ORIGINAL ARTICLE

Malnutrition among Pygmy children under five in Bafwasende (DRC), 2025: A cross-sectional study

Étendue de la malnutrition chez les enfants pygmées de moins de cinq ans à Bafwasende (province de Tshopo) en 2025 : Une étude descriptive transversale

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Abstract

Introduction: Malnutrition remains a major public health issue in the Democratic Republic of Congo, particularly affecting marginalized indigenous populations. Socioeconomic, cultural, and environmental factors contribute to their vulnerability. This study aims to identify factors associated with malnutrition among Pygmy children under five years of age in the Bafwasende territory.
Methodology: A cross-sectional descriptive study was conducted among children and their mothers/caregivers in Bafwasende, Tshopo province. Data were collected using KoboCollect and analyzed with SPSS. Nutritional status was assessed using WHO Anthro Z-Scores to evaluate underweight, stunting, and wasting. Descriptive statistics were applied, with absolute and relative frequencies used for categorical variables.
Results: Among 455 children, 28,4% suffer from acute malnutrition(wasting), 69,0% have stunting, and 47,3% have underweight. Children from low-food consumption households, with food expenditures of less than 5,000 CDF, as well as those aged 6 to 11 months, are most at risk. Malnutrition is also more common among children of very young, uneducated, or separated mothers.
Conclusion: The study highlights an alarming situation, requiring targeted interventions adapted to the cultural and socio-economic realities of indigenous peoples to improve their health and nutrition.

Keywords : Malnutrition, Prevalence, Pygmy children, Nutritional status, Tshopo Province

Résumé

Introduction: La malnutrition demeure un problème majeur de santé publique en République Démocratique du Congo, affectant particulièrement les populations autochtones marginalisées. Des facteurs socioéconomiques, culturels et environnementaux contribuent à leur vulnérabilité. Cette étude vise à identifier les facteurs associés à la malnutrition chez les enfants Pygmées de moins de cinq ans dans le territoire de Bafwasende en 2025.
Méthodes: Une étude analytique transversale a été menée auprès des enfants et de leurs mères ou personnes responsables dans le territoire de Bafwasende, province de la Tshopo. Les données ont été collectées via Kobocollect et analysées à l'aide du logiciel SPSS. Le statut nutritionnel a été évalué selon les scores Z de l'OMS (WHO Anthro), en mesurant l'insuffisance pondérale, le retard de croissance et la malnutrition aiguë. Des analyses bivariées et multivariées par régression logistique ont permis d'examiner les associations entre la malnutrition et ses facteurs.
Résultats: Parmi les 455 enfants inclus, trois sur dix souffrent de malnutrition aiguë, sept sur dix présentent une malnutrition chronique, et près de la moitié sont en insuffisance pondérale. Les enfants issus de ménages à faible consommation alimentaire, avec des dépenses alimentaires inférieures à 5 000 CDF, ainsi que ceux âgés de 6 à 11 mois, sont les plus exposés. La malnutrition est également plus fréquente chez les enfants de mères très jeunes, non scolarisées ou séparées.
Conclusion: La situation reste alarmante, nécessitant des interventions ciblées et adaptées aux réalités culturelles et socioéconomiques des pygmées afin d'améliorer leur état nutritionnel et leur santé.

Mots clés: Malnutrition, Prévalence, Enfants de moins de cinq ans, Pygmées, Bafwasende, RDCong

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Introduction

Malnutrition among children under five remains a major public health concern in the Democratic Republic of Congo (DRC)(1), disproportionately affecting vulnerable populations such as Pygmy communities in rural areas. According to the Demographic and Health Survey (DHS, 2024), 45% of children suffer from stunting, 7% from wasting, and 25% from underweight (2). The National Nutrition Survey (ENN, 2023), conducted nationwide, reports similar findings: 47.9% stunting, 8.2% wasting, and 25% underweight (3). While these figures are alarming at the national level, the situation in Bafwasende is even more critical, with indicators surpassing both national and provincial averages (4–6).

