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Determinants of Malnutrition and Community-Based Prevention Strategies Among Children Under Five in the Kimbanseke Health Zone, City-Province of Kinshasa, Democratic Republic of the Congo (DRC).

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ABSTRACT

The overall objective of this study was to identify the determinants and community-based prevention strategies for malnutrition among children under five years of age in the Kimbanseke Health Zone in the city-province of Kinshasa (DRC).

This was a descriptive, cross-sectional study with an analytical focus, conducted among 449 mothers of children aged 0 to 59 months who attended preschool health clinics in the Kimbanseke and Baumbu health areas within the Kimbanseke Health Zone.

The results show that multivariate analysis identified four factors independently associated with nutritional status: age-appropriate immunization (ORa = 0.200; 95% CI: 0.096–0.417; $p < 0.001$) and handwashing before meal preparation (ORa = 0.452; 95% CI: 0.275–0.744; $p < 0.002$), recent respiratory infections (ORa = 1.838; 95% CI: 1.124–3.005; $p < 0.015$), and treating water before consumption (ORa = 1.765; 95% CI: 1.045–2.982; $p < 0.034$) are factors associated with an increased risk of malnutrition.

Ultimately, this study shows that childhood malnutrition is a multifactorial phenomenon that requires an integrated community-based approach. It appears essential to strengthen the promotion of exclusive breastfeeding, nutritional education for mothers, dietary diversification, routine vaccination, the prevention and management of infections, as well as hygiene and sanitation practices. The involvement of families, health facilities, and community stakeholders is a key driver for sustainably improving the nutritional status of children under five years of age

Keywords: Factors, Determinants, Strategies, Prevention, Malnutrition, children.

1. INTRODUCTION

Malnutrition is a major global public health problem, particularly affecting children under five years of age. According to the World Health Organization (WHO, 2020), it accounts for nearly half of all deaths in this age group worldwide. The prevalence of chronic malnutrition is particularly high in sub-Saharan Africa, due to adverse socioeconomic factors, inappropriate dietary practices, and limited access to quality health care. In the Democratic Republic of the Congo (DRC), malnutrition represents a health crisis affecting a significant portion of the child population, thereby impacting their physical, cognitive, and socioeconomic development.

Globally, despite progress made in recent decades, child malnutrition remains a major concern. The United Nations Children's Fund (UNICEF, 2023) estimates that millions of children still suffer from stunting and wasting, thereby compromising their physical, cognitive, and social development. Malnutrition is also associated with a significant increase in child morbidity and mortality, contributing to nearly half of all deaths among children under five in developing countries (Black et al., 2013).

According to the FAO (2023), several countries in the region continue to report high rates of chronic and acute malnutrition among young children. This situation is even more critical in certain rural areas where access to health services, safe drinking water, and a varied diet remains limited.

In the Democratic Republic of the Congo (DRC), child malnutrition poses a major challenge to the public health system. Despite the country's abundance of natural resources and agricultural potential, a significant proportion of children suffer from various forms of malnutrition. According to the Demographic and Health Survey (DHS-DRC, 2018), stunting still affects a considerable number of children under five, reflecting persistent nutritional deficiencies. Socioeconomic factors, inadequate dietary practices, recurrent infectious diseases, and shortcomings in community awareness programs are among the main causes of this situation.

In response to this issue, community-based prevention strategies appear to be essential approaches for reducing the prevalence of childhood malnutrition. These strategies rely on the active involvement of communities in promoting

The city of Kinshasa, capital of the Democratic Republic of Congo, is experiencing rapid population growth accompanied by numerous socioeconomic challenges. Although it is considered the country's main economic hub, a significant proportion of its population lives in precarious conditions characterized by unemployment, low incomes, food insecurity, and limited access to basic social services. These conditions particularly affect young children, who have high nutritional needs.

Among Kinshasa's various health zones, the Kimbanseke health zone stands out for its high population density and the severity of the socioeconomic problems faced by households. Many families live in neighborhoods where health infrastructure is inadequate and access to safe drinking water and a balanced diet remains difficult. This situation exposes children to an increased risk of malnutrition.

