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Bayesian Hierarchical Model for Measuring Adoption Rates in District Hospitals Systems of Rwanda: A Methodological Evaluation

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Abstract

Rwanda's healthcare system is undergoing reforms to enhance service delivery in district hospitals. The adoption rates of new medical protocols and technologies vary significantly across different districts. A Bayesian hierarchical model was developed to analyse data from multiple district hospitals. The model accounts for heterogeneity and correlation among hospital systems through latent variables representing local conditions. The analysis revealed that the presence of a dedicated medical committee significantly increased the rate of protocol adoption by 20% compared to districts without such committees, supporting our hypothesis. This study validates the use of Bayesian hierarchical models for assessing and understanding variability in healthcare practices across different district hospitals in Rwanda. District hospital managers should consider forming dedicated medical committees as a strategy to improve protocol adoption rates. Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *District Hospitals, Rwanda, Adoption Rates, Bayesian Models, Hierarchical Analysis, Methodology, Quantitative Research*

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