

**ASSESSMENT OF THE FACTORS ASSOCIATED WITH MALNUTRITION IN
CHILDREN UNDER FIVE YEARS AT KAPKATET SUB COUNTY HOSPITAL**

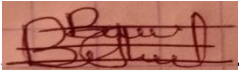
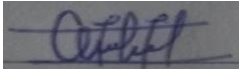


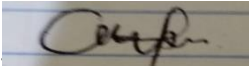
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**A RESEARCH PROJECT/THESIS SUBMITTED IN THE PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE AWARD OF DEGREE IN NURSING, OF THE
SCHOOL OF HEALTH SCIENCES, UNIVERSITY OF KABIANGA.**

DECLARATION

We declare that this research thesis is our original and independent work, and has not been presented or published anywhere. All the sources that have been quoted/cited have been acknowledged through provision of references. We have designed and conducted the research study in accordance with the ethical principles and guidelines outlined by the University of Kabianga, Kapkatet Campus. We upheld the highest standards of integrity, professionalism, and confidentiality throughout the research process until completion of the study.

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Supervisor

The supervisor of this research study has reviewed the research proposal, thesis and protocols presented by the student researchers and is satisfied that the study adheres to the ethical principles and guidelines of the University of Kabianga, Kapkatet Campus. By signing below, I affirm my support for the student researchers and their commitment to throughout this study with integrity and adherence to ethical guidelines.

Supervisor's Name ...**Dr. Dabo Halake**... Signature:



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LIST OF ABBREVIATIONS AND ACRONYMS

AIDS Acquired Immune Deficiency Syndrome

ANC Antenatal Care

ARI Acute Respiratory Infection

BMI Body Mass Index

HAZ Height for Age Z-scores

HIV Human Immunodeficiency Virus

IUGR Intrauterine growth retardation

MAM Moderately Acute Malnutrition

MUAC Mid-upper-arm circumference

NCHS National Center for Health Statistic

NGOs Non-Governmental Organizations

OPD Outpatient Therapeutic Department

PEM Protein Energy Malnutrition

PHCC Primary Health Care Center

PHCU Primary Health Care Unit

PLW Pregnant and lactating women

PLWHA People Living with HIV/AIDS

PM2A Prevention of Malnutrition for children under two years of Age

PMCT Prevention of Mother to Child Transmission

SAM Severely Acute Malnutrition

UNICEF United Nations Children's Fund

USAID United States Agency for International Development

WFP World Food Program

WHO World Health Organization

WHZ Weight for Height Z-scores

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ABSTRACT

Prevalence of various forms of malnutrition among children has increased on a global scale and according to recent data, there has been 222 million of more children suffering from under nutrition in Sub-Saharan Africa in 2016 than there were in 2010. Malnutrition remains a significant public health concern globally, with varying prevalence rates across different regions and countries. The study aimed to assess factors associated with malnutrition in children under five years of age in Kapkatet Sub County Hospital. The study adopted cross-sectional study design. The study was carried out in Kapkatet Subcounty Hospital. The research targeted 44 children under 5 years of age, however the response rate was 91%. This study employed a convenience sampling technique. The data were obtained from respondents using structured questionnaires. Data was analyzed using Statistical Package of Social Sciences (SPSS). Descriptive statistics were summarized using mean, frequency and percentages. Binomial Logistic Regression analysis was used to determine association between independent variables and outcome variables (extent of malnutrition among under five years). Data were presented using tables and pie chart. The majority of children under 5 years of age, were of 24-35 months, accounting for 22.5% of the sample. Females' children were more prevalent, constituting 62.5% of the sample, while males accounted for 37.5%. the prevalence of malnutrition is highest in children aged 12-23 months, with 25% of children in this age group being malnourished. The prevalence of malnutrition is also relatively high in children aged 24-35 months and 48-59 months, at 22.2% and 20% respectively. The results also show that there is a slight gender difference in the prevalence of malnutrition, with slightly more girls (24%) being malnourished than boys (13.3%). The Composite Index of Anthropometric Failure (CIAF) of malnutrition in this study is 20%, which is relatively high. Among under 5 years children population, stunting growth was still the highest with 10% of the participants having it,

followed by 7.5% for underweight and 2.5% for wasting. The mean duration of breastfeeding in the sample population was 4.5 months. The mean age at which complementary foods were introduced to infants was 3.6 months. Approximately 35.0% reported have less than 3 meals per day, while 55.0% reported having 3 meals per day. A smaller proportion of participants, 10.0%, reported having more than 3 meals per day. Majority of 60.0% reported undergoing regular routine health check-ups. Majority, 45%, of the study participants (parents) reported that they were satisfied with healthcare services provided, followed by very satisfied (25%), neutral (15%), dissatisfied (10%) while the least were very dissatisfied (5%). Socio-demographic factors such as parental age (46 and above years), educational level (no formal and tertiary education), occupation (unemployment), household income, child's age and number of children under 5 years in a family (3 or more) were statistically associated with malnutrition among under 5 years children. Furthermore, dietary patterns or practices such as number of meals per day and eating of balanced diet meals were significantly associated with malnutrition among under 5 years children. Therefore, it its significant to emphasize the urgent need for targeted interventions to combat malnutrition, improve nutrition practices, and promote overall health and well-being among children. By addressing these challenges and implementing effective public health interventions, we can mitigate the negative consequences of malnutrition and ensure a healthier future for children in the population.

CHAPTER ONE: INTRODUCTION

1.1 Outline

This chapter contains the background of the study, statement of the problem, objectives of the study, research questions, significance of the study and scope of the study.

1.2 Background to the study

Malnutrition according to World Health Organization (WHO), (2016), malnutrition is a condition that results from deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. The term malnutrition covers two broad groups of conditions. One is 'under nutrition'—which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). The other is overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes and cancer.)

However according to Anderson & Ray (2012), malnutrition can also occur when an individual's diet does not provide him/her with adequate calories and proteins needed for maintenance and growth or they cannot fully utilize the food they eat due to illness (under nutrition), while those who suffer from over nutrition consumes too much calories. Malnutrition is not exclusively a problem of extreme poverty, nor only of the young, but affects all communities around the world and people of all ages including pregnant women.

Globally, Malnutrition is regarded as the most important risk factor for illness and death and it is associated with 52.5 % of all deaths in young children (Müller & Krawinkel, 2005). According to UNICEF, (2014), out of the 161 million under-fives estimated to be stunted globally

in 2013, over a third resided in Africa. It is considered as a major cause of child morbidity and mortality globally. There are several interventions to prevent the condition, but it is unclear how well they are taken up by both malnourished and well-nourished children and their mothers and the extent to which this is influenced by socio-economic factors (Tette et al., 2015).

Despite impressive progress in reducing hunger and poverty, about 800 million people worldwide continue to suffer from undernourishment. Food insecurity and malnutrition are problems affecting rural areas, as part of a pattern of deep-rooted spatial inequalities. Conventional sectoral agriculture and food policies often overlook such territorial disparities and, consequently, are unlikely to suffice to meet the sustainable development goal of ending hunger and achieving food security for all by 2030 (Cistulli et al., 2016).

Improving the educational status of parents, especially of mothers, on nutrition, sanitation and common disease prevention strategies should logically reduce the malnutrition related mortality and morbidity. It is said that the way to the child's stomach is through the mind of the mother. Quality of food taken, choices and quantity are all at the discretion of the mother or care giver. This problem is very crucial in Sub Saharan Africa, where access to formal education for the girl child in certain communities is still a major burning challenge. The burden of malnutrition has been directly linked to poverty, quality of food intake, excessive disease and poor health status (World Bank, 2006).

In Kenya, maternal and child malnutrition is a significant public health problem, among children aged 6-59 months, 26% are stunted, 11% are underweight, and nearly 23% are acutely malnourished of which 13% are estimated to suffer from moderate acute malnutrition and 10% from severe acute malnutrition.

UNICEF's conceptual framework on nutrition developed in 1990 identifies the underlying causes of malnutrition. The framework illustrates that the causes of malnutrition are multifaceted and considers insufficient access to food, inadequate maternal and child care, and insufficient health services. Causes are categorized as immediate (disease and inadequate dietary intake), underlying (food, health and care) and basic (control and use of resources). (United Nations Children's Fund (UNICEF), 2013). In the context of Kenya, food insecurity is a chronic problem, mostly owing to decades of conflict, though also due to floods and drought throughout the region. The health-specific issues are substantial, generally stemming from the lack of access for the vast majority of the population to decent health facilities, water and a clean and sanitary environment. Finally, care, referring to the practices taking place with caregivers and receivers of care, is hindered due to social, physical and economic reasons (Harvey & Rogers-Witte, 2007). Malnutrition and infection combine to have destructive results on health. Diarrhea is one of the leading causes of death and stems from poor hygiene and sanitation, caused and aggravated by a number of factors. Problems include the lack of potable water, access to water supply systems and sanitation facilities, as well as contaminated water and food (Caulfield et al., 2004). Since 2010, no national-level data had been available on key nutrition indicators. In 2018, through a UNICEF-led initiative, food security and nutrition monitoring system data quality were improved, generating national-level data on key nutrition indicators. The data revealed that between 2010 and 2018, national global acute malnutrition prevalence decreased from 23 per cent to 13 per cent and that stunting prevalence fell from 31 per cent to 17 per cent. (UNICEF, 2019) Prevention of malnutrition for children under two (PM2A) is a new approach being used by the United States Agency for International Development (USAID). Since 2010, PM2A has been adopted on a widespread basis in food assistance programs with the aim of preventing chronic malnutrition

(stunting) in non-emergency settings. While PM2A is a relatively new strategy and efforts are under way to evaluate outcomes, more evidence is needed to determine the appropriateness of the PM2A approach in highly food insecure contexts and to establish the range of contexts in which PM2A is a choice approach for food assistance programs. (Doocy et al., 2013). From the above point of view therefore the assessment of factors associated with malnutrition in children under five years of age must be put into consideration and more importantly its management, control and prevention should be emphasized.

