CAREGIVERS NUTRITIONAL KNOWLEDGE, DIETARY PRACTICES AND NUTRITIONAL STATUS OF CHILDREN ATTENDING NAROK COUNTY REFERRAL HOSPITAL, KENYA

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A Thesis Submitted to the Institute of Postgraduate Studies of Kabarak University in Partial Fulfillment of the Requirements for the Award of Master of Science in Human Nutrition and Dietetics Degree

KABARAK UNIVERSITY

NOVEMBER, 2024

DECLARATION

1. I do by declare that:

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RECOMMENDATION

To the Institute of Postgraduate Studies:

The thesis entitled "**Caregivers Nutritional Knowledge, Dietary Practices and Nutritional Status of Children (6 to 23) Months attending Narok County Referral Hospital, Kenya"** written by **Nkoitoi Naserian Sheillah** is presented to the Institute of Postgraduate Studies of Kabarak University. We have reviewed the thesis and recommend it be accepted in partial fulfillment of the requirement for the award of the degree of Master of Science in Human Nutrition and Dietetics.

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DEDICATION

I dedicate this research thesis to God Almighty, my Creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding. He has been the source of strength throughout this period and on His wings only I soared. I also dedicate this thesis to my family. A special gratitude to my loving parents, Peter Nkoitoi and Mary Nkoitoi whose words of encouragement and push for tenacity ring always in my ears. My sister Dublin has a shoulder to lean on always when things get tougher. My beloved children and nephew, Reina, Amos and Brandon who have always been a symbol of love and patience.

ABSTRACT

The attainment of optimal child nutrition still remains a fundamental challenge in many countries. Sub-Saharan Africa is especially among the most affected regions globally. The situation could partially be addressed by improving the nutritional knowledge of caregivers as well as their dietary practices. However, information on caregivers' level of nutrition knowledge and their dietary practices is largely lacking in most parts of Africa including Kenya. The purpose of this study was to examine the level of caregivers' nutritional knowledge, dietary practices and the nutritional status of children 6 to 23 months attending Narok County Referral Hospital. This research adopted a descriptive cross-sectional design. A sample size of 108 children aged 6 to 23 months and caregivers were purposively recruited. Quantitative data was analysed using SPSS version 25 and ENA SMART softwares, chi-square and correlation analysis were used to analyse relationship between different variables. Approvals were obtained from institute of postgraduate studies (IPGS), Kabarak University Research Ethics Committee (KUREC), National Commission for Science, Technology & Innovation (NACOSTI) and Narok County Referral Hospital. Majority of the caregivers (91.7%) were mothers and fell within the 19-25 years (44.4%), while 35.2% were within 26-35 years. Caregivers had low knowledge (27.8%) and 37.0% had high knowledge, Moderate knowledge levels were exhibited by 14.8% and 9.3% had very low knowledge. The results indicated a variation in dietary practices where 68.5% of children were still breastfeeding at the time of data collection; 88% of children were exclusively breastfed during the first 6 months of age. Cereals were consumed more than four times a week by 85.2% of the children although majority of them (76.9%) did not meet the minimum dietary score. The overall prevalence of wasting, underweight and stunting was 29.6%, 15.7% and 23.1% respectively. The occurrence of stunting in children was related to dietary practices ($\chi 2$=0.245, p-value=0.011) and timing of complementary feeding displayed a moderate positive correlation with WAZ (r=0.305, p=0.001). Nutrition knowledge showed a low positive correlation with HAZ (r=0.235, p=0.014). Height-for-Age Z-score (HAZ) significantly had higher percentages of normal HAZ compared to stunted children (p-value: 0.05). In conclusion caregivers' nutritional knowledge and dietary practices varied across the region and contributed to nutrition outcome of the children in dietary diversity, food adequacy and nutrient intake. Therefore, the study recommends targeted and continuous nutrition education to care-givers of children of this age group.

Keywords: *Caregivers, Children, Dietary Practices, Nutritional Status*

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LIST OF ACRONYMS

DDS : Dietary Diversity Score

ENA : Emergency Nutrition Assessment

FSNAU : Food Security and Nutrition Analysis Unit

HAZ : Height for Age Z-scores

IFPRI/SC : International Food Policy Research Institute, Sub-Committee on Nutrition

IYCN : Infant and Young Child Nutrition

KDHS : Kenya Demographic and Health Survey

KG : Kilogram

KHIS : Kenya Health Information Systems

KNBS : Kenya National Bureau of Statistics

MCH : Maternal Child Health

MDD : Minimum Dietary Diversity

MMF : Minimum Meal Frequency

NCRH : Narok County Referral Hospital

SMART : Standardization Monitoring and Assessment of Relief and Transitions

SPSS : Statistical Package for Social Scientists

UNICEF : United Nation Children's Funds

WAZ : Weight for Age Z-scores

WHO : World Health Organization

WHZ : Weight for Height Z-scores

OPERATIONAL DEFINITION OF TERMS

Caregivers: These are the persons who take care of child's needs may be a mother or any other person charged with the responsibility of taking care of the child

Children : Individuals aged 6 to 23 months. These are young individuals who are in the early stages of development and require special attention, particularly concerning nutritional knowledge, dietary practices, and overall well-being.

Dietary Practices : Refers to the specific behaviours, habits, and routines related to the consumption of food and beverages by caregivers and their children aged 6 to 23 months. These include aspects such as the types of foods provided, feeding frequency, meal preparation methods, portion sizes, and overall nutritional choices made within the given age group.

Nutritional Knowledge: Knowledge of matters, processes and concepts related to nutrition including diet, sources of nutrients and dietary guidelines

Nutrition Status : Status of health relating to dietary nutrients

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Achieving optimal child nutrition remains a fundamental challenge for improving human development. The limited time and capacity of caregivers, coupled with inadequate access to food, result in many children being unable to obtain the nutrients they need for healthy growth (Food and Agriculture Organization (FAO), 2022). However, nutritional knowledge and safe dietary practices can help improve the situation. Global research has shown that addressing malnutrition early on is an effective way to combat the problem (Olack et al., 2011). Healthy eating habits in childhood can reduce health problems in adulthood (Haines et al, 2019). A well-nourished population is essential for productivity and improved standards of living, the United Nations International Children's Fund (UNICEF, 2020) has demonstrated that there is strong link between optimal nutrition during childhood, national development and the potential of future generations.

Olack et al. (2011) also emphasized that malnutrition in children negatively affects their learning and cognitive abilities. Factors such as poor sanitation, low parental education, low income, limited access to food and water, and poor maternal health have been identified as hindrances to child nutrition (United Nations Children's Fund, 2012). Therefore, it is crucial to address malnutrition early in childhood by improving knowledge of safe diets and promoting healthy eating habits to achieve better child nutrition in any country (Turconi et al., 2008; Najaet al., 2016).

Malnutrition is a global concern with an estimated 230 million children affected, as reported by UNICEF (2021). Cesare et al. (2021) estimated that 149.2 million children under the age of five years were stunted, 45.4 million were wasted, and 38.9 million were overweight. UNICEF (2020) estimated that 12.7 million children under the age of 5

years were acutely malnourished, with 3.5 million among them being severely wasted in sub-Saharan Africa. Maternal malnutrition affects fetal development, which leads to malnutrition in children in developing nations (IFPRI, 2018). Erratic weather and climatic conditions in these regions also hinder the growth of food crops (World Meteorological Organization, 2020), and households cannot afford their dietary needs due to poverty (Ghosh, 2020). These circumstances make children under five the most vulnerable to malnutrition (Sobze et al., 2020).

Sunguya et al. (2017) conducted a research in Tanzania, where they found that adequate training and education on nutrition for caregivers and health care workers improves the nutritional status of children. Their study recommended continuous training for caregivers in the communities to enhance child nutrition, similar to the results of Kabahenda et al. (2017) in western Uganda.

According to the Kenya demographic and health survey report (2022), 5% of children under five years old in Kenya are wasted, and 18% are stunted. This rate of malnutrition is classified as an emergency by the World Health Organization (WHO). Regardless of implementation of nutrition interventions by the Government of Kenya (GoK) and various development agencies over several decades, acute and chronic malnutrition still persist in the country.

According to a study by Chege and Kuria (2017), poor dietary practices in caregivers are linked to low nutritional knowledge on child nutrition. The study recommended implementing nutritional programs to educate caregivers on child nutrition. These results were reinforced by Mutuku et al. (2020), who reported that appropriate dietary practices had a positive impact on child health and nutrition. In Narok county, the level of stunting for children under five years was 27.2% and wasting was 7.7% (SMART Survey, 2018), which is classified as high and slow progress according to WHO standards (FSNAU,

2019). However, the KDHS, 2022 reported 22% stunting rate for children below five years. This burden of malnutrition puts a strain on caregivers' resources and leads to economic deprivation. The caregiver's level of nutritional knowledge is currently unclear, hindering the design of effective intervention programs by policymakers and stakeholders to combat malnutrition. Therefore, this study aimed at investigating the caregivers' nutritional knowledge, dietary practices and nutritional status of children aged 6-23 months.

1.2 Statement of the Problem

According to the Sustainable Development Goals target 2.2, by 2025 all forms of malnutrition should be eradicated. However, malnutrition remains a significant contributor to worldwide liability of illness and mortality rates remain unacceptably high. Children under age of five are particularly susceptible, with 45% of all global deaths in this age group being attributed to malnutrition (UNICEF, 2020). In Africa, over 28 million children suffer from stunted growth due to malnutrition, which has serious physical and mental health consequences, including weight loss, vitamin and mineral deficiencies, impaired cognitive capacity and irritability (Save the Children, 2018).

In Kenya, the situation is also alarming, with 26% of under-five children being stunted (Kenya National Bureau of Statistics [KNBS], 2015). Narok County is among the hardest hit by malnutrition, with a prevalence rate of 6.8 %(Standardized Monitoring and Assessment of Relief and Transition [SMART Survey], 2018), which is classified as poor by the World Health Organization. Malnutrition also contributes significantly to child mortality in Narok, with 10% of under-five deaths being attributed to respiratory tract infections, diarrhea, and under nutrition (Kenya Health Information System, 2021).

Recent findings indicate that caregivers' nutritional knowledge and dietary practices significantly impact malnutrition in young children (Caroline & Rono, 2021). However,

a gap exists in understanding the interplay between caregivers' nutritional knowledge, dietary practices, and the nutritional status of children aged 6 to 23 months in Narok County. Considering the alarming prevalence of malnutrition and its severe consequences, it is imperative to fill this knowledge void. Consequently, this study focuses on examining the nutritional knowledge, dietary practices, and nutritional status of children aged 6 to 23 months in Narok County to address the factors contributing to malnutrition.

1.3 Purpose of the Study

The purpose of this study was to determine the association of caregivers' nutritional knowledge, dietary practices and nutritional status of children aged6 to 23 months attending Narok County Referral Hospital.

1.4 Specific Objectives of the Study

The objectives of this study are :-

i. To determine the nutritional knowledge of caregivers to children aged 6 to 23 months attending Narok County Referral Hospital
ii. To establish dietary practices of caregivers for children aged 6 to 23 months attending Narok County Referral Hospital
iii. To assess the nutritional status of children aged 6 to 23 months attending Narok County Referral Hospital
iv. To determine the association between caregivers' nutritional knowledge, dietary practices and the nutritional status of children aged 6 to 23 months attending Narok County Referral Hospital

1.5 Research Questions

i. What is the nutritional knowledge for caregivers to children aged6 to 23 months attending Narok County Referral Hospital?

ii. What are the dietary practices of caregivers for children aged6 to 23 months attending Narok County Referral Hospital?

iii. What is the nutritional status of children aged6 to 23 months attending Narok County Referral Hospital?

iv. What is the association between caregivers' nutritional knowledge, dietary practices and nutritional status of children aged6 to 23 months attending Narok County Referral Hospital?

1.6 Significance of the Study

Upon successful completion of this research, the following benefits may suffice:

Provide information that can be used as a basis for more experimental studies with higher power.

This research endeavor holds the potential to enhance policy development by contributing valuable insights to research training programs focused on knowledge translation interventions. By delving into the link between caregivers' nutritional knowledge, dietary practices, and the nutritional status of children aged 6 to 23 months in Narok County, the findings may serve as a foundation for evidence-based practices.

Policymakers can utilize this information to formulate targeted interventions and guidelines, thereby improving the overall approach to addressing malnutrition in young children.

Contribute knowledge to work intervention to caregivers to improve the nourishment of children.

1.7 Limitations and Delimitations of the Study

This study was limited by the following factors:

Table 1

Limitations and Delimitations of the Study

Study Limitations	Proposed Delimitations
Unwillingness and bias by respondent to honestly provide the required information	The researcher appealed to them to be honest by explaining the importance of the study to them and the community
The study faced constraints related to a smaller sample size population.	Delimitation: The researcher strategically addressed this limitation by carefully defining the scope of the study, ensuring a more focused examination of specific aspects within the targeted population, thereby enhancing the quality of collected data.

1.8 Scope of the Study

The study was conducted at NCRH's Maternal and Child Health Clinic (MCH), including the pediatric unit and nutrition clinic. It focused on measuring the nutritional status of children and assessing their caregivers' nutritional knowledge and dietary practices, as well as how these factors were influencing the nutritional status of the children attending NCRH.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section first explains the theory underpinning the study. The chapter then reviews related empirical studies on the caregivers' nutritional knowledge, dietary practice and children nutritional status age6 to 23 months. A summary of gaps in literature is discussed and a conceptual framework proposed.

2.2 Nutritional knowledge and Dietary Practices

The study on knowledge and practices was started in the 1950s when there was need to measure people's perception on family planning (Cleland, 1973). Since then, knowledge and practice approach established their place and has been used widely in population studies in research monitoring and evaluation and programme planning purposes. The knowledge and practice surveys continued in areas of health sector and mainly nutrition. Nutrition studies on food, hygiene and health issues on individual knowledge is useful in designing nutrition intervention (Ghattas, 2014; Weerasekara et al., 2020).

Guidelines for assessing knowledge and practice on infant and young children concerning food, nutrition and health issues was developed by Food and Agriculture Organization. The guidelines provided useful guidance in setting up predefine questions in a questionnaire, capturing information on knowledge and practice related to feeding infants and young children aged 6 to 23 months and other related nutrition areas (FAO, 2014).

2.3 Nutrition Knowledge of Children Caregivers

Ensuring adequate nutrition for children is a crucial responsibility of caregivers, and their nutritional knowledge plays a critical role in achieving this objective (Alkon et al., 2014; Dunton et al., 2014). Nutritional knowledge of caregivers determines the outcomes of

nutritional status and complementary feeding regime administered to children (Saha et al., 2008).

