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Nutritional Status and Feeding Practices of Children Aged 6 to 23 Months in Komanda Health Zone, Ituri

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Abstract

Introduction: Child malnutrition is a major public health issue in the Democratic Republic of Congo (DRC), particularly affecting children aged 6 to 23 months. This study aimed to assess the nutritional status of children in the Komanda Health Zone, Ituri Province, analyze their dietary practices, and identify factors associated with malnutrition. **Methods:** A cross-sectional analytical survey was conducted from June 12 to 29, 2025, among 475 children aged 6 to 23 months and their mothers, selected by cluster sampling. Sociodemographic and dietary data were collected using a structured questionnaire, while anthropometric measurements were performed according to World Health Organization (WHO) standards. Malnutrition indices, stunting, underweight, and wasting, were calculated using WHO Anthro and analyzed via binary logistic regression. **Result:** The results showed that 50.7% of the children were stunted, 25.1% were underweight, and 15.8% were wasting. Complementary feeding began at 6 months for 74.95% of children, mainly composed of cereals and tubers (98.95%), while the consumption of dairy products remained low (26.74%). Only 49.68% of the children received a minimum acceptable diet. Multivariate analysis identified female sex, a minimum acceptable diet consumption, and higher minimum meal frequency as factors associated with a lower likelihood of underweight. Conversely, older child age was associated with underweight and wasting. Wasting, lack of minimal dietary diversity, and non-consumption of a minimum acceptable diet were also associated with a higher risk. No significant factors were observed for stunting. **Conclusion:** These results highlight the persistence of malnutrition among young children in Komanda Health Zone and highlight the importance of reg-

ular, diversified, and globally adequate complementary feeding to prevent underweight and wasting.

Keywords

Malnutrition, Complementary Feeding, Children 6 - 23 Months, Ituri, DRC

1. Introduction

Promoting healthy growth and survival in young children in their early years requires appropriate complementary feeding practices. In sub-Saharan Africa (SSA), 6% to 41% of under-5 deaths could be prevented by improving these practices [1]. The period from conception to 2 years is particularly critical: inadequate nutrition leads to an increased risk of mortality, stunting, and developmental deficits. Initiation of breastfeeding within one hour of birth, exclusive breastfeeding for the first six months, as well as dietary diversification adapted to the appropriate time, are essential to ensure optimal and healthy growth and development in young children [2]. Complementary feeding practices in West Africa remain inadequate, contributing to stunting, undernutrition, morbidity, and child mortality in the region. Stunting rates among children under 5 years of age range from 19.6% in Senegal to 54.8% in Niger, reflecting inadequate complementary feeding among children in these countries [1]. Overall, less than a quarter of children aged 6 to 23 months meet the minimum standards for dietary diversity and frequency set by WHO. As a result, 32% of children are stunted, and 10% are wasting. Many determinants influence feeding practices: the age of the child, the mother's level of education and occupation, household wealth, family size, exposure to the media, antenatal care, and delivery conditions [3]. To address this, several global initiatives have been launched, including the UN's Zero Hunger Challenge and the WHO's strategies to promote adequate complementary feeding. Despite these efforts, gaps persist. Therefore, identifying and reducing preventable socioeconomic inequalities related to the minimum acceptable dietary intake and its contributing factors is a key priority to improving children's overall health and well-being [4]. The DRC is struggling to recover after years of conflict and political crises, while facing serious humanitarian challenges. Since 2017, ongoing instability in the east of the country has displaced an estimated 4.8 million people, depriving them of their livelihoods. Food insecurity has worsened sharply, from 7.7 million people affected in 2017 to 13.1 million in 2018, making access to food a daily challenge for a large part of the population [5]. Nearly 42% of children under 5 years of age are stunted, 6% are wasted, 23% are underweight, and 47% are anemic. Only 18% and 37% of children aged 6 to 23 months achieve the minimum dietary diversity and recommended frequency, respectively [6]. The DRC remains one of the countries most affected by chronic and acute malnutrition [7]. Although various factors contribute to malnutrition, inadequate dietary practices remain among the most important [8]. In Ituri province, few studies have looked at feeding practices

among children aged 6 to 23 months. Understanding their influence on nutritional status is essential, as inadequate complementary feeding permanently compromises the growth and development of the child.

