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Prevalence of Malnutrition and Anaemia in Children ≤ 5 Years of Age in Some Conflict Hit Areas of Meme Division of the South West Region of Cameroon

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Abstract

Malnutrition refers to the deficiency, imbalances, or excesses in a person's intake of energy or nutrients [1]. Khan defines anaemia as below level of Haemoglobin in red blood shown by a lower number of functioning red blood cells [2]. The crisis in the North West and South West Regions of Cameroon has led to several negative effects on children's living conditions. There has been an increase in malnutrition and anaemia in the South West Region and Kumba in particular. The main objective of this study was "to examine the prevalence of malnutrition and anaemia in children ≤ 5 years of age in some conflict-hit areas of Meme Division". A descriptive cross-sectional study was conducted in 2023 from March to June. We recruited 200 children ≤ 5 years into the study from three hospitals. The regional hospital annex in Kumba, Presbyterian General Hospital Kumba and the Ntam Hospital in Kumba. Socio-demographic factors were assessed using questionnaire, nutritional status was assessed by the use anthropometric measurements and an auto haematology analyser was used to determine anaemia. The overall prevalence of malnutrition in the study area was 40.5%. The prevalence of malnutrition varied significantly ($P < 0.001$) with the study sites. The overall prevalence of anaemia in the study area was 70.5%. The prevalence of anaemia was not significantly associated with the study sites. The prevalence of Malnutrition and Anaemia in children ≤ 5 years of age is very high in the Kumba municipalities. This could be attributed to the ongoing crisis which has caused a lot of social migrations from rural areas to Urban areas which

are safer.

Keywords

Malnutrition, Anaemia, Prevalence, Conflict Hit Areas

1. Introduction

1.1. An Overview

Malnutrition refers to deficiencies, imbalances, or excesses in a person's intake of energy and/or nutrients [1]. The World Health Organization classifies malnutrition into two broad categories, namely under nutrition and over-nutrition. They further classified under nutrition into four broad sub-forms namely, wasting (low weight for height), stunting (low height for age), underweight (low weight for age), and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals) [3]. Over-nutrition includes overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes, and cancer) due to excessive consumption of energy and other nutrients. Khan *et al.* [4] define Anaemia as a low level of haemoglobin in the blood, shown by a lower number of functioning red blood cells. The World Health Organization (WHO) defines anaemia as haemoglobin (Hb) less than 11.0 g/dl for children aged 3 to 49 months and less than 15.0 g/dl for children aged 0 to 2 months. Fatigue, pallor, dyspnea, and tachycardia are some of the common symptoms of aneamia [3].

1.2. Problem Statement

According to Asoba *et al.* [5], malnutrition and Anaemia were one of the principal underlying causes of death for many of the world's children, contributing to more than one-third of the deaths of children below five years globally. They noted that malnutrition and Anaemia in the first two (2) years of life have been directly linked with poor breastfeeding and complementary feeding practices of mothers together with high rates of infectious diseases. The triple burden of malnutrition which includes undernutrition, hidden hunger and overweight threatens the survival, growth and development of children, young people, economy and nations, with almost 200 million children under 5 years of age suffering from stunting, wasting, or both globally [6]. They also stated that more than 1 in 3 children were not growing well, over 340 million children were suffering from deficiencies of essential micronutrients (vitamins and minerals) and at least 1 in 2 children with hidden hunger. The above conditions are common during armed conflicts and socio-political crises, when access to basic social needs, especially nutritious foods is limited and may result in malnutrition, and where individuals and families including children are forced to move out or migrate from their homes and live either as internally displaced persons in other

lands, often under difficult living conditions. The South West region including Kumba I municipality has been experiencing socio-political crises since 2016 till date, resulting in the displacement of several families and communities, the destruction of livelihood sources such as farms, houses, businesses, and health facilities, as well as disruption of social life, health, and living conditions in many communities. This crisis may have several negative effects on children, including malnutrition and Anaemia in children below five years of age.