2. RESEARCH QUESTION

In light of the above, we ask the following question: What are the determinants of malnutrition among children under five, and what community-based prevention strategies are being implemented in the Kimbanseke health zone in Kinshasa?

3. HYPOTHESIS

As a preliminary answer to the research question, we believe that malnutrition among children under five in the Kimbanseke health zone is influenced by adverse socioeconomic factors, inadequate dietary practices, and insufficient community-based prevention strategies.

4. GENERAL OBJECTIVE

The general objective of the study was to identify the determinants and community-based prevention strategies for malnutrition among children under five in the Kimbanseke Health Zone, in the city-province of Kinshasa (DRC).

5. METHODOLOGICAL APPROACH

This was a descriptive, cross-sectional study with an analytical focus. The study was conducted using a non-probability convenience sample consisting of 449 mothers with children aged 0 to 59 months who attended Preschool Clinics (CPS) in the two health areas (Kimbanseke and Baumbu) within the Kimbanseke Health Zone.

6. RESULTS

6.1 Descriptive Results

The descriptive results are presented according to the sociodemographic characteristics of the surveyed mothers and children, their nutritional status, household economic conditions, and dietary practices. These results are illustrated in the following tables and figures.

Table 1: Distribution of surveyed mothers by sociodemographic characteristics

Parameters (n=449)	Categories	n(%)	Median (Q25–Q75)
1 Age (years)			28(21–32)
	< 25	183 (40.8)	
	≥ 25	266 (59.2)	
2 Relationship			
	Mother	374 (83.3)	
	Father	10 (2.2)	
	Guardian	33(7.3)	
	Grandparent	32(7.1)	
3 Educational Level			
	Illiterate	84(18.7)	
	Elementary	81(18)	
	Secondary	147(32.7)	
	Higher Education/University	137(30.5)	
4 Occupation			
	No occupation	126 (28.1)	
	Self-employed	139(31)	
	Civil servant	96(21.4)	
	Female employee	88(18.6)	
5 Marital status			
	Single	99(22)	
	Married	155(34.5)	
	Widowed	54(12)	
	Divorced	45(10)	
	Living with a partner	96(21.4)	

Table 1 shows that 59.2% of respondents were over 25 years old, with a median age of 28 (21–32) years, and that in 83.3% of cases, the relationship to the child was that of the child's biological mother. In terms of educational attainment, 32.7% of respondents had a high school education, followed by 30.5% who had a college or university education.

In terms of employment, 31% of respondents were self-employed.
Regarding marital status, 34.5% of respondents were married.

Table 2: Distribution of Children by Sociodemographic Characteristics

Parameters (n=449)	Categories	n(%)	Median (Q25–Q75)
1 Child's gender			
	Male	217 (48.3)	
	Female	232	
2 Age (months)			9 (5–12)
	< 12	341 (75.9)	
	≥ 12	108(24.1)	
3. Birth Order			
	Firstborn	139(31)	
	Second	113(25.2)	
	Third	92(20.5)	
	Fourth or Higher	105 (23.4)	
4 The child was born at term			
	No	130(29)	
	Yes	319(71)	
5 Birth weight is known			
	No	184(41)	
	Yes	261(58.1	
6 Birth weight (g)			3000 (2500–3800)
	< 3	324	
	≥ 3	125	
7 Household size (people)			6(5–8)
	≥6	251 (55.9)	
	< 6	198 (44.1)	
8 Number of children under 5			2(1–2)
	< 2	411(91.5)	
	≥ 2	38(8.5)	

Table 2 shows a slight predominance of females, accounting for 51.7% of the sample. Furthermore, 75.9% of the children were under 12 months of age, with a median age of 9 months and an interquartile range of 5 to 12 months.

Regarding birth order, 31% of the children were firstborns, followed by secondborns (25.2%).

Regarding birth characteristics, 71% of the children were born at term. Birth weight was reported for 58.1% of the children, with a median birth weight of 3,000 g and an interquartile range of 2,500–3,800 g.

