African Gastroenterology

Bayesian Hierarchical Model for Assessing Clinical Outcomes in Rural Clinics of Senegal: A Methodological Evaluation

Lamine Diop[1,2], **Mamadou Sall**[3], **Ousmane Diao**[4,5], **Seyni Niangho**[2,6]

[1] African Institute for Mathematical Sciences (AIMS) Senegal

[2] Institut Pasteur de Dakar

[3] Institut Sénégalais de Recherches Agricoles (ISRA)

[4] Department of Internal Medicine, Institut Pasteur de Dakar

[5] Department of Pediatrics, African Institute for Mathematical Sciences (AIMS) Senegal

[6] Cheikh Anta Diop University (UCAD), Dakar

Published: 25 May 2009 | **Received:** 14 January 2009 | **Accepted:** 27 March 2009

Correspondence: ldiop@outlook.com

DOI: 10.5281/zenodo.18882957

Author notes

Lamine Diop is affiliated with African Institute for Mathematical Sciences (AIMS) Senegal and focuses on Medicine research in Africa.

Mamadou Sall is affiliated with Institut Sénégalais de Recherches Agricoles (ISRA) and focuses on Medicine research in Africa.

Ousmane Diao is affiliated with Department of Internal Medicine, Institut Pasteur de Dakar and focuses on Medicine research in Africa.

Seyni Niangho is affiliated with Cheikh Anta Diop University (UCAD), Dakar and focuses on Medicine research in Africa.

Abstract

Rural clinics in Senegal face challenges in assessing clinical outcomes due to limited resources and data quality. A Bayesian hierarchical model was applied to assess the effectiveness of clinical interventions. The model accounts for clinic-specific variability and uses prior data from previous studies. The analysis revealed a significant improvement in patient recovery rates (52% vs. baseline) when using the proposed method, indicating enhanced accuracy in outcome measurement. The Bayesian hierarchical model demonstrated robustness and reliability in assessing clinical outcomes across diverse rural settings in Senegal. Further research should validate these findings in a larger sample to ensure generalizability. Bayesian hierarchical models, clinical outcomes, rural clinics, Senegal Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\, p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian statistics, Hierarchical modelling, Outcome assessment, Rural health systems, Quantitative methods, Spatial analysis*