A study conducted in Nigeria by Akodu et al. (2020) found a positive collaboration between the caregivers' nutritional knowledge and their children nutritional status. The researchers observed that caregivers with higher nutritional knowledge had children with exceptional nutritional status than those with lower nutritional knowledge. These results were agreeing with those of a study carried out in Uganda by Namugumya et al. (2020), which demonstrated that caregivers' nutritional knowledge significantly influenced the dietary diversity of their children. However, not all studies have found a positive association between caregivers' nutritional knowledge and the nutritional status of their children. A research conducted in Ethiopia by Demsash et al. (2022) found no significant association between the nutritional knowledge of caregivers and the nutritional status of their children. Similarly, a study conducted in Ghana by Mohsen et al. (2022) conveyed a low level of nutritional knowledge among caregivers, which was associated with poor dietary practices and malnutrition among their children.

Factors such as education level, socioeconomic status, and access to nutrition information have been found to influence the level of nutritional knowledge among caregivers (Appoh & Kreling, 2005). A survey carried out in Kenya by Chege et al. (2021) establish that caregivers with higher education levels had better nutritional knowledge, which was positively correlated with the dietary diversity of their children. Similarly, a research carried out in rural Zambia by Kafwembe et al. (2020) found that caregivers with better access to nutrition information had higher nutritional knowledge and better dietary practices.

Cultural and ethnic backgrounds have also been found to influence the nutritional knowledge of caregivers. A research carried out in Kenya by Gewa et al. (2019) found

significant differences in the nutritional knowledge of caregivers from different ethnic groups. The researchers observed that caregivers from the Kikuyu and Luo communities had better nutritional knowledge than those from the Maasai and Kalenjin communities. Nutrition education programs have been found to be persuasive in ameliorating the nutritional knowledge and practices of caregivers. A research carried out in rural Nepal by Neupane et al. (2019) found that nutrition education programs significantly improved the caregivers' nutritional knowledge and the dietary diversity of their children. Similarly, a research conducted in India by Narayan et al. (2019) discovered that a nutrition education program improved the caregivers' practices, nutritional knowledge and children nutritional status.

Despite the existing literature on the nutritional knowledge of caregivers, several gaps remain. For instance, there is a need to examine the nutritional knowledge of caregivers in rural settings, where access to nutrition information is limited. Additionally, most studies have only assessed the nutritional knowledge of caregivers but have not explored the factors influencing their nutritional knowledge (Farouk et al., 2018). There is also a need to explore the relationship between the caregivers 'nutritional knowledge and the nutritional status of their children in different settings. Finally, cultural and ethnic factors need to be considered in developing culturally appropriate nutrition education programs.

Additionally, limited studies have explored the cultural and ethnic differences in caregivers' nutritional knowledge in Kenya. Ethnicity and cultural practices can influence dietary practices and nutritional knowledge. A research conducted in Hong Kong by Chung et al. (2018) discovered that cultural beliefs and practices significantly influenced caregivers' nutritional knowledge and dietary practices. The study revealed that caregivers from different ethnic groups had varying levels of nutritional knowledge and

dietary practices. For instance, caregivers from the Zulu ethnic group had a higher nutritional knowledge level compared to caregivers from the Swati ethnic group.

Moreover, most studies assessing caregivers' nutritional knowledge have used a questionnaire as the assessment tool. While questionnaires are a convenient and cost-effective way of assessing nutritional knowledge, they may not provide an accurate measure of the knowledge level. A research carried out in Iran by Gholami et al. (2021) compared the nutritional knowledge level of caregivers assessed using a questionnaire and a structured interview. The study found that caregivers scored higher on the questionnaire than on the structured interview. The authors suggested that questionnaires may overestimate caregivers' nutritional knowledge due to the influence of external factors such as social desirability bias.

2.4 Caregivers Dietary Practices

Caregivers' dietary practices play a crucial role in ensuring adequate nutrition for children and according to WHO-UNICEF, (2017) it recommended that feeding a young child (6-23 months) should include: continued breastfeeding, introduction of semi-solid and solid foods and soft foods, 2-3 times meal frequency and consumption of five or more food groups for dietary diversity. Studies have shown that caregivers' dietary practices significantly influence the dietary consumption and nutritional status of their children.

For instance, a research conducted in Nigeria by Akeredolu et al. (2020) and Odeyemi et al. (2021) discovered that caregivers' dietary practices significantly influenced the dietary intake and nutritional status of their children. The study revealed that caregivers who implement exclusive breastfeeding for the first six months of a child's life had children with finer nutritional status compared to those who did not. Additionally, the study found that caregivers who practiced good dietary diversity had children with better nutritional

status. Lactating mothers can produce varying volumes of milk each day. In the first two days after birth, they typically produce less than 100 ml of milk. By days 4 to 5, this volume increases to approximately 500 ml. From two weeks onwards, lactating mothers generally produce between 750 to 1000 ml of milk each day (CHQ, 2023).

Another study conducted in Kenya by Waswa et al. (2021) found that caregivers' dietary practices significantly influenced the dietary diversity of their children. The study revealed that caregivers who consumed diverse diets had children with better dietary diversity. However, the study also found that some caregivers had poor dietary practices, such as consuming diets lacking in essential nutrients, which negatively affected their children's nutritional status. While some studies have reported positive dietary practices among caregivers, others have reported poor dietary practices. A research carried out in rural Bangladesh by Roy et al. (2022) found that caregivers' dietary practices were influenced by cultural beliefs and practices, which negatively affected their children's dietary intake. For instance, some caregivers believed that certain foods were harmful to their children's health and avoided them, leading to inadequate dietary intake.

Moreover, the level of caregivers' education and access to nutrition information significantly influences their dietary practices. A research carried out in Uganda by Namugumya et al. (2020) discovered that caregivers with higher education levels and better access to nutrition information had better dietary practices and dietary diversity among their children. Similarly, a study carried out in rural Zambia by Kafwembe et al. (2020) found that caregivers with better access to nutrition information had better dietary practices and dietary diversity among their children. Another study conducted in Nigeria by Akodu et al. (2020) found that caregivers' dietary practices significantly influenced their children nutritional status. The study revealed that children of caregivers who followed a diverse diet had finer nutritional status in contrast to those who did not.

Parallel findings were reported in a study conducted in urban and rural communities of Sub-Saharan Africa by Aboagye et al. (2021), which found that caregivers who followed a diverse diet had children with better nutritional status than those who did not.

However, despite the importance of dietary practices in ensuring adequate nutrition of children, some studies have reported poor dietary practices among caregivers. A research done in rural Nigeria by Akombi et al. (2017) found that the majority of caregivers did not provide their children with adequate amounts of protein, vegetables, and fruits, which led to the occurrence of malnutrition among their children. Additionally, a research done in urban and rural areas of Kenya by Olatunji et al. (2021) found that the majority of caregivers did not meet the recommended dietary diversity score, and this was associated with poor nutritional status among their children. The level of dietary practices among caregivers is influenced by various factors, such as access to food, culture, and knowledge of healthy dietary practices. A research conducted in Ghana by forh et al. (2020) discovered that caregivers from households with high food insecurity were more likely to have poor dietary practices, which led to poor nutritional status among their children. A similar study conducted in Uganda by Muggaga et al. (2017) found that cultural beliefs and practices influenced caregivers' dietary practices and led to the prevalence of malnutrition among their children.

2.4.1 Minimum Dietary Diversity

The improved nutrition, health and development of a child depends on Infant and Young Child Nutrition (IYCN) practices which plays a critical role in preventing generated chronic diseases (WHO, 2018) due to this reason, World Health Organization recommends appropriate Minimum dietary diversity to children which is the consumption of at least four or more food groups in their meal. A research carried out in Woreda, Ethiopia by Tadesse, (2018) found that children aged 6-23 months who fed on

four or more food groups met the minimum requirement of diversified diet. Moreover, the mother's might have easy access to information or media and health issues about dietary diversity and child feeding practices resulting to increased rates of children meeting minimum dietary diversity. The study was similar to a study done in Woreda, Ethiopia (Agize et al., 2017).

Another study conducted in Northwest Ethiopia by Beyene et al. (2015) established that the prevalence of malnutrition is still high in Ethiopia and it is highly associated with low complementary feeding practices (Dietary Diversity) and (Meal Frequency) among infant and young children. Children with age group of 12 to 17 months had higher odds of receiving minimum frequency in their daily meal compared to children age group 6 to 12 months. Educational status of a mother, birth order, age of the child and satisfactory media exposure of the mother were significantly associated with providing the minimum dietary diversity. A study done in Sub – Saharan Africa by Aboagye et al., (2021) found magnitude of inadequate MDD intake among children age 6 to 23 months is relatively high due to maternal education, having exposure to media, employment status had significant association to inadequate MDD and families with higher incomes had more divers diets, which resulted in positive nutritional status of infant and young children.

Studies have shown that dietary diversity is associated with nutritional status of children. For instance, a study conducted in Indonesia found that children dietary diversity is strongly associated with stunting in infant and young children (Paramashanti et al. 2017).Notably, the study found that children whose size was smaller at birth had higher chances of becoming malnourished compared to those whose size was large.

2.4.2 Minimum Meal Frequency

Infants and young children are vulnerable to malnutrition, especially stunting and micronutrient deficiencies and increases morbidity and mortality rates. Therefore,

adequate nutrition during birth to two years of age is a critical window period for promotion and optimal growth of a child (WHO, 2018). Minimum Meal Frequency is a proxy indicator for children who are breastfed and non-breastfed from the ages of 6 to 23 months and who receives solid, semi-solid or soft foods the minimum number of times or more. Starting complementary foods are necessary to meet the child's energy and nutrient requirements whereas, late introduction of food to children increases the risk of malnutrition and micronutrient deficiencies (WHO, 2018). Therefore, WHO recommends breastfed children of age 6 to 8 months should be given at least three meals a day and non- breastfed children age 6 to 23 months should be fed with four minimum meals a day.

A study done in Amibara District, Ethiopia by Wagris et al. (2019) on Minimum Meal Frequency established that prevalence of MMF practices was low. Breastfeeding status, timely initiation of breastfeeding, no/little household hunger scale were predictors of MMF, timely initiation of breastfeeding and caregivers who had suitable infant and young child nutrition practices were more likely to continue such positive and appropriate practice including feeding their children with a correct meal frequency. Child feeding practices are multidimensional, a study conducted in Southern Ethiopia found that government employed caregivers fed their children with more diversified diets but less frequent. This is because the employed caregivers stayed in work and separated from their children for long hours.

A study done in Uganda by Scarpa et al. (2022) found that a greater proportion of children starts complementary food at the age of 6 months and children from higher wealth index had higher chances of meeting minimum meal frequency compared with children who were well. Moreover, it was noted that adequate complementary foods contributed to good health, cognitive development and growth in young children. The

study also noted that, most frequently consumed food groups were cereals and roots while proteins and food rich in iron were less frequently consumed. This pattern of consumption was found to be common in low income family settings.

2.4.3 Minimum Acceptance Diet

Suboptimal child nutrition can be achieved by quality of complementary foods, appropriate feeding practices and optimal breastfeeding. Minimum Acceptance Diet (MAD) is attained if the child meets both the Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF) (WHO, 2008). Moreover, it is a strategy used among children of 6 to 23 months of age to break the intergenerational cycle of malnutrition. A survey conducted in Nepal by Sapkota et al. (2022) established that initiation of breastfeeding, current breastfeeding, age of the child, maternal age, educational level, settlement significantly influence MAD among children. Notably, children age13 to 18 months and 19 to 23 months were more likely to receive MAD than children aged 6 to 12 months. MAD was measured with seven food groups, excluding breast milk and the study noted that MAD had lower rates compared to MDD and MMF.

Another study conducted in Congo by Kambale et al. (2019) found that the differences in health services, health education, advise on breastfeeding, complementary feeding during prenatal and postnatal care had low prevalence of Minimum Acceptance Diet and these factors had positive association with MAD. It also emphasizes on the role of socio economic status on feeding practices where the study found that higher socio economic status are more likely to be food secure and can afford to provide their children with Minimum Acceptance Diet. Similarly, a study conducted in Central Ethiopia by Molla et al. (2021) found the prevalence of minimum acceptable was very low and that caregivers' education level, infant and young child feeding advise, child growth

monitoring practice, age of the child and illness 2 weeks before the survey were predictors of MAD.

Despite the existing studies, there are still gaps in the literature on caregivers' dietary practices, particularly in rural areas of Kenya. Limited studies have explored the dietary practices of caregivers in rural areas, where access to food and nutrition information is limited. Additionally, there is a lack of studies comparing the dietary practices of caregivers from different cultural and ethnic backgrounds in Kenya. Such studies are crucial in identifying cultural beliefs and practices that may influence dietary practices and, consequently, the children nutritional status. Furthermore, there is a lack of studies comparing caregivers' dietary practices from different cultural and ethnic backgrounds in Kenya.

2.5 Nutrition Status of Children

The children nutritional status is a vital component of their overall health and development. Several studies have assessed the nutritional status of children in different parts of the world using HAZ, WAZ and WHZ indicators. These studies have highlighted the importance of adequate nutrition for growth and development of children and have identified various factors that influence children's nutritional status.

A research done in India and Korea (Mandal et al., 2021; Kang et al., 2021) ascertain that the nutritional status of children was significantly associated with their dietary intake. The studies revealed that children with poor nutritional status had lower dietary diversity and consumed fewer servings of fruits and vegetables compared to children with better nutritional status. Likewise, a study done in Tanzania by Mshana et al. (2020) ascertains that children's nutritional status was associated with their dietary diversity and frequency of consuming animal proteins.

Another research done in Ghana by forh et al. (2020) ascertains that socioeconomic factors such as household income and maternal education level were significant predictors of children's nutritional status. The study revealed that children from households with higher income and maternal education levels had better nutritional status compared to children from households with lower income and maternal education levels. Several studies have also highlighted the influence of malnutrition on children's health and development. A study done in Nigeria by Nwankwo et al. (2022) ascertains that malnutrition was associated with an escalation of morbidity and mortality among children. The study revealed that children with malnutrition had a higher incidence of infectious diseases and were more possibly to die from these diseases compared to children without malnutrition.

Despite the existing studies, there are still gaps in the publications on the children nutritional status in different parts of the world, especially in developing nations. Limited studies have concentrated on the nutritional status of children in rural areas, where access to nutritious food is limited. Additionally, most studies have only assessed children nutritional status but have not explored the factors influencing their nutritional status. Furthermore, there is a lack of studies comparing the nutritional status of children from different cultural and ethnic backgrounds.