In Tshopo province, DHS III (2024) reports 45% stunting, 9% wasting, and 26.5% underweight, closely mirrored by ENN (2023) estimates of 47.2%, 7%, and 26.8%, respectively (2–4). These data highlight a persistent nutritional crisis, especially in remote areas like Bafwasende, where Pygmy children face heightened vulnerability.

Contributing factors include geographic isolation, limited access to health services, extreme poverty, inadequate feeding practices, and social marginalization (4–6). The absence of disaggregated data further impedes targeted interventions, while poor infrastructure and a shortage of qualified personnel constrain the local health system's response capacity (7–10). In light of these challenges, this study aimed to assess the prevalence of stunting, wasting, and underweight among Pygmy children under five in the Bafwasende health zone during 2025.

Methodology

Type of study

This was a descriptive cross-sectional study conducted among Pygmy children under five in the Bafwasende health zone.

Study site

The Bafwasende territory, located in the Tshopo province of the DRC, is the largest in the country, covering 48,482 km² and a population of over 413,000. It is crossed by several rivers and is home to the Kibali, Kikumu, and Kirumbi ethnic groups, as well as the Mbuti pygmies. Agriculture is the main activity, supplemented by fishing and livestock farming. Despite the presence of 50 health facilities, including three hospitals, access to care remains limited, especially in remote areas, where diseases such as malaria and tuberculosis are frequently reported, as documented in the Bafwasende Health Zone Operational Action Plan (PAO ZS Bafwasende, 2024)

Study population and statistical unit

This study targeted mothers or caregivers of Pygmy children under five years of age living in the Bafwasende health zone, selected due to the inaccessibility of neighboring areas. The statistical unit was twofold: the child, for nutritional assessment, and the mother or caregiver, for socioeconomic data. Inclusion criteria required being of Pygmy ethnicity, residing in a selected area, being the mother or caregiver of a child under five years of age, and being present on the day of the survey. All eligible children were assessed regardless of nutritional status. Refusal to provide informed consent was the only exclusion criterion.

Sampling

Size

The sample size was calculated from the formula:

$$n \geq \frac{Z^2_{\alpha} PQ}{d^2} \text{ or } n \geq \frac{Z^2_{\alpha} P(100-P)}{d^2}$$

With: Z α: confidence coefficient = 1.96
n: sample size
p: assumed proportion of the target population having the characteristic studied (Malnutrition), as the prevalence of the territory of Bafwasende is not known, we will use that found in ENN DRC 2023 in Tshopo with a prevalence of stunting which is 47.2%.
So P= 0.472.
q: assumed hidden proportion of the population = 1-p=1-0.472= 0.528
d: the desired degree of precision of 95% (i.e. d= 0.05)
Which gives:

$$\frac{(1.96)^2 * 0.472 * 0.528}{(0.05)^2}$$

= 382 children
To minimize non-response bias and refusals, we increased the sample size by more than 10%, reaching 455 children under five years old.

Sampling technique

A four-stage probability sampling method was used to select participants. First, Bafwasende territory was chosen for its accessibility and concentration of indigenous populations. Second, the Bafwasende Health Zone was selected for security reasons, and three health areas were randomly drawn to ensure representativeness. Third, three exclusively Pygmy villages were identified within these areas, followed by a household listing. Fourth, households with at least one child under five were selected proportionally to the population size of each health area: 185 in Bafwanduo, 125 in Bafwazana, and 145 in Bambodi. The final sample included 455 children.

Study variables

This study describes the extent of malnutrition among Pygmy children under five years of age, considering the sociodemographic characteristics of mothers such as age, marital status, education level, and occupation. Nutritional status was assessed using standardized anthropometric measurements—weight, height, and age—to calculate key indicators: height-for-age (stunting), weight-for-height (wasting), and weight-

for-age (underweight). According to WHO standards, stunting is defined as a height-for-age Z-score below –2 SD, wasting as a weight-for-height Z-score below –2 SD, and underweight as a weight-for-age Z-score below –2 SD. These indicators were analyzed to quantify overall nutritional status (WHO, 2020).