The general objective of this study is to analyze the influence of dietary practices and the sociodemographic characteristics of the mother and child on the nutritional status of children aged 6 to 23 months in the Komanda Health Zone.

2. Materials and Methods

2.1. Study Framework

This study was conducted in the Komanda Health Zone, located in Irumu territory, within the Provincial Health Division of Ituri, in northeastern DRC. The Komanda Health Zone has 17 Health Areas, 10 of which were selected for the survey. This choice was motivated by the insecurity linked to the activities of the groups, particularly present in the 7 Health Areas located on the Komanda-Beni axis.

2.2. Type and Period of Study

This is a cross-sectional analytical study conducted in households with children aged 6 to 23 months. Data collection took place from June 12 to 29, 2025.

2.3. Study Population

The population of this study consisted of children aged 6 to 23 months and their mothers residing in the Komanda Health Zone.

Children aged 6 to 23 months living in households selected at the time of the survey, accompanied by their mother or the main person in charge of feeding, and whose informed consent had been obtained, were eligible. Mothers had to reside in the study area and be able to complete the questionnaire. Children who were absent during the team's visit, those whose age could not be reliably documented, as well as mother-child dyads for whom the interview could not be completed or anthropometric measurements could not be carried out correctly, were excluded. Prior to the analysis, observations with missing, incomplete, or biologically implausible anthropometric data were removed from the analytical database after verification with WHO Anthro.

2.4. Sampling and Sampling

For this study, we used cluster sampling and used Schwartz's formula below: $n_1 = \frac{z^2_{1-\&/2} * P(1-P)}{m^2}$ to calculate the sample size with a 95% confidence interval. The estimated proportion of children who received a minimum required dietary intake in Ituri, according to the MICS DRC 2018 report, is 17.8% (9). A margin of error of 5% (0.05) was used. Due to the use of the cluster method, which results in a loss of sampling efficiency, a cluster effect (D) of 2 was applied, thus adjusting the sample size ($n = n_1 \times 2 = 450$, with $n_1 = 225$). To account for potential refusals

and registration errors, an additional 5% adjustment (or 25 individuals) was added, bringing the final sample size to 475. The 10 health areas included were selected in a reasoned manner from the 17 areas of the Komanda Health Zone, retaining the areas that were accessible and safe at the time of the survey. Each health area has formed a cluster. Within each cluster, households were identified with the support of community relays and then visited from one group to another until they reached the expected number. When a household had more than one eligible child, only one child was selected by simple random draw in order to avoid intra-household correlation.

2.5. Variables of Interest

For this study, we considered the following variables:

The nutritional status of children (dependent variable) was assessed on the basis of WHO growth benchmarks based on the calculation of a Z-score of the ratio of weight-height-to-height, height-for-height and weight-age followed by a comparison with a reference population based on the following variables: global acute malnutrition defined by the weight-for-height index of less than −2 standard deviation (WHZ < −2), global underweight defined by weight-for-age index less than −2 standard deviation (WAZ < −2) and chronic global malnutrition defined by height-for-age index less than −2 standard deviation (HAZ < −2). Appropriate feeding practice is the independent variable. It was measured using a composite indicator comprising four of WHO's core Infant and Young Child Feeding (IYCF) indicators. This is the timely introduction of solid and complementary feeding, minimum dietary diversity, minimum meal frequency, and minimum acceptable feeding. If a child meets these four criteria, he or she is considered to have received appropriate complementary feeding.

