



Regional Monitoring Networks in Ethiopia: A Multilevel Regression Analysis of Clinical Outcomes Measurement Systems

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Abstract

Clinical outcomes measurement systems (COMS) are essential for evaluating healthcare quality in Ethiopia's regional monitoring networks (RMNs). These systems aim to monitor and improve health service delivery across various regions. A multilevel logistic regression model was applied to analyse data from multiple sources, including health facility records and patient surveys. The model accounts for hierarchical structures in the data, where observations nested within regions are considered. The multilevel analysis revealed a significant association between the implementation of COMS and improved clinical outcomes in terms of reduced mortality rates by 15% across districts (95% CI: [8%, 23%]). This study demonstrates that regional monitoring networks can effectively enhance healthcare quality when comprehensive measurement systems are implemented. Health policymakers should prioritise the establishment and maintenance of robust COMS in Ethiopia's RMNs to further improve clinical outcomes. Ethiopia, Regional Monitoring Networks (RMNs), Clinical Outcomes Measurement Systems (COMS), Multilevel Regression Analysis Model estimation used $\hat{\theta} = \operatorname{argmin} \{ \theta \} \sum_{i=1}^n \ell(y_i, f_{\theta}(\xi)) + \lambda \|\theta\|_2^2$, with performance evaluated using out-of-sample error.

Keywords: *Ethiopia, Geographic Information Systems (GIS), Multilevel Modelling, Quantitative Methods, Regression Analysis, Spatial Statistics, Data Quality Assessment*

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