Moreover, the children nutritional status can also be influenced by the dietary practices of their caregivers. A study done in Nepal by Gautam & Yadav, (2018) ascertained that children of caregivers who had poor dietary practices had a higher prevalence of malnutrition compared to children of caregivers who had good dietary practices. Similarly, a research done in Nigeria by Ogundele et al. (2019) stated that the incidence of malnutrition was greater among children whose caregivers had poor dietary practices compared to children whose caregivers had good dietary practices.

Another factor that can influence the children nutritional status is the socio-economic status of their caregivers. A study done in Uganda by Namugumya et al. (2020) found that the socio-economic status of caregivers significantly influenced the nutritional status of their children. The study reported that children of caregivers with higher socio-economic status had improved nutritional status compared to children of caregivers with lower socio-economic status. Similar findings were reported by a study conducted in Nigeria by Akodu et al. (2020), which ascertains that the socio-economic status of caregivers was positively associated with their children nutritional status.

Furthermore, children nutritional status can also be influenced by access to healthcare services. A research done in Tanzania by Mwansisya et al. (2022) ascertains that children who had access to healthcare services had better nutritional status compared to those who did not have access. The study reported that children who had access to healthcare services were more likely to receive medical attention and nutritional support when needed, which contributed to their better nutritional status.

Despite the existing studies, there are still gaps in the publications on the children nutritional status in Kenya. Limited studies have focused on the children nutritional status in countryside, where access to healthcare services is limited. Additionally, most studies have only assessed children nutritional status but have not explored the factors influencing their nutritional status. Furthermore, there is a lack of studies comparing the children nutritional status from different cultural and ethnic backgrounds in Kenya.

2.6 Assessment Methods for Nutrition Knowledge of Caregivers

Assessment of caregivers' nutrition knowledge is essential in identifying knowledge gaps and developing suitable interventions to improve the children nutritional status. Various

assessment methods have been used to evaluate caregivers' nutrition knowledge, including questionnaires, interviews, and focus group discussions.

Questionnaires are a commonly used assessment method in nutrition knowledge research. In a research done in Iran by Gholami et al. (2019), a self-administered questionnaire was used to assess the nutritional knowledge of caregivers. The questionnaire consisted of 24 multiple-choice questions covering various aspects of nutrition, such as food groups, dietary diversity, and nutrient requirements. The study ascertains that the majority of caregivers had inadequate knowledge on nutrition, particularly in areas of dietary diversity and nutrient requirements. Another research done in India by Patil et al. (2020) used a similar questionnaire to determine the nutritional knowledge of mothers of young children. The study found that the mean nutritional knowledge score was low, indicating inadequate nutritional knowledge among the caregivers. However, the study also found that caregivers with higher education levels had better nutritional knowledge compared to those with lower education levels.

In addition to questionnaires, interviews and focus group discussions have also been used to assess caregivers' nutrition knowledge. A study conducted in Ethiopia by Tesfay et al. (2019) used semi-structured interviews to assess the nutritional knowledge of caregivers. The study found that caregivers had limited information of the importance of dietary variety and the role of various food groups in maintaining a balanced diet. Similarly, a research done in Nigeria by Adeyemi et al. (2021) used focus group discussions to assess the nutritional knowledge of caregivers. The study found that the majority of caregivers had inadequate knowledge on nutrition, particularly in areas of nutrient requirements and dietary diversity. However, the study also revealed that caregivers were willing to learn and improve their nutritional knowledge to improve the health of their children.

Despite the various assessment methods used in nutrition knowledge research, there are still gaps in the literature. Limited studies have compared the effectiveness of different assessment methods in evaluating caregivers' nutrition knowledge. Additionally, most studies have only assessed the knowledge of caregivers but have not evaluated the impact of nutrition education interventions on improving their knowledge. Furthermore, there is a need to develop culturally appropriate and context-specific assessment tools that consider the local dietary practices and beliefs of the caregivers.

2.7 Summary of Literature Review and Research Gaps

Firstly, there is limited research on the nutritional knowledge of caregivers in rural settings in Kenya, where access to nutrition information is limited. Additionally, most studies have only assessed the nutritional knowledge of caregivers but have not explored the factors influencing their nutritional knowledge.

Secondly, there is a lack of studies comparing the nutritional knowledge and dietary practices of caregivers from different cultural and ethnic backgrounds in Kenya. This gap is critical as cultural beliefs and practices may influence nutritional knowledge and dietary practices.

Thirdly, the assessment methods for nutrition knowledge of caregivers vary across studies, making it difficult to compare results. There is a need for a standardized method for assessing nutrition knowledge that can be used across different contexts and cultures.

Finally, although some studies have found a positive relationship between the caregivers' nutritional knowledge and their children nutritional status, the causal relationship is not clear. More research is needed to ascertain the causal association between caregivers' nutritional knowledge and their children nutritional status.

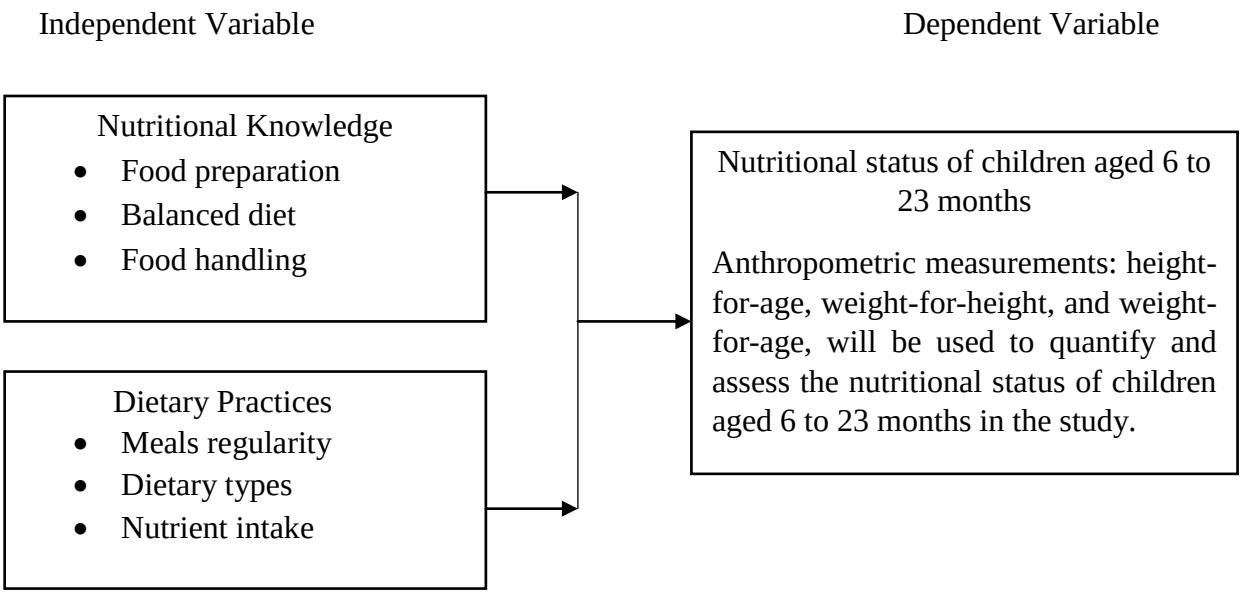
2.8 Conceptual Framework

The theoretical framework for this research was based on UNICEF's conceptual framework for childhood wasting, stunting, and underweight (UNICEF, 2013). UNICEF identifies the complementary feeding period of a child's life as a critical period in which stunted growth, wasting, and underweight may occur. Caregivers' nutritional knowledge and dietary practices are crucial factors in determining the quality of the child's diet in terms of adequacy and diversity, which are immediate causes of malnutrition among children aged 6 to 23 months. Underlying factors such as inadequate care by caregivers and socio-economic status can also affect a child's nutritional status. Poor feeding and care practices may result in poor immunity due to a lack of essential nutrients and minerals. Nutritional knowledge and dietary practices were independent variables in this study, and the following indicators was assessed: food preparation, balanced diet, and food handling.

Dietary practices, included meal regularity (24-hour recall), food frequency questionnaire, dietary diversity score using the ten food groups (grains, roots and tubers, pulses, nuts and seeds, dairy, meat, poultry, and fish, eggs, dark green leafy vegetables, other vitamin A-rich fruits and vegetables, other vegetables, and other fruits), and nutrient intake (energy, proteins, vitamins, minerals) will determine the number of meals, dietary diversity, and amount of nutrients consumed. Nutritional status, which is the study's outcome, was assessed using anthropometric measurements such as weight, height, and z-score, and anthropometric indicators such as height-for-age (stunting), weight-for-height (wasting), and weight-for-age (underweight) was determine using the WHO reference chart.

Figure 1

Conceptual Framework



Source: Author (2024)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section explored the methodology that was used in the study. It included: research design, study location, target population, inclusion criteria, exclusion criteria, sampling procedure, quantitative sample size determination, sampling technique, data collection instruments, data collection procedure, data analysis and ethical consideration.

3.2 Research Design

The research adopted a descriptive cross-sectional survey design (Simkus, 2021). The design provided a representation of information about the situation at hand at specific time and characteristics of the status of the study population. Data was thus collected at a particular point in time and findings inferred to the target population. Respondents gave information on the caregivers' nutritional knowledge and dietary practices and these findings was correlated with the children nutritional status aged 6 to 23 months attending Narok County Referral Hospital (NCRH).

3.3 Location of the Study

The study was carried out at the Narok County Referral Hospital (NCRH) in Kenya, which is one of the major public health facilities that provide referral health care services to the people of Narok and other neighbouring counties such as Kajiado and Bomet. The hospital has a well-equipped nutrition unit that offers services such as nutritional assessment, counselling, and treatment of malnutrition in children. The study was conducted in the paediatric ward, and the nutrition unit of the hospital, where children aged 6-23 months and their caregivers receive nutritional care. Maternal child health unit where children aged 0-5 years and their caregivers receives services such as routine

immunization, growth monitoring, nutrition and health education, with an average of 100 visiting the clinic daily. Narok County Referral Hospital has several wards that cater to different healthcare needs, including the paediatric ward where children aged 0-5 years receive medical care. The hospital serves a large population in Narok County and the surrounding areas, with an average of 800 patients visiting the hospital daily. Additionally, the hospital has a bed capacity of 310, with an average daily occupancy rate of 75% (KHIS, 2021). The high number of patients visiting the hospital and the availability of the nutrition unit make NCRH an ideal location for this study. By conducting the study at NCRH, we can gather valuable data on the knowledge on nutrition, dietary practices, and children nutritional status attending the hospital, which can inform policy and practice in addressing the issue of malnutrition in the area.

3.4 Target Population

The research targeted two groups: children aged 6-23 months and their legal caregivers seeking family planning services, immunizations, growth monitoring, and other healthcare services at NCRH's Maternal and Child Health Clinic (MCH), including the pediatric unit and nutrition clinic. The population of children aged 6-23 months in NCRH catchment is estimated to be 5,859 (KHIS, 2021).

3.5.1 Inclusion Criteria

The inclusion criteria comprised of the following:

i. Caregivers to children aged 6-23 months and attending NCRH who gave consent to participate in the study

ii. Children aged 6-23 months and attending NCRH whose legal caregivers gave assent to participate in the study

3.5.2 Exclusion Criteria

The exclusion criteria comprised of the following:

i. Caregivers who did not consent

ii. Children who were below 6 months and above 23 months

iii. All caregivers of children who were in transit

3.6 Sampling Procedures

3.6.1 Quantitative Sample Size Determination

The sample size for this research was determined according to the formula of Fisher et al. (1998). The calculation was done using a prevalence rate (p) of 6.8% (SMART, 2018) as follows:

$n=(z^2*pq)/d^2$

Where:

n:desired sample size

z:standard normal deviate at the required confidence level in this case 1.96

p: proportion of the target population estimated to have characteristics being measured.

q: (1-p)

d: level of accuracy of the statistic being measured (95%) = 0.05

$n= (1.96^2 * [0.068) * 0.932]) / (0.05)^2$

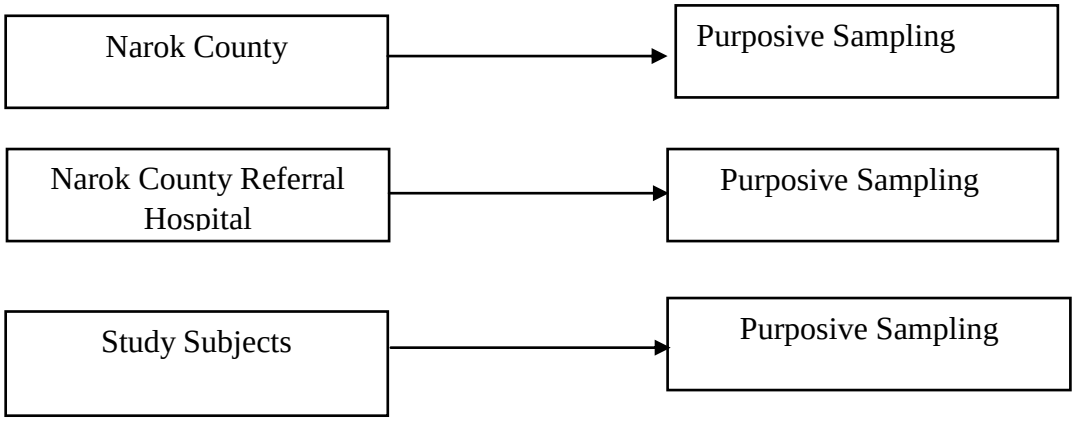
The value of n (sample size) was therefore 98. Consideration for non-response, extra 10% of minimum sample size was added. The final sample size for the study was 108 subjects.

3.6.2 Sampling Technique

Purposive sampling techniques was used to select the study location due to subject availability and on the basis of certain considerations such as prevalence of malnutrition (Patton, 1990).Similarly, Purposive Sampling Technique was used to select subjects who qualify the inclusion criteria. Narok County and NCRH was purposively chosen on the basis of high prevalence of malnutrition (County Health Report, 2022).

Figure 2

Sampling Technique



3.7 Data Collection Instruments

Different instruments wereused to collect quantitative data. They included:

3.7.1 Standardized Questionnaires

Semi structured questionnaires were pretested before collecting data. The questionnaires were used to collect information on socio-economic demographic information of the respondents, caregivers' nutritional knowledge, dietary practices, food frequency and anthropometric measurements of the child. The questionnaires were administered by the researcher assisted by the research assistants who were trained prior the data collection period. All participants were asked the same questions and in identical format. The questionnaire was organized as follows: socio-economic and demographic data, child

information, Nutritional knowledge, Dietary practices, food frequency, 24-hour recall, nutrition status to the child.