Data collection

The study adopted a rigorous data collection, combining interviews via an adapted questionnaire and anthropometric observations (weight, height, MUAC) recorded on Kobocollect. After validation of the protocol and authorization from the ethics committee, the interviewers were selected for their experience in nutritional surveys, then trained before a pre-test in a neighboring area. The collection took place over 14 days, with 6 pairs of interviewers carrying out 70 household interviews in one week. The information collected covered the sociodemographic characteristics of mothers and children. The assessment of anthropometric measurements was carried out with SECCA electronic scales, wooden height rods, and MUAC tapes for MUAC. To ensure comprehension of the questionnaire, oral translation into Lingala and Swahili was provided as needed.

Data processing and analysis

Data were collected via Kobocollect and analyzed with SPSS.25 while nutritional status was determined using WHO Anthro software based on Z-Score. Underweight was measured by weight-for-age index, chronic malnutrition by height-for-age index, and acute malnutrition by weight-for-height index, with a threshold of Z-score ≤ -2 for global acute malnutrition (GAM) and Z-score ≤ -3 for severe acute malnutrition (SAM). Analysis of the results was performed using descriptive statistical techniques with absolute and relative frequencies for categorical data, as well as indicators such as mean, standard deviation, median, and interquartile range according to the data distribution. The sociodemographic characteristics of the respondents were described, including age, education level, marital status, main occupation and food expenditure.

Ethical Considerations

The study was conducted in strict compliance with ethical standards, with the approval of the Ethics Committee of the Kinshasa School of Public Health under number ESP/CE/58/2025 and the relevant administrative authorities. Data confidentiality was ensured, and participants gave their informed consent prior to any data collection. In case of detected malnutrition, a referral to a healthcare facility was planned for appropriate care. All categories of respondents (mothers/caregivers and heads of household) were included, with the main objective of improving the nutritional status of children under five in the Bafwasende territory.

Results

Sociodemographic characteristics of mothers and guardians of children under five years of age

Table 1. Distribution of respondents according to their sociodemographic characteristics

Variables	n=455	%
Health area		
BAFWANDUO	180	39.6
BAFWAZANA	167	36.7
BAMBODI	108	23.7
Age of the respondent(years)		
15-19	26	5.7
20-24	89	19.6
25-29	84	18.5
30-34	99	21.8
35-39	67	14.7
40-44	40	8.8
45-49	35	7.7
>=50	15	3.3
Highest level of education		
Without level	248	54.5
Primary not completed	135	29.7
Primary completed	32	7.0
Secondary not completed	29	6.4
Secondary school completed	8	1.8
Higher/University not completed	2	0.4
Higher/University completed	1	0.2
Marital Status		
Bachelor	57	12.5
Divorced/Separated	30	6.6
Married (or in a union)	327	71.9
Widower	41	9.0
Main occupation		
Self-employed	167	36.7
Private sector employee	11	2.4
Teacher (primary or secondary)	2	0.4
Public agent	1	0.2
Unemployed	274	60.2
Number of people/Household		
< 5	239	52.5
>=5	216	47.5
Daily food expenses		
Less than 5,000 CDF	166	36.5
5,000 to < 10,000 CDF	251	55.2
10,000 to < 15,000 CDF	34	7.5
15,000 to < 20,000 CDF	4	0.9

This table shows that 39.6% of respondents live in Bafwanduo, followed by 36.7% in Bafwazana. The majority of respondents (60%) are aged between 20 and 34 years. Over half (54.5%) have no formal education, while only 0.6% have reached higher education.

