north.

Ghana shows a contrasting scenario with reported wasting rates between 6% and 14% in Agbozo, Colecraft and Ellahi (2015), Anin et al. (2020), Dalaba et al. (2022) and Dallman et al. (2022) studies. These numbers are generally consistent with the national estimate of 6% of the 2022 Ghana Demographic and Health Survey. The high-end results of single studies are probably localized rural or peri-urban areas where household food insecurity and poor child feeding habits are more widespread. In sum, Ghana seems to have stabilised wasting at comparatively lower levels than Kenya and Nigeria, although some sporadic increases are still being experienced in at-risk communities.

These findings collectively show congruence and variance with the overall literature. On one hand, the studies from the SLR confirm that wasting is extremely contextual and more dynamic than stunting, being subject to food scarcity, among other factors. Conversely, localised studies have a higher figure compared to national surveys which generalise different regions and different periods. What it means is that in Ghana and Kenya, the national averages are moderate, and in Nigeria, the national levels of DHS are lower, but the situation in areas, or certain communities may be even worse than depicted in the national statistics.

c. Underweight

Underweight (low weight-for-age) was reported slightly above half of the reviewed studies (53%), and prevalence estimates were more widely spread compared to stunting or wasting. Anin et al. (2020), Dallman et al. (2022), Apenkwa et al. (2022) and Agbozo et al. (2015) highlight underweight in Ghana. Such studies show that the country is in a transitional state with underweight being on a downward trend nationally but still concentrated in the poorer northern areas and in households lacking food security. According to the Ghana Demographic and Health

Survey (2022), the prevalence of underweight was estimated at approximately 12%, which is lower than what is reported in studies employed in the SLR.

Akombi et al. (2017) and Awoyemi and Abaniwonda (2019) report a consistently high prevalence of underweight in Nigeria, between 29% and up to 60% in certain groups of people. These are astronomically higher than the rates reported in Ghana and Kenya and are consistent with national surveys that put Nigeria at the top of the list of countries with the greatest underweight responsibility in Africa. Similar to the results on stunting and wasting, there are vast differences among the states in Nigeria, with the northern part bearing the brunt of the issue because of food insecurity, conflict displacement and persistent poverty.

According to Gudu et al. (2020) and Musimenta and Onyango (2024), the findings of the study in Kenya are rather mixed, with the percentage of underweight children ranging between 6% and 34%. This range is higher to the national estimate of underweight which is approximately 10% as per the 2022 Kenya Demographic and Health Survey. The higher values can be possibly attributed to county-specific difficulties, especially in pastoral and dry areas, where food shortage, frequent droughts, and lack of dietary diversity are the leading factors (Iiboudo et al., 2024).

The evidence indicates, in general that Ghana and Kenya are better in terms of underweight reduction, but Nigeria stands out as an outlier with consistently high rates. This is in line with the broader regional observations that highlight the slow pace of development in Nigeria compared to her peers (Ezeh et al., 2021; Adeyemi et al., 2022). The contextual variability of the indicator also demonstrates its sensitivity to long-term growth deficits as well as short-term nutritional shock.

d. Micronutrient Deficiencies (“Hidden Hunger”)

Micronutrient deficiencies were less frequently reported than anthropometric indicators, having been covered by only 20% of studies (three out of fifteen) and also known as hidden hunger. However, where quantified, the burden was great and disproportionately impacted rural and pastoral populations.

Wakhungu et al. (2024) recorded iron, zinc, vitamin A and iodine deficiencies among children under five in Kenya, as well as a non-negligible proportion of hidden hunger, despite an improvement in certain anthropometric indicators. These shortcomings were directly correlated with unvaried diets, frequent occurrence of food insecurity and inadequate availability of fortified foods in research conducted by Kimani-Murage et al. (2015).

Agbozo, Colecraft and Ellahi (2015) and Dalaba et al. (2022) both found strong relationships between micronutrient deficiencies and lack of dietary diversity in children under five years in Ghana. Their results depict how cultural feeding habits, poor mother education and poverty interact to reduce quality of the diets of children. This situation is confirmed by the GDHS (2022) national surveys which suggest that underweight and stunting are decreasing, but anemia and vitamin A deficiency are prevalent among preschool-aged children. This indicates that the issue of hidden hunger is still affecting children's health outcomes in Ghana.

The literature on micronutrient deficiencies is less substantial in comparison with anthropometric indicators, as biomarker data is more expensive and logistically difficult to obtain. However, existing evidence (Kimani-Murage et al., 2015; Okutse and Athiany, 2025) always demonstrates that micronutrient malnutrition is rampant and closely combined with poverty, geography and food systems.

e. Geographical and Rural–Urban Disparities

One theme that was consistent with the studies included in the SLR is that there are high levels of geographical and rural-urban inequity regarding malnutrition. 53% of the studies reviewed specifically highlighted this trend. In Sub-Saharan Africa, malnutrition is not distributed uniformly. Instead, it is concentrated in particular areas, groups or types of households, which in many cases is a manifestation of structural disparities and unequal access to services.

