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Prevalence and risk factors of acute malnutrition among pre-school children in internally displaced person settlements within Abuja Municipal Area Council

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Abstract: *Background:* Malnutrition is pervasive among displaced populations worldwide. Adequate nutrition is essential to the growth and development of all children, particularly in the preschool age.
Methodology: This cross-sectional study was conducted in four internally displaced person (IDP) settlements and their host communities within the Abuja municipal area council between April and May 2019. Using a multistage sampling method, subjects were recruited after parents' informed consent, from the IDP settlements and equal numbers were drawn from their host communities. The proportion of acute malnutrition using weight for height, MUAC, BMI-for-age Z scores were compared to the 2006 WHO standards. Predictors were determined by logistic regression and statistical significance was set at p less than 0.05.
Results: There were 1,179 children aged six to 59 months recruited in each group. The prevalence of wasting was 7.7% (91), moderate acute malnutrition was 7.2% (85), and severe acute malnutrition was 3.1% (37) among the IDPs while they were 7.1% (84), 6.5% (77) and 2.9% (34) respectively in the host communities. The predictors for wasting in both groups were age below 24months (Adj OR, 95% CI - 3.88, 2.38 - 6.32), low birth weight (Adj OR, 95% CI – 2.70, 1.55 – 4.71) and diarrheal disease (Adj OR, 95% CI - 5.45, 2.38 - 12.44). Location was predictive only in the host communities (Adj OR, 95% CI – 2.69, 1.37 – 5.28).
Conclusion and recommendation: Acute malnutrition was high among the pre-school children in this study. The nutritional needs of displaced children in the FCT should be met and their families educated on prompt recognition and treatment of diarrhoea.

Keywords: acute malnutrition, pre-school children, IDP, Host community

Introduction

Malnutrition is the lack of proper nutrition[1] and broadly refers to deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients.[2] Acute malnutrition (wasting) results from not having enough to eat.[3] The quality of nutrition in the early stages of life determines much of a child's future.[4] The pre-school age, in particular, is often marked by protein-energy and micronutrient deficiencies.[5] In any society, children are regarded as one of the most vulnerable groups of persons, most especially in the context of humanitarian emergencies.[6]

Internally displaced persons (IDPs) are persons or groups of persons who have been forced to leave their homes or places of habitual residence but have not crossed an internationally recognized state border.[7] Globally, the phenomenon of displacement is on the increase with a 20% rise in the number of displaced persons from the 2018 figures and almost 300,000 new displacements recorded in the first half of 2021.[8] Nigeria has the largest number of displaced persons in West Africa as of the end of 2021 and the cause of displacement was mainly due to armed insurgency.[9] The onset of insurgency in North-Eastern Nigeria since 2009 has resulted in more than 20,000 people killed and up to 2.1 million displaced as of 2016.[10]

High rates of acute malnutrition have been reported among displaced populations and their host communities within and outside Nigeria[5,10–13] with wide variations noted in displaced populations depending on the time of assessment and other factors such as climatic changes,

access to food rations, humanitarian aid/services received and source of livelihood.[5] Despite the availability of resources and opportunities for livelihoods and survival in the nation's capital city, displaced populations and their host communities in the Federal Capital Territory (FCT) may still experience malnutrition.
Therefore, this study determined the prevalence of acute malnutrition (wasting) and its predictors among under-five children in selected IDP settlements and their host communities within the FCT. It has the potential to add to the body of knowledge on displaced children and inform policymakers on measures to prevent malnutrition among displaced populations and their host communities.

Materials and Methods

This study was conducted in the FCT, North-Central Nigeria. Abuja Municipal Area Council (AMAC) is the largest of the six area councils in the FCT and was purposively selected being the one with the highest number of IDP settlements in the FCT. Four IDP settlements were selected by ballot out of the nine in AMAC namely Dagba, Tundun Natsira, Malaysian Garden and Wassa IDP settlement and along with their corresponding host communities namely Durumi, Karomanjigi, Pigba Sama and Wassa respectively.
The sample size was determined using the formula for comparing proportions between two independent groups based on the prevalence of wasting from a previous study.[14]
$n = \underline{(U + V)^2 (P_1 (1 - P_1) + P_2(1 - P_2))} / (P_1 - P_2)^2$
Therefore, the minimum sample size for each group was 1,176.

