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Socio-Economic and Cultural Determinants of Malnutrition in Children Aged 6-59 Months in the Commune of Beoumi (Cote D'ivoire)

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Abstract **Original Research Article**

Malnutrition is a significant contributor to infant mortality and morbidity. It is the consequence of an imbalanced diet, encompassing both inadequate quantity and poor quality of nourishment. Malnutrition represents a substantial public health concern on a global scale, particularly in developing countries. The objective of this study is to ascertain the socio-economic and cultural factors associated with malnutrition among children aged 6 to 59 months residing in Kongounoussou, within the commune of Béoumi. The initial step is to ascertain the prevalence of malnutrition based on anthropometric indices, specifically weight, height, and age. Secondly, the objective is to establish a link between socio-economic and cultural variables and the types of malnutrition. The results demonstrated that among a cohort of 258 children aged 6 to 59 months, the prevalence of acute malnutrition was 8.1%, chronic malnutrition was 15.5%, and underweight was 10.1%. A cross-analysis revealed that housing type, level of education, and mother's religion were variables significantly associated with the three types of malnutrition under investigation. Nationality was linked to wasting and stunting, while daily food budget had an influence on stunting. The results of this study demonstrate that stunting is the most widespread type of malnutrition among children in the locality studied. Furthermore, several socio-economic and cultural parameters were identified as risk factors for malnutrition in all its forms.

Keywords : Malnutrition, Children, Socio-economic determinants, Cultural determinants, Béoumi, Côte d'Ivoire.

INTRODUCTION

Malnutrition is clinically defined as an insufficient or excessive intake of protein, energy, and micronutrients, as well as the frequent infections and disorders that result [1]. Malnutrition represents a significant contributor to infant mortality and morbidity. The consequence of an inadequate diet, in terms of both quantity and quality, it represents a significant public health concern on a global scale, particularly in developing countries. Despite a 51% reduction in global mortality rates since 2000, 4.9 million children under the age of five died in 2022. Additionally, 149 million children are stunted, 45 million are wasted, and 37 million children under the age of five are overweight or obese [2]. The most recent national assessment of the nutritional status of children under five years of age in Côte d'Ivoire indicates that 8% are wasted, 23% are stunted, and 14% are underweight [3]. A study conducted in the Bandama Valley district in 2021 revealed that 22.7% of children under the age of five were affected by acute malnutrition or wasting, 30.5% by chronic malnutrition or stunting, and 24.8% by underweight [3]. In light of the aforementioned data, a study was conducted in the commune of Béoumi with the objective of identifying the factors that contribute to the occurrence of malnutrition in children aged 6 to 59 months, a demographic group that is particularly vulnerable to the problem.

MATERIALS AND METHODS

Study Framework and Target Population

The study was conducted in Kongonoussou, a locality in the commune of Béoumi, situated in the Bandama Valley district, between February and April 2024. The study cohort comprised 258 children aged between 6 and 59 months.

The study population included all mothers with at least one child aged between 6 and 59 months and residing in the study area. Mothers without children in the specified age range and those with children in this age group who declined to participate were excluded.

Technical equipment and principle of use

The children's weights were determined using two types of scale: a baby scale for children not yet able to stand and a bathroom scale, which was used either for normal weighing of children able to stand or by the double weighing method for agitated or frightened children. A 150 cm wooden measuring rod was employed to measure the height of children aged 6 to 59 months. For the youngest children, height was measured lying down, while for those who could stand, it was measured standing up.

A questionnaire was constructed for the purpose of data collection. In addition to personal information and anthropometric indices such as age, weight, and height, the questionnaire also includes socio-economic and cultural characteristics. The variables selected are the daily food budget (inclusive daily amount), the type of dwelling with its amenities (presence or absence of electricity, tap water, etc.), and the number of rooms in the dwelling. The questionnaire also enquired about the mother's level of education, nationality, ethnic group for Ivorian women, and religion.

Indices Used to Assess the Prevalence of Malnutrition

Anthropometric measures of weight, height, and age were employed to ascertain the prevalence of malnutrition in children aged 6 to 59 months. Wasting is defined by the weight-to-height ratio (W/H), stunting by the height-to-age ratio (H/A), and underweight by the weight-to-age ratio (W/A). These indices are expressed in "z-score," which represents a standard deviation of the child's measurement from the reference median, divided by the reference standard deviation [4]. The various forms of malnutrition were delineated according to the Waterlow classification [5], as recommended by the WHO. Consequently, irrespective of the specific type of malnutrition (acute, chronic, or global malnutrition), moderate malnutrition is defined as a z-score threshold between -2 and -3 standard deviations from the reference median, while severe malnutrition is identified by a z-score value less than -3 standard deviations from the reference median [6, 7].