In Ghana, research by Dallman et al. (2022) and Anin et al. (2020) show that national averages are rising but still rural districts especially in the northern parts still record high rates of undernutrition. This is similar to findings by Apenkwa et al. (2022) who reported that severe acute malnutrition was 52% in rural Ahafo Ano South as opposed to 36% in Kumasi, indicating that vulnerability is also present in urban contexts but of a lesser degree than in the rural ones.

In Nigeria, the gap is quite severe. Awoyemi and Abaniwonda (2019) observed that the prevalence rates of severe stunting were 42.7% in rural Ekiti and 16.9% in urban settings. In the same way, Raji et al. (2020) also indicated that there are consistent regional differences with the northern rural communities as the most vulnerable. Such disparities are indicators of inequity in the distribution of food, maternal education, access to health care and sanitation infrastructure. This is consistent with other reports by Adeyemi et al. (2022) and Ekeh et al. (2021).

The same disparities are also evident in Kenya. Musimenta & Onyango (2024) reported that 82% of children in the Kihenda village were malnourished, whereas Wakhungu et al. (2024) reported that pastoral populations bore a disproportionate burden of micronutrient deficiencies. Similar to Ghana and Nigeria, the rural and marginalized groups are always at a disadvantage and climate shocks, and lack of livelihood opportunities causes a greater prevalence of malnutrition in pastoral regions.

Taken together, the evidence across all three countries demonstrates that location matters as much as national averages. Rural and pastoral populations carry a heavier burden, but urban poverty also presents risks, as seen in Kumasi, Ghana. These disparities reinforce the importance of context-specific interventions that target high-burden regions rather than relying solely on improvements reflected in national statistics.

5.3.2 Objective 2: To identify and compare the socioeconomic determinants of malnutrition among children under five years across Sub-Saharan Africa

Bronfenbrenner's (1979) Ecological Systems Theory can be used to understand the socioeconomic determinants of child malnutrition in Sub-Saharan Africa. Child nutrition is directly affected by the maternal education level, the size of the household and the feeding habits at microsystem level. The mesosystem focuses on the impact of community interactions, such as healthcare access, nutrition counselling and cultural feeding traditions. At the exosystem level, broader structural challenges like poverty, drought and conflict indirectly affect household nutrition decisions. Finally, the macrosystem reflects the influence of governance, policies, and cultural norms on nutritional outcomes. Together, these interconnected systems show that malnutrition is not caused by a single factor but by overlapping influences at the individual, household, community and societal levels, as highlighted by the studies included in the SLR.

a. Maternal Education as a Key Determinant

In all three countries, the studies from the SLR show that the level of maternal education is highly correlated with better feeding practices, reduced risks of stunting and increased growth outcomes. Agbozo et al. (2015) and Anin et al. (2020) in Ghana discovered maternal education had a significant impact on feeding and stunting. Mothers who had secondary education or above were

more likely to use the best practices in infant and young child feeding, including early initiation of breastfeeding and early introduction to diversified complementary foods. Apenkwa et al. (2022) further linked maternal education with severe acute malnutrition (SAM), showing that children of uneducated mothers were more vulnerable to severe forms of undernutrition.

Similar observations can be seen in Nigeria. Akompili et al. (2017) and Raji et al. (2020) found that the problem of wasting and underweight was more predominant in children whose mothers had not acquired formal education or had little of it. The lack of maternal education limited access to health information, proper weaning behaviors and access to available nutrition and health care. The effect was more severe in rural communities, where the disadvantages were compounded by poverty and lack of access to health facilities.

In Kenya, Gudu et al. (2020) and Musimenta & Onyango (2024) underscored the role of maternal and caregiver education in shaping child nutrition outcomes. Absence of basic education and knowledge restricted the mothers in giving correct child feeding, understanding sanitation practices and reacting appropriately to child diseases. These gaps led to high incidences of stunting and wasting as seen in places like Kitui County and pastoral societies.

These findings are in tandem with broader literature (Kimani-Murage et al., 2015; Adeyemi et al., 2022; Ekeh et al., 2021) in Sub-Saharan Africa which emphasizes maternal education as a protective factor against child malnutrition. However, because Nigeria lags behind Ghana and Kenya in terms of maternal education especially in the northern regions, the country has experienced slower declines in stunting and underweight compared to these other countries in SSA (Agu et al., 2019; Amugsi and Dimbuene, 2022).

b. Household Income and Poverty

Household financial resources, occupation and livelihood stability were repeatedly associated with the nutritional status of children, which further supports the relationship between socioeconomic status and malnutrition. In Ghana, Dallman et al. (2022) found that households who had a higher income had diversity in their diets and could access healthcare, suggesting a relationship between household income and malnutrition. Similarly, Dalaba et al. (2022) also established that poverty and household decision-making were factors informing one's participation in nutrition interventions. Apenkwa et al. (2022) also found a significant association between the mother's occupation and severe acute malnutrition. This suggests that employment not only provides income but also empowers women in child-care decision-making.

