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Methodological Evaluation of District Hospitals Systems in Tanzania Using Multilevel Regression Analysis for Cost-Effectiveness Measurement

Simba Sokoși[1,2], **Mawanda Simiyu**[3,4], **Chituwo Mwalimu**[5,6], **Kabaka Chito**[7,8]

[1] Department of Epidemiology, National Institute for Medical Research (NIMR)

[2] Tanzania Commission for Science and Technology (COSTECH)

[3] National Institute for Medical Research (NIMR)

[4] Ardhi University, Dar es Salaam

[5] Sokoine University of Agriculture (SUA), Morogoro

[6] Department of Public Health, Tanzania Commission for Science and Technology (COSTECH)

[7] Department of Surgery, National Institute for Medical Research (NIMR)

[8] Department of Internal Medicine, Tanzania Commission for Science and Technology (COSTECH)

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Correspondence: ssokoi@gmail.com

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Author notes

Simba Sokoși is affiliated with Department of Epidemiology, National Institute for Medical Research (NIMR) and focuses on Medicine research in Africa.

Mawanda Simiyu is affiliated with National Institute for Medical Research (NIMR) and focuses on Medicine research in Africa.

Chituwo Mwalimu is affiliated with Sokoine University of Agriculture (SUA), Morogoro and focuses on Medicine research in Africa.

Kabaka Chito is affiliated with Department of Surgery, National Institute for Medical Research (NIMR) and focuses on Medicine research in Africa.

Abstract

District hospitals in Tanzania play a critical role in providing primary healthcare services across various regions. However, their operational efficiency and cost-effectiveness have not been systematically evaluated. The research employs a mixed-methods approach combining quantitative data from hospital records and qualitative insights through interviews with healthcare providers. Multilevel regression models are used to analyse data at different levels (individual patient care vs. system-wide operations) with robust standard errors accounting for intra-cluster correlations. Data analysis revealed that the cost-effectiveness ratio varied significantly across districts, ranging from a low of 1.2:1 in some rural areas to a high of 3.5:1 in urban centers, indicating substantial variations in resource utilization and efficiency. The findings suggest that district hospital systems in Tanzania exhibit varying degrees of cost-effectiveness, necessitating targeted interventions for improvement based on specific geographical contexts. Policy makers are encouraged to implement data-driven strategies tailored to the unique conditions of each district, with particular attention given to resource allocation and training programmes. district hospitals,

cost-effectiveness, multilevel regression analysis, Tanzania Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, district hospitals, multilevel modelling, cost-effectiveness, randomized trials, qualitative methods, health systems research*

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