



ASSESSING THE RELATIONSHIP BETWEEN POPULATION DISPLACEMENT AND THE PREVALENCE OF PARASITIC INFECTIONS AMONG IDP HOST COMMUNITIES IN ADAMAWA, BORNO, AND YOBE STATES, NORTHEAST NIGERIA

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ABSTRACT

Armed conflicts in Northeast Nigeria, driven largely by Boko Haram and ISWAP insurgencies, have led to widespread population displacements, with millions of internally displaced persons (IDPs) settling in host communities. This study assessed the relationship between displacement rates and the prevalence of parasitic infections among IDP host communities in Adamawa, Borno, and Yobe States. A descriptive cross-sectional design was employed across 12 host communities, which had a combined population of 243,000, including 45,354 displaced persons. Structured questionnaires and laboratory investigations (stool, urine, and blood smears) were conducted among 1,094 participants. Data were analyzed using descriptive statistics and the Pearson correlation coefficient. Results revealed high displacement rates, ranging from 8.0% (Damare, Adamawa) to 28.0% (Dalori, Borno). The prevalence of parasitic infections ranged from 17.5% to 38.0%, with intestinal helminths as the most common. A strong positive correlation was found between displacement rate and parasitic prevalence ($r = 0.81$, $p < 0.01$), with the highest associations observed in Borno communities (Dalori $r = 0.84$, Bama $r = 0.82$). These findings suggest that increasing displacement intensity is significantly linked with higher parasitic burdens, largely due to overcrowding, poor sanitation, and inadequate health interventions. Integrated WASH, deworming, and malaria prevention programs are recommended to reduce morbidity in these vulnerable populations.

Keywords: Displacement, Parasitic infections, Internally Displaced Persons, Northeast Nigeria

INTRODUCTION

Northeast Nigeria remains one of the regions most affected by conflict-induced displacements, with over three million internally displaced persons (IDPs) spread across Adamawa, Borno, and Yobe States (UNHCR, 2022; IDMC, 2023). These mass displacements are linked to deteriorating health outcomes, particularly parasitic infections such as malaria, schistosomiasis, and soil-transmitted helminths, which thrive under overcrowded and unsanitary conditions (Abiye *et al.*, 2022; Adebote, 2023; Ali & Gambo, 2023). While parasitic diseases are endemic in Nigeria, their burden among IDP host communities remains under-examined. This study fills that gap by quantifying the relationship between displacement intensity and infection prevalence.

MATERIALS AND METHODS

Study Area

This study was carried out in selected Internally Displaced Persons (IDP) host communities across the insurgency-affected states of Borno, Yobe, and Adamawa in North-Eastern Nigeria. This region lies approximately between latitude 7°N and 13.5°N and longitude 8.5°E and 14.25°E, encompassing an estimated landmass of 402,159 square kilometres, or about 24.5% of Nigeria's total territorial expanse (Federal Republic of Nigeria, 2015). It shares international boundaries with the Republic of Niger to the north, the Republic of Chad to the northeast, and the Republic of Cameroon to the east, which has made cross-border humanitarian and security concerns an ongoing issue (United

Nations Office for the Coordination of Humanitarian Affairs (OCHA), 2023). The study targeted key communities that exemplify the socio-epidemiological consequences of long-term displacement and limited healthcare access, particularly in the wake of the Boko Haram insurgency that has destabilized the zone since 2009 (Thurston, 2018).

Specifically, the IDP host communities sampled included Dalori, Ngondori/Bakkasi, Bama Town, and Gwoza Town in Borno State; Bindigari/Pawari, Danjuwa, Ashelkiri/Ngadala, and Watinani in Yobe State; as well as Mayo Inne, Mbilla, Malkohi, and Damare in Adamawa State. These communities represent different stages of displacement and rehabilitation, ranging from temporary camps to more permanent host settlements. The climate in these areas is typically tropical, with mean annual rainfall ranging from 700 mm in the arid north to about 1600 mm in the more humid southern parts. The temperature peaks at 40°C in April and drops to about 18°C between December and January (Federal Republic of Nigeria, 2015). Vegetation is predominantly savannah—ranging from northern guinea to Sudan savannah—while soils are largely Entisols and Alfisols, depending on latitudinal variations (Adejuwon & Jeje, 2018). This ecological diversity, compounded by the effects of armed conflict and population displacement, has significantly altered sanitation, access to potable water, and disease ecology (Idris, 2016). Thus, the selected communities serve as a robust platform for assessing the spatial and epidemiological dynamics of parasitic infections in a post-insurgency context.