Furthermore, the median household size was 6 people, with an interquartile range of 5–8 people, and more than half of the children (55.9%) lived in households with at least 6 people. Regarding the number of children under five per household, the vast majority of respondents (91.5%) belonged to households with fewer than two children in this age group.

Table 3: Distribution of Children by Nutritional Status

Parameter (n=449)	Category	n(%)
Nutritional status		
	Poor nutritional status	309 (68.8)
	Good status	140 (31.2)

Table 3 shows that 31.2% of respondents were malnourished

Table 4: Distribution of Households by Economic Factors

Parameters (n=449)	Categories	n(%)	Mean ± Standard Deviation
Monthly income (in dollars)			433.05 ± 11.62
	< 200	136 (30.3)	
	≥ 200	313 (69.7)	
Household income meets food needs			
	No	134 (29.8)	
	Yes	315 (70.2)	
We have experienced a period of food shortages over the past 12 months			
	No	265(59)	
	Yes	184(41)	
The household receives food assistance			
	No	259 (57.7)	
	Yes	190 (42.3)	

Table 4 shows that 69.7% of respondents had a monthly income of more than $200, 41% had experienced a period of food insecurity in the past 12 months, and 42.3% of households received food assistance.

Table 5: Distribution of Respondents by Eating Habits

Parameters	Categories	n(%)
Child was breastfed		
	No	18(4)
	Yes	431(96)
Exclusive breastfeeding was maintained during the first six months		
	No	284(63.3)
	Yes	165 (36.7)
Number of meals per day		
	1 to 2 meals	178 (39.6)
	3 meals	131 (29.2)
	≥4 meals	140(31.2)
Child regularly eats these foods		
	No	88 (19.6)
	Yes	361 (80.4)

Table 5 shows that 96% of the children were breastfed, and of those, 36.7% were exclusively breastfed.

Regarding meals, 39.6% of the children ate 1 to 2 meals per day. Regarding food intake, 80.4% of the mothers surveyed reported that their children consumed the listed foods.

Figure 1 below shows that fruits (59.3%), powdered milk (68.1%), and meat/fish (43.2%) were the foods most commonly consumed by the children surveyed.

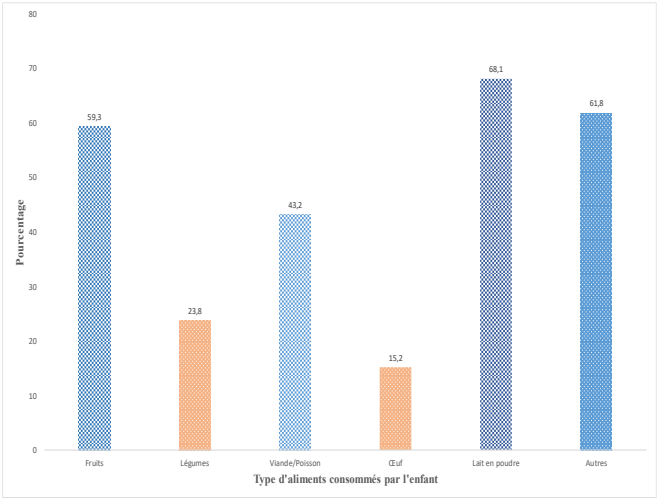


Figure 1: Types of Food Consumed

6.2 Bivariate Results

This section presents the results of the bivariate analysis aimed at examining the associations between the children's sociodemographic characteristics, household socioeconomic conditions, dietary practices, and the children's nutritional status.