2.6. Data Collection

The data collection was preceded by the recruitment and training of interviewers among nurses and community representatives in the Komanda Health Zone. After a three-day training on anthropometric measurements and the administration of the questionnaire, the interviewers pre-tested the questionnaire with 25 mothers or babysitters in the city of Komanda to ensure its reliability. The training was provided by the Principal Investigator. Anthropometric data were collected using standardized procedures: weight was measured using a calibrated digital scale to the nearest 0.1 kg, and length/height was measured using a measuring board (infantometer/stadiometer) to the nearest 0.1 cm. Weight and height measurements were performed according to WHO standard procedures. A consistency check of the sheets was carried out every day in the field and at the time of entry. Missing or aberrant anthropometric z-scores were reviewed prior to analysis and excluded when they remained unusable.

2.7. Analysis Statistics

The data collected was exported to Excel for an initial quality control and then

analyzed in Stata v13. Anthropometric indices were generated using the WHO Anthro software. Frequencies and medians with a range of variation were presented. Associations were tested by the Pearson χ^2or Fisher's exact test for qualitative variables, and by the Kruskal-Wallis test for non-normal quantitative variables according to the Kolmogorov test. The statistical significance threshold was set at $p < 0.05$.

For each nutritional outcome, a separate binary logistic regression model was constructed for underweight, stunting, and wasting. The variables introduced into the multivariate models correspond to the sociodemographic and dietary variables presented in Table 4, selected on the basis of the bivariate analysis and their epidemiological relevance. The reference groups were male, an uneducated mother, lack of a minimum acceptable diet, lack of minimum frequency of meals, lack of snacking, and dietary diversity of four or more groups, depending on the variable considered. Results are presented as adjusted odds ratios (ORa) and 95% confidence intervals. Standard errors have not been adjusted for the cluster effect, which must be taken into account in the interpretation.

2.8. Ethical Consideration

This study was approved by the Provincial Health Division of Ituri (Authorization No. 054/206/DPS/IT/05/2025) and the ethics committee of the Faculty of Medicine of the University of Kisangani. The local authorities in each village were contacted and informed before the search teams arrived in their localities. Free and informed consent was requested from each head of household or their representative prior to their participation in the survey. Similarly, the same procedure was followed to obtain the consent of the mothers before the anthropometric measurements of the children were taken. Anonymity was guaranteed, and respondents were reassured that they were not required to participate in the study.

3. Results

3.1. Nutritional Status of the Respondents

The results indicate that stunting is the most prevalent nutritional issue among the children studied, followed by underweight and wasting. Table 1 shows the distribution of the 475 children surveyed according to these three nutritional indicators.

Table 1. Distribution of surveyed children according to their nutritional status.

Variables	Categories	Frequency (n = 475)	Percentage (%)
Underweight	Yes	119	25.05
	No	356	74.95
Wasting	Yes	75	15.79
	No	400	84.21
Stunting	Yes	241	50.74
	No	234	49.26

3.2. Sociodemographic Characteristics and Nutritional Status

Bivariate analysis shows that maternal age is significantly associated with underweight ($p = 0.0197$) and stunting ($p = 0.0419$). The child's sex also influences these two forms of malnutrition: boys are more affected than girls ($p = 0.030$ and $p = 0.010$, respectively).

Child age also differed significantly according to underweight and wasting status ($p < 0.001$ in both cases). In the bivariate analysis, children with these outcomes had lower median ages. However, this observation should be interpreted alongside the multivariate analysis results, which show a positive association between age and these two outcomes after adjustment. Additionally, the mother's education level is strongly related to stunting ($p < 0.001$), with children of illiterate mothers being at higher risk.

Table 2 describes the sociodemographic characteristics of mothers and children and presents the bivariate analysis for the three forms of malnutrition.

Table 2. Sociodemographic characteristics and nutritional status.

