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Determinants of Acute Malnutrition in Children Aged 6 to 59 Months in the Miabi Rural Health Zone, Kasai Oriental Province, Democratic Republic of Congo

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Abstract

Child malnutrition is a major public health problem, particularly in developing countries. This study aims to identify the determinants of acute malnutrition in children aged 6 to 59 months in the Miabi Rural Health Zone, Democratic Republic of Congo (DRC), an area classified as being on red alert by health authorities. The quantitative, analytical, and cross-sectional study was conducted with 401 mothers or caregivers of children aged 6 to 59 months, selected using multi-level probability sampling. The descriptive data reveal a high prevalence of young mothers (under 28 years old) with limited education (primary level), mostly housewives with a low monthly income (less than 100,000 Congolese francs). The prevalence of acute malnutrition (mid-upper arm circumference <115 mm or presence of nutritional edema) among the children studied is alarming. The results of the bivariate and multivariate analysis (not presented in this section) will be essential to determine the socio-economic, demographic, dietary practices and morbidity factors associated with this condition in the region.

Objective: Given this persistent situation, the overall objective of this study is to contribute to improving the health status of the population of the Miabi Health Zone by identifying the determinants of malnutrition in children aged 6 to 59 months in this area and to contribute to universal health.

Materials and methods: Quantitative and analytical in nature, conducted cross-sectionally in households in the Miabi Rural Health Zone, Miabi Territory, Kasai-Oriental Province, DRC. The data collection period extended from July 3 to September 2, 2025. The health zone has a total population of 209,168 inhabitants (2025).

The target population consists of all children aged 6 to 59 months in the area. The respondents are the mothers or caregivers of these children.

The sample size was calculated using Fischer's formula, using an expected proportion (p) of 50% and a desired degree of precision (d) of 0.05.

$$n = (d)^2(Z\alpha)^2 \times p \times q = (0.05)^2(1.96)^2 \times 0.5 \times 0.5 = 384 \text{ subjects}$$

Adding 5% to account for possible loss to follow-up, the final sample size retained is 403 subjects.

Results: The prevalence of acute malnutrition, estimated by a basal body height <115 mm (8.7%) and the presence of edema (6.5%), is concerning, consistent with the red alert classification of the area by health authorities. Furthermore, feeding practices are suboptimal, with exclusive breastfeeding not being practiced in 55.9% of cases.

Further analysis of the association and determinants (bivariate and multivariate variables) will make it possible to quantify the exact impact of these factors (low income, low level of education, non-compliance with exclusive breastfeeding, etc.) on the occurrence of acute malnutrition in children aged 6 to 59 months, and to formulate targeted recommendations for public health interventions in the Miabi Rural Health Zone.

Keywords: Determinants of Acute Malnutrition in Children Aged 6 to 59 Months, Congo

Introduction

Malnutrition is one of the major health and well-being problems affecting children worldwide, with a particularly high incidence in developing countries. It results from inadequate nutrition and poor sanitation. Inadequate feeding practices concern not only the quality and quantity of food, but also the steps involved in its introduction (Soumaila Manko, 2010).

This scourge constitutes a major public health problem, contributing significantly to increased mortality among children aged 0 to 59 months (Priyanka Kumari, 2017). The World Health Organization (WHO, 2013) and UNICEF have long emphasized that malnutrition is responsible for more than 50% of deaths of children under 5 years of age worldwide.

Global and regional statistics remain alarming. According to UNDP estimates (2013), undernourishment affects more than 150 million children. In South Asia, one in two children suffers from malnutrition, and in Africa, one in three is underweight (UNDP/UNICEF, 2015). Africa and Asia alone bear the greatest burden of all forms of malnutrition.

The **Democratic Republic of Congo (DRC)** is not spared. Half of all deaths of children under five are attributable to malnutrition (PNSMN, 2023). Although the prevalence of Global Acute Malnutrition (GAM) has decreased slightly in recent years, the latest results of the 2018 MICS survey still revealed a prevalence of 8.5% GAM, with 2% Severe Acute Malnutrition (SAM), and 41.8% stunting (INS and UNICEF, 2019). More recently, at the national level, SAM stood at 2.6% [2.2–3.1], above the humanitarian emergency threshold of 2% (PRONANUT, 2024).