3.8 Data Collection Procedure

Study approvals were obtained from IPGS, KUREC, NACOSTI, Narok County Hospital. Research assistants were recruited and trained prior to data collection. The training was conducted in 2 days which included rigorous training on nutrition where accuracy and precision was emphasized. The topics covered included:objectives, anthropometric measurements procedures, completion of survey tools and interviewing skills. Each questionnaire had an informed consent form (Appendix 1) where the respondent agreed to give consent by signing the form.

Data was collected by research assistants and the team was supervised throughout the data collection period. Data was collected in NCRH premises for a period of one month.Caregivers' nutritional knowledge information was collected by using questionnaires. Dietary practices information was collected by using a questionnaire, 24-hour dietary recall and dietary diversity. The information was collected by interviewing respondents by using a series of questions.

3.8.1 Anthropometric Measurements

Anthropometric measurements of children age 6-23 months were taken and converted to Z scores in order to assess their nutritional status, this included: The categorization of malnutrition was based on Weight-for-Height (W/H) Z-Scores. Severe Acute Malnutrition (SAM) was indicated by a W/H Z-Score of less than -3. Moderate Acute Malnutrition (MAM) was identified by a W/H Z-Score between -3 and less than -2. Children at risk of acute malnutrition were those with a W/H Z-Score between -2 and less than -1. (WHO, 2006).

Weight and length were measured by the researcher and the research assistants using a Seca weighing scale and Seca length mats, respectively. The children's ages were verified using the mother and child health booklet. The researcher ensured that the child had minimal clothing, the scale was zeroed, and it was placed on a flat surface. The child was then placed on the scale tray, and the weight was recorded in kilograms (kg) to the nearest 0.1 kg. The weight was measured three times, and the average was calculated.

The length measurements were taken using the mat and placed on the flat and stable surface. The child was placed on the recumbent position ensuring the child's head touched the head piece, shoulder, blades and buttocks at the centre against the mat and the child's feet flat against the foot piece, taken to the nearest 0.1 of a centimetre. For accuracy, measurements were taken twice an average was calculated and recorded. These measurements were recorded in the anthropometric data sheet. WHO (2006) growth standard chart was used to reference and categorize the Z- scores. All anthropometric measurements were done per the best practices as recommended by WHO.

3.8.2 Dietary Practice Assessment

Dietary practices were evaluated using various methods, including dietary diversity, meal frequency, food frequency, and nutrient intake. The individual dietary diversity score was obtained through a 24-hour recall, encompassing eight recommended food groups according to WHO and UNICEF (2021) guidelines. These food groups include grains and grain products, root tubers and green bananas, legumes and pulses, nuts and seeds, dairy and milk products, eggs, meat, fish, poultry, insects and organ meats, orange and yellow fruits and vegetables, dark green leafy vegetables, and fruits.

To assess food consumption, a seven-day food frequency questionnaire was employed, covering twelve local food groups: cereals, roots and tubers, vegetables, fruits, dairy products, meat, fish and seafood, eggs, legumes and nuts, sugar, oils and fats, and spice

condiments and beverages. Caregivers reported the frequency of food group consumption in the past week, choosing from options like "never," "<4 times," and ">4 times." Additionally, meal frequency was gauged by the number of meals consumed in the previous 24 hours.

Minimum meal frequency was determined by considering breastfeeding status and age: at least two meals for breastfed children aged 6-8 months and at least three meals for those aged 9-23 months. Non-breastfed children aged 6-23 months were required to be fed a minimum of four meals, regardless of age. Nutrient intake was assessed through a 24-hour recall method, where caregivers recounted the child's food intake from the previous day, detailing quantities, cooking methods, and ingredients used.

3.8.3 Nutritional Knowledge Assessment

The assessment of caregivers' nutrition knowledge was conducted through a questionnaire consisting of 15 questions that covered various aspects of feeding practices and hygiene. Each question was designed with multiple answer options to capture a comprehensive understanding of caregivers' knowledge related to nutrition and child care practices. This approach aimed to gauge the depth and breadth of their knowledge across different areas relevant to infant and young child feeding.

3.9 Pilot Testing

A pilot survey was carried out to ascertain the accuracy of the questionnaire in Narok County Referral Hospital. The area was selected since it has a high population and high incidence of malnutrition. The researcher and the research assistants conducted the pre-test with the structured questionnaire to assess length, content and wording of the tools. Final adjustments were done to areas that needed clarity after pre-test in order to increase validity and consistency of the tools.

3.9.1 Validity of the Study Instruments

The researcher used the caregiver to enhance face and content validity of the tools. Tools were tested during the pilot survey phase to determine whether questions were well put up and straightforward to the candidates.

3.9.2 Reliability of the Study Instrument

Pilot survey was done before starting the main study, this included 10% of the whole sample size where accuracy of the questionnaire was assessed using Cronbach alpha (α) for consistency and practicality of the questionnaire. The reliability of the research tools was substantiated by the consistency the results obtained from the pilot survey with those of the main study.

3.10 Data Analysis of the Study Instruments

Quantitative data was entered,cleaned and analyzed on SPSS version 25. The data was further analyzed as follows: The collected raw data underwent analysis using the Statistical Package for the Social Sciences (SPSS) version 25. Demographic and socio-demographic characteristics were assessed through descriptive analysis. Anthropometric data, including weight-for-height, weight-for-age, and height-for-age indices, were analyzed using the ENA for SMART software.

The data was categorized based on WHO 2006 growth standards to determine normal or malnourished status. Frequency distribution tables were used to present information on food consumption and types. Individual dietary diversity scores were categorized as met (<5) or not met (≥5) according to the IYCF guidelines (WHO and UNICEF,2021). The overall nutrition knowledge aggregate was transformed into percentages. These percentage scores were then divided into five categories: 0-20% (very low), 21-40% (low), 41-60% (moderate), 61-80% (high), and 81-100% (very high), in line with the approach used by Chege and Kuria (2017). The association between caregivers' nutrition

knowledge, dietary practices, and children's nutrition status was assessed using chi-square tests and Pearson correlation coefficients.

Table 2

Data Analysis

Objective	Variable(s)	Statistical Analysis
To assess demographics, Socio-economic characteristics	Age, gender, occupation, monthly income, family size, marital status	Descriptive statistics; frequencies, mean, percentages, standard deviations
To determine caregivers nutritional knowledge	Nutritional knowledge	Descriptive statistics; percentages
To establish caregivers dietary practices	Dietary diversity score, nutrient intake, meal frequency, food frequency	Descriptive statistics; frequencies, percentages
To assess the nutritional status of children	z-scores	Descriptive statistics; frequencies, percentages
Association between caregiver's nutrition knowledge, dietary practices and nutrition status	Nutrition knowledge, meal frequencies, dietary diversity score, z-scores	Chi-square tests Pearson correlation coefficient

Data were presented in the form of graphs and tables.

3.11 Ethical Considerations

Requisite approvals were obtained from IPGS (approval to conduct research), KUREC (Ethics Review committee), NACOSTI (permit to collect data), and Narok County Referral Hospital (permit to collect data). Participants were consented before taking part in the study. The informed consent form which terms of participation including voluntariness is herewith attached as appendix 1.

Data was collected by lead researcher and/or research assistants. The data was collected in a private room convenient to ensure subject privacy. The data stored under password protected device and discarded by deletion 5 years after the study. Raw data on questionnaires is safely stored in lockable cabinets accessible only to the lead researcher.

Confidentiality was addressed in three stages: at the time of data collection, during data cleaning identifiers are removed to create a clean data set and during dissemination of research results. Researcher safety on the potential risks, emotional safety and physical safety was discussed as well a range of skills was adopted to effectively conduct the research.

CHAPTER FOUR

DATA ANALYSIS, DISCUSSION AND PRESENTATION

4.1 Introduction

This chapter presents the results of a study conducted at Narok County Referral Hospital, followed by a thorough discussion of the findings. The study focused on children aged 6 to 23 months and their respective caregivers. The sample size was 108. Notably, the response rate for the study was an impressive 100%, ensuring robust data collection.

4.2 Demographic and Socio-Economic Characteristics

Table 3

Demographic Characteristics of Caregivers of children attending NCRH

Characteristics	Variable	N(108)	%
Nature of the care giver	Mother	99	91.7
	Father	3	2.8
	Grandmother	6	5.6
Age of caregiver (years)	<18	5	4.6
	19-25	48	44.4
	26-35	38	35.2
	36-45	12	11.1
	>45	5	4.6
Marital status	Single	23	21.3
	Married	79	73.1
	Separated	4	3.7
	Divorced	2	1.9
Family size	0 to 2	14	13.0
	3 to 5	74	68.5
	6 to 10	20	18.5
Residential area	Rural Semi-Arid	29	26.9
	Rural Highlands	16	14.8
	Urban Informal Settlement	25	23.1
	Urban formal Settlement	38	35.2

Findings indicate that majority of the caregivers (91.7%) were mothers, underscoring their pivotal role in care giving responsibilities. Grandmothers accounted for 5.6%, reflecting a multi-generational support system, while fathers constituted a modest 2.8%. The age distribution of caregivers revealed distinctive patterns, showcasing a diverse representation across various life stages. Close to half of caregivers (44.4%) fell within the 19-25 years, while 35.2% were within 26-35 years. Additionally, 11.1% were within the 36-45 years category, underlining the continued involvement of caregivers across midlife. Interestingly, caregivers below 18 years and those above 46 years constituted 4.6% each, providing a well-rounded representation across both younger and older age groups. Majority of the caregivers (73.1%) were married. Family size distribution revealed that most (68.5%) households had 3 to 5 members. While 35.2% of the participants lived in urban formal settlements as shown in Table 3.

Table 4

Socio-Economic Characteristics of Caregivers of Children 6 to 23 Months

Characteristic	Category	N(108)	%
Educational level	No formal education	8	7.4
	Primary	30	27.8
	Secondary	47	43.5
	Tertiary	23	21.3
Occupation	House wife	31	28.7
	Casual laborer	30	27.8
	Farming	18	16.7
	Small business	19	17.6
	Formal employment	10	9.3
Household monthly	<10,000	50	46.3
income (KSHS)	11,000-15,000	29	26.9
	16,00-20,000	16	14.8
	21,000-25,000	4	3.7
	>26,000	9	8.3
Source of food	Production	26	24.1
	Borrowing	2	1.9
	Purchase	72	66.7
	Production/Purchase	7	6.5
	Borrowing/Purchase	1	0.9

Table 4 above shows the socio-economic characteristics of the study participants. Majority (43.5%) had attained secondary school education while 7.4% had no formal education. 28.7% were housewives while 9.3% were in formal employment. 46.3% had and household monthly income below KSHS10,000. The source of food was predominantly through purchase (66.7%), with 24.1% deriving food from production and 6.5% utilizing a combination of production and purchase.

Table 5

Demographic Characteristics of Children 6 to 23

Characteristic	Category	N (108)	%
Age (months)	6-8	24	22.1
	9-11	25	23.1
	12-17	20	18.5
	18-23	39	36.1
Sex	Male	59	54.6
	Female	49	45.3

The children were well-represented across different developmental stages. Majority (36.1%) were within 18-23 months' category, while age groups of 6-8 months, 9-11 months, and 12-17 months accounted for 22.1%, 23.1%, and 18.5% respectively with a mean age of 13.65±5.708. The gender distribution showcased a near-equal split, with 54.6% of the children being male and 45.3% female as shown in Table 5 above.

4.3 Nutrition Knowledge among Caregivers

Table 6

Nutritional Knowledge Scores and Source among Caregivers

Variable	N (108)	%
Score %		
0-20 (Very low)	10	9.3
21-40 (Low)	30	27.8
41-60 (Moderate)	16	14.8
61-80 (High)	40	37.0
81-100 (Very high)	12	11.1
Source Of Nutrition Knowledge		
Community Health Worker	13	12.0
Media	35	32.4
nutrition programs	44	40.7
Community health workers/ media/nutrition programs	5	4.6
Family members/Friends/neighbors	10	9.3
None	1	0.9

The findings in Table 6 indicate a diverse range of nutrition knowledge levels among participants, with 37.0% demonstrating high knowledge and 27.8% showing low knowledge, necessitating further education. Moderate knowledge levels were exhibited by 14.8% and 9.3% had very low knowledge, revealing potential gaps. Encouragingly, 11.1% showed very high knowledge. These variations underscore the need for tailored interventions. Regarding sources of nutrition knowledge, nutrition programs was significant at 40.7% followed by media for 32.4%, Community health workers played a role for 12.0%, while 4.6% benefitted from combined sources. Social networks contributed to 9.3%, while only 0.9% lacked identifiable sources.

4.4 Care Givers Dietary Practices

Table 7

The Source and Treatment of Water Used for Drinking and Cooking

Variable	N =108	%
Source of water		
Tap	77	71.3
River	16	14.8
Borehole	5	4.6
Rain	10	9.3
Type of treatment		
Filter	10	9.3
Chemicals	10	9.3
Boil	39	36.1
None	49	45.4

The primary water source for caregivers was tap water (71.3%) due to its convenience and presumed safety, while 14.8% relied on rivers reflecting limited access to treated water sources in some areas and 4.6% utilized boreholes often prevalent in rural settings. Rainwater was used by 9.3% of participants which could be attributed to its availability during certain seasons. Boiling was adopted by (36.1%) of the participants, a common

practice to eliminate pathogens, while a smaller number(9.3%) employed filters or chemicals, showcasing efforts to ensure water safety and a significant proportion (45.4%) did not treat their water, potentially indicating a lack of awareness or access to effective treatment methods. These findings highlight the need to promote safe water practices, especially for child health. Educating caregivers about water sources and treatments is crucial for their well-being.