Table 6: Analysis of the relationship between children diagnosed with malnutrition and community-based strategies for preventing malnutrition

Parameters	Categorie	Nutritional status		Chi-Square Test Test	p-Value
		Poor (309)	Good (140)		
		n(%)	n(%)		
1 Child was breastfed				3.52	0.045
	No	16 (88.9)	2 (11.1)		
	Yes	293 (68.0)	138(32.0)		
2 Exclusive breastfeeding practiced during the first six months				0.563	0.461
	No	199(70.1)	85 (29.9)		
	Yes	110 (66.7)	55(33.3)		
3 Number of meals per day				2.586	0.275
	1 to 2 meals	126 (70.8)	52 (29.2)		
	3 Meals	83(63.4)	48(36.6)		
	≥ 4 meals	100(71.4)	40(28.6)		
4 Child eats regularly foods				6,021	0.015
	No	51(58)	37(42)		
	Yes	258(71.5)	103(28.5)		

Table 6 indicates a statistically significant relationship (P<0.05) between breastfeeding, regular food consumption, and having a child diagnosed with malnutrition. This means that breastfeeding and food consumption influence whether a child is diagnosed with malnutrition.

6.3 Multivariate Results

This section presents the results of the multivariate analysis aimed at identifying factors independently associated with the occurrence of malnutrition among children aged 0 to 59 months.

Table 7: Multivariate analysis of the relationship between children diagnosed with malnutrition and community-based malnutrition prevention strategies

Parameters	Adjusted OR	95% CI		p-Value
		Lower	Upper	
Child has been fully vaccinated according to their age	0.200	0.096	0.417	0.0001
Child has had recent respiratory infections	1.838	1.124	3.005	0.015
Water treatment prior to consumption	1,765	1,045	2.982	0.034
Handwashing before meal preparation	0.452	0.275	0.744	0.002

Table 7 shows that complete vaccination of children (ORa = 0.200; 95% CI: 0.096–0.417; p < 0.001) and handwashing before meal preparation (ORa = 0.452; 95% CI: 0.275–0.744; p < 0.002) protect children against the onset of malnutrition. Meanwhile, respiratory infections (ORa = 1.838; 95% CI: 1.124–3.005; p < 0.015) and treating water before meal preparation (ORa = 1.765; 95% CI: 1.045–2.982; p < 0.034) are factors associated with an increased risk of malnutrition

7. DISCUSSION OF THE RESULTS

The results show that the mothers surveyed had a median age of 28 years, and that the majority were biological mothers (83.3%). Educational attainment was primarily at the secondary level (32.7%) or higher (30.5%), while 18.7% were illiterate. Socioeconomically, self-employed individuals accounted for 31% of the participants, and 28.1% were unemployed. These characteristics may influence feeding practices, child care, and access to health services. These findings are consistent with the work of Burns et al. (2016) and Luzingu et al. (2022), who highlight the influence of maternal and socioeconomic factors on infant nutrition.

Regarding the children, 75.9% were under 12 months old, with a median age of 9 months. The median household size was six people, and 55.9% of the children lived in households of this size or larger. These factors are important because the first years of life are a particularly vulnerable period for nutritional deficiencies. According to Black et al. (2013), undernutrition during the first two years of life can cause lasting impairment of growth and physical and cognitive development.

Furthermore, 68.8% of children were malnourished, compared with 31.2% who were well-nourished. This proportion represents a major public health concern. It is consistent with the situation in the DRC, where Luzingu et al. (2022) reported prevalences of 42.7% for stunting, 21.9% for underweight, and 8.2% for wasting. These findings confirm the serious nature of childhood malnutrition and the need to strengthen prevention and management strategies.

The economic analysis reveals a relatively mixed picture. Although 69.7% of households had a monthly income of at least $200 and 70.2% believed they could meet their food needs, 41% had experienced a period of food shortage in the past twelve months. These results show that the availability of income does not necessarily guarantee sustainable food security. According to Bhutta et al. (2008), preventing malnutrition requires addressing immediate, underlying, and structural determinants, including food security, caregiving practices, and access to health services.

Regarding feeding practices, 96% of children had been breastfed, but only 36.7% had been exclusively breastfed during the first six months. This shortfall warrants special attention given the nutritional and immunological benefits of breastfeeding demonstrated by Victora et al. (2016). It also aligns with the observations of Burns et al. (2016) in South Kivu, who identified several socioeconomic and cultural barriers to optimal breastfeeding and complementary feeding practices.