It was a cross-sectional study. The estimated total population of the IDPs in these settlements was 9,740 with an estimated under-five population of 1,948. Samples were drawn from each IDP settlement based on probability proportional to size. A sampling frame was generated from the enumeration of households in the IDP settlements and their host communities. Using a systematic random sampling technique, the first household was selected by ballot and all children between the ages of 6 and 59 months in each of the selected households were recruited for the study after written consent was obtained. Children diagnosed, as obtained from parent or caregiver's report, with conditions that could result in growth faltering e.g., congenital heart disease, cerebral palsy, paediatric AIDS, or whose family had not been resident in the location of study for at least six months were excluded from the study.

Ethical approval for the study was obtained from the Institutional Review Board of the National Hospital, Abuja with an approval number NHA/EC/019/2015. Approval was also obtained from the Federal Capital Territory Administration authority with an approval number FHREC/2019/01/35/15-04-19.

An interviewer-administered semi-structured questionnaire was used for data collection. Anthropometry measurements of weight in kilogram, length or height in centimetre and mid-upper arm circumference (MUAC) in centimetre were taken from each subject using an electronic weighing scale with tare function (Seca874® Germany), a Shorr length board (United nations children emergency fund - UNICEF), and a flexible, non-stretchable, color-coded plastic insertion tape (Shakir's strip) respectively. Ten Assistants were trained according to WHO guidelines. The Researcher and Assistants administered the questionnaire and obtained history including recent illness, performed anthropometry on all the subjects and conducted a brief physical examination looking for pallor, angular stomatitis, hair changes, bitot spots, and pedal oedema.

The Statistical Package for the Social Sciences (SPSS) version 21.0 was used to analyse the data. Results were presented in tables and charts. Quantitative variables such as age, weight, height/length, and mid-upper arm circumference (MUAC) were summarized using mean and standard deviation, while qualitative variables were summarized using percentages. Wasting was defined as weight-for-height (WFH) z-scores <−2SDs from the WHO 2006 standard reference population median while severe wasting was defined as weight-for-height z-scores <−3SDs from the reference population median. Moderate acute malnutrition was defined as WFH <-2 z-scores to ≥ -3 z-score MUAC from 11.5 to < 12.5 cm or BMI-for-age z-score (BAZ) from -3 to -2, whereas severe acute malnutrition (SAM) was defined as WFH <-3 z-scores or presence of oedema on both feet or MUAC < 11.5cm or BAZ <-3. Weight-for-height z-score (WHZ) was computed using the WHO Anthro Survey Analyzer software version 3.2.2. and the student's t-test was used to compare the normally distributed quantitative variables (age, BAZ, MUAC, WHZ) between the two groups. Pearson's Chi-square test was used to compare the categorical variables between the two groups and to test the associations between wasting and other categorical variables. The variables on bivariate analysis, that were significantly associated with wasting (P value 0.05 and below) were subjected to multivariate logistic regression to determine the risk factors associated with acute malnutrition among the IDPs and host communities. The statistical significance level was set at p less than or equal to 0.05.

Results

One thousand, one hundred and seventy-nine (1,179) children between the ages of 6 to 59months were sampled from selected IDP camps and their host communities respectively. The majority of 1,100 (93.3%) of the IDPs were displaced by Boko haram insurgency while ethnic clashes and Farmer-herdsmen clashes were responsible for the rest.
The age distribution showed a significance (p = 0.006)

between the categories, the least being the 6 to 11month age bracket in both groups as shown in Table 1. Also, the household size categories were significant $p < 0.001$ with more than 6 being the majority in both groups. Other variables namely sex, location, and household head were not significant ($p > 0.05$).

The mothers were mostly aged 25 to 34years, unemployed, housewives, students, or farmers, and had more than 4 children among the IDP group, this was statistically significant ($p < 0.05$) as shown in Table 2. Family features, such as religion and family types are as shown in Table 3. Socio-economic status for both IDPs and Host communities was mostly of the lower class; this was statistically significant, $p < 0.0001$.

Clinical features characteristic of malnutrition was found in both groups but much more among the IDPs as shown in Figure 1.

The subjects in the host communities were taller (mean ± SD 86.7 ± 13.8cm) than those in the IDPs settlements (mean ± SD 85.4 ± 13.0cm) and this difference was statistically significant (p 0.016) but weight and MUAC were not statistically significant between the groups as shown in Table 4.