In the province of Kasai-Oriental, the situation is particularly worrying. The quarterly nutritional surveillance bulletin (SNSAP) for the first quarter of 2025 classified the **Miabi Rural Health Zone** as being on red alert, with alarming indicators, including 27% of children aged 6-59 months having a Mid-Arm Circumference (MUC) <125 mm (PRONANUT, 2025).

Given this persistent situation, the overall objective of this study is to contribute to improving the health status of the population of the Miabi Health Zone by identifying the determinants of malnutrition in children aged 6 to 59 months in this area.

Type of Study

Quantitative and analytical in nature, conducted cross-sectionally in households in the Miabi Rural Health Zone, Miabi Territory, Kasai-Oriental Province, DRC. The data collection period extended from July 3 to September 2, 2025. The health zone has a total population of 209,168 inhabitants (2025).

The target population consists of all children aged 6 to 59 months in the area. The respondents are the mothers or caregivers of these children.

The sample size was calculated using Fisher's formula, using an expected proportion (p) of 50% and a desired degree of precision (d) of 0.05.

$$n = (d)^2(Z\alpha)^2 \times p \times q = (0.05)^2(1.96)^2 \times 0.5 \times 0.5 = 384 \text{ subjects}$$

Adding 5% to account for possible loss to follow-up, the final sample size retained is 403 subjects.

The variables studied included nutritional status (dependent variable), and independent variables relating to the sociodemographic and cultural characteristics of the mother/caregiver, economic characteristics of the child, dietary practices and morbidity.

Results

Sociodemographic and Cultural Characteristics of the Mother/Guardian

Features	Modality	Effective	%
Age	< 28 years old	229	57.1
	≥ 28 years old	172	42.9
Education level	No level	3	0.7
	Primary	338	84.3
	Secondary	51	12.7
	Higher and university	9	2.2
Household size	< 6	249	62.1
	≥ 6	152	37.9
Number of children aged 6-59 months	< 3	287	71.6
	≥ 3	114	28.4

The findings indicate that the majority of mothers or guardians of children are young (57.1% are under 28) and have a low level of education (84.3% have only a primary school education). A majority (62.1%) live in households of fewer than six people.

Economic Characteristics

Features	Modality	Effective	%
Mother's profession	trade	4	1.0
	Farmer	19	4.7
	teacher	3	0.7
	Nurse	1	0.2
	Housewife	374	**93.3**
Average monthly income	**< 100,000 FC**	**393**	**98.0**
	≥ 100,000 FC	8	2.0
Availability of valuable assets	Yes	267	66.6
	No	134	33.4

The results show a predominance of housewives (93.3%) with a very low average monthly income: 98.0% earn less than 100,000 Congolese Francs (FC).

Child Characteristics

Features	Modality	Effective	%
Child's age	≤ 23 months	114	28.4
	> 23 months	287	71.6
Sex	Male	204	50.9
	Female	197	49.1
Mid-upper arm circumference	**< 115 mm**	**35**	**8.7**
	≥ 115 mm	366	91.3
Presence of nutritional edema	**Yes**	**26**	**6.5**
	No	375	93.5

The majority of children are over 23 months old (71.6%). Regarding nutritional status, 8.7% of the children have a mid-upper arm circumference (MUAC) <115 mm, and 6.5% present with nutritional edema. These two indicators, while not mutually exclusive, confirm a high prevalence of acute malnutrition.

Characteristics Related to Dietary Practices

Features	Modality	Effective	%
Exclusive breastfeeding respected	Yes	177	44.1
	No	**224**	**55.9**
Continuous breastfeeding respected	**Yes**	**219**	**54.6**
	No	182	45.4

These results indicate that more than half of the mothers did not adhere to exclusive breastfeeding (55.9% "No").