1.3 Statement of the problem

Prevalence of various forms of malnutrition among children has increased on a global scale and according to recent data, there has been 222 million of more children suffering from under nutrition in Sub-Saharan Africa in 2016 than there were in 2010 (WHO, 2018.) Although stunting in under-fives has reduced, the number affected still continues to soar while those wasted are at 13.8 million children (WHO, 2018). Children under nutrition has significantly higher in Kenya, yet stunting rates remains over the WHO cutoff of 20% and the rate of double burdens is at 43% nationwide (Kimani-Murage *et al.*,2016). Despite improvements and eradicating poverty and empowering women, under nutrition is still a major problem in Kenya (El Kishawi *et al.*, 2016)

According to UNICEF study from 2016, Kericho county is one of the 28 counties in Kenya with a high prevalence of stunting and wasting with rates ranging at ranging from 20 to 28%. According to a 2013 report from the Kericho county government, the counties incidence of stunting was 28.7% compared to the nation average of 26.0% while its rate of underweight was 12.4% compared to the 11.0% nationally (Kericho County Health at Glance, 2013). The aforementioned research clearly illustrates that malnutrition exists both at a national and county scale but no precise study on Kapkatet Sub-County. From the hospital records of both pediatric

unit and the MCH, they were total of 53 out 195 children with cases of malnutrition seen in the past 6 months with January having highest number of cases, 8 at MCH and 5 in the ward. This equates to 27.2% of children with cases of malnutrition reported in for the last 6 months. This situation therefore necessitated the study to determine factors associated with malnutrition cases at Kapkatet sub county hospital.

While there have been studies on malnutrition in Kenya and other regions, there is a specific knowledge gap regarding the factors associated with malnutrition in Kapkatet Sub-County. Understanding these factors is crucial for developing effective interventions and policies to address the problem. Malnutrition refers to deficiencies, excesses, or imbalances in energy and nutrient intake, resulting in adverse health outcomes (WHO, 2016). Despite efforts to reduce malnutrition, it remains a significant public health concern globally, particularly in low- and middle-income countries like Kenya (UNICEF, 2014).

Malnutrition has severe consequences for children's health, growth, and development. It increases the risk of morbidity and mortality, impairs cognitive and physical development, and perpetuates the cycle of poverty (Black et al., 2013). In Kapkatet Sub-County, the prevalence of malnutrition is not well-documented, but there is evidence of high stunting and wasting rates in the surrounding regions (UNICEF, 2016). This suggests that malnutrition is likely a problem in Kapkatet Sub-County as well. Malnutrition affects children's overall health and well-being. It compromises their immune system, making them more susceptible to infections and diseases (UNICEF, 2014). It also hinders their growth and development, leading to stunting, wasting, and underweight conditions (WHO, 2018). These conditions have long-term consequences, such as reduced cognitive abilities, poor school performance, and decreased productivity in adulthood (Black et al., 2013).

This study aimed to address the problem by conducting a comprehensive investigation into the factors associated with malnutrition in Kapkatet Sub-County. By identifying the specific socio-demographic factors, such as maternal education, household income, and household size, as well as other factors like dietary patterns, feeding practices, and healthcare utilization, we can gain insights into the underlying causes of malnutrition in the region. The findings of this study would contribute to filling the knowledge gap by providing a deeper understanding of the factors that contribute to malnutrition in Kapkatet Sub-County. This knowledge can inform the development and implementation of targeted interventions and policies aimed at preventing and addressing malnutrition. For example, interventions can focus on improving nutrition education and counseling for caregivers, promoting optimal feeding practices, and enhancing access to healthcare services for early detection and management of malnutrition cases.

1.4 Objectives of the Study

1.4.1 Broad objectives

To determine factors associated with malnutrition in children under five years in Kapkatet sub-county hospital.

1.4.2 Specific objectives

- i. To determine the extent of malnutrition in children under five years in Kapkatet sub-county hospital.
- ii. To determine socio-demographic factors associated with malnutrition among children under five years in Kapkatet sub-county hospital.
- iii. To investigate the dietary patterns and feeding practices of children under five years in Kapkatet sub-county hospital.

- iv. To explore healthcare utilization and access to healthcare services among mothers/caregivers of children under five years in Kapkatet sub-county hospital.

1.5 Research questions

- i. What is the extent of malnutrition among children under five years in Kapkatet sub-county hospital?
- ii. How do socio-demographic factors associate with malnutrition among children under five years in Kapkatet sub-county hospital?
- iii. What are the dietary patterns and feeding practices of children under five years in Kapkatet sub-county hospital?
- iv. What is the level of healthcare utilization and access to healthcare services among caregivers of children under five years in Kapkatet sub-county hospital?

1.6 Significance of the study

The purpose of this study is to identify factors associated with malnutrition in children under 5 years in Kapkatet sub-county hospital and to challenge administrative powers to initiate proper interventions to handle this situation. The study looked into the extent of malnutrition in children under the age of five in the Kapkatet sub-county hospital, as well as the socio-demographic factors, dietary patterns, feeding practices, healthcare utilization, and access to healthcare services in relation to malnutrition.

Malnutrition is a major public health concern, especially among children, because it can have long-term consequences for their physical and cognitive development. This study is significant, particularly in provision of vital information on the scale of the problem in the specific region by estimating the level of malnutrition in Kapkatet sub-county hospital, enabling for

focused interventions and resource allocation. Understanding the socio-demographic variables that contribute to malnutrition is critical for identifying vulnerable populations and establishing effective prevention and treatment techniques. By examining factors such as income, education, household size, and parental characteristics, the study might contribute to a comprehensive understanding of the social determinants of malnutrition in this population.

Investigating the dietary patterns and feeding practices of children under five years in Kapkatet sub-county hospital is essential to identifying potential risk factors for malnutrition. This information provides insights into the types of foods consumed, the frequency and quality of meals, and the influence of cultural and behavioral practices on nutrition. Additionally, examining healthcare utilization and access to healthcare services among caregivers of children under five years is vital for understanding the barriers and facilitators to seeking medical care for malnutrition. The findings help in identification of gaps in healthcare access and utilization and inform the development of interventions to improve healthcare-seeking behaviors.

1.7 Assumptions of the study

The study assumed that the information that obtained from the respondents were valid and were used to determine cases of malnutrition among children less than 5 years. The study also assumed that there was enough time and resources to allow the researcher carry out the research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section of the proposal attempts to answer the research questions and furthers the objectives of the study and all related literature. Literature is from different sources such as text books, internet, journals and health articles among others. The literature is organized according to the objectives of the study.

2.2. Prevalence of Malnutrition

Malnutrition is a complex condition characterized by an imbalance between nutrient intake and the body's requirements for optimal growth, development, and overall health (UNICEF, 2019). It can arise due to inadequate consumption of essential nutrients or impaired absorption and utilization within the body (World Health Organization [WHO], 2020). Malnutrition may take several forms, including undernutrition, overnutrition, and micronutrient deficiencies, each with its own set of health concerns (UNICEF, 2020). According to World Health Organization, malnutrition is a condition characterized by an imbalance between the intake of nutrients and the body's nutritional requirements, resulting in deficiencies, excesses, or imbalances in energy, protein, and/or micronutrient intake. It encompasses both undernutrition, which refers to inadequate intake of essential nutrients, and overnutrition, which refers to excessive intake of nutrients leading to obesity or diet-related non-communicable diseases (World Health Organization [WHO], 2020).

Malnutrition remains a significant public health concern globally, with varying prevalence rates across different regions and countries (WHO, 2021). Prevalence of malnutrition among

children under five years of age is a critical indicator of the overall nutritional status and well-being of this vulnerable population. The Global Nutrition Report (2020) estimated that 149 million children under five years of age worldwide are stunted, while 45 million are wasted.

Stunting, or low height-for-age, is an indicator of chronic undernutrition and reflects long-term inadequate nutrition. According to the Global Nutrition Report (2020), approximately 149 million children under the age of five worldwide were affected by stunting. The highest prevalence of stunting is observed in Sub-Saharan Africa, where around 30% of children are stunted, followed by South Asia with approximately 25% (UNICEF, 2020). According to Okolie et al. (2021), revealed that 28.4% of the children were stunted, 19.6% were wasted, and 5.9% were underweight in Nigeria.

Wasting, or low weight-for-height, indicates acute undernutrition and is associated with recent weight loss or insufficient weight gain. The prevalence of wasting among children under five globally is estimated to be around 7.3%, with the highest rates seen in Central and West Africa (UNICEF, 2020). In emergencies and humanitarian settings, the prevalence of wasting can be much higher, reaching critical levels.

Micronutrient deficiencies are also a significant concern among children under five years of age. Vitamin A deficiency, for example, affects approximately 190 million children globally, with the highest burden observed in Africa and Southeast Asia (World Health Organization, 2019). Iron deficiency, which can lead to anemia, affects approximately 40% of children under five in developing countries (WHO, 2019).

According to the Global Nutrition Report (2020), in 2020, 26.8% of Kenyan children under five years of age were stunted, while 4.5% were wasted. Additionally, 16.5% of Kenyan women

of reproductive age were underweight, and 7.6% were overweight. The prevalence of malnutrition in Kenya varies across regions, with the highest rates observed in arid and semi-arid areas. For example, in the Turkana region, the prevalence of stunting is 43%, while in Mandera, it is 39%. In contrast, the prevalence of stunting in Nairobi is 11% (KNBS, 2014). A study conducted in 2019 in western Kenya found a high prevalence of malnutrition among children under five years of age. The study reported a stunting prevalence of 35.4%, wasting prevalence of 4.8%, and underweight prevalence of 18.4% (Onyango-Makumbi et al., 2020). Another study conducted in 2021 in Nairobi, Kenya, found that the prevalence of stunting among children under five years of age was 23.8%, while the prevalence of wasting was 3.7% (Kiarie et al., 2021). The high prevalence of malnutrition in Kenya is attributed to various factors, including poverty, limited access to nutritious food, inadequate sanitation and hygiene, and limited access to healthcare. The COVID-19 pandemic has further exacerbated the situation, with disruptions in food supply chains and increased poverty levels (UNICEF, 2021). Several factors contribute to the high prevalence of malnutrition in Kenya, including poverty, inadequate access to nutritious food, limited access to healthcare services, and poor sanitation and hygiene. In addition, frequent droughts and other environmental factors exacerbate the problem, particularly in arid and semi-arid areas.