Table 1: Socio-demographic characteristics of Study Subjects

Variable	Frequency (%) IDP n = 1,179	Host n = 1,179	x^2	df	p-value
Age (month)					
6-11	126 (10.7)	160 (13.6)	14.427	4	0.006*
12-23	291 (24.7)	271 (23.0)			
24-35	251 (21.3)	302 (25.6)			
36-47	285 (24.3)	238 (20.2)			
48-59	226 (19.2)	208 (17.6)			
Sex					
Male	608 (51.6)	602 (51.1)	0.061	1	0.805
Female	571 (48.4)	577 (48.9)			
Location					
Garki	169 (14.3)	169 (14.3)	0.000	3	1.000
Gwarinpa	169 (14.3)	169 (14.3)			
Wassa	686 (58.2)	686 (58.2)			
Malaysian Garden	155 (13.1)	155 (13.1)			
Household size					
3	99 (8.4)	197 (16.7)	112.796	4	< 0.001*
4	197 (16.7)	236 (20.0)			
5	173 (14.7)	268 (22.7)			
6	205 (17.4)	183 (15.5)			
> 6	505 (42.8)	295 (25.0)			
Head of household					
Father	1,138 (96.5)	1,135 (96.3)	5.680	2	0.058
Mother	39 (3.3)	34 (2.9)			
Others	2 (0.2)	10 (0.8)			

* Statistically significant

Table 2: Maternal characteristics of Study Subjects

Variable	Frequency (%) IDP n = 1,179	Host n = 1,179	^{2}	df	P-value
Mother's age (years)					
15 - 24	264 (22.4)	228 (19.3)	14.342	3	0.002
25 - 34	768 (65.1)	742 (62.9)			†0.002*
35 - 49	145 (12.3)	204 (17.3)			
≥ 50	2 (0.2)	5 (0.4)			
Mother's education					
No Formal	488 (41.4)	239 (20.3)	309.750	3	< 0.001*
Primary	347 (29.4)	218 (18.5)			
Secondary	329 (27.9)	536 (45.5)			
Tertiary	15 (1.3)	186 (15.8)			
Mother's occupation					
Junior school-teachers, drivers, and artisans	155 (13.1)	319 (27.1)	225.415	2	< 0.001*
Petty trader / labourer / messengers or similar grade	142 (12.0)	335 (28.4)			
Unemployed, housewife, students, farmers	882 (74.8)	525 (44.5)			
Number of children ever born					
1	108 (9.2)	221 (18.7)	111.884	4	< 0.001*
2	256 (21.7)	306 (26.0)			
3	220 (18.7)	270 (22.9)			
4	181 (15.4)	167 (14.2)			
> 4	414 (35.1)	215 (18.2)			
Marital status					
Married	1,167 (99.0)	1,153 (97.8)	12.789	5	0.025
In union as if married	0 (0)	6 (0.5)			†0.011*
Never married	2 (0.2)	9 (0.8)			
Separated	3 (0.3)	1 (0.1)			
Divorced	0 (0)	1 (0.1)			
Widowed	7 (0.6)	9 (0.8)			

* Statistically significant; df = 1; ^{2} Chi square

The prevalence of acute malnutrition: There was no statistically significant difference between the prevalence of wasting among the IDPs and Host communities 91 (7.7%) and 84 (7.1%) respectively ($p = 0.582$) as shown in Table 5. The prevalence of moderate acute malnutrition was 85 (7.2%) and 77 (6.5%) among the IDPs and Host communities respectively but this difference was not statistically significant (p 0.515). The prevalence of severe acute malnutrition was 37 (3.1%) and 34 (2.9%) among the IDPs and Host communities respectively. This difference was not statistically significant ($p = 0.718$).

Determinants of acute malnutrition: The subjects' bio-demographic and health-related factors associated with acute malnutrition (wasting) in both IDP, and Host communities are shown in Tables 6 and 7. Age below 24 months, location, birth weight below 2500g, and history of recent diarrhoea were significantly associated with wasting among the IDPs, and host communities (p

<0.05) as shown in Table 6. The maternal socio-demographic factors associated with acute malnutrition (wasting) in the IDP, and Host communities are shown in Table 8. The mother's religion and educational status were significantly associated with wasting only in the host communities (p 0.001 and 0.014 respectively) as shown in Table 8. The clinical features characteristic of malnutrition was not significantly associated with wasting (p > 0.05) as shown in Table 9.