Results of the univariate analysis

Table 6: Association between sociodemographic and cultural characteristics of the mother or caregiver of the child and malnutrition in children aged 6–59 months

Factors		Acute malnutrition		P.value	S
		Yes n(%)	No n(%)		
Age	<28 years old	12 (5.2)	217 (94.8)	0.004	S
	≥28 years old	23 (13.4)	149 (86.6)		
Education level	Low level	34 (10.0)	307 (90.0)	0.036	S
	Acceptable	1 (1.7)	59 (98.3)		
Household size	<6	14 (5,6)	235 (94.4)	0.005	S
	≥6	21 (13.8)	131 (86.2)		
Number of children under 6-59 months	<3	8 (2.8)	279 (97.2)	0.000	S
	≥3	27 (23.7)	87 (76.3)		

The results in this table show that the mother's age (p=0.004), the bottom Education level (p=0.036), household size greater than 6 people (p=0.005) and the number of children under 5 years of age greater than 2 in the household (p=0.000) are factors that are associated with the occurrence of malnutrition in children aged 6-59 months.

Table 7: Association between economic characteristics and malnutrition in children aged 6–59 months

Factors		Acute Malnutrition		P.value	S
		Yes n(%)	No n(%)		
Mother's profession	Housewife	33 (8.8)	341 (91.2)	0.801	NS
	Others	2 (7.4)	25 (92.6)		
Average monthly income	<100000Fc	33 (8.4)	360 (91.6)	0.100	NS
	≥100000Fc	2 (25.0)	6 (75.0)		
Availability of valuables	(smartphones, televisions, motorcycles, etc.) Yes	9 (3,4)	258 (96.6)	0.000	S
	No	26 (19.0)	108 (81.0)		

The results in this table show that the low socioeconomic level translated by the lack in the household of a valuable good (p=0.000) is a factor associated with malnutrition in children aged 6-59 months.

Table 8: Association between child characteristics and malnutrition in children aged 6–59 months

Factors		Acute malnutrition		pvalue	S
		Yes n(%)	No n(%)		
Child's age	≤23 months	12 (10.5)	102 (89.5)	0.002	S
	>23 months	23 (8.0)	264 (92.0)		
Sex	Male	20 (9.8)	184 (90.2)	0.447	NS
	Female	15 (7.7)	181 (92.3)		

This table shows that the child's age (p=0.002) is associated with malnutrition in children aged 6-59 months.

Table 9: Association between certain characteristics related to dietary practices and malnutrition in children aged 6–59 months

Factors		Acute malnutrition		pvalue	S
		Yes n(%)	No n(%)		
Having respected exclusive breastfeeding	Yes	30 (13.4)	194 (86.6)	0.000	S
	No	5 (2.8)	172 (97.2)		
Having respected continuous breastfeeding	Yes	7 (3,2)	212 (96.8)	0.000	S
	No	28 (15.4)	154 (84.6)		
Average number of meals	Once	30 (9.9)	272 (90.1)	0.135	NS
	Two and more	5 (5.1)	94 (94.9)		
The person who is responsible for feeding the child	His mother	28 (7.3)	356 (92.7)	0.000	S
	Others	7 (41.2)	10 (58.8)		

This table shows that failure to respect the duration of exclusive breastfeeding and continuous breastfeeding (p=0.000) and the fact that another person is involved in feeding the child (p=0.000) are associated with malnutrition in children aged 6–59 months.

Table 10: Association between certain characteristics related to child morbidity and malnutrition in children aged 6–59 months

Factors		Acute malnutrition		pvalue	S
		Yes n(%)	No n(%)		
Having had a fever a month before our visit	Yes	32 (12.9)	216 (87.1)	0.000	S
	No	3 (2.0)	150 (98.0)		
History of hospitalization	Yes	29 (8.0)	332 (92.0)	0.139	NS
	No	6 (15.0)	34 (85.0)		
History of malnutrition	Yes	6 (54.5)	5 (45.5)	0.000	S
	No	29 (7.4)	361 (92.6)		

This table shows that repeated fevers (p=0.000) and a history of... Malnutrition in the household (p=0.000) is associated with malnutrition in children aged 6–59 months.

