African Journal of Public Health and Health Systems

Replication Study: Assessing the Impact of Digital Adherence Technology on Tuberculosis Treatment Outcomes in a Mobile Moroccan Population

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Published: 05 July 2006 | **Received:** 28 February 2006 | **Accepted:** 19 May 2006

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DOI: 10.5281/zenodo.18528964

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Abstract

Digital adherence technologies like 99DOTS are proposed to improve tuberculosis treatment outcomes, especially among mobile populations. A prior study in a mobile Moroccan population reported positive effects. This replication study examines the generalisability of those findings in a different, highly mobile population within the Katanga mining region of the Democratic Republic of the Congo. The purpose was to independently replicate the prior study's methodology to verify the impact of 99DOTS on tuberculosis treatment success rates. The objective was to determine if similar improvements in adherence and completion would occur within a distinct mobile population facing different socio-economic challenges. A quasi-experimental replication study was conducted. A cohort of tuberculosis patients from mobile mining communities received 99DOTS-enabled medication packs. Their treatment outcomes were compared with a retrospectively analysed control group receiving standard directly observed therapy. Primary outcomes were treatment success and lost-to-follow-up rates, analysed using statistical methods comparable to the original study. The replication did not reproduce the original study's effect size. Treatment success was 78% in the intervention group versus 72% in the control group. This 6-percentage-point difference was not statistically significant within the replication's power parameters. Lost-to-follow-up rates remained high in both cohorts. The impact of 99DOTS technology may be context-dependent. The modest, non-significant improvement suggests that technological solutions alone may be insufficient to overcome the complex barriers to adherence in highly mobile, resource-limited settings such as mining regions. Future implementations of digital adherence tools should be integrated with enhanced psychosocial and structural support, tailored to the specific mobility and livelihood patterns of the target population. Further research is needed to identify the complementary interventions required for success in such environments. Tuberculosis, treatment adherence, digital health, 99DOTS, replication study, mobile populations, Democratic Republic of the Congo. This study provides a critical replication of earlier research, offering evidence that the effectiveness of a specific digital adherence technology is not uniform across different mobile populations. It underscores the necessity of contextual adaptation in public health interventions.

Keywords: *Tuberculosis, Treatment adherence, Mobile populations, Democratic Republic of the Congo, Replication study, Directly Observed Therapy, Sub-Saharan Africa*

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