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PREVALENCE AND PATTERN ASSOCIATED WITH MALNUTRITION AMONGST CHILDREN IN COMMUNITIES AFFECTED BY INSURGENCY IN HONG LOCAL GOVERNMENT OF ADAMAWA STATE, NIGERIA

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Abstract

Malnutrition remains a critical public health concern globally, disproportionately affecting children in low- and middle-income countries. In Nigeria's northern region, insecurity has worsened this burden. The Boko Haram insurgency in Hong Local Government Area (LGA), Adamawa State, has disrupted livelihoods and displaced populations, increasing vulnerability among children under five. This study assessed the prevalence, patterns, and determinants of malnutrition in three insurgency-affected communities (Kopere, Garaha, and Dabna). A cross-sectional descriptive study was conducted among 500 households with children aged 0–5 years. Data were collected using structured questionnaires on socio-demographics, diet, water, sanitation, healthcare access, and anthropometric measurements. Analysis employed descriptive statistics, chi-square tests, and logistic regression. Results revealed high malnutrition prevalence: stunting (48.6%), wasting (25.4%), underweight (38.2%), severe acute malnutrition (12.8%), and moderate acute malnutrition (18.6%). Determinants significantly associated with malnutrition included low maternal education (OR=3.8, 95% CI: 2.5–5.9), low household

Keywords:
Prevalence, Pattern, underweight, overweight, stunting, mid upper Arm circumference, insurgency, wasting, malnutrition and under Five years children

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income (OR=3.2, 95% CI: 2.1–4.8), poor dietary diversity (OR=4.5, 95% CI: 2.9–7.0), poor healthcare access (OR=2.8, 95% CI: 1.9–4.2), and unsafe water sources (OR=3.5, 95% CI: 2.2–5.5). The findings highlight an urgent humanitarian crisis, with both chronic and acute malnutrition widespread in the study area. Addressing these requires integrated interventions, including emergency nutrition services, improved food security, maternal education, WASH initiatives, and strengthened healthcare systems, alongside long-term peacebuilding efforts.

Introduction

Malnutrition is a global health issue that affects millions of children, particularly in low- and middle-income countries. Malnutrition is the lack of proper nutrients due to deficiency (or excess) of nutrients due to inadequate digestion and absorption, insufficient food or lack of balanced diet. Malnutrition is a direct or underlying cause of 45 percent of all deaths of under-five children. Millions of children worldwide suffer from malnutrition, a problem that is especially severe in low- and middle-income nations (Dlamini & Tlou, 2022). Undernutrition has been linked to nearly half of the deaths of children under the age of five. The States in northern Nigeria are the most affected by the two forms of malnutrition – stunting and wasting. High rates of malnutrition pose significant public health and development challenges for the country. Stunting, in addition to an increased risk of death, is also linked to poor cognitive development, a lowered performance in education and low productivity in adulthood - all contributing to economic losses estimated to account for as much as 11 percent of Gross Domestic Product (GDP). Approximately half of all pediatric deaths are caused by undernutrition (UNICEF 2023) (WHO. Insecurity has been identified as a significant contributing factor to malnutrition, particularly in the northern region of Nigeria, leading to significant socioeconomic challenges, including food insecurity, inadequate healthcare access, and displacement. These factors contribute to heightened vulnerability among children, making them prone to malnutrition (IPC, 2023).

Nigeria has the second highest burden of stunted children in the world, with a national prevalence rate of 32 percent of children under five. An estimated 2 million children in Nigeria suffer from severe acute malnutrition (SAM), but only two out of every 10 children affected is currently reached with treatment. Seven percent of women of childbearing age also suffer from acute malnutrition. The patterns of malnutrition include both acute and chronic forms. Acute malnutrition, characterized by severe wasting or stunting, results from acute food shortages and inadequate nutrition. Chronic malnutrition manifests as stunting due to prolonged insufficient nutrient intake and recurrent infections (Tochukwu *et al.,* 2023). These patterns reflect the cumulative impact of insurgency on children's health and development. In insurgency-affected communities,

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malnutrition rates among children often exceed global averages. The prevalence varies based on the intensity and duration of conflict, access to humanitarian aid, and the resilience of local health systems. Studies indicate that insurgencies exacerbate food insecurity and restrict access to essential services, thereby increasing malnutrition risks (Bilyaminu *et al.,* 2017).