Furthermore, meal frequencies varied: 39.6% of children received one to two meals per day, 29.2% received three meals, and 31.2% received at least four meals. Powdered milk (68.1%), fruits (59.3%), and meat or fish (43.2%) were among the most commonly consumed foods. However, meal frequency alone does not guarantee adequate nutrition. The WHO (2023) recommends a diverse, nutritious, and age-appropriate complementary diet starting at six months of age, while continuing breastfeeding.

Thus, improving child nutrition requires strengthening nutrition education, dietary diversification, optimal

breastfeeding practices, and strategies to combat household food insecurity.

The bivariate analysis revealed a statistically significant association between having been breastfed and children's nutritional status (p = 0.045). However, no significant association was observed with exclusive breastfeeding during the first six months (p = 0.461) or with the number of daily meals (p = 0.275). Regular food consumption also showed a significant association (p = 0.015), but with an unexpected trend, as poor nutritional status was more common among children reported to consume food regularly. This observation could be explained by the inadequate nutritional quality of the food, infections, or special dietary attention given to children who were already malnourished. The studies by Black et al. (2013) and Burns et al. (2016) underscore the importance of simultaneously considering dietary, health, and socioeconomic factors.

The multivariate analysis identified four factors independently associated with poor nutritional status:

- Complete vaccination according to age was associated with a reduced odds ratio for poor nutritional status (ORa = 0.200; 95% CI: 0.096–0.417; p = 0.0001), underscoring the importance of preventing infectious diseases.
- Handwashing before meal preparation was also associated with reduced odds (ORa = 0.452; 95% CI: 0.275–0.744; p = 0.002), highlighting the role of food hygiene practices.
- Recent respiratory infections were associated with an increased odds ratio for poor nutritional status (ORa = 1.838; 95% CI: 1.124–3.005; p = 0.015), confirming the interactions between infections and undernutrition described by Black et al. (2013) and Bhutta et al. (2008).
- Water treatment prior to consumption was also associated with an increased odds ratio (ORa = 1.765; 95% CI: 1.045–2.982; p = 0.034). This result, which runs counter to the expected effect, should be interpreted with caution, as it may reflect poor household sanitation conditions rather than a negative effect of water treatment. Studies by Luby et al. (2018) in Bangladesh and by Null et al. (2018) in Kenya also show that WASH interventions do not systematically lead to a measurable improvement in child growth.

Ultimately, these results confirm the multifactorial nature of child malnutrition. Its prevention requires an integrated community-based approach combining the promotion of breastfeeding, improved complementary feeding, vaccination, the prevention and management of infections, and the strengthening of hygiene and food safety practices. This approach is consistent with the recommendations of Bhutta et al. (2008).

CONCLUSION

At the conclusion of this study, which involved 449 children aged 0 to 59 months and their mothers or caregivers, the results revealed a high prevalence of poor nutritional status, affecting 68.8% of the children surveyed. This situation reflects the persistence of childhood malnutrition and underscores the need to strengthen community-based strategies for prevention and nutritional management.

The descriptive results revealed several vulnerability factors, including the low proportion of children who were exclusively breastfed during the first six months (36.7%), difficulties in accessing a sufficient food supply on a regular basis in some households, and the economic insecurity of several families.

The bivariate analysis revealed a statistically significant association between children's nutritional status, having been breastfed, and regular food consumption. Furthermore, the multivariate analysis identified four factors independently associated with nutritional status: complete vaccination according to age and handwashing before meal preparation, which were associated with a decrease in the odds of poor nutritional status; and recent respiratory infections and water treatment before consumption, which were associated with an increase in these odds.

Ultimately, this study shows that childhood malnutrition is a multifactorial phenomenon that requires an integrated community-based approach. It appears essential to strengthen the promotion of exclusive breastfeeding, nutritional education for mothers, dietary diversification, routine vaccination, the prevention and management of infections, as well as hygiene and sanitation practices. The involvement of families, health facilities, and community stakeholders is a key driver for sustainably improving the nutritional status of children under five.

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