



Bayesian Hierarchical Model for Evaluating System Reliability in Senegalese Community Health Centres

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Abstract

Community health centers in Senegal play a crucial role in healthcare delivery but face challenges related to system reliability and effectiveness. A Bayesian hierarchical model was developed to assess the reliability of Senegalese community health centers. The model accounts for variability across different health centers while estimating overall system performance. The study identified a significant proportion (35%) of health centers that exhibited unreliable service delivery patterns, necessitating targeted interventions to improve their reliability. Bayesian hierarchical modelling provided valuable insights into the systematic reliability of Senegalese community health centers, highlighting areas for improvement and suggesting potential solutions. Based on findings from this study, it is recommended that policy makers prioritise resource allocation towards enhancing the operation and maintenance of these centers to ensure continuous reliable service delivery. Community Health Centers, Bayesian Hierarchical Model, Reliability Assessment, Senegal Treatment effect was estimated with $\text{text} \{ \text{logit} \} (\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian statistics, Hierarchical modelling, System reliability, Community health centers, Methodology, Epidemiology*

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