This crisis has led to the re-emergence of the Anglophone question and highlighted the limits of the Cameroon governance model, based on centralization and co-optation of elites. The Anglophone area consists of two of the country's ten regions, the Northwest and the Southwest. It covers 16,364 sq km of the country's total area of 475,442 sq km and has about 5 million of Cameroon's 24 million inhabitants. it is the stronghold of the main opposition party, Social Democratic Fronts (SDF) and plays an important role in the economy, especially its dynamic agricultural and Commercial Sectors. Most of Cameroon's oil, which accounts for a large part of the country's gross domestic product is located off the coast of the Anglophone Region. As a result, of this situation, the majority of the population especially children are suffering from severe malnutrition and Anaemia which has been a very big problem to the community.

2. Materials and Method

2.1. Study Sites

Specifically, the study was carried out in the Kumba Regional Hospital Annex, the Presbyterian General Hospital (Manyemen Annex Kumba) and the Ntam health center at 3 Corners Fiango. These hospitals were selected because they are moderate to low-cost medical facilities where the average inhabitant in Kumba 1 and 11 municipalities and from the hinterlands can consult for most diseases.

2.2. Sample Size

A random sampling of respondents involved parents who had children below or equal to 5 years of age in the regional hospital Annex., Presbyterian General Hospital (Manyemen Annex) and the Ntam Health Center at 3 corners Fiango. The total sample size of this study were 200 respondents. Inclusion criteria considered only internally displaced persons (IDP's), displaced as a result of the crisis within the area.

This study made use of primary data which was collected using a semi-structured questionnaire designed by the researcher. The questionnaire consists of mainly open-ended questions to guide respondents towards the objectives of the study. The questionnaire was designed for internally displaced children who were malnourished and anaemic. Its key sections sourced data on Socio-demographic and clinical characteristics of the study population, Prevalence of Malnutrition and the Prevalence of anaemia in the study area. The total number of

items on the questionnaire was 15.

2.3. Sample Collection and Laboratory Analysis

2.3.1. Questionnaire Survey

Data was collected regarding the following: demographics (gender and age), feeding habits (exclusive breastfeeding and duration/mixed feeding/no breastfeeding), types of local weaning foods, mother's knowledge of balanced diet, history of fever in the preceding 2 to 3 days, history of consumption of any medication in the preceding month, history of diarrhea, internally displaced persons, number of occupants in a house and parent/guardian educational level. Infants were classified as being exclusively breastfed using the definitions proposed by the WHO [3].

2.3.2. Clinical Evaluation

Anthropometric measurements such as height, weight, head circumference, Body Mass Index (BMI), Body circumference to assess for adiposity (waist, hip, limbs) and Skinfold thickness were measured using appropriate equipment. Personnel were trained on the use of the equipment used in anthropometric measurements and on the core elements of Anthropometry. The ages of the children were obtained from their mothers and caregivers. Under-nutrition indices such as height-for-age (HA), weight-for-age (WA), and weight-for-height (WH) standard deviation (SD) scores (Z scores) were computed based on the WHO growth reference curves using the WHO AnthroPlus for personal computers manual [3]. A child was identified as being malnourished if he or she scored < −2 in one of the anthropometric indices of HA (stunting), WA (underweight) and WH (wasting) indices while corresponding Z scores of <−3 SD were considered indicative of severe under-nutrition [7].

2.3.3. Assessment of Haematological Parameters

Assessment of haematological parameters was done using a complete blood cell count. 1 ml blood collected ie (0.1 ml citrate and 0.9 ml blood) placed into a syringe. Haematological parameters were assessed using an auto-haematology analyser (MINRAY 2800 BC), following the manufacturer's instructions. A complete blood count was obtained for haematological parameters such as haemoglobin levels, red blood cell counts (RBC), erythrocyte indices (mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) and red cell distribution width (RDW), total white blood cell count (WBC) and platelet count (PLT). Anaemia was defined as Hb < 11.0 g/dL [3] and further categorized as severe (Hb < 7.0 g/dL), moderate (Hb between 7.0 and 10.0 g/dL), and mild (>10 Hb < 11 g/dL) [8]. Malarial anaemia (MA) was defined as children with a malaria-positive smear for *P. falciparum* parasitaemia (of any density) and Hb < 11 g/dL. Non-malarial anaemia was defined as children with anaemia and without a malaria-positive smear for *P. falciparum.*

