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Bayesian Hierarchical Model for Measuring Adoption Rates in Community Health Centres Systems in Ethiopia: A Methodological Evaluation

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Abstract

Community health centers (CHCs) play a crucial role in delivering healthcare services to underserved populations in Ethiopia. A Bayesian hierarchical model was applied to analyse adoption data from multiple CHCs across different regions in Ethiopia. The model accounts for variability at both the individual centre level and regional levels. The analysis revealed significant variation in adoption rates between CHCs, with some centres adopting new technologies at a rate of up to 80% compared to others at only 25%. This variance was attributed primarily to differences in infrastructure and training availability among centres. Bayesian hierarchical models provided nuanced insights into the factors influencing technology adoption within the Ethiopian CHC system, offering a more accurate representation than traditional single-level models. Future studies should consider implementing tailored interventions based on regional adoption rates to maximise the impact of new technologies in underserved areas. Bayesian Hierarchical Model, Community Health Centres, Adoption Rates, Ethiopia Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\ p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Ethiopia, Bayesian hierarchical models, adoption rates, community health centers, methodological evaluation, geographical analysis, statistical methods*

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