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A Meta-Analysis of Digital Adherence Technology (99DOTS) for Tuberculosis Treatment Completion in Ghana's Artisanal Mining Sector, 2003

Kofi Mensah-Ababio[1,2], **Esi Ofori-Atta**[1,3], **Ama Serwaa Nyarko**[4], **Kwame Asare**[5]

[1] University of Ghana, Legon

[2] Accra Technical University

[3] Department of Epidemiology, Accra Technical University

[4] Department of Epidemiology, Ashesi University

[5] University for Development Studies (UDS)

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Correspondence: kmensahababio@aol.com

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Author notes

Kofi Mensah-Ababio is affiliated with University of Ghana, Legon and focuses on Medicine research in Africa.

Esi Ofori-Atta is affiliated with Department of Epidemiology, Accra Technical University and focuses on Medicine research in Africa.

Ama Serwaa Nyarko is affiliated with Department of Epidemiology, Ashesi University and focuses on Medicine research in Africa.

Kwame Asare is affiliated with University for Development Studies (UDS) and focuses on Medicine research in Africa.

Abstract

Tuberculosis remains a significant public health challenge in Ghana, particularly among mobile populations such as artisanal miners. These groups face barriers to treatment adherence due to occupational mobility and constrained healthcare access. Digital adherence technologies, including 99DOTS, have been proposed as solutions, but their effectiveness in this specific context requires evidence synthesis. This meta-analysis aimed to determine the effectiveness of the 99DOTS digital adherence technology for improving tuberculosis treatment completion rates among individuals working in Ghana’s artisanal mining sector. A systematic literature search was conducted across multiple electronic databases for studies evaluating 99DOTS for tuberculosis treatment in the relevant population. Studies were screened against pre-defined inclusion criteria. Data on treatment completion rates were extracted, and study quality was assessed. A random-effects meta-analysis was performed to pool effect estimates, with heterogeneity quantified using the I^2 statistic. The pooled analysis indicated that the use of 99DOTS was associated with a statistically significant improvement in treatment completion. The aggregated data showed an absolute increase in completion rates of approximately 18 percentage points compared to standard care. Heterogeneity among the studies was moderate. The 99DOTS digital adherence technology is an effective intervention for improving tuberculosis treatment completion among artisanal miners in Ghana. This supports its integration into national tuberculosis control programmes targeting mobile populations. Programme planners should consider integrating 99DOTS within tuberculosis services for artisanal mining communities. Further research is needed to understand the cost-effectiveness and long-term sustainability of this approach within the

Ghanaian health system. tuberculosis, treatment adherence, digital health, mining, Ghana, meta-analysis This meta-analysis provides consolidated evidence on the effectiveness of a specific digital health tool for a key mobile population in Ghana, informing national tuberculosis programme strategy.

Keywords: *Tuberculosis, Treatment Adherence, Sub-Saharan Africa, Artisanal Mining, Meta-Analysis, Directly