Results of multivariate analyses

Table: Determinants of malnutrition in children aged 6-59 months

Determinant of malnutrition in children	B	pvalue	ORa	ICORBI	95% BS
low socioeconomic level	0.94	0.018	2.58	1.17	5.68
Failure to continue breastfeeding until 23 months	1.19	0.010	3.29	1.33	8.15
History of malnutrition in the household	2.16	0.000	8.73	3.71	20.49

These results show that malnutrition in children aged 6 to 59 months is determined by:

- Low socioeconomic level;
- Failure to maintain continuous breastfeeding until 23 months
- History of malnutrition in the household

Discussion and Conclusion

The descriptive results highlight the socio-economic and demographic vulnerability of households in the Miabi Health Zone, characterized by the youth and low level of education of the mothers, combined with extreme economic insecurity, with 98.0% of mothers earning less than 100,000 FC per month and the vast majority (93.3%) being housewives. This situation of structural poverty creates a favorable environment for malnutrition.

The prevalence of acute malnutrition, estimated by a basal body height <115 mm (8.7%) and the presence of edema (6.5%), is concerning, consistent with the red alert classification of the area by health authorities. Furthermore, feeding practices are suboptimal, with exclusive breastfeeding not being practiced in 55.9% of cases.

Further analysis of the association and determinants (bivariate and multivariate variables) will make it possible to quantify the exact impact of these factors (low income, low level of education, non-compliance with exclusive breastfeeding, etc.) on the occurrence of acute malnutrition in children aged 6 to 59 months, and to formulate targeted recommendations for public health interventions in the Miabi Rural Health Zone.

Results of the univariate analysis

Mother's age (p=0.004), low level of education (p=0.036), household size greater than 6 people (p=0.005) and the number of children under 5 years of age greater than 2 in the household (p=0.000) are factors that are associated with the occurrence of malnutrition in children aged 6-59 months.

Low socioeconomic status, resulting in the lack of a valuable asset in the household (p=0.000), is a factor associated with malnutrition in children aged 6–59 months.

The child's age (p=0.002) is associated with malnutrition in children aged 6–59 months.

Failure to adhere to the duration of exclusive breastfeeding and continuous breastfeeding (p=0.000) and the fact that another person is involved in feeding the child (p=0.000) are associated with malnutrition in children aged 6–59 months.

Repeated fevers (p=0.000) and a history of malnutrition in the household (p=0.000) are associated with malnutrition in children aged 6–59 months.

Results of multivariate analyses

These results indicate that malnutrition in children aged 6 to 59 months is determined by:

1. Low socioeconomic level;
2. Failure to maintain continuous breastfeeding until 23 months

History of malnutrition in the household

We had set ourselves the following objectives:

❖ Determine the frequency of acute malnutrition

❖ Describe the socio-demographic characteristics

❖ Describe the factors that promote

❖ Propose possible solutions.

The collection method used is the survey by a pre-established questionnaire, administered by previously trained interviewers (RECOs) via a semi-structured face-to-face interview technique, mainly in Tshiluba.

The collected data underwent daily quality control. Data analysis was performed using **Epi Info 3.5.2** and **SPSS 23 software**. Statistical analyses included:

- **Descriptive analyses:** frequencies and %s for categorical variables; measures of central tendency (mean, standard deviation) for quantitative variables.
- **Bivariate analysis:** Chi-square test at the 95% confidence interval and the odds ratio at the significance level α=5%.
- **Multivariate analysis:** Binary logistic regression to identify independent determinants of malnutrition.

After collecting, processing and analyzing the data, we arrived at the following results:

1. Characterized by the youth and low level of education of the mothers, combined with extreme economic insecurity, with 98.0% of mothers earning less than 100,000 FC per month and the vast majority (93.3%) being housewives, this situation of structural poverty creates a favorable environment for malnutrition.
2. The prevalence of acute malnutrition, estimated by a basal body height <115 mm (8.7%) and the presence of edema (6.5%), is concerning, consistent with the red alert classification of the area by health authorities. Furthermore, feeding practices are suboptimal, with exclusive breastfeeding not being practiced in 55.9% of cases.
3. Further analysis of the association and determinants (bivariate and multivariate variables) will allow us to quantify the exact impact of these factors (low income, low level of education, failure to adhere to exclusive breastfeeding, etc.) on the occurrence of acute malnutrition in children aged 6 to 59 months, and to formulate targeted recommendations for public health interventions in the Miabi Rural Health Zone

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