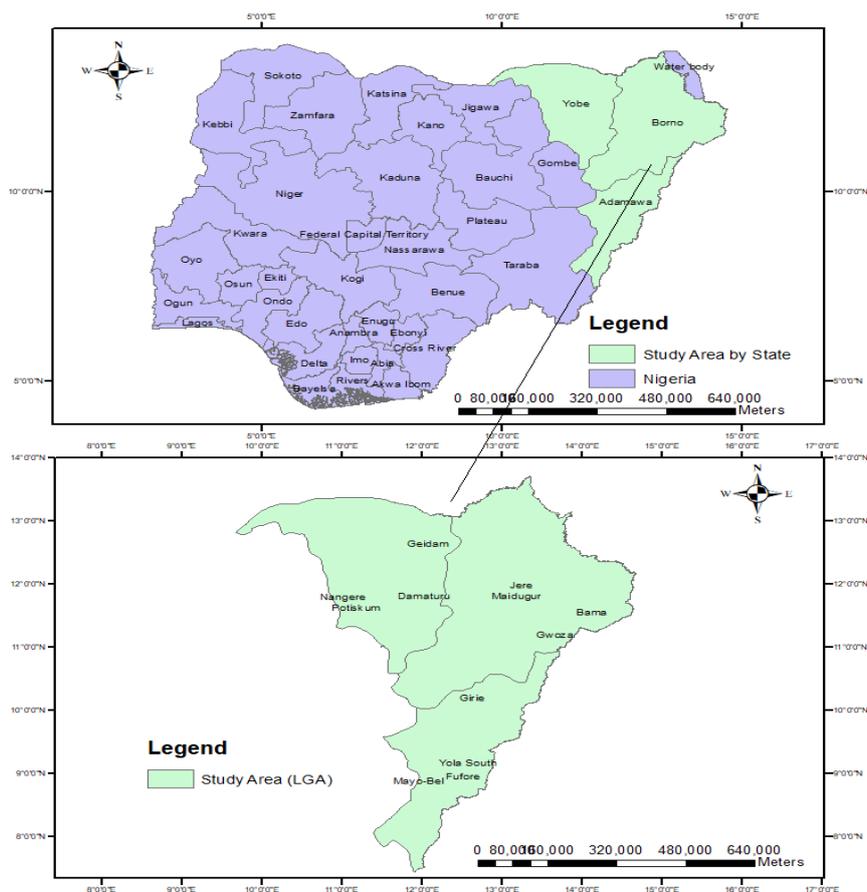


Figure 1: Map of the Study Area

Methods

A descriptive cross-sectional study was conducted in 12 host communities across Adamawa, Borno, and Yobe States. A total population of 243,000 was recorded, including 45,354 IDPs. A sample size of 1,094 respondents was selected using stratified random sampling (response rate 95.96%). Data collection involved structured questionnaires and laboratory diagnosis of parasites: stool examination (Kato-Katz for helminths), urine microscopy (for schistosomiasis), and thick/thin blood smears (for malaria). Samples were analyzed at the various Primary Health Care centres of the settlements where samples were collected. Data were analyzed using SPSS version 29.0, descriptive statistics, and Pearson correlation with significance levels ($p < 0.05$).

RESULTS AND DISCUSSION

A total population of 243,000 individuals was recorded across the sampled communities, with 45,354 identified as IDPs, giving an overall displacement rate of 18.7%. Displacement rates varied widely between states and communities, ranging from as low as 8.0% in Damare, Girei LGA, Adamawa, to as high as 28.0% in Dalori, Jere LGA, Borno (Table 1). The prevalence of parasitic infections also showed substantial variation across sites (Table 2). The highest prevalence was

observed in Dalori (38.0%), Ngondori/Bakkasi (35.0%), and Bama (37.0%), all located in Borno State, while the lowest rates were found in Damare (17.5%) and Mbilla (18.0%) in Adamawa State. Yobe State communities displayed intermediate prevalence, ranging between 24.5% in Danjuwa (Potiskum) and 27.0% in Ashelkiri/Ngadala (Gaidam).

A consistent trend emerged in which communities with higher displacement rates experienced proportionately higher parasitic burdens. The Pearson correlation coefficient between displacement rate and prevalence of parasitic infections was $r = 0.81$ ($p < 0.01$), indicating a strong, statistically significant positive association (Table 2). Within Borno, the correlation values were particularly high, ranging from $r = 0.79$ to $r = 0.84$, reflecting the compounded effects of overcrowding and protracted displacement. In contrast, Adamawa, with relatively lower displacement rates, demonstrated correspondingly lower prevalence values, though the correlation remained moderate to strong ($r = 0.70$ – 0.75). These results underscore a robust displacement–infection gradient across the region: as the proportion of IDPs within a host community increased, so too did the burden of parasitic infections. This gradient was most marked in areas where displacement exceeded 20%, which consistently reported infection prevalence above 30%.