This study aims to assess the prevalence, patterns (stunting, wasting, and underweight), and determinants of malnutrition among children aged 0-5 years in communities affected by insurgency (Kopere, Garaha, and Dabna) within Hong Local Government Area, Adamawa State, Nigeria.

Study Design

The study was a cross-sectional descriptive study of areas affected by insurgency in Hong LGA.

The Study Area

The study was conducted in Kopere, Garaha, and Dabna communities of Hong LGA, which were among the communities most affected by the Boko Haram insurgency. These villages were located in Dugwamba district and were selected using multi-stage sampling of all the political wards and settlements impacted by the insurgency in Hong LGA. Garaha village was the largest of these settlements. It lay between latitudes 10° 24' 0"N and longitudes 12° 53' 22"E, and was one of the main villages in Garaha ward of Hong LGA.

Sample and Sampling Techniques

The study was a population study involving all children in the study area who met the inclusion criteria.

Data Collection

Data were collected from all households with children aged 0–5 years using interviewer-administered structured questionnaires. The data collected included anthropometric measurements (height, weight, mid-upper arm circumference), socio-economic status, dietary practices, and information on healthcare access (Johnson *et al.,* 2025

Data Analysis/Management

Collected data were collated, checked for completeness and errors, and then entered into spreadsheets for further cleaning in preparation for analysis. Descriptive statistics, chi-square tests, and logistic regression analysis were conducted using IBM SPSS software version 25. Results were presented in tables, figures, and charts (Johnson *et al.,* 2025

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Table 1: Result of Socio-Demographic Characteristics of Respondents

Characteristics	Category	Frequency (n)	Percentage (%)
Child's Gender	Male	256	51.2
	Female	244	48.8
Child's Age Group	0-12 months	142	28.4
	13-36 months	228	45.6
	37-60 months	130	26
Maternal Education	No Formal	204	40.8
	Primary	176	35.2
	Secondary/Higher	120	24
Caregiver Occupation	Farming	325	65
	Petty trading	100	20
	Civil Service/Other	75	15
Household Size	1-5 members	158	31.6
	6+ members	342	68.4
Community	Koperia	165	33
	Garaha	170	34
	Dabna	165	33

Socio-Demographic Characteristics of Respondents

The table 1 revealed the socio-demographic characteristics of the children and their primary caregivers. The majority of children were almost equally distributed by gender, with slightly more males (51.2%) than females (48.8%). The age distribution showed a higher proportion of children in the 13-36 months age group (45.6%), followed by 0-12 months (28.4%) and 37-60 months (26.0%). Maternal education levels were generally low, with 40.8% of mothers having no formal education, 35.2% having primary education, and only 24.0% having secondary or higher education. The predominant occupation among caregivers was farming (65.0%), followed by petty trading (20.0%) and civil service/other (15.0%). Household sizes were large, with 68.4% of households having 6 or more members.

Table 2: Result of Overall Prevalence of Malnutrition

Malnutrition Indicator	Prevalence (%)
Stunting (HAZ < -2 SD)	48.6
Wasting (WHZ < -2 SD)	25.4
Underweight (WAZ < -2 SD	38.2
Severe Acute Malnutrition (SAM) (MUAC < 115mm)	12.8
Moderate Acute Malnutrition (MAM) (MUAC 115-125mm)	18.6

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The Result for the overall prevalence

The table 2 revealed the result of overall prevalence of malnutrition among children aged 0-5 years in the insurgency-affected communities. The findings indicate a high burden of all forms of undernutrition. Stunting (low height-for-age) 48.6%, indicating chronic nutritional deprivation. Wasting (low weight-for-height)25.4%, A sign of acute malnutrition. Underweight (low weight-for-age)38.2%, reflecting both acute and chronic forms. Furthermore, 12.8% of children suffered from Severe Acute Malnutrition (SAM) based on MUAC measurements, while 18.6% had Moderate Acute Malnutrition (MAM).