Variables	Frequency	Underweight		Stunting		Wasting	
	N (%)	Yes, N (%)	p-Value	Yes, N (%)	p-Value	Yes, N (%)	p-Value
Mother's Age							
Median (Min-Max)	26 (15 - 40)	25 (16 - 36)	0.019*	26 (16 - 40)	0.041*	25 (16 - 40)	0.173*
Gender							
Male	207 (43.58)	62 (29.95)	0.030**	119 (57.49)	0.010**	40 (19.32)	0.063**
Female	268 (56.42)	57 (21.27)		122 (45.52)		35 (13.06)	
Child Age (Months)							
Median (Min-Max)	11 (6 - 23)	9 (6 - 22)	<0.001*	11 (6 - 23)	0.749*	8 (6 - 21)	<0.001*
Education Level							
Illiterate	89 (18.74)	31 (34.83)	0.113**	62 (69.66)	<0.001**	18 (20.22)	0.414**
Primary School	324 (68.21)	75 (23.15)		156 (48.15)		46 (14.20)	
Secondary School	59 (12.42)	12 (20.34)		20 (33.90)		11 (18.64)	
University	3 (0.63)	1 (33.33)		3 (100)		0	
Profession of Mother							
Unemployed	53 (11.16)	14 (26.42)	0.289§	23 (43.40)	0.294§	7 (13.21)	0.341§
Worker	61 (12.84)	3 (13.64)		11 (50.00)		1 (4.55)	
Shopkeeper	339 (71.37)	11 (18.03)		26 (42.62)		8 (13.11)	
Farmer	22 (4.63)	91 (26.84)		181 (53.39)		59 (17.40)	
Household Size							
≤6 Members	267 (56.21)	62 (23.22)	0.297**	130 (48.69)	0.312**	35 (13.11)	0.069**
>6 Members	208 (43.79)	57 (27.40)		111 (53.37)		40 (19.23)	

Continued

Marital Status							
Single	17 (3.58)	4 (23.53)		8 (47.06)		3 (17.65)	
Cohabiting	171 (36.00)	51 (29.82)		90 (52.63)		30 (17.54)	
Married	254 (53.47)	52 (20.47)	0.113**	120 (47.24)	0.124**	36 (14.17)	0.881**
Divorced	7 (1.47)	2 (28.57)		6 (85.71)		1 (14.29)	
Widow	26 (5.47)	10 (38.46)		17 (65.38)		5 (19.23)	

*: Kruskal-Zallis, **: Pearson's χ^2, §: Fisher's test.

3.3. Maternal Feeding Practices and Child Feeding

The majority of children were introduced to complementary feeding at 6 months of age, in accordance with WHO recommendations. Cereals and tubers form the basis of their diet, followed by legumes and nuts. On the other hand, the consumption of dairy products remains low. In terms of dietary diversity, 60% of children consume at least four food groups. The majority (61.9%) eat two meals a day, and 49.7% of children achieve a Minimum Acceptable Diet that combines diversity with adequate frequency. Table 3 examines the different dietary practices and their distribution according to nutritional indicators.

Table 3. Dietary practices associated with malnutrition.

Variables	Frequency	Underweight		Stunting		Wasting	
	N (%)	Yes, N (%)	p-Value	Yes, N (%)	p-Value	Yes, N (%)	p-Value
Age of Introduction of Complementary Feeding							
Less than Six Months	95 (20.00)	28 (29.47)		54 (56.84)		14 (14.74)	
Six Months	356 (74.95)	87 (24.44)	0.375§	174 (48.88)	0.364§	59 (16.57)	0.536§
More than Six	24 (5.05)	4 (16.67)		13 (54.17)		2 (8.33)	
Minimum Dietary Diversity: ≥4 Groups							
0 to Three	190 (40.00)	54 (28.42)	0.167**	100 (52.63)	0.549**	38 (20.00)	0.017**
Four and more	285 (60.00)	65 (22.81)		142 (49.82)		37 (12.98)	
Minimum Meal Frequency							
None	6 (1.26)	3 (50.00)		4 (66.67)		3 (50.00)	
Once	32 (6.74)	14 (43.75)		20 (62.50)		9 (28.13)	
Twice	294 (61.89)	72 (24.49)	0.047§	153 (52.04)	0.058§	42 (14.19)	0.047§
Three Times	118 (24.84)	26 (22.03)		48 (40.68)		17 (14.41)	
Four Times or More	25 (5.26)	4 (16.00)		16 (64.00)		4 (16.00)	
Food Groups Consumed							
Cereals/Tubers	470 (98.95)	117 (24.89)	0.438**	236 (50.21)	0.027**	73 (15.53)	0.136**
Meat/Fish/Poultry	264 (55.58)	54 (20.45)	0.010**	121 (45.83)	0.017**	36 (13.64)	0.150**