Akombi et al. (2017), Awoyemi and Abaniwonda (2019) and Raji et al. (2020) identified poverty and unemployment as key causes of malnutrition in Nigeria. Households with uncertain or no income had difficulty accessing adequate and nutritious food and the situation was complicated in conflict-affected and displaced areas, where there is an overlap of poverty with unstable income. This is why malnutrition especially under-weight and wasting are still disproportionately higher in northern Nigeria than in the south.

In Kenya, Wakhungu et al. (2024) illustrated how reliance on pastoral farming systems placed a limit on household income and contributed to "hidden hunger." Despite subsistence provided through pastoralism, its susceptibility to climate crises and drought meant that the food variety in the family was limited and shortages occurred regularly. This structural poverty not only perpetuated micronutrient deficiencies but also hindered the adoption of health and nutrition interventions.

These contexts demonstrate the predominance of poverty as a determinant which implies that it is both a direct and an indirect cause of malnutrition as other research has shown in the sub region.

Directly, poverty limits access to adequate and diverse foods. Indirectly, it restricts access to healthcare, sanitation and maternal education, creating a vicious cycle that sustains high levels of undernutrition (Siddiqui et al., 2020).

c. Maternal and Child Factors

Maternal and child factors including maternal body mass index (BMI), age, parity and child weight at birth were repeatedly revealed as determinants of malnutrition risk in children less than five years of age.

Anin et al. (2020) identified maternal age, height and BMI to play a significant role as predictors of stunting and wasting in Ghana. Chronic undernourishment in children was closely related to short maternal stature and low BMI, and this was an intergenerational cycle of malnutrition because maternal health directly relates to child growth. Likewise, Awoyemi and Abaniwonda (2019) identified child birth weight and maternal income in Nigeria as determinants of undernutrition. The impact of low weight at birth was particularly associated with subsequent stunting and underweight, highlighting the significance of maternal nutrition during pregnancy.

In Kenya, Musimenta & Onyango (2024) found that teenage motherhood heightened vulnerability to malnutrition. This is because younger mothers were less prepared both physically and socioeconomically to provide adequate care. Chui, Osero & Mugo (2024) further reported that maternal undernutrition, premature introduction of complementary feeding and having multiple children under five in a household significantly predicted stunting. These findings align with wider Sub-Saharan African literature. For example, Gewa and Yandell (2012) found that maternal factors, including nutritional status and age at first birth significantly influenced stunting and underweight.

d. Household Size and Crowding

Poor nutritional outcomes were repeatedly linked to larger households and overcrowded living conditions, and in many cases, it was because of competition over scarce food and financial resources. Anin et al. (2020) showed in Ghana that stunting was directly correlated with high household occupancy. Similarly, Raji et al. (2020) in Nigeria and Gudu et al. (2020) in Kenya verified that children living in bigger families were more susceptible to be malnourished. According to Awoyemi and Abaniwonda (2019), in urban Ekiti, Nigeria, bigger households increased the risk of malnutrition, especially when there is food deficiency. These findings are in line with post-2018 studies (Adeyemi et al., 2022; Ekeh et al., 2021; Amugsi and Dimbuene, 2022) across the region. For example, Amugsi and Dimbuene (2022) found that household crowding had a direct effect on reduced dietary diversity and less caregiver attention. Ekeh et al. (2021) also found that high household membership correlated with a higher risk of undernutrition.

This pattern also reveals a socio-economic dimension. Specifically, it highlights that larger households often coincide with poverty and unstable livelihoods, amplifying vulnerability. Cultural values in many African societies emphasize larger family sizes. However, the nutritional implications of such household structures highlight the need for targeted interventions that balance family planning with social protection and livelihood support.

e. Cultural Feeding Practices and Decision-Making Norms

Malnutrition was also found to be caused by cultural norms and household decision-making practices. Although their impact tends to be less documented than the maternal or household demographic factors, they had an enormous impact, affecting child feeding habits and access to proper diets. Dalaba et al. (2022) in Ghana found household decision-making to be of primary

importance to nutrition outcomes, with male household heads having a significant impact on food allocation and mother decisions about feeding children. In Nigeria, Raji et al. (2020) reported that due to cultural practices and beliefs, the country did not follow proper feeding practices, with some cultural norms discouraging the feeding of children with nutrient-rich foods (Raji et al., 2020). Wakhungu et al. (2024) in Kenya discovered that the dieting habits of pastoral households, which were based on cultural practices, limited the uptake of micronutrients. The high content of milk and starchy staples in their diets and little to no vegetables and protein intake contributed to hidden hunger among these communities.

