Bayesian Hierarchical Model in Ghanaian District Hospitals: Evaluating Clinical Outcomes

Abena Kwasi Doe[1]**, Logah Amoako Thompson**[2]

[1] Ghana Institute of Management and Public Administration (GIMPA)

[2] Council for Scientific and Industrial Research (CSIR-Ghana)

Author notes

Abena Kwasi Doe is affiliated with Ghana Institute of Management and Public Administration (GIMPA) and focuses on Medicine research in Africa.

Logah Amoako Thompson is affiliated with Council for Scientific and Industrial Research (CSIR-Ghana) and focuses on Medicine research in Africa.

Abstract

Bayesian hierarchical models have been increasingly applied in various fields to analyse complex data hierarchically. A Bayesian hierarchical model was developed and implemented to assess clinical outcomes across different hospital districts. Uncertainty quantification was conducted using robust standard errors. The analysis revealed significant variability in patient recovery rates between districts, with a notable difference in the 20% range for certain medical conditions. Bayesian hierarchical models provide a nuanced approach to evaluating clinical outcomes and system performance in district hospitals. The model's ability to account for spatial variation is particularly useful. The findings suggest that targeted interventions should be implemented based on the identified disparities, aiming to improve patient recovery rates across all districts. Treatment effect was estimated with $text\{logit\}(\pi) = beta\, 0 + \beta^{\rightarrow}\, p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Hierarchical, Bayesian, Data, Analysis, Evaluation, Ghana*

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