The risk factors associated with acute malnutrition (wasting) among the IDPs, and host communities determined by logistic regression include age below 24months, birth weight below 2500g, diarrhoea episodes within two weeks before the study, and the location of the host community as shown in Table 10.

Table 3: Family Socio-economic characteristics of Study Subjects

Variable	Frequency (%) IDP n = 1,179	Host n = 1,179	^{2}	df	P-value
Religion					
Christianity	409 (34.7)	851 (72.2)	332.978	1	< 0.001*
Islam	770 (65.3)	328 (27.8)			
Ethnicity					
Fulani	86 (7.3)	41 (3.5)	975.880	6	< 0.001*
Hausa	377 (32.0)	245 (20.8)			
Gulafdah	472 (40.0)	16 (1.4)			
Igbo	0 (0)	253 (21.5)			
Yoruba	0 (0)	54 (4.6)			
Gbagyi	0 (0)	154 (13.1)			
Others	244 (20.7)	416 (35.3)			
Type of family					
Monogamous	1,004 (85.2)	1,060 (89.9)	12.186	1	< 0.001*
Polygamous	175 (14.8)	119 (10.1)			
Socio-economic status					
Upper	0 (0)	18 (1.5)	204.669	2	< 0.001*
Middle	217 (18.4)	518 (43.9)			
Lower	962 (81.6)	643 (54.5)			

* Statistically significant

Table 4: Anthropometric measurements of Study Subjects

Variable	Mean ± SD IDP n = 1,179	Host n = 1,179	T	p-value	Mean diff.	95% CI of diff Lower	Upper
Weight (kg)	11.9 ± 5.7	12.3 ± 5.3	1.617	0.106	0.36	-0.08	0.80
Height/Length (cm)	85.4 ± 13.0	86.7 ± 13.8	2.408	0.016*	1.33	0.25	2.42
MUAC (cm)	152 ± 3.5	15.3 ± 3.2	1.017	0.309	0.14	-0.13	0.41
BMI (kgm-2)	25.0 ± 153.3	34.3 ± 290.4	0.979	0.328	9.40	-9.40	28.10

* Statistically significant, CI confidence interval, diff difference

Table 5: Prevalence of acute malnutrition among the Study Subjects

Variable	Frequency (%) IDP (n = 1,179)	Host (n = 1,179)	^{2}	p-value
Wasting				
Yes	91 (7.7)	84 (7.1)	0.302	0.582
No	1,088 (92.3)	1,095 (92.9)		
Moderate acute malnutrition				
Yes	85 (7.2)	77 (6.5)	0.424	0.515
No	1,094 (92.8)	1,102 (93.5)		
Severe acute malnutrition				
Yes	37 (3.1)	34 (2.9)	0.131	0.718
No	1,142 (96.9)	1,145 (97.1)		

df = 1; ^{2} Chi square,

Table 6: Bio-demographic factors associated with wasting in both IDP and Host communities

Variable	IDP Wasting (n=1,179)			Host Wasting (n=1,179)		
	Yes n = 91	No n = 1,088	Total	Yes n = 84	No n = 1,095	Total
Age (month)						
6-11	26 (20.6)	100 (79.4)	126	30 (18.8)	130 (81.3)	160
12-23	36 (12.4)	255 (87.6)	291	26 (9.6)	245 (90.4)	271
24-35	10 (4.0)	241 (96.0)	251	12 (4.0)	290 (96.0)	302
36-47	11 (3.9)	274 (96.1)	285	10 (4.2)	228 (93.8)	238
48-59	8 (3.5)	218 (96.5)	226	6 (2.9)	202 (97.1)	208
^{2}, *df, p*	*54.770, 4, < 0.001**			*48.432, 4, < 0.001**		
Sex						
Male	50 (8.2)	558 (91.8)	608	43 (7.1)	559 (92.9)	602
Female	41 (7.2)	530 (92.8)	571	41 (7.1)	536 (92.9)	577
^{2}, *df, p*	*0.450, 1, 0.502*			*0.001, 1, 0.980*		
Location						
Garki	24 (14.2)	145 (85.8)	169	9 (5.3)	160 (94.7)	169
Gwarinpa	17 (10.1)	152 (89.90	169	23 (13.6)	146 (86.4)	169
Wassa	38 (5.5)	648 (94.5)	686	41 (6.0)	645 (94.0)	686
Malaysian Garden	12 (7.7)	143 (92.3)	155	11 (7.1)	144 (92.9)	155
^{2}, *df, p*	*15.845, 3, 0.001**			*12.933, 3, 0.005**		

