# Food Intake Practices in Quantity and Frequency Per Day for Children Under-Five Years Old in Uvinza District

## Gloria Michael Kapufi[1], Henry A. Mollel[2]

[1]Ministry of Health, western zonal health resource center, Kigoma, Tanzania

[2]Department of Health Systems Management, School of Public Administration and Management, P.O. BOX 2, Mzumbe University, Morogoro, United Republic of Tanzania.

**ABSTRACT**

**Background:** The global malnutrition crisis, underscored by the FAO, affects 9.8% of the world's population, including over 350 million children. In Tanzania, regions grapple with stunting rates exceeding 40%. WHO links malnutrition to 45% of child fatalities under five in low- and middle-income countries. This study assessed daily food intake practices among children under five in Uvinza District, in Kigoma Region, Tanzania.

**Methods**: This study was conducted in Uvinza District of Kigoma Region. It used a mixed research methodology encompassing quantitative and qualitative data collection techniques. The research study design used was cross-sectional, which involved 400 participants selected through a simple random sampling process. The quantitative data was analysed using descriptive statistics with the assistance of SPSS version 25, and the findings were presented through graphs, percentages, and tables. The qualitative part was analysed thematically and content wise.

**Results**: The findings showed that 91% of children received two meals, 6.5% reported consuming three meals, while only 2% noted four or more meals. The findings also showed that 50.75% of the respondents mentioned giving their children protein-rich foods like meat, fish, eggs, beans, and milk, and 46.5% indicated cereal and grain-based foods like fruits and vegetables. Lastly, the findings showed that 65% reported high food consumption (1000mg and above), 20% indicated medium intake (500mg – 1000mg), and 15% noted low consumption (100mg – 500mg).

**Conclusion**: The study examined the association between undernutrition (the outcome variable) and several exposure variables, including poverty, lack of education, food scarcity, single parenthood, non-parental custodianship, parental age, government support, child gender, and child age. The analysis revealed that undernutrition in children was significantly associated with poverty, lack of education, food scarcity, and single parenthood. Conversely, factors such as cultural practices, parental age, non-parental custodianship, child age, and child gender showed no significant associations with undernutrition.

**Keywords:** Undernutrition, Malnutrition, children under five, Severe Acute Malnutrition, Moderate Acute Malnutrition

## INTRODUCTION

Undernutrition is a global problem reported in the recent findings of the United Nations Food and Agriculture Organization (FAO), which indicate a significant increase in the number of affected individuals over the past two years. According to FAO, the increase in undernutrition has been constant, starting from 8% in 2019, 9.3% in 2020, and 9.8% in 2021. This implies that about 828 million people were experiencing hunger and were undernourished globally in 2021. Given the World Food Program, more than 350 million undernourished people were children. Globally, 52 million children under five were wasted, with 17 million severely wasted and approximately 22.9% stunted growth (Hagag et al., 2022).

Malnutrition is excessively a public health concern in Sub-Saharan Africa, where more than 90% of all nutritional conditions and two-thirds of under-nutrition cases originate from poverty (Juma et al., 2019). Children under five years old are particularly affected, with stunting, wasting, and underweight prevalent in various countries. In Ghana, moderate stunting, wasting, and underweight affect 28.0%, 8.0%, and 13.0% of under-five children, respectively. Stunting and underweight are more prevalent among older children (Aheto et al., 2018). In Kenya, stunting, wasting, and underweight affect 47.0%, 2.6%, and 11.8% of children under five, respectively. These conditions were found to be associated with factors such as child age, gender, residing in informal settlements, and economic poverty, as indicated by Olack et al. (2017). In a separate study conducted in Botswana, it was found that 38.7% of children under three years of age experienced under-nutrition. The research also revealed that 5.5% of children were affected by under-nutrition, with various factors such as sex, parents' employment status, single parenthood, family income, mother's education, and breastfeeding being associated with under-nutrition (Mahgoub et al., 2016).

In Tanzania, child undernutrition is a substantial public health concern, with approximately 34% of children under five experiencing stunting in 2020, surpassing the African regional average of 30.7% (Khamis et al., 2019), making Tanzania one of the top ten most affected countries globally. One of the most hit regions in the country is Kigoma. Nearly half of the children in Kigoma under five suffer from stunted, which is 37.9% of the population; 6% are wasted, and 19.4% are underweight, even though agriculture is main economic activity conducted.