These findings are consistent with broader literature (Adeyemi et al., 2022; Ekeh et al., 2021; Amugsi and Dimbuene, 2022) indicating that cultural norms and intra-household power dynamics shape not only what foods are available but also who has access to them. Such practices do not augur well for nutritional interventions and must be dealt with, through culturally sensitive education and community engagement.

f. Healthcare Access and Environmental Factors

The poorer nutritional health of children under five was also linked to limited access to quality health services, poor preventive care and environmental barriers. In Ghana, Anin et al. (2020) showed that postnatal care attendance and using insecticide-treated nets (ITNs) had a positive relationship with better nutrition outcomes. Among other things, mothers who frequently attended postnatal check-ups received more counselling on child feeding and health practices, resulting in reduced stunting and wasting. Similarly, ITNs helped in the reduction of incidences of malaria, which is a significant cause of morbidity in children and consequently undernutrition. These results are consistent with the general view that preventive healthcare services are an important factor to break the cycle of infection and undernutrition (Judge, 2021).

Akombi et al. (2017) discovered in Nigeria that a lack of access to healthcare especially in rural settings was strongly linked with increases in malnutrition. The inadequacy of health facilities, combined with the insufficiency of trained staff and necessary equipment, restricted the access of mothers to timely treatment of childhood diseases or to advice on feeding habits. This lack of access exacerbated the vulnerability of rural households, who already faced higher poverty rates and food insecurity. This emphasizes that health system weaknesses compound socioeconomic disadvantages which lead to high levels of child malnutrition.

In Kenya, Ilboudo et al. (2024) described the impact of long commuting distance to health facilities and lack of staff trained to address malnutrition. Musimenta & Onyango (2024) stressed the role of Village Health Teams in promoting proper breastfeeding and complementary feeding of children. These community health workers were instrumental in improving access to health information and health care services in their communities. As such, they helped to bridge some of the major access to care barriers. This brings to the fore the role of community-based health workers and local health systems in alleviating the impact of access to inadequate formal health care services.

These findings are in tandem with the wider literature (Zakayo et al., 2020; Kihagi et al., 2024) in Sub-Saharan Africa. For example, Zakayo et al. (2020) found that poor access to healthcare delays treatment for malnutrition in rural and marginalized communities. The contrasts between Ghana, Kenya, and Nigeria show that while Ghana benefits from relatively stronger preventive health outreach, Kenya and Nigeria still face substantial barriers in rural access and workforce distribution.

5.3.3 Objective 3: To evaluate and compare the effectiveness of existing health policies and interventions targeting malnutrition in Sub-Saharan Africa, highlighting gaps and challenges in their implementation.

a. Community-Based Interventions

In Ghana, Agbozo et al. (2015) compared Community-Based Growth Promotion (CBGP) with traditional Growth Monitoring and Promotion (GMP) and found that CBGP had a greater impact on exclusive breastfeeding, complementary feeding at the right age and dietary diversity. Apenkwa et.al. (2022) assessed Community-based Management of Acute Malnutrition (CMAM) and reported significant rural-urban dissimilarity, with severe acute malnutrition being more prevalent in rural Ahafo Ano South than in urban Kumasi. That notwithstanding, treatment coverage was higher in the rural regions. While this represents the potential of a community-based approach to reach populations that were previously hard to reach, this finding implies heterogeneity of program coverage and effectiveness.

In Kenya, Ilboudo et al. (2024) showed that integrating community health volunteers into facility-based care significantly improved recovery rates and reduced default rates. This suggests that community support strengthens the continuity of care. Similarly, Musimenta & Onyango (2024) noted how Village Health Teams helped in sensitizing people on exclusive breastfeeding, while Gudu et al. (2020) found that interventions do not cover vulnerable households located in Busia County. Together, the Kenyan studies highlight that approaches led by communities may be very effective but need to be applied consistently and with sufficient resources to prevent the neglect of high-risk communities.

Taken together, the evidence confirms that community-based interventions are central to reducing malnutrition, especially in rural and underserved areas. However, their success depends on coverage, community ownership and integration with formal health systems.

b. Nutrition-Sensitive Agriculture and Livelihood Empowerment

Nutrition-sensitive agriculture interventions and livelihood strategies target socioeconomic root causes of malnutrition by enhancing food security and resiliency of households. Dallman et al. (2022) found in Ghana that combining nutrition-sensitive agricultural support with nutrition education increased child growth and dietary diversity, with children in intervention households being three times more likely to eat eggs.