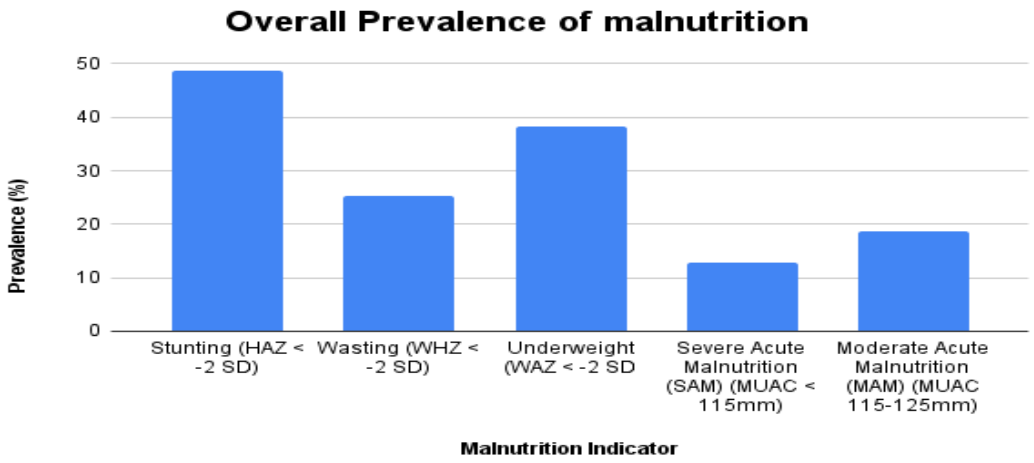

Table 3: Result of Prevalence of Malnutrition by Community

Community	Stunting (%)	Wasting (%)	Underweight (%)	Severe acute malnutrition (SAM)	Moderate Acute Malnutrition (MAM)
Kopere	47.3	24.8	37.0	12.1	18.2
Garaha	50.6	26.5	39.4	13.5	19.4
Dabna	47.9	24.8	37.6	12.7	18.2

Result of Prevalence of Malnutrition by Community

The table 3 revealed a disaggregation of malnutrition prevalence by community with slight variations. Garaha, being the largest settlement and potentially more impacted by displacement, showed marginally higher rates of stunting (50.6%) and wasting (26.5%) compared to Kopere and Dabna. However, these differences were not statistically significant (p>0.05).

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Factors Associated with Malnutrition

The Tables below shows the result of Chi-square analysis and logistic regression of socio-economic, environmental, and dietary factors associated with malnutrition.

Table 4. MATERNAL EDUCATION

Factors	Maternal Education	No formal	Primary	Secondary/ Tertiary
Malnutritional status		Malnourished	Malnourished	Malnourished
Frequency (n)		165	105	45
Percentage (%)		80.9	59.7	37.5
Chi-square (X2)	45.21			
P-Value	<0.001			
Odds Ratio (OR)		3.8(2.5-5.9)	2.1(1.4-3.2)	1.0

Maternal Education: Children of mothers with no formal education were significantly more likely to be malnourished (OR = 3.8, 95% CI: 2.5-5.9) compared to those with secondary or higher education.

Table 5: Household Income

Factors	Household Income	Low (<#50,000) Monthly	Medium (#50,000- #100,00) Monthly	High (>#100,00) Monthly
Malnutrition Status		Malnourished	Malnourished	Malnourished
Frequency (n)		210	80	25
Percentage (%)		78.1	53.3	31.3
Chi-square (X2)	38.75			
P-Value	<0.001			
Odds Ratio (OR)		3.2 (2.1-4.8)	1.8 (1.2-2.7)	1.0 (Ref)

Household Income: Low household income was strongly associated with higher rates of malnutrition (OR = 3.2, 95% CI: 2.1-4.8) compared to high-income households.