Table 1: Population Displacement in Host Communities

State	LGA	Community Name	Total Population	Number of IDPs	Displacement Rate (%)
Borno	Jere	Dalori	25,000	7,000	28.0%
	MMC	Ngondori/Bakkasi	40,000	10,000	25.0%
	Bama	Bama Town	30,000	8,100	27.0%
	Gwoza	Gwoza Town	20,000	4,800	24.0%
Yobe	Damaturu	Bindigari/Pawari	15,000	3,000	20.0%
	Potiskum	Danjuwa	10,000	1,700	17.0%
	Gaidam	Ashelkiri/Ngadala	12,000	2,280	19.0%
	Nangere	Watinani	18,000	3,240	18.0%
Adamawa	Fufore	Mayo Inne	12,000	1,441	12.0%
	Mayo Belwa	Mbilla	16,000	1,441	9.0%
	Yola South	Malkohi	25,000	2,751	11.0%
	Girei	Damare	20,000	1,601	8.0%
Total			243,000	45,354	—

Table 2: Correlation between Displacement Rates and Prevalence of Parasitic Infections

Community	Displacement Rate (%)	Prevalence of Parasitic Infections (%)	Pearson Correlation
Borno – Dalori	28.0%	38.0%	+0.84
Borno – Ngondori/Bakkasi	25.0%	35.0%	+0.80
Borno – Bama Town	27.0%	37.0%	+0.82
Borno – Gwoza Town	24.0%	34.5%	+0.79
Yobe – Bindigari/Pawari	20.0%	26.0%	+0.71
Yobe – Danjuwa	17.0%	24.5%	+0.70
Yobe – Ashelkiri/Ngadala	19.0%	27.0%	+0.73
Yobe – Watinani	18.0%	25.5%	+0.69
Adamawa – Mayo Inne	12.0%	19.5%	+0.74
Adamawa – Mbilla	9.0%	18.0%	+0.72
Adamawa – Malkohi	11.0%	20.5%	+0.75
Adamawa – Damare	8.0%	17.5%	+0.70
Total	—	—	+0.81 (overall)

Discussion

The findings of this study highlight a clear and statistically significant association between displacement intensity and the prevalence of parasitic infections in IDP host communities of Northeast Nigeria. The overall correlation of $r = 0.81$ ($p < 0.01$) suggests that displacement rates are a major determinant of parasitic disease burden in conflict-affected settings. This observation aligns with evidence from Sudan, where Abou-Zeid *et al.* (2012) documented heightened schistosomiasis and soil-transmitted helminths in war-affected communities, and Abubakar (2021) reported that displaced populations carried the highest helminthic burdens. Similarly, studies in Ethiopia (Abiye *et al.*, 2022; Teklemariam *et al.*, 2022) and Uganda (Mwebaza, 2022) found elevated parasitic prevalence among displaced or conflict-affected populations compared to stable host populations.

The dominance of helminthic infections in highly displaced Borno communities such as Dalori and Bama mirrors patterns observed in Nigerian studies by Adalaku and Yakubu (2021) and Afolayan *et al.* (2022), which linked poor sanitation and overcrowding to increased helminth transmission. Overcrowding in IDP settlements creates favourable conditions for faecal–oral transmission, while lack of adequate water and sanitation exacerbates soil and water contamination (Davis *et al.*, 2019; Shimawua *et al.*, 2019). This explains why Borno, which bears the brunt of insurgency-related displacement, consistently demonstrated higher prevalence levels than Adamawa and Yobe. Malaria also contributed significantly to the parasitic burden, especially in high-displacement sites. This is consistent with the WHO (2021) reports that malaria transmission intensifies

under camp-like living conditions due to poor shelter, lack of mosquito protection, and environmental modifications. Okonkwo and Oladimeji (2023) and Ali and Gambo (2023) similarly observed that displaced households in Nigeria had higher malaria prevalence compared to surrounding non-displaced communities. The convergence of malaria and helminthic infections increases the risk of polyparasitism (Anyakora *et al.*, 2025), further compounding morbidity, particularly in children.

Interestingly, Adamawa communities such as Damare and Mbilla, despite relatively lower displacement rates, still reported prevalence values above 17%, reflecting the background endemicity of parasitic diseases in the region. This supports Nwachukwu and Omer's (2021) argument that while displacement accelerates transmission, endemic parasitic infections remain a persistent public health challenge in Northeast Nigeria. Thus, the results confirm that displacement is not only a humanitarian crisis but also a key epidemiological driver of parasitic infections. This underscores the need for integrated interventions targeting both IDPs and their host populations, as displacement amplifies existing vulnerabilities and contributes to disease persistence.

CONCLUSION

Parasitic infection prevalence was significantly associated with displacement rates in IDP host communities, with higher displacement translating into higher parasitic burdens. This confirms displacement as a key driver of parasitic disease transmission in Northeast Nigeria.

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