DETERMINANTS OF NUTRITIONAL STATUS AMONG CHILDREN AGED 6-59 MONTHS IN KERICHO COUNTY, KENYA

DANIEL KIPNGENO CHERUIYOT

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DECLARATION AND APPROVAL

This thesis is my original work except where otherwise indicated and has not been presented for examination in any other University. No part of this proposal may be reproduced without prior written permission of the author and Mount Kenya University.

Declaration by the Student

Signature…  ..... Date...08th Oct, 2024.....

Approval by the Supervisors

This thesis has been submitted for examination with our approval as University Supervisors

Signature.... ..... Date.....

Dr Kamau David, PhD

School of Clinical Medicine

Mount Kenya University

Signature…..... Date.....

Dr Willy Kiboi, PhD.

School of Nursing and Public Health

Chuka University

DEDICATION

I would like to dedicate this study to my family who gave me humble time and sacrificed some comfort while working on the thesis.

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ABSTRACT

Child growth and well-being are critically dependent on proper nutrition, particularly during the developmental phase between the ages of 6 and 59 months. Poor nutritional status is associated with high proportion of mortality and morbidity in Kenya and globally. Malnutrition during this critical window can predispose children to cognitive impairments, infectious diseases, and an increased risk of chronic conditions, contributing to high mortality rates. Despite the severity of the problem, few studies have focused on the factors affecting the nutritional status of children in this age group in Kenya. This study aimed to identify the factors influencing the nutritional status of children aged 6 months to 5 years in Kericho County, Kenya. Specifically, the study sought to assess the nutritional status, examine dietary practices, explore the socio-economic and demographic characteristics of caregivers, and evaluate the morbidity status of the children. The research employed a cross-sectional analytical design, targeting children attending outpatient child welfare clinics at Kericho County Referral Hospital and Kapkatet Sub-County Hospital. A total of 172 children were selected through systematic random sampling, and data was collected using a structured questionnaire. Anthropometric data were analyzed using ENA for SMART, and all other variables were processed using the Statistical Package for Social Sciences (SPSS) version 27. Descriptive statistics were used to outline the population characteristics, while regression analysis was employed to identify predictors of nutritional status, with a confidence interval of 95% and significance set at $p \leq 0.05$. Key findings revealed that stunting affected 25% of the children, while wasting and underweight were prevalent in 23.8%. Dietary practices showed that only 39.2% of children aged 6 to 23 months met the minimum dietary diversity, and 39.2% received a minimum acceptable diet. Moreover, 45.3% of children experienced illness in the past month. Regression analysis identified several key predictors of malnutrition: children of caregivers without formal education were more likely to be underweight (AOR = 0.70, p = 0.01), those born via caesarean section were at higher risk of being underweight and stunted (AOR = 3.39, p = 0.03; AOR = 3.12, p = 0.04), and delayed complementary feeding reduced the likelihood of being underweight (OR = 0.53, 95% CI: 0.12-0.85, p = 0.01), wasted (OR = 0.49, 95% CI: 0.29-0.83, p = 0.04) and stunted (OR = 0.71, 95% CI: 0.25-0.99, p = 0.02). Additionally, children with illness symptoms lasting over 6 days were more likely to be underweight (AOR = 1.27, p = 0.01). Evidence from this study highlights the critical role of caregiver education, birth method, feeding practices, and illness duration in influencing child nutritional outcomes. These findings underscore the need for targeted interventions that enhance caregiver education and improve early childhood feeding practices. Future research should investigate the link between nutritional status and childhood morbidity, assess the long-term effects of early childhood nutrition on health, and develop scalable interventions to improve dietary diversity and reduce malnutrition in resourcelimited settings.

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Figure 1: Conceptual framework on the factors associated with the children nutrition status

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LIST OF ABBREVIATIONS AND ACRONYMS

AOR:	Adjusted Chances Ratio
BMI:	Body Mass Index
CWC:	Child Welfare Clinic
DDS:	Dietary diversity score
FBP:	Food by prescription
FFQ:	Food Frequency Questionnaire
HAZ:	Height-for-age
KCRH:	Kericho County Referral Hospital

KEPI:	Kenya Expanded Program on Immunization
KSCH:	Kapkatet Sub-County Hospital
MUAC:	Mid Upper Arm Circumference
PEM:	Protein Energy Malnutrition
SPSS:	Statistical Package for Social Sciences
WASH:	Water, Sanitation and Hygiene
WAZ:	The weight-for-age z- score
WHZ:	weight-for-length/height z-score
WHO:	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1. Background to the study

A child's growth and well-being depend on proper nutrition. According to the World Health Organization (2017), our nutritional status is determined by the nutrient composition of the food we consume, our nutritional demands, and our body's capacity to digest, absorb, and utilize those nutrients. Children's nutritional health is especially important between the ages of 6 and 59 months since that's when they're developing and growing the most. Indirectly and directly, the growth of a nation is impacted by the nutritional well-being of its children since it shows that the government, communities, and households are investing in the health of their families (UNICEF, 2022). In the context of early childhood, chronic and frequent malnutrition can have severe and prolonged negative effects on the mental growth and development of young children (UNICEF, 2022). Malnutrition can also predispose such children to a number of cognitive impairments and infectious diseases. It has also been linked with chronic diseases, exacerbating high mortality and morbidity rates among young children (The Mother and Child Health and Education, 2022; UNICEF, 2022).

Malnutrition, however, remains a problem not only in Kenya but also regionally and globally. It has been attributed to poor complementary feeding behaviors and practices. The feeding practices of children have a direct impact on their nutritional status (WHO, 2022). Inappropriate complementary feeding practices can directly affect the child’s social, mental, and physical growth, and this calls for the promotion of adequate complimentary feeding practices for the children’s optimal development and growth (WHO, 2022).

Worldwide, it was estimated that around 148.1 million of under-fives were stunted in 2022, 45.0 million were wasted, and 37 million had overweight, according to the 2023 edition of the UNICEF-WHO-World Bank Group Joint Malnutrition Estimates (UNCEF & WHO, 2023). According to Bayih et al. (2022), a significant number of children in Asia and Africa succumb to complications related to vitamin A deficiency, which affects 7 million women. As a result, malnutrition is responsible for nearly half of all child deaths, particularly in societies with low levels of poverty. Additionally, 55 out of every 1,000 live births occur as

a consequence of malnutrition in children aged 6-59 months (Bayih, Arega, & Motbainor, 2022).

Regionally, it has been established that East African countries take lead in the prevalence of poor nutritional status among six- to fifty-nine-month-old children globally (Yusuf, 2017). Kenya had a crude mortality rate of 0.8 per 10,000 children per day between 2013 and 2017, with more than 66% of these deaths being attributed to drought (Kigaru & Milelu, 2017). Undernutrition remains a key public health issue in less developed countries like Kenya because of poor sanitation, household food insecurity, infections like diarrhea, and poor dietary consumption. For children in East African countries between the ages of 6 and 59 months, it is a major attributor of illness and death. Mekonen, Addisu, & Mekonnen (2019) found out that the cumulative prevalence of chronic undernutrition for similar age groups in East African countries was 33.3%, with Kenya having the lowest prevalence of 21.9% and Burundi having the highest prevalence of 53%.

According to KDHS 2022, in Kenya, the frequency of stunting, wasting, and underweight was 18%, 5%, and 10%, respectively (KNBS & ICF, 2023). Multiple international and local studies have examined the nutritional condition of children between the ages of six and fiftynine months (Bayih et al., 2022; Nyanchoka et al., 2021; Kigaru et al., 2017; Mboya et al., 2015; Kahsay et al., 2015; Kwena et al., 2012). But among Ethiopian children 9–59 months old, stunting was less common (47.6%), underweight (30.9%), and wasting (16.7%), according to research (Mengistu et al., 2013). However, little has been reported on the determinants of the under-five children's nutrition status. This provides a need to conduct this study to identify these determinants that play a vital role in determining below five children’s nutrition status. Hence, the determinants of the nutritional condition of children in Kericho County, Kenya, ranging from 6 to 59 months old, were identified in the research.

1.2. Problem statement

Among the leading causes of death and illness in Kenya, poor nutritional status persists as a major public health concern in every county. According to recent research by the United Nations Children's Fund (UNICEF), more than 25% of children in Kenya below the age of five have stunted development (UNICEF, 2022). Moreover, ten percent of the under-fives in Kenya are underweight, with five percent wasted (KNBS & ICF, 2023). Severe wasting and

wasting have been closely linked to preventable child mortality. Kiilu et al. (2020) reported that approximately 35,000 Kenyan children aged below five years die annually due to undernutrition.

Deficiency in essential macronutrients like fat, carbohydrates, and protein can trigger protein-energy malnutrition (PEM) (Chakrabarty et al., 2019). A combination of macronutrient and micronutrient deficiencies results in severe health problems for young children (Kiani et al., 2022). Malnourished young children, particularly those suffering from severe malnutrition, are at elevated risk of mortality from illnesses like malaria, pneumonia, and diarrhea. While poor nutrition status is a leading attributor to diseases and mortality in children under five, limited research has explored the specific factors affecting the nutritional status of children aged six months to five years in Kenya. Moreover, few data exist about the predictors of nutritional outcomes for children in Kericho County. This research aims to fill this gap by identifying the determinants of the nutritional condition of children aged 6 to 59 months in Kericho County. The findings of this research will contribute new knowledge by uncovering context-specific factors influencing child nutrition, thereby informing targeted interventions for improving nutritional outcomes in this vulnerable age group.

1.3. Objective of the study

1.3.1 Broad objective

The broad objective of this research was to determine what factors in Kericho County, Kenya, affect the nutritional status of children between the ages of 6 and 59 months.

1.3.2. Specific objectives of the study

1. To assess the nutritional status of children aged 6-59 months in Kericho county, Kenya.
2. To determine the socio-economic and demographic characteristics of caregivers of children aged 6-59 months in Kericho County, Kenya.
3. To evaluate the dietary practices implemented by the caregivers of children aged 659 months in Kericho County, Kenya.

4. To assess the morbidity status of children aged 6-59 months in Kericho County, Kenya.
5. To determine the factors associated with the child nutritional status of children aged 6-59 months in Kericho County, Kenya.

1.4. Justification of the study

The Big Four Agenda, which includes national health care, diet, and food security, is one of the main goals of the Kenyan government. The major goal of the study on the factors that affect children's nutritional status between the ages of 6 and 59 months in Kericho County, Kenya, is to improve the eating habits and nutritional status of babies, young children, and moms. The government in partnership with international players, who include UNICEF, and the implementation of nutritional services and strategies underscore the importance of addressing nutrition-related issues in the region. The mention of UNICEF's provision of counseling to 1.6 million caregivers on optimal feeding practices for young children and infants in 2020 further emphasizes the ongoing efforts to enhance nutritional outcomes, providing context for the study's examination of factors influencing the nutritional status of children in the specified age group in Kericho County. The research is in support of the Kenyan government's nutritional interventional programs by providing empirical evidence regarding the factors that contributed to malnutrition among children aged below 6-59 months in Kericho County.

The Kenyan government, in partnership with the United Nations (UN), has been working towards achieving 17 Sustainable Development Goals (SDGs). Some of these SDGs serve as a call to action to eradicate poverty across the country. Particularly, SDG 1 seeks to end all forms of poverty. SDG 2 seeks to improve nutrition, achieve food security, end hunger, and enhance sustainable agriculture (United Nations in Kenya, 2022). SDG 3 is focused on promoting people's wellbeing and ensuring healthy lives. SDG 6 seeks to promote feasible governance and accessibility of hygiene and water for all. Finally, SDG 12 centers on enhancing feasible making and utilization patterns in the country (United Nations in Kenya, 2022). The study resonated well with all these five SDGs. Its findings will help the Kenyan

government tailor its inventions to achieve these SDGs with regard to children aged 6-59 months.

While prior literature identified multiple risk factors for malnutrition, individual factors were varied from one country to another and with time. As such, the then characterization of such factors in other counties may have not provided an empirical basis for the nutritional intervention programs in Kericho County. The findings regarding the nutritional status of children aged 5-59 months in Kericho County will enable this county to address malnutrition which is a public health problem.

1.5. Study limitations and delimitations

Limitation 1: The research was cross-sectional, conducted at a single point in time.
Delimitation 1: To overcome this, data was collected from a relatively large sample size to enhance representativeness.
Limitation 2: Availability of food due to production and supply at the time may have affected interpretation of participants' dietary characteristics.
Delimitation 2: The study accounted for this by employing rigorous data collection methods, considering temporal factors such as food production and supply.
Limitation 3: Dietary practices may have been influenced by prevailing high food prices and inflation.
Delimitation 3: The study acknowledged the impact of high food prices and inflation, incorporating sophisticated statistical analyses for nuanced insights.

1.6. Scope of the study

The study scope was spelt out to setup the confines and parameters within which the research was done. It defined specific aspects, participants, and locations included in the investigation. In the study on the determinants of nutritional status in children aged 6 to 59 months in Kericho County, Kenya, the scope encompassed a defined geographical area, Kericho County. The age comprised 6 to 59 months specified as the target population. The study explored various factors that influenced nutrition, including dietary practices, socioeconomic

conditions, and healthcare access within this specified demographic. The scope set the context for the study's focus and the extent of its findings.

1.7. Study assumptions

The study assumed that all the participants gave honest and truthful responses.

1.8. Operational definition of key terms

Dietary diversity score is a numerical representation of the variety of food groups consumed by a child within a specified period, serving as an indicator to predict the sufficiency of both macro and micro-nutrients in their diet.

Dietary practice: refers to the reported behaviours, actions, or individual choices regarding dietary habit such as meal frequency and dietary diversity.

Morbidity status: is the state of having illnesses or symptoms of illnesses.

Nutritional status: the health condition of children, influenced by the intake and utilization of nutrients, often assessed through anthropometric indicators such as heightfor-age, weight-for-age, and weight-for-height.

Stunting: a condition characterized by a child's height-for-age falling below a specified standard, typically expressed as a Z-score, indicating a level of growth retardation.

Underweight: to a child's weight-for-age falling below a specified standard, usually expressed as a Z-score, suggesting a deficiency in overall body mass relative to age.

Wasting: a condition marked by a child's weight-for-height falling below a specified standard, often expressed as a Z-score.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

In this chapter, emphasis was made on a literature review relating to the study. In this chapter, the empirical literature review findings were discussed to aid the objectives of the research. Now shall consider the findings on the nutritional data, dietary practices, morbidity profile

and socio demographic characteristics of the caregivers of children of age 6-59 months. This part also reviewed research on the links between the socioeconomic level of caregivers, the eating habits of children, the prevalence of childhood illnesses, and the nutritional health of children. Underlying the research was the conceptual framework that was offered.

2.1. Empirical literature

2.1.1. Nutritional status

Among the significant global public health concerns is malnutrition. No matter how many efforts are made to avoid it, childhood malnutrition will always be a problem. It has been noted that feeding behaviors significantly impact the result of nutritional status in people. For instance, children incarcerated alongside the caregivers in eight women's prisons in Kenya had malnutrition prevalences of 7.5%, 3.8%, and 21.4% for underweight, wasting, and stunting, respectively (Makau, Ochola, & Mbithe, 2017), largely due to their caregivers' feeding practices. According to Kigaru and Milelu (2017), most children in Kenya, especially those living in semi-arid and dry areas, suffer from hunger among the ages of six to fiftynine months because their families don't have enough food. In 2014, stunting rates were 46% in Kitui County, one of the dry areas in Kenya (Kigaru & Milelu, 2017). The researchers indicated that nutritional status can be improved through improving sanitation, water, and nutritional practices. Kitui County has rates of stunting at 27.9%, underweight at 15.8%, and wasting at 12.2%, according to research by Kigaru and Milelu (2017). According to the research, stunting is more common in males than girls. Approximately 16% of all the boys studied were found to be wasted (Kigaru & Milelu, 2017).

Good nutrition is associated with good health. Research by Nnubia et al. (2023) indicated that micronutrients had a role in the cognitive development of the children. More generally, previous findings agree that malnutrition could impair cognitive development (Roberts et al., 2022). Additionally, prolonged malnutrition is associated with increased risks of dying from malaria, respiratory infections, and other infectious diseases, while good nutrition improves the immune functioning of a child (Anino et al., 2015). Mboya et al. (2015) did retrospective longitudinal research to find out the outcomes of the program of using therapeutic food as an intervention for severely malnourished children aged between six and 59 months in Kitui County Hospital. The study results indicated that the program's nonresponse rate, defaulter

rate, weight gain rate, and recovery rate were 13.9%, 2.9%, 5.1 g/kg/day, and 73.3%, respectively (Mboya et al., 2015). The researchers concluded that the weight gain and recovery rates were below the globally accepted standards.