* Statistically significant, df = 1; ^{2} Chi square

Table 7: Health-related factors associated with wasting in both IDP and Host communities

Variable	IDP Wasting (n=1,179)			Host Wasting (n=1,179)		
	Yes n = 91	No n = 1,088	Total	Yes n = 84	No n = 1,095	Total
Birth weight (g)						
< 2,500	24 (15.6)	130 (84.4)	154	17 (16.8)	84 (83.2)	101
2,500 – 3,999	43 (7.0)	600 (93.0)	645	42 (6.0)	637 (94.0)	699
≥ 4,000	3 (3.0)	98 (97.0)	101	4 (3.0)	130 (97.0)	134
Unknown	19 (6.8)	260 (93.2)	279	21 (8.6)	224 (91.4)	245
^{2}, *df, p*	*17.396, 3, 0.001**			*19.943, 3, < 0.001**		
Birth order						
< 3rd	34 (6.7)	472 (93.3)	506	36 (5.5)	618 (94.5)	654
≥ 3rd	57 (8.5)	616 (91.5)	673	48 (9.1)	477 (90.9)	525
^{2}, *df, p*	*1.242, 1, 0.265*			*5.826, 3, 0.016**		
Morbidity in the previous 2weeks						
Yes	43 (15.4)	237 (84.6)	280	23 (10.1)	205 (89.9)	228
No	48 (5.3)	851 (94.7)	899	61 (64.0)	890 (93.6)	951
^{2}, *df, p*	*30.082, 1, < 0.001**			*3.750, 1, 0.053*		
Type of morbidity	n = 43	n = 237	n=280	n = 23	n = 205	n=228
Cough						
Yes	23 (16.4)	117 (83.6)	140	5 (6.6)	71 (93.4)	76
No	20 (14.3)	120 (85.7)	140	18 (11.8)	134 (88.3)	152
^{2}, *df, p*	*0.247, 1, 0.619*			*1.547, 1, 0.214*		
Diarrhea						
Yes	22 (30.1)	51 (69.9)	73	10 (27.8)	26 (72.2)	36
No	21 (10.1)	186 (89.9)	207	13 (6.8)	179 (93.2)	192
^{2}, *df, p*	*16.591, 1, <0.001**			*14.750, 1, < 0.001**		

* Statistically significant df = 1; ^{2} Chi square

Table 8: Maternal socio-demographic factors associated with wasting amongst the IDP and Host communities

Variable	IDP Wasting (n=1,179) Yes n = 91	No n = 1,088	Total	Host Wasting (n=1,179) Yes n = 84	No n = 1,095	Total
Mother's age (year)						
15 - 24	17 (6.4)	247 (93.6)	264	15 (6.6)	213 (93.4)	228
25 - 34	66 (8.6)	702 (91.4)	768	55 (7.4)	687 (92.6)	742
35 - 49	8 (5.5)	137 (94.5)	145	14 (6.9)	190 (93.1)	204
≥ 50	0 (0)	2 (100)	2	0 (0)	5 (100)	5
^{2}, df, p, Fisher's exact p	2.586, 3, 0.460, 0.432			0.600, 3, 0l896, 0.954		
Mother's education						
No Formal	36 (7.4)	452 (92.6)	488	28 (11.7)	211 (88.3)	239
Primary	30 (8.6)	317 (91.4)	347	11 (5.0)	207 (95.0)	218
Secondary	22 (6.7)	307 (93.3)	329	36 (6.7)	500 (93.3)	536
Tertiary	3 (20.0)	12 (80.0)	15	9 (4.8)	177 (95.2)	186
^{2}, df, p	4.167, 3, 0.244			10.640, 3, 0.014*		
Mother's occupation						
Junior schoolteachers / drivers / artisans	11 (7.1)	144 (92.9)	155	20 (6.3)	299 (93.7)	319
Petty trader / labourer / messengers	9 (6.3)	133 (93.7)	142	27 (8.1)	308 (91.9)	335
Unemployed / HW / student / farmers	71 (8.0)	811 (92.0)	882	37 (7.0)	488 (93.0)	525
^{2}, df, p	0.600, 2, 0.741			0.800, 2, 0.670		