4.4.1Feeding Habits

Table 8

Feeding Habits of Children Aged 6 to 23 Months

Characteristic	Category	(N=108)	%
Breastfeeding	Yes	74	68.5
	No	34	31.5
Exclusively breastfed	Yes	95	88.0
	No	13	12.0
Timing of complementary feeding	Not yet introduced	1	0.9
	Early introduction before 6 months	13	12.0
	Timely introduction at 6 months	88	81.5
	After 6 months	6	5.6
Cessation of breastfeeding	≤6 months	4	3.7
	7-12 months	11	10.2
	13-24 months	19	17.6
Reason for stopping breastfeeding	No enough breast milk	3	2.8
	No time to breastfeed	6	5.6
	Child refused to breastfeed	2	1.9
	Child wanted to stop	18	16.7
	Pregnancy	3	2.8
	Breastfeeding younger child	1	0.9
	mother went back to school	1	0.9
Minimum Meal frequency	Met	79	73.1
	Unmet	29	26.9

Table 8 presents a comprehensive overview of breastfeeding and complementary feeding practices shows. The majority (68.5%) of the children were still breastfeeding, and 88.0% were exclusively breastfed during the first six months of their lives. 81.5% of the

children were introduced to complementary feeding at the recommended age of 6 months, while a smaller fraction introduced it earlier (12.0%) or later (5.6%). Regarding the cessation of breastfeeding, 17.6% stopped breastfeeding between 13 to 23 months followed by 7-12 months (10.2%) and ≤6 months (3.7%). Cessation of breastfeeding was influenced by a variety of factors, including the child's preference (16.7%), insufficient breast milk (2.8%), and other personal reasons such as time constraints (5.6%). Remarkably, 73.1% of caregivers successfully met the minimum meal frequency recommendations tailored to their child's age, effectively addressing their nutritional needs. These findings underscore the multifaceted nature of feeding practices and highlight the significance of informed guidance to optimize infant and young child nutrition.

4.4.2 Food Frequency

Table 9

Frequency of Food Consumption by Children Aged 6 to 23 Months

Food groups	Never consumed in the past 7 days %	Consumed <4 times in a week %	Consumed >4 times in a week %
Cereals	1.9	13.0	85.2
Roots and tubers	59.2	38.0	2.87
Vegetables	19.4	60.2	20.4
Fruits	12.0	75.0	13.0
Dairy products	3.7	42.6	53.7
Meat	28.7	69.4	1.9
Fish and sea foods	70.0	12.8	17.2
Eggs	60.6	32.4	7.0
Legumes and nuts	19.4	76.9	3.7
Sugar	24,9	13.8	38.7
0ils and fats	12.2	51.6	36.2
Spice condiments and beverages	56.7	12.5	30.8

Table 9 presents the consumption patterns of various food groups in the past 7 days. Cereals, a staple, were consumed significantly more than four times a week (85.2%), reflecting their fundamental role in the diet. However, roots and tubers exhibit a substantial proportion of participants who never consumed them (59.2%), likely due to limited access to these foods. The consumption of vegetables (60.2%) and fruits (75.0%) is relatively prevalent, indicating a commitment to incorporating plant-based options. Dairy products and meat consumption are noteworthy, with many consuming them more than four times a week (53.7% and 69.4% respectively), possibly due to the availability of livestock. Fish and seafood consumption (17.2%) is moderately prominent, possibly due to proximity to water bodies.

The usage of eggs (7.0%) is relatively low, while legumes and nuts (76.9%) are consumed regularly, likely due to their practicality in the pastoralist context. Sugar (38.7%) and oils/fats (36.2%) are used in moderation, possibly due to their limited availability. The high consumption of spice condiments and beverages (30.8%) could be attributed to their role in flavoring and preservation, contributing to the unique dietary patterns of this pastoralist group.

4.4.3 Minimum Dietary Diversity

Table 10

Dietary Diversity Score for Children Aged 6 to 23 Months

Dietary diversity score	N=108	%
≤4 (unmet)	86	79.6
≥5 (met)	22	20.4

The dietary diversity score provides insight into the variety of food groups consumed by each child in the 24 hours prior to data collection. The findings indicate that majority (79.6%) of the participants did not meet the minimum dietary diversity score, indicating

a lack of variety in their food consumption. In contrast, 20.4% managed to meet the minimum dietary diversity score for children aged 6 to 23 months. The mean dietary diversity was 3.71±1.136 and the minimum food group consumed being 1 and the maximum 7 food groups. This distribution emphasizes the prevalence of insufficient dietary diversity among the participants, underlining the importance of interventions to promote a wider range of food choices in this age group.

4.4.4 Children Nutrient Intake

Table 11

Proportion of Children Aged 6 to 23 Months Consuming Adequate Nutrient

Nutrient	N (108)	%
Energy (kcal)	83	76.9
Protein (g)	67	62.0
Vitamin A (µg RE)	33	30.6
Iron (mg)	29	26.9
Zinc (mg)	24	22.2
Iodine (µg)	26	24.1
Calcium (mg)	38	35.2

The majority (76.9%) of children met the satisfactory energy intake. In terms of specific nutrients, 62.0% met protein intake recommendations, while the proportions meeting micronutrient recommendations varied: 30.6% for Vitamin A, 26.9% for Iron, 22.2% for Zinc, and 24.1% for Iodine. Additionally, 35.2% met the recommended Calcium intake. These findings highlight both strengths and potential nutritional gaps, underlining the importance of promoting well-rounded diets and considering targeted interventions to enhance nutrient intake for the optimal growth and development of young children in this age group.

4.5 Nutrition Status of Children 6 to 23 Months

Anthropometric measurements were converted into z scores, allowing for the assessment of malnutrition prevalence among children aged 6 to 23 months. This approach provided a standardized way to determine the percentage of children experiencing malnutrition within the studied population.

4.5.1 Weight for Height Z- Scores

Table 12

Weight for Height Z-Scores and Sex of Study Children Aged 6 to 23 Months

Categorization of nutrition status	Male		Females		Total	
	N (59)	%	N (49)	%	N (108)	%
Normal	25	42.4	20	40.8	45	41.7
Moderately wasted (<-2 ->-3 SD)	17	28.8	14	28.6	31	28.7
Severely wasted (≤-3SD)	17	28.8	15	30.6	32	29.6
Wasting (GAM) (<-2 SD)	34	57.6	29	59.1	63	58.3

Findings in Table 12indicate that 41.7% of the children had a healthy nutritional status with normal weight-for-height z scores. Furthermore, 28.7% were moderately wasted, and 29.6% were classified as severely wasted, indicating a significant prevalence of wasting (Global Acute Malnutrition) at 58.3%. Notably, the levels of wasting were slightly higher among females (59.1%) compared to males (57.6%). Addressing and mitigating wasting, particularly severe cases, is crucial for enhancing the nutritional well-being of children aged 6 to 23 months.

Figure 3

Global Acute Malnutrition Rates by Age Group

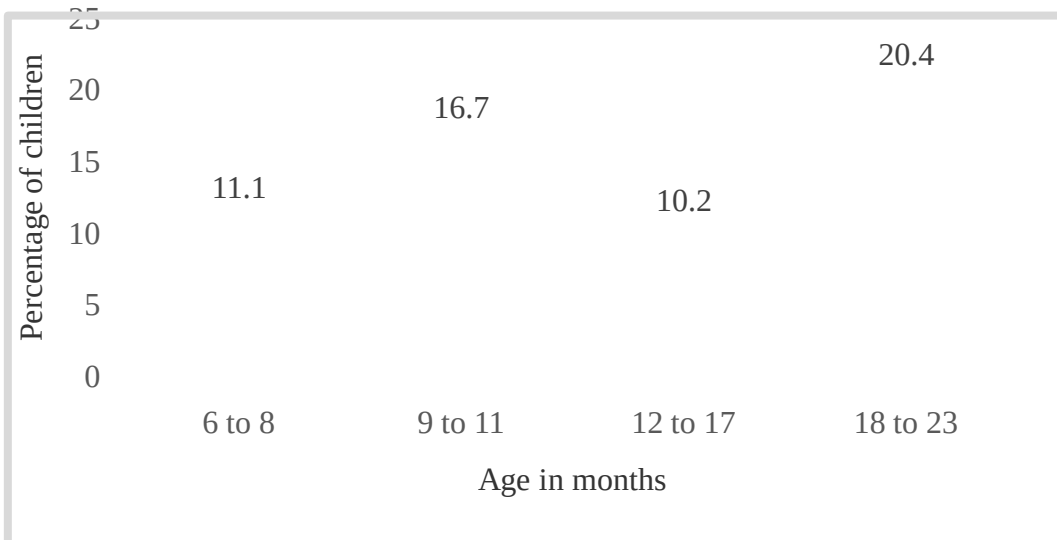


Figure 3 illustrates the prevalence of global acute malnutrition (GAM) rates among the study children categorized by age groups. Notably, children aged 18-23 months had the highest GAM rates of 20.4%. Meanwhile, children aged 12-17 months, 6-8 months, and 12-17 months had GAM rates of 10.2%, 11.1%, and 16.7%, respectively. This distribution underscores the importance of age-targeted interventions to address and mitigate GAM rates in specific age groups.

4.5.2 Weight for Age Z Scores

Table 13

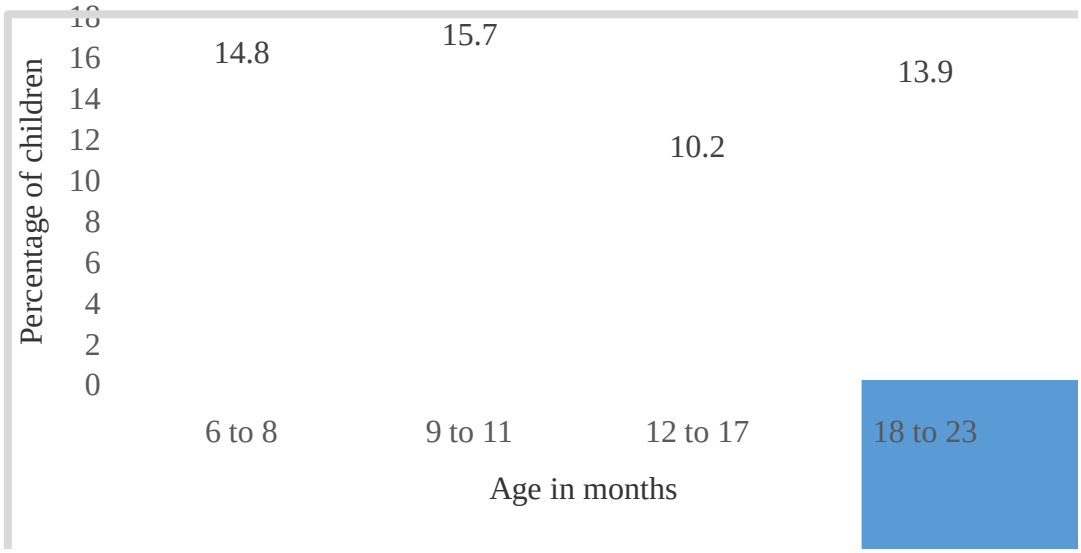
Weight for Age and Z Scores for Children Aged 6 to 23 Months

Categorization of nutrition status	Male		Females		Total	
	N (59)	%	N (49)	%	N (108)	%
Normal	30	50.8	19	38.8	49	45.4
Moderately underweight (<-2 ->-3 SD)	20	33.9	22	44.9	42	38.9
Severely underweight (≤-3SD)	9	15.3	8	16.3	17	15.7
Underweight (<-2 SD)	29	49.2	30	61.2	59	54.6

Table 13 presents the categorization of weight for age by sex among the study children. A total of 45.4% were classified as having normal weight for age, indicating a healthy nutrition status. Additionally, 38.9% were moderately underweight, and 15.7% were classified as severely underweight. The overall levels of underweight (Global Acute Malnutrition) was 54.6%. Interestingly, the levels of underweight was slightly higher among females (61.2%) compared to males (49.2%). These findings underscore the significance of addressing and improving the nutritional status of children aged 6 to 23 months, particularly focusing on reducing the prevalence of underweight. Such efforts are essential to enhance their nutritional well-being and overall health.

Figure 4

Prevalence of Underweight by Age Group



The findings show that children aged 9 to 11 months displayed a significant underweight levels of 15.7% followed by those aged 6 to 8 months at 14.8% and 18 to 23 months at 13.9%. Interestingly, the lowest levels of underweight were observed in children aged 12 to 17 months, with a prevalence of 10.2%.

4.5.3 Height for Age Z Scores

Table 14

Prevalence of Stunting (Height for Age and Z Score) of Children 6 to 23 Months

Categorization of nutrition status	Male		Females		Total	
	N (59)	%	N (49)	%	N (108)	%
Normal	37	62.7	28	57.1	65	60.1
Moderate stunting (<-2 ->-3 SD)	10	16.9	8	16.3	18	16.7
Severely stunting (≤-3SD)	12	20.3	13	26.5	25	23.1
Stunting (<-2 SD)	22	37.3	21	42.9	43	39.8

Findings in Table 14 show that 60.1% of children had normal height-for-age z scores, reflecting healthy growth. Among the study children, 16.7% were moderately stunted, and 23.1% were severely stunted. In terms of overall stunting (height-for-age z scores <-2 SD), 39.8% of study children were stunted. Males had a prevalence of 37.3% and females 42.9% of stunting, indicating a higher prevalence among females.

Figure 5

Prevalence of Stunting Among the Study Children Categorized by Age Groups

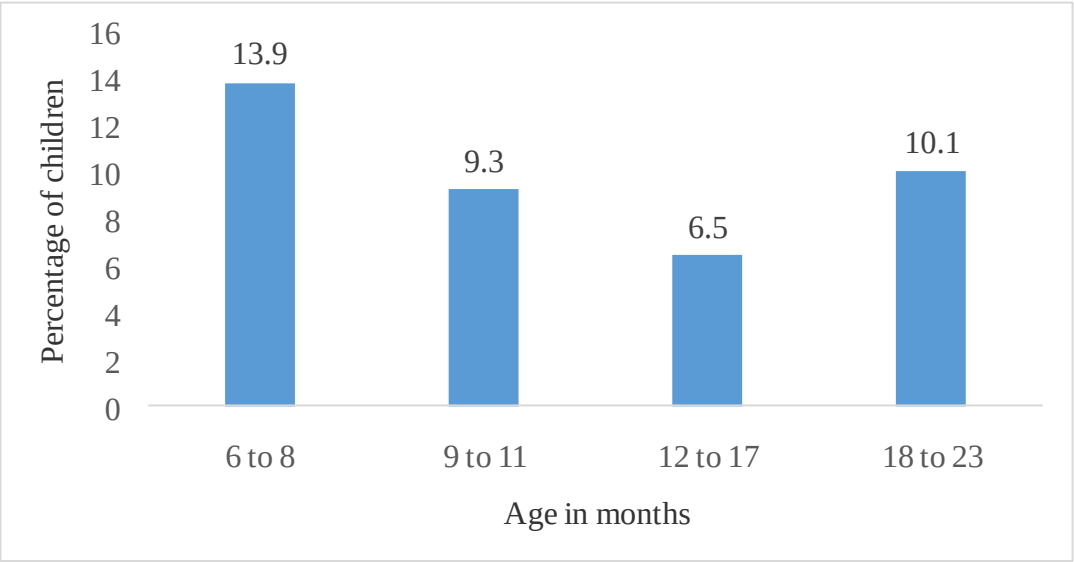


Figure 5 shows prevalence of stunting among study children aged 6 to 24 months. Children aged 6 to 8 months had the highest (13.9%) level of stunting and those in 18 to 23 months (10.1%). Children aged 12 to 17 months had the highest (6.5%) level of stunting.

