



# Methodological Evaluation of Community Health Centre Systems in South Africa Using Difference-in-Differences Models to Assess System Reliability

Zola Khumalo<sup>1</sup>, Siphon Cele<sup>2</sup>, Mankweng Motshega<sup>1</sup>, Nokuthula Ngwenya<sup>3,4</sup>

<sup>1</sup> University of Venda

<sup>2</sup> Department of Epidemiology, Council for Geoscience

<sup>3</sup> Stellenbosch University

<sup>4</sup> Council for Geoscience

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**Correspondence:** [zkhumalo@gmail.com](mailto:zkhumalo@gmail.com)

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## Author notes

*Zola Khumalo is affiliated with University of Venda and focuses on Medicine research in Africa.*

*Siphon Cele is affiliated with Department of Epidemiology, Council for Geoscience and focuses on Medicine research in Africa.*

*Mankweng Motshega is affiliated with University of Venda and focuses on Medicine research in Africa.*

*Nokuthula Ngwenya is affiliated with Stellenbosch University and focuses on Medicine research in Africa.*

## Abstract

Community health centres in South Africa play a crucial role in providing essential healthcare services to underserved populations. However, their effectiveness and reliability are subject to scrutiny. We employed a Difference-in-Differences model to compare changes in service delivery metrics before and after implementing quality improvement interventions at selected health centres. Data were collected from electronic health records and validated through cross-sectional surveys of patients. A significant difference was observed between the control and intervention groups, with an effect size of approximately 20%, indicating that the implemented improvements had a substantial impact on service delivery reliability. The findings suggest that systematic quality improvement measures can significantly enhance the reliability of community health centre systems in South Africa. The use of DID models provided robust evidence to support these conclusions. Health authorities should prioritise continuous monitoring and periodic reviews of community health centres to ensure ongoing improvements and maintain high service standards. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** African geography, health systems reform, difference-in-differences, quasi-experimental design, outcome measurement, randomized controlled trials, statistical analysis

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