2.3 Socio-demographic factors associated of malnutrition

2.3.1 Maternal Age

Nutritional status of the child and the mother's ability to provide optimal nutrition can be impacted by the age of the mother during childbirth. Young maternal age, usually defined as below 20 years, is associated with a higher risk of malnutrition in children. Studies have shown that children born to adolescent mothers are more likely to be malnourished than those born to older mothers (Ngnie-Teta et al., 2013; Dearden et al., 2017). Adolescent mothers may lack the

knowledge and experience needed to provide adequate nutrition and may face greater challenges in accessing healthcare services and nutritious food (Ngnie-Teta et al., 2013). This may be due to several factors, such as a higher likelihood of multiple births, preterm births, and pregnancy complications, which can impact the mother's ability to provide adequate nutrition for the child (Dearden et al., 2017). According to Wado et al. (2019), optimal range of maternal age associated with the lowest risk of child malnutrition. This study revealed that children born to mothers aged 20-34 years had a lower risk of stunting compared to those born to younger or older mothers. Similarly, another study found that children born to mothers aged 20-34 had a lower risk of stunting and underweight compared to children born to adolescent and older mothers (Tesfaye et al., 2021).

The prevalence of malnutrition in children under five years is higher among those born to adolescent mothers compared to those born to older mothers. The Kenya Demographic and Health Survey (KDHS) 2014 found that children born to mothers aged 15-19 years had a higher prevalence of stunting (38%) and underweight (24%) compared to those born to mothers aged 20-34 years (KDHS, 2014). Similarly, children born to mothers aged 35 years and above had a higher prevalence of stunting (40%) and underweight (27%) compared to those born to mothers aged 20-34 years (KDHS, 2014).

2.3.2 Marital status

Single mothers, who are not in a marital or cohabiting relationship, often face distinct challenges in providing optimal nutrition for their children. Recent studies have shown that children in single-mother households experience higher rates of food insecurity and are more likely to have inadequate nutrition compared to children in married-parent households (Whitaker et al., 2020). Limited financial resources, lack of social support, and increased parenting responsibilities

contribute to the nutritional vulnerabilities of single mothers and their children. Children raised in stable marital or cohabiting relationships tend to have better nutritional outcomes. Research conducted in various contexts has consistently found that children in married-parent households exhibit improved nutritional status compared to children in single-parent households (Li et al., 2021). Stable relationships provide a conducive environment that fosters consistent income, shared responsibilities, and access to social support networks, all of which positively impact child nutrition.

Children from divorced or separated parents face an elevated risk of malnutrition. Studies conducted in different countries have indicated a higher prevalence of stunting and other forms of malnutrition among children from divorced or separated parents (Giacomin et al., 2021). The economic strain, disrupted family dynamics, and reduced access to resources that often accompany divorce or separation contribute to the nutritional vulnerabilities faced by these children.

2.3.3 Religion

According to Nigatu et al. (2019) children from Muslim households had a higher prevalence of stunting compared to children from Christian households. Similarly, a study conducted in Pakistan found that the prevalence of stunting was significantly higher among Muslim children compared to Hindu and Christian children (Ashraf et al., 2020). The study also found that Muslim children had a higher prevalence of underweight and wasting, although the differences were not statistically significant. Furthermore, a study conducted in India found that Muslim children had a higher prevalence of stunting and underweight compared to Hindu and Christian children (Bharati et al., 2020).

Religious beliefs and practices often have implications for dietary choices and restrictions. Certain religious groups may follow specific dietary guidelines, such as vegetarianism, fasting, or avoidance of certain food groups. These dietary practices can potentially affect the nutritional adequacy of children's diets. For example, a study conducted in India found that children from vegetarian households had a higher prevalence of stunting compared to children from non-vegetarian households (Sabate et al., 2020). Religious dietary restrictions may limit the intake of certain essential nutrients, potentially contributing to malnutrition. religious practices related to breastfeeding initiation, duration, and exclusive breastfeeding may vary among different religious communities. A study conducted in Nigeria found significant differences in breastfeeding practices among Muslim and Christian mothers, with Muslim mothers exhibiting higher rates of exclusive breastfeeding (Adewuyi et al., 2017). These variations in feeding practices may impact the nutritional status of children within different religious groups.

2.3.4 Maternal education

Studies have consistently shown that mothers with no education or low education levels are more likely to have children who experience malnutrition. For example, a study conducted in Nigeria found that children of mothers with no education had a higher prevalence of stunting, underweight, and wasting compared to children of mothers with higher education levels (Ene-Obong et al., 2019). The lack of education can limit a mother's knowledge about proper nutrition, infant feeding practices, and healthcare-seeking behaviors, which are crucial for ensuring optimal child nutrition. Similarly, a study conducted by Dahiru & Aliyu, (2018), found that children of mothers with no education had a significantly higher prevalence of stunting and underweight compared to children of mothers with any level of education

Maternal completion of primary education has been associated with improved child nutrition outcomes compared to those who have no formal education. A study conducted in Bangladesh found that children of mothers who completed primary education had a lower prevalence of stunting and underweight compared to children of mothers with no education (Hossain et al., 2020). Primary education equips mothers with basic literacy and numeracy skills, enabling them to make informed decisions about child feeding, hygiene, and healthcare

Higher levels of maternal education, such as secondary and tertiary education, have consistently shown positive associations with child nutrition outcomes. A study conducted in India found that children of mothers with secondary or higher education had a lower prevalence of stunting, underweight, and wasting compared to children of mothers with lower education levels (Chakrabarti et al., 2020). Maternal secondary and tertiary education provide mothers with a broader understanding of nutrition, healthcare, and access to information and resources, which can positively influence child nutrition. Consistently, according to the Global Nutrition Report 2020, in low- and middle-income countries, children of mothers with no education were more likely to experience stunting compared to children of mothers with secondary or higher education levels (Global Nutrition Report, 2020).

2.3.5 Household Size

Several studies have found a positive association between larger household size and a higher prevalence of malnutrition among children. A study conducted in Nigeria reported that children from larger households had a higher risk of stunting and underweight compared to children from smaller households (Okop et al., 2017). Similarly, a study conducted in India found that children from larger households had a significantly higher prevalence of stunting and underweight (Bhargava et al., 2020). According to Khan et al. (2019), households with a higher

number of children under five years old had a significantly higher prevalence of stunting and underweight. Furthermore, a study conducted in Nigeria found a positive association between household size and child malnutrition, with larger households having a higher prevalence of stunting and underweight (Olack et al., 2019). The findings suggested that as household size increases, the available resources for food, healthcare, and caregiving may become limited, leading to a higher risk of malnutrition among children.

A study conducted in Pakistan found that larger household size was associated with a higher risk of child malnutrition, likely due to limited resource availability and compromised caregiving practices (Ali et al., 2020). Larger household size can lead to increased competition for limited resources, including food and healthcare, within the household. This can result in insufficient access to nutritious food and healthcare services for each household member, particularly children.

2.3.6 Employment Status

Unemployment or lack of stable employment can contribute to an increased risk of malnutrition among children. Unemployed parents often face financial constraints, which can limit their ability to provide adequate food and nutrition for their children. A study conducted in South Africa found that households with unemployed caregivers had a higher prevalence of child malnutrition compared to households with employed caregivers (AbdulwasIU et al., 2020). The lack of income and financial resources can lead to food insecurity and hinder access to essential healthcare services, thereby increasing the risk of malnutrition.

In many regions, informal or low-paying employment is prevalent. Such employment may be associated with limited access to social protection, inadequate wages, and job insecurity. A

study conducted in urban slums of India found that children of parents engaged in informal employment had a higher prevalence of malnutrition compared to children of parents engaged in formal employment (Srivastava et al., 2018). Informal employment often lacks job benefits and stability, making it challenging for families to ensure consistent access to nutritious food and healthcare for their children.

Employed mothers with good salaries often contribute to an increased household income, which can positively impact the availability of resources for adequate nutrition. A study conducted in India found that higher maternal income was associated with a lower prevalence of stunting among children (Raghunathan et al., 2019). Increased income provides opportunities for improved food security, access to a diverse and nutritious diet, and better healthcare services, all of which can contribute to better child nutrition outcomes.

2.3.7 Household monthly income

Studies consistently show that households with low income are more likely to have a higher prevalence of malnutrition among children. Limited income restricts the ability to afford an adequate and diverse diet, access healthcare services, and provide a nurturing environment for children. According to the Kenya Demographic and Health Survey (KDHS) 2014, households with lower incomes had higher rates of malnutrition in children under five years old. The prevalence of stunting, wasting, and underweight was highest among households in the lowest income quintile (KDHS, 2014). These findings suggest that low household income is a significant risk factor for malnutrition in under-five children in Kenya. A study conducted in rural areas of Nigeria found that households with lower income had a higher prevalence of stunting and underweight among children (Ibrahim & Oyewole, 2020). Similarly, a study conducted in rural Cambodia found that children from poorer households had a higher prevalence of stunting, wasting, and underweight

(Gewa et al., 2019). These findings highlight the vulnerability of children from low-income households to malnutrition.

Income disparities within a population can also influence the prevalence of malnutrition. A study conducted in urban areas of India found that children from higher-income households had a lower prevalence of stunting and underweight (Semali et al., 2019). The widening income gap between the rich and the poor can exacerbate inequalities in access to quality food, healthcare, and other resources that are essential for child nutrition.

2.3.8 Gender disparity

Gender disparities can result in nutritional neglect and discrimination against girls in some societies. A study conducted in India found that girls had a higher prevalence of malnutrition compared to boys, which was attributed to gender-based discrimination, unequal access to resources, and differential care practices (Semali et al., 2019). Girls may receive less priority in terms of food allocation and healthcare, leading to poorer nutrition outcomes. In many societies, boys may receive preferential treatment in terms of nutrition and healthcare due to cultural beliefs regarding their future roles as breadwinners. For example, a study conducted in Bangladesh found that cultural practices such as purdah (seclusion of women) limited mothers' ability to access healthcare services, resulting in a higher prevalence of malnutrition among girls (Hossain et al., 2019). These gender-based norms and practices can perpetuate inequalities in child nutrition.

2.4 The Dietary Patterns and Feeding Practices

2.4.1 Frequency and quality of meals

The World Health Organization (WHO) recommends that infants should be exclusively breastfed for the first six months of life, with the introduction of complementary foods at six

months while continuing breastfeeding up to two years or beyond (WHO, 2021). Complementary feeding should be offered 2–3 times per day for infants 6–8 months of age and 3–4 times per day for those 9–23 months of age, with nutritious foods (WHO, 2021). The frequency of meals consumed by children is closely linked to their nutritional status. The frequency and quality of meals are important determinants of child nutrition. Regular and frequent meals, including breakfast, lunch, dinner, and snacks, provide a consistent supply of energy and nutrients. According to Sahoo et al. (2020), children who consumed three or more meals per day had a lower risk of underweight and stunting compared to those with fewer meals. A study conducted in rural Bangladesh found that higher meal frequency (≥ 4 meals per day) was associated with a lower prevalence of stunting among children aged 6-24 months (Khan et al., 2019). Similarly, according to Desalew et al. (2020), children who had more frequent meals (≥ 4 meals per day) had a significantly lower risk of stunting and underweight (Seth et al., 2019).