Statistical Methods, Data Processing and Analysis

The questionnaire was developed using the Kobo Collect software and recorded on a smartphone. The data were subsequently transferred to Excel 2016, and the anthropometric data were processed and analyzed using the "ENA for smart," version 2008, nutrition software. Entries and graphical representations were made using Word and Excel 2016. Finally, the P-Value was determined using INSTAT 3. The significance level was set at 5%. Confidence intervals for prevalences were calculated with a 95% confidence level.

RESULTS

One of the most crucial socio-economic characteristics is the daily household food budget. The amount allocated for daily subsistence varies considerably, from 500 to 3,500 CFA. A significant proportion of children (77.5%) whose mothers utilize less than 2,500 CFA for their daily meals are found to be in this category. In contrast, only 22.5% of children whose daily food budget is equal to or greater than 2,500 CFA are observed to fall within this category (Table I).

Table I: Distribution of children by daily food budget

Daily food budget (FCFA)	Number of children	Percentage (%)
< 2,500	200	77.5
≥ 2,500	58	22.5
Total	**258**	**100**

With regard to the type of dwelling, the largest proportion of children reside in spontaneous dwellings (37.2%), followed by those in traditional banco houses (33.3%). Finally, children residing in modern dwellings (villas) constituted 29.5% of the total (Figure 1). It is also crucial to highlight the number of rooms in these types of dwellings and the presence of essential amenities, such as electricity and tap water. The majority of these children (53.3%) reside in two-bedroom houses with a living room (Figure 2). Of the children in these households, 87.6% have access to electricity, while 12.4% lack this amenity. Tap water is utilized in 86% of households, while 14% do not have access to this resource (Table II).

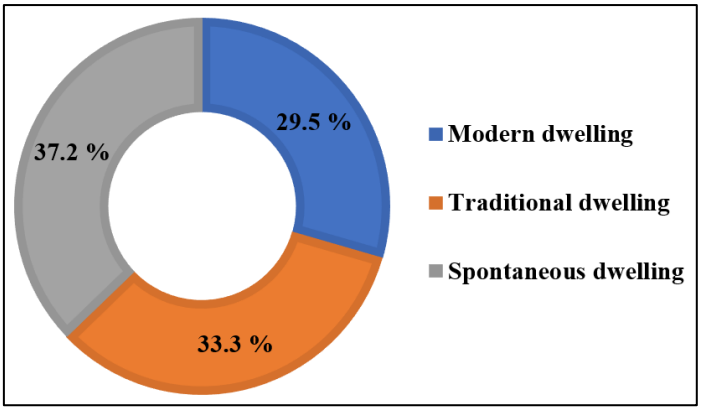

Figure 1: Distribution of children by type of dwelling

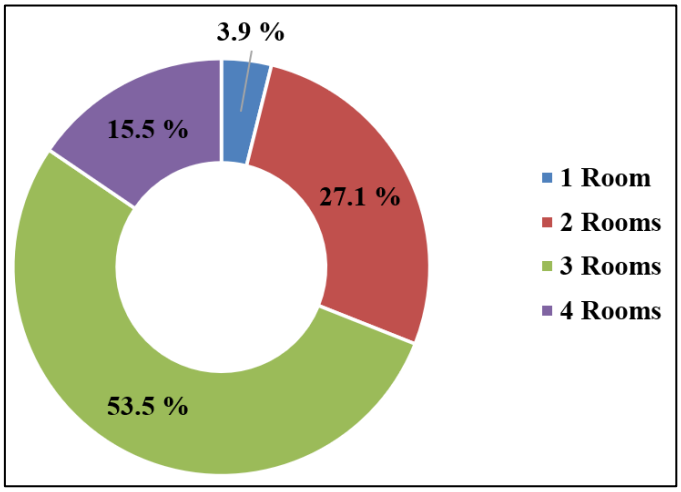

Figure 2: Distribution of children by number of rooms in the dwelling

Table II: Distribution of children by household amenities

Household amenities	Yes		No		Total
	Frequency	Percentage (%)	Frequency	Percentage (%)	
Electrical installation	226	87.6	32	12.4	258 (100%)
Existence of tap water	222	86	36	14	258 (100%)

The results at the mother's level of education indicate that 43.8% of the mothers surveyed had no formal schooling; 34.9% had completed primary education, and 21.3% had obtained secondary education or higher (Figure 3). As illustrated in the graph pertaining to religious affiliation, the majority of mothers surveyed identified as Christian (47.7%), while a smaller proportion identified as Muslim (28.7%). Mothers who identified as neither Christian nor Muslim constituted 23.6% of the sample (Figure 4).

