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A Randomised Field Trial of Efficiency Gains in Ethiopian District Hospital Systems

A Methodological Evaluation

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ABSTRACT

Background: District hospitals in sub-Saharan Africa face severe resource constraints, yet rigorous, field-based evaluations of systemic efficiency interventions are scarce. Existing studies often rely on observational data, limiting causal inference about operational improvements.

Purpose and objectives: This case study aims to methodologically evaluate the implementation of a randomised field trial designed to measure efficiency gains from a lean management intervention in district hospital systems. The primary objective is to assess the trial's design, execution, and analytical robustness.

Keywords: *Health systems research, Sub-Saharan Africa, Randomised controlled trial, District hospitals, Efficiency measurement, Methodological evaluation, Ethiopia*

Article Highlights

- Cluster-randomised trial across 24 Ethiopian district hospitals assessed a lean management intervention.
- Key methodological challenge was controlling contamination between hospital clusters.
- Effect heterogeneity observed, with larger gains in hospitals with electronic records.
- Hierarchical linear modelling with cluster-robust errors provided analytical robustness.

Core Analytical Model

Patient throughput time was modelled using a hierarchical linear model: $Y_{ij} = \beta_0 + \beta_1 T_j + \gamma X_{ij} + u_j + \varepsilon_{ij}$, with inference based on cluster-robust standard errors.

This brief outlines the editorial presentation for a methodological case study.