



# Bayesian Hierarchical Model in Evaluating Clinical Outcomes across Ethiopian District Hospitals Systems,

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## Abstract

This study aims to evaluate clinical outcomes in Ethiopian district hospitals by applying a Bayesian hierarchical model. A Bayesian hierarchical model will be used to analyse clinical outcome data from Ethiopian district hospitals, incorporating regional variability and patient-level information. The analysis revealed significant variation in treatment outcomes between different districts, with a notable improvement in surgical success rates attributed to standardised protocols. Bayesian hierarchical modelling provided insights into hospital performance that can inform targeted interventions for quality improvement. District hospitals should implement uniform training programmes and standard operating procedures based on the model's findings. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Ethiopia, Hierarchical Models, Bayesian Methods, Quantile Regression, Precision Medicine, Clinical Trials, Random Effects*

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