

# Replication Study: Evaluating the Efficacy of mHealth Nudge Interventions on Antiretroviral Therapy Adherence Among Adolescents in Rural Zambia

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## Abstract

### Background:

This study replicates a 2021 trial that demonstrated the efficacy of mobile health (mHealth) nudges for improving antiretroviral therapy (ART) adherence among adolescents in urban Zambia. The original findings required validation in a rural context, where healthcare access and digital connectivity present distinct challenges.

**Purpose** and **objectives:**  
The primary objective was to replicate the evaluation of a tailored mHealth nudge intervention, using SMS and voice message reminders, on ART adherence among adolescents aged 10-19 in rural Zambia. It aimed to determine if the previously reported efficacy could be generalised to this lower-resource setting.

### Methodology:

A quasi-experimental design was employed from June 2024 to March 2025. Two hundred adolescents living with HIV and on ART were recruited from four rural health centres. The intervention group received daily mHealth nudges for six months, whilst the control group received standard care. Adherence was measured via pharmacy refill data and self-report.

### Findings/Key insights:

The replication did not reproduce the original study's strong positive effect. The intervention group showed a modest, non-significant improvement in adherence (78% versus 75% in controls). Qualitative data indicated that poor network coverage and shared access to mobile phones frequently undermined the intervention's consistency.

### Conclusion:

The efficacy of mHealth nudge interventions for ART adherence, whilst demonstrated in urban settings, may be substantially reduced in rural areas due to infrastructural and socio-economic barriers. Context is a critical moderator of success.

Recommendations:

Future mHealth strategies for rural adolescents should integrate more resilient communication methods, such as offline-capable applications, and consider community-based support structures to complement digital nudges.

Key words:

HIV, adolescents, antiretroviral therapy, adherence, mHealth, replication study, rural health, Zambia.

Contribution statement:

This replication provides evidence on the contextual limitations of scaling digital health interventions, informing more equitable implementation strategies within sub-Saharan Africa.

**Keywords:** *mHealth, antiretroviral therapy adherence, adolescents, Sub-Saharan Africa, replication study, behavioural nudges, rural health*