



# Bayesian Hierarchical Model for Measuring Adoption Rates in Ethiopian District Hospitals Systems,

Berhane Yilma<sup>1</sup>, Mekonnen Mulugeta<sup>2</sup>

<sup>1</sup> Debre Markos University

<sup>2</sup> Jimma University

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**Correspondence:** [byilma@yahoo.com](mailto:byilma@yahoo.com)

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## Author notes

*Berhane Yilma is affiliated with Debre Markos University and focuses on Medicine research in Africa.*

*Mekonnen Mulugeta is affiliated with Jimma University and focuses on Medicine research in Africa.*

## Abstract

This study focuses on evaluating adoption rates in district hospitals within the Ethiopian healthcare system. A Bayesian hierarchical model was employed to estimate adoption rates. The model accounts for variability between hospitals by incorporating hyperparameters that reflect hospital-specific characteristics. The study identified significant differences in adoption rates among district hospitals, with some showing an adoption rate of over 70% for certain technologies. Bayesian hierarchical models provided a nuanced understanding of adoption patterns across the Ethiopian healthcare landscape, highlighting areas where intervention might be necessary to improve coverage. Health policymakers should consider implementing targeted interventions in districts with lower adoption rates to ensure equitable access to new medical resources. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Ethiopia, Bayesian hierarchical model, adoption rates, district hospitals, spatial analysis, methodological evaluation, geographic information systems*

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