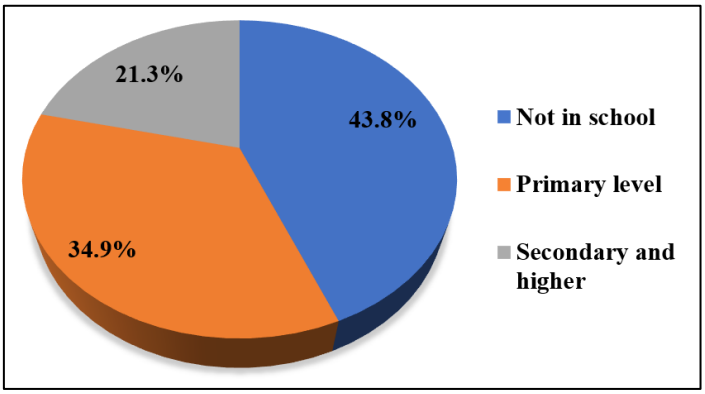

Figure 3: Distribution of children by mother's level education

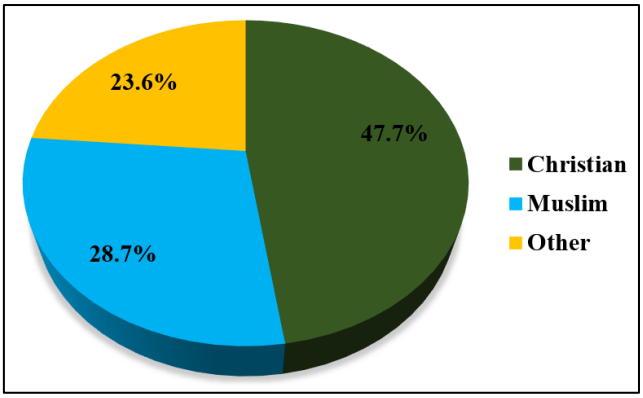

Figure 4: Distribution of children by religion

The target population is 79.8% Ivorian, with the Akan ethnic group representing the majority (44.7% of Ivorians). The minority ethnic group is Mandé du nord, with an estimated 8.7% of the Ivorian population. This study area is home to 20.2% of non-Ivorians (Tables III and IV).

Table III : Distribution of children by nationality

Nationality	Number of children	Percentage %
Ivorians	206	79,8
Non-Ivorian	52	20,2
Total	**258**	**100**

Table IV: Distribution of children by ethnic group

Ethnic group	Number of children	Percentage (%)
Akan	92	44,7
Mandé du nord	18	8,7
Mandé du sud	34	16,5
Voltaïque	28	13,6
Krou	34	16,5
Total	**206**	**100**

Prevalence of Malnutrition in Children Aged 0-59 Months

The results of the prevalence study indicate that the most prevalent form of malnutrition in the study area is chronic malnutrition. Indeed, 15.5% of children aged 6 to 59 months in this locality are affected by stunting, with 8.9% exhibiting moderate symptoms and 6.6% displaying severe symptoms. The lowest prevalence is observed for acute malnutrition, with an estimated 8.1% of children affected, of whom 5.4% suffer from moderate malnutrition and 2.7% from severe malnutrition. Additionally, 10.1% of children are classified as underweight, with 7% experiencing moderate malnutrition and 3.1% severe malnutrition. Of these three forms of malnutrition, moderate malnutrition affects a greater number of children than severe malnutrition (Table V).

