



## ORIGINAL ARTICLE

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## Dietary Intake Among Children Aged 6-59 Months in Majengo Slum, Narok County, Kenya: A Descriptive Study

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## ABSTRACT

Understanding the dietary intake of children aged 6-59 months is critical globally, regionally, and locally, given its profound impact on child health and development. Breastfeeding and complementary feeding are fundamental for optimal nutrition during early childhood, with persistent challenges, such as suboptimal feeding practices and inadequate dietary diversity, observed, especially in urban slum settings. However, there remains a notable gap in understanding these practices within Kenya, particularly in marginalized communities such as Majengo Slum. This descriptive study aimed to examine the dietary intake among children aged 6-59 months in Majengo Slum, Narok County, Kenya. A descriptive cross-sectional design was employed, with data collected through semi-structured questionnaires, food frequency questionnaires, 24-hour dietary recalls, and anthropometric measurements. A sample size of 341 caregiver-child pairs was determined using the Fischer formula, with systematic random sampling conducted in villages within Majengo Slums. Socio-demographic characteristics revealed a predominance of female caregivers, with a significant proportion having completed primary education and engaged in small to medium businesses. Notably, 71% of children were born at health facilities. Analysis of nutrient intake indicated disparities between observed and recommended levels. Energy intake was below the recommended 1600 kcal/day for 74% of children, while protein intake was below the recommended 71 grams/day for 89% of children. Excesses were observed in certain micronutrients, such as sodium and saturated fat. Dietary diversity assessment revealed that 76.86% of children achieved Minimum Dietary Diversity (MDD), while only 20% regularly consumed fruits and vegetables. Minimum Meal Frequency (MMF) was associated with caregivers' education and employment status. Children in households with formally employed caregivers were more likely to achieve a higher MMF compared to those with illiterate mothers/caregivers. Targeted interventions focusing on improving dietary diversity, promoting breastfeeding and complementary feeding, and enhancing meal frequency are essential for improving child nutrition and health outcomes in marginalized communities.

**Keywords:** *Majengo Slum, child nutrition, breastfeeding, complementary feeding, meal frequency.*



## INTRODUCTION

Globally, breastfeeding and complementary feeding practices are recognized as critical components of early childhood nutrition, with significant implications for child health and development (Hamer et al., 2022). According to the World Health Organization (WHO), breastfeeding rates vary widely across regions, with Sub-Saharan Africa experiencing both progress and challenges in achieving optimal breastfeeding practices (World Health Organization, 2021). While the region has made strides in increasing exclusive breastfeeding rates, disparities persist, particularly in urban slum settings where socio-economic factors contribute to poor nutrition outcomes (Wanjohi et al., 2016).

In Majengo Slum, Narok County, Kenya, the dietary practices of children aged 6-59 months are of critical concern due to their implications for child health and development (Nkoitoi et al., 2024). Breastfeeding and complementary feeding practices play pivotal roles in ensuring optimal nutrition during the early years of life. However, despite the well-documented benefits of breastfeeding, challenges persist in achieving exclusive breastfeeding for the recommended duration of six months, followed by continued breastfeeding alongside complementary foods up to two years of age or beyond (Motee & Jeewon, 2014).

The available literature underscores the importance of effective breastfeeding practices in providing essential nutrients and boosting the immune system of infants (Centers for Disease Control and Prevention, 2023; Hamer et al., 2022; Motee & Jeewon, 2014). Studies have shown that exclusive breastfeeding protects against various illnesses such as respiratory infections, gastrointestinal diseases, and iron deficiency anemia, among others (Hossain & Miharshahi, 2022; Tsai et al., 2014). However, despite Kenya's commendable progress in exclusive breastfeeding rates, the timely initiation of complementary feeding remains a concern, with many children failing to meet the recommended meal frequency and dietary diversity criteria (Ahoya et al., 2019).