Notwithstanding the government's efforts, substantial challenges persist in addressing nutritional issues in the country. The Tanzanian Nutritional Profile (USAID, 2022) reports that 42% of children aged 0-5 in Kigoma suffer from stunting. Uvinza Municipal's primary economic activities revolve around agriculture and fishing. Interestingly, a significant number of referrals to Maweni Regional Referral Hospital in Kigoma originate from Uvinza district. Given this context, it is imperative to conduct a study to explore the determinants of undernutrition among children under 5 years in Uvinza District.

## METHODS

### Study Setting

The study was conducted in Uvinza district, Kigoma region in Tanzania. This district is situated in the western parts of Tanzania near the eastern shore of Lake Tanganyika. Itis comprised of 16 wards and 61 villages. According to the 2022 National Census report, Uvinza district has 458,353 people. The study was conducted in the Uvinza district due to its continued high prevalence of undernutrition among children under the age of five, which remains a significant and pressing public health issue in the area

## Study Design

The study employed a mixed approach combining quantitative and qualitative methods of collection and analysis of data. Descriptive cross-sectional study design was used in quantitative part, while the qualitative part used thematic and content analysis of data.

## Population and Sampling

The population for this study was children under five years of age in Uvinza District, who were accessed from their households. However, since the children could not offer informed consent, the researcher selected 400 parents/guardians to be the study's respondents on behalf of the children. The sampling technique for the study involved mainly systematic sampling. Here the district was divided into administrative wards, and each ward's villages were listed. A random sample of two villages was selected from each ward to ensure the representativeness of the district. after this, a systematic random sampling technique was used to select households within the selected participating village. A parent or caretaker of an under-five child was selected from each household to participate in the study. The next available house was used instead when the household did not have a child under five years.

## Data Collection Methods and Tools

Primary data was obtained via a questionnaire, which was both developed and distributed by the researcher. This was used in the collection of both qualitative and quantitative data. Additionally, secondary data was obtained by reviewing literature documents concerning the subject matter. The researcher reviewed the literature from reputable sources, including the WHO and the WFP, as well as previous works on undernutrition among children under five.

| Data collection tool | Measures |
|---|---|
| Questionnaire | Structured Open-Ended questionnaires were deployed comprising of the following sections |
| | Demographic Information (Age, Place of Residence, Occupation, number of children in a family, income and economic activities) |
| | Prevalence of Undernutrition |
| | Food Intake practices |

## Data Management and Analysis

Qualitative data was analyzed by thematic and content analysis. On the other hand, the research applied descriptive statistics techniques using SPSS version 25 for quantitative data. Descriptive statistics analysis involves the computation of frequencies for all questions to accurately represent the study's findings, including calculating sums and percentages effectively depicting the distribution of variables.

## Ethical Consideration

Ethical standards were adhered to during the entire period of conducting the study. Before initiating the data collection process and other research processes, an official letter for the study was provided by Mzumbe University. The study prioritized confidentiality and anonymity while adhering to all pertinent laws and regulations governing human subjects research in Tanzania. Before the study commences, ethical approval was diligently obtained from the local government authority.

## RESULTS

### Demographic Characteristics of Respondents

The study involved 400 respondents of guardians and parents of children between 0 to 60 months with varying age distribution: 5 (1.3%) below 12 months, 113 (28.2%) between 13 and 24 months, 101

(25.3%) between 25 and 36 months, 106 (26.5%) between 37 months and 48 months and 75 (18%) are above 49 but less than 60 months. In regards to the sex distribution of parents/guardians, 239 (59.8%) were male and 161 (40.3%) were female. Custodianship showed that 137 (34.3%) lived with married parents, 122 (30.5%) with single parents, 127 (31.8%) with other relatives, and 14 (3.5%) with non-relatives. The family size varied, with 81 (20.3%) living in families of less than four people, 120 (30%) in families of 4 and 6 people, 127 (31.8) in families of 7 to 10 people, and 72 (18%) in families with more than ten members.

