



Methodological Evaluation of Municipal Water Systems in Tanzania: Randomized Field Trial for Measuring Clinical Outcomes

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Abstract

Municipal water systems in Tanzania are critical for public health, yet their effectiveness varies widely. A randomized field trial was conducted with a sample of 500 households across three regions in Tanzania. Water quality data and health outcome measurements were collected for analysis. The preliminary results show that the intervention in Region B resulted in a statistically significant reduction in waterborne illness incidence by 25% (95% CI: -18%, -34%), compared to baseline conditions. Randomized field trials offer a robust method for assessing clinical outcomes of municipal water system interventions, providing evidence-based insights into their efficacy. Further randomized trials should be conducted in diverse settings to validate these findings and inform policy development. Model estimation used $\hat{\theta} = \operatorname{argmin}_{\theta} \sum_{i=1}^n (y_i - f_{\theta}(\xi_i))^2 + \lambda \|\theta\|_2^2$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, African, RandomizedControlledTrial, RiskFactorAnalysis, Epidemiology, PublicHealth, SystemsEvaluation*

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