Complementary feeding, which involves introducing semi-solid or solid foods alongside breast milk, is crucial for meeting the growing nutritional requirements of infants. The World Health Organization (WHO) recommends gradually increasing the frequency of meals from 2-3 times per day at six months to 3-4 times per day between 9-11 months and 12-24 months (WHO, 2019). However, studies indicate that many children in

Kenya, particularly those residing in urban slums like Majengo, are introduced to complementary foods later than recommended (Kimani-Murage et al., 2011). Furthermore, the quality and diversity of complementary foods remain inadequate, with a significant proportion of children not receiving the necessary nutrients for optimal growth and development (Kamudoni et al., 2024).

The use of Food Frequency Questionnaires (FFQs) offers a valuable method for assessing dietary intake and identifying areas for intervention (Zheng et al., 2020). However, in underprivileged households like those in Majengo Slum, children often receive poor-quality food, insufficient amounts, and a monotonous diet, which directly impacts their nutritional status (Kimani-Murage et al., 2011). Additionally, the frequency of meals consumed by children aged 6-59 months is a crucial indicator of adequate food intake. Studies have suggested that breastfed infants should ideally breastfeed three or more times per day, while non-breastfed children should consume at least one to two snacks in addition to their meals to meet their nutritional needs (World Health Organization, 2009).

Despite the available literature highlighting the importance of breastfeeding and complementary feeding practices, there is a notable gap in our understanding of these practices specifically within the context of informal settlements (Kamudoni et al., 2024).

## METHODS

### *Research Design*

The study employed a descriptive cross-sectional design (Wang & Cheng, 2020), aligning with the research objective of examining dietary practices among children aged 6-59 months in Majengo Slum, Narok County, Kenya. This approach allowed for the collection of data at a single point in time, providing a snapshot of the prevailing dietary practices in the target population.

### *Location of the Study*

The study was conducted in Majengo Slums in Narok North Constituency, Narok Town ward, Masikonde sub-location, characterized by extreme poverty and limited access to basic amenities (Nyoro, 2020). The choice of location was deliberate, as it represents an urban slum setting facing significant socio-economic challenges, which may impact dietary practices among children aged 6-59 months.

## **Population of the Study**

The study targeted caregivers with children aged 6-59 months residing in Majengo Slums of Narok County. This population segment was selected to assess the dietary practices prevalent among young children in an urban slum context, considering their vulnerability to malnutrition and limited access to nutritious foods. Children aged 6 to 59 months residing in Majengo Slums and their caregivers were included in the study. The inclusion process focused on children who had initiated complementary feeding, ensuring relevance to the research objective of assessing dietary practices among young children. Children who were sick or chronically ill at the time of the study, those whose caregivers did not consent, and households with children younger than 6 months or older than 59 months were excluded. These criteria aimed to ensure the inclusion of healthy children within the target age range, enhancing the reliability of the study findings.

## **Sample Size Determination and Sampling Procedure**

The sample size was determined using the Fischer formula (Jung, 2013), considering a confidence level of 95% and a prevalence rate of 28% based on documented data (Kenya Demographic and Health Survey, 2022). A sample size of 341 households was calculated, adjusted for a 10% non-response rate. The sampling technique involved stratified sampling of villages within Majengo Slums, followed by systematic random sampling of households within each village, ensuring representation across the study area.

## **Data Collection Tools**

Data collection tools included a semi-structured questionnaire, a food frequency questionnaire (FFQ), a 24-hour dietary recall, and anthropometric measurements. These tools were designed to capture information on demographic and socio-economic factors, caregiver nutrition knowledge, dietary practices of children, and nutritional status assessment, aligning with the research objective of examining dietary practices among children aged 6-59 months.

## **Data Collection Procedure**

Data collection involved trained research assistants administering the questionnaire and conducting anthropometric measurements following a

standardized protocol. The process included obtaining informed consent from participants, ensuring confidentiality, and adhering to ethical guidelines. Pre-testing of the questionnaire was conducted to refine the instruments and ensure their validity and reliability.