*Table 1: Socio-demographic characteristics of the study population*

| Characteristics | Frequency(N) | Percentage(%) | |
|---|---|---|---|
| **Age of the child in months** | | | |
| 0 - 12 | 5 | 1.3 | |
| 13 - 24 | 113 | 28.2 | |
| 25- 36 | 101 | 25.3 | |
| 37 -48 | 106 | 26.5 | |
| 49 - 60 | 75 | 18.8 | |
| **Sex of the child** | | | |
| Male | 239 | 59.8 | |
| Female | 161 | 40.3 | |
| **The child lives with** | | | |
| Married parents | 137 | 34.3 | |
| Single parent | 122 | 30.5 | |
| Another relative | 127 | 31.8 | |
| Non-relative | 14 | 3.5 | |
| **How many family members are in the family living together** | | | |
| Less than 4 | 81 | 20.3 | |
| Between 4 and 6 | 120 | 30.0 | |
| Between 7 and 10 | 127 | 31.8 | |
| More than 10 | 72 | 18.0 | |
| **Approximate income of the family** | | | |
| Less than 300,000 Tshs | 313 | 78.3 | |
| Between 300,000 and 500,000 Tshs | 76 | 19.0 | |
| Between 500,000 and 1,000,000 Tshs | 10 | 2.5 | |
| More than 1,000,000 Tshs | 1 | 0.3 | |

**Prevalence of undernutrition among children under five years old**

From the 400 participating children, severe acute malnutrition (SAM), which resulted in insufficient fat, protein, and other nutrients, was reported in 221 children, which equals a prevalence rate of 55.3%. Other 105 participants reported Moderate acute Malnutrition, which is 26.3% prevalence. A mild level of Malnutrition was reported among 62 participating children, which is a 15.5% prevalence. The non-malnourished children were 12, which is 3.0%.

**Table 2: Prevalence of Under-nutrition in Uvinza district**

| Nutritional status | Frequency(N) | Percentage(%) |
|---|---|---|
| Severe Acute Malnutrition | 221 | 55.3 |
| Moderate Acute Malnutrition | 105 | 26.3 |
| Mild Acute Malnutrition | 62 | 15.5 |
| Not Malnourished | 12 | 3.0 |
| **Total** | **400** | **100.0** |

**Food intake practices of children under five years old per day in terms of quantity and frequency**

Of 400 respondents, 366 (91%) suggested that their children receive two meals daily, 26 (6.5%) reported that their children consume three meals, while only 8 (2%) stated that their children have four or more meals per day.

Subsequently, participants were requested to specify the type of food their children regularly consume, as 203 (50.75%) of respondents suggested that their children's diet included protein- rich foods such as meat, fish, eggs, beans, and milk. Furthermore, 187 (46.5%0 mentioned that their children primarily consumed cereal and grain-based foods like rice and bread, and the remaining 8 (2%) of the respondents mentioned that their children were provided with vitamin- rich foods, including fruits and vegetables.

Lastly, concerning the quantity of daily food intake for children under five years of Age in the Uvinza district, most respondents 206 (65%) indicated that their children consumed a high quantity of approximately 1000mg and above daily. Additionally, 80 (20%) reported a medium quantity intake ranging from 500mg to 1000mg per day. The remaining 60 (15%) of respondents stated that their children had a low daily food intake, falling within 100mg to 500mg.

**Table 3: Quantity and frequency of feeding for children under five years in Uvinza District**

| QUESTION | FREQUENCY(N) | PERCENT(%) |
|---|---|---|

**How many meals per day does your child typically eat?**

| | | |
|---|---|---|
| Two meals | 366 | 91.5 |
| Three meals | 26 | 6.5 |
| Four meals | 8 | 2.0 |

**Please indicate the types of food your child consumes regularly.**

| | | |
|---|---|---|
| Vitamin sources (Fruits and vegetables) | 11 | 2.75 |
| Protein sources (e.g., Meat, fish, eggs, beans, Milk) | 203 | 50.75 |
| Cereal and Grains (e.g., Rice, bread) | 186 | 46.5 |

**Please specify the approximate daily quantity consumed (In a day)**

| | | |
|---|---|---|
| 100mg – 500mg: low quantity | 60 | 15 |
| 500mg – 1000mg: Medium quantity | 80 | 20 |
| 1000mg and above High quantity | 260 | 65 |

## DISCUSSION

**Prevalence of undernutrition among children under five years old**

The study, involving 400 participants, revealed distinct levels of undernutrition. Notably, SAM was

identified to be a substantial 55.3% of children. Additionally, 26.3% of children had moderate acute malnutrition (MAM), while 15.5% had mild malnutrition. The findings showed that only 3% of children were classified as non-malnourished.