The quality of meals consumed by under five children is also critical in determining their nutritional status. Nutrient-rich foods, including fruits, vegetables, and animal source foods, are important in promoting optimal growth and development. In contrast, foods that are high in sugar, salt, and fat can lead to poor nutrition outcomes. A study conducted in Indonesia found that children who consumed a diverse diet, including fruits, vegetables, and animal source foods, had a lower risk of stunting (Dewi et al., 2021). A study conducted in Ghana also found that children who consumed animal source foods were less likely to be stunted or wasted (Adu-Afarwuah et al., 2017). On the other hand, a study conducted in Egypt found that children who consumed high-energy snacks were more likely to be underweight and stunted (El Shazly et al., 2020). Similarly, a study conducted in rural Uganda showed that a higher dietary diversity score was associated with

a lower risk of stunting and underweight among children aged 6-59 months (Namatovu et al., 2020).

2.4.2 Breastfeeding practices and complementary feeding

Exclusive breastfeeding, where infants receive only breast milk without any additional liquids or foods, is recommended by global health organizations, including the World Health Organization (WHO) and UNICEF. Exclusive breastfeeding provides essential nutrients, protective antibodies, and promotes healthy growth and development. A study conducted in Uganda found that exclusive breastfeeding for six months was associated with a lower risk of stunting among children (Ndugwa et al., 2019). Another study in Bangladesh demonstrated that exclusive breastfeeding reduced the risk of underweight and wasting in infants (Ahmed et al., 2021). Timely initiation of breastfeeding within the first hour of birth is crucial for the health and survival of newborns. It ensures early colostrum intake, which is rich in antibodies and provides protection against infections. A study in India revealed that delayed initiation of breastfeeding was associated with an increased risk of stunting and underweight among infants (Patel et al., 2020).

After six months of age, infants require complementary foods in addition to breast milk to meet their nutritional needs. Timely introduction of appropriate and diverse complementary foods is important for growth and development. A study conducted in Ghana showed that appropriate complementary feeding practices, including dietary diversity and meal frequency, were associated with improved nutritional outcomes among infants (Adekanmbi et al., 2021). Conversely, inadequate complementary feeding practices can contribute to malnutrition. A study in Nepal found that inappropriate complementary feeding practices were associated with an increased risk of stunting and underweight among children (Katuwal et al., 2019).

Responsive feeding involves recognizing and responding to an infant's hunger and satiety cues during feeding. It promotes a positive feeding environment and encourages self-regulation of food intake. A study in Malawi demonstrated that responsive feeding practices were associated with better growth and reduced stunting risk among infants (Phuka et al., 2018).

2.4.3 Dietary diversity

Dietary diversity refers to the consumption of a variety of foods from different food groups. It is an important aspect of nutrition as it ensures that the body gets a balanced and adequate supply of essential nutrients.

Several studies have shown a positive association between dietary diversity and improved nutritional status among children. A study conducted in Ethiopia found that higher dietary diversity scores were associated with a lower prevalence of stunting and underweight in children (Gebremedhin et al., 2020). Similarly, a study in Bangladesh reported that children with higher dietary diversity scores had a lower risk of stunting and wasting (Rah et al., 2017). These findings highlight the importance of consuming a variety of foods to meet nutritional needs and prevent malnutrition.

A study conducted in Nepal found that a higher dietary diversity score was associated with a reduced risk of anemia in children (Sharma et al., 2019). Including a variety of foods from different food groups can help ensure an adequate intake of essential nutrients, reducing the risk of micronutrient deficiencies. According to Gebremedhin et al. (2019), children who consumed a more diverse diet had a lower prevalence of stunting (chronic malnutrition) than those who had a less diverse diet. Another study conducted in Tanzania found that children who consumed a more

diverse diet had a lower risk of anemia compared to those who had a less diverse diet (Shadrach et al., 2020).

2.5 Healthcare Utilization and Access to Healthcare Services

Regular health check-ups for children are important for monitoring their growth and development, identifying any health issues or nutritional deficiencies early on, and providing appropriate interventions. A study conducted in Nigeria found that children who received regular check-ups had a lower prevalence of malnutrition compared to those who did not (Adebisi et al., 2021). Regular check-ups enable healthcare providers to detect and address any nutritional problems promptly.

Immunizations are vital for preventing infectious diseases that can contribute to malnutrition in children. Vaccines protect children from illnesses that can impair their appetite, nutrient absorption, and overall nutritional status. A study conducted in Ghana found that children who received full immunization were less likely to be malnourished compared to those who were not fully immunized (Baiden et al., 2019). Access to immunization services is crucial in reducing the burden of preventable diseases and promoting child nutrition.

Access to nutrition education and counseling services provides caregivers with valuable information on appropriate feeding practices, dietary diversity, and optimal nutrition for their children. A study conducted in Bangladesh found that mothers who received nutrition education and counseling had a better understanding of appropriate feeding practices, leading to improved child nutrition outcomes (Hasan et al., 2018). Nutrition education empowers caregivers to make informed decisions regarding their child's diet and helps prevent malnutrition.

Access to healthcare services, including proximity to health facilities and affordability of services, plays a vital role in healthcare utilization. A study conducted in rural areas of Ethiopia found that children living closer to health facilities had higher odds of receiving regular check-ups and immunizations (Biks et al., 2020). Improving access to healthcare services, particularly in underserved areas, can enhance healthcare utilization and contribute to better child nutrition outcomes

2.6 Conceptual framework

The independent variable is the variable that is manipulated or controlled by the researcher in an experiment or study. It is the variable that is hypothesized to have an effect on the dependent variable (Johnson & Christensen, 2019). In this study, independent variables were socio-demographic factors such as maternal age, education, household income, household size, and marital status; dietary patterns and feeding practices such as the frequency and quality of their meals, breastfeeding practices, introduction of complementary foods, and dietary diversity; and healthcare utilization and access to healthcare services such as regular check-ups, immunizations, and access to nutrition education or counseling.

The dependent variable is the variable that is measured or observed in an experiment or study. It is the variable that is expected to change as a result of the manipulation of the independent variable. The dependent variable is influenced by or dependent on the independent variable (McBurney & White, 2017). The dependent variable is the extent of malnutrition among children under five years. The extent of malnutrition is the outcome variable that is being measured and observed, and it is dependent on the independent variables to be studied.

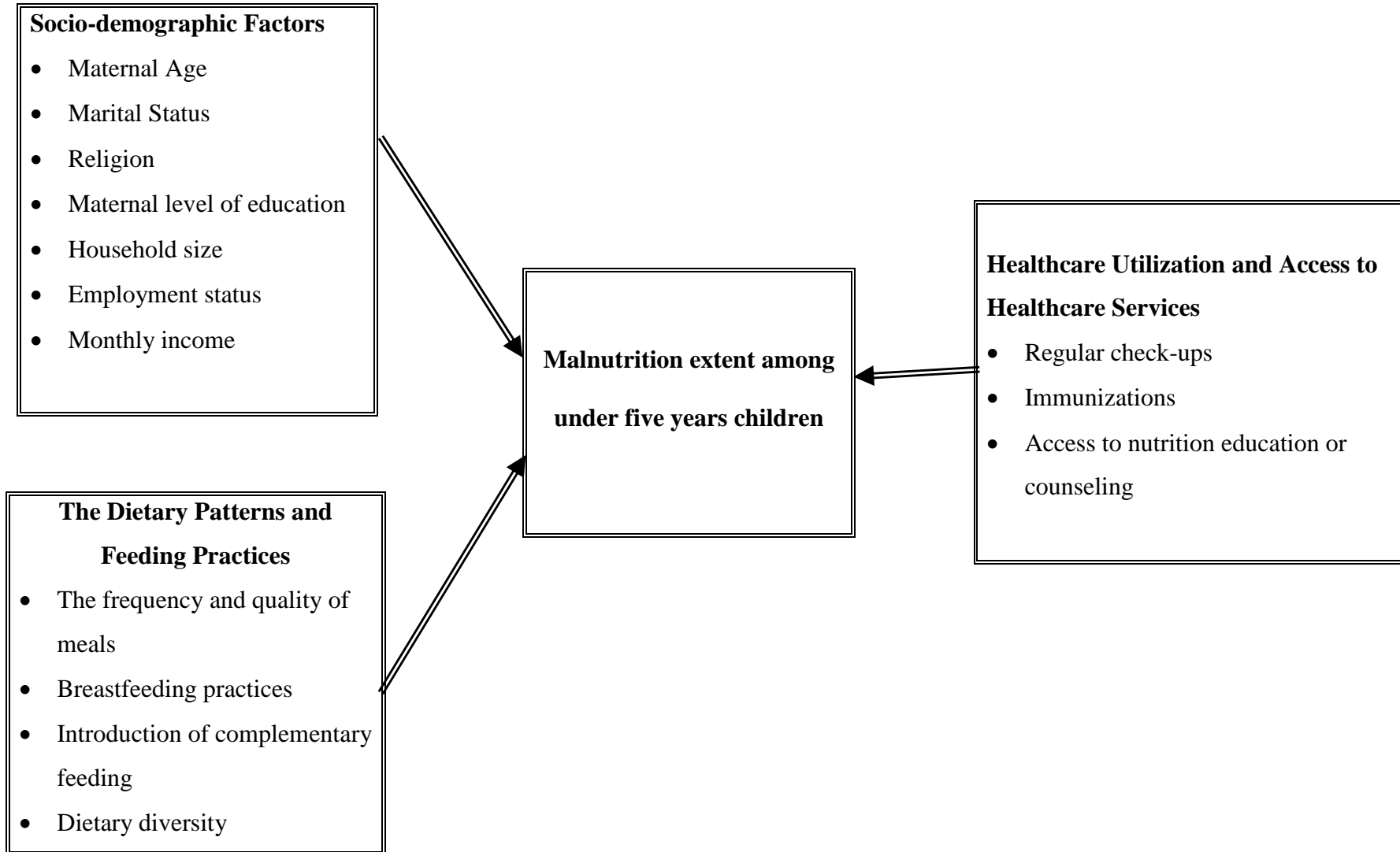


Figure 1: Conceptual framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses on research design, area of study, study population, sample and sampling procedure, research instrument of data collection, data analysis and presentation.