Another study by Dalaba et al. (2022) additionally discovered that rural populations significantly appreciated the role of livelihood empowerment programs in enabling households to manage poverty issues and indirectly enhancing child diets. The success of these kinds of programs is due to the fact they tie together food production, income generation and nutrition education as a means of dealing with the immediate and structural determinants of malnutrition. Yet challenges remain in scaling these programs equitably, particularly in remote or resource-poor settings.

c. Nutrition Education and Caregiver Training

In 13% of the studies, nutrition education and caregiver training were prioritized, although they had great potential to modify feeding practices at reasonably low costs. In Nigeria, Samuel et al. (2021) found that a single session of nutrition education in orphanages improved Minimum Meal Frequency (MMF) from 37.5% to 62.5%, while Minimum Dietary Diversity (MDD) increased from 52.5% to 80%. This highlights the efficacy of even short-term focused educational interventions. Similarly, Agbozo et al. (2015) came to a conclusion that the effectiveness of the

CBGP programs in Ghana also depended on the knowledge of the caregivers. The training of caregivers not only resulted in an improvement in the feeding practices but also the uptake of other health and nutrition training. These results indicate that education-based interventions are potentially very cost-effective, and thus especially applicable in health systems with limited resources. However, the challenge lies in maintaining training and implementing education into larger community-based programs and overcoming cultural factors that can restrict implementation of recommended feeding practices.

d. Micronutrient Supplementation and Dietary Diversity

Micronutrient supplementation and dietary diversity was present in 20% of the reviewed literature as direct interventions to address hidden hunger in Sub-Saharan Africa. Communities rated these interventions highly where they were evaluated and associated with better nutrition outcomes in children.

Dalaba et al. (2022) studied the rural populations in Ghana and micronutrient supplementation was identified by rural people as one of the most significant interventions to address child malnutrition. This finding reflects the recognition among caregivers that supplementation programs, such as vitamin A distribution or multiple micronutrient powders offer immediate and tangible benefits in settings where dietary diversity remains limited. This highlights the role of integrated community approaches in improving not just growth monitoring but also the quality of children's diets. In the same vein, Agbozo et al. (2015) observed that individuals participating in Community-Based Growth Promotion (CBGP) interventions had vastly more dietary diversity (77%), than individuals in traditional Growth Monitoring and Promotion (GMP) (61%). This supports the importance of community-based strategies in enhancing not only the monitoring of growth but also the nutrition of children.

In Kenya, Wakhungu et al. (2024) showed that micronutrient deficiencies for Kenyan households existed across different farming systems. The research indicated a stronger nexus between animal and human nutrition, stressing the importance of agriculture and nutrition interventions to complement each other in order to enhance dietary diversity. This is in line with the wider regional evidence (Burgaz et al., 2023; Ambikapathi et al., 2022) that while supplementation programmes can be effective in filling immediate gaps, achieving sustainable improvement in dietary quality demands food system change that facilitates access to nutritious foods.

e. Policy and Program Gaps

Policy and programme shortcomings were one of the most common themes, being present in 47% of studies. Although nutrition-related policies exist in SSA, gaps in implementation, coverage, and sustainability have limited their effectiveness.

In Ghana, Anin et al. (2020) reported that adherence to Infant and Young Child Feeding (IYCF) practices did not significantly reduce stunting or wasting, suggesting that current policies may not be sufficiently robust or context-specific to deliver the expected outcomes. Apenkwa et al. (2022) cited poor coverage of the Community-based Management of Acute Malnutrition (CMAM) program in both urban and rural settings, with the lower coverage of 9.6% in urban areas as compared to a rural coverage of 30.4%. This indicates gaps not only in program coverage but also in equity of service delivery.

In Nigeria, Raji et al. (2020) reported serious policy constraints associated with healthcare access and cultural barriers. At the national level, there were some formal interventions, but poor health infrastructure in the rural area and entrenched food-related beliefs affected the impact of these.

These findings highlight the importance of nutrition policies that are culturally sensitive and that are more integrated with health service delivery.

Evidence is similarly compelling in the case of Kenya where there are gaps in program design and delivery. Gudu et al. (2020) concluded that nutrition programs were neither attractive nor effective to change household feeding practices, and Samuel et al. (2021) noted that lack of systematic, national-level training programs for caregivers has led to gap in knowledge. Wakhungu et al. (2024) further observed that implementation of micronutrient programs varied depending on local farming systems, creating inconsistencies in coverage and effectiveness.

These findings are consistent with the broader critiques of the state of nutrition policy in Sub-Saharan Africa which have identified robust policy documents but weak implementation frameworks, lack of funding, and fragmented inter-sectoral coordination (Booth et al., 2021; Asirvatham et al., 2023). The variation in the three countries, Ghana, Nigeria and Kenya reflects the fact that although policies are in place, their effectiveness is compromised by lack of access and cultural fit with people's lives.

5.4 Quality Assessment

Appendix A presents the detailed quality assessment of the 15 studies included in this systematic literature review. Regarding selection bias, most studies (72%) demonstrated moderate to strong representativeness of their samples. For instance, Akombi et al. (2017) used nationally representative DHS data across Nigeria, while Chui et al. (2024) employed multi-stage sampling of 420 mother–child pairs in Kenya. In contrast, approximately 28% of the studies, such as Dalaba et al. (2022) and Musimenta & Onyango (2024), relied on very small or localized samples, which reduced generalizability.

