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## Nutritional status of under five children in the Cameroonian refugee settlement in Ogoja, cross river state, Nigeria

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### Abstract

**Background:** One of the major problems seen in the developing country is malnutrition and this has been showed to have a devastating effect causing a high morbidity and mortality. The aim of this study was to check the malnutrition prevalence and the nutritional status seen among children who are under - five living in the Cameroonian refugee settlement in Ogoja, Nigeria.

**Methods:** The research was conducted among 211 children between ages 6-59 months, using the descriptive cross-sectional study. The study participants were selected using the multistage cluster method of sampling. The collections of data were through a structured questionnaire and anthropometric measurement. The data entry was EPI Data 3.1 while the data analysis was done using SPSS version 20.0. The frequency and percentage of sociodemographic characteristics along with the nutritional status were determined using descriptive analysis.

**Result:** From the study, it was found that 83.2% of children under-five were exclusively breastfed for six months. Majority (55.8%) of children under-five, were not fully immunized and 29.8% had diarrhoea preceding two weeks. Prevalence of underweight, stunting and wasting was 38.4%, 41.7% and 26.8% respectively.

**Conclusions:** This study indicated that child malnutrition was high in children under-five living in Cameroonian refugee settlement in Ogoja, Nigeria.

**Keywords:** malnutrition, refugees, under-five children, stunting, wasting

### Introduction

Malnutrition is a public health concern-worldwide, since the frequency of reported cases of malnourishment remain high (Dorcus and Mary, 2017) <sup>[5]</sup>. Adequate nutrition is vital for healthy growth and development during childhood (Black *et al.*, 2008) <sup>[14]</sup>. Malnutrition commonly referred to as any pathological state that may result from an absolute or a relative deficiency or excess of one or more nutrients that are considered as essential (Pavani and Prasad, 2017). Among the anthropometric indicators in detecting the level of under-nutrition in children who are under-five include underweight, stunting and wasting (Zemenu *et al.*, 2017) <sup>[16]</sup>. Malnutrition in children may transcend to potent levels of chronic infection and diseases during adulthood, thereby affecting malnourished females resulting in likelihood in giving birth to babies of low- weight (Mengistu *et al.*, 2013; Darsene *et al.*, 2017) <sup>[22, 23]</sup>.

In developing countries, malnutrition especially in children remain one of the leading causes of morbidity and mortality (Amsalu and Tigabu, 2008) <sup>[17]</sup>. An estimate of three hundred thousand (300,000) deaths has been directly related to the malnutrition and indirectly linked to causes half of all death in children, thus making malnutrition an important risk factor (Alemu *et al.*, 2009). About 60 million children are affected with moderate malnutrition while 13 million are reported to have severe form of acute malnutrition worldwide (Islam *et al.*, 2013) <sup>[19]</sup>. Global reports has also shown that the children under-five affected by stunting, underweight and wasting include 21.9%, 13.4%, and 7.3% respectively (de Onis *et al.*, 2018) <sup>[20]</sup>. The estimate according to WHO in 2017, showed that 5.4 million children under-five die each year from malnutrition of which 2.7 million are from Sub-Saharan African countries (Hug *et al.*, 2017) <sup>[21]</sup>.

Nutrition and food insecurity are becoming increasingly worsen in areas affected by armed conflict (Loewenberg, 2015) [11]. Some of the factors that can contribute to public health emergencies during conflicts as described by UNICEF include outbreak of infectious diseases, unsafe and reduced availability of water, poor hygiene and sanitation, poverty, violence, destruction of agricultural infrastructure, health care facilities and humanitarian convoys attacks, conflicts related sanctions by countries (UNICEF, 2016a) [13]. The burden faced by children is evident from nutritional deficiencies reported in current conflict-affected areas. For example, an estimated 244,000 children in Borno State, Nigeria, were suffering from Severe Acute malnutrition (SAM) due to violence and mass displacement caused by the Boko Haram insurgency in 2016 (UNICEF, 2016b) [13].