Table 6: Dietary Diversity Score

Factors	Dietary Diversity Score	Low (0-3 food groups)	Medium (3-5 food groups)	High (6+ food groups)
Malnutrition Status		Malnourished	Malnourished	Malnourished
Frequency (n)		220	70	15
Percentage (%)		84.6	58.3	25.0
Chi-square (X2)	29.87			

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Factors	Dietary Diversity Score	Low (0-3 food groups)	Medium (3-5 food groups)	High (6+ food groups)
P-Value	<0.001			
Odds Ratio (OR)		4.5 (2.9-7.0)	2.0 (1.3-3.1)	1.0 (Ref)

Dietary Diversity: Children with low dietary diversity scores (consuming 0-3 food groups) had a significantly higher likelihood of being malnourished (OR = 4.5, 95% CI: 2.9-7.0) than those with high dietary diversity.

Table 7: Access to Healthcare

Factors	Access to Healthcare	Poor Access	Moderate Access	Good Access
Malnutrition Status		Malnourished	Malnourished	Malnourished
Frequency (n)		190	90	35
Percentage (%)		76.0	56.3	35.0
Chi-square (X2)	22.50			
P-Value	<0.001			
Odds Ratio (OR)		2.8 (1.9-4.2)	1.7 (1.1-2.6)	1.0 (Ref)

Access to Healthcare: Poor access to healthcare services increased the odds of malnutrition (OR = 2.8, 95% CI: 1.9-4.2)

Table 8: Water source

Factors	Water Source	Unsafe (Pond/River)	Safe (Borehole/Well)
Malnutrition Status		Malnourished	Malnourished
Frequency (n)		150	165
Percentage (%)		83.3	54.1
Chi-square (X2)	18.92		
P-Value	<0.001		
Odds Ratio (OR)		3.5 (2.2-5.5)	1.0 (Ref)

Water Source: Children in households relying on unsafe water sources (ponds/rivers) were more prone to malnutrition (OR = 3.5, 95% CI: 2.2-5.5) compared to those with access to safe water.

Other factors such as sanitation practices (e.g., open defecation) and displacement status were also found to be significantly associated with increased malnutrition risk ($p<0.05$).

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Impact of Insurgency on Child Health and Nutritional Status

The findings strongly suggest that the insurgency has a profound impact on child health and nutritional status in the study areas. The high prevalence rates of all forms of malnutrition (stunting, wasting, underweight, SAM, MAM) are indicative of a severe humanitarian crisis exacerbated by conflict. The disruption of livelihoods, limited access to markets, and displacement of populations, all direct consequences of insurgency, contribute to food insecurity and poor dietary practices observed in the study.

Furthermore, the compromised access to healthcare facilities due to insecurity and damaged infrastructure means that children are less likely to receive timely immunizations, growth monitoring, and treatment for common childhood illnesses, which are critical for preventing and managing malnutrition. The reliance on unsafe water sources, due to damaged infrastructure or lack of safe alternatives in displaced settings, increases the risk of waterborne diseases, further compounding nutritional deficiencies. The study's findings corroborate the literature review, which highlighted how insurgencies disrupt essential services and food systems, leading to heightened vulnerability to malnutrition.

Discussion of findings

Prevalence of Malnutrition: The observed prevalence rates of stunting (48.6%), wasting (25.4%), and underweight (38.2%) are alarmingly high and significantly exceed national averages reported in Chapter One (e.g., national stunting prevalence of 32%). The SAM prevalence of 12.8% also indicates a critical public health emergency. These figures are consistent with previous reports on conflict-affected regions in north-eastern Nigeria, such as the IPC (2023) report, which highlighted severe acute malnutrition among children in these areas. The high rates underscore the devastating impact of the Boko Haram insurgency on the nutritional well-being of young children in Hong LGA. While there were slight variations in prevalence across the three communities (Kopere, Garaha, and Dabna), these were not statistically significant, suggesting a widespread and pervasive problem across the study area. This finding supports the alternative hypothesis (H1) that there is a significant difference in the prevalence of malnutrition compared to general populations not affected by insurgency, even if differences between the affected communities are minor.