Table V: Prevalence of malnutrition

Types of malnutrition	Absence of malnutrition >-2 z-score	Forms of malnutrition		Total malnourished
		Moderate -3 <z-score< -2	Severe < -3 z-score	
Acute malnutrition or emaciation (W/H)	237(91.9 %)	14(5.4 %)	7(2.7 %)	21(8.1 %)
Chronic malnutrition or stunted growth (H/A)	218(84.5 %)	23(8.9 %)	17(6.6 %)	40(15.5 %)
Global malnutrition or underweight (W/A)	232(89.9 %)	18(7 %)	8(3.1 %)	26(10.1 %)

Influence of Socio-Economic and Cultural Factors on Malnutrition

Tables VI, VII, and VIII illustrate the correlation between various forms of malnutrition (acute, chronic, and global) and a range of socio-economic and cultural attributes. The analysis revealed a significant correlation between acute malnutrition and several socio-economic and cultural factors, including the type of dwelling, the mother's level of education and religion, and the nationality of children aged 6 to 59 months. The corresponding p-values were 0.01, 0.009, 0.03, and 0.04, respectively. The remaining socio-economic and cultural factors, with p-values greater than 0.05, were not found to be significantly linked to this form of malnutrition. In addition to the number of rooms in the dwelling and ethnic group, all other socio-economic and cultural

parameters demonstrated a significant relationship with chronic malnutrition ($p < 0.05$). With regard to global malnutrition, a relatively significant relationship was observed with dwelling type ($p = 0.03$), mother's level of education ($p = 0.02$), and religion ($p = 0.03$).

The cross-analyses between the types of malnutrition and the socio-economic and cultural parameters indicate that specific variables, such as dwelling type, mother's level of education, and religion, are common risk factors for malnutrition. Conversely, other variables, such as the number of rooms in the dwelling and ethnic group, do not appear to be associated with these three types of malnutrition.

Table VI: Socio-economic and cultural risk factors for acute malnutrition

Variables	Modalities	Malnourished children	Good nutritional status	P-Value
Daily food budget	< 2,500	13	187	0.07
	≥ 2,500	8	50	
Type of dwelling	Modern dwelling	3	73	*0.01*
	Traditional dwelling	13	73	
	Spontaneous dwelling	5	91	
Number of rooms	≤ 2 Rooms	8	72	0.46
	> 2 Rooms	13	165	
Mother's education level	Not in school	16	97	*0.009*
	Primary level	7	83	
	Secondary and higher	0	55	
Nationality	Ivoirians	13	193	*0.03*
	Non-Ivoirian	8	33	
Ethnic group	Akan	5	87	0.7
	Mandé du nord	1	17	
	Mandé du sud	4	30	
	Voltaïques	1	27	
	Krou	2	32	
Religion	Christian	5	118	*0.04*
	Muslim	7	67	
	Other	9	52	

Table VII: Socio-economic and cultural risk factors for chronic malnutrition

Variables	Modalities	Malnourished children	Good nutritional status	P-Value
Daily food budget	< 2,500	24	176	*0.004*
	≥ 2,500	16	42	
Type of dwelling	Modern dwelling	9	67	*0.02*
	Traditional dwelling	21	65	
	Spontaneous dwelling	10	86	
Number of rooms	≤ 2 Rooms	17	63	0.09
	> 2 Rooms	23	155	
Mother's education level	Not in school	25	88	*0.015*
	Primary level	12	78	
	Secondary and higher	3	52	
Nationality	Ivoirians	25	181	*0.003*
	Non-Ivoirian	15	37	
Ethnic group	Akan	7	85	0.33
	Mandé du nord	4	14	
	Mandé du sud	4	30	
	Voltaïques	4	24	
	Krou	6	28	
Religion	Christian	14	109	*0.009*
	Muslim	9	65	
	Other	17	44	

Table VIII: Socio-economic and cultural risk factors for global malnutrition

Variables	Modalities	Malnourished children	Good nutritional status	P-Value
Daily food budget	< 2,500	19	181	0.57
	≥ 2,500	7	51	
Type of dwelling	Modern dwelling	2	74	*0.03*
	Traditional dwelling	10	76	
	Spontaneous dwelling	14	82	
Number of rooms	≤ 2 Rooms	10	70	0.39
	> 2 Rooms	16	162	
Mother's education level	Not in school	18	95	*0.02*
	Primary level	4	86	
	Secondary and higher	4	51	
Nationality	Ivoirians	18	188	0.15
	Non-Ivoirian	8	44	
Ethnic group	Akan	5	87	0.25
	Mandé du nord	2	16	
	Mandé du sud	5	29	
	Voltaïques	1	27	
	Krou	5	29	
Religion	Christian	6	117	*0.03*
	Muslim	12	62	
	Other	8	53	

DISCUSSIONS

A cohort of 258 children aged 6 to 59 months exhibited the following nutritional deficiencies: 8.1% were wasted, 15.5% were stunted, and 10.1% were underweight for their age. The prevalence of wasting is consistent with that reported in analysis of the nutritional situation in Côte d'Ivoire [8]. Indeed, this report estimates the prevalence of acute malnutrition to be 8%, with 2% in the severe form. Conversely, stunting and underweight have high rates (respectively 29.8% and 14.9%) [9]. However, stunting remains the most prevalent form of malnutrition in children under five years of age in the area under study, and even in Côte d'Ivoire, according to the "Politique Nationale de Nutrition" [10].