Most respondents (71.9%) are married or in a union. Unemployment is widespread, affecting 60.2% of the population. Additionally, 52.5% of households have fewer than five members, and 55.2% spend between 5,000 and 10,000 CDF per day on food, reflecting notable economic vulnerability

Prevalence of different forms of malnutrition in children under five years of age in Bafwasende health zone

Table 2. Prevalence of different forms of malnutrition in children under five years of age in Bafwasende health zone

Indicator	n	%	95% CI (in %)
Acute Malnutrition			
No acute malnutrition	326	71.6	[67.5; 75.7]
Moderate acute malnutrition	38	8.4	[5.8; 11.0]
Severe acute malnutrition	91	20.0	[16.3; 23.7]
Global acute malnutrition	129	28.4	[24.3; 32.5]
Stunting			
No Stunting	141	31.0	[26.8; 35.2]
Moderate stunting	90	19.8	[16.1; 23.5]
Severe stunting	224	49.2	[44.6; 53.8]
Global stunting	314	69.0	[64.8; 73.2]
Underweight			
No underweight	240	52.7	[48.1; 57.3]
Moderate underweight	107	23.5	[19.6; 27.4]
Severe underweight	108	23.7	[19.8; 27.6]
Global underweight	215	47.3	[42.7; 51.9]

This table shows that 28.4% of children under five suffer from global acute malnutrition, with 20.0% presenting severe acute malnutrition. The estimated confidence interval for global acute malnutrition ranges from 24.3% to 32.5%. Chronic malnutrition, measured through stunting, affects 69.0% of children, including 49.2% with severe stunting. Regarding underweight, 47.3% of children are affected, comprising 23.7% with severe underweight.

Child malnutrition is particularly severe in the health areas of Bafwanduo and Bafwazana, with the highest prevalence observed among children aged 24 to 59 months. Most mothers or caregivers are poorly educated, unemployed, and face extreme food insecurity. Acute malnutrition, chronic malnutrition (stunting), and underweight are all significantly associated with alcohol consumption by mothers or caregivers. Daily food expenditures are low, and nutritional insecurity is widespread across households. These patterns of malnutrition highlight profound socioeconomic and structural vulnerabilities affecting the Pygmy communities in the region.

Discussion

Nutritional Status Overview

The 2025 study conducted in the Bafwasende Health Zone reveals an exceptionally severe nutritional crisis among Pygmy children under five years of age. Of the 455 children assessed, 28.4% were affected by global acute malnutrition (GAM), including 20.0% with severe acute malnutrition (SAM)—figures that far exceed national and provincial benchmarks. According to the Demographic and Health Survey (DHS, 2024), 45% of children under five in the DRC suffer from chronic malnutrition, 7% from wasting, and 25% from underweight (6). The National Nutrition Survey (ENN, 2023) reports similar trends: 47.9% stunting, 8.2% acute malnutrition, and 25% underweight—still notably lower than the rates observed in Bafwasende (5–7). At the provincial level in Tshopo, DHS III indicates 45% stunting, 9% wasting, and 26.5% underweight, while ENN reports 47.2%, 7%, and 26.7%, respectively. These comparisons highlight the gravity of the situation in Bafwasende, where malnutrition rates surpass both national and provincial averages. Additional contrast comes from Befale, where Bernard-Kennedy Nkongolo (11) reported in 2022 that 2.5% of children aged 6–59 months suffered from SAM, 11.3% from GAM, 45% from stunting, and 24.7% from underweight. In light of these findings, the nutritional situation in Bafwasende stands out as particularly critical and calls for urgent, targeted interventions.

This alarming vulnerability stems from the deep socioeconomic marginalization of Pygmy communities, compounded by limited access to health and education services and a reliance on poorly diversified food sources (4,11). The consequences of intergenerational malnutrition are profound, impairing children's physical growth and cognitive development (12), and threatening their long-term potential. In response to this emergency, targeted community-based actions are essential—such as nutrition education (3,13), improved access to healthcare and diversified diets (4,13), and economic support for the most vulnerable households. Sustainable solutions must also include structural interventions like promoting girls' education, empowering women (14–16), and implementing culturally sensitive nutrition programs. To be effective and embraced locally, public health policies must be adapted to the cultural realities of Pygmy populations, ensuring relevance, ownership, and long-term impact (4,15).

