GIS Mapping in Northern Nigeria: Epidemiology of Malaria Transmission Zones

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Abstract

Malaria remains a significant public health issue in northern Nigeria, particularly affecting vulnerable populations such as children under five and pregnant women. A GIS-based study was conducted across selected districts in northern Nigeria. Data on malaria prevalence rates and environmental factors were collected from health records and satellite imagery, analysed using a logistic regression model to predict transmission hotspots. Analysis revealed that areas with an annual rainfall exceeding 1500 mm had significantly higher malaria incidence ($p < 0.05$), suggesting the need for water management strategies in these regions. GIS mapping accurately identified high-risk malaria zones, facilitating more effective health resource allocation and intervention planning. Integrate GIS data into routine public health surveillance systems to monitor and respond to malaria outbreaks promptly. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{\to}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic Information Systems (GIS), Malaria Epidemiology, Remote Sensing, Vector-Borne Diseases, Spatial Analysis, Community Health Models, Ecological Modelling*

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