In terms of socio-economic and cultural factors, cross-analyses have permitted the establishment of a correlation between the parameters under investigation and the types of malnutrition. The results of this study indicate a significant correlation between the daily food budget and chronic malnutrition. This can be attributed to the fact that the issue is not contingent on the quantity consumed during a single day's meal, but rather on the child's diet lacking sufficient nutrients essential for typical growth and development, leading to a child who is below the expected age-appropriate height. Additionally, the study revealed that children residing in modern dwellings exhibited a lower prevalence of malnutrition compared to those in traditional dwellings (banco houses) and spontaneous dwellings (precarious dwellings). The influence of housing type on malnutrition is significant, regardless of whether the malnutrition is acute, chronic, or global. The p-values for these comparisons are less than 0.05, indicating a statistically significant relationship. This correlation between malnutrition and housing type is consistent with the findings of the Fall study [11]. In consequence, the housing situation defines the socio-economic level of the household. A low-income household lacking the financial resources to reside in a villa with all the requisite amenities (access to drinking water, electricity, latrines, etc.) exposes its children not only to malnutrition but also to any pathologies linked to poor hygiene conditions. This is why the WHO states that "malnutrition affects all age groups, but is particularly prevalent among those with low incomes, inadequate access to drinking water and lack of adequate health education" [12].

The mother's level of education is a significant explanatory factor in the occurrence of malnutrition in children aged 6 to 59 months. The analysis revealed that children whose mothers had not attended school exhibited the most pronounced signs of malnutrition. The p-values for the associations between maternal education and the three forms of malnutrition were 0.009 for acute malnutrition, 0.015 for stunting, and 0.02 for underweight. These values indicate that a mother's low level of education is associated with an increased risk of all three forms of malnutrition. This finding was also observed by Aouehougon [13] and Mukalay *et al.*, [14] in their study. Indeed, education enables mothers to gain access to more comprehensive nutritional education, knowledge of diverse dietary practices, an understanding of different food types, and guidance on hygiene rules to prevent the onset of malnutrition. These findings align with those of Edoun & Mongbo [15], who discovered that an elevated mother's level of education is associated with a reduced prevalence of malnutrition among children. Religion and nationality are also significant socio-cultural factors that influence the prevalence of malnutrition. The observed correlation between religion and malnutrition is statistically significant ($p < 0.05$).

This is due to the fact that diets vary significantly between different nationalities, reflecting the influence of certain religious practices that prohibit the consumption of specific foods containing nutrients essential for child growth and health. The accumulation of this deficit results in a dietary imbalance, which in turn leads to malnutrition. The data from this study indicate that children whose mothers adhere to religions other than Christianity and Islam are just as malnourished as others. This finding was also observed by Djamou in a study conducted in Cameroon, in which she posits that Christianity, Islam, and other traditional African religions give rise to a cultural diversity that presents distinct features in terms of perceptions of illness, child care, infant feeding, and attachment to the child [16].

CONCLUSION

This study initially evaluated the prevalence of malnutrition among children aged 6 to 59 months in the Kongounoussou locality. Subsequently, it identified the socio-economic and cultural factors associated with the three types of moderate and severe malnutrition under investigation. The findings indicate that chronic malnutrition, or stunting, is the most prevalent form of malnutrition among children in the study area, with a prevalence rate of 15.5%. This is followed by acute malnutrition and underweight. A correlation between socio-economic and cultural variables and types of malnutrition revealed that housing type, level of education, and mother's religious life were significantly associated with these three types of malnutrition. The study also demonstrated that nationality is a risk factor for wasting and stunting. Furthermore, the daily food budget was found to have an influence on stunting. However, no association was observed between the number of rooms in the house and ethnic group and any type of malnutrition. These results could potentially be utilized to assist in reducing the prevalence of malnourished children in Kongounoussou/Béoumi (Côte d'Ivoire).

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