A study by Kwena and Baliddawa (2012) using a cross-sectional study design aimed at establishing malnutrition's prevalence in 6-59-year-old children in some Community Based Education and Service (COBES) health centers within Western Kenya. The results indicated that Chulaimbo had the lowest prevalence of 3% WAZ and 7% HAZ, while Meteitei had the highest prevalence of 18.1% MUAC, 27% WAZ, 15% WHZ, and 53% HAZ (Kwena & Balddawa, 2012). The other five COBES centers revealed mixed prevalence. The researchers suggested that the cause of the high prevalence at one of the centers could have been the households' overreliance on sugarcane and tea as key sources of income, disadvantaging growth of food crops. They also suggested that the reason underlying the lowest prevalence could have been successful health education or the practice of mixed farming in Chulaimbo. Kimwele and Ochola (2017) used a cross-sectional study design to assess the feeding and nutritional status of infants aged six to twenty-three months at the Kahawa West Public Health Centre in Nairobi, Kenya. Mothers of the study's children tended to be young, with an average age of 26.1; 47.2% had only completed elementary school, and 66.4% were stayat-home moms. Kimwele and Ochola (2017) found that of the children studied, 16.8% were underweight, 11.9% were wasting, and 13.3% were stunted. In establishisg the nutritional condition of children in Northwest Ethiopia who are 6-59 months old and whose homesteads have home gardening techniques vs. those without, Bayih, Arega, and Motbainor (2022) performed community-based comparison research. The results revealed high wasting and stunting among the study children, although there was no significant difference noted in homesteads that had home gardening practices in comparison with those void of such activities (Bayih, Arega, & Motbainor, 2022). Some of the predictors of stunting were the presence of diarrhea, feeding frequency, being male, and low dietary diversity. The predictors of wasting,, on the other hand, included being female, not fully immunized, and unprotected drinking water (Bayih, Arega, & Motbainor, 2022).

The nutritional condition of children under the age of five, particularly those living in rural areas, is often underreported in Kenyan statistics, highlighting a significant gap in the existing literature. Many counties have insufficient documentation regarding their nutritional status,

with Kericho County presenting a particularly concerning scenario, as it exhibits shockingly low rates of undernourishment and wasting. This lack of comprehensive data emphasizes the importance of the current study, as it seeks to fill these critical gaps in prior research. By highlighting the nutritional challenges faced by children in this region, the study underscores the urgency of addressing these issues to inform public health interventions and policies aimed at improving child nutrition in underrepresented populations.

2.1.2. Socio-economic and demographic factors

A previous study by Imdad et al. (2010) looked into the socioeconomic inequality that leads to poor nutritional status. The research's key objective was to find out the effects factors of socioeconomic origin had on malnutrition status in Lahore area primary school-going children, Pakistan. Results revealed that lower socioeconomic class children had below-par nutritional status relative to their counterparts from upper socioeconomic class (Imdad et al. 2010). The study established that multiple factors were attributed to poor nutritional status among the low socioeconomic class children. These factors included women's education, food safety, food insecurity, large families, a low literacy rate, and poverty. This poor nutritional status can be improved through educational opportunities coupled with social, political, and economic changes.

Similarly, Wu et al. (2015) sought to determine the role socioeconomic development played in enhancing the status of nutrition of the under-five children and at the same time point out the relevant policy interventions that could result in nutritional improvement for the children in China. The study adopted a national survey, collecting data on malnutrition prevalence, average family size, food consumption, recreational and cultural services, education, and socioeconomic development. The results of this research indicated an elevation in China's gross domestic product (GDP) per capita between the years 1990 and 2010, which was accompanied by significant increases in food expenditure, average disposable income, and per capita expenditure for education (Wu et al. 2015). The per capita consumption for various cultural services also increased, coupled with decreases in family size, illiteracy rate, underweight, and stunting. The study was able to correlate GDP per capita negative effect to underweight or stunting and average family size after making adjustments for the relevant cofounding variables (Wu et al., 2015). Nonetheless, an illiteracy rate and the presence of an

underweight or stunted growth association were not observed. The study concluded that not all nutritional problems can be solved by economic development and hence suggested the consideration of national developmental strategies to eradicate malnutrition.

Forrester et al. (2017) hypothesised that there was a positive correlation between severe acute malnutrition (SAM) and higher average soil concentrations of arsenic, cadmium, and lead, major crime, low educational attainment, and poverty. The researchers reviewed records of all infants who had been admitted with SAM diagnosis between the years 2000 and 2013 in Jamaica across 204 rural and urban communities within the country (Forrester et al. 2017). SAM and major crime were found to have a statistically significant positive correlation ($r = 0.53$; $P < 0.001$). Nonetheless, no correlation was established between SAM and poverty index or educational attainment. Reports of major crime influx by one unit resulted in an increase in the SAM cases by 1.01% (Forrester et al., 2017). However, the concentration of heavy metals was not correlated with malnutrition prevalence. These findings suggested the possibility of major crime and SAM having sociological origins. In other words, major crimes within the community indicated reduced income opportunities coupled with poor nutrition. Another study by Imtiaz et al. (2020) sought to find out the outcome that socio-economic factors had on nutritional status amongst the under-fives in Punjab province, Pakistan. Stunted growth was statistically linked to sanitation facility, family size, age, wealth quintile, and maternal education. More male children were wasted and underweight as compared to the girls of the same age. (Imtiaz et al., 2020). Additionally, wasting was mostly associated with food shortages and children or urban areas. Underweight was also associated with access to treated water and incomplete immunization. The researchers concluded that the increase in malnutrition cases among the underfives was directly proportional to the population's lower socioeconomic status, especially those originating from rural areas. They suggested multiple policies to combat wasting, including the need for the government to take the necessary social, political, and economic policy measures to improve personal hygiene habits, increase nutritional access, promote healthcare education, and enhance economic activities.

Igbokwe et al. (2017) conducted research to know whether socio-demographic variables affected the nutritional quality of young children in Enugu, Nigeria. They sampled nine private primary schools and five public primary schools within a three-month period of the

research using cross-sectional descriptive study design. The papers showed that among the research subjects 3.3%, 3.0%, and 0.8% were underweight wasted, and stunted correspondingly (Igbokwe et al., 2017). Comparing students of lower socioeconomic classes with the students of upper socioeconomic classes, the former was more wasted, underweight, and children, while the latter had higher levels of obesity and overweight (Igbokwe et al., 2017). ;Similarly, in the same study, authors established that diet and feeding of the child were significantly influenced by the main source of income of the family, parents' level of education, sex of the child, and age of the child. Stunting and wasting were significantly higher among poor children in the public schools while obesity and overweight were higher among the rich children who attend private schools as found out by Igbokwe et al. In their study, Chaudhary and Agrawal (2018) investigated the different dietary habits, patterns of malnutrition among children of six-59 months of age as well as the association between demographic variables and malnutrition in India. The research has reported somewhat higher incidences of stunting than the National Family Health Survey 4 at 43 % (Chaudhary et al., 2018). That meant 56% of the research subjects were born underweight when recruited into the study. (Chaudhary et al. 2018). The researchers also found that the people of India were not utilizing the Integrated Child Development Services ICDs in appropriate manner. They laid down recommendations that can help enhance delivery of Anganwadi services.

A hospital-based case-control study researched by Gudu et al. (2020) sought to unveil the components influencing poor nutrition among the under-fives in Western Kenya. These researchers found a number of factors that were associated with undernutrition, including pre-lacteal feeding, deworming, and failure of the mother to attend an antenatal clinic (Gudu et al., 2020). Other factors that were found to be independently correlated with undernutrition included paternal lack of formal education, low birth weight, and delayed developmental milestones (Gudu et al., 2020). The study recommendations included improvement of deworming programs, child feeding practices, and prenatal care in order to combat malnutrition in Western Kenya.

In order to establish the degree of relationship between demographic factors and malnutrition cases among children of one day to twenty-four months in Kwale County, Kenya, the study by Ndemwa et al. (2017) adopted a KWAME County population. In their findings, the sex, underweight, stunting, and age showed some variability they noted this was due to age. They

found out that the children had higher rates of global acute malnutrition, being underweight and Growth stunting. The males presented larger numbers of stunted growths than the females in the research done. Not surprisingly, if the children grew stunted or underweight, there was a substantial increase for both growing with an age of the children.

Cross-sectional study, Shinsugi et al. (2015) looked at factors associated with young children's stunting based on households' food security status in Southeastern Kenya. One of the types of data collection that was used in this study was the cohort-based study that was intended to assess the children's anthropometric measures. The study instruments applied were questionnaires which aimed at capturing information on child health status, household SES and the HFIAS. Based on the results of the multivariate stepwise logistic regression analysis it was established the relationship between stunting and factors. Feeding porridge or tea with milk was associated with stunting while severe food insecurity was also associated with stunting. Regarding age within the demographic characteristic, it was associated with stunting in the preschool age, while other age increased the children's risk of stunting (Shinsugi et al., 2020).

A cross sectional study in a Nepali semi urban community also showed that 25% children between 9 and 17 years of age had poor nutritional status most of them being over weight or obese. The researcher did not observe any changes between the lower and upper SES to lack nutrition and children being obese and overweight implying that SES barriers were wearing masks of nutrition. However, on growth, thebreadth was significantly smaller for the low SES participants than those in the upper SES group (Hamann, 2023).

Ole-Tankoi et al. (2016) identified antecedents of nutritional status of children aged 6-59 months in Trans- Mara East sub country. Data was gathered employing descriptive crosssectional research design and a structured self-administered questionnaire. These findings detail indicate that poverty, mother's employment status as a homemaker, and the size of the household were the major determinants of stunting in children. When it came to the gender of the child, the likelihood of males being captured as being obese in comparison to the female children was higher. The study used the prevalence of nutrition and undernutrition to determine that poor nutritional status was twice higher in the country sides of Trans-Mara East sub-county.

If at all, there are very few studies that have been conducted in this field: that gap has been filled by our study, as indicated in the literature review above. Further, the research studies undertaken in Kenya appeared to have aimed at identifying the role of specified sociodemographic/socioeconomic predictors on the nutritional status of children in the age group of six to fifty-nine months. The attempt of the study considers this gap by focusing on the level and magnitude of all the socio-economic and demographic factors on the nutritional status of these children.

Socioeconomic level of a given household is greatly influencing the nutritional health of children in the society. It has been gathered that the level of economic development, education of parents, household size and many others have been regarded as the causes for child malnutrition around the world. For example, in survey conducted at Itang Special Woreda, Ethiopia there is a significant correlation between economic status and status of the children (Alemu et al., 2024). This paper explored the nutritional status of children in some selected communities in Nigeria and discovered that children coming from the more affluent families enjoyed a lesser proportion of malnutrition than those from the puller communities. This trend shows the reasons why sufficient financial capital is necessary to ensure that children receive proper nutrition. Also, status of mothers in employment factor was considered significant since unemployed mothers were found inclined towards malnutrition in their children. This relationship implies that because of low income, such households may be unable to deliver adequate nutrient resources to the child especially if he or she originates from a rural or a marginalised background (Chowdhury et al., 2020). According to a crosssectional study carried out in Bangladesh it was observed that; children from richer families had reduced stunting and wasting rates compared with children from poorer families. According to the survey, about one-third of children had wasting in Bangladesh and 11 per cent children were underweight; inequalities by wealth were major. It was also evidenced from the study that children from higher-income families had better nutritional status primarily because of better intake of foods, health facility, and education. However, while both studies examined education level of the parents as an independent variable that influenced child malnutrition. By attaining higher father education level of the study subjects of Itang Special Woreda Ethiopia children with primary or secondary education have significantly better nutritional health status than children with uneducated fathers (Alemu et

al., 2024). Similarly, analysis done around the world and in Bangladesh it was also observed that parental education is another determinant of child stunting because educated mother and father are in a better position to take right decision regarding their children's health and nutrition.

2.1.3. Dietary Practices

Young children and infant feeding practices can have significant effects on their survival, development, and growth. Children are supposed to be exclusively breastfed during the initial 6 months and do not cease for at least 2 years or longer. Makau et al. (2017) set out to investigate the eating habits of mothers and their children's inmates in a subset of Kenyan women's prisons. The children's ages ranged from 0 to 59 months. The findings indicated that the rate of exclusive breastfeeding stood at 69.4% while that of continued breastfeeding at one and two years stood at 88.5% and 52.2%, respectively (Makau et al., 2017). The Mean Diversity Score (DDS) was found to be 3.52 ± 1.04 out of a total of seven groups (Makau et al., 2017). Less than 50% of the participants (48.6%) achieved the minimum acceptable diet (Makau et al., 2017).

The patterns of child development are therefore provide clues to nutritional and food insecurity within a community. That is why Ohiokpehai et al. (2007) have described work on determining the nutritional and health status of the population to develop the necessary strategy for addressing the problem occurring in Suba District, Kenya. Specific goals of the study were to identify the morbidity of children as well as the morbidity of households to illnesses; to identify the availabilities of food; to identify food accessibility; to establish food consumption; to conclude to food utilisation; and to set the consumption of food. Concerning dietary practices of families and children, 24-hour recall and food frequency questionnaires were administered. The authors also employed observational checklists as well as focus groups to confirm the data findings. From the data analysis, the authors established that diets could not adequately support most of the households (Ohiokpehai et al., 2007). This is because most of the households had to purchase most of their food and, although most of the households practiced farming, few of them had kitchen gardens.

In order to determine the nutrition-dietary practices of the six- to fifty-nine-month-old children and the sanitation-water situation in Kenya, Kitui County, a study was conducted by

Kigaru and Milelu (2017). An analytical cross-sectional research design was employed in the study. To establish the mean DDS of the children in the study, results were obtained and showed that children between the age of 6 to 23 months had an average of DDS of 2.8, whereas the recommended minimum DSS required was 4.DDS (Kigaru & Milelu, 2017). The food groups most often consumed were tubers, roots and grains. It was identified that all sample households used unsafe water and sourced water more than half a kilometer away (Kigaru & Milelu, 2017).

Neglect of the children's feeding requirements or malnutrition distorts their growth in one way or the other. Exclusive breastfeeding is inadequate in meeting the micronutrient and energy requirements of the Children aged 6 months and above and thus for them to eat complementary foods. The DDS is used as an index of the dietary diversity of children; One of the measures used in the assessment of the quality of children's diets. In their study of children's dietary practices Rakotonirainy et al. (2018) identified children from rural areas of Morondava and Moramanga in Madagascar. The findings showed that the percent age of early initiation of breastfeeding such that breastfeeding occurs within one hour after birth was at 53.5% in Moramanga town according to Rakotonirainy et al., 2018. In addition, allowing breastfeed until one year after birth that only 2.4% of all children were not breastfed at all with 87.6% and 98.5% of all the children being fed up to a year (Rakotonirainy et al., 2018). The day prior to the interview, the children consumed eight different food portions out of which only rice was described as being semi-solid. A study conducted by Rakotonirainy et al., (2018) shows that there is a persistent 20% of children who do not consume adequate milk, egg or other milk products. The results also show that the percentage of children with low DDS were 47.6% Morondava and 42.1% Moramanga (Rakotonirainy et al., 2018). In this regard, a low DDS definition was the intake of 3 or fewer food groups.

Curing the COVID 19 pandemic, Abi Khalil et al. (2022) conducted a retrospective study to analyze feeding patterns among five- to fifty-nine-year-old 'babies,' evaluate the diversity of mother-child diet, identify factors responsible for the inadequate nutritional status, and quantify overweight, underweight, stunted, and wasting frequency among Mount Lebanon and Beirut children in Lebanon. Among these feeding practices where; complementary feeding, mixed feeding (MF); exclusive use of the bottle (EBOT), continuous breastfeeding (CBF) and exclusive breastfeeding (EBF). The findings showed that concerning participants

40% of all the infants had initiated complimentary feeding before the age of six months (Abi Khalil et al., 2022). The results also revealed that 62.5% of the mothers offered the babies with sugary drinks before they could be six months old (Abi Khalil et al., 2022). Thus, there was low DDS among 33% of all the children and 50% of all the mothers. It was possible to establish a strong association between the mothers' and the children's DDS.