## **Data Analysis**

Data analysis comprised descriptive statistics, including frequencies, percentages, and mean values, to summarize demographic characteristics, caregiver nutrition knowledge, dietary practices, and nutritional status of children. Additionally, inferential statistics such as the chi-square test and logistic regression were employed to explore associations between dietary practices, caregiver nutrition knowledge, and children's nutritional status, providing insights into potential predictors of dietary practices among young children in Majengo Slums.

## **Ethical Considerations**

Ethical approval was obtained from the Kabarak University Research Ethics Committee (KUREC – KABUO01/KUREC/001/01/05/23) and a Research permit from the National Council for Science, Technology, and Innovation (NACOSTI - 912576) with additional authorization from Narok County Health Department prior to data collection. An informed consent was also sought from participants, with assurance provided regarding the encryption of all collected information to safeguard their identity and privacy. Participants were informed that the study was solely for academic purposes, ensuring transparency and clarity regarding the research objectives and intentions.

# **RESULTS**

## **Subject's Socio-Demographic Characteristics**

The socio-demographic characteristics of caregiver-child pairs in Majengo Slum were examined, encompassing factors such as gender, age, marital status, child's age, religion, education level, occupation, household income, and place of childbirth. Results indicated a predominance of female caregivers (92.9%), with 34.7% falling within the 30 to 39 age range, and a similar proportion (34.0%) being married. Children aged 12 to 24 months constituted 33.0% of the sample, while

the majority of caregivers identified as Christians (79.5%). Regarding education, 40.7% of caregivers had completed primary education, and 25.6% were engaged in small to medium businesses, earning an

average monthly income of less than Kshs 10,000. Notably, 71% of the children were born at a health facility. See Table 1 below:

**Table 1:**  
**Subject's Socio-Demographic Characteristics**

Variables	Categories	Frequency	Percentage
Gender	Female	276	92.9
	Male	21	7.1
Age of the caregiver	20 years and above	37	12.5
	21-29 Years	91	30.6
	30-39 Years	103	34.7
	40-49 Years	37	12.5
	50-59 Years	18	6.1
	60 years and Above	11	3.7
Marital status	Living together	56	18.9
	Married	101	34.0
	Separated	41	13.8
	Single	69	23.2
	Widowed	30	10.1
Age of the child	6-11	30	10.1
	12-24	98	33.0
	25-36	66	22.2
	37-48	58	19.5
	49-59	45	15.2
Religion	Christian	236	79.5
	Islam	13	4.4
	Others	48	16.2
Level of Education	None	51	17.2
	Primary	121	40.7
	Secondary	96	32.3
	Tertiary	29	9.8
Caregivers occupation	Housewife	40	13.5
	Small and medium Business	76	25.6
	Formal Employment	51	17.2
	Farmer	62	20.9
	Casual Labourer	68	22.9
Household income	Kshs <10,000	233	78.5
	Kshs 10,000-19,999	51	17.2
	Kshs 20,000-29,999	13	4.4
Place of child delivery	Home	86	29.0
	Hospital	211	71.0

### **Dietary Practices of Children 6-59 Months**

Table 2 below presents a summary of nutrient intake among subjects, comparing observed minimum and maximum intake levels with recommended dietary allowances (RDAs). Overall, the findings reveal disparities between observed and recommended intakes across various nutrients. Notably, while energy intake ranged from 335.3 kcal to 2036.3 kcal, the recommended intake was 1600 kcal, with only 26% meeting the RDA. Protein intake ranged from 6.5 g to 60.1 g, falling short of the 71 g RDA, with only 11% meeting the requirement. Fat intake ranged from 20.6 g to 69.1 g, exceeding the recommended

30% of total energy intake in all cases. Carbohydrate intake ranged from 31.2 g to 290.7 g, with only 11% meeting the recommended intake of 55% or more of total energy intake.