2.3.4. Data Analysis Procedure

After the instrumentation process, the data collected was systematically processed followed data analysis. The process included using the Lawrence equation to calculate the sample size of the population [9]. The screening, scoring, and coding of the data were done manually, while the capturing and analysis were done using Excel.

$$n = \frac{z^2}{e^2}[pq] \quad (1)$$

3. Results and Discussions

A total of 200 children with a mean (SD) age of 31.3 (16.1) months, were enrolled at Ntam Health center (37.5%, 75), Manyemen Annex (25.0%, 50) and Regional Hospital Annex (75.0%, 37.5). The proportion of females (63.5%) was higher than males (36.5%). Most of the study participants were in the age group 25 to 48 months (44.5%) and the least in the age group 49 to 60 months (21.5%). In addition, majority of the children were internally displaced (73.0%). Furthermore, the prevalence of malnutrition, wasting, underweight, stunting and anaemia in the study population was 40.5%, 1.5%, 15.0%, 38.5% and 70.5%. (Table 1)

Table 1. Socio-demographic and clinical characteristics of the study population.

Parameter	% (n/N)
	100 (200)
Study sites	
Ntam Health centre	37.5 (75)
Manyemen annex	25.0 (50)
Regional Hospital Annex	37.5 (75)
Sex	
Male	36.5 (73)
Female	63.5 (127)
Age groups in months	
≤24	34.0 (68)
25 to 48	44.5 (89)
49 to 60	21.5 (43)
IDP Status	
Yes	73.0 (146)
No	27.0 (54)
Malnutrition	40.5 (81)
Wasting (n)	1.5 (3)
Stunting (n)	38.8 (77)
Underweight (n)	15.0 (30)
Anaemia status	70.5 (141)

3.1. Prevalence of Malnutrition in the Study Area

The overall prevalence of malnutrition in the study area was 40.5%. As shown in Figure 1, the prevalence of malnutrition varied significantly (P < 0.001) within the study sites. The highest prevalence was observed in children who attended Manyemen annex (54.0%) and the lowest among children who attended the Regional Hospital annex (26.7%).

Malnutrition, IDP and Clinical Status of Children

As shown in Table 2, the prevalence of malnutrition was significantly higher among non-IDP (66.7%), males (64.4%), children ≤ 24 months (72.1%) and those with anaemia (54.2%) when compared to their counterparts.

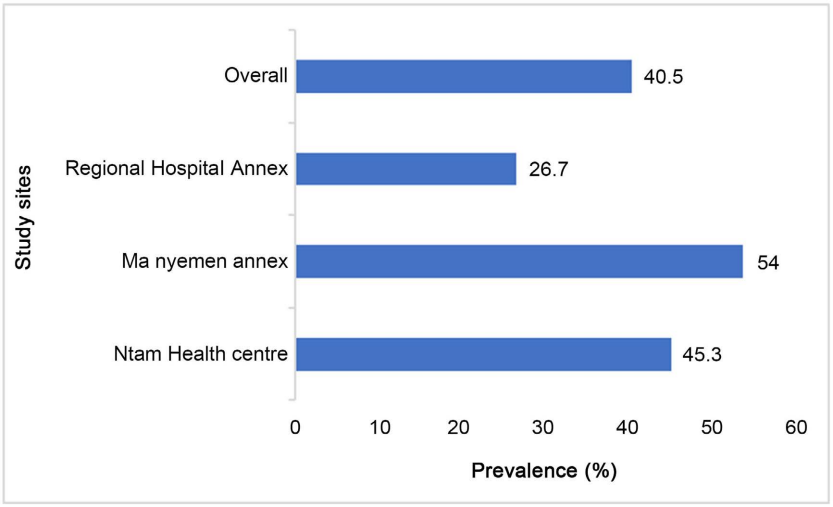

Figure 1. Prevalence of malnutrition in the study area.