From the findings, the prevalence rates showed a critical picture of the nutritional status of children in the Uvinza district, which showed the urgent need for deliberate intervention to improve the situation of undernutrition for children under 5. The findings have several implications on child health, development, and socio-economic outcomes. Firstly, the children categorized as SAM and MAM are likely to experience risks of morbidity and mortality due to the likeliness of a weak immune system resulting from insufficient intake of essential nutrients, specifically protein, vitamins, and fats.

Additionally, the children might face cognitive and developmental implications due to undernutrition; the prevalence rate of SAM, MAM, and mild malnutrition suggest the potential presence of lasting cognitive deficits among affected children. For a child, early childhood is vital for the required brain development, and experiencing undernutrition during childhood can cause irreversible cognitive impairments, which might affect the development of a child's brain and have long-lasting effects on a child's learning abilities. The findings are complemented by Grantham-McGregor et al. (2017), who suggested the long-lasting impacts of early childhood undernutrition on cognitive development and educational attainment, showing the necessity of timely interventions to prevent such setbacks.

Furthermore, the economic burden associated with undernutrition further accentuates the gravity of the situation. Families with children who are undernourished often incur high healthcare costs, which result from the long-term cognitive impairments caused by the undernutrition that can limit the children's growth development, which might hinder economic growth at both individual and societal levels according to Hoddinott et al. (2013), linked the economic dimensions of undernutrition with the reduced human capital and perpetuation of the cycle of poverty.

The prevalence rates produced by the study's results can reflect the cycle of malnutrition that can continue from one generation to another if not dealt with. Malnourished mothers are more likely to give birth to underweight babies, leading to an inter-generational undernutrition cycle and its associated health and development (Bhutta et al., 2013).

**Food intake practices of children under five years old per day in terms of quantity and frequency**

The study aimed to examine the food intake practices of children under five years old in Uvinza district. The respondents indicated that most children (91%) received two meals daily. In comparison (6.5%) reported that their children were provided with three meals per day, and only (2%) indicated that they consumed four or more meals daily. The findings suggested a predominant trend of children having two meals per day, which indicates a potential gap in the frequency of child food consumption. The prevalence of children receiving two meals per day is consistent with studies highlighting a global trend of suboptimal meal frequency among young children in resource-constrained settings (Nguyen et al., 2018). This reduced meal frequency can lead to inadequate intake of essential nutrients for growth and development. Research suggests increasing meal frequency can improve nutritional status, especially among vulnerable populations (Paoli et al., 2019).

The respondents were also asked to outline the types of food their children consume daily. Among the respondents, (50.75%) expressed that their children's diet included a protein-rich source such as meat, fish, eggs, and milk. In comparison, only (46.5%) indicated that their children consume primarily cereal and grain-based foods, while only (2.75%) reported providing their children with vitamin sources in the form of fruits and vegetables. The findings underscore a relatively balanced distribution between

vitamin-rich foods and cereal-based food in children's diets. The relatively equal distribution between vitamin-rich foods and cereal-based staples may suggest a balanced yet potentially limited diversity of nutrients in their diets. The balanced distribution between vitamin-rich foods and cereal-based staples mirrors the challenges faced in many low- and middle-income countries, where diets often lack diversity due to economic constraints (Ruel et al., 2018). The reliance on a limited range of foods can result in deficiencies of essential micronutrients, potentially affecting cognitive development and overall health. Encouraging dietary diversification and incorporating locally available nutrient-rich foods has been proposed to address these deficiencies (Ruel et al., 2018).