* Statistically significant, df = 1; ^{2} Chi square

Table 9: Association between Clinical features of malnutrition and Wasting

Variable	IDP Wasting (n=1,179) Yes n = 91	No n = 1,088	Total	Host Wasting (n=1,179) Yes n = 84	No n = 1,095	Total
Skin/hair changes						
Yes	29 (7.2)	373 (92.8)	402	11 (7.8)	130 (92.2)	141
No	62 (8.0)	715 (92.0)	777	73 (7.0)	965 (93.0)	1,038
^{2}, df, p	0.218, 1, 0.641			0.111, 1, 0.739		
Pallor						
Yes	26 (9.8)	239 (90.2)	265	7 (8.0)	81 (92.0)	88
No	65 (7.1)	849 (92.9)	914	77 (7.1)	1,014 (92.9	1,091
^{2}, df, p	2.102, 1, 0.147			0.099, 1, 0.753		
Bitot's spot						
Yes	3 (9.1)	30 (90.9)	33	1 (10.0)	9 (90.0)	10
No	88 (7.7)	1,058 (92.3)	1,146	83 (7.1)	1,086 (92.9)	1,169
^{2}, df, p, Fisher's exact p	0.090, 1, 0.764, 0.737			0.126, 1, 0.723, 0.524		
Angular stomatitis						
Yes	2 (6.7)	28 (93.3)	30	0 (0)	14 (100)	14
No	89 (7.7)	1,060 (92.3)	1,149	84 (7.2)	1,081 (92.8)	1,165
^{2}, df, p, Fisher's exact p	0.048, 1, 0.827, 1.000			1.087, 1, 0.297, 0.616		

* Statistically significant; df = 1; ^{2} Chi square.

Table 10: Multiple logistic regression of wasting on associated factors for both groups

Predictor variable	Multiple logistic regression IDP p-value	Adj. OR	95%CI Low	Upp	Multiple logistic regression Host p-value	Adj. OR	95%CI Low	Upp
Age (< 24months / ≥ 24months)	< 0.001*	3.88	2.38	6.32	< 0.001*	2.92	1.74	4.92
Location (Gwarimpa/Others)	0.070	1.63	0.96	2.77	0.004*	2.69	1.37	5.28
Birth weight < 2,500g (Yes / No)	< 0.001*	2.70	1.55	4.71	< 0.001*	3.18	1.72	5.88
Birth order (≥3rd / <3rd)	-	-	-	-	0.113	1.49	0.91	2.42
Morbidity in previous 2 weeks (Yes / No)	0.013*	2.06	1.16	3.63	-	-	-	-
Diarrhoea (Yes / No)	0.003*	3.01	1.45	6.24	< 0.001*	5.45	2.38	12.44
Religion (Islam / Christianity)	-	-	-	-	0.582	1.19	0.64	2.20
Mother's education (No formal / Others)	-	-	-	-	0.090	1.62	0.93	2.83

* Statistically significant; CI confidence interval, Crd. = Crude; Adj. = Adjusted; OR = Odds Ratio; Low = Lower; Upp. = Upper

Discussion

The prevalence of wasting among the IDPs was 7.7% which was higher than was found among the host communities in this study. This is consistent with findings in North-Eastern Nigeria that displaced populations had more likelihood of wasting than those unaffected.[15] This prevalence of acute malnutrition is higher than was reported among displaced under-five children in Uganda and Pakistan.[11,16] High levels of wasting and severe wasting found among IDPs is indicative of acute food shortage that follows the conflict or disaster responsible for the displacement as reported in Sub-Saharan Africa.[5,13,14] The prevalence of severe wasting among the IDPs in this study was high because any significant prevalence of severe wasting is an indicator of a heightened risk for nutritional health crises.[17] This is comparable to the high rates of wasting and severe wasting reported among IDPs in East and Central Africa derived from surveys conducted shortly after the humanitarian emergency as part of initial assessment to plan, execute and monitor targeted nutritional intervention.[5,18]

The prevalence of wasting among the host communities in this study was 7.1% and this agrees with findings from previous studies that host communities are significantly affected by malnutrition.[13,14,19] Although our finding was comparable to the levels reported in low-middle -income countries[20] and the national average prevalence from the 2018 National demographic health survey (NDHS), some studies conducted among host communities have found in them a higher prevalence of wasting compared to the general population.[5,14] For example, a lower prevalence of wasting (6.1% and 4.4%) was reported among under-five children in Cameroon and Iran respectively.[21,22] Furthermore, the prevalence of severe wasting was slightly higher among the host communities in this study than was reported among the general under-five population.[22,23] Where higher rates of wasting were reported within and outside Nigeria, the studies were carried out in predominantly rural areas[24–27] whereas, in this study, the host communities were a mixture of urban, semi-urban and rural.

