African Applied Marine Biology (Fisheries/Aquatic)

Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Off-Grid Community Systems in Nigeria

Oluwatobiloba Adesida[1], **Olugbodun Adekoya**[2,3], **Boluwatife Adebisi**[4], **Funmilayo Ogunley**[1,5]

[1] University of Ilorin

[2] Nigerian Institute of Advanced Legal Studies (NIALS)

[3] Department of Animal Science, University of Ilorin

[4] Usmanu Danfodiyo University, Sokoto

[5] National Centre for Technology Management (NACETEM)

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Correspondence: oadesida@aol.com

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Author notes

Oluwatobiloba Adesida is affiliated with University of Ilorin and focuses on Agriculture research in Africa.
Olugbodun Adekoya is affiliated with Nigerian Institute of Advanced Legal Studies (NIALS) and focuses on Agriculture research in Africa.
Boluwatife Adebisi is affiliated with Usmanu Danfodiyo University, Sokoto and focuses on Agriculture research in Africa.
Funmilayo Ogunley is affiliated with National Centre for Technology Management (NACETEM) and focuses on Agriculture research in Africa.

Abstract

Off-grid community systems in Nigeria often lack access to reliable electricity for medical facilities, impacting clinical outcomes. A Bayesian hierarchical model was developed to analyse clinical data from multiple off-grid health centers. Uncertainty in the model predictions was quantified using robust standard errors. The model estimated an average improvement of 15% in patient outcomes, with a 95% credible interval indicating significant positive effects across various health indicators. The Bayesian hierarchical model demonstrated improved accuracy and reliability in predicting clinical outcomes for off-grid community systems compared to existing methods. Utilise the developed Bayesian hierarchical model for ongoing monitoring and improvement of healthcare services in off-grid communities. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African Geography, Bayesian Statistics, Hierarchical Modelling, Clinical Trials, Data Analysis, Epidemiology, Geographic Information Systems*

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