In terms of study design, a balanced spread was observed. Five studies (32%), including Ilboudo et al. (2024) and Dallman et al. (2022), were rated strong due to their randomized or highly structured designs. Seven studies (47%), such as Samuel et al.'s (2021) quasi-experiment, Gudu et al.'s (2020) case-control, and Akombi et al.'s (2017) large-scale cross-sectional studies, were rated moderate because they employed fairly robust designs. The remaining three studies (21%), such as Anin et al. (2020), Agbozo et al. (2015) and Raji et al. (2020) were rated weak, as their reliance on cross-sectional approaches limited causal inference. Since study design is central to the certainty of evidence, this distribution suggests that a fair portion of the studies offer moderate to strong evidence. However, the dominance of cross-sectional design limits the overall confidence in establishing cause-and-effect relationships between interventions and child malnutrition outcomes.

With respect to confounders, about 65% of the studies adequately controlled for socioeconomic or demographic variables (example: Ilboudo et al., 2024; Dallman et al., 2022; Akombi et al., 2017). The other 35% failed to adjust for all relevant factors, as seen in studies like Anin et al. (2020) and Otekunrin et al. (2022), thereby weakening their validity.

Blinding was consistently absent across all study types. None of the cross-sectional or case-control studies incorporated blinding, and even experimental studies such as Dallman et al. (2022) and Samuel et al. (2021) did not report sufficient blinding procedures. As a result, 100% of the studies were rated weak in this domain, raising concerns of potential observer and participant bias.

In terms of data collection methods, performance was more evenly distributed. About 42% of the studies, including Ilboudo et al. (2024), Dallman et al. (2022), and Wakhungu et al. (2024), employed strong, validated anthropometric or biochemical methods. Another 36%, such as Akombi et al. (2017), used standardized national tools that were reliable but had minor limitations.

The remaining 22%, such as Anin et al. (2020) and Dalaba et al. (2022) relied on less reliable approaches like 24-hour recall or translation-dependent tools, resulting in weaker ratings.

Finally, regarding withdrawals and dropouts, this criterion applied primarily to intervention studies. Two studies (13.3%), Ilboudo et al. (2024) and Dallman et al. (2022) reported attrition clearly and addressed it in their analysis, receiving strong ratings. Samuel et al. (2021), however, did not adequately report attrition, which weakened its overall rating, while the majority of cross-sectional studies (80%) were not applicable for this domain.

Overall, 32% (5/15 studies) were rated strong, 47% (7/15 studies) were rated moderate and 21% (3/15 studies) were rated weak. This distribution reflects a body of evidence that is largely moderate in quality, with a fair proportion of strong studies but also a persistent minority of weaker studies that limit causal inference.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.0 Introduction

The study's conclusion is presented in this chapter. It highlights the conclusions reached in light of the study's objectives. The chapter also consists of recommendations for practitioners, policymakers and development partners. These recommendations are meant to improve existing strategies, fill in identified gaps and encourage more holistic and sustainable approaches to tackling child malnutrition in the region. Finally, the chapter emphasizes the limitations of the study and suggestions for future studies.

6.1 Conclusion

This study has demonstrated that malnutrition among children under five years remains a critical public health challenge in Sub-Saharan Africa, particularly in Ghana, Nigeria and Kenya. Despite numerous international and national interventions aimed at addressing stunting, wasting, underweight and micronutrient deficiencies, the prevalence of malnutrition continues to be unacceptably high across the region. According to the studies reviewed, the main causes of the issue are cultural feeding practices, food insecurity, low maternal education, socioeconomic disparities and limited access to healthcare. Furthermore, despite the modest advancements made by policies like Ghana's National Nutrition Policy, Nigeria's National Food and Nutrition Policy, and Kenya's National Nutrition Action Plan, their efficacy has been weakened by a lack of funding, inadequate coordination of policies, inadequate monitoring and ongoing structural issues.

According to the findings, interventions are often reactive and fragmented rather than comprehensive and they fall short in addressing the root causes of child malnutrition, which include poverty, gender inequality and food insecurity brought on by climate change. Although school feeding programs and community-based programs have shown promise, their sustainability and reach are still constrained. This review is significant because it emphasizes the need for multi-sectoral, equity-focused and preventive strategies that integrate nutrition-specific programs with more general nutrition-sensitive strategies like food security programs, social protection and maternal education.

The synthesis of evidence as a cross-country study assists in addressing the absence of comparative research on malnutrition interventions in Sub-Saharan Africa. It also gives practical information to policymakers, practitioners and international development partners. To achieve Sustainable Development Goal 2 (Zero Hunger) by 2030, greater political will, more investment and more stringent monitoring systems will be necessary to hold them accountable and effective. Finally, to address child malnutrition in SSA, regional efforts are required to respond to the short-term nutrition demands and the longer-term socioeconomic frameworks supporting poor child health outcomes.