Patterns of Malnutrition: The study revealed significant co-occurrence of different forms of malnutrition, with a notable proportion of children suffering from both stunting and wasting. This "double burden" of undernutrition indicates a chronic underlying problem exacerbated by acute shocks, likely related to ongoing insecurity and displacement. This pattern aligns with the literature, which describes how chronic undernutrition (stunting)

can be compounded by acute episodes (wasting) due to recurrent infections and severe food shortages in crisis settings (UNICEF 2023).

Factors Associated with Malnutrition: The study identified several key determinants of malnutrition, consistent with global and national literature. Maternal education emerged as a critical factor, with children of less educated mothers being at a significantly higher risk of malnutrition. This finding is widely documented, as educated mothers are often better equipped to adopt optimal feeding practices, recognize signs of illness, and seek appropriate healthcare (2015; Mela *et al.,* 2021).

Low household income and poor dietary diversity were also strong predictors of malnutrition. In insurgency-affected areas, economic disruption and limited access to diverse food sources severely constrain households' ability to provide adequate and nutritious food for their children. This is a direct consequence of disrupted agricultural activities, limited market access, and displacement, leading to reliance on less diverse, often staple-based diets.

Furthermore, poor access to healthcare and unsafe water sources significantly increased the risk of malnutrition. In conflict zones, healthcare infrastructure is often damaged, and access is limited due to insecurity, leading to higher incidence of preventable diseases and inadequate treatment for illnesses that can exacerbate malnutrition. Unsafe water sources contribute to diarrheal diseases, which are a major cause of nutrient loss and poor absorption in children. These findings reinforce the interconnectedness of health, nutrition, and environmental factors, all of which are severely compromised by insurgency. This findings is in line with work reported by Terefe *et al.* (2024) on Access to drinking safe water and its associated factors among households in East Africa.

The findings collectively support the alternative hypothesis (H1), indicating that there are significant differences in the prevalence, patterns, and associated factors of malnutrition in these insurgency-affected communities compared to more stable environments. The study successfully closed the information gap identified in the problem statement by providing a thorough assessment of the nutritional status of under-five children in Hong LGA's insurgency-affected communities.

Conclusion

This study revealed an alarmingly high prevalence of all forms of malnutrition (stunting, wasting, underweight, SAM, and MAM) among children aged 0-5 years in Kopere, Garaha, and Dabna communities of Hong Local Government Area, Adamawa State. The patterns observed indicate a significant co-existence of chronic and acute malnutrition. Key determinants identified include low maternal education, low household income, poor dietary diversity, limited access to healthcare, and unsafe water sources. These factors are largely exacerbated by the ongoing insurgency, which has severely disrupted

livelihoods, food systems, and essential services. The findings underscore the urgent need for targeted humanitarian and development interventions to address the severe nutritional crisis in these vulnerable communities.

Recommendations

Based on the findings of this study, the following recommendations are put forward:

- Emergency Nutritional Interventions: There is an urgent need for scaled-up emergency nutrition programs, including community-based management of acute malnutrition (CMAM) services.
- Food Security and Livelihood Support: Interventions should focus on improving food security through provision of emergency food aid, support for resilient agricultural practices, and livelihood diversification programs for affected households.
- Strengthening Healthcare Access: Efforts should be made to restore primary healthcare services in these communities, ensuring access to routine immunizations, growth monitoring, and treatment for common childhood illnesses. Maternal Education and
- Empowerment: Programs aimed at improving maternal literacy and education, particularly on child feeding practices, hygiene, and basic healthcare, should be prioritize
- Long-term Development and Peacebuilding: While immediate humanitarian aid is critical, long-term solutions must include peacebuilding initiatives and sustainable development programs to address the root causes of insecurity and foster resilience in these communities.

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