3.2 Study design

The study employed cross-sectional study design. Cross-sectional studies provided a snapshot of the population at a specific point in time, allowing researchers to gather data on multiple variables simultaneously. In the context of malnutrition among children under five, a cross-sectional design enabled researchers to assess the prevalence of malnutrition and its associated factors among the study population at a specific moment.

3.3 Study site

The study was carried out in Kapkatet Subcounty Hospital; in Bureti subcounty, along Kericho-Sotik Highway, approximately half a kilometer to the right-hand side of the highway on your way to Sotik. It is bordered by Kapkatet stadium and KMTC Kapkatet. It is one of the leading hospitals in the county which is committed to offer better healthcare services.

3.4 Study population

The study targeted all children under 5 years of age that were attending Kapkatet subcounty Hospital during study period.

3.5 Sampling technique

The convenience sampling technique was employed. Thus, the study involved all the respondents who happened to be available at the time of data collection and who met inclusion criteria.

3.5.1 Sample size determination

The desired sample size of the participants for this study were calculated using Fisher's et al formula below;

$$n = \frac{z^2 pq}{d^2}$$

Where;

n = desired sample size (if the target population is greater than 10,000).

z = the standard normal deviate at the required confidence level (1.96).

p = the proportion in the target population estimated to have characteristics being measured; since the prevalence is unknown, it was assumed to be 50% as recommended by Fisher, (1925).

$q = 1-p$.

d = the level of statistical significance set; 0.05

Therefore;

$$n = \frac{(1.96)^2 0.5(1 - 0.5)}{(0.05)^2}$$

$$n = 384$$

Since the entire population (N) was less than 10,000, the required sample size was smaller. Hence the final sample estimate (nf) was adjusted by use the following formula:

$$nf = \frac{n}{\{1 + (\frac{n}{N})\}}$$

Where;

nf = the desired sample size (if the target population is less than 10,000)

n = the desired sample size (when the target population is more than 10,000)

N = the estimate of the population size = 50

$$nf = \frac{384}{\{1 + (\frac{384}{50})\}}$$

$$nf = 44$$

3.6 Inclusion and Exclusion criteria

3.6.1 Inclusion Criteria

- i. Children under five years of age.
- ii. Children who are attending Kapkatet sub-county hospital.
- iii. Children whose parents or guardians provide informed consent for participation in the study.

3.6.2 Exclusion Criteria

- i. Children with known or diagnosed chronic diseases or medical conditions that directly affect nutritional status (e.g., cystic fibrosis, celiac disease).
- ii. Children with severe disabilities or impairments that affect feeding and nutritional assessment.
- iii. Children with incomplete or unreliable medical records.
- iv. Children whose caregivers do not provide consent for participation in the study.

3.7 Data collection techniques

The data was obtained from respondents using structured questionnaires ([Appendix IV](#)). A structured questionnaire provides a standardized format and set of questions for data collection. This ensures consistency in the information gathered from different participants, allowing for reliable comparisons and analysis of the data. These questionnaires were used as the main data collection instruments because of their efficiency and effectiveness in soliciting reliable and valid data. The structured questionnaire allows for efficient data collection as it provides pre-determined response options and closed-ended questions. This makes it easier for participants to understand and respond to the questions, and also facilitates the process of data entry and analysis.

3.8 Data analysis and Presentation

The study employed quantitative data analysis models. The raw data were analyzed quantitatively using statistical methods. The information on proportion of malnutrition by age, sex, residence and comorbidity were analyzed using descriptive statistics being summarized using mean, median, mode and presented in tables and figures. Data collected were analyzed for frequency and percentages and displayed using statistical package of social sciences (SPSS). Binomial Logistic Regression analysis was used to determine association between independent variables and outcome variables (extent of malnutrition among under five years).

3.9 Ethical consideration

The study was conducted upon approval by the supervisor. Legal approval and permission were sought from the Scientific and Ethical Review Committee (ISERC) of University of Kabianga; approval number **ISERC/2023/0015**. For access to health records for data collection purposes, a

letter was written to the medical superintendent, KSCH requesting for permission to carry out data collection. The participants were explained to, the importance of their participation in the study and possible benefits of the findings to their communities. Informed consent ([appendix III](#)) was sought from the participants by giving them consent forms to fill before taking part in the study and ensuring that the freedom, dignity, confidentiality and autonomy of the participants as independent human beings is respected. The researchers therefore, did not use any coercive methods or intimidation during data collection.

CHAPTER FOUR: FINDINGS

Response Rate

The response rate of this study was 91% who completely filled the questionnaires. 9% of the targeted eligible sample had incompletely filled the questionnaires and some of them pulled out during interview.

Socio-demographic characteristics of study participants

Table 1: Socio-demographic characteristics of the study participants

Socio-demographic characteristics	Frequency	Percentage
<u>Parental</u>		
Age		
18-25 years	8	20
26-35 years	12	30
36-45 years	10	25
46 or above years	10	25
Gender		
Female	39	97.5
Male	1	2.5
Highest educational level		
No formal education	8	20
Primary education	16	40
Secondary education	14	35
Tertiary education	2	5
Marital Status		
Single	4	10
Married	28	70
Divorced/separated	6	15
Widowed	2	5
Religion		
Christianity	39	97.5
Islamic	1	2.5
Occupation		
Employed	6	15
Self-employed	8	20
Unemployed	18	45
Student	6	15
Retired	2	5

Household size

1-3	17	42.5
4-6	16	40
7 or more	7	17.5
Household monthly income		
Low-income	9	22.5
Middle income	27	67.5
High income	4	10
<u>Child</u>		
Age		
< 6 Months	5	12.5
6-11 months	6	15.0
12-23 months	8	20.0
24-35 months	9	22.5
36-47 months	7	17.5
48-59 months	5	12.5
Gender		
Male	15	37.5
Female	25	62.5
Children under 5 years		
1	20	50.0
2	15	37.5
3 or more	5	12.5

The sample consisted of 40 participants, with varying socio-demographic characteristics. In terms of parental age, the largest group was between 26-35 years, accounting for 30% of the participants. There were equal proportions of parents in the age groups of 18-25 years, 36-45 years, and 46 years and above, each representing 20% of the sample. Gender distribution revealed a significant majority of females, comprising 97.5% of the participants. Males, on the other hand, constituted only 2.5% of the sample. Participants with primary education formed the largest group at 40%. This was followed by individuals with secondary education at 35%. Those with no formal education represented 20% of the sample, while individuals with tertiary education accounted for 5%. Marital status indicated that the majority of participants were married, comprising 70% of the sample. Single individuals accounted for 10%, while 15% were either divorced/separated or widowed. Christianity was the dominant faith, representing 97.5% of the sample. Islamic religion,

on the other hand, was followed by only 2.5% of the participants. Unemployment was the most prevalent status, accounting for 45% of the sample. Employed individuals constituted 15%, while self-employed individuals represented 20%. Students and retired individuals made up smaller proportions at 6% and 2%, respectively.

The majority of households had a size ranging from 1-3 members, accounting for 42.5% of the sample. Households with 4-6 members represented 40% of the sample, while households with 7 or more members constituted 17.5%. Middle-income households were the most prevalent, comprising 67.5% of the sample. Low-income households accounted for 22.5%, while high-income households represented 10%. The majority of children under 5 years of age, were of 24-35 months, accounting for 22.5% of the sample. Children aged 12-23 months and 36-47 months each represented 20% and 17.5% of the sample, respectively. The remaining age groups (<6 months, 6-11 months, and 48-59 months) each made up 12.5% of the sample. Females' children were more prevalent, constituting 62.5% of the sample, while males accounted for 37.5%. Furthermore, households with one child were the most common, representing 50% of the sample. Households with two children made up 37.5%, while those with three or more children represented 12.5%.

Prevalence of malnutrition

Table 2: Malnutrition prevalence among under 5 years

Child's	Frequency (Percentage)
Age	
< 6 Months	0 (0.0)
6-11 months	1 (16.7)
12-23 months	2 (25.0)
24-35 months	2 (22.2)
36-47 months	2 (28.6)
48-59 months	1 (20.0)

Gender	
Male	2 (13.3)
Female	6 (24.0)
CIAF 20	

The results show that the prevalence of malnutrition is highest in children aged 12-23 months, with 25% of children in this age group being malnourished. The prevalence of malnutrition is also relatively high in children aged 24-35 months and 48-59 months, at 22.2% and 20% respectively. The results also show that there is a slight gender difference in the prevalence of malnutrition, with slightly more girls (24%) being malnourished than boys (13.3%). However, this difference is not statistically significant. The Composite Index of Anthropometric Failure (CIAF) of malnutrition in this study is 20%, which is relatively high.

Malnutritional conditions prevalence

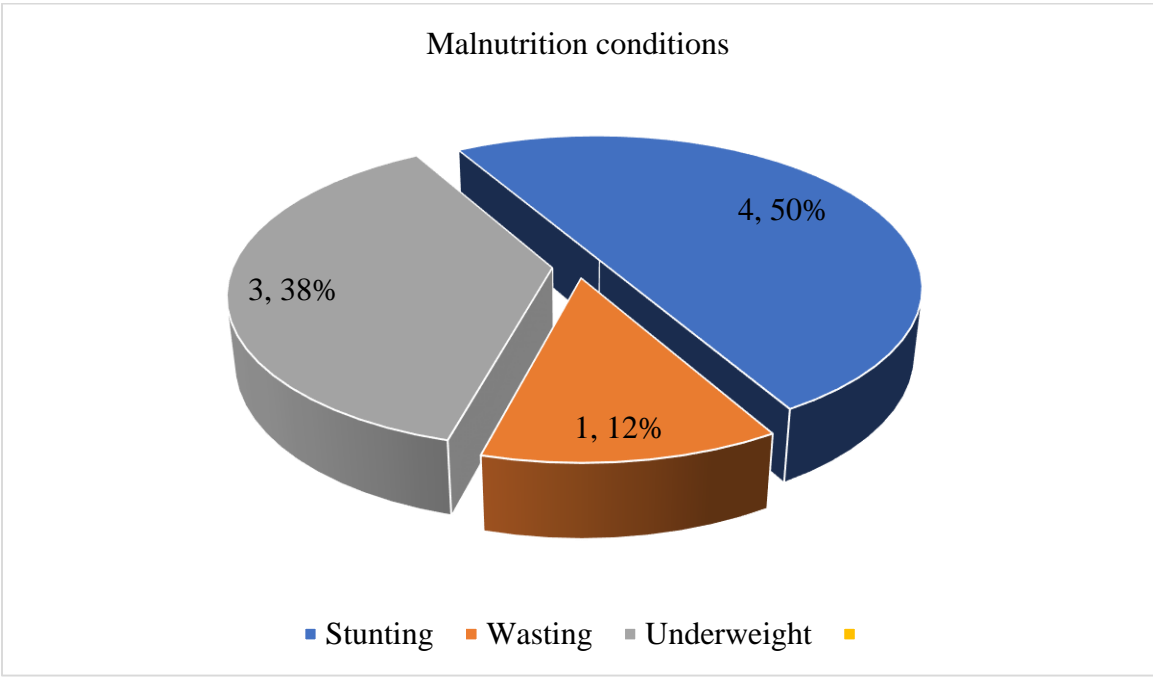


Figure 2: Proportions of malnutrition conditions among those with malnutrition

The larger proportion, 50%, of the all-malnutrition cases were attributed to stunting growth, followed by 38% for underweight and finally 12% for wasting. Among under 5 years children

population, stunting growth was still the highest with 10% of the participants having it, followed by 7.5% for underweight and 2.5% for wasting.