Table 2. Prevalence of malnutrition as affected by IDP status, sex, age and anaemic status.

Variable		Number examined	Malnutrition (n)
IDP status	No	54	66.7 (36)
	Yes	146	30.8 (45)
Level of Sig.		**P < 0.001**	
Sex	Female	127	26.8 (34)
	Male	73	64.4 (47)
Level of Sig.		**P < 0.001**	
Age group in months	≤24	68	72.1 (49)
	25 to 48	89	30.3 (27)
	49 to 60	43	11.6 (5)
Level of Sig.		**P < 0.001**	
Anaemia status	Anaemia	59	54.2 (32)
	Non-Anaemic	141	34.8 (49)
Level of Sig.		**P = 0.01**	

3.2. Prevalence of Anaemia

The overall prevalence of anaemia in the study area was 70.5%. As shown in Figure 2, the prevalence of anaemia was not significantly associated with the study sites. The highest prevalence was observed in children who attended Manyemen annex (78.0%) and lowest among children who attended the Regional Hospital annex (64.0%).

3.2.1. Anaemia, IDP and Demographic Status of Children

As shown in Table 3, the prevalence of anaemia was significantly higher among IDPs (78.1%), and children aged 49 to 60 months old (79.1%) when compared to their counterparts. However, the prevalence of anaemia was higher among females (72.4%) than males (67.1%), although the difference was not significant.

3.2.2. Anaemia, IDP and Malnutrition

As indicated in Table 4, the prevalence of anaemia was higher among healthy children (77.3%) when compared to their malnourished counterparts (60.5%) at P = 0.01. In addition, the prevalence of anaemia was higher among non-stunted children (77.2%) when compared with stunted children (59.7%). On the other hand, the prevalence of anaemia was higher among wasted children (100.0%) when compared with healthy children (70.1%), although the difference was not significant. Also, although not significant, the prevalence of anaemia was higher among underweight children (73.3%) when compared with non-underweight children.

3.3. Discussion

The overall malnutrition status observed from its different forms in the study population was 40.5% as compared to the malnutrition status carried out by Teh Rene in 2022 [10] at the mount Cameroon area which is a crisis-hit zone, he had a percentage 36.0%. This confirms the studies by Asoba *et al.* [5] that Malnutrition remains a major cause of illness during childhood and is Meso endemic in this part of the southwest region.

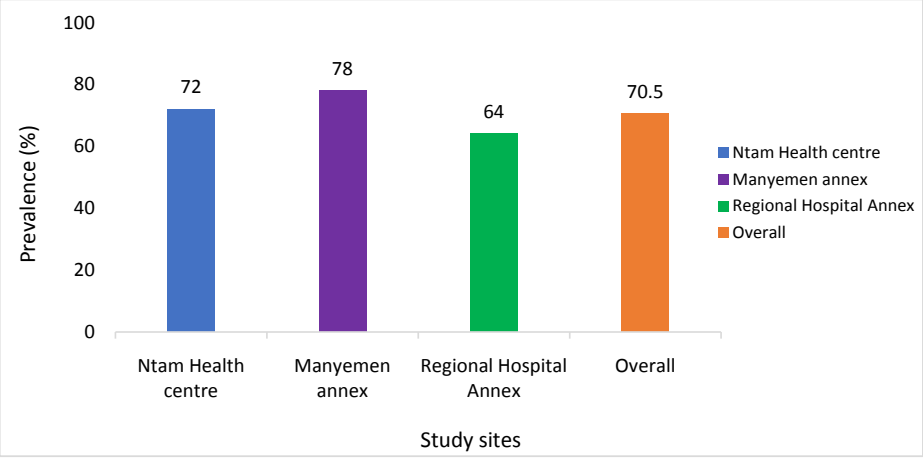

Figure 2. Prevalence of anaemia.