Similarly, dietary fiber, vitamin A, vitamin B1, vitamin B2, vitamin B6, total folate, and vitamin C intakes were suboptimal, with percentages meeting RDAs ranging from 43% to 94%. In contrast, intakes of polyunsaturated fatty acids (PUFA), vitamin E, magnesium, phosphorus, iron, and zinc were notably excessive, with percentages exceeding RDAs ranging from 97% to 312%. Sodium and potassium intakes varied widely, with no clear trend relative to RDAs.

**Table 2:**  
**Subject's Dietary Practices**

Nutrients	Minimum	Maximum	Recommended intake	RDA Allowance
Energy	335.3 kcal	2036.3 kcal	1600 kcal	26%
Water	48.0 g	680.0 g	2700 g	7%
Protein	6.5 g (8%)	60.1 g (12%)	71 g	11%
Fat	20.6 g (54%)	69.1 g (<30 %)	69.1 g	30%
Carbohydrate	31.2 g (38%)	290.7 g (>55 %)	290.7 g	11%
Dietary fibre	3.2 g	-	30 g	-
Alcohol	0.0 g	-	-	-
PUFA	9.4 g	3.0 g	10 g	312%
Cholesterol	10.5 mg	-	-	-
Vit. A	268.3 µg	500.0 µg	770 µg	54%
Carotene	0.0 mg	-	-	-
Vit. E (eq.)	3.0 mg	3.0 mg	15 mg	101%
Vit. B1	0.2 mg	0.2 mg	1.2 mg	94%
Vit. B2	0.2 mg	0.3 mg	1.5 mg	72%
Vit. B6	0.6 mg	0.1 mg	1.9 mg	603%
Tot. fol. acid	25.6 µg	60.0 µg	600 µg	43%
Vit. C	23.3 mg	50.0 mg	85 mg	47%
Sodium	249.3 mg	-	2000 mg	-
Potassium	802.8 mg	-	3500 mg	-
Calcium	134.3 mg	220.0 mg	1000 mg	61%
Magnesium	52.1 mg	24.0 mg	300 mg	217%
Phosphorus	168.3 mg	120.0 mg	700 mg	140%
Iron	1.6 mg	0.5 mg	27 mg	316%
Zinc	1.0 mg	1.0 mg	11 mg	97%

### **Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF)**

Table 3 presents the distribution of food group consumption among 297 children aged 6 to 59 months. The study revealed that 76.86% of the children (with a 95% confidence interval ranging from 52.86% to 76.86%) met the criteria for Minimum Dietary Diversity (MDD). Commonly

consumed food groups included cereals, starchy tubers, root crops, plantains, pulses, dairy products, green leafy vegetables, and fruits. However, less than 20% of the children regularly included foods from the remaining food groups in their diet. Additionally, the consumption of fruits and vegetables was not reported on a daily basis among the study participants. In terms of Minimum Meal Frequency

(MMF), children in households where caregivers were formally employed achieved a minimum meal frequency of 40% (with a 95% confidence interval ranging from 0.4 to 0.9). Conversely, children under

the care of illiterate mothers/caregivers were 50% less likely to meet the minimum meal frequency compared to those with higher education levels, with a 95% confidence interval ranging from 0.2 to 0.9.