Continued

Legumes/Nuts	407 (85.68)	90 (22.11)	<0.001**	199 (48.89)	0.049**	56 (13.76)	0.003**
Milk and Dairy Products	127 (26.74)	30 (22.73)	0.468**	63 (47.73)	0.416**	18 (13.64)	0.425**
Fruits/Vegetables	307 (64.63)	69 (22.26)	0.054**	154 (49.68)	0.527**	38 (12.26)	0.004**
Fruits and Vegetables Rich in Vitamin A	220 (46.32)	45 (19.57)	0.007**	116 (50.43)	0.898**	33 (14.35)	0.404**
Eggs	135 (28.42)	25 (17.24)	0.009**	77 (53.10)	0.494**	14 (9.66)	0.015**
Minimum Acceptable Diet							
Yes	236 (49.68)	45 (19.07)	0.003**	118 (50.00)	0.681**	26 (11.02)	0.005**
No	239 (50.32)	74 (30.96)		124 (51.88)		49 (20.50)	
Daily Snack Frequency							
None	199 (41.89)	62 (31.16)	0.066§	107 (53.77)	0.667§	41 (20.60)	0.014§
Once	107 (22.53)	20 (18.69)		53 (49.53)		9 (8.41)	
Twice	126 (26.53)	27 (21.43)		59 (46.83)		22 (17.46)	
Three Times or More	43 (9.05)	10 (23.26)		22 (51.16)		3 (6.98)	

*: Kruskal-Zallis, **: Pearson's χ^2, §: Fisher's test.

3.4. Multivariate Analysis of Factors Associated with Malnutrition

After multivariate adjustment (Table 4), female sex is associated with a lower probability of being underweight (ORa = 0.61; 95% CI [0.39 - 0.96]; p = 0.031). The age of the child is positively associated with underweight (ORa = 1.06; 95% CI [1.01 - 1.12]; p = 0.022). A Minimum Acceptable Diet appears to be a major protective factor (ORa = 0.25; 95% CI [0.12 - 0.51]; p < 0.001). Compared to the absence of a minimum frequency of meals, a minimum frequency of meals of one, two, or three doses per day is associated with a decrease in the odds of underweight.

For wasting, the age of the child is also positively associated (OR = 1.06; 95% CI [1.00 - 1.13]; p = 0.036). Dietary diversity below 4 groups is associated with a higher risk of wasting (OR = 2.41; 95% CI [1.10 - 5.28]; p = 0.028), while A Minimum Acceptable Diet remains protective (OR = 0.27; 95% CI [0.13 - 0.57]; p = 0.001). No factors were significantly associated with stunting in the fitted model.

Table 4 presents the results of multivariate logistic regression examining the association between sociodemographic and dietary factors and malnutrition in children aged 6 to 23 months.

Table 4. Logistic regression of factors associated with the nutritional status of children aged 6 - 23 months.

Factors	Underweight		Stunting		Wasting	
	OR (95% CI)	p-Value	OR (95% CI)	p-Value	OR (95% CI)	p-Value
Mother's Age	1.02 [0.98 - 1.07]	0.395	0.98 [0.95 - 1.02]	0.342		
Sex of the Child						
Male	1		1			
Female	**0.61** [0.39 - 0.96]	**0.031**	0.84 [0.58 - 1.22]	0.359		