The dietary patterns and feeding practices of children under five years

Table 3: Infant feeding practice mean duration in months

Infant feeding practice	Mean (Months)
Breastfeeding duration	4.5
Complementary food introduction	3.6

The mean duration of breastfeeding in the sample population was 4.5 months. This indicates that, on average, infants were breastfed for a period of 4.5 months before other types of food or feeding methods were introduced. The mean age at which complementary foods were introduced to infants was 3.6 months. This suggests that, on average, caregivers started introducing solid foods or other complementary foods to their infants at around 3.6 months of age.

Table 4: Infant feeding practice and dietary patterns

Infant feeding practice and dietary patterns	Frequency (Percentage)
Meals per day	
Less than 3	14 (35.0)
3	22 (55.0)
More than 3	4 (10.0)
Awareness of dietary guidelines	
Yes	16 (40.0)
No	24 (60.0)
Balanced diet in meals	
Yes	26 (65.0)
No	14 (35.0)
Cultural/religious restrictions affect child's diet	
Yes	12 (30.0)
No	28 (70.0)

Among the participants, 35.0% reported having less than 3 meals per day, while 55.0% reported having 3 meals per day. A smaller proportion of participants, 10.0%, reported having more than 3 meals per day. It was found that 40.0% of the participants reported being aware of dietary guidelines, while the majority, 60.0%, reported not being aware of dietary guidelines. Among the participants, 65.0% reported having a balanced diet in their meals, indicating that their meals included a variety of different food groups. On the other hand, 35.0% of the participants reported not having a balanced diet in their meals. Around 30.0% of the participants reported that cultural or religious restrictions influenced their child's diet, indicating that certain food choices or dietary practices were influenced by cultural or religious beliefs. In contrast, the majority of participants, 70.0%, reported that cultural or religious restrictions did not affect their child's diet.

Healthcare utilization and access to healthcare services

Table 5: Healthcare utilization

Healthcare utilization	Frequency (Percentage)
Regular routine health check-up	
Yes	24 (60.0)
No	16 (40.0)
Satisfaction	
Very satisfied	10 (25.0)
Satisfied	18 (45.0)
Neutral	6 (15.0)
Dissatisfied	4 (10.0)
Very dissatisfied	2 (5.0)

Among the participants, a majority of 60.0% reported undergoing regular routine health check-ups. This indicates that they actively seek preventive healthcare measures and regularly visit healthcare providers for check-ups and monitoring. On the other hand, 40.0% of the participants reported not having regular routine health check-ups, suggesting a lower frequency of seeking

preventive care. When asked about their satisfaction with healthcare services, participants' responses varied. Among the participants, 25.0% reported being very satisfied with the healthcare services they received. A larger proportion, 45.0%, expressed satisfaction with the healthcare services provided. Around 15.0% of the participants reported a neutral stance regarding their satisfaction, indicating neither strong satisfaction nor dissatisfaction. However, 10.0% of the participants reported being dissatisfied with the healthcare services, and 5.0% expressed being very dissatisfied.

Table 6: Binomial-regression analysis of sociodemographic factors vs malnutrition cases

Socio-demographic characteristics	OR	95% CI
<u>Parental</u>		
Age		
18-25 years	1	
26-35 years	1.02	0.84-1.38
36-45 years	1.31	0.98-1.88
46 or above years	1.54	1.41-2.30
Highest educational level		
Primary education	1	
No formal education	1.42	1.06-1.89
Secondary education	0.6	0.23-1.92
Tertiary education	0.49	0.16-0.92
Occupation		
Employed	1	
Self-employed	1.10	0.85-1.38
Unemployed	1.43	1.19-1.87
Student	1.65	0.84-2.18
Retired	1.31	0.39-1.56
Household size		
1-3	1	1
4-6	1.23	0.59-1.69
7 or more	1.58	0.84-2.29
Household monthly income		
Low-income	1	
Middle income	0.72	0.51-0.89
High income	0.54	0.36-0.70
<u>Child</u>		
Age		
< 6 Months	1	

6-11 months	0.76	0.37-1.30
12-23 months	2.31	1.38-3.84
24-35 months	3.24	2.52-6.45
36-47 months	3.83	2.19-4.38
48-59 months	2.67	1.34-3.84
Gender		
Male	1	
Female	1.23	0.82-2.04
Children under 5 years		
1	1	
2	1.25	0.82-1.93
3 or more	1.41	1.14-1.87

According to the finding, under 5 years children who were living with parent aged 46 years and above have higher likelihood of experiencing malnutrition (OR: 1.54; 95% CI:1.41-2.30) compared to those who aged 18-25 years. Participants with a secondary education had significantly lower odds of malnutrition cases compared to those with tertiary education (OR = 0.49, 95% CI = 0.16-0.92). This suggests that higher educational attainment is associated with a reduced risk of malnutrition. Students had significantly higher odds of malnutrition cases compared to employed individuals (OR = 1.65, 95% CI = 0.39-1.56). This indicates that being a student is associated with an increased risk of malnutrition. Lower-income households were found to have significantly lower odds of malnutrition cases compared to higher-income households. Participants from low-income households had lower odds of malnutrition (OR = 0.54, 95% CI = 0.36-0.70), as did those from middle-income households (OR = 0.72, 95% CI = 0.51-0.89). These findings suggest that household income plays a role in determining the risk of malnutrition, with higher income levels being associated with a higher risk.

Regarding child age, the odds of malnutrition varied across different age groups compared to infants below 6 months. Children aged 12-23 months had significantly higher odds of malnutrition (2.31 times higher, 95% CI: 1.38-3.84). The odds increased further for children aged

24-35 months (3.24 times higher, 95% CI: 2.52-6.45), and peaked among children aged 36-47 months (3.83 times higher, 95% CI: 2.19-4.38). Even for children aged 48-59 months, the odds of malnutrition remained significantly elevated (2.67 times higher, 95% CI: 1.34-3.84). These findings indicate an increasing risk of malnutrition with increasing age within the under-5 age group. Furthermore, the number of children under 5 years in a household showed a significant association with malnutrition. Having two children under 5 years increased the odds of malnutrition (1.25 times higher, 95% CI: 1.14-1.87), and having three or more children under 5 years further elevated the odds (1.41 times higher, 95% CI: 0.82-1.93). These results suggest that households with multiple children under 5 years may face an increased risk of malnutrition.

Table 7: Binomial logistic regression analysis of dietary patterns/feeding practices vs malnutrition

Infant feeding practice and dietary patterns	OR	95% CI
Meals per day		
Less than 3	1	
3	0.69	0.23-0.89
More than 3	0.38	0.16-0.73
Awareness of dietary guidelines		
Yes	1	
No	1.39	0.38-1.71
Balanced diet in meals		
Yes	1	
No	2.15	1.29-4.29
Cultural/religious restrictions affect child's diet		
Yes	1.24	0.87-1.84
No		

The odds of malnutrition significantly decreased as the number of meals per day increased. Infants who consumed less than 3 meals per day had higher odds of malnutrition compared to those who had 3 meals (OR: 0.69, 95% CI: 0.23-0.89). Furthermore, infants who consumed more than 3 meals per day had even lower odds of malnutrition (OR: 0.38, 95% CI: 0.16-0.73). These

findings suggest that a higher frequency of meals per day is associated with a reduced risk of malnutrition among infants. the awareness of dietary guidelines showed a significant association with malnutrition. Furthermore, the presence of a balanced diet in meals was found to be significantly associated with malnutrition. Infants who had a balanced diet in their meals had significantly lower odds of malnutrition compared to those who did not (OR: 2.15, 95% CI: 1.29-4.29). This suggests that incorporating a variety of nutritious foods in the diet of infants is associated with a reduced risk of malnutrition.

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 DISCUSSION

Children between the ages of 12 and 23 months have the highest prevalence of malnutrition, with 25% of children in this age group being affected. This is consistent with previous research that has shown this age range to be a critical period for child growth and development (UNICEF, 2018). Additionally, the results indicate that children aged 24-35 months and 48-59 months also have relatively high rates of malnutrition, at 22.2% and 20%, respectively. These findings emphasize the importance of addressing nutritional needs during early childhood to prevent the long-term consequences of malnutrition. In terms of gender differences, the study reveals a slightly higher prevalence of malnutrition among girls (24%) compared to boys (13.3%), although this difference is not statistically significant. It is important to note that malnutrition affects children of both genders and requires attention regardless of gender. However, further research may be needed to explore potential underlying factors contributing to the observed differences in malnutrition prevalence among boys and girls. The Composite Index of Anthropometric Failure (CIAF), which measures overall malnutrition burden, was found to be 20% in this study. This indicates a considerable level of malnutrition within the sample population. The CIAF combines multiple anthropometric indicators, such as stunting, wasting, and underweight, to provide a comprehensive assessment of malnutrition (Black et al., 2013). The high CIAF score highlights the urgent need for targeted interventions to address malnutrition and improve the overall health and well-being of the affected children. In conclusion, the results demonstrate a high prevalence of malnutrition among children in the study sample, particularly among those aged 12–23 months. While there is a slight gender difference in the prevalence of

malnutrition, it is not statistically significant. The high prevalence of malnutrition in children under 5 years of age has a number of negative consequences. Malnutrition can impair physical and cognitive development, increase the risk of infections, and increase the risk of death. The Composite Index of Anthropometric Failure underscores the urgency of implementing effective public health interventions to combat malnutrition and improve the nutritional status of children in the population.