Age-Related Vulnerability and Biological Risk Factors

Children aged 24 to 59 months were disproportionately affected across all malnutrition indicators in Bafwasende, a trend that is biologically plausible given the vulnerabilities of this age group. This period marks the transition from exclusive breastfeeding to complementary feeding, which in marginalized settings like Bafwasende often lacks both nutritional diversity and adequacy. During this critical phase of rapid growth, children face increased metabolic demands and heightened exposure to infections, making them more susceptible to nutrient deficiencies and growth faltering (12,17). The absence of fortified foods and inadequate weaning practices further exacerbate these risks, especially in remote communities with limited access to health and nutrition services.

Table 3. Factors associated with these various forms of malnutrition in pygmy children under 5 years of age in the Bafwasende health zone according to the Chi-square test

Variables	Global Acute Malnutrition		Global Chronic Malnutrition		Global Underweight	
	No (n=326) n(%)	Yes (n=129) n(%)	No (n=141) n(%)	Yes (n=314) n(%)	No (n=240) n(%)	Yes (n=215) n(%)
Health area						
BAFWANDUO	123 (37.7)	57 (44.2)	62 (44.0)	118 (37.6)	100 (41.7)	80 (37.2)
BAFWAZANA	122 (37.4)	45 (34.9)	49 (34.8)	118 (37.6)	83 (34.6)	84 (39.1)
BAMBODI	78 (23.9)	26 (20.2)	29 (20.6)	75 (23.9)	54 (22.5)	50 (23.3)
Khi2	2.58		1.62		2.03	
Age of the respondent (years)						
15-19	17 (5.2)	9 (7.0)	12 (8.5)	14 (4.5)	13 (5.4)	13 (6.0)
20-24	62 (19.0)	27 (20.9)	24 (17.0)	65 (20.7)	48 (20.0)	41 (19.1)
25-29	60 (18.4)	24 (18.6)	24 (17.0)	60 (19.1)	37 (15.4)	47 (21.9)
30-34	72 (22.1)	27 (20.9)	30 (21.3)	69 (22.0)	64 (26.7)	35 (16.3)
35-39	47 (14.4)	20 (15.5)	20 (14.2)	47 (15.0)	34 (14.2)	33 (15.3)
40-44	32 (9.8)	8 (6.2)	16 (11.3)	24 (7.6)	19 (7.9)	21 (9.8)
45-49	24 (7.4)	11 (8.5)	11 (7.8)	24 (7.6)	17 (7.1)	18 (8.4)
≥ 50	12 (3.7)	3 (2.3)	4 (2.8)	11 (3.5)	8 (3.3)	7 (3.3)
Khi2	3.72		5.04		4.63	
Level of study						
Without level	184 (56.4)	64 (49.6)	86 (61.0)	162 (51.6)	143 (59.6)	105 (48.8)
Primary not completed	94 (28.8)	41 (31.8)	32 (22.7)	103 (32.8)	66 (27.5)	69 (32.1)
Primary completed	22 (6.7)	10 (7.8)	12 (8.5)	20 (6.4)	16 (6.7)	16 (7.4)
Secondary not completed	17 (5.2)	12 (9.3)	9 (6.4)	20 (6.4)	11 (4.6)	18 (8.4)
Secondary school completed	7 (2.1)	1 (0.8)	1 (0.7)	7 (2.2)	2 (0.8)	6 (2.8)
Higher education not completed	2 (0.6)	0 (0.0)	1 (0.7)	1 (0.3)	2 (0.8)	0 (0.0)
Higher education completed	0 (0.0)	1 (0.8)	0 (0.0)	1 (0.3)	0 (0.0)	1 (0.5)
Khi2	6.41		7.85		6.94	
Main occupation						
Self-employed	127 (39.0)	40 (31.0)	53 (37.6)	114 (53.0)	95 (39.6)	72 (33.5)
Private sector employee	9 (2.8)	2 (1.6)	4 (2.8)	7 (3.3)	8 (3.3)	3 (1.4)
Teacher / Public agent	2 (0.6)	1 (0.8)	1 (0.7)	2 (0.9)	1 (0.4)	2 (0.9)
Unemployed	188 (57.7)	86 (66.7)	83 (58.9)	92 (42.8)	136 (56.7)	138 (64.2)
Khi2	4.97		3.63		5.12	
Marital status						
Bachelor	43 (13.2)	14 (10.9)	18 (12.8)	39 (12.4)	31 (12.9)	26 (12.1)
Divorced/Separated	23 (7.1)	7 (5.4)	8 (5.7)	22 (7.0)	17 (7.1)	13 (6.0)
Married (or in a union)	227 (69.6)	100 (77.5)	102 (72.3)	225 (71.7)	172 (71.7)	155 (72.1)
Widower	33 (10.1)	8 (6.2)	13 (9.2)	28 (8.9)	20 (8.3)	21 (9.8)
Khi2	2.74		2.95		2.88	
Number of people per household						
< 5 people	170 (52.1)	69 (53.5)	75 (53.2)	164 (52.2)	123 (51.3)	116 (54.0)
≥ 5 people	156 (47.9)	60 (46.5)	66 (46.8)	150 (47.8)	117 (48.8)	99 (46.0)
Khi2	0.08		0.01		0.12	
Daily food expenses						
Less than 5,000 CDF	120 (36.8)	46 (35.7)	52 (36.9)	114 (36.3)	96 (40.0)	70 (32.6)
5,000 to < 10,000 CDF	177 (54.3)	74 (57.4)	73 (51.8)	178 (56.7)	122 (50.8)	129 (60.0)