Nigeria is known to have a population with the highest number of children in West Africa, the nutritional status of her children generally has an impacts on the health and development of the sub-region and Africa (de Onis *et al.* 2004) [58]. Therefore, the magnitude and pattern of malnutrition in the under-five population in Nigeria will be of significant relevance in African. Reports has shown that every 2 in 5 children in Nigeria are stunted while about 30% are found to be underweight and malnutrition contributes almost half of under-five deaths (Black *et al.* 2013; NPC and ICF, 2014) [13, 8, 34]. There has been report of steady increase in the percentage of children who are wasted in Nigeria over the last decades from 11% in 2003 to 18% in 2013 (NPC and ICF, 2014) [8, 34]. The sustainable development goal (SDG) target 2.3 is to end by 2030 all forms of malnutrition and achieve by 2025 the internationally agreed targets to end wasting and stunting in children whose age is under five years (United Nations, 2015) [9].

United Nations reports has shown that about 60,000 Cameroonians and more has entered Cross River in Nigeria (UNHCR, 2020). The Cameroonian refugee settlements in Ogoja was established by UNHCR in the third quarter of 2018 to accommodate the refugees living in local communities around Cross River State. Although the prevalence of child malnutrition is relatively well documented among refugees camps in North-Eastern Nigeria inhabiting nationals of Nigeria and Cameroon, evidence on the nature, prevalence, and the factors affecting this child malnutrition in Southern parts of Nigeria is limited. Therefore, with this background in mind, this study aimed to investigate the nutritional status of under-five children in Ogoja Refugee Settlement, Cross River State.

## Methodology

### Setting and design

This descriptive cross-sectional survey study was conducted in the Cameroonian refugee settlement in Adagom community in Ogoja Local Government of Cross River state. Ogoja is located at latitude 6°39'17"N and longitude 8°47'51"E. It lies within the south-south region of Nigeria and occupies a land area of about 972 square km. As of Nigeria's 2006 census, Ogoja was with a total population of 171,901. The current estimation of the people of Ogoja Local Government Area in Cross River state is 221,408 as at 2018, using the 2017 growing rate of 2.4% in Cross River State.

### Study Population

The calculation of sample size was done using the formula (Araoye, 2003)  $Z(P)(1-P)/d$  where  $Z=z$  score at 95% confidence limit (1.96),  $P=$  The prevalence of malnutrition

among under five was 23.6% from a previous study (Obarisiagbon *et al.*, 2018) [1], and precision of 5%. After accounting for attrition rate of 2%, the total sample size used was further rounded up to 211

### Sample Size Determination

The sample size was calculated using the formula (Araoye, 2003)  $Z(P)(1-P)/d$  where  $Z=z$  score at 95% confidence limit (1.96),  $P=$  The prevalence of malnutrition among under five was 23.6% from a previous study (Obarisiagbon *et al.*, 2018) [1], and precision of 5%. After accounting for attrition rate of 2%, the total sample size was rounded up to 211

### Sampling Method

A multi-stage sampling procedure was adopted in selecting participants for this study. The sampling procedure involved a three stage sampling process. Study area is composed of 41 communities and each community has between 7 and 15 households. The surveys were undertaken by four teams. Using simple random sampling, each team randomly selected five communities, total of twenty communities were therefore selected. Finally, from each sampled communities, six (6) households were selected by simple random sampling making a total of the sample population needed for the study. From each household, only one Guardian/ mother-child pair was selected for the study. In a situation where there are more than more than child between 6-59 months, the youngest is therefore selected to avoid a recall bias by the parents.

### Data Collection Technique

The collection of data was from the mother of 6- 59 months of age using structured - interviewer-administered questionnaire in a the face-to-face approach. The development of questionnaire was structured on the basis of the study objectives. The data collection process was done by the principal investigator, six health extension workers and two BSc nurse supervisors who were fluent in speaking the local languages. Verbal informed consent was obtained prior to the interview after explaining the objective of the study and information confidentiality to all participants.

### Measure

The standard procedure for anthropometric measurement was employed to take the child's anthropometric measurements such as height and weight (Bruce, 2007) [4]. The weighing scale was used to measure the body weight in a light clothing after the removal of heavy clothing such as jackets, coats, shoes and other clothing of approximately 0.1kg on a new calibrated portable scale. Portable standimeter was used to measure the height of the children without putting on shoes; the shoulders, buttocks, and the heels touched the vertical stand with the head in Frankfurt's position to the nearest 0.1 cm. Recumbent length was used for children between the ages of 6-23 months, while standing height was used for children between 24-59 months of age, all to the nearest 0.1 cm were measured.

The measurement of the MUAC was taken by measuring the midway from the tip of the shoulder to tip of the elbow of the upper arm when bent at right angle on the vertical axis while the horizontal axis is taking between the medial and lateral surface of the left arm (Fekadu *et al.*, 2015) [2]. Data on child's age were collected from the mother and then counter-checked using the vaccination card.