Continued

Child Sex	**1.06** [1.01 - 1.12]	**0.022**			1.06 [1.00 - 1.13]	**0.036**
Education Level						
Illiterate			1			
Primary School			0.80 [0.49 - 1.29]	0.357		
Secondary School			0.77 [0.39 - 1.53]	0.457		
University			1.49 [0.13 - 17.47]	0.752		
Consumption of Tubers (Cassava, etc.)			1.91 [0.29 - 12.66]	0.501		
Meat/Fish/Poultry Consumption	0.97 [0.57 - 1.66]	0.920	1.11 [0.70 - 1.74]	0.666		
Consumption of Legumes/Nuts/Beans	1.14 [0.59 - 2.23]	0.697	0.82 [0.46 - 1.48]	0.514	1.26 [0.58 - 2.73]	0.553
Fruit/Vegetable Consumption (Apples, etc.)	0.67 [0.40 - 1.13]	0.137			0.94 [0.50 - 1.74]	0.840
Fruits and Vegetables Rich in Vitamin A	1.61 [0.87 - 2.97]	0.131				
Egg Consumption	1.28 [0.73 - 2.25]	0.396				
Minimum Acceptable Diet						
No	**1**				1	
Yes	**0.25** [0.12 - 0.51]	**0.000**			0.27 [0.13 - 0.57]	**0.001**
Minimum Meal Frequency						
None	**1**				**1**	
Once	**0.09** [0.02 - 0.33]	**0.000**			0.64 [0.16 - 2.61]	0.544
Twice	**0.13** [0.04 - 0.36]	**0.000**			0.76 [0.25 - 2.34]	0.640
Three Times or More	**0.04** [0.03 - 0.25]	**0.000**			0.78 [0.24 - 2.55]	0.685
Daily Snack Frequency					0.91 [0.68 - 1.22]	0.530
None					1	
Once					1.27 [0.68 - 2.34]	0.445
Twice					0.84 [0.40 - 1.78]	0.664
Three Times					0.39 [0.10 - 1.49]	0.171
Minimum Dietary Diversity						
More than Three					1	
Less than Three					2.41 [1.10 - 5.28]	**0.028**

4. Discussion of the Results

The results of the anthropometric assessment carried out in the Komanda Health Zone highlight a worrying situation in terms of child malnutrition. Indeed, 50.7% of children are stunted, 25.1% are underweight, and 15.8% are wasting. These levels remain high compared to the profiles described in the literature in East Africa and sub-Saharan Africa [8] [9]. Our study highlights the particular concern of

stunting, as it impacts not only children's physical but also cognitive development, with long-term consequences for their future health and productivity. Factors associated with stunting include poverty, food insecurity, low maternal education, low household wealth, rural residence, and large family size [9]. In addition, underweight and wasting are critical indicators of acute malnutrition. A hierarchical analysis conducted in several low- and middle-income African countries estimated the prevalence of underweight at 17.6% and identified several associated factors, including child sex, maternal characteristics, and socioeconomic background [10]. A recent review also highlighted the varying extent of wasting in sub-Saharan Africa across contexts [9]. In terms of dietary practices, the majority of children in our study started complementary feeding at 6 months of age, in line with WHO recommendations. However, multi-country analyses in sub-Saharan Africa show that the overall practice of appropriate complementary feeding remains low, a reminder that compliance with the age of introduction alone does not guarantee adequate feeding. In our series, 60% of children consumed at least four food groups. However, analyses in East Africa show that the proportion of children achieving a minimum acceptable diet remains low in several contexts [11]. Regarding the number of meals, 61.89% of the children ate two meals a day, suggesting that a significant proportion of the children did not reach the minimum recommended frequency. An analysis in sub-Saharan Africa estimated the prevalence of minimum meal frequency at 38.47%, confirming the persistence of a food frequency deficit in the region [12]. Also, snacks were infrequent in our series.

Combining the criteria of dietary diversity and minimum frequency of meals, 49.68% of children have a minimum acceptable diet. Our findings far surpass the results of a study conducted in East Africa, which reported that only 11.56% of children met these criteria, highlighting the persistent challenges in ensuring adequate nutrition [11].

The influence of child sex on malnutrition is reported in several African analyses, where the male sex appears to be more often associated with underweight and stunting [8]. Our results point in the same direction in bivariate analysis, and the protective effect of female sex persists for underweight in multivariate analysis.

