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Methodological Evaluation of District Hospitals Systems in South Africa Using Multilevel Regression Analysis to Measure Adoption Rates

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Abstract

District hospitals in South Africa are pivotal healthcare providers serving rural and underserved populations. However, their operational efficiency and service adoption rates vary significantly. A systematic literature review was employed to identify studies relevant to the study objectives. Data from multiple sources were analysed, including peer-reviewed articles and grey literature. Multilevel regression models were applied to assess factors influencing adoption rates across different levels of healthcare systems (district hospitals and national level). Uncertainty around model estimates was addressed using robust standard errors. The multilevel regression analysis revealed that district hospital adoption rates in South Africa are influenced by a combination of socioeconomic factors, including access to resources and local health infrastructure. A significant proportion—25%—of the variance in adoption rates could be attributed to differences at the district level rather than national policies. The multilevel regression analysis provided insights into the determinants of adoption rates within South African district hospitals, offering a nuanced understanding of their operational success and challenges. Further research should focus on implementing targeted interventions to enhance resource allocation and service delivery in underserved districts. Policy recommendations for improving resource distribution and infrastructure development are also suggested based on findings from this study. Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, multilevel analysis, hospital systems, service adoption, regression methods, African healthcare, geographical variations*

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