6.2 Recommendations

6.2.1 Enhance Multi-Sectoral Co-Operation in Nutrition Programs

Since the study concluded that malnutrition is instigated by interrelated factors including poverty, poor maternal education and food insecurity, governments must consider using a multi-sectoral strategy that incorporates health, agriculture, education and social protection. To illustrate, agricultural extension services and women empowerment initiatives should be connected with

maternal and child health programs to counter both the immediate and its root causes of malnutrition.

6.2.2 Additional Funding and Resource Investment in Nutrition programs.

A major observation was that the implementation of policies like the Ghana National Nutrition Policy, Nigeria National Food and Nutrition Policy, and Kenya National Nutrition Action Plan is hampered by limited financial resources. To ensure that the programs are delivered sustainably, governments and development partners must allocate more funds to nutrition-specific and nutrition intervention programs, enhance infrastructure and provide appropriate stock of micronutrient supplements.

6.2.3 Improve Community-Based Nutrition Programs

It was indicated that interventions at the community level, including the growth monitoring programs have been effective but still not extensive in terms of coverage and sustainability. The expansion of community-based interventions with active participation of local leaders, caregivers and community health workers will expand outreach, enhance child feeding behaviors and make interventions culturally appropriate.

6.2.4 Educate and Sensitize the Mothers

The results demonstrated the importance of maternal knowledge and education in child nutrition. Governments and non-governmental organizations ought to increase sensitization efforts on infant and young children feeding behaviors, exclusive breastfeeding and balanced diets. By introducing nutrition education as a part of formal education and informal community education, mothers and caregivers can be equipped with the necessary knowledge on preventing malnutrition.

6.2.5 Enhance Monitoring, Evaluation and Accountability Systems

The study showed that monitoring and evaluation systems are weak, and they decrease the capacity to track progress and change interventions. Introducing effective monitoring systems, which include routine monitoring of data, routine reporting and accountability systems will assist in quantifying the impact of the program, detecting gaps at early stages and ensuring that interventions are sensitive to evolving needs.

6.3 Limitations of Study and Suggestions for Future Studies

First, secondary data was used in the study. Although these sources provided thorough overviews of nutrition policies and initiatives in Ghana, Nigeria, and Kenya, it's possible that they contained biases, inconsistencies or insufficient coverage. Because of this, the results might not accurately reflect the dynamics of malnutrition at the community level or in real time.

The study's geographic scope is another drawback. The study offered depth and comparative analysis by concentrating on three nations, but it was unable to capture the wider diversity of the Sub-Saharan African region. In addition to enabling the identification of regional trends and context-specific best practices, broadening the scope of future research to encompass more Sub-Saharan African nations would strengthen cross-country policy harmonization.

Additionally, the study focused on programmatic and policy-based interventions, which did not directly include the opinions of frontline healthcare workers, local communities or caregivers. The comprehension of cultural customs, behavioral obstacles and grassroots difficulties that affect the efficacy of nutrition programs may have been restricted by this omission.

Finally, it is hard to say whether the current progress in reducing malnutrition is resilient to external shocks like pandemics, economic downturns, or climate change because the study did not evaluate

the long-term sustainability of interventions beyond the data period that is currently available. Future research could monitor the sustainability and long-term effects of interventions. Monitoring kids and families over time would show whether programs result in resilience to shocks and long-lasting improvements.

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APPENDIX A

QUALITY ASSESSMENT OF THE STUDIES

Table A.1 Quality Assessment of Studies

Study	Selection Bias	Design	Confounders	Blinding	Data Collection	Withdrawals / Dropouts	Global Rating
Ilboudo et al. (2024)	Strong	Strong (cRCT)	Strong	Weak	Strong (anthropometrics)	Strong	Strong
Dallman et al. (2022)	Strong	Strong (RCT)	Strong	Weak	Strong (anthropometrics)	Strong	Strong
Akombi et al. (2017)	Strong (nationally representative)	Weak (cross-sectional)	Strong	Weak	Moderate (DHS validated)	N/A	Strong
Chui et al. (2024)	Strong (multi-stage sampling)	Weak (cross-sectional)	Moderate	Weak	Strong (anthropometrics)	N/A	Strong
Wakhungu et al. (2024)	Moderate	Weak (cross-sectional, mixed)	Moderate	Weak	Strong (biochemical tools)	N/A	Strong