Certain dietary practices researched are those between children 6-59 months of age both locally and globally (Abi Khalil et al., 2022; Rakotonirainy et al., 2018; Makau et al., 2017; Kigaru & Milelu, 2017; Ohiokpehai et al., 2007). A number of empirical researches has been undertaken in sundry place in Kenya and some of them were done over five years ago Ohiokpehai et al 2007 carried out research in Homa Bay Country (Suba District), Kigaru and Milelu 2017 on Kitui County and Makau et al 2017 on prisons. In addition, it was established that none of the studies employed a cross-sectional analytical method. In addition, the cross sectional study was employed to establish the relationship between the children's nutritive status and all the diet pattern data extracted from previous studies.

Socioeconomic level of a given household is greatly influencing the nutritional health of children in the society. It has been gathered that the level of economic development, education of parents, household size and many others have been regarded as the causes for child malnutrition around the world. For example, in survey conducted at Itang Special Woreda, Ethiopia there is a significant correlation between economic status and status of the children (Chowdhury et al., 2020). This paper explored the nutritional status of children in some selected communities in Nigeria and discovered that children coming from the more affluent families enjoyed a lesser proportion of malnutrition than those from the puller communities. This trend shows the reasons why sufficient financial capital is necessary to ensure that children receive proper nutrition. Also, status of mothers in employment factor was considered significant since unemployed mothers were found inclined towards malnutrition in their children. This relationship implies that because of low income, such households may be unable to deliver adequate nutrient resources to the child especially if he or she originates from a rural or a marginalised background. According to a cross-sectional study carried out in Bangladesh it was observed that; children from richer families had reduced stunting and wasting rates compared with children from poorer families (Chowdhury et al., 2020). According to the survey, about one-third of children had wasting in Bangladesh

and 11 per cent children were underweight; inequalities by wealth were major. It was also evidenced from the study that children from higher-income families had better nutritional status primarily because of better intake of foods, health facility, and education. However, while both studies examined education level of the parents as an independent variable that influenced child malnutrition. By attaining higher father education level of the study subjects of Itang Special Woreda Ethiopia children with primary or secondary education have significantly better nutritional health status than children with uneducated fathers (Alemu et al., 2024). Similarly, analysis done around the world and in Bangladesh it was also observed that parental education is another determinant of child stunting because educated mother and father are in a better position to take right decision regarding their children's health and nutrition.

2.1.4. Morbidity status

It is common knowledge that during sickness, most people see their appetite change in one way or the other. Illness, including infections, chronic disease or gastric disorders often results in changes in taste buds, nausea or discomfort, and therefore reduced appetites. As a result, people take fewer nutrients and calories than their body needs, and the consequence is low nutrient intake. Further, through disease, there is changes in metabolism in the body as well. Fever raises metabolic rate and inflammation has been show to elevate nutrient density demands of the body (Kluger et al., 1998). Other researchers have also indicated that during sickness, nutrient absorption is compromised thus leads to deficiency even with the correct proportionate consumption of foods (Balli et al., 2022). For example, peristaltic diseases such as Crohn's disease or coeliac disease are among the most frequently cited conditions that affect nutrient absorption, and may cause malnutrition despite normal nutrient consumption. Macharia et al. (2019) surveyed the inequalities and performing trends in under five children mortality in Kenya. This research used data from three national censuses and ten surveys on households, while data on children's birth histories were collected between 1989 and 2014. The study was then used to allocate the birth histories to the appropriate counties that used demographic methods to estimate under five mortalities (U5M) for each country through a survey. The findings identified that there was a reduction in U5M from 141.7 in the year 1965 to 54.5 % in the year 2013 as analyzed by Macharia et al., (2019). However, such a

decrease in U5M was not alarming and via a comparison that recognized a variation from 19 per cent as the least to 80 per cent as the most was understood. By the year 2000, the World Summit for Children set targets that to date, are implementable in 25 counties (Macharia et al., 2019). Despite the decrease in inequality gap of magnitude, the inequality existed between county governments.

A study by Ohiokpehai et al. (2007) among children aged 6-59 months found increased incidence of various illnesses in households and the children. The most commonly reported illnesses were typhoid/diarrhoea, stomachache, upper respiratory tract infections, and malaria (Ohiokpehai et al., 2007). These researchers recommend that an in-depth study be conducted within the same area of study so as to find out the rate of morbidity, magnitude of malnutrition, and their causes and consequences. Cross-sectional research found that 42.1% of children in the non-project area and 46.5% of children under the World Vision program had stunted development. Compared to the national prevalence, the number of underweight and stunted children was higher (Macharia, Kogi-Makau, & Muroki, 2005).

Previous studies conducted in Kenya did not provide a full picture of the morbidity status in the country. Particularly, studies were lacking on the prevalence of stunting, wasting, and underweight in other counties, including Kericho. Some of the studies were also conducted more than 15 years ago. The nutritional statuses of children kept on changing over time, and thus the findings of these older studies did not accurately describe the recent current nutritional status in the country. The research intended to determine the morbidity status of six to fifty-nine months old in Kericho County; there was no similar study found before this one.

Exposure to HIV influences the nutritional status of children in sub-Saharan Africa in a rather fragile way. Children living with HIV or acutely affected by the virus, including those who have tested negative for the virus, have an increased risk of malnutrition because HIV weakens the immune system while putting more metabolic pressure on the child. Defining malnutrition through weight-for-height, undernutrition, was reviewed among HIV exposed, uninfected children in Africa and found factors that included child age, maternal income, and caregiver education (Obeagu et al., 2022). The groups most affected were the young and children from poor households. Controlling for poverty, lack of maternal education and access to healthcare services have made malnutrition common among HIV exposed children

in sub-Saharan Africa. Low maternal income was recategorized to show that families with poor income could not afford adequate food or healthcare services, and thus higher malnutrition. This review also noted that maternal education and marital status are predictors for malnutrition in HIV exposed children (Obeagu et al., 2022). Uneducated mothers could not afford to feed their children properly, and sometimes they did not know the right foods to buy, or if they did not have health insurance or do not know where to get it, their children were doomed to poor health. This is similar to studies conducted in both Ethiopia and Bangladesh in which maternal education was one of the most significant factors affecting child nutrition .

2.2. Theoretical Framework

The Ecological Model of Health Behavior is a worthy theoretical concept to apply in the identification of determinants of health behaviours since many factors exert impact on these behaviours, particularly nutrient intake among vulnerable groups including children in the age of 6-59 months. It postulates that health is determined by multiple dynamic processes at various levels of the ecosystem starting at the individual level, then the interpersonal, the community and the societal level (Bronfenbrenner, 1977). For the individual level, we have age, gender, and personal health behaviors; these children are right in the developing stage and sensitive to diet changes (WHO, 2020). Moreover, the role of interpersonal level explained by caregivers and close relatives affect eating behaviours and nutrition habits.

Studies have shown that the level of caregivers' knowledge and their practices affects children nutrition status; this emphasizes the need for the family environment in order to promote the good nutritional status (Liu et al., 2021).

The Ecological Model is most appropriate in assessing the multiple factors that affect child nutrition. Education and income level of the caregiver is especially important as it relates to food access, food choices and child health. Adam & Brett, 2014 suggested that Maternal education was an overall determinant of child nutritional status because many educated carers select appropriate foods that would improve on the child's diet. Besides individual level characteristics, there are other aspects at the community level including health services, food availability, and community's perception about certain foods. For example, promotion of child nutrition can be enhanced by'structural features such as the availability of healthcare

for individuals and nutrition education in strong support communities (WHO, 2020). The Ecological Model further facilitates the development of multi-level interventions that address child malnutrition comprehensively. By recognizing that individual behaviors are influenced by broader social and environmental contexts, the model encourages the design of interventions that target multiple levels of influence. For example, while individual education initiatives can improve knowledge about nutrition, community-based programs that enhance food security and access to healthcare are equally essential (Hu et al., 2021). Policies aimed at improving maternal education, food availability, and healthcare access can foster an environment conducive to healthy child nutrition. This comprehensive approach is supported by findings from a study by WHO (2020), which emphasizes the need for coordinated strategies that address both individual and structural determinants of health.

2.3. Conceptual framework

Socioeconomic status of the carer can lead to mixed nutritional outcomes. For instance, in the current study, use of alcohol and large household size are likely to cause low z-score values. However, occupation and ownership of land and kitchen gardens were associated with increased Z-score values. Additionally, good dietary practices were likely to increase Z score values. On the contrary, morbidity status like sickness, experiencing certain symptoms, duration of the symptoms, and duration of illness were associated with low z-score values. However, seeking medical assistance and good immunisation status were likely to lead to high Z score values. There was a correlation between the location of medical care and the nutritional condition of the youngsters, but the results were inconsistent. Nutritional habits and illness prevention strategies were likely impacted by the carer's and child's sociodemographic characteristics. Carers' socioeconomic status was likely impacted by their socio-demographic traits as well.

Independent variables Intervening variables Dependent variables

Figure 1: Conceptual framework on the factors associated with the children nutritional status

Source: Author, 2024

CHAPTER THREE

RESEARCH METHODOLOGY

3.0. Introduction

The research methods used to perform the study is detailed in this chapter. It details the study's location, methodology, variables, inclusion and exclusion criteria, and data collection tools (including anthropometric measurements, height/length, socioeconomic, demographic, dietary, and analytical tools) as well as ethical considerations.

3.1. Study area

The research was done at Kericho County Referral Hospital (0.3713° S, 35.2801° E) and Kapkatet Sub-County Hospital (-0.629716, 35.197243). The two hospitals are situated in Kericho County in Kenya. Kericho County Referral Hospital is the first sample of a Level Five Hospital within the Kericho county. It is the main teaching, referral, and producing health care services to 136 primary units and seven public hospitals (Maarifa Center, 2019). The hospital serves not only Kericho County residents but also those from neighbouring counties. As of 2019, the hospital had 32 departmental units with a total of 400 health care professionals serving between 450 and 500 patients per day (Maarifa Center, 2019). Kapkatet Sub-County Hospital is situated in Kapkatet town in Kericho County. It provides a wide variety of treatments, which ranges from outpatient services to inpatient services. The two hospitals were chosen because they were the major referral hospitals in Kericho County and thus served many children and their mothers as per the MOH data reports. Particularly, children with severe acute malnutrition (SAM) were likely to be referred to Kericho County Referral Hospital.

Kericho County lies in the south rift about 256kilometers from the nation’s capital, Nairobi (Kericho County, 2019). The county neighbours Bomet Country to the south, Nakuru County to the east, Nandi County to the north-west, Baringo County to the north, Kisumu County to the west, Uasin Gishu County to the north-west, and Nyamira to the south-west. As a cosmopolitan county, Kericho County is connected with well-developed transportation network, including county and national roads. The country has a total population of over

900,000 people as of the 2019 National Census (KNBS 2019). Tea growing and processing is the main economic activity in Kericho County.

3.2. Study design

In order to determine the factors influencing the nutritional status of children in Kericho County, Kenya, between the ages of six and fifty-nine months, an institution-based crosssectional analytical research design was used. The cross-sectional design allowed the researcher to examine data from both the children and the caregivers of 6-59-month-old children at one particular moment in time. This study design was also chosen because it provided the researcher with multiple variables in relatively short period of time. It further enabled the study to gather and contrast many factors associated with the nutritional condition of childs between the ages of 6 and 59.

3.3. Study variables

3.3.1. Independent variables

Independent variables included socioeconomic and demographic traits such farm ownership and size, profession, income, number of children, age of the main carer, and educational attainment. They also included nutritional habits including eating often, varying one's diet, and nursing.

3.3.2. Dependent variable

Weight for age, weight for length/height, and length/height for age were the dependent variables that represented the nutritional status.

3.4. Study population

3.4.1. Target population

The target population for this study comprised children aged 6 to 59 months living in Kericho County, Kenya. This specific age group is critical because it represents a period of rapid growth and development, during which children are particularly vulnerable to malnutrition

and related health issues (UNICEF, 2022). The study population was drawn from children attending outpatient child welfare clinics at Kericho County Referral Hospital and Kapkatet Sub-County Hospital. These clinics serve as primary healthcare centers for the community, providing essential services such as vaccinations, health check-ups, and nutritional monitoring. The selection of this population is significant, as children within this age range are not only at a heightened risk of morbidity and mortality due to poor nutritional status but also form a key demographic in public health interventions aimed at reducing child malnutrition in rural Kenya (WHO, 2022).

3.4.2. Accessible population

They included children 6-59 months who were be attending Kericho County Referral Hospital and Kapkatet Sub-County Hospital hospitals for outpatient child welfare clinic services.

3.5. Inclusion criteria

The study included:

i. Primary caregivers who encompassed any person who were responsible for the child's day-to-day wellbeing and care (Ole Tankoi et al, 2016). Specifically, the primary caregivers included biological mothers, aunts, grandparents, and others who sufficed as primary caregivers for children whose biological parents were not available or deceased.
ii. Only caregivers who gave their informed consent were included in the study.

3.5.1. Exclusion criteria

The study excluded:

i. Children who were very ill.
ii. Those whose caregivers did not give consent to participate in the study.
iii. Children whose birth dates were unknown or inappropriate. Such children could have been out of the target range of age of 6-59 months and hence data relating to them would have compromised the validity of the study.

3.6. Sampling technique and recruitment process

The study used systematic random sampling method to get the participants from the target population. Systematic random sampling also involves making a sample from the already defined total population using an equal interval. In this case, the target population was composed of caregivers of children 6 to 59 months old who attended child welfare clinics at Kericho County Hospital and Kapkatet Sub-County Hospital, only on the study day. For this purpose, collaboration with the medical practitioners and clinic managers of the selected sites was initiated. Such collaborations also made it easy to access potential participants by arranging for all the necessary approvals and support from the clinic. Hypothesized mean number of caregivers with eligible children based on health records suggest they were about 40 caregivers per day accessing clinics. To invite participants in a more systematic manner, caregivers were chosen following every fourth consecutive criterion-based eligible caregiver rule, with the inclusion criteria being children aged between 6 to 59 months visiting the clinic with their caregiver for health check-ups or immunization sessions For this reason, it was possible to recruit at least 10 caregivers within a single day. This sampling interval was viable and ensured that bias in the selection of the sample was reduced. Having identified the potential participants, they were given information to be Participant Information Sheet that highlights the study objectives and methods, benefits, and risks of participating. The communicative rights of the caregivers participating in the study were first observed, and their consent to participate was sought. Screening was also done in order to confirm that all the interested participants suitability for the study as proposed in the inclusion and exclusion criterion. During the entire recruitment, services users were informed about the follow up work and the part they played in the research and ensured they had a good attitude towards the study.

3.7. Sample size

The sample size was determined based on Fischer's formula (2003) as follows:

$N= Z^2Pq/d^2$

Where, N denoted the desired sample size from a sample size of over 10,000
Z denoted the standard deviation at 1.96 as the required confidence level

P= the proportion within the target market that was estimated to be having the characteristic that is being measured. Kericho County prevalence of malnutrition =12.4% (MOH, 2022).

q = 1-P

D = the set level of statistical confidence, which is 95% CI (0.005).

Therefore: $N= (1.96^{2 \times} 0.124 \times (1-0.124))/0.005^2$

Using this formula, the initial sample size determined was 167. To account for the possibility of attrition the sample size of the primary caregivers of children aged 6-59 years was increased by 3% (Anino et al., 2015). Thus, the total sample size determined was 172.

3.8. Data collection tools

The researcher-administered structured questionnaire was employed in data collection of the primary caregivers' socio-demographic and economic characteristics and children's morbidity status. The questionnaire was also used to collect data regarding the children's socio-demographic characteristics, dietary practices and the children's anthropometry. The main data collected for socio-demographic characteristics of the child were age, sex, place of childbirth and mode of delivery. Similarly, for caregivers' data was collected on the age, marital status, religion, household head, educational status, caregivers use of alcohol and the household size. The socio-economic features of the respondents were studied by looking at their occupation, ownership of land and kitchen gardens, the order in which their food was provided, and the proportion of prime portion that was served. about dietary practice, information was gathered about the practice of breastfeeding and supplemental feeding, as well as the kind of food supplied to children between the ages of 6 and 59 months. Lastly, data on morbidity collected included child health status in the past one month, symptoms and duration of the symptoms, medical assistance, where assistance was sought and immunization status.