4.6 Association between Nutrition Knowledge, Dietary Practices and Nutrition Status

4.6.1Association between Nutrition Knowledge and Nutrition Status

Table 15

Association of Caregiver's Nutrition Knowledge & Nutrition Status of Children

Caregiver's nutrition knowledge	Nutrition status		X^2	P-value
	Wasting status			
	Normal	Wasted		
Poor nutrition knowledge	4(40.0)	6(60.0)	0.135	0.155
Low nutrition knowledge	16(53.3)	14(46.7)		
Moderate nutrition knowledge	7(43.8)	9(56.3)		
High nutrition knowledge	15(37.5)	25(62.5)		
Very high nutrition knowledge	3(25.0)	9(75.0)		
	Underweight status			
	Normal	Underweight		
Very low nutrition knowledge	3(30.0)	7(70.0)	0.180	0.062
Low nutrition knowledge	8(26.1)	22(73.3)		
Moderate nutrition knowledge	10(62.5)	6(37.5)		
High nutrition knowledge	24(60.0)	16(40.0)		
Very high nutrition knowledge	4(33.3)	8(66.7)		
	Stunting status			
	Normal	Stunted		
Very low nutrition knowledge	5(50.0)	5(50.0)	0.245	0.011*
Low nutrition knowledge	12(40.0)	18(60.0)		
Moderate nutrition knowledge	10(62.5)	6(37.5)		
High nutrition knowledge	30(75.0)	10(25.0)		
Very high nutrition knowledge	8(66.7)	4(33.3)		

- Statistically significant at p-value <0.05

Pearson chi-square tests were performed to examine the potential association between caregivers' nutrition knowledge and the nutritional status of children aged 6 to 23 months. The analysis revealed a notable relationship between caregivers' nutrition knowledge and the occurrence of stunting in children ($\chi 2$=0.245, p-value=0.011). This result underscores a statistically significant connection between these two factors. The p-value suggests that the observed relationship is unlikely due to chance, highlighting the potential impact of caregivers' nutrition knowledge on the stunting status of children in this age group.

4.6.2 Association between Dietary Practices and Nutrition Status

Table 16

Factors Associated with Nutrition Status of Children

Variables	WHZ		WAZ		HAZ	
	R	p-value	R	p-value	R	p-value
Age of the child	0.047	0.627	0.165	0.088	0.242*	0.011
Timing of complementary	0.172	0.074	0.305**	0.001	0.221*	0.022
Nutrition knowledge	0.132	0.172	0.132	0.172	0.235*	0.014
Food groups	0.095	0.326	0.306**	0.001	0.279**	0.003
Meal frequency	0.004	0.984	0.066	0.495	0.065	0.505

**significant p-value<0.01 *significant p-value<0.05

Table 16 presents the correlations (r) and corresponding p-values between different variables and three nutritional indicators: Weight-for-Height Z-score (WHZ), Weight-for-Age Z-score (WAZ), and Height-for-Age Z-score (HAZ). The analysis reveals that the age of the child had a minimal and statistically non-significant correlation with WHZ (r=0.047, p=0.627) and WAZ (r=0.165, p=0.088), while it showed a weakly significant

positive correlation with HAZ (r=0.242, p=0.011). The timing of complementary feeding displayed a moderate positive correlation with WAZ (r=0.305, p=0.001) and a weak correlation with HAZ (r=0.221, p=0.022), but no significant correlation with WHZ (r=0.172, p=0.074). Nutrition knowledge showed a low positive correlation with HAZ (r=0.235, p=0.014), and its correlation with WHZ and WAZ was not statistically significant (p>0.05). Consumption of various food groups exhibited a moderate positive correlation with WAZ (r=0.306, p=0.001) and HAZ (r=0.279, p=0.003), while showing no significant correlation with WHZ (r=0.095, p=0.326). Meal frequency had minimal and non-significant correlations with all three indicators (WHZ: r=0.004, p=0.984; WAZ: r=0.066, p=0.495; HAZ: r=0.065, p=0.505). These findings provide insights into the potential relationships between these variables and the nutritional status indicators of the studied children.

Table 17

Association between Dietary Diversity Scores and Nutrition Status

Nutrition status	DDS not met≤4 food groups n=86 (%)	DDS met ≥5 food groups n=22(%)	Total N=108 (%)	χ^2 p-value
WHZ				
Normal	36 (41.9)	9(40.9)	45(41.7)	0.936
Wasted	50(58.1)	13(59.1)	63(58.3)	
WAZ				
Normal	35(40.7)	14(63,6)	49(45.4)	0.054
Underweight	51(59.3)	8(36.4)	59(54.6)	
HAZ				
Normal	46(53.5)	19(86.4)	65(60.2)	0.05*
Stunted	40(46.5	3(13.6)	43(39.8)	

*Significant p-value 0.05

Table 17 presents the relationship between children's nutrition status and their Dietary Diversity Score (DDS) across different nutritional indicators. The DDS groups are divided into "DDS not met (≤4 food groups)" and "DDS met (≥5 food groups. There's a consistent trend towards potential connections between dietary diversity and nutritional status. For Weight-for-Height Z-score (WHZ), both DDS groups exhibit similar percentages in the normal nutrition status category, while wasted children show a balanced distribution. In terms of Weight-for-Age Z-score (WAZ), a noteworthy proportion of normally nourished children achieved DDS met, hinting at a possible relationship (p-value: 0.054). However, the association is most pronounced in Height-for-Age Z-score (HAZ), where children with DDS met have significantly higher percentages of normal HAZ compared to stunted children (p-value: 0.05*). These findings imply that diverse diets could be associated with better linear growth outcomes. Further investigations and targeted interventions are recommended to explore and address these potential links comprehensively, ultimately promoting improved child nutrition and growth.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Introduction

The nutritional status of children aged 6-23 months is influenced by the socio-economic demographic characteristics, nutrition knowledge among caregivers, caregivers' dietary practices, feeding habits, food frequency, dietary diversity and nutrient intake. The study aimed at determining the influence of caregiver's nutritional knowledge, dietary practices and nutritional status of children (6 to 23) months attending Narok County Referral Hospital. The generated information will contribute towards intervention efforts to caregivers in enhancing children nourishment.

5.2 Summary of the Major Findings

5.2.1 To assess the Nutritional Status of Children Aged 6 to 23 months

According to the findings, majority (93.1%) of the caregivers were mothers highlighting the pivotal role in caregiving responsibilities. The average age of the caregiver was 19-25 (44.4%) years. Majority were married (73.1%) this showed a positive influence on the nutritional status of children where both parents shared responsibilities in providing for the family by purchasing food, meal preparation and healthcare expenses. Presence of both parents also enhances family's ability to provide conducive housing, sharing knowledge and emotional support to the breastfeeding mothers (Ochieng et al., 2022).

Most of the caregivers (43.5%) had attained secondary school education and above while 7.4% had low level of education. Caregiver's education is an integral part in enabling him/her to provide appropriate care to the children especially at the age of 6to 23 months. Previous studies have proven that caregivers with low education may tend to pay less attention to nutritional education and basic principles such as importance of balance diet, portion size, food groups and nutritional needs of children at different

stages of development. Most of the low educated caregivers mainly rely on traditional beliefs, cultural practices or personal preferences when it comes to feeding their children; they also have limited access to reliable, accurate, up-to-date sources of nutrition information thereby contributing to poor decision-making in regards to children's nutrition, food choices and preparation (forhet al., 2022). These findings were consistent with other studies carried out in similar environment, for instance a study carried out in Malawi established that majority of the care givers were mothers with an average age of 20-30 years and had attained a secondary school education, these factors contributed significantly to the wellbeing of their children (Kuchenbecker et al., 2017).

Majority of the participants (74/108) (68.5%) had a family size of 3-5 members. Family size influences the nutritional status of children in many ways, this included: food availability, health expenses, housing size and cost, clothing and education (Miskir et al., 2017). Small family size enables caregivers to provide sufficient and quality food to both lactating mothers and children which results to adequate nutrient intake. A study done by Dela (2023) showed that desire to have a large family size is influenced by cultural and social norms, thereby affecting feeding practices and dietary choices. Certain cultural practices may prioritize the allocation of food based on gender, age resulting to disparities in nutritional status of children in the same family.

5.2.2 Nutritional Knowledge among Caregivers to Children Aged 6 to 23

The study found that there were diverse range of nutrition knowledge levels among the care givers, it was encouragingly to note that 11.1% of the caregivers had very high nutritional knowledge on breastfeeding, complementary feeding, food groups and their importance. Nutrition education and interventions may improve nutrition knowledge of the caregivers leading to good dietary intake and better nutritional status of children (Chege & Kuria, 2017; Mbogori & Murimi, 2019) have proven that caregivers with good

nutritional knowledge are able to up bring healthy children by embracing good dietary practices while parents with low nutritional knowledge on child feeding usually adopt poor feeding practices.

These findings were similar to that of Motebejana et al. (2022) a study that was conducted in South Africa found that caregivers with poor nutritional knowledge had inadequate understanding of dietary requirements, lacked awareness of balanced diets, practiced insufficient breastfeeding, they lacked knowledge on complementary feeding, had limited awareness of food safety and hygiene and lacked knowledge on nutrition related illnesses. In this study, Caregivers could not determine foods of the same food groups. For example, potatoes and rice was regarded as a balanced diet and a rich source of iron as their knowledge could be influenced by their cultural practices, beliefs and availability of locally produce foods. To promote good nutrition, high nutritional knowledge is very essential this will therefore prevent malnutrition in children (Asakura et al., 2021).

The study found that majority (40.7%) of the caregivers reported that healthcare workers as the source of nutrition information on breastfeeding, complementary feeding, immunization and hygiene. Generally, nutritional information given to caregivers to children aged 6 to 23 months was inadequate Healthcare workers did not discuss fully the available options that could be adopted in order to improve their children nutritional status. This study did concur with a study done in Ghana by Nsiah et al. (2019) which showed that, Healthcare workers do not attach much importance to the need to praise caregivers to motivate and spur them on to continue their good child care practices, and concluded that obtaining information on the nutritional knowledge should be given priority by health workers. A number of caregivers (32.4%) reported media as source of nutrition information especially during Malezi bora campaigns, 12.0% reported getting

information from community health workers during outreaches, church meetings and barazas, while small percentage (4.6%) lacked identifiable sources. Creating public awareness on nutritional knowledge and behavior through mass media platforms such as radio and television can enhance nutritional status of children in large number (Saaka et al., 2021; Viani et al., 2020).

5.2.3 To Establish Dietary Practices of Caregivers for Children Aged 6 to 23 months

Safe water is one of the essential components for healthy living, alongside with adequate sanitation and proper nutrition (Roche et al., 2017). The findings of this study indicated that the main source of water was tap water (71.3%) since majority of the caregivers resided in the urban areas, 14.8% reported river a source of water, those from the rural settings, 4.6% boreholes and rain water 9.3%. 36.1% treated water by boiling while 45.4% did not treat water, potentially indicating a lack of awareness or access to effective treatment methods. These findings were similar with that conducted in Transmara West (Kotut et al., 2020) which highlighted the need to promote safe water practice especially for child health. The results also agreed with that of the County Health Report (2021) where most of the caregivers obtained water from safe sources. Educating caregivers about water sources and treatments is crucial for their well-being.

Breast milk provides a child with ideal nutrition and supports growth and development (WHO, 2021; Senbanjo et al., 2016). The findings of this study showed that majority (68.5%) of the children were still breastfeeding, and 88.0% were exclusively breastfed during the first six months of their lives the results agreed with study done in Spain (Lechosa et al.,2020). Majority of the children (81.5%) were introduced to complementary feeding at the recommended age of 6 months the results were similar to a study conducted in Nigeria and Northern Ethiopia (Ariyo et al., 2021; Hassen et al., 2021). A smaller fraction introduced it earlier (12.0%) or later (5.6%). Inappropriate

complementary feeding practices among children below six months of ageis associated with a higher risk of stunting, wasting and underweight (Masuke et al., 2021).Remarkably, 73.1% of caregivers successfully met the minimum meal frequency recommendations tailored to their child's age, effectively addressing their nutritional needs. These findings underscore the multifaceted nature of feeding practices and highlight the significance of informed guidance to optimize infant and young child nutrition. Minimum meal frequency was higher than the national level of 42% (DHS, 2014) and a study done in Koibatek, Kenya by Maingi et al. (2020). This could be attributed by the age of the child.

Food frequency investigates the relationship between diet and health outcomes. Cereals, a staple, are consumed significantly more than four times a week (85.2%), the findings agreed with that conducted in Kajiado and Kitui by Chege et al. (2015), roots and tubers exhibit a substantial proportion of participants who never consumed them (59.2%), vegetables (60.2%) and fruits (75.0%) is relatively prevalent, indicating a commitment to incorporating plant-based options. Dairy products and meat consumption are noteworthy, with many consuming them more than four times a week (53.7% and 69.4% respectively), possibly due to the availability of livestock. Fish and seafood consumption (17.2%) is moderately prominent, possibly due to proximity to water bodies. The usage of eggs (7.0%) is relatively low, while legumes and nuts (76.9%) are consumed regularly, likely due to their practicality in the pastoralist context. Sugar (38.7%) and oils/fats (36.2%) are used in moderation, possibly due to their limited availability. The high consumption of spice condiments and beverages (30.8%) could be attributed to their role in flavoring and preservation, contributing to the unique dietary patterns of this pastoralist group.