Table 3. Prevalence of anaemia as affected by IDP status, sex and age.

Variable		Number examined	Anaemia (n)
IDP status	No	146	78.1 (114)
	Yes	54	50.0 (27)
Level of Sig.		**<0.001**	
Sex	Female	127	72.4 (92)
	Male	73	67.1 (49)
Level of Sig.		P = 0.427	
Age group in months	≤24	68	57.4 (39)
	25 to 48	89	76.4 (68)
	49 to 60	43	79.1 (34)
Level of Sig.		**P = 0.013**	

Table 4. Prevalence of anaemia as affected by malnutrition and its forms.

Variable		N	Malnutrition
Malnutrition	Malnourish	81	60.5 (49)
	Healthy	119	77.3 (92)
Level of Sig.		P = 0.01	
Wasting	Yes	3	100.0 (3)
	No	197	70.1 (138)
Level of Sig.		P = 0.259	
Stunting	Yes	77	59.7 (46)
	No	123	77.2 (95)
Level of Sig.		P = 0.008	
Underweight	Yes	30	73.3 (22)
	No	170	70.0 (119)
Level of Sig.		P = 0.712	

In **Figure 1**, the highest prevalence was observed in children who attended Manyemen Annex (54.0%) and the lowest among children who attended the regional Hospital Annex (26.7%). The prevalence of Malnutrition forms with regards to it study site, Ntam health Centre had 40% wasting, 42.7% stunting, 17.3% underweight. Manyemen Annex had 50% stunting as compared with the Malnutrition forms in a crisis hit zone carried out by Teh *et al.*, the prevalence of stunting, wasting, and underweight, were 29.0%, 18.2% and 21.2% [10].

Egbe. S.T., reported that 55.8% stunting 13.77% wasting and 31.91% underweight were found among under five indigenous Mbororo children in another community in Cameroon which is a crisis-hit zone which he carried out from 1990 to 2014. The prevalence of stunting in Cameroon drastically increased from 29.0% to 38.5%. [11]. The prevalence of Malnutrition IDPs and the clinical status

of children shows that malnutrition was higher among non-IDPs as compared to their counterparts. It also showed that Malnutrition according to the gender of respondents was higher among males than females. The prevalence of Malnutrition according to the different age groups of the respondents shows that children ≤ 24 months were more Malnourished as compared to their other counterparts and this increases the chances of death by the age of 24 months. According to review by Thurstans *et al.*, the peak age of wasting and stunting is from birth to 3 months, with implications for subsequent deterioration in infancy and childhood [12].

The overall prevalence of Anaemia in the study area was 70.5% as compared to Teh *et al.* which was 72.8% carried out in a crisis-hit zone [10]. In this study area the Anaemic status of children ≤ 5 years of age was unacceptably high. This study of Anaemic prevalence is like the 77.3% found by Asoba *et al.* among 5-year-old children in other Mount Cameroon communities which was affected by the crisis [5].

In **Figure 2**, the highest prevalence was observed in children who attended Manyemen Annex (78.0%) and lowest among children who attended the regional hospital (64.0%) as compared to Sumbele *et al.* whose percentage of Anaemic cases were 53.7%. the prevalence of Anaemia was significantly higher among IDPs (78.1%) and was from children aged between 25 to 48 months as compared to Sama *et al.* which was found in children between the ages 6 to 10 years and high in those living in low altitude [13].

The prevalence of Anaemia is higher in Females (72.4%) than Males (67.1%). This contrary to the findings of Sakwe *et al.* who reported lower Anaemia prevalence community base study. This prevalence of Anaemia was affected by Malnutrition and it was high among healthy children [14].

3.4. Conclusion

The prevalence of Malnutrition and Anaemia in children ≤ 5 years of age are very high in the Kumba municipalities. This could be attributed to the crisis which has caused a lot of social migrations from rural areas to Urban areas which are a bit safe.

Conflicts of Interest

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

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