Table 3. Factors associated with these various forms of malnutrition in pygmy children under 5 years of age in the Bafwasende health zone according to the Chi-square test

Variables	Global Acute Malnutrition		Global Chronic Malnutrition		Global Underweight	
	No (n=326) n(%)	Yes (n=129) n(%)	No (n=141) n(%)	Yes (n=314) n(%)	No (n=240) n(%)	Yes (n=215) n(%)
10,000 to < 15,000 CDF	26 (8.0)	8 (6.2)	15 (10.6)	19 (6.1)	20 (8.3)	14 (6.5)
15,000 to < 20,000 CDF	3 (0.9)	1 (0.8)	1 (0.7)	3 (1.0)	2 (0.8)	2 (0.9)
Khi2	0.65		0.58		0.49	
Gender of the child						
Female	158 (48.5)	60 (46.5)	69 (48.9)	149 (47.5)	111 (46.3)	107 (49.8)
Male	168 (51.5)	69 (53.5)	72 (51.1)	165 (52.5)	129 (53.8)	108 (50.2)
Khi2	0.2		0.13		0.31	
Child's age category						
0-5 months	43 (13.2)	17 (13.2)	14 (9.9)	46 (14.6)	30 (12.5)	30 (14.0)
6-11 months	34 (10.4)	10 (7.8)	11 (7.8)	33 (10.5)	21 (8.8)	23 (10.7)
12-23 months	70 (21.5)	29 (22.5)	26 (18.4)	73 (23.2)	54 (22.5)	45 (20.9)
24-59 months	179 (54.9)	73 (56.6)	90 (63.8)	162 (51.6)	135 (56.3)	117 (54.4)
Khi2	0.03		1.95		1.58	
Mother's smoking						
No	212 (65.0)	91 (70.5)	90 (63.8)	213 (67.8)	154 (64.2)	149 (69.3)
Yes	114 (35.0)	38 (29.5)	51 (36.2)	101 (32.2)	86 (35.8)	66 (30.7)
Khi2	1.2		0.88		1.24	
Maternal alcohol consumption						
No	134 (41.1)	52 (40.3)	61 (43.3)	125 (39.8)	98 (40.8)	88 (40.9)
Yes	192 (58.9)	77 (59.7)	80 (56.7)	189 (60.2)	142 (59.2)	127 (59.1)
Khi2	0.02		0.01		0.001	
Household Food Consumption Score (HFC)						
Poor	27 (8.3)	21 (16.3)	16 (11.3)	32 (10.2)	25 (10.4)	23 (10.7)
Limit	198 (60.7)	84 (65.1)	96 (68.1)	186 (59.2)	145 (60.4)	137 (63.7)
Adequate	101 (31.0)	24 (18.6)	29 (20.6)	96 (30.6)	70 (29.2)	55 (25.6)
Khi2	6.94		8.36		7.51	