All the anthropometric measurements taken were measured twice, and then the average of these two measurements was

calculated and recorded. The 2006 WHO Anthro 3.2.1 software was used to convert weight, height, and age of child (months) into weight-for-age (WAZ), height-for-age (HAZ) and weight-for-height (WHZ) Z- scores, these were to assess malnutrition status. Anthropometric classifications of the measured anthropometry, were based on global standards: <-3 SD, <-2 SD, and =-2 SD. Children with WAZ, HAZ and WHZ below -2 SD of the median of reference population were considered as underweight, stunted and wasted, respectively.

Children with WAZ, HAZ and WHZ below -3 SD were also considered as severely wasted, stunted and underweight respectively. The variables stunting, underweight, and wasting were defined as 0 = for not stunted and 1 = for stunted, 0 = for not underweight and 1 = for underweight, and 0 = for not wasted and 1 = for wasted respectively (WHO, 2006).

### Data Analyses

The survey was premised on a revised guidelines for refugee populations (UNHCR Standardized Expanded Nutrition Survey, version 2, 2013). Data entry and analysis was done using EPI data 3.1 and SPSS version 20.0, respectively. Anthropometric indices were calculated with the 2006 WHO Anthro 3.2. Descriptive analysis was used to describe the

percentages and frequency of sociodemographic characteristics and nutritional status in the study.

### Ethical Approval/ Informed Consent

Ethical clearance (UPH/CREMAD/REC/MM61/033) was obtained from the Research and Ethical Committee (REC) of the University of Port-Harcourt, Port-Harcourt. Approval to gain access to the site (Adagom Refugee Settlement) was sought from the Cross River State Emergency Management Agency. Verbal informed consents were obtained from either of guardians/ mothers prior to the interview, this was after explaining the purpose of the study

### Result

Socio-demographic characteristics of the study participants in Ogoja Refugee Settlement, Cross River State The sample consisted of 211 mother-child pair who started the survey with 280 completing it. This gave a response rate of 98.6%. Most (55.8%) of the mothers are aged 25–34 years, 79.8% delivered their first child at age 14 - 17 years and 96.2% of the mothers have one under-five child. Majority (54%) of participant's household rarely/sometimes experience hunger. Furthermore, most (70.2%) of the under-five participants live in a household with family size of more than five (5) persons (Table 1).

**Table 1:** Demographic data on mothers (n = 208) of under-five children in Ogoja Refugee Settlement, Cross River State

Variables		Frequency (n)	Percentage (%)
(years)	15.24	71	34.1
25-34		116	55.8
35-44		19	9.1
45 and above		2	0.96
Age at delivery of first child	14-17	166	79.8
	18-34	39	18.8
	35-44	3	1.4
Number of under-five children	One	200	96.2
	Two	8	3.8
Household hunger	Often	94	45.2
	Rarely/Sometimes	114	54.8
	Never	0	0
Total family size	Less than 5	62	29.8
	5 or more	146	70.2

Characteristics and Caring Practices of Children.

Among the children participated in this study, 90 (43.3%) and 118 (56.7%) were males and females, respectively. The mean age  $\pm$  SD of children were 30.33  $\pm$ 16.00 months. All respondents breastfed their children while 155 (74.5%) of them started breastfeeding immediately after birth within one

hour. Majority of the participants 83.2% breastfeed their children exclusively for 6 months. Concerning vaccination, 116 (55.8%) of the children did not receive full vaccine, and 146 (70.2%) of children had diarrhoea in the past two weeks prior to the study period.

**Table 2:** Characteristics and caring practices of under-five children in Ogoja Refugee Settlement, Cross River State

Characteristics	Categories	Frequency (n)	Percent (%)
Child's Gender	Male	90	43.3
	Female	118	56.7
Age (Months)	6-17	55	26.4
	18-29	51	24.5
	30-41	42	20.2
	42-53	42	20.2
	54 - 59	18	8.7
	Mean = 30.33 $\pm$ 16.00		
Did you breastfeed your child?	Yes	208	100
	No	0	0
Initiation of Breastfeeding	Less than 1 hour	155	74.5
	More than 1 hour	53	25.5
Duration of exclusive Breast Feeding	< 4	4	1.9
	4 - 5	31	14.9

(months)	6	173	83.2
	Yes	92	44.2
Child immunization	No	116	55.8
Diarrhoea preceding	Yes	62	29.8
two weeks)	No	146	70.2
Nutritional status of under-five children			
The average weights and heights were 10.91 ±	4.11 kg and 82.73	± 17.03 cm	

respectively. Furthermore, the MUAC of the under-five children was 15.52 ± 1.67 cm.