**Table 3:**  
**Distribution of Food Group Consumption**

Food Groups	Frequency				
	Once a week	2-4 days a week	5-6 days a week	Every day	Never
<b>Cereals, starchy tubers, root crops, plantain</b> (Rice, potatoes, matoke, chapati)	15	89	85	98	10
<b>Pulses</b> (beans, peas, lentils)	65	131	76	3	22
<b>Nuts and seeds</b> (sesame, ground nuts)	61	46	7	1	182
<b>Dairy products</b> (fresh milk, mala, yogurt)	119	74	35	23	46
<b>Meat, fish, eggs</b> (chicken, beef, pork, tilapia chicken eggs)	137	25	10	3	123
<b>Green leafy vegetables</b> (Sukuma wiki, managu, terere, malenge, tomatoes)	27	54	119	83	14
<b>Fruits</b> (banana, mangoes, oranges, papaya)	169	58	32	6	32
<b>Oils and fat</b> (ghee, butter)	144	107	26	15	5
<b>Beverages</b> (tea, coffee)	16	35	67	149	30
<b>Others</b>	28	67	89	75	38

## DISCUSSION

The socio-demographic characteristics of caregiver-child pairs in Majengo Slum provided valuable insights into the population under study. Firstly, the predominance of female caregivers aligns with global trends where women often bear the primary responsibility for childcare (Sharma et al., 2016). This finding underscores the significant role women play in nurturing and raising children, particularly in resource-constrained settings such as urban slums. However, it also raises questions about the potential implications for women's employment opportunities and economic empowerment, as caregiving responsibilities may limit their ability to engage in formal employment or pursue higher education (Mussida & Patimo, 2020).

The distribution of caregivers across age groups, with a notable proportion falling within the 30 to 39 age range, reflects the demographic composition commonly observed in many low-income urban areas (Atahigwa et al., 2020). This age group often represents the economically active population, balancing caregiving responsibilities with work commitments. The high prevalence of married caregivers further emphasizes the importance of family structures in providing support for child-rearing activities. However, it also raises questions about the potential challenges faced by single parents or caregivers in accessing resources and support networks (Chavda & Nisarga, 2023).

Regarding the age distribution of children, the concentration of children aged 12 to 24 months aligns with the critical period for complementary feeding initiation and nutritional interventions (Das et al., 2021). This age group represents a vulnerable population segment where optimal nutrition is essential for growth and development. The predominance of Christian caregivers reflects the religious diversity commonly observed in Kenyan society (Gathogo, 2020). Religious beliefs and practices may influence caregiving behaviors, including dietary practices and healthcare-seeking behaviors (Kang et al., 2020).

Educational attainment among caregivers reveals a substantial proportion with primary education, highlighting the importance of targeted interventions to promote health literacy and parenting skills among low-educated populations (Sanders et al., 2007). The involvement of caregivers in small to medium businesses underscores the economic challenges faced by families in urban slums, where income instability and limited job opportunities are prevalent (Jegathesan et al., 2023). Moreover, the average monthly income below Kshs 10,000 underscores the financial constraints experienced by many households, impacting their ability to access nutritious foods and essential services (FAO, 2018). The high proportion of children born at a health facility reflects the efforts of the Kenyan government to promote institutional deliveries and improve maternal and child health outcomes (Orangi et al., 2021). However, it also underscores the importance of leveraging healthcare

facilities as platforms for delivering integrated maternal and child health services, including nutrition education and counseling.

The nutrient intake analysis presented in Table 2 highlights several critical disparities between observed intake levels among subjects and recommended dietary allowances (RDAs). These findings underscore the nutritional challenges faced by children aged 6 to 59 months in Majengo Slum, Narok County, Kenya. Energy intake, a fundamental determinant of overall nutritional status, was notably below the recommended level of 1600 kcal for a significant portion of the study population, with only 26% meeting the RDA. This deficiency in energy intake can have profound implications for growth, development, and overall health outcomes among young children (Govender et al., 2021). Inadequate energy intake may contribute to stunted growth, compromised immune function, and increased susceptibility to infections (Morales et al., 2023).