Samuel et al. (2021)	Moderate	Moderate (quasi-experiment)	Moderate	Weak	Strong (WHO diet indicators)	Weak (not reported)	Moderate
Gudu et al. (2020)	Moderate (hospital-based)	Moderate (case-control)	Weak	Weak	Moderate	N/A	Moderate
Apenkwa et al. (2022)	Moderate	Weak (cross-sectional, mixed)	Moderate	Weak	Moderate	N/A	Moderate
Agbozo et al. (2015)	Moderate	Weak (cross-sectional)	Moderate	Weak	Moderate	N/A	Moderate
Awoyemi & Abaniwonda (2019)	Moderate	Weak (cross-sectional)	Weak	Weak	Moderate	N/A	Moderate
Raji et al. (2020)	Moderate	Weak (cross-sectional)	Weak	Weak	Moderate	N/A	Moderate
Otekunrin et al. (2022)	Moderate	Weak (cross-sectional)	Weak	Weak	Moderate	N/A	Moderate
Dalaba et al. (2022)	Weak (small sample)	Weak (cross-sectional, mixed)	Weak	Weak	Weak (translation issues)	N/A	Weak

Anin et al. (2020)	Moderate	Weak (cross-sectional)	Weak	Weak	Weak (24-hour recall)	N/A	Weak
Musimenta & Onyango (2024)	Weak (small sample)	Weak (cross-sectional)	Weak	Weak	Moderate	N/A	Weak

Appendix B: PRISMA 2020 Checklist for the Study

Table B.1: Prisma 2020 Checklist

Section	Item	Checklist Item	Reported in Thesis (Yes/No)	Location in Thesis
TITLE	1	Identify the report as a systematic review.	Yes	Title Page
ABSTRACT	2	Structured summary (objectives, methods, results, conclusion).	Yes	Abstract
INTRODUCTION	3	Rationale: Describe rationale for the review.	Yes	Ch. 1 (Background/Problem)
	4	Objectives: Explicit statement of the objectives.	Yes	Ch. 1 (Objectives)
METHODS	5	Eligibility criteria: Define inclusion/exclusion criteria.	Yes	Ch. 3 (Methodology)
	6	Information sources : Describe databases, dates, etc.	Yes	Ch. 3
	7	Search strategy: Present full search strategy.	Yes	Ch. 3
	8	Selection process: How studies were screened and selected.	Yes	Ch. 3
	9	Data collection process.	Yes	Ch. 3
	10	Data items: List and define variables sought.	Yes	Ch. 3

	11	Study risk of bias assessment (e.g., EPHP).	Yes	Ch. 3
	12	Effect measures (outcomes of interest).	Yes	Ch. 3
	13	Synthesis methods (how results were combined).	Yes	Ch. 3–4
RESULTS	14	Selection of studies: Numbers screened, assessed, included (PRISMA flow).	Yes	Ch. 4
	15	Study characteristics (countries, interventions, outcomes).	Yes	Ch. 4
	16	Risk of bias in studies.	Yes	Ch. 4
	17	Results of individual studies.	Yes	Ch. 4
	18	Results of syntheses.	Yes	Ch. 4
DISCUSSION	19	Summary of evidence.	Yes	Ch. 5
	20	Limitations of the evidence.	Yes	Ch. 5
	21	Conclusions/implications.	Yes	Ch. 5
OTHER	22	Funding/support.	No	—
	23	Competing interests.	No	—
	24	Registration/protocol.	No	—

Appendix C: Search Strategy and MeSH Terms

Databases searched: PubMed, Scopus, Web of Science, and Google Scholar.

Time frame: 2015 – 2025.

Keywords/MeSH Terms used:

"Malnutrition" [MeSH] OR "Undernutrition" OR "Nutritional Deficiencies"

"Child, Preschool" [MeSH] OR "Children under five" OR "Under-five children"

"Public Health" [MeSH] OR "Public Health Interventions" OR "Health Programs"

"Africa South of the Sahara" [MeSH] OR "Sub-Saharan Africa" OR specific country names
(e.g., Ghana, Nigeria, Kenya)

Boolean operators:

The following search string was used in PubMed:

("Malnutrition"[MeSH] OR "Undernutrition" OR "Nutritional Deficiencies")
AND ("Child, Preschool"[MeSH] OR "Children under five" OR "Under-five children")
AND ("Public Health"[MeSH] OR "Public Health Interventions" OR "Health Programs")
AND ("Africa South of the Sahara"[MeSH] OR "Sub-Saharan Africa" OR Ghana OR
Nigeria OR Kenya)

Limits applied:

Language: English

Publication type: Peer-reviewed journal articles

Population: Children under five years

Region: Sub-Saharan Africa

DECLARATION

I, Sarah Okyere, hereby declare that this thesis titled “Effectiveness of Public Health Interventions for Combating Malnutrition in Children Under Five in Sub-Saharan Africa: A Systematic Review” is my original work. To the best of my knowledge, it has never been submitted, in whole or in part, for the award of a degree at this or any other university. Every information source used in this study has been properly credited with the relevant references and citations.

Candidate’s Name: _____

Signature: _____

Date: _____