The analysis of the three anthropometric indices revealed that the prevalence of wasting, stunting, and underweight were 17.2%, 21.1% and 20%, respectively. Moreover, the

prevalence of severe wasting, stunting, and underweight among the children was 9.6%, 20.6%, and 18.4%, respectively (Table 3).

**Table 3:** Anthropometry and nutritional status of under-five children in Ogoja Refugee Settlement, Cross River State

Anthropometric indices	Categories	Frequency (n)	Percentage (%)
Weight (Kg)	3.0-5.9	13	6.25
	6.0-8.9	40	19.23
	9.0-11.9	78	37.50
	12.0-14.9	37	17.79
	15.0-17.9	31	14.90
	>18.0	9	4.33
	Mean = 10.91 ± 4.11		
Height (cm)	≤ 50	6	2.9
	51 - 60	4	1.9
	61 - 70	33	15.9
	≥ 71	165	79.3
	Mean = 82.73 ± 17.05		
MUAC (cm)	<11.5	1	0.5
	11.6-12.4	34	16.3
	>12.4	173	83.2
	Mean = 15.52 ± 1.67		
Weight for height (wasting)	Normal (≥ -2 WHZ score)	115	73.2
	Moderate wasting (≥ -3 and < -2 WHZ score)	27	17.2
	Severe wasting (< -3 WHZ score)	15	9.6
Height for age (stunting)	Normal (≥ -2 HAZ score)	102	58.3
	Moderate stunting (≥ -3 and < -2 HAZ score)	37	21.1
	Severe stunting (< -3 HAZ score)	36	20.6
Weight for age (underweight)	Normal (≥ -2 WAZ score)	114	61.6
	Moderate underweight (≥ -3 and < -2 WAZ score)	37	20
	Severe underweight (< -3 WAZ score)	34	18.4

MUAC-Mid upper arm circumference; WHZ: Weight-for-Height z-score; HAZ: Height- for-Age z-score; WAZ: Weight-for-Age z-score

## Discussion

Child malnutrition continues to be one major problem in public health especially in the developing countries including Nigeria. Factors such as low dietary intake, infectious diseases, inequitable food distribution and low appropriate care has made children in the developing counties vulnerable to malnutrition (Teferi *et al.*, 2016; Victora *et al.*, 2010) [24, 25]. Therefore, the current study was aimed at assessing the prevalence of nutritional status (wasting, stunting, and underweight) among children under-five in Ogoja Refugee Settlement, Cross River State.

Studies in Nigeria (Awogbenja and Ugwuoma, 2010) [26], other parts of Africa (Lespiato *et al.*, 2010) [27] and Asia (Nguyen and Sin, 2008) [28] have also reported that a high proportion (95-99.8%) of under-fives were breastfed as found in this study. However the 83.2% prevalence rate of exclusive breastfeeding for six months found in this study is similar to the 80% reported by Ajao *et al* (2010) [29] in Ile Ife but higher than the 64% reported by Amsalu *et al* (2008) [17] in Ethiopia, 23.5% in India (Dinesh *et al.*, 2006) [31] and 17.1% reported in Vietnam (Nguyen and Sin, 2008) [28]. This is probably because of sociocultural differences and attitude of caregivers to exclusive breastfeeding.

From the measurement of Mid Upper Arm Circumference (MUAC), 16.8% were discovered to be below the 12.4cm mark suggesting the prevalence of intense malnutrition. The malnutrition among the studied participants further revealed that 26.8%, 41.7% and 38.4% of the children under-five were wasted, stunted and underweight, respectively in area of study, which were noticed to be very high using the WHO classification (Yalew *et al.*, 2014) [32].

In this study, the prevalence of wasting is 26.8% of which 17.2% were moderate, and 9.6%, severe, is much higher than the values of national figure, 8.2% (Andy *et al.*, 2016) [33] which is an alarming case to increase risk of deaths among children. Over the last decade in Nigeria, the percentage of wasted children has increased steadily from 11% recorded in 2003 to 18% seen in 2013 (NPC and ICF, 2014). Wasting is an indicator of acute malnutrition that can occur due to recent infection or weight loss due to periodical variation of food supply. The increased rate of wasting in this study is attributable to the feeding habits and the study population.