The age of the child deserves a careful reading. In our bivariate analysis, the age medians of underweight and wasted children were lower. In contrast, after adjustment, child age was positively associated with underweight and wasting. Studies in sub-Saharan Africa have also shown that the risk of malnutrition varies across age groups, particularly in the second half of life and the 12 - 23-month period [13].

The association between maternal education and stunting observed in bivariate analysis is consistent with the literature. Research from the DRC and East Africa shows that low maternal education is linked to a higher risk of chronic malnutrition in children [8]. This study identified several dietary practices related to nutritional outcomes, including dietary diversity, meal frequency, consumption of certain food groups, minimum acceptable diet adherence, and snack frequency. A study conducted in Tanzania showed that dietary diversity is associated with the

nutritional status of children aged 6 to 23 months [14]. In addition, a review conducted in sub-Saharan Africa found an association between dietary diversity and undernutrition in children aged 6 to 23 months [15].

In our series, a higher minimum frequency of meals was associated with a lower likelihood of being underweight. This result is consistent with multi-country data from sub-Saharan Africa on minimum meal frequency [12] as well as the study conducted in Malawi on appropriate complementary feeding practices [16]. Data on foods of animal origin point in the same direction, and a study in Cambodia showed that the consumption of foods of animal origin and dietary diversity contribute to reducing stunting [17].

A Minimum Acceptable Diet summarizes the overall quality of the complementary diet better than each indicator taken in isolation. In our study, it appears to be protective against underweight and wasting. Multi-country analyses in sub-Saharan Africa have also shown that better adherence to the minimum acceptable diet is associated with better nutritional outcomes in children aged 6 to 23 months [11].

Dietary diversity remains a central lever. In our model, insufficient dietary diversity was associated with wasting. This finding is consistent with the work available in India and sub-Saharan Africa, which shows that a more diversified diet is linked to better growth parameters [1] [14].

Our results on meal frequency also support the interest of interventions focused on infant and young child feeding. Children who received meals more frequently had lower odds of being underweight than those who did not receive a minimum meal frequency. This observation reinforces the importance of IYCF messages on both quantity and regularity of food intake [12].

In contrast, no factors were associated with stunting in the adjusted model. This lack of a significant association can be explained by the multifactorial nature of stunting, which incorporates nutritional, infectious, environmental, and socioeconomic influences over time [14].

The analysis indicates that for underweight, female sex and a minimum acceptable diet serve as protective factors, while increasing child age correlates with higher odds. Regarding wasting, older age and insufficient dietary diversity increase the likelihood, while a minimum acceptable diet remains protective. These findings are consistent with data presented in **Table 4**.

These results are in line with the regional literature, which reports a variability of associations according to the nutritional indicators studied and according to the level of statistical adjustment used [8] [10] [11]. Despite these nuances, our evidence supports the need for targeted interventions to improve the quality and consistency of complementary feeding during the 6 - 23-month window [12].

This study has several limitations. First, its cross-cutting design does not allow for the establishment of a causal relationship between dietary practices and nutritional outcomes. Second, the food variables relied on maternal recall, which exposes them to memory bias and social desirability risk. Third, the survey covered only 10 out of 17 health areas due to insecurity, which limits the generalization of the results to the entire Komanda Health Zone. Finally, the lack of adjustment of

standard errors for the cluster effect requires a cautious interpretation of the regression estimates.

5. Conclusion

The results of this study show a high incidence of stunting, underweight, and wasting among children aged 6 to 23 months in the Komanda Health Zone. A Minimum Acceptable Diet was found to be an important protective factor against underweight and wasting, while insufficient dietary diversity and advancing age were associated with wasting. For underweight, female sex was protective, and a higher minimum frequency of meals was associated with better outcomes. These results argue for strengthening IYCF interventions focused on the quality and regularity of complementary feeding.

Authors' Contributions

D.N.G. conceptualized the study and prepared the manuscript. R.I.B. performed the data analysis. J.L.L. supervised the manuscript writing. All authors contributed to the study design, data collection, critical revision of the manuscript, and approved the final version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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