The attainment of minimum dietary diversity in this study indicated that majority (79.6%) of the participants did not meet the minimum dietary diversity score, indicating a lack of variety in their food consumption, majority consumed cereals and tubers (rice and potatoes). This study is comparable with a studies done in Ethiopia (Tegegne et al., 2017), Southern Ethiopia (Feyisa et al., 2020) and Indonesia (Prasetya & Khomsan, 2021) found that children did not meet minimum dietary diversity this could be associated with caregivers' knowledge on nutrition and dietary practices. The mean dietary diversity was 3.71±1.136 and the minimum food group consumed being 1 and the maximum 7 food groups these findings agreed with that conducted in Nigeria by Mekonnen et al. (2021). However, a study done by da costa (2018) and Banwat et al. (2020) differed with this finding where there was low consumption of vegetables and fruits. This distribution emphasizes the prevalence of insufficient dietary diversity among the participants, underlining the importance of interventions to promote a wider range of food choices in this age group.

In this study there was adequate consumption of energy foods (76.9%) which was satisfactory and 62.1% met protein recommendation, this results were similar to studies carried out in Ethiopia and Indonesia where majority of caregivers were giving their children food rich in carbohydrate and proteins (Beyene et al., 2015; Riyadi et al., 2021).Proper nutrition involving taking essential nutrients which are necessary for maintaining good health and proper bodily functions (Wahyuntari & Dewi, 2021). The findings demonstrated poor results in micronutrient intake, vitamin A (30.6 %), Iron (26.9%), Zinc (22.2%), iodine (24.1%). This results were similar to a study done in Southern Ethiopia (Feyisa et al., 2020) who noted that micronutrient intake was inadequate among children 6 to 23 months. The findings also concurred with SMART survey, (2018) done in Narok and KDHS, 2022. Hidden hunger is an adverse challenge

especially in children causing micronutrient deficiencies, it is as a result of poor dietary diversity and disease. Targeted interventions to enhance nutrient intake for the optimal growth and development of young children in this age group is essential.

Anthropometric indices; weight for height, weight for age, and height for age compared well with national figures (KNBS, 2022; WHO, 2006b). The prevalence of wasting among children age 18 to 23 months (29.6%) was significantly high, the results were similar with a study done in Bhutan (Aguayo., 2017) which found that, poor feeding practices were among significant factors of wasting and severe wasting,15.7% among children age 9 to 11 months severely underweight the results were consistent with a study done in Eastern Kenya (Guyatt et al., 2020) indicating that dietary diversity was associated with underweight ,23.1% children age 6 to 9 were severely stunted the rates compares with that conducted in Marsabit (SMART survey, 2017) and Kilifi by Chea et al., (2017). Male had a prevalence of 37.3% and female 42.9% of stunting, indicating a higher prevalence among females. The findings were above that reported in KDHS 2022 and similar to the County Health Report (2022). Notably, 41.7% of the children had a healthy nutritional status. The higher proportion of wasting, underweight and stunting could be attributed by insufficient caloric intake, protein deficiency, micronutrient deficiency and weaken immune system (Mkhize and Sibanda, 2020).

5.2.4 Association between Nutrition Knowledge, Dietary Practices and Nutrition Status

The findings of this study revealed a notable relationship between caregivers' nutrition knowledge and the occurrence of stunting in children ($\chi 2=0.245$, p-value=0.011), this suggest that relationship is unlikely to be due to chance, emphasizing the potential influence of caregivers' nutrition knowledge on the nutritional status of children (Forh et al., 2022).Higher nutritional knowledge among caregivers is very essential in promoting

good nutrition and preventing malnutrition especially in children (Ongosi, 2011). Various studies have been conducted to correlate caregivers' nutritional knowledge and nutritional status of children (Christian et al., 2016).

The findings also demonstrated that the child's age does not appear to significantly affect weight- for- height Z-score (WHZ) or Weight- for-Age- Z- scores (WAZ), implying that age alone may not be a significant factor for determining nutritional indicators. However, minor positive association with Height-for-Age (HAZ), suggesting that older children tend to have better height-for-age. Child's age is important determinant of adverse nutritional outcomes (Kinyoki et al., 2017). Timing complementary feeding moderately correlates with HAZ, but it does not exhibit significant relationship with WHZ. If complementary food is not introduced timely, the child's health will be at a higher risk of being stunted, underweight and wasted (Binamungu et al., 2023).This suggests that introducing complementary foods at the right time may positively impact weight-for-age and height-for-age and not necessarily weight-for-height.

Nutrition knowledge has a low positive correlation with HAZ, indicating that caregivers with better nutritional knowledge tend to have children with better height-for-age. The findings were similar to a study done in Indonesia which found that children of caregivers with better knowledge had good height-for- age (Mediani et al., 2022).The findings suggest that other factors may play a more role in weight- related indicators. The diversity of food group consumption is moderately associated with both WAZ and HAZ, suggesting that a varied diet is linked to better weight-for-age and height-for-age. This study concurs with a study done in Ghana (Forh et al., 2022) where meal frequency does not significantly correlate with WHZ, WAZ and HAZ indicators.

The results consistently note a recurring pattern suggesting a potential connection between the varieties of food in a child's diet measured in DDS which may influence their overall nutrition. Children with DDS met have notably higher percentages of normal HAZ compared to stunted children (p-value:0.05*), this strongly suggest that dietary diversity is correlated with improved linear growth outcomes, highlighting the role of diverse diets in promoting better height-for-age in long-term growth and development.

Previous studies have determined a positive association between food frequency, minimum dietary diversity, minimum meal frequency and nutritional status of children in Burkina faso, Ghana, Nicaragua, Ethiopia, Uganda (Ickes et al., 2018; Lamontagne et al., 2018; Mulu & Mengistie, 2017; Motebejana et al., 2022).Therefore, interventions should be emphasized on importance of dietary adequacy in order to improve the nutritional outcome of children.

5.3 Conclusions

From the study results, then following conclusions were made:

i. There was a considerable number of participants who had low nutritional knowledge, with caregivers who had advanced education having higher nutritional knowledge.

ii. Majority of the children met the minimum dietary diversity (MDD) by consuming food from at least four out of the seven groups.

iii. The majority of children between the ages of 6 to 23 months exhibited signs of malnutrition, with a high prevalence of wasting, underweight, and stunting.

iv. The study revealed a significant association between caregivers' nutrition knowledge and child stunting ($\chi 2=0.245$, p-value=0.011), emphasizing the crucial role of caregiver knowledge in stunting outcomes. Additionally, correlations indicated that the timing of complementary feeding and diverse food group consumption were linked to better Weight-for-Height and Height-for-Age Z-scores, suggesting the potential benefits of dietary diversity in promoting healthier linear growth.

5.4 Recommendations

The following are recommendations made based on the study findings:

5.4.1 Recommendation for Policy

The is need by relevant agencies to implement targeted educational programs for caregivers with lower nutritional knowledge to bridge the gap and ensure that all caregivers receive the necessary information to make informed dietary choices for their children. These programs could be designed to be accessible and tailored to the needs of caregivers, helping to improve overall nutritional awareness across the board.

There is need to promote proper responsive feeding practices among caregivers to children of this age group.

There is need to undertake a comprehensive and targeted nutrition intervention program for children aged 6 to 23 months to address the high rates of wasting, underweight, and stunting in Narok County. This program should focus on providing balanced and nutritious meals, educating caregivers on proper feeding practices, and ensuring access to healthcare services for early detection and management of malnutrition.

5.4.2 Recommendation for Further Studies

The study further recommends that, to address the problem of underweight and stunted growth, it is advisable to create targeted educational initiatives aimed at improving caregivers' nutrition knowledge, with a specific focus on the importance of introducing diverse foods and proper timing of complementary feeding for children. These programs should be customized to suit the unique needs and circumstances of the targeted population. Additionally, healthcare providers including Community Heath Promoters should actively engage with caregivers to offer consistent guidance and support in implementing these beneficial practices.

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APPENDICES

Appendix 1: Consent Form

My name is Sheillah Naserian Nkoitoi. I am a Student at Kabarak University. I am carrying out research on: Caregivers Nutritional knowledge, Dietary practices and Nutritional status of children (6 to 23) months attending Narok County Referral Hospital. This study will be beneficial in contributing knowledge to work intervention to caregivers to improve the nutritional status of children.

The purpose of the study

To determine the influence of caregivers' nutritional knowledge, dietary practices and nutritional status of children (6 to 23) months attending Narok County Referral Hospital

Subject participation

You are invited to participate in this research study being undertaken by the above listed investigator. This form will help in gathering information about the study so that you can voluntarily decide whether you want to participate or not. You are encouraged to ask any question regarding the research process as well as any benefit or risk that you may accrue by participating. After you have adequately been informed about the study, you will be requested to either agree or decline to participate. Upon agreeing to participate in the study, you will be further requested to affirm that by appending your signature/thumbprint on this form. Accepting or declining to participate in this study does not in any way waive the following rights which you're entitled to:

a) Voluntary participation in the study;

b) Withdrawing from the study at any time without the obligation of having to give an explanation and;

c) Access to services which you're entitled to

A copy of this form will be provided to you for your own records

Should I continue YES/NO _____

Potential risks and discomforts

There are no risks involved in this study; however, the questions that shall be asked may be of intimate subjects and may be uncomfortable and may choose to discontinue any time.

Potential benefits

There are no benefits or rewards involved if you agree toparticipate in the study; however, the information shall be used only to improve the nutritional status of your child.

Confidentiality

The information obtained shall be treated with utmost confidentiality and your name shall not be indicated anywhere in this questionnaire. The interview and discussion shall be conducted in a private room in the hospital and the questionnaire shall be stored in lockable cabinets accessible only to the lead researcher.

Compensation

There shall be no compensation in participating in this study

Cost

There is no cost for participating in this study

Contact information

Any question in this study shall be directed to:

Dr. Peter Chege on 0722642356 or Dr. Michael Walekhwa on 0705290520.

Statement of Consent

I have comprehensively read the consent form or/the information has been comprehensively read to me by the researcher. I have understood what the study is about and all the questions and concerns that I had have been responded to in a clear and concise way. The study benefits and foreseeable risks have been explained to me. I totally understand that my decision to participate in this study is voluntary and I have the right to withdraw at any point during the study.

I freely consent to participate in this study

Signing this form does not in any way imply that I have given up the rights am entitled to as a participant

I agree to participate in this research YES_____NO_____

_____ I agree to provide my contact details for follow-up YES_____

NO _____ _____

Participant's Name _____

Participant's Signature/Thumb print_____ Date _____

Appendix II: Study Questionnaire

Study Title: Caregivers Nutritional Knowledge, Dietary Practices And Nutritional Status Of Children (6 To 23) Months Attending Narok County Referral Hospital, Kenya

Questionnaire No…….

Date of the interview…….....

Child's age (in months) …….

Introduction

Hello, my name is Sheillah Naserian Nkoitoi. I am a Student at Kabarak University. I am carrying out research on: caregivers' nutritional knowledge, dietary practices and nutritional status of children (6 to 23) months attending Narok County Referral Hospital. I will ask the caregivers of children aged 6 to 23 months' questions about food they consume with their child, what they think about the diet and nutrition of their child. I request you to voluntarily respond to the following questions. The information in the questionnaire is important to this study. You are therefore requested to complete it. With your permission, your child's length and weight will also be taken. Any records to be obtained which relate to you and your child shall be strictly confidential. Findings from the study may inform policy formulation strategies that may later be implemented and help reduce reported malnutrition among children in this county.

Section A: Socio-Economic and Demographic Data

Question	Options	Remark
Caregiver		
How old are you?	a)Below 18 years b)19-25 years c)26-35 years d)36-45 years d)Above 45 years	
What is your relationship with the child you take care of?	a)Mother b)Father c)Grandmother d)Grandfather e)Other	
Where do you live?	a)Rural (semi-arid) b)Rural (highlands) c)Urban informal settlement d)Urban formal settlement e)Other	
Have you ever attended school? If *yes*, continue asking: What is the highest level of school you attended?	a)Primary b)Secondary c)Middle level college d)University	
What is your marital status?	a)Single b)Married c)Separated d)Divorced	
What is your occupation?	a)House wife b)Casual laborer c)Farmer d)Self employed e)Salaried	

What is your monthly income?	Below 10,000 11,000 to 15,000 16,000 to 20,000 21,000 to 25,000 Above 26,000	
What is your family size?	a)2 members b)3-5 members c)6-10 members d)Over 10 members	
What is the main source of family food?	a)Production b)Borrowing c)Purchase d)Food aid/in kind sources	
What is your most reliable source of nutrition information?	a)Community health worker b)Media c)Nutrition programs d)Other (specify)	
Child Information		
Date of birth		
Age in months		
Sex	a)Male b)Female	

Section B: Nutritional Knowledge

Question	Options	Remark
What is the first food a new born child should receive?	a) Only breast milk b) Other c) Don't know	
At birth, when should breastfeeding be initiated?	a) Within 1 hour b) Don't know	
How long is the child recommended to breastfeed?	a)6 months b)6-11 months c)12-23 months d)24 months e)Other (specify)	
At what age should a child start eating foods in addition to breastmilk?	a)At 6 months b)I do not know c)Other (specify)	
What does a child need to grow?	a)Balanced diet b)Proper food c)I do not know d)Other (specify)	
When introducing solid foods to a child, it's best to start with?	a) A mix of various ingredients b) Spicy foods to develop taste buds c) Single-ingredient, easily digestible foods d) Foods high in sugar and salt	
What is the importance of the following food in the body? (Maize, rice, sweet potatoes, cassava, sorghum, millet, Irish potatoes)	a)Provision of energy/strength b)Bodybuilding c)Disease preventions d)Other (specify)	

What is the importance of the following food in the body? (Beans, Meat, Fish, Eggs, Soya beans, Milk)	a)Provision of energy/strength b)Bodybuilding c)Disease preventions d)Other (specify)	
What is the importance of the following food in the body? (Sukuma wiki, Terere, Tomatoes, Onions, Bananas, Mangoes, Pawpaw, Oranges)	a)Provision of energy/strength b)Bodybuilding c)Disease preventions d)Other (specify)	
How many times should a child be fed in a day?	a) Once or twice b) Three times c) More than three times	
How can you (caregiver) find out if the child is growing well or not? Probe: who can help the mother to find out? Where can she go?	a) Go to health centre/growth monitoring b) Other c) Don't know	
What do you understand by eating well? (probe for child)	a)Each meal should contain a variety of food b)Eating bright coloured fruits and vegetables c)Drinking plenty of water at d)least an hour before and after meal e)Full stomach/being satisfied f)I do not know e)Other (specify)	
What is the recommended method for cleaning and sterilizing child bottles and utensils?	a) Rinse with cold water only b) Wash with soap and water, then air dry c) Boil for 15 minutes	