In this study, the prevalence of stunting was 41.7% of which 20.6% were severe and 21.1% moderate. This is higher than the 37.0% obtained by Osazuwa and Ayo (2010) [35] in rural communities in Edo, 3.75% by Jeremiah and Uko (2007) [36]



in Port Harcourt, 23.7% in mountain slope of Cameroon by Teh *et al.* (2018) [37] and 17.4% documented in the Southwest Nigeria by Senbanjo *et al.* (2011) [38]. It was also higher than figures in other countries including Kenya, 28.9% (Dennis *et al.*, 2014) [39], Sudan, 24.9% (Musa *et al.*, 2014) [40], and Mongolia (Otgonjargal *et al.*, 2012) [41]. It was also lower than the regional figure, 50.2% (CSA, 2016), Ethiopia, 49.4% (Geberelassie *et al.*, 2018) [43], Kuwait, 12.1% (Al-Qaoud *et al.* 2015) [44], and India, 74.2% (Amritanshu *et al.*, 2013) [46]. According to works by different groups in Nigeria including the National Bureau of Statistics, the Nigerian Demographic and Health Survey (DHS) and the Nigeria Multiple Indicator Cluster Survey (MICS) (NPC and ICF, 2014; NBS, 2013) [34, 46] the national prevalence of stunting in Nigeria has steadily declined from 41% in 2008 to 34.8% in 2011 and then 32.2% in 2015. The latter figure is lower than what is obtained in 11 of the 19 Northern states in Nigeria compared to the Southern states where this study was carried out. This may not be unrelated to the increasing cases of internally displaced persons due to insurgency and arm conflicts in the Northern Nigeria. The most vulnerable groups in such situations are usually children and women. Stunting showed a failure to get adequate food over long period and affected through infections.

On the other hand, the prevalence of underweight was 38.4% was higher than some regions in Nigeria, for example 17.2% in Northern Nigeria (Aliyu *et al.*, 2012) 14.30%, in Okrika (Okari *et al.*, 2019) [47], 8.5% in Akure (Akorede and Abiola, 2013) [48] 15.5% in Ifewara (Senbanjo *et al.*, 2006) [49], and 29% in Zaria (Sufiyan *et al.*, 2012) [50]. The prevalence of underweight was also found to be higher than the national figure, 24.6% (Andy *et al.*, 2016) [33], and other studies done in Eastern region of Ghana, 6.9% (Anderson *et al.*, 2010) [52] and Kenya, 11.8% (Olack *et al.*, 2011). Higher figures were observed in Ethiopia, 49.2% (Teshome *et al.*, 2009) [53], Sudan, 52.0% (Eptihag *et al.*, 2017) [54], However, it was also relatively similar with the findings from Cameroon, 30% (Nagahori *et al.*, 2017) [55], India, 32.4% (Popat *et al.*, 2014) [56], and Pakistan, 39.5% (Khan *et al.*, 2016) [57]. The variation in prevalence of underweight among under-five children when compared to this study is understandable as study settings with higher values are known to be associated with regional conflicts. The prevalence of underweight among under-five children in Ogoja Refugee Camp in Cross River State is however, much higher than the projected increase from 24% in 1990 to 26.8% in 2015 for Africa (de Onis *et al.* 2004) [58]. The plausible reason for this might be the lack of knowledge in secular trend of increase in growth parameters over years.

Gebre *et al.* (2019) [59] in their study showed that the presence of diarrhoea disease was significantly associated with increasing prevalence of wasting. The 29.8% of children under-five in the study with diarrhea two weeks before the survey could partially explain depletion of nutrients. Inadequate and substandard sanitation as well poor hygiene and scarcity of soap in the IDP are the risk factors associated with diarrhea diseases which have been attributed to be a major cause of morbidity and mortality and (Connolly *et al.*, 2004) [60].

## Conclusion

The present study showed that the prevalence of wasting, stunting, and underweight were about 26.8%, 38.4% and 41.7% respectively in under-five children of Ogoja Refugee Settlement, Cross River State. The result indicates that

malnutrition is a serious public health problem in the Refugee settlement. Caregivers should be encouraged to exclusively breastfeed their children in the first six months of life and give adequate complementary foods that will promote the growth and development of their children.

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