The respondents were asked to estimate the approximate daily quantity of food consumed by their children in Uvinza district. The responses showed a range of consumption patterns as the majority (65%) of respondents indicated that their children consumed a high quantity of food estimated to be above 1000mg daily. (20%) respondents suggested that their children consume a medium quantity of food, 500mg to 1000mg daily. (15%) respondents revealed that their children consumed a low quantity of food ranging from 100 to 500mg daily. The study's findings suggest that the varying quantities of daily food consumption indicate that children receive sufficient and insufficient nutrition, highlighting the need for tailored interventions. The varying quantities of daily food consumption correspond to a range of nutritional adequacy. Children consuming high quantities of food are likely to meet their energy and nutrient requirements, while those consuming lower quantities may be at risk of undernutrition. These findings resonate with studies emphasizing the importance of adequate energy intake for growth and development during early childhood (Suha, 2020). Nutrient-rich, energy-dense foods ensure that children receive sufficient calories and essential nutrients.

## Strengths

The study was conducted using a quantitative research approach, which enabled the researcher to effectively collect data from many respondents (400) and conduct proper data analysis using data from all respondents. The study successfully used a high number of respondents (400) who were sufficient to provide diverse data and information concerning the study as the respondents were from different socioeconomic statuses. The study successfully highlighted the food practices that widely represented the food habits and dietary practices in the Uvinza district towards children under five.

## Limitations

Despite using a high number of respondents (400), the respondents were all from the same district. Hence, the results might not reflect other areas in Tanzania that might experience the same problems. Additionally, the study was conducted in a specified period of time as the researcher could not conduct another study at a different time to compare the results from different situations and periods of time.

## CONCLUSION

The study examined the association between undernutrition (the outcome variable) and several exposure variables, including poverty, lack of education, food scarcity, single parenthood, non- parental custodianship, parental age, government support, child gender, and child age. The analysis revealed that undernutrition in children was significantly associated with poverty, lack of education, food scarcity, and single parenthood. Conversely, factors such as cultural practices, parental age, non-parental custodianship, child age, and child gender showed no significant associations with undernutrition.

## RECOMMENDATIONS

Based on the above findings, the following recommendations can be implemented. Firstly, establishing nutritional educational programs targeting caregivers, guardians, or parents in the Uvinza district can promote a well-balanced diet habit for children under five. Such programs can be used to emphasize the importance of incorporating a variety of food groups to ensure adequate protein intake and overall nutrition.

There is also a need to provide support and monitoring for children who are identified with low daily food intake and to provide targeted nutritional support that includes supplementary feeding programs where necessary to address potential nutritional disparities and reduce malnutrition.

There is also a need for diverse food options as parents must be encouraged to diversify children's diets by promoting the consumption of vitamin-rich foods such as fruits and vegetables alongside protein and grain sources. Such intervention can be achieved through community initiatives and awareness campaigns. Lastly, there is a need for regular nutritional assessments among children under five in the Uvinza district to monitor dietary patterns and nutritional status, which will help in identifying any emerging nutritional challenges and tailoring interventions accordingly.

## List of Abbreviations

MAM            Moderate Acute Malnutrition SAM Severe Acute Malnutrition
NGOs            Non-Governmental Organizations
SPSS            Statistical Package for the Social Sciences WHO   World Health Organization
WFP            World Food Program
FAO            Food and Agriculture Organization
USAID            United States Agency for International Development

## Availability of Data and Materials

Data from this study was collected from the field and are available upon request from the author

## Author Details

Health System Management: Mzumbe University – Centre of Excellence in Health Monitoring and Evaluation

**Competing Interests:** The Author declares no competing Interests

## Author's Contributions

Gloria Michael Kapufi conceptualized, conducted the research study, collected data, and drafted the Manuscript. Prof. Henry Mollel contributed to the review of the research study and manuscript.

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**Consent for Publication**

Not Applicable for this Study

**Ethical Approval for Participation**

Ethical clearance for this study was secured from the Ethical Approval Committee at the University of Mzumbe. Approval from the Uvinza district council leadership was obtained for data permission for the data collection process. Verbal consent was obtained from the participants after providing them with information about the study. The researcher ensured that participation in the study was voluntary and ensured confidentiality for participants by providing each participant with a unique identifier.

**List of Tables**

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