The results of the study indicate that stunted growth is the most prevalent form of malnutrition, accounting for 50% of all malnutrition cases. This finding aligns with previous research highlighting the significance of stunting as a major public health concern in child nutrition (Black et al., 2013). Stunting refers to impaired linear growth and is often indicative of chronic malnutrition or inadequate nutrition over a prolonged period of time (UNICEF, 2013). According to the World Health Organization (WHO) (2019) and the United Nations Children's Fund (UNICEF) (2021), stunting was present in 21.9% of children under 5 years of age globally. Underweight was present in 15.3% of children under 5 years of age, and wasting was present in 5.2% of children under 5 years of age. The high proportion of stunting emphasizes the need for interventions that address long-term nutritional deficiencies and promote healthy growth and development. There are a number of reasons why stunting is the most prevalent form of malnutrition in children under 5 years of age. Stunting is the result of chronic malnutrition, which means that it occurs over a long period of time. This is in contrast to underweight and wasting, which can be caused by acute malnutrition, which occurs over a shorter period of time. Stunting is the most prevalent form of malnutrition in children under 5 years of age because it is more difficult to detect than underweight and wasting. Stunting is not always visible, so it can be easy to overlook.

Underweight is another significant form of malnutrition, representing 38% of the cases in the study. Underweight refers to a low weight-for-age ratio and is typically associated with acute or recent malnutrition (Black et al., 2013). This finding is consistent with global estimates indicating that underweight continues to be a major concern, particularly in low- and middle-income countries (UNICEF, 2018). Efforts to address underweight should focus on improving access to nutritious food and ensuring adequate caloric intake for children. Wasting, characterized by a low weight-for-height ratio, accounted for 12% of the malnutrition cases in the study. Wasting is often a result of acute malnutrition and is associated with a rapid decline in weight (UNICEF, 2013). Although the proportion of wasting cases is lower than stunting and underweight, it still requires attention as it indicates acute nutritional deficiencies that can lead to severe health consequences if not addressed promptly (Black et al., 2013). Strategies targeting wasting should include interventions that provide immediate and adequate nutritional support to affected children.

The mean duration of breastfeeding of 4.5 months indicates that infants in the study were breastfed for an average of 4.5 months before transitioning to other types of food or feeding methods. This finding is consistent with recommendations from the World Health Organization (WHO) and other public health organizations, which encourage exclusive breastfeeding for the first six months of life (WHO, 2019). Breastfeeding provides numerous health benefits for infants, including optimal nutrition, protection against infections, and improved cognitive development (Victora et al., 2016). The average duration of breastfeeding in the study population falls within the recommended timeframe, which is crucial for promoting infant health and development. The mean age of 3.6 months suggests that caregivers in the sample population typically started introducing solid foods or other complementary foods to their infants at around 3.6 months of age. The introduction of complementary foods is an important milestone in infant feeding practices, as

they provide additional nutrients and help meet the changing nutritional needs of growing infants (Fewtrell et al., 2017). The recommended age for introducing complementary foods is generally around six months, as recommended by the WHO (WHO, 2019). However, the findings of this study indicate that caregivers in the sample population initiated complementary feeding slightly earlier, at around 3.6 months. This finding highlights the need for targeted education and guidance for caregivers regarding optimal timing and appropriate types of complementary foods to ensure adequate nutrition and minimize the risk of the early introduction of inappropriate foods. These results have significant implications for public health. They provide insights into breastfeeding practices and the introduction of complementary foods, which are crucial factors in infant nutrition and health outcomes. The average duration of breastfeeding aligns with recommendations for exclusive breastfeeding, which is essential for promoting optimal growth, development, and overall health of infants. On the other hand, the early introduction of complementary foods raises awareness about the importance of accurate information and education for caregivers, emphasizing the need for targeted interventions and support to promote appropriate feeding practices.

The finding that 35.0% of participants reported having less than 3 meals per day suggests a potential risk for inadequate nutrient intake, which can contribute to malnutrition (Saravia et al., 2016). Additionally, the majority of participants (60.0%) reported not being aware of dietary guidelines, indicating a lack of knowledge regarding optimal nutrition practices. This lack of awareness can hinder the adoption of healthy dietary behaviors and increase the likelihood of malnutrition (Bhurosy & Jeewon, 2014). However, it is encouraging that 65.0% of participants reported having a balanced diet in their meals, as this dietary pattern is associated with improved nutritional status and a reduced risk of malnutrition (Dumont et al., 2017). The finding that cultural or religious restrictions influenced the diet of 30.0% of participants underscores the importance of

considering cultural beliefs and practices when designing interventions to address malnutrition (Daelmans et al., 2013). Overall, these results highlight the need for targeted nutrition education and interventions that address meal frequency, promote awareness of dietary guidelines, and respect cultural and religious practices to effectively combat malnutrition.

The majority of the participants, 60.0%, reported undergoing regular routine health check-ups, demonstrating their proactive approach towards preventive healthcare (World Health Organization, 2020). This suggests that these individuals prioritize their health and actively engage in regular visits to healthcare providers for check-ups and monitoring. However, 40.0% of the participants reported not having regular routine health check-ups, highlighting a potential gap in accessing preventive care. In terms of satisfaction with healthcare services, the majority of participants expressed satisfaction, with 25.0% reporting being very satisfied and 45.0% indicating satisfaction (World Health Organization, 2013). These findings indicate a positive perception of the healthcare services received. However, it is essential to address the concerns of the 10.0% who expressed dissatisfaction and the 5.0% who reported being very dissatisfied, as their feedback highlights areas for improvement in healthcare service delivery.

According to the findings, children living with parents aged 46 years and older were found to have a higher likelihood of experiencing malnutrition compared to those living with parents aged 18–25 years (UNICEF, 2020). This highlights the importance of parental age as a contributing factor to the risk of malnutrition. Secondly, participants with a secondary education had significantly lower odds of malnutrition compared to those with a tertiary education (World Health Organization, 2018). This emphasizes the protective effect of higher educational attainment against malnutrition. Furthermore, being a student was associated with higher odds of malnutrition

compared to being employed (Balarajan et al., 2013). This suggests that the student population may be more vulnerable to malnutrition. In terms of household income, lower-income households were found to have lower odds of malnutrition compared to higher-income households (World Bank, 2020). Both low- and middle-income households had a reduced risk of malnutrition. This highlights the impact of household income on nutritional status. Furthermore, the odds of malnutrition varied across different age groups, with increasing age associated with a higher risk of malnutrition within the under-5 age group (World Health Organization, 2019). Children aged 12-23 months, 24-35 months, 36-47 months, and 48-59 months had significantly higher odds of malnutrition compared to infants below 6 months. This highlights the vulnerability of older children to malnutrition. Lastly, having multiple children under 5 in a household was associated with an increased risk of malnutrition (World Health Organization, 2013). Having two children under 5 years and three or more children under 5 years elevated the odds of malnutrition. This suggests that households with multiple young children face a higher risk of malnutrition. These findings underscore the need for targeted interventions addressing these sociodemographic factors to effectively combat malnutrition and improve the health outcomes of children in public health programs (Bhutta et al., 2013).

The results of the study indicate that the number of meals per day is significantly associated with the risk of malnutrition in infants. Infants who consumed less than 3 meals per day had higher odds of malnutrition compared to those who had 3 meals, and infants who consumed more than 3 meals per day had even lower odds of malnutrition (Smith et al., 2020). This highlights the importance of providing an adequate number of meals per day to infants to mitigate the risk of malnutrition. However, awareness of dietary guidelines did not show a significant impact on the odds of malnutrition among infants (World Health Organization, 2020). This suggests that

although caregivers' awareness of dietary guidelines is important for promoting healthy eating practices, it may not be directly associated with the risk of malnutrition in infants. On the other hand, the presence of a balanced diet in meals was significantly associated with a reduced risk of malnutrition in infants (UNICEF, 2019). This finding highlights the importance of providing infants with a variety of nutritious foods to ensure their nutritional needs are met and to prevent malnutrition. These results emphasize the significance of appropriate feeding practices and the incorporation of a balanced diet in infant meals to promote optimal growth and development and mitigate the risk of malnutrition (Black et al., 2013).

5.2 CONCLUSION

In conclusion, the findings from the discussed research shed light on the high prevalence of malnutrition among children in the studied population, with children between the ages of 12-23 months being particularly affected. The results underscore the critical importance of addressing nutritional needs during early childhood to prevent the long-term consequences of malnutrition. While there is a slight difference in malnutrition prevalence between genders, it is not statistically significant, emphasizing the need to address malnutrition in children regardless of gender. Stunting growth was found to be the most prevalent form of malnutrition, accounting for 50% of all malnutrition cases. This highlights the significance of addressing chronic malnutrition and promoting healthy growth and development. Underweight and wasting were also observed, emphasizing the need to address acute malnutrition and provide immediate nutritional support.

The duration of breastfeeding and the introduction of complementary foods were in line with recommended guidelines, indicating positive practices among caregivers. However, early introduction of complementary foods suggests a need for targeted education and guidance to ensure appropriate feeding practices. The study revealed potential risks for inadequate nutrient intake due to low meal frequency and a lack of awareness of dietary guidelines among caregivers. Encouragingly, a majority of participants reported having a balanced diet in their meals, which is associated with improved nutritional status.

Sociodemographic factors such as parental age, educational attainment, household income, number of children under 5 years, and age of the child were found to influence the risk of malnutrition, highlighting the need for targeted interventions considering these factors. The study emphasizes the urgent need for targeted interventions to combat malnutrition, improve nutrition practices, and promote overall health and well-being among children. By addressing these

challenges and implementing effective public health interventions, we can mitigate the negative consequences of malnutrition and ensure a healthier future for children in the population.