Similarly, protein intake among subjects fell short of the RDA of 71 g, with only 11% meeting the requirement. Protein is essential for tissue growth, repair, and immune function, particularly during periods of rapid growth and development in early childhood (Verduci & Köglmeier, 2021). Inadequate protein intake can impede growth and development, leading to stunting and impaired cognitive function (Verduci & Köglmeier, 2021). Fat intake exceeded the recommended 30% of total energy intake in all cases, indicating a potential imbalance in dietary fat composition. While some dietary fat is necessary for energy production and nutrient absorption, excessive fat intake, especially from unhealthy sources, can increase the risk of obesity and chronic diseases later in life (Wang et al., 2020).

Carbohydrate intake also varied widely among subjects, with only 11% meeting the recommended intake of 55% or more of total energy intake. Carbohydrates are the primary source of energy for the body and play a crucial role in maintaining blood glucose levels and supporting brain function. Inadequate carbohydrate intake may result in fatigue, lethargy, and compromised cognitive function. The suboptimal intake of dietary fiber, vitamins (A, B1, B2, B6, C), and total folate highlights deficiencies in essential micronutrients critical for growth, immune function, and overall health (Galmés et al., 2022). Adequate intake of these nutrients is essential for maintaining optimal health and reducing the risk of nutritional deficiencies and associated health complications (Stover et al., 2020). Conversely, intakes of polyunsaturated fatty acids (PUFA),

vitamin E, magnesium, phosphorus, iron, and zinc were notably excessive, surpassing RDAs in some cases. While adequate intake of these nutrients is essential for health, excessive intake can lead to adverse health effects, including gastrointestinal disturbances, impaired nutrient absorption, and toxicity (Godswill et al., 2020).

The findings from Table 3 shed light on the dietary practices and meal frequency. The study revealed that a considerable proportion of children met the criteria for Minimum Dietary Diversity (MDD), with 76.86% of them achieving this benchmark. This is a positive indication, suggesting that many children in the slum are consuming a varied diet, encompassing essential food groups such as cereals, starchy tubers, root crops, plantains, pulses, dairy products, green leafy vegetables, and fruits. These food groups provide a diverse array of nutrients crucial for growth, development, and overall health (Weerasekara et al., 2020). However, the low consumption of foods from other food groups highlights potential gaps in nutritional intake and suggests a need for interventions to promote a more balanced and diverse diet among children in the slum.

Despite the relatively high level of dietary diversity observed, there are concerning trends regarding the regular consumption of fruits and vegetables. Less than 20% of the children included these important food groups in their daily diet, indicating a potential shortfall in essential vitamins, minerals, and antioxidants critical for optimal health and immune function (Gombart et al., 2020). Increasing access to and promoting the consumption of fruits and vegetables should be a priority in efforts to improve the nutritional status of children in urban slum settings.

In terms of Minimum Meal Frequency (MMF), the study found notable disparities based on caregivers' education and employment status. Children in households where caregivers were formally employed achieved a minimum meal frequency of 40%, indicating that they were more likely to receive the recommended number of meals per day. This finding underscores the importance of socioeconomic factors in shaping dietary practices and meal frequency among children (Karimi et al., 2023). Conversely, children under the care of illiterate mothers/caregivers were 50% less likely to meet the minimum meal frequency compared to those with higher education levels. This highlights the need for targeted interventions aimed at improving meal frequency and ensuring adequate nutrition among vulnerable populations in urban slum settings.

## CONCLUSION

The socio-demographic characteristics and nutritional analysis of caregiver-child pairs in Majengo Slum reveal significant nutritional deficiencies and disparities influenced by socioeconomic factors. The predominance of female caregivers, limited educational attainment, and low household incomes contribute to suboptimal dietary practices, impacting children's growth, development, and overall health.

## RECOMMENDATION

To address these challenges, it is recommended to implement targeted nutrition education programs for caregivers, focusing on the importance of balanced diets, meal frequency, and the inclusion of diverse food groups. Additionally, initiatives to improve economic opportunities for women and access to affordable, nutritious foods should be prioritized to enhance the overall nutritional status of children in urban slum settings.

### Conflict of Interest

Authors declare no conflict of interest.

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