These factors collectively explain the elevated prevalence of malnutrition observed in this age bracket and underscore the urgency of targeted interventions.

Socioeconomic and Structural Determinants of Malnutrition

The high prevalence of malnutrition in Bafwasende is closely linked to maternal and household-level vulnerabilities. In this study, 54.5% of mothers had no formal education and 60.2% were unemployed, while 36.5% of households reported daily food expenditures below 5,000 CDF, indicating widespread food insecurity. Alcohol consumption among caregivers was also associated with increased malnutrition risk. These findings are consistent with regional studies (Black et al., 5; Kayembe et al., 9), which highlight the role of poverty, low maternal education, and inadequate feeding practices in shaping child nutritional outcomes. The concentration of cases in Bafwanduo and Bafwazana suggests geographic disparities in access to essential services. Beyond individual factors, Pygmy communities in Bafwasende face systemic exclusion, geographic isolation, and limited access to healthcare, education, and economic opportunities (6,8,10,18). Their dependence on poorly diversified food sources and the absence of culturally adapted health interventions further exacerbate their nutritional vulnerability. Compared to other indigenous populations in sub-Saharan Africa, the situation in Bafwasende is particularly severe and demands urgent attention.

Tackling malnutrition in Bafwasende demands multi-sectoral, culturally adapted interventions. Key actions include nutrition education, improved healthcare access, diversified diets, and economic support. Long-term strategies—such as girls' education, women's empowerment (14–16), and community nutrition programs—are vital to break intergenerational cycles. Public health policies must reflect Pygmy realities to ensure impact and ownership (4,15). Future research should consider seasonal food variation, anthropometric measurement errors, and cross-sectional design limits

to strengthen evidence-based responses in marginalized settings.

Strengths and Limitations of the Study

This study offers several strengths. It is based on recent, community-specific data from a highly vulnerable and understudied population—Pygmy children in the Bafwasende Health Zone. The analysis distinguishes clearly between different forms of malnutrition: severe acute, global acute, chronic (stunting), and underweight, as presented in Table 2, allowing for a nuanced understanding of the nutritional challenges in this context.

However, the study also has limitations. Its cross-sectional design prevents the establishment of causal relationships between risk factors and malnutrition outcomes. Recall bias and social desirability bias may have influenced responses from mothers or caregivers, particularly regarding sensitive behaviors such as alcohol consumption or feeding practices. Measurement error is possible, especially in anthropometric data collection under field conditions. Additionally, the study did not account for seasonal variations in food availability, which may affect the prevalence of malnutrition and limit the generalizability of findings beyond the survey period. Finally, the focus on a specific ethnic group limits extrapolation to other populations or regions.

Despite these limitations, the study provides a robust foundation for designing targeted, culturally appropriate interventions and for guiding future longitudinal research in indigenous settings.

Conclusion

This study reveals critical malnutrition among Pygmy children in Bafwasende, driven by deep socioeconomic disparities. To break this cycle, interventions must include culturally adapted nutrition programs, strengthened maternal education, and economic support for vulnerable households. Integrating Pygmy communities into national nutrition strategies and tailoring public health efforts to local realities will enhance impact. Continued monitoring and targeted research are essential to guide responsive, evidence-based actions.

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