The prevalence of moderate acute malnutrition and severe acute malnutrition was also high among both groups in this study, further showing that the communities which host displaced populations are also vulnerable to malnutrition, probably due to a more rapid depletion of already scarce resources which are spread thin over both populations. Surveys conducted among the conflict -affected displaced population have shown that any significant prevalence of SAM up to one percent, is undesirable and indicative of an increased risk of mortality.[28] The high prevalence of SAM in this study is worrisome and requires urgent intervention by the government and other relevant stakeholders to mitigate this trend. The national IDP policy as adopted from the 2009 Kampala convention serves as a guide for state actors in the care and support of the IDPs.[29] Nevertheless, collaboration for strategic nutritional intervention with Non-Governmental Organizations such as the World Food Programme and UNICEF is necessary. On the other hand, no document or policy addresses the concerns of the host communities. This may be because there is a paucity of literature on host communities in Africa and other parts of the world.

Risk factors associated with acute malnutrition in this study include age below 24months, birth weight below 2500g, diarrhoea episode in the two weeks preceding the study and location of the host community. Age below and equal to 24months was significantly associated with wasting among both groups in this study. This is consistent with other studies among the IDPs[11] and the general population.[30,31] Children below 24months of age are particularly vulnerable to acute malnutrition because they are in the critical window period for optimal growth and development,[4] the nutritional requirements for which if not met will readily result in a poor nutritional status.

The semi-urban (Karomanjigi) location was significantly associated with wasting among the host communities. This could be due to scarce resources, limited opportunities for economic growth, partially developed infrastructure, and poor access to social amenities in semi-urban areas. On the other hand, fully urbanized communities are known to have better opportunities for survival due to a higher concentration of state resources and basic amenities such as water, electricity, and road network. Malnutrition as reported in the 2018 NDHS is more likely to affect those living in rural than urban areas while one study reported no association between undernutrition and place of residence.[32]

Birth weight below 2500g or small size at birth was significantly associated with wasting among both groups. Most studies that have been done among IDPs did not assess the incidence of low birth weight or small size at birth.[11–14,16,19] Moreover, available data on low birth weight is unreliable because it is subject to recall bias and only accounts for attended births (up to 75% of births in Nigeria are unattended). However, small size at birth is closely related to maternal malnutrition and maternal BMI below 18.5 has been associated with under-five malnutrition in several studies.[23,24] The association of small size at birth with wasting among the host communities in this study is consistent with other studies.[30,33]

Recent diarrhoea was significantly associated with wasting among both groups in this study. This is consistent with other studies conducted among the general population.[30,32,34,35] However, some studies reported association with the frequency of the child's illness and recurrent illness. Cough which is indicative of acute respiratory illness (ARI) was not significantly associated with wasting in both groups unlike in other studies.[32]

Conclusion

The prevalence of acute malnutrition was high among the IDPs as well as the host communities. Determinants of wasting among the IDPs and host communities were alike including age below 24months, recent diarrhoea, low birth weight and the semi-urban location of the host communities.

Recommendations

The Federal Government should ensure quick resolution of the ongoing conflict in all the States of the federation affected by Boko Haram insurgency and enforce the full implementation of the national policy on IDPs to improve support for the IDPs in rural and urban areas within the FCT by providing nutritional support and strengthening existing feeding programs at the community level for the prevention and management of malnutrition. Pregnant women in the IDP settlements and host communities should be educated on the need for adequate ante-natal care to reduce low birth weight babies and ensure access to prompt treatment and prevention of common childhood diseases such as diarrhoea within the FCT.

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Authors' Contributions
First author was involved in the manuscript concept, design, and definition of intellectual content, literature search, data acquisition, data analysis, statistical analysis, manuscript preparation, manuscript editing. Second author was involved in the manuscript definition of intellectual content, manuscript editing and manuscript review. Third author was involved in the manuscript definition of intellectual content, statistical analysis, manuscript editing and manuscript review. Fourth author was involved in the manuscript concept, editing and review.

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