5.3 RECOMMENDATIONS

Based on the discussion and findings presented, the following recommendations are proposed to address the issue of malnutrition among children:

1. **Strengthen early childhood nutrition programs:** Given the high prevalence of malnutrition among children aged 12-23 months, targeted interventions should focus on this critical age group. Implement comprehensive nutrition programs that emphasize exclusive breastfeeding for the first six months, proper introduction of complementary foods, and education for caregivers on optimal feeding practices.
2. **Enhance nutrition education and awareness:** Develop and implement educational campaigns to increase awareness of dietary guidelines and the importance of a balanced diet for infants and young children. Provide caregivers with practical information on nutritious food choices, meal planning, and appropriate portion sizes to improve their understanding and ability to provide adequate nutrition.
3. **Improve access to nutritious food:** Address socioeconomic disparities by implementing policies that improve household income and food security. Provide targeted support to low-income families, ensuring access to affordable and nutritious food options. Collaborate with local farmers and food suppliers to promote the availability of fresh and locally sourced produce.
4. **Strengthen healthcare systems:** Ensure regular routine health check-ups for children, with a particular focus on preventive care and nutritional assessments. Enhance the capacity of

healthcare providers to identify and address early signs of malnutrition, provide guidance on feeding practices, and refer cases to appropriate specialists when needed.

5. Promote culturally sensitive interventions: Recognize and respect cultural and religious beliefs that may influence dietary choices and feeding practices. Develop culturally sensitive nutrition programs that take into account local customs and traditions, adapting guidelines and recommendations accordingly.
6. Conduct further research: Investigate the underlying factors contributing to the higher prevalence of malnutrition among girls compared to boys. Explore potential gender-specific barriers, social norms, and cultural practices that may affect nutritional outcomes. This research will help tailor interventions to address gender disparities in malnutrition.

5.4. LIMITATIONS OF THE STUDY

The study encountered various challenges such as financial constraints, language barrier and limited time, which affected the study. Furthermore, the study might have been influenced selection bias which might affect generalization of the study finding. However, the study aimed to provide valuable insights on the prevalence and factors associated with malnutrition among children under 5 years.

5.5. FURTHER RESEARCH SUGGESTION

Future research should be conducted to explore potential underlying factors that may contribute to the observed differences in malnutrition prevalence among boys and girls.

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APPENDICES

Appendix I: Workplan.

Study time	Week 1	Week 2	Week 3 & 4	Week 5	Week 6
Proposal development, writing and review					
Proposal submission					
Data collection and documentation					
Data analysis and presentation					
Report writing					
Presentation of findings					

Appendix II: Budget

2.1 Study budget

Serial number	Item	Unit cost	Quantity	Total
1	Proposal development, printing and binding	280	1	280
2	Stationery			
	I. Books	60	3 (A4 size)	180
	II. Pens	10	5	50
	III. Ruler	30	2	60
	IV. Rubber	5	5	25
3	Flash disk	500	1	500
4	Transport			100
5	ERC fee	500		500
Total				1345

2.2 Budget justification

Stationery will be used in data collection. Flash disk shall be used to store all the collected data and analyzed data.

Appendix III: Informed Consent

Researcher(s): BETHWEL BWIRE FANUEL NG'ENO CYNTHIA JEPCHUMBA GEORGE
KITUA SHADRACK KIPKEMBOI

Institution: University of Kabianga, Kapkatet Campus

Introduction: You are being invited to participate in a research study on malnutrition among children under five years in Kapkatet sub-county hospital. The purpose of this study is to determine the extent of malnutrition and explore the factors associated with it. Your participation in this study is voluntary, and this consent form aims to provide you with information about the study and its procedures. Please take the time to read and understand the information provided below. Feel free to ask any questions you may have before deciding whether or not to participate.

Study Procedures: If you agree to participate in this study, the following procedures will take place:

1. Your child's medical records will be reviewed to collect information on age, gender, medical history, and nutritional status.
2. You will be asked to answer a questionnaire about socio-demographic factors, dietary patterns, feeding practices, and access to healthcare services.
3. Anthropometric measurements, such as height, weight, and mid-upper arm circumference, will be taken to assess your child's nutritional status.
4. The collected data will be analyzed and reported in an aggregated and anonymized manner.

Benefits of Participation: By participating in this study, you will contribute to the understanding of malnutrition among children under five years in Kapkatet sub-county hospital. The findings of this study may help inform future interventions and strategies to address malnutrition and improve child health outcomes.

Risks and Discomforts: There are minimal risks associated with this study. Some participants may feel discomfort or inconvenience during the data collection process. However, the researchers will ensure your privacy and confidentiality throughout the study.

Confidentiality and Data Security: All information collected during this study will be treated with strict confidentiality. Your personal identifying information will be coded and stored separately from the research data. Only the researchers involved in this study will have access to the data. The research findings will be reported in a manner that ensures anonymity.

Voluntary Participation and Withdrawal: Participation in this study is entirely voluntary. You have the right to refuse to participate or withdraw from the study at any time, without any negative consequences. Your decision will not affect your child's healthcare services or relationship with the hospital staff.

Contact Information: If you have any questions or concerns regarding the study, you can contact the researchers at the following contact details:

Principal Researcher's Name: Cynthia Jepchumba.

Email: nurk00162019@students.kabianga.ac.ke

Phone Number: 0702924698

By signing below, you acknowledge that you have read and understood the information provided in this consent form. You voluntarily agree to participate in the study and provide consent for the researchers to collect, analyze, and report your child's data for research purposes.

Participant's Signature: _____ Date: _____

Parent/Guardian's Signature (if participant is under 18 years): _____ Date:

Researcher's Signature: _____ Date: _____

UNIVERSITY OF KABIANGA,
KAPKATET CAMPUS.
DEPARTMENT OF NURSING.
P.O.BOX2030-20200,
KERICHO.
17TH JUNE, 2023.
THE MEDICAL SUPPURETENDANT,
KAPKATET SUB-COUNTY HOSPITAL
P.O BOX 95-202214,
KAPKATET.

- Approved -
The students to work
in sister - Ngelechi.
As per agreed conditions
pts must have
Malnutrition



Dear Sir,

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

With respect to the above subject, we, a group of fourth year nursing students of University of Kabianga Kapkatet Campus, department of nursing would like to request for permission to conduct a research at your hospital on the topic "ASSESSMENT OF THE FACTORS ASSOCIATED WITH MALNUTRITION IN CHILDREN UNDER FIVE YEARS AT KAPKATET SUB COUNTY HOSPITAL". This study is in partial fulfillment of the requirements for the award of degree in Bachelor of Science in nursing. The following students will carry out the research as a team:

- | | |
|--------------------|-----------------|
| BETHWEL BWIRE | NUR/K/0018/2019 |
| CYNTHIA JEPCHUMBA | NUR/K/0015/2019 |
| FANUEL NG'ENO | NUR/K/0004/2019 |
| GEORGE KITUA | NUR/K/0034/2019 |
| SHADRACK KIPKEMBOI | NUR/K/0021/2019 |

Attached is our letter of approval.

We are looking forward for your response. Thank you.

Yours faithfully, ~~_____~~.....

Cynthia Jepchumba-team leader

Tel No. 0702924698

Email:cynthiarotich1@gmail.com

To proceed
& bring the
feedback
to the office
- malnutrition dept.



Appendix IV: Questionnaire

**Study Title: ASSESSMENT OF THE FACTORS ASSOCIATED WITH
MALNUTRITION IN CHILDREN UNDER FIVE YEARS OF AGE AT KAPKATET
SUB-COUNTY HOSPITAL**

QUESTIONNAIRE FORM

Date of Data Collection.....Questionnaire No.....

**A. SOCIO-ECONOMIC AND DEMOGRAPHIC FACTORS ASSOCIATED WITH
MALNUTRITION**

Section A: Socio-demographic Information

Parental

1. What is your age?
a) 18-25 years b) 26-35 years c) 36-45 years d) 46 or above
2. What is your gender?
a) Male b) Female
3. What is your highest level of education?
a) No formal education b) Primary education
c) Secondary education d) Tertiary education
4. What is your Marital Status?
a) Married b) Single c) Divorced d) Widowed
5. What is your Occupation?
a) Employed b) Self-employed c) Unemployed d) Homemaker

6. Number of people in your household?

- a) 1-3 b) 4-6 c) 7 or more

7. What is your household monthly income?

- a) Below poverty line b) Low-income c) Middle income
d) High income

Child

8. What is your child's Age?

- a) Less than 1 year b) 1-2 years c) 2-3 years
a. d) 3-4 years e) 4-5 years

9. What is your child's Gender?

- a. a) Male b) Female

10. What is the number of children under five years in your household?

- a. a) 1 b) 2 c) 3 or more

Section B: Assessment of Malnutrition

11. Do you have access to information on child nutrition and healthcare services?

- a. a) Yes b) No

12. What sources of information do you rely on for child health-related issues? (Select all that apply)

- a. a) Healthcare providers b) Internet/websites c) Television/radio
b. d) Community health workers e) Family/friends
c. f) Other (Please specify: _____)

13. Has any of your children under five years ever been diagnosed with malnutrition?

- a. a) Yes b) No

14. Has the child ever experienced any of the following conditions? (Select all that apply)

- a. a) Stunting b) Wasting c) Underweight d) None of the
above

15. Assessment of Z-scores;

			Z- Scores
Malnutrition			
Weight for Height kgm	
Weight for Age kg months	
Height for Age m months	

16. Are you aware of the importance of early identification and treatment of malnutrition in children?

- a. a) Yes b) No

Section C: Infant Feeding Practices

17. Did you breastfeed your child?

- i. a) Yes b) No

18. If yes, for how long?..... months.

19. Did you introduce complementary foods to your child?

- i. a) Yes b) No

20. If yes, at what age?months

21. What types of complementary foods do you provide to your child? (Select all that apply)

- i. a) Cereals/grains b) Fruits c) Vegetables
ii. d) Meat/poultry/fish e) Legumes/pulses f) Dairy products

iii. g) Other (Please specify: _____)

22. How many meals does your child typically consume in a day?

- i. a) Less than 3 b) 3 c) More than 3

23. Are you aware of the recommended dietary guidelines for children under five years?

- i. a) Yes b) No

Section D: Dietary Patterns

24. 25. Does your child have a balanced diet that includes all food groups?

- i. a) Yes b) No

25. If no, what are the main challenges you face in providing a diverse and nutritious diet to your child?.....

26. Are there any cultural or religious restrictions that affect your child's diet?

- i. a) Yes b) No

Section E: Healthcare Utilization

27. 28. Do you regularly take your child for routine health check-ups?

- i. a) Yes b) No

28. Have you ever visited Kapkatet sub-county hospital for your child's healthcare needs?

- i. a) Yes b) No

29. If yes, how satisfied were you with the services provided at the hospital?

- i. a) Very satisfied b) Satisfied c) Neutral
ii. d) Dissatisfied e) Very dissatisfied

30. Do you face any challenges in accessing healthcare services for your child?

- i. a) Yes b) No