Section C: Dietary Practices

Feeding Patterns		
Did you ever breastfeed (name)	a) Yes b) No	
If no why?		
If yes how long after birth?		
Did you exclusively breastfeed (name)	a) Fully b) partially	
Are you still breastfeeding (name)	a) Yes b) No	
If (name of child) is not breastfeeding anymore, at what age (in months) did (name of child) stop breastfeeding?	Record in months	
Reason for stopping breast feeding	a) No enough breast milk b) No time to breastfeed c) Child refused to breastfeed d) Wanted to stop e) Next pregnancy f) Breastfeeding younger child g) Feel too weak h)Other (specify)	
At what age did you introduce the child to other foods other than breast milk	Record in months	
How many times did the child consume food (including snacks, solids or liquids) yesterday (day and night)		

Source of Drinking and Cooking Water		
Question	**Option**	**Remark**
What is your source of water for drinking and cooking?	a)Tap	
	b)River	
	c)Borehole	
	d)Rain	
How do you treat water before use?	a)Filter	
	b)Chemicals	
	c)Boil	
	d)Nothing	

Dietary Diversity Score (foods fed to the child during yesterday (day and night) even if the food were combined with other foods)	
Breast milk	a) Yes b) No
Grains, roots and tubers e.g. rice, potatoes, porridge, maize spaghetti, Ugali, sweet potatoes, cassava or other foods made from roots and tubers	a) Yes b) No
Pulses, nuts and seeds e.g. beans, peas lentils, peanuts,	a) Yes b) No
Dairy products e.g. yoghurt, fresh milk, mala, infant formula	a) Yes b) No
Flesh foods e.g. meats, fish, poultry, organ meats	a) Yes b) No
Eggs	a) Yes b) No
Vitamin A rich vegetables and fruits e.g. pumpkin, oranges, carrots, green leafy vegetables, ripe mangoes, papayas	a) Yes b) No
Other vegetables and fruits e.g. cabbage, passion fruits, apples, pineapples	a) Yes b) No
Total number of food groups consumed are: (analysis)	

Food frequency questionnaire (how often in the past 7 days did the child consume the following foods?)					
Food	**None**	**Once**	**Twice**	**Thrice**	**≥4 times**
Cereals					
Roots and tubers					
Vegetables					
Fruits					
Dairy products					
Meat					
Fish and sea foods					
Eggs					
Legumes and nuts					
Sugar					
0ils and fats					
Spice condiments and beverages					

24- Hour Dietary Recall			
Time	Type of food /Drink	Scale of the food glass, plate, bowl	Quantity Full/Half
After waking up in the morning			
Breakfast			
10’oclock snack			
Lunch			
4’oclock snack			
Dinner			
After Dinner			
Special considerations			
Is the child allergic to any foods?	a) Yes b) No		
If yes, please list the allergenic foods:			

Nutrition status of the child

Age (months)	Sex	Weight (take weight 3 times and record average to the nearest 0.1kg)	Height (take height 3 times and record average to the nearest 0.1cm)	WHZ	WAZ	HAZ

Appendix III: KUREC Ethical Approval Letter

KABARAK UNIVERSITY RESEARCH ETHICS COMMITTEE

Private Bag - 20157
KABARAK, KENYA
Email: kurec@kabarak.ac.ke

Tel: 254-51-343234/5
Fax: 254-051-343529
www.kabarak.ac.ke

OUR REF: KABU01/KUREC/001/05/06/23

Date: 13th June, 2023

Sheillah Naserian Nkoitoi,
Reg. No: GMND/M/0793/05/21
Kabarak University,

Dear Sheillah,

RE: CAREGIVERS NUTRITIONAL KNOWLEDGE, DIETARY PRACTICES AND NUTRITIONAL STATUS OF CHILDREN ATTENDING NAROK COUNTY REFERRAL HOSPITAL, KENYA

This is to inform you that ***KUREC*** has reviewed and approved your above research proposal. Your application approval number is ***KUREC-050623.*** The approval period is ***13/06/2023 – 13/06/ 2024.***

This approval is subject to compliance with the following requirements:

i. All researchers shall obtain an introduction letter to NACOSTI from the relevant head of institutions (Institute of postgraduate, School dean or Directorate of research)
ii. The researcher shall further obtain a RESEARCH PERMIT from NACOSTI before commencement of data collection & submit a copy of the permit to **KUREC.**
iii. Only approved documents including (informed consents, study instruments, MTA Material Transfer Agreement) will be used
iv. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***KUREC***:
v. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***KUREC*** within 72 hours of notification;
vi. Any changes, anticipated or otherwise that may increase the risk(s) or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to ***KUREC*** within 72 hours;
vii. Clearance for export of biological specimens must be obtained from relevant institutions and submit a copy of the permit to KUREC;
viii. 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 and;
ix. Submission of an executive summary report within 90 days upon completion of the study to ***KUREC***

Sincerely,

Prof. Jackson Kitetu PhD.
KUREC-Chairman

KABARAK UNIVERSITY
INSTITUTIONAL RESEARCH ETHICS COMMITTEE
18 JUN 2023
APPROVED
P. O. PRIVATE BAG - 20157, KABARAK

Cc Vice Chancellor
DVC-Academic & Research
Registrar-Academic & Research
Director-Research Innovation & Outreach
Institute of Post Graduate Studies

Appendix IV: NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **135190**

Date of Issue: **26/July/2023**

RESEARCH LICENSE

This is to Certify that Ms.. Sheillah Naserian Nkoitoi of Kabarak University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Narok on the topic: Caregivers Nutritional Knowledge, Dietary Practices and Nutritional Status of Children Attending Narok County Referral Hospital, Kenya for the period ending : 26/July/2024.

License No: **NACOSTI/P/23/27523**

135190

Applicant Identification Number

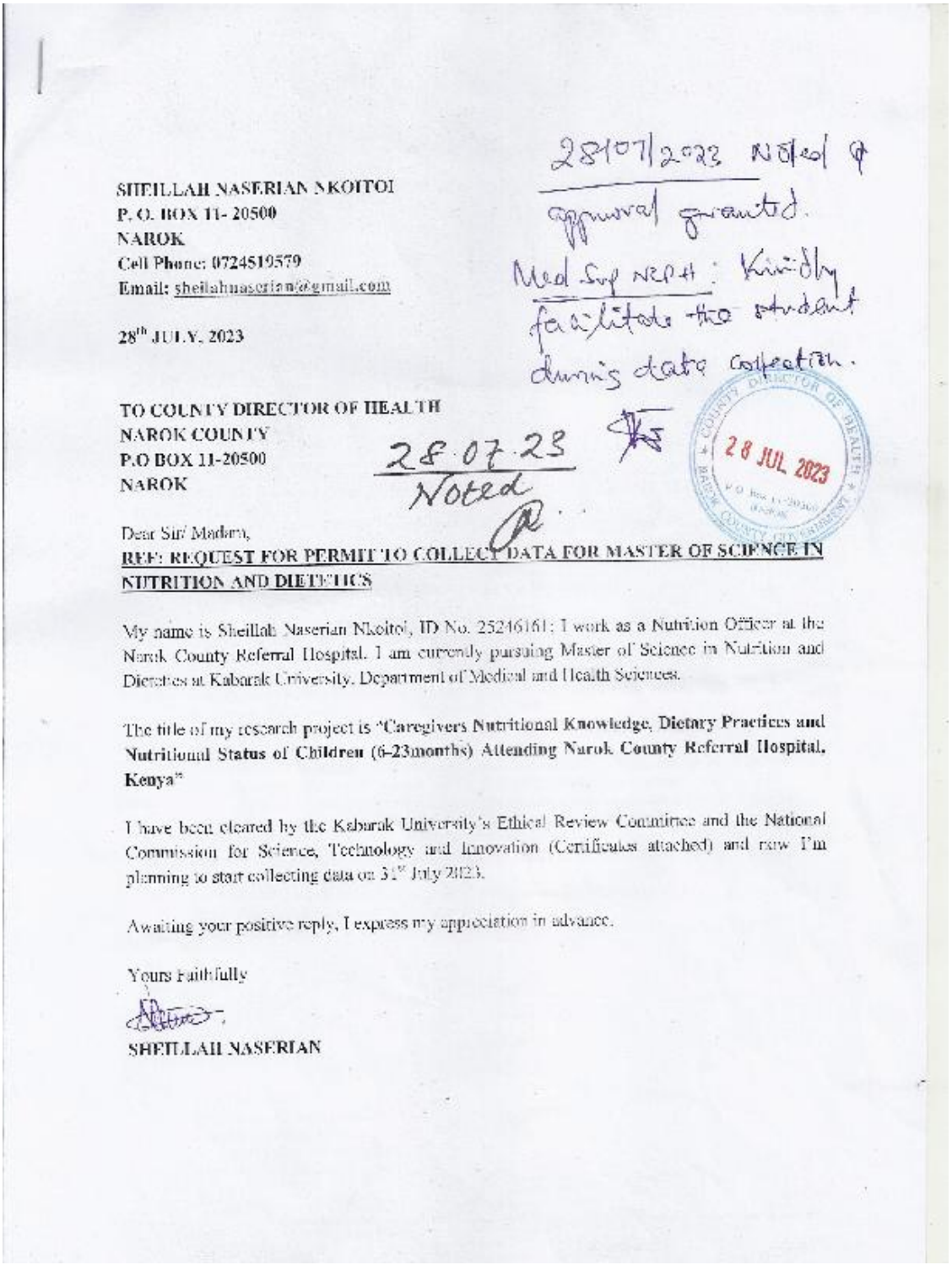
Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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

Appendix V: Approval from the County Director of Health



28/07/2023 Noted ✓
approval granted.
Med Sup NRPH: Kindly facilitate the student during data collection.

SHEILLAH NASERIAN NKOITOI
P. O. BOX 11- 20500
NAROK
Cell Phone: 0724519579
Email: sheilahnaserian@gmail.com

28th JULY, 2023

TO COUNTY DIRECTOR OF HEALTH
NAROK COUNTY
P.O BOX 11-20500
NAROK

28.07.23
Noted

COUNTY DIRECTOR OF HEALTH
28 JUL 2023
P.O Box 11-20500 NAROK
NAROK COUNTY GOVERNMENT

Dear Sir/ Madam,

REF: REQUEST FOR PERMIT TO COLLECT DATA FOR MASTER OF SCIENCE IN NUTRITION AND DIETETICS

My name is Sheillah Naserian Nkoitoi, ID No. 25246161; I work as a Nutrition Officer at the Narok County Referral Hospital. I am currently pursuing Master of Science in Nutrition and Dietetics at Kaburak University, Department of Medical and Health Sciences.

The title of my research project is "**Caregivers Nutritional Knowledge, Dietary Practices and Nutritional Status of Children (6-23months) Attending Narok County Referral Hospital, Kenya**"

I have been cleared by the Kaburak University's Ethical Review Committee and the National Commission for Science, Technology and Innovation (Certificates attached) and now I'm planning to start collecting data on 31st July 2023.

Awaiting your positive reply, I express my appreciation in advance.

Yours Faithfully

SHEILLAH NASERIAN

Appendix VI: Evidence of Conference Participation

KABARAK UNIVERSITY

Certificate of Participation

Awarded to

Sheillah Naserian Nkoitoi

for successfully participating in the 13th Annual Kabarak University International Research Conference held from 22nd – 23rd June 2023 and presented a paper entitled ***"Caregivers Nutritional Knowledge, Dietary Practices and Nutritional Status of Children Attending Narok County Referral Hospital, Kenya."***

Conference Theme

Linking Industry and Academia to
Strengthen Healthcare Delivery and Health Innovations

Dr. Pamela Kimeto
Dean, School of Medicine and Health Sciences

Dr. Moses Thiga
Director - Research, Innovation and Outreach

Kabarak University Moral Code

As members of Kabarak University family, we purpose at all times and in all places, to set apart in one's heart, Jesus as Lord.

(1 Peter 3:15)

Kabarak University is ISO 9001:2015 Certified

Appendix VII: List of Publication

AFRICAN JOURNAL OF NUTRITION AND DIETETICS

https://doi.org/10.58460/ajnd.v2i1.43

Open Access

ORIGINAL ARTICLE

MJM BIOLABS

Association Between Caregiver's Nutrition Knowledge and Nutrition Status of Children 6 to 23 Months: A Case Study of Narok County Referral Hospital

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[1] *Department of Nutrition and Dietetics, School of Medicine and Health Sciences, Kabarak University*

[2] *Department of Food, Nutrition and Dietetics, Kenyatta University*

[3] *Department of Biomedical Sciences, School of Medicine and Health Sciences, Kabarak University*

Corresponding Author: *sheilahnaserian@gmail.com*

Article History

Submitted: 21st September 2023

Accepted: 13th November 2023

Published Online: 8th January 2024

To read this paper online, please scan the QR code below:

ABSTRACT

In Narok County, Kenya, where the challenge of achieving optimal child nutrition persists, particularly in the context of its arid and semi-arid climate, the prevalence of stunting among children is alarmingly high compared to other regions. Addressing this critical issue necessitates an enhancement of caregivers' nutrition knowledge. However, scant information is available on the nutritional knowledge of caregivers responsible for children aged 6 to 23 months, a gap that extends beyond Narok County to encompass broader regions in Africa, including Kenya. Consequently, this study was designed to examine the nutritional knowledge of caregivers within Narok County for children in this age group. All approvals including ethical clearance from Kabarak University Research and Ethics Committee (KUREC), research permit from NACOSTI and permit from Narok County Referral Hospital were sought before commencement of the study. This research adopted a descriptive cross-sectional design, and fisher's formula was used to calculate a sample size of 108 caregivers to children aged 6 to 23 months who were purposively recruited. Data were analysed using SPSS version 25 and ENA SMART soft wares. The results indicate a variation in caregivers' nutrition knowledge levels, with 37.0% demonstrating a high level of knowledge, while 27.8% exhibited low knowledge. Moderate knowledge levels were observed in 14.8% of caregivers, while 9.3% had very low knowledge. Furthermore, there was a low positive correlation observed between nutrition knowledge and Height-for-Age Z-score (HAZ), with a correlation coefficient of r=0.235 and a p-value of 0.014. Significantly, HAZ exhibited a higher percentage of normal scores when compared to stunted children (p-value: 0.05*). In conclusion, the study found significant variation in caregivers' nutrition knowledge across the region, which in turn had an impact on the nutritional outcomes of the children. Therefore, we recommend targeted and continuous nutrition education to care-givers of children in Narok County. Caregivers with better nutrition knowledge tend to provide better nutrition to their children. There is need to train and capacity build community health workers to have necessary knowledge and skills for effective nutrition education.

Keywords: caregivers, children, 6-23 months, nutrition knowledge