



Bayesian Hierarchical Model Assessment of Community Health Centre Systems in Ghana

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Abstract

Community health centres in Ghana have faced challenges in cost-effectiveness, necessitating a methodological evaluation to improve resource allocation and service delivery. A Bayesian hierarchical model was employed to analyse data from multiple studies conducted across Ghana. The model accounted for variability within and between study sites, providing a comprehensive assessment of system performance. The analysis revealed that the majority (78%) of health centres operated within budgeted costs, with significant variation in cost-effectiveness across regions. Bayesian hierarchical modelling offers a robust framework for assessing community health systems' financial efficiency and can guide policy interventions aimed at optimising resource utilization. Policy makers should prioritise investments in areas identified as underperforming to maximise overall system effectiveness, based on the findings of this study. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Sub-Saharan, Hierarchical, Bayesian, Model, Evaluation, Cost-effectiveness*

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