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Bayesian Hierarchical Model Evaluation of Community Health Centre Systems in Senegal: A Systematic Literature Review

Guèye Sène[1,2], **Sékou Ndiaye**[2], **Mamy Diagne**[1,2], **Diallo Sall**[1,3]

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

[2] Institut Pasteur de Dakar

[3] Department of Public Health, Institut Sénégalais de Recherches Agricoles (ISRA)

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Correspondence: gsne@gmail.com

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Author notes

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

Sékou Ndiaye is affiliated with Institut Pasteur de Dakar and focuses on Medicine research in Africa.

Mamy Diagne is affiliated with Institut Pasteur de Dakar and focuses on Medicine research in Africa.

Diallo Sall is affiliated with Department of Public Health, Institut Sénégalais de Recherches Agricoles (ISRA) and focuses on Medicine research in Africa.

Abstract

Community health centers (CHCs) play a crucial role in healthcare delivery in Senegal. However, their effectiveness and efficiency are subject to variability across different settings. A comprehensive search of peer-reviewed journals and conference proceedings was conducted using multiple databases. Eligible studies were selected based on predefined inclusion criteria, including those that employed Bayesian hierarchical modelling techniques. The review identified several studies employing Bayesian hierarchical models to evaluate CHC systems in Senegal. Notably, one study found a significant increase in yield improvement ($p < 0.05$) when using these models compared to traditional methods. Bayesian hierarchical models offer a robust framework for evaluating the performance of community health centers and could be further validated with larger datasets. Further research should explore the scalability and generalizability of Bayesian hierarchical models in various CHC settings across Senegal, aiming to inform policy decisions aimed at improving healthcare delivery. Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian hierarchical models, community health centers, evaluation methods, geographic variability, mathematical modelling, performance measurement*