3.9. Data collection tools pretesting

Pretesting was conducted in Longisa County Referral hospital in Bomet County, Kenya among 17 participants which was about 10% of the sample size expected. Pretesting was

done to assess the practical problems associated with the researcher-administered questionnaire. Longisa County Referral hospital had similar characteristics with the study hospitals making it suitable choice.

3.9.1. Data collection tool validity

The data collection tool validity was checked by a panel of experts in the field including university supervisors.

3.9.2. Data collection tools reliability

The tool reliability was determined through test-retest method. This was done by administering the tool to a small group of participants and then repeating the procedure five days later. A correlation coefficient of above 0.80 was considered acceptable (Bayih, Arega, & Motbainor, 2022), the corelation coefficient for the study tool was 0.67 and after validation it increased to 0.84.

3.10. Data collection procedures

3.10.1. Nutritional status

Anthropometric data was collected according to the WHO guidelines. Prior to collecting this data, each child's age was determined with a view of ensuring that it was within the range of 6 to 59 months. In this regard, the z scores were computed in line with the WHO child growth standards of the year 2006 (Turck et al., 2013).

3.10.2. Height/length measurement

Without shoes, we measured the lengths of children ranging from 6 to 23 months to the closest 0.1 cm. Here, the child was laid down in a recumbent posture and the length was measured using a horizontal wooden board (Ole et al., 2016). The alternative method included having the children, who were between the ages of 24 and 59 months old, stand in the centre of a vertical wooden height board while the researchers measured their height.

3.10.3. Weight measurement

An electronic digital weighing scale was used to measure each child's weight, with lightly or minimum clothing but without shoes. The scale was calibrated by setting it to zero prior to measuring each child. The measurement was taken thrice, and the average computed to the nearest grams or Kg. Meanwhile oedema was checked and noted considering that any child with oedema was severely malnourished (Ole Tankoi et al, 2016). The presence of oedema on both limbs was elicited by placing the thumbs while exerting normal pressure to the child's two legs and feet for about three seconds and the lifting the thumb. The child was said to have bilateral oedema if a shallow print remains on the two feet once the thumb has been lifted.

3.10.4. Socio-economic and demographic data

The demographic as well as the socio-economic variables of the study children's primary caregivers was assessed. This included size of farmland, ownership of livestock, occupation, education, income, family size, religion, ethnicity, marital status, and head of household. The child characteristics included sickness status, and type of birth, gestation age, place of delivery, birth order, sex, and age.

3.10.5. Dietary practices

Dietary practices are significant determinant of nutritional status. The primary caregivers were asked to state the breastfeeding status, the type of foods they fed their children the previous day during the day and night. The researcher asked for the ingredients of any composite food mentioned. The researcher also probed for any snacks and meals that were not mentioned.

The dietary diversity score (DDS) focused on the following 7 food groups:

1. Breastmilk
2. Plantains, tubers and white roots, and grains
3. Pulses (lentils, peas, and beans) and nuts
4. Dairy products
5. Fish, poultry and meat (flesh foods)
6. Eggs
7. Vitamin A-rich vegetables and fruits

8. Other vegetables and fruits

The Dietary Diversity Questionnaire (FFQ) was used to measure various food groups consumption by the children based on the 24 hour dietary recall.. Meal frequency was also assessed using 24-hour dietary recalls. The caregivers gave an account of child breastfeeding status and habits, meal frequency and feeding time, dietary diversity and preferences and the person(s) responsible for feeding.

3.10.6. Morbidity status

The caregivers were asked about illnesses the child had in the last one month. The duration, signs and symptoms of the illness was established.

3.11. Data analysis and presentation

The following anthropometric indices were evaluated using height, weight and age parameters: underweight, stunting and wasting. However, these variables were log transformed a well as standardized to get Z-scores which were used to derive these indices. A child was classified as stunted if HAZ was < -2SD, and as severely stunted if HAZ was < - 3SD. In the same manner, wasting and severe wasting were defined as the WHZ r-value which was below -2SD and -3SD respectively. Underweight classification was used weighing below the WAZ, which was defined as <-2SD (WHO, 2007). The DDS which act as an index of dietary diversity was obtained by adding up the food groups consumed in the previous 24hours. The target DDS for teeth must not be less than 5 for a given community, while a mean of less than 5 was considered to be low DDS (WHO & UNICEF, 2021). Also assessed was minimum meal frequency and types of foods consumed distinguished from the seven Food Categories. Morbidity status of the children was defined by basing on overall quantities of nutrition related diseases the children had ever been treated the previous six months.

The collected data was analysed with the help of ENA for SMART, statistical package for social sciences, that is, SPSS version 27 and Microsoft Excel 2010. In SMART which was done using ENA, anthropometric data was looked at. A number of nutritional parameters was assessed with the help of the software in the research. These were stunting, wasting, underweight, and MUAC for age and weight and height for age respectively (Gudu et al.,

2020). All the other variables were assessed using Excel and SPSS. So in the analysis of data; we used the chi square test for bivariate testing and logistic regression analysis for multivariate testing, and descriptive statistics including percentage were also computed. Thus, in order to describe the respondents' characteristics, the results of descriptive analysis of the socio-demographic and economic parameters were considered. The percent score was also offered for the percent of respondents who attained a certain value on all of the evaluated factors. Each nutritional status indicator was ascertained from a percent analysis of nutritional status. The chi-square test was employed to test the relationship between nutritional status and socio-demographic and economic characteristics of caregivers. To examine the correlation between morbidity and the nutritional status of the children, and between the nutritive condition of children and dietary behaviour of the care giver chi–square tests were used. In this study, children whose regression coefficients were statistically significant for the variables in question, between the ages of 6-59 months had their nutritional status assessed. Chi-square analysis was then followed by regression analysis on the variables that showed significance. With the view of controlling for such factors we also computed the Adjusted Chances Ratio (ACR) and the Crude Chances Ratio (CCR). Using a confidence interval of 95% the level of statistical significance was tested at $p<0.05$.

Table 1. Data analysis matrix

Source: Author, 2024

Objectives	Data Analysis
To determine the socio-economic and demographic characteristics of caregivers of children aged 6-59 months in Kericho County, Kenya	Descriptive statistics: Frequencies and Percentages
To determine the dietary practices of children aged 6-59 months in Kericho county, Kenya	Descriptive statistics: Frequencies and Percentages
To assess the morbidity status of children aged 6-59 months in Kericho county, Kenya	Descriptive statistics: Frequencies and Percentages
To determine the nutrition status of children aged 6-59 months in Kericho county, Kenya	Descriptive statistics: Frequencies and Percentages

To determine the factors associated with the child nutrition status.	Inferential statistics: Chi square and regression analysis

3.12. Ethical considerations

This study initially sought approval from the Mount Kenya University Institutional Scientific and Ethical Review Committees (ISREC). There is also the need to make a research authorization from NACOSTI (the National Commission for Science, Technology, and Innovation) before conducting any study. The Kericho County Government and the administrative units of the participating health institutions offered their blessings for the research exercise.

Participants' identity was maintained throughout the study by providing them with numerical codes and in the self-completed questionnaire, there were no questions on identifying details of the participants. Each of the child's caregiver was asked for their permission to participate in the study for them to be selected and they were free to pull out at any time without any penalties during the study process. In the case of the underage caregivers, consent was sought from the guardian of the minor. Espиту these caregiver subjects who had the consent fvтr the child in question answered the qtτv getenv.

To assess demographic, socio- economic characteristics of each child, a pre-tested transadapted structured questionnaire was completed by the responding primary caregivers. In addition, the pilot testing of the questionnaire was also conducted and the results used to make modifications in the main one. The interviewer had good knowledge of some of the local languages, in this case she was able to interview the primary caregivers some of whom could barely communicate in English or Kiswahili. The mother or primary caregiver of each child was expected to answer the interviewer's questions. Furthermore, all information sources were cited as they should.

CHAPTER FOUR

RESULTS

4.1. Response rate

Each of the participants identified and approached to participate in the study agreed to do so which gave a 100% response rate. By all participating increases the validity of the study

results obtained in the investigation. Additionally, the fact that none declined to participate also means the results represent the whole sample the investigator was interested in studying.

4.2. Socio-demographic and economic characteristics

Tables 4.1 and 4.2 display the participants' socio-demographic characteristics as they pertain to children and caregivers, whereas Table 4.3 displays their socio-economic features.

4.2.1. Child specific socio-demographic characteristics

As shown in table 2, 75 (43.6%) of the children were aged 24-59 years, followed by 55 (32%) who were aged 9 to 23 months and 42 (24.4%) who had an age range of 6 to 8 months. Additionally, 88 (51.2%) of the children were males and 84 (48.8%) were females. The majority of the children (n = 163, 94.8%) were given birth at the health facility. The mode of delivery for about three-quarters of the children (n = 131, 76.2%) was through the vagina.

Table 2. Child specific socio-demographic characteristics

Source: Field data, 2024

Variable	N (172)	% (100)
Age of the child		
6-8	42	24.4
9-23	55	32
4-59	75	43.6

Sex of the child		
Male	88	51.2
Female	84	48.8
Place of childbirth		
At home	9	5.2
Health facility	163	94.8
Mode of delivery		
CS	41	23.8
Vaginal	131	76.2

4.2.2. Caregiver-specific socio-demographic characteristics

As shown in Table 3, the age range of the respondents was 14 to 47 years, with 163 (92.4%) of them aged 20 to 47 years. The majority of the caregivers practiced Christianity (n = 169, 98.3%) and were either married or cohabiting (63.4%). Households were majorly headed by males (102, 59.3%), and about an equal proportion of the households had 1 to 3 members (n = 80, 46.5%) and 4 to 6 members (n = 79, 45.9%). Almost equal proportion of the household size was observed for households with members ranging from 1 to 3 (n = 80, 46.5%) and 4 to 6 (n = 79, 45.9%). Additionally, 47 (27.3%) of the caregivers used alcohol.

Table 3. Caregiver-specific socio-demographic characteristics

Source: Field data, 2024

Variable	N (172)	% (100)
Age of the caregiver		
14 to 19 years	13	7.6
20 to 47 years	159	92.4

Marital status		
Never married	51	29.7
Married or cohabiting	109	63.4
Separated/divorced/widowed	12	7
Religion		
Christian	169	98.3
Muslim	2	1.2
None	1	0.6
Household head		
Female	70	40.7
Male	102	59.3
Caregivers use alcohol		
Yes	47	27.3
No	125	72.7
Household size		
1-3	80	46.5
4-6	79	45.9
7-9	13	7.6

4.2.3. Socio-economic characteristics

The results on the socio-economic characteristics of the caregivers are shown in Table 4. The findings revealed that about two-thirds of the caregivers had secondary (n = 77, 44.8%) and tertiary education (n = 41, 23.8%). Casual labor, with a proportion of 46 (26.7%) of the respondents, followed by 40 (23.3%) of respondents on salaried employment and 35 (23.3%) of respondents on farming, was the leading source of income for the caregivers. Over half of the caregivers (n = 103, 59.9%) owned land, but only a third (n = 58, 33.7%) had a kitchen garden. Though the majority of the caregivers (n = 85, 49.4%) served food first to a child, they served the prime portion to the father (50%) and mother (30.8%), respectively.

Table 4. Socio-economic characteristics

Source: Field data, 2024

Variable	N (172)	% (100)
Educational status		
No formal education	11	6.4
Primary	43	25
Secondary	77	44.8
Tertiary	41	23.8
Occupation		
None	19	11
Casual laborer	46	26.7
Farmer	35	20.3
Salaried employed	40	23.3
Self employed	32	18.6
Household land ownership		
Yes	103	59.9
No	69	40.1
Have kitchen garden		
Yes	58	33.7
No	114	66.3
Served food first		
Child	85	49.4
Father	41	23.8
Mother	43	25
Grandparents	3	1.7
Prime portion		
Child	28	16.3
Father	86	50
Mother	53	30.8
Grandparents	5	2.9

4.3. Dietary practices

The results on dietary practices are reported in Table 5. The majority of the children, with a proportion of 167 (97.1%), had ever been breastfed, and 139 (80.8%) were breastfed within 1 hour after birth. Additionally, 158 (91.9%) of the caregivers received breastfeeding support and education from healthcare providers, followed by 9 (5.2%) from the CHVs and 5 (2.9%) from an elderly mother. Additionally, 71 (41.3%) of the children were currently breastfeeding. About 67 (39%) had their caregivers introduce complimentary food before the age of 6 months. With regards to minimum dietary diversity, 38 (39.2%) of the children aged 6 to 23 months fed on five or more food groups, while the rest didn't. A similar proportion of the children were fed on the minimum acceptable diet (MAD), whereas 93 (95.9%) of the children within 6 to 23 months of age were fed on the recommended minimum meal frequency.

Table 5. Breastfeeding and complementary feeding practices

Source: Field data, 2024

Variable	N (172)	% (100)
Child ever breastfed		
Yes	167	97.1
No	5	2.9
Child breastfeeding duration after birth		
Within 1 hour	139	80.8
After 1 hour	33	19.2
Mother received breastfeeding support and education		
Healthcare provider	158	91.9
CHV	9	5.2
Mother	5	2.9
Child currently breastfeeding		
Yes	71	41.3
No	101	58.7
Age of complimentary food introduction		
Before 6 months	67	39
After 6 months	105	61
Minimum dietary diversity (MDD)		
5 or more food groups	38	39.2
Less than 5 food groups	59	60.8
Minimum meal frequency (MMF)		
Yes	93	95.9
No	4	4.1
Minimum acceptable diet (MAD)		
Yes	38	39.2
No	59	60.8

Figure 2 shows food groups and proportions the caregivers fed their children. The findings presented in this figure show that 169 (98.3%) of the children were fed grains, white/pale starchy roots, tubers, and plantains. About 123 (71.5%) of the children were fed other fruits and vegetables, while 110 (64%) of them were fed dairy products. Additionally, 88 (51.2%) of the children were fed legumes and pulses, and a similar number were given vitamin Arich fruits and vegetables. The children were also fed flesh food, with 61 (35.5%) of them given food from this food group. Eggs were the least consumed, with 55 (32%) of children feeding from them.

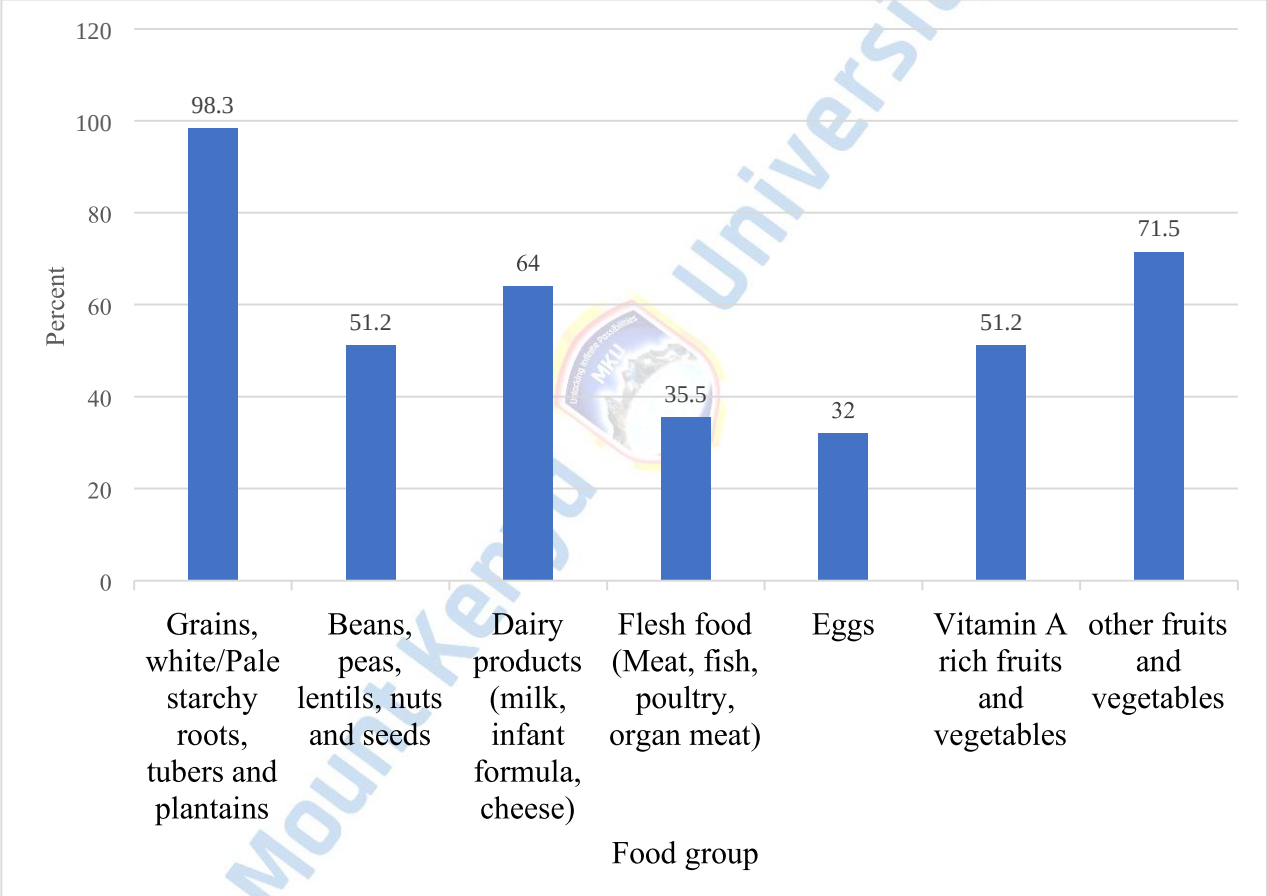

Figure 2: Types of food given to children aged 6 to 59 months.

Source: Field data, 2024

4.4. Morbidity status

The results on the morbidity status of the children are reported in Table 6. The findings revealed that 78 (45.3%) of the children had been sick in the past month. They experienced various symptoms, including cough (n = 53, 68%), fever (49, 62.8%), diarrhea (n = 38,

48.7%), vomiting (n = 27, 34.6%), rashes (n = 14, 18.0%), and others (n = 10, 12.8). The symptoms lasted for 1 to 3 days for 43 (55.1%) of the children, 4 to 6 days for 10 (12.8%) of the children, and >6 days for 15 (19.2%) of the children. The majority of the children (n = 73, 93.6%) had received medical assistance, and 71 (91%) of them sought assistance from a health facility, 5 (6.4%) from pharmacies or chemists, and 2 (2.6%) from herbalists. Additionally, 170 (8.8%) had received vaccination up to date.

Table 6. Morbidity status of the children aged 6 to 59 months

Source: Field data, 2024

Variable	N (172)	% (100)
Child sick in the past 1 month		
Yes	78	45.3
No	94	54.7

Symptoms (multiple responses)		
Fever	49	62.8
Cough	53	68.0
Vomiting	27	34.6
Diarrhea	38	48.7
Rashes	14	18.0
Other symptoms	10	12.8
Duration of symptoms		
1 – 3 days	43	55.1
4 – 6 days	10	12.8
>6 days	15	19.2
Medical assistance		
Yes	73	93.6
No	5	6.4
Where assistance was sought		
Health facility	70	95.9
Pharmacy or Chemist	1	1.4
Herbalist	2	2.7
Immunization up to date		
Yes	168	97.7
No	4	2.3

Other symptoms; nasal congestion, chest congestion, sweating at night, abdominal distention.

4.5. Nutritional status of children aged 6 to 59 months

The nutritional status of children aged 6 to 59 months in Kericho County is as shown in figure 3. The prevalence of stunting was higher than both underweight and wasting with a score of 25%. An equal proportion (23.8%) of the children studied were underweight and wasting.

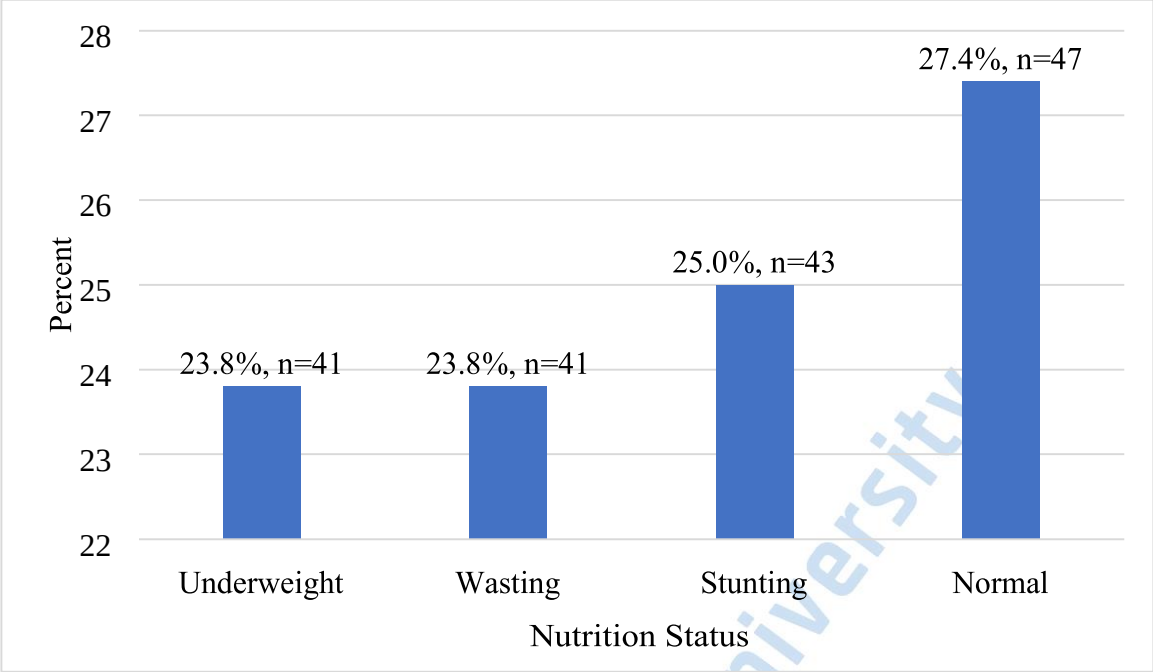

Figure 3: Nutritional status of children aged 6 to 59 months

Source: Field data, 2024

4.6. Association between the study variables

The correlation between the dependent variable nutritional status and the independent variables were done using logistic regression test.

4.6.1. Association between nutritional status and socio-demographic and economics characteristics of the participants

The unadjusted logistic regression analysis result of the relationship between sociodemographic characteristics and nutritional status is also shown in table7. Caesarean section babies were also more likely to be low birth weight compared to the vaginal delivery babies (OR = 2.36, 95% CI: 1.17-3.34, p = 0.01). The same trend was observed in children grouped under stunting where odds of being stunted if a child was delivered through caesarian section were higher compared to vaginally borne children (OR = 2.40, 95% CI: 1.83-2.75, p = 0.03). Additionally, children with caregivers who had no formal education had higher

chances of being underweight compared to those who were with caregivers who had attained tertiary education (OR = 2.61, 95% CI: 1.82-2.99, p = 0.01). Children aged 6 to 8 months had reduced chances of being stunted with OR = 0.53 (95% CI: 0.19-1.46, p = 0.02). Furthermore, when the mother was served first, there were higher chances of children being wasted compared to when children were served first (OR = 1.30, 95% CI: 0.99-2.18, P = <0.01).

Table 7. Logistic regression analysis of nutritional status and socio-demographic and economic characteristics
Source: Field data, 2024

Variables	Underweight [a]	Wasting [a]	Stunting [a]	Normal nutritional status
Mode of delivery				
Vaginal	1	1	1	1
Caesarean	2.36 (1.17-3.34) *	0.72 (0.30-1.71)	2.40 (1.83-2.75) *	0.26 (0.21-0.90)
Educational status				
Tertiary education	1	1	1	1
Primary education	0.51 (0.35-0.84)	1.60 (0.58-4.43)	1.52 (1.06-1.89)	1.05 (0.60-3.27)
Secondary education	0.79 (0.26-1.03)	1.35 (0.53-3.43)	0.62 (0.40-0.74)	2.03 (0.76-5.45)
No formal education	2.61 (1.82-2.99) *	0.92 (0.17-5.10)	0.29 (0.21-0.32)	0.48 (0.07-0.93)
Age of child				
24-59 months	1	1	1	1
9-23 months	1.66 (0.76-3.62)	2.20 (1.76-2.95)	1.67 (0.78-3.60)	0.99 (0.62-1.34)
6-8 months	0.57 (0.21-1.58)	1.09 (0.88-1.92)	0.53 (0.19-1.46) *	1.16 (0.35-4.63)
Who is served first				
Child	1	1	1	1
Father	2.29 (0.88-5.96)	0.75 (0.60-0.97)	2.20 (0.85-5.74)	0.57 (0.04-3.22)
Mother	1.33 (0.13-1.83)	1.30 (0.99-2.18) *	1.29 (0.28-2.89)	1.24 (0.22-2.22)
Other relatives	-	0.43 (0.09-1.10)	-	-

Normal nutritional status is the reference category, [a] Crude chances ratio, * Statistically significant.

The results of adjusted logistic regression analysis on the association between sociodemographic characteristics and nutritional status presented in table 8 indicated that children born through caesarean section had an association with increased risk of being underweight and stunted. (aOR = 3.39, 95% CI: 1.44-7.97, p = 0.03) and (aOR = 3.12, 95%: 1.32-7.37, p = 0.04), respectively. Children whose caregivers had secondary and tertiary education were also significantly associated with reduced chances of being underweight, with aOR = 0.34 (95% CI: 0.12-0.96, p = 0.03) and aOR = 0.25 (95% CI: 0.08-0.67, p = 0.02) in that order. Additionally, children aged 9 to 23 months were more likely to be underweight and stunted. Their adjusted chances ratio was aOR = 2.74 (95% CI: 1.12-6.71, p = 0.04) for underweight and aOR = 2.70 (95% CI: 1.10-6.61, p = 0.02) for stunted growth. In the adjusted model, being served first was not associated with any form of nutritional status.

Table 8. Binary logistic regression analysis for socio-demographic and economic factors associated with nutritional status
Source: Field data, 2024

Variables	Underweight [a]	Wasting [a]	Stunting [a]	Normal nutritional status
Mode of delivery				
Vaginal	1	1	1	1
Caesarean	3.39 (1.44-7.97) *	2.33 (1.40-3.68)	3.12 (1.32-7.37) *	1.28 (1.86-6.23)
Educational status				
No. formal education	1	1	1	1
Primary education	2.04 (0.78-5.33)	1.57 (0.54-4.57)	2.23 (0.85-5.88)	1.91 (0.13-3.25)
Secondary education	0.34 (0.12-0.96) *	1.03 (0.38-2.77)	0.43 (0.16-1.17)	2.92 (1.17-4.02)
Tertiary education	0.25 (0.08-0.67) *	0.98 (0.25-1.54)	0.68 (0.24-1.25)	0.31 (0.07-2.04)
Age of child				
6-8 months	1	1	1	1
9-23 months	2.74 (1.12-6.71) *	1.04 (0.41-2.66)	2.70 (1.10-6.61) *	2.03 (1.01-7.02)
24-59 months	2.25 (1.64-3.82)	1.23 (0.76-3.40)	3.18 (1.25-5.01)	0.95 (0.64-5.21)
Who is served first				
Child	1	1	1	1
Father	3.60 (0.12-10.86)	0.43 (0.03-6.18)	3.40 (1.14-10.14)	2.19 (1.01-7.20)
Mother	2.33 (0.73-3.32)	1.11 (0.08-14.84)	2.18 (0.21-8.27)	1.03 (0.99-5.16)
Other relatives	-	2.21 (1.34-4.55)	-	-

Normal nutritional status is reference category, [a] Model adjusted for variables in the table, * Statistically significant, - no respondent

4.6.2. Association between nutritional status and dietary practices

Table 9 presents the estimate of the logistic regression analysis on the identified dietary factors and nutritional status before adjusting for other factors. The findings revealed that children who were introduced to complementary food after 6 months had significantly lower chances of being underweight (OR = 0.53, 95% CI: 0.12-0.85, p = 0.01), wasted (OR = 0.49, 95% CI: 0.29-0.83, p = 0.04) and stunted (OR = 0.71, 95% CI: 0.25-0.99, p = 0.02) compared to those who were introduced to complementary food before 6 months. Breastfeeding support from health workers was not likely to prevent underweight, while initiation of breastfeeding within 1 hour after birth was associated with reduced chances for stunting (OR = 0.05, 95% CI: 0.03-0.07, p = 0.04).

Table 9. Logistic regression analysis of nutritional status and dietary practices

Source: Field data, 2024

Variables	Underweight [a]	Wasting [a]	Stunting [a]	Normal nutritional status
Child breastfeeding duration after birth				
After 1 hour	1	1	1	1
Within 1 hour	1.42 (1.07-1.56)	0.88 (0.62-0.91)	0.05 (0.03-0.07) *	0.67 (0.13-3.27)
Received breastfeeding support				
Healthcare provider	1	1	1	1
CHV	3.42 (3.00-3.87)	0.73 (0.38-1.64)	1.84 (1.54-2.06)	1.94 (1.28-5.25)
Mother	1.08 (0.82-1.21)	0.87 (0.58-1.07)	0.95 (0.82-1.10)	1.56 (0.45-2.11)
Age of complementary food introduction				
Before 6 months	1	1	1	1
After 6 months	0.53 (0.12-0.85) *	0.49 (0.29-0.83) *	0.71 (0.25-0.99) *	0.66 (0.34-2.04)
MAD				
No	1	1	1	1
Yes	1.08 (0.53-2.20)	0.49 (0.24-1.01)	1.20 (0.59-2.43)	2.25 (1.66-2.52)

Normal nutritional status is the reference category, [a] Crude chances ratio, * Statistically significance

In the adjusted model presented in Table 10, the analysis revealed that only one factor, specifically the age of complementary food introduction, showed a significant association with nutritional status. Introducing complementary foods after 6 months of birth was linked to decreased chances for both wasting and stunting. The adjusted chances ratio (aOR) for wasting was found to be aOR = 0.25 (95% CI: 0.05-0.91, p = 0.03), indicating a statistically significant reduction in the likelihood of wasting. Similarly, the aOR for stunting was aOR = 0.44 (95% CI: 0.16–1.08, p = 0.04), suggesting a statistically significant decrease in the chances of stunting.

Table 10. Binary logistic regression analysis for dietary practices associated with nutritional status Source: Field data, 2024

Variables	Underweight [a]	Wasting [a]	Stunting [a]	Normal nutritional status
Child breastfeeding duration after birth				
Within 1 hour	1	1	1	1
After 1 hour	1.10 (0.33-1.24)	1.15 (0.43-2.88)	2.84 (1.33-4.07)	1.51 (0.62-2.23)
Age of complementary food introduction				
Before 6 months	1	1	1	1
After 6 months	0.54 (0.22-1.82)	0.25 (0.05-0.91) *	0.44 (0.16-1.08) *	1.67 (0.85-1.99)

Normal nutritional status is the reference category, [a] Model adjusted for all the variables in the table, * Statistically significance.

4.6.3. Binary logistic regression analysis of nutritional status and morbidity status

The logistic regression analysis results in table 11 showed that children who experienced symptoms for >6 days had a higher likelihood of being underweight (OR = 1.83, 95% CI: 1.12-2.44, p = 0.03). Similarly, those who experienced duration of illness for 4 to 6 days had a higher likelihood of being wasted (OR = 2.00, 95% CI: 0.32-12.59). On the other hand, children who were not sick in the past 1 month were less likely to be underweight (OR = 0.65, 95% CI:0.32-0.86, p = 0.03) and stunted (OR = 0.43, 95% CI: 0.22-0.75, p = 0.01) compared to those who were sick. Additionally, children whose caregivers had not sought medical assistance had higher chances of being underweight (OR = 0.91, 95% CI: 0.38-3.12, p = 0.04).

Table 11. Logistic regression analysis of nutritional status and morbidity status

Variables	Underweight [a]	Wasting [a]	Stunting [a]	Normal nutritional status
Duration of sickness				
1-3 days	1	1	1	1
4-6 days	1.20 (0.66-1.81)	2.00 (0.32-12.59) *	0.48 (0.09-2.51)	1.60 (0.39-6.66)
>6 days	1.83 (1.12-2.44) *	-	-	-
Child sick in the past 1 month				
Yes	1	1	1	1
No	0.65 (0.32-0.86) *	-	0.43 (0.22-0.75) *	0.81 (0.40-1.65)
Medical assistance				
Yes	1	1	1	1
No	1.91 (0.38-3.12) *	2.67 (1.01-4.32)	7.83 (5.43-9.14)	2.27 (0.76-5.86)

Normal nutritional status is the reference category, [a] Crude chances ratio, * Statistically significance, - no respondents

In the adjusted logistic regression model presented in table 12, duration of sickness and a child being sick in the past one month were the two variables that were associated with nutritional status. Duration of sickness lasting for more than six days was significantly associated with likelihood of underweight among children (aOR = 1.27, 95% CI: 0.98-2.66, p = 0.01). On the other hand, child being sick in the last month was associated with decreased chances for wasting, aOR = 0.56 (95% CI: 0.27-0.89, p = 0.03). Medical assistance was not significantly associated with nutritional status after adjusting for factors.

Table 12. Logistic regression analysis of nutritional status and morbidity status

Variables	Underweight [a]	Wasting [a]	Stunting [a]	Normal nutritional status
Duration of sickness				
1-3 days	1	1	1	1
4-6 days	0.28 (0.05-1.73)	2.00 (0.32-12.59)	0.48 (0.09-2.51)	0.36 (0.11-1.19)
>6 days	1.27 (0.98-2.66) *	-	-	-
Child sick in the past 1 month				
Yes	1	1	1	1
No	0.82 (0.43-2.24)	-	0.56 (0.27-0.89) *	1.11 (0.56-1.89)
Medical assistance				
Yes	1	1	1	1
No	0.65 (0.21-3.28)	3.13 (0.98-4.74)	3.10 (1.28-9.94)	2.33 (1.12-4.26)

Normal nutritional status is the reference category, [a] Model adjusted for all the variables in the table, * Statistically significance, - no respondents.

CHAPTER FIVE

DISCUSSION

5.1. Discussion

5.1.1. Socio-demographic and economic characteristics

The findings of this study demonstrated many socio-demographic factors that are precise to children and might influence their nutritional status between 6 and 59 months. The distribution of children across different age groups reveals that a substantial proportion (43.6%) falls within the age range of 24-59 months, indicating a concentration of older children in the sample. This observation aligns with other studies that focused on child nutrition, where older children may face different nutritional challenges compared to their younger counterparts (Akseer et al., 2017). The study also reveals that majority of children (94.8 percent) were born in health facilities and hence exercises every control through antenatal and perinatal care as a major contributor towards early childhood health status (UNICEF, 2020). The mode of delivery, with 76.2% of children born through the vagina, may have implications for early microbial colonization and subsequent health (Levin et al., 2016). Furthermore, the gender distribution indicates a slightly higher proportion of male children (51.2%), and gender disparities play a vital role in child nutrition outcomes (Santoso et al., 2019). Comparing these findings with other studies, it is essential to consider contextual factors such as geographic location, cultural practices, and healthcare infrastructure to contextualize and interpret the observed patterns (Jones et al., 2019). The predominance of caregivers aged 20 to 47 years highlights the reproductive age group's crucial role in child care and nutrition (Nyamasege, 2021). The majority of caregivers who are married or cohabiting have outlined that the presence of a family support system plays a key role in impacting child feeding practices (Mahmood et al., 2021). The educational attainment of caregivers, particularly with approximately 45 percent having secondary and 24 percent having tertiary education, is a positive factor for child nutrition, as maternal education is consistently associated with improved child health outcomes (Chakona, 2020; Mensch et al., 2019). Important factors in allocating resources, such as the size of the family and the gender

of the head of the household, may affect the accessibility to healthy food (Drammeh et al., 2019). Notably, the presence of alcohol use among 27 percent of caregivers raises concerns, as substance use may impact caregiving practices and household priorities. Findings on the socio-economic characteristics of the caregiver outlined that casual labor was the most prevalent income source for respondents, outlining the diverse economic activities that most caregivers rely on in order to meet children's nutritional needs, which has a great impact (Ueda et al., 2020). While a considerable proportion of caregivers' land is their own, the limited presence of kitchen gardens raises concerns about the accessibility of diverse and nutrient-rich foods. According to Rehman et al. (2019), ownership of land is positively associated with improved child nutritional status, indicating a potential link between household land ownership and enhanced access to resources that positively influence children's well-being. The dynamics of food distribution within households are evident, with caregivers often prioritizing serving food to children initially (Raza et al., 2020). However, nuances arise as optimal portions are commonly allocated to fathers and mothers, illustrating complex intra-household food allocation patterns. Therefore, based on these findings, there is a need to consider income sources, asset ownership, and intra-household dynamics in designing effective nutritional interventions.

The study also corroborates similar studies done in Ethiopia regarding socio demographic factors which include number of household members and birth interval as major factors which influence children's nutritional status. A cross-sectional study done among children aged between six months and five years in Itang Special Woreda, Ethiopia showed that children from large families were more likely to be malnourished than their counterparts from small families because; competition for limited resources such as food is high among the large families (Ayele et al., 2022). Likewise, birth interval of 24 months and above were more beneficial to the nutritional outcome of the children since the period offered the mother enough time to get fatter between child bearing period, time to breast feed and also to offer adequate care to the baby. Larger households rank high in food insecurity in Kericho County, and this could affect the nutritional status of children hence the need for large household support in Kericho County (Ngesa et al., 2023). Furthermore, HDs also endorse the role of employment status the mother most significantly in relation to household income totally affecting children's access to health enhancing foods. Since employment status of the

mothers meant that they were unable to pay for children's nutrition and other basic health needs, children in families where the mother was unemployed were likely to be malnourished (Ayele et al., 2022).

Besides, the results revealed agree with the cross-sectional studies from other countries on household economic status and child malnutrition. For example, cross-sectional study was conducted in Bangladesh to show that students from higher economic class had less prevalence of stunting and wasting as compared to students from lower economic class (Chowdhury et al., 2021). This is in agreement with results from the Kericho County where casual labour income was established to be the leading source of income implying that poor families may not be able to feed their children adequately and meet other nutritional needs. However, due to COVID-19 restrictions, there has not been effective construction, existence and utilization of kitchen garden, which are critical in providing food for families, hence escalating the use of purchased foods that in most cases are poor in diet diversity (Mwangi et al., 2021). In connection with the experience of Kericho County, such policies as those concerning household food security, which encourage the establishment of kitchen gardens and support non-farm income-generating activities may have high potential for combating malnutrition and improving children's health. The nature of this analysis underscores the fact that child malnutrition is a complex phenomenon and not just a function of either sociodemographic characteristics or economic status of households.

5.1.2. Nutritional status

The results showed that underweight, wasting, and stunting were rather common. Conflicting findings were reported in earlier research. A greater rate of stunting (27%), as well as underweight (26.3%), was found by Ahmad et al. (2018). However, they reported lower wasting values of 23%. Similarly, the Ethiopian Demographic and Health Survey conducted in 2016 revealed that the underweight in the Tigran region was 23% (Ethiopia Central Statistical Agency (CSA), 2016). However, a study in Northern Ghana reported lower prevalence scores for all three forms of nutritional status, that is, stunting, underweight, and wasting, with scores of 20.5%, 21.1%, and 11.5%, respectively (Debpuur et al., 2021). Furthermore, according to the 2022 Kenya Demographic Health Survey, the prevalence in the current study is significantly higher compared to the county and national prevalence of

19% and 18% in 2022, respectively (KNBS & ICF, 2023). This substantial disparity in the prevalence might be attributed to variation in the sampling population and dynamics in socioeconomics over time. Moreover, earlier research to the subject has linked the favorable nutritional status to several aspects such as increased efforts on community-based nutrition programs, appropriate age of introducing complementary foods, and time of the research (Paramashanti et al., 2022).

The implications of this high stunting prevalence cannot be overstated, as it heralds potentially lasting consequences for both the immediate and long-term health of these children, such as delayed cognitive development and high risks of chronic diseases later on in their lives (Forgie et al., 2020). Child stunting still persists as one of the main issues affecting several areas of the nation and the region of the similar structure and requires an efficient strategy to address the problem (Chaudhary & Agrawal, 2018; Gudu et al., 2020). The high incidence of underweight, wasting and stunting revealed in the current study is also in agreement with the other cross sectional studies in other parts of sub-Saharan Africa.

For instance, a research carried out in Ethiopia by Asfaw et al. (2021) estimated that about 31 % of the children within 6-59 months of age were stunted, and 24% being underweight. The same trend of malnutrition was seen in Malawi: 37% of children were stunted, and 12% were wasted (Maleta & Amati, 2022). Taken together, these figures add up to the longstanding problem of many African countries in combating poor nutritional status of children. The determinants that can influence such high rates of malnutrition consist of low maternal education, low standards of hygiene, and negative wellness get right of entry to (Chowdhury et al., 2020). Socioeconomic status of households is also found to have a crucial impact on nutritional results; research from Bangladesh and Ethiopia revealed that stunted and wasted odd ratio of kids from moneyed families was significantly lower than those of miracles families (Chowdhury et al., 2020; Asfaw et al., 2021).

Maternal factors and employment status the nutritional status of children depends on employment status and educational level of mothers along a study conducted on mother and their children in Gambella Ethiopia it was observed that unemployed mothers with low education standards have malnourished children (Obeagu et al., 2023). Similarly, in researches done in Bangladesh, it revealed that children under the age of five living with

mother having less education are more prone to suffer from stunting and wasting Chowdhury et al., (2020). Another precondition for the child welfare is the status of maternal health and education concerning children's nutrition and health care, as well as the availability of medical services. Unless there is an enhancement on maternal education and economic status of the households, nutrition woes confronting young ones in regions like Kericho County will remain a stiff thorn in the president's flesh. Thus, contextualized activities promoting mother's education, family income and healthcare should be synchronous to enhance the child's nutritional status (Obeagu et al., 2023).

5.1.3. Association between nutritional status and socio-demographic and economic characteristics of the participants

It was revealed that maternal education status and mode of delivery are significant predictors of underweight. Those children of mothers or caregivers with no education had higher odds of being underweight than those of caregivers with a tertiary education. These findings were consistent with a study conducted in Bangladesh that reported that children of mothers with secondary and higher education had a lower risk (RR: 0.83, 95% CI: 0.78, 0.88) of experiencing underweight compared to children of mothers who had no formal education (Hasan et al., 2016). Additionally, another study described that these children were 23% less likely to be underweight if their mothers had secondary education than the children whose mothers had no education level (Chowdhury et al., 2020). Maternal education was inversely related to underweight; the findings are endorsed by Woldeamanuel & Tesfaye (2019) and Mtongwa et al. (2021). This may be attributed to the fact that educated mothers have a boost of information regarding appropriate feeding practices and general child rearing, which could have a positive impact on child nutrition. It also found that underweight was 2.36 more likely to occur in cesarean compared to those that were a result of vaginal delivery. This result goes against the available studies that portrayed an overall 1.88-fold rise in the likelihood of overweight or obesity in children who were aged between 2- 5 years but born through cesarean section compared with the children born through vaginal delivery (Papadopoulou et al., 2023). However, infants born by CS had a significantly lower risk of being underweight, 0.71 times that of infants born vaginally, according to Abbasi et al. (2018). The above results may be due to health policies and initiatives, whereby more emphasis is placed on policy

than on initiatives. The research also found that the order of serving has a relationship with malnutrition in children, with a test result of less than 0.05. The analysis of the results showed that children whose moms were served before their parents had a 1,30 times higher risk of wasting. These findings are similar to the study that reported an odds ratio of 2.18 for acute malnutrition related to families /children who ate meals with their families and those who had children ever.

Besides maternal education and mode of delivery, household economic status was other factors that had impact on children nutritional status. Some families cannot easily afford to put enough food on the table or get the variety of foods important for proper growth and development of a child. The studies done in Ethiopia found out that childhood malnutrition risk belonged to children from poor families were higher compared to the risk seen in affluent households (Zerfu et al., 2023). These results call attention to the need for financial system stability in terms of provision of affordable and healthy foods and healthcare services. This was supported by Bawadi et al. (2022) who established that household income and parental occupation have predictors for malnutrition rates. Basic asset ownership in the household was observed to have an impact towards the nutritional status, children from wealthy family hod a 1.5-fold less likely to be stunted than children in poor families. These associations support underlining the call for policies focused on bettering the economic status of families for the sake of better nutritional child status.

In addition, the maternal nutritional status was also an important determinant of child health status. Poor AN can led to adverse births and perpetuate malnutrition in children, and maternal undernutrition disrupts the healthy growth of children (Kumar et al., 2022). Shifting focus to child nutritionally, research carried out in Kenya showed that if the mother has a low BMI, there is high probability that resultant children will be underweight proving that maternal health is determinative of child nutrition and nutritional status. In this regard, people's reciprocal dependency is emphasized as a concern for maternal health indicates the inclusion of this segment in multifaceted solutions regarding child malnutrition. The quality of maternal nutrition should be enhanced through nutrition education and food supplementation, which if achieved, should have dramatic effects on children's nutrition status in future. If government policies put focus in maternal health, alongside child nutrition

activities then the idea can blend the efforts towards tackling underweight challenges such as malnutrition.

5.1.4. Association between nutritional status and dietary practices

The study established that nutrition of the kids was connected to many aspects of eating. A significantly higher proportion of the caregivers who took part in current research fed their milk to their infants. Akinyinka et al. (2016) found that almost all respondents (97.3%) had nursed their kids at some point; therefore, our results are in accordance with that. In order to ensure a child's development and overall health and nutritional condition, breastfeeding is essential (Sharma et al., 2023). More than half of the mothers surveyed said they had started breastfeeding their infants within the first hour after delivery. According to Adrawa et al. (2016), this goes against the results. Initiation of breastfeeding occurred in 68.6% of the research participants within one hour following birth. Distinct cultural customs and traditions may impact the date of breastfeeding beginning, which might explain the observed proportional variances (Wanjohi et al., 2016).

There was a considerable decrease in underweight, stunting and wasted food in children whose supplementary food introduction occurred after 6 months as opposed to those whose introduction occurred before 6 months, according to this research. The result of this research supported the result of a study conducted in Northern Ghana, which showed that there was a 0.75 lower risk of chronic malnutrition amongst children who began receiving supplementary foods at the age of six months (Saaka et al., 2015). A study conducted in India anesthetized the late introduction of supplementary meals; the odds of what was 1.24 times higher in children with stunting and 1.21 times higher for severe stunting. However, Udoh and Amodu (2016) observed that delayed supplementary meal delivery beyond six point zero zero zero months age doubled the odds of wasting by 5.15 times. The research reported the nature of supplement meals as being predominantly grains – white or pale starchy roots, tubers, and plantains accounting for 97% of them. Akinsola et al. (2017), in a cross-sectional review, noted that grains and tuber foods, which are rich in carbohydrates, were offered as supplementary foods 75% of the time. This finding suggests that there is only a small difference in percentage that may be attributed to the difference in geographical location and socioeconomic variables.

The results showed that MAD was received by 40% of the children, MMF by 95.9%, and MDD by 39.2%. These crucial markers have been the subject of conflicting findings in different research. These results were in line with another study that found that over half of the infants (49.7%) had reached MDD, almost 40% had reached the MAD, and over three quarters of the children (74.4%) had reached the recommended MMF (Ahmad et al., 2018). As per Solomon et al. (2017), there was research done in Ethiopia that found a somewhat greater MDD (59.9%) than what we have here but a very low MAD percentage of approximately 10% who were eligible for MAD. In inaggrement to the present study, different research by Mekbib et al. (2014) found lower proportions: only 17.8% of the youngsters had met MDD, 12% had satisfied MAD, and 40% had gotten meals twice daily. Disparities in food security due to variances in healthcare systems, cultural variety, and geographical location may have explained the variation. All three have significant impacts on people's eating patterns.

5.1.5. Association between nutritional status and morbidity status

The results of the initial bivariate logistic regression analysis on the relationship between morbidity status and nutritional status indicated that the duration of symptoms of sickness (6 days or more) was significantly related to the underweight status of the children and no sickness in the previous month to the stunting status of the children. This study revealed that children having symptoms of sickness for a duration over 6 days were 1.83 times more likely to be underweight than those with symptoms for 1–3 days. These study indications had similar findings with research carried out in Western Kenya that showed that children under five years of age with illnesses such as diarrhea, upper respiratory infections, and other illnesses or symptoms for more than a week were 3.19 times, 3.10 times, and 2.55 times, respectively, more likely to be underweight than those who had no symptoms of illness less than one week (Bloss et al., 2004). In addition, a similar study undertaken in South Ethiopia showed that children who experienced diarrhea two weeks prior to the study period were 4.0 times more likely to develop underweight than children who did not suffer from diarrhea (Asfaw et al., 2015).

The probability of a child being stunted was much lower if that child had not been ill in the preceding month. Similar to Asfaw et al., we established that stunting was three times more likely in the children sampled if they were afflicted by diarrheal diseases a fortnight prior to the study than in the children not experiencing diarrhea. These results were in concord with the under-five children stunting findings research done in Ethiopia, which observed that stunting illness compared to healthy young children the prevalence rate was higher (Teshome et al., 2009). In their study, Sonu et al. (2019) avow that the nutritive states of the under-five children are highly vulnerable to sickness. According to much research, including those by Abdulahi et al. (2017), and Hasib et al. (2020), stunting is more common in children less than five years old when there is a history of sickness and the time it lasts. This shows how important it is to treat diseases and encourage healthy eating in order to guarantee that kids grow and develop to their full potential.

CHAPTER SIX

CONCLUSSION AND RECOMMENDATIONS

6.1. Conclusion of the study

The study found out that there was a raised prevalence of underweight, wasting, and stunting. From the 2022 KDHS report, there is a need for a multi sectorial approach to address factors contributing to undernutrition among children in Kericho County ensuring the health of young children. This is because the proportion which deviates from the recommended nutritional value is more than that In some of the other counties & the country.

The study also supported the center's assertion that socio demographic and economic factors play a huge role in the current state of nutrition. Individuals with a secondary or higher degree were less likely to be underweight. Maternal education influences optimal feeding practices, and the study revealed its pivotal role in fostering children's nutritional well-being. The associations observed between child age, hierarchical food distribution, and wasting echo established knowledge, highlighting the need for tailored interventions that account for children's evolving dietary needs and household dynamics. Importantly, while some variables in the analysis did not show significant associations, the complex interplay of multifaceted factors influencing child nutritional status is evident. This aligns with the understanding that child nutrition outcomes are shaped by a combination of socioeconomic, cultural, and behavioral influences that extend beyond singular demographic factors. The higher chances of underweight and stunting among children born via caesarean sections underscore the need for specialized care for this group. This study also outlines the significance of caregiver education, intra-household dynamics, and early feeding practices. The correlation between maternal education and reduced child underweight underscores the empowering impact of education on child well-being.

Additional findings from the research highlight the significance of breastfeeding length and the timing of supplemental meal introduction in determining nutritional results. In particular, the research found that children who were given supplemental meals at the prescribed frequency had reduced likelihood of wasting and stunting. The nutritional

condition of the research participants was also affected by the length of nursing after delivery.

The impact of recent illnesses on stunting emphasized the critical role of morbidity factors in child malnutrition. The findings stressed the need for targeted interventions and adherence to evidence-based guidelines to optimize child growth. Further research is warranted to explore potential trends in underweight and the duration of illness, contributing to a broader understanding of integrated health and nutrition programs for child well-being. These findings align with existing research, thus emphasizing the need for integrated health and nutrition programs.

6.2. Recommendations

The research outcomes resulted in 4 notable recommendations as follows:

1. There is a need to establish nutrition specific intervention program in Kericho County targeting children aged 6 to 59 months. This program should comprehensively address both acute and chronic malnutrition.

2. There is a need to intensify the promotion and support of exclusive breastfeeding for the first six months of life, followed by the introduction of safe complementary foods while continuing breastfeeding up to two years of age or beyond.

3. There is a need for further research on the association between nutritional status and children morbidity status.

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ANNEXES

Annex I: CONSENT FORM

STUDY NAME: DETERMINANTS OF THE NUTRITION STATUS OF CHILDREN AGED 6-59 MONTHS IN KERICHO COUNTY, KENYA

PRINCIPAL INVESTIGATOR: DANIEL CHERUIYOT

Introduction

My name is……, a researcher in this county. I am conducting a study on Determinants of the nutritional status of children aged 6-59 months in Kericho County, Kenya. Your child has been selected as one of the people who can participate in this study to help us find answers to that problem. To be able to enrol, I am seeking for your permission so that you get to know more about the study. Am presenting this

information pack for your perusal. Please read this consent document and ask questions for clarifications. At the bottom of the document place your signature. Your signature shall be interpreted as consent to the study. To be able to grant permission you must be 18 years and above therefore a legal guardian who MUST be above 18 years will sign on behalf of the child.

You may withdraw from the study anytime you wish to without prior notice through verbal or written communication.

BACKGROUND OF THE STUDY

Kenya is only one of several nations throughout the world that are dealing with the public health crisis of malnutrition. Malnutrition may occur when there is an imbalance of vital nutrients, an imbalance in the intake or utilization of nutrients, or both. Health care for everyone and ensuring adequate nutrition and food security are two of the four tenets of Kenya's Big Four Agenda, which is in line with the planned study.

The National Commission for Science, Technology & Innovation (NACOSTI), the statutory organization tasked with regulating research in Kenya by law, has examined and authorized the study. The Mount Kenya University Scientific and Ethical Review Committee approved the study's ethical component.

Benefits

Short term

You will know your nutritional status, how to have a good nutritional status and the available options for improving nutrition at no cost.

Long term

You will be part of solution on malnutrition problem that part of the people of Kericho County are suffering from.

Risks

You will compromise confidential information during this study. However, that information will be kept confidential.

Participants' obligation

To sincerely answer the asked questions to the ability and best of their knowledge.

Confidentiality

A unique number will be assigned you at the recruitment. This number will be used as your name throughout the study and any other time you will be required in reference to this study.

No record of your name will be entered anywhere in the data collection tools or any place. The data will be kept in confidential lockable locker. Am the only person who will keep the key.

The data will be published but your name will not appear anywhere. Should the names be required for whatever reason, your name will not be disclosed without you being contacted and consent sought from you.

Disclaimer

To participate in this study is voluntary. No charges whatsoever will be charged. There will be no coercion or threats. If you wish to consult someone before giving consent, that will be granted. You can choose to discontinue from the study whenever you want to. Should you decline consent to this study, there will be no loss of benefit, penalty or denial of services. If you wish this information, be translated to a language of your choice, a translator will be provided before.

Consent Form

Purpose of the Study

(1) To determine the socio-economic & demographic characteristics of caregivers of children of 6-59 months years old in Kericho County, Kenya
(2) To determine the dietary practices of children of 6-59 months years old in Kericho county, Kenya
(3) To assess the morbidity status of children of 6-59 months years old in Kericho county, Kenya
(4) To determine the nutritional status of children of 6-59 months years old in Kericho county, Kenya
(5) To determine if there is a statistically significant relationship between caregivers' socioeconomic characteristics, child dietary practices, child morbidity status and child nutritional status.

Having gone through the content of the research, I consent to the study.

I ……. do consent to the study titled Determinants of

nutritional status of children of six to fifty-nine months in Kericho County

Signature……...Date……

Mothers below 18 years old: I ……. do assent to the study titled Determinants of nutritional status of children of six to fifty-nine months in Kericho County

Signature……...Date……

Researcher

name……Signature……Date…….

Annex II: Questionnaire

The research questionnaire purpose is to help the study PI to identify the determinants of nutritional status in Kapkatet Sub-County Hospital and Kericho County Hospital. It will not be used for any other purposes apart from the research purpose. You are not supposed to write your name or any other personally identifiable information on this questionnaire. Kindly respond to all the questionnaire items below:

1. Age……..... Sex.....

Measure (M)	M1	M2	M3	Average
Weight				
Height/length				

2. Bilateral oedema (elicited through exerting normal thumb pressure to the feet bilaterally for at least 3 seconds) .....
3. Does the child have any special needs, birth or congenital defects? Specify.

.....

Socio-economic and Demographic 4. What the child's birth order? …….

5. Where was the child born?

(a) Health facility □

(b) At home □

(c) Others (specify)……

6. How was the child born?

   (a) Vaginal delivery □

   (b) Caesarean section □

7. What is the age of the primary caregiver?.....

8. Primary caregiver's marital status

   (a) Married □ (d) Single □

   (b) Separated □ (e) Divorced □

   (c) Widowed □ (f) Cohabiting □

9. Religious affiliation of the child's primary caregiver?

   (a) Christian □ (c) Hindu □

   (b) Muslim □ (d) Other (specify).....

10. What is the ethnicity of the primary caregiver? .....

11. Who is the household head?

   (a) Mother □

   (b) Father □

   (c) Other (specify)……

12. Educational level of the head of the household

   (a) No formal education □ (c) Secondary level □

   (b) Primary level □ (d) Tertiary level □

13. What is the source of livelihood of the child's mother/caregiver?

   (a) Salaried employee □ (d) Casual labourer □

   (b) Farmer □ (e) Unemployed □

   (c) Self-employment □

14. On average how much income is generated as a household per month?

   Ksh.....

15. What are the main sources of household income? .....

(a) Salary □ (d) Petty trading □

(b) Farming □ (e) Borrowing/donations □

(c) Casual labour □ (f) Others (specify)…….

16. What is your average monthly expenditure on Food Ksh……...

17. (a) Does any of household members take alcohol or substance abuse? [YES/NO] (b) If yes specify the type and the member's position…….

18. How many people live in your household? ……

19. Do you own land? [YES/NO]

    (a) If yes what is the approximate size of your farmland in acres?.....

    (b) Do you have a kitchen garden?

    (c) If yes in (b) list the food grown

    (i)……..
    (ii)…….
    (iii)…….

20. Decision-making and food distribution within households.

    (a) Who is served first?

    (i) Child (iii)Mother

    (ii) Father (iv) Other (specify)…….

    (b) Who gets the prime portion of the meals?

    (i) Child (iii)Mother

    (ii) Father (iv) Other (specify)……...

Dietary Practices

21. Has the child ever been breastfed? Yes □ No □

22. How long did the child take to be breastfed at birth?

    (a) Immediately □ (b) Less than 1 hour □ (e) 7-12 hours □

    (f) 13- 16 hours□

    (c) 1-3 hours □ (g) 17-24 hours □

    (d) 4-6 hours □ (h) >24 hours (specify)…….

23. Did the mother receive breastfeeding support and education from (tick the applicable)

    (a) Healthcare workers □

(b) CHV □

(c) Other (specify)……

24. Is the child still breastfeeding? Yes □ No □
25. If yes in Q. 24, has the child been breastfed in the last 3 days?
26. On average how often is your child breastfeed per day?.....
27. At what age was complementary feeding introduced?
28. What is the family main staple food?
29. What is the child main staple food?
30. Who feeds the child? Please give in order from the list of frequency of (i-vi) with (i) being the most frequent and (vi) being the list frequent to feed the baby

(a) Self (d) Grandmother

(b) Mother (e) Sibling <7 years

(c) Father (f) Sibling < 10 years

(g) Sibling (other ages) (h) Other (specify)…….

31. 24-hour dietary recall;

Time	Place	Meal	Food/Beverage Item	Details/Ingredients/Preparation	Amount

32. Food frequency questionnaire;

FOOD	AVERAGE USE LAST YEAR

Medium serving (Specific foods in each group to be generated using 24hour recall findings)	None or <1 per 1/12	One to three times per 1/12	Ones per 1/52	Two-four times per 1/52	Five to six times per 1/52	Ones per 24 hours	Two to three times per 24 hours	Four to five times per 24 hours	6+ times per 24 hours
Plantains, tubers and white roots, and grains									
Pulses (lentils, peas, and beans) and nuts									
Dairy products									
Fish, poultry & meat (Flesh)									
Eggs									
Vit A-abundant vegetables & fruits									
Other leafy greens & fruits									

Morbidity

33. In the past one (1) month has the child been sick and taken to hospital for treatment?
34. If yes in (33), what were the symptoms of the illness?

    (a) …… (c) ……. (b) ……. (d) …….
35. What was the duration of the above symptoms in days?.....
36. Did the caregiver seek medical attention?

37. If yes in (36) where?

(a) Level 2 public □

(b) Level 3 public □

(c) Level 4 public □ (d) Chemist/pharmacy □

(e) Herbal medication □

(f) Level 5/6 hospital □

(g) Level 2 private □ (h) Private (other) □

(i) Other (specify)……...

38. The child immunization received as per (KEPI) schedule? (Check CWC booklet)

Vaccine	Age of administration	Yes/No/NA
BCG	At birth or 1st contact	
Polio	At birth or within 2 weeks	
	At six weeks	
	At ten weeks	
	At fourteen weeks	
Rotavirus	At six weeks	
	At ten weeks	
Pentavalent	At six weeks	
	At ten weeks	
	At fourteen weeks	
Pneumococcal conjugate vaccine (PCV10)	At six weeks	
	At ten weeks	
	At fourteen weeks	
Measles Rubella	Ninemonths	
	Eighteen months	
Yellow fever	At 9 months	

39. If any no in (38), why?.....

Annex III: Ethical Clearance Certificate

Mount Kenya University

REF: **MKU/ISERC/2607**

Date: 16 February 2023

TO: **DANIEL KIPNGENO CHERUIYOT**

REG: **MCM/2020/68043**

Dear Sir/Madam,

RE: DETERMINANTS OF NUTRITION STATUS OF CHILDREN AGED 6-59 MONTHS IN KERICHO COUNTY, KENYA

This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **1680**. The approval period is **16/02/2023 - 15/02/2024.**

This approval is subject to compliance with the following requirements:

i. Only approved documents including informed consents, study instruments, MTA will be used
ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal
vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

The Chairman
Mount Kenya University
Ethics Review Committee
P. O. Box 342 - 0100, Thika

Dr. Peter G. Kirira
Chairman, Mount Kenya University ISERC

Annex IV: Letter of Introduction

Mount Kenya University

DIRECTORATE OF GRADUATE STUDIES

MCM/2020/68043

24th February, 2023

National Commission for Science Technology & Innovation (NACOSTI)
Off Waiyaki Way, Upper Kabete,
P.O Box 30623- 00100
NAIROBI, KENYA

Dear Sir/Madam,

RE: DANIEL KIPNGENO CHERUIYOT – REGISTRATION NO. MCM/2020/68043

The purpose of this letter is to introduce the above named student who is pursuing **Master of Clinical Medicine** in the department of **Clinical Sciences** in the School of **Clinical Medicine**

The title of the research is ***"Determinants of Nutrition Status on Children Aged 6-59 Months in Kericho County, Kenya.***

It has been cleared by the University's Ethics Review Committee (Certificate attached) and now has to proceed to the field to collect data between **February, 2023 and April, 2023.**

Any assistance accorded to the student will be highly appreciated.

Thank you.

Mount Kenya University
P. O. Box 342 - 01000, THIKA
Office of the Director
Graduate Studies

for Samuel M. Kariuki, Ph.D
Director, Graduate Studies
Enc.

Annex V: NACOSTI Research License

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 322672

Date of Issue: 31/March/2023

RESEARCH LICENSE

This is to Certify that Mr.. Daniel Kipngeno Cheruiyot of Mount Kenya University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kericho on the topic: DETERMINANTS OF NUTRITION STATUS OF CHILDREN AGED 6-59 MONTHS IN KERICHO COUNTY, KENYA for the period ending : 31/March/2024.

License No: NACOSTI/P/23/24211

322672

Applicant Identification Number

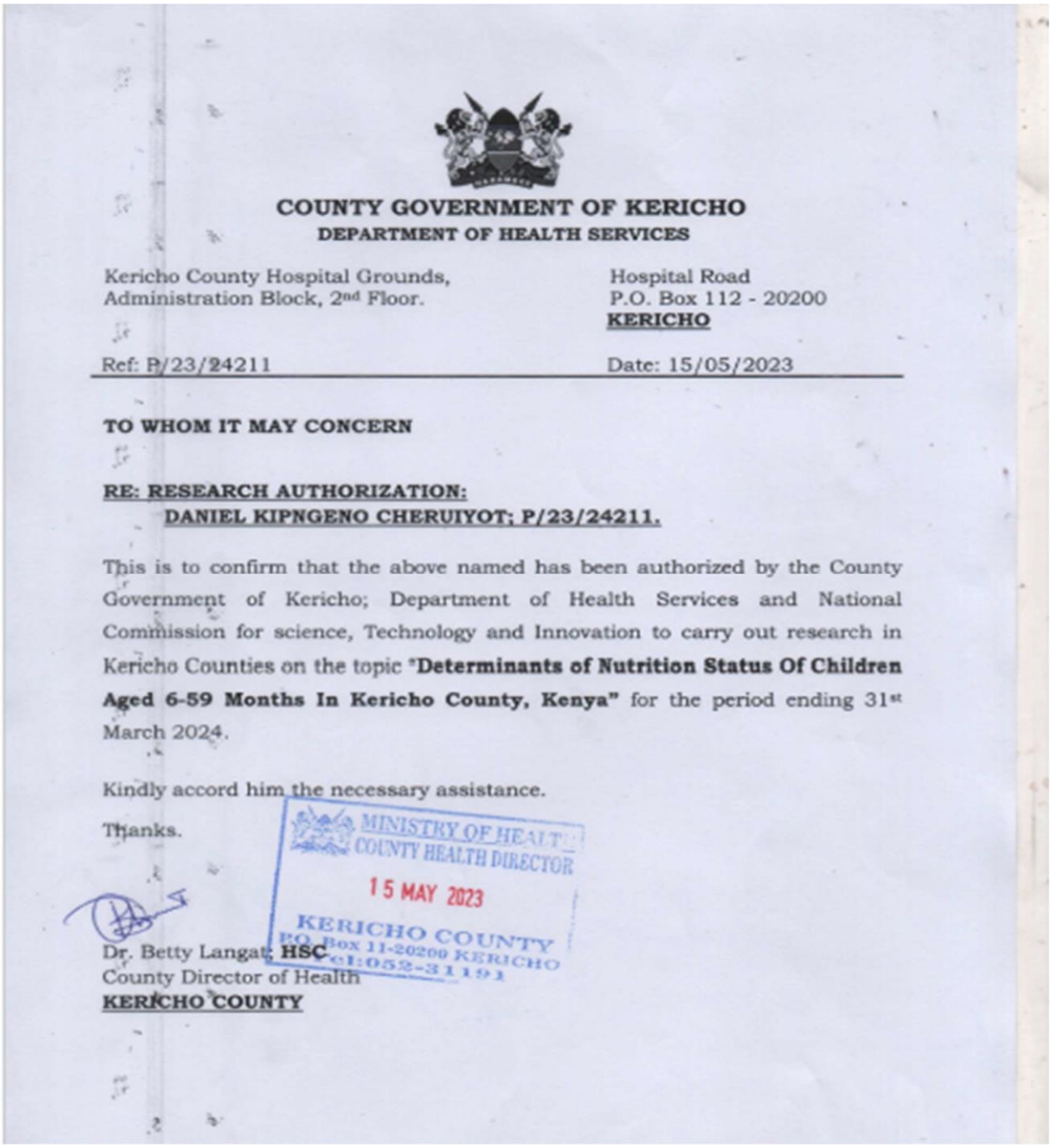
Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

Annex VI: County Government of Kericho clearance



COUNTY GOVERNMENT OF KERICHO
DEPARTMENT OF HEALTH SERVICES

Kericho County Hospital Grounds,
Administration Block, 2nd Floor.

Hospital Road
P.O. Box 112 - 20200
KERICHO

Ref: P/23/24211

Date: 15/05/2023

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION:
DANIEL KIPNGENO CHERUIYOT; P/23/24211.

This is to confirm that the above named has been authorized by the County Government of Kericho; Department of Health Services and National Commission for science, Technology and Innovation to carry out research in Kericho Counties on the topic **"Determinants of Nutrition Status Of Children Aged 6-59 Months In Kericho County, Kenya"** for the period ending 31st March 2024.

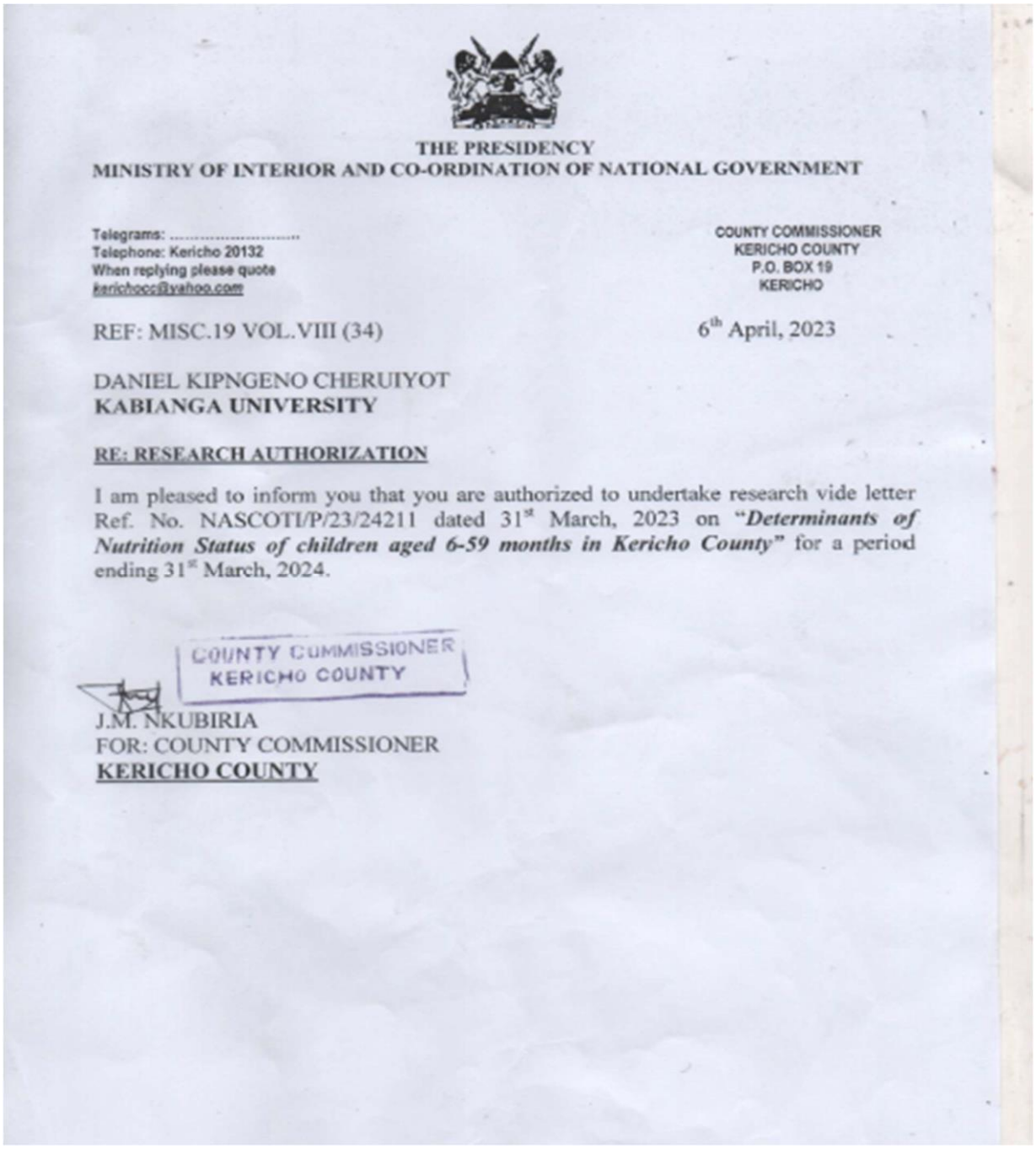
Kindly accord him the necessary assistance.

Thanks.

MINISTRY OF HEALTH
COUNTY HEALTH DIRECTOR
15 MAY 2023
KERICHO COUNTY
P.O. Box 11-20200 KERICHO
Tel:052-31191

Dr. Betty Langat; **HSC**
County Director of Health
KERICHO COUNTY

Annex VII: County Commissioner of Kericho clearance



THE PRESIDENCY
MINISTRY OF INTERIOR AND CO-ORDINATION OF NATIONAL GOVERNMENT

Telegrams: .....
Telephone: Kericho 20132
When replying please quote
kerichocc@yahoo.com

COUNTY COMMISSIONER
KERICHO COUNTY
P.O. BOX 19
KERICHO

REF: MISC.19 VOL.VIII (34)

6th April, 2023

DANIEL KIPNGENO CHERUIYOT
KABIANGA UNIVERSITY

RE: RESEARCH AUTHORIZATION

I am pleased to inform you that you are authorized to undertake research vide letter Ref. No. NASCOTI/P/23/24211 dated 31st March, 2023 on ***"Determinants of Nutrition Status of children aged 6-59 months in Kericho County"*** for a period ending 31st March, 2024.

COUNTY COMMISSIONER
KERICHO COUNTY

J.M. NKUBIRIA
FOR: COUNTY COMMISSIONER
KERICHO COUNTY

Annex VIII: Ministry of Education Kericho County clearance

REPUBLIC OF KENYA

MINISTRY OF EDUCATION

State Department of Early learning and Basic Education

Email: cdekerichocounty@gmail.com
When Replying Please Quote:

County Education Office
P.O BOX 149
KERICHO

Ref: KER/C/ED/GC/2/VOL.III1/05

7TH APRIL, 2023

TO WHOM IT MAY CONCERN.

RE: RESEARCH AUTHORIZATION: MR. DANIELKIPNGENO CHERUIYOT LICENCE NO. NACOSTI/P/23 /24211

I refer to the Director General NACOSTI Letter Ref: No. 3222672 dated 31st March, 2023 granting the above student authority to proceed for field work. His area of study is titled: ***"DETERMINANTS OF NUTRITION STATUS OF CHILDREN AGED 6-59 MONTHS IN KERICHO COUNTY, KENYA"*** for the period ending 31st March 2024.

This is to request your office to accord him' the necessary support during the data collection process.

Thank you.

COUNTY DIRECTOR OF EDUCATION
KERICHO COUNTY
P.O. Box 149, KERICHO

ROSE K SAGARA
COUNTRY DIRECTOR EDUCATION
KERICHO COUNTY

Annex IX: Similarity report

Daniel CHERUIYOT

DETERMINANTS OF NUTRITIONAL STATUS AMONG CHILDREN AGED 6-59 MONTHS IN KERICHO COUNTY, KENYA

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University of Kabianga

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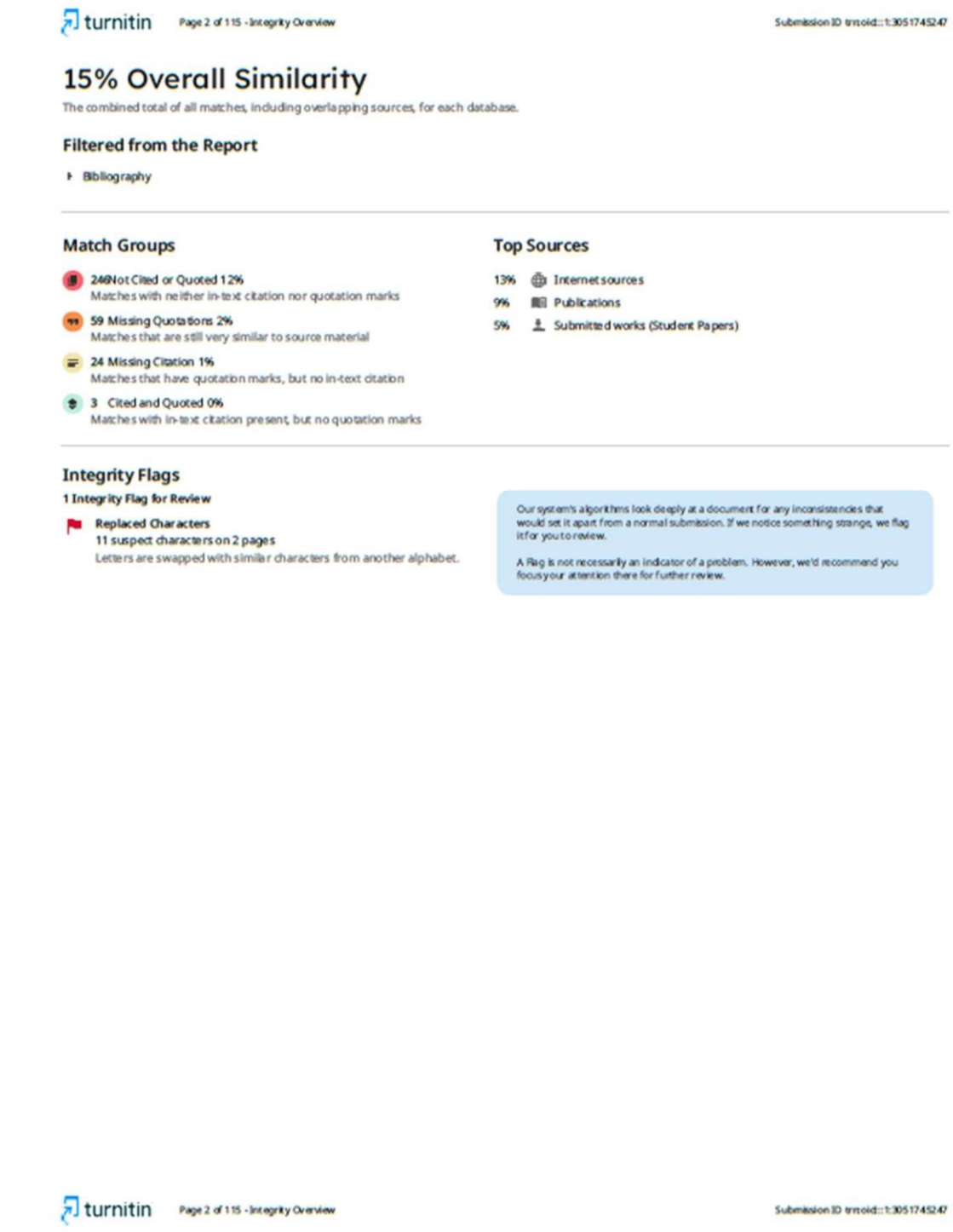
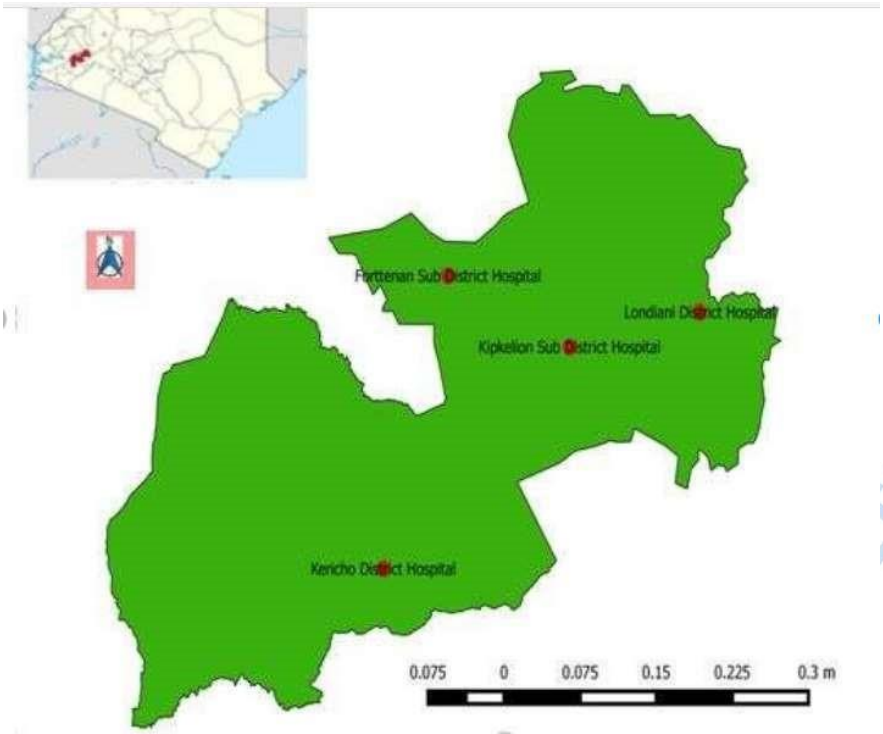


Annex X: Map of Kericho County



Map of Kericho County showing study facilities, Kenya 2016