

A Systematic Review of Randomised Field Trial Methodologies for Evaluating District Hospital System Adoption in Rwanda, 2000–2026.

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ABSTRACT

Background: The evaluation of health system innovations in low-resource settings requires robust methodologies to measure real-world adoption. Randomised field trials (RFTs) are considered a gold standard for impact evaluation, yet their specific application and methodological rigour in assessing district hospital system adoption in sub-Saharan Africa remain under-scrutinised.

Purpose and objectives: This systematic review aims to critically appraise the methodological approaches, strengths, and limitations of RFTs used to evaluate the adoption of integrated systems within district hospitals. It seeks to identify common design flaws and best practices to inform future trial design in similar contexts.

Methodology: A systematic search of multiple electronic databases was conducted following PRISMA guidelines. Peer-reviewed studies employing an RFT design to evaluate a system-level intervention within the district hospital tier were included. Data were extracted on trial design, randomisation unit, adoption metrics, and analytical methods. Quality was assessed using a modified Cochrane Risk of Bias tool for cluster-randomised trials.

Keywords: *Randomised controlled trials, implementation science, health systems research, Sub-Saharan Africa, district hospitals, adoption, Rwanda*

Article Highlights

- Systematic review reveals scarcity of high-quality randomised field trials in this domain.
- Frequent methodological flaw: failure to account for intra-cluster correlation in analyses.
- Hospital or catchment area predominates as the unit of randomisation.
- Evidence base requires more rigorous trials with appropriate hierarchical modelling.

Core Analytical Model

The predominant model was a generalised linear mixed model: $\text{logit}(P(\text{Adoption})) = \beta_0 + \beta_1 \text{Treatment} + u_j + e_{ij}$, where u_j is the random intercept for cluster j .

This review critically appraises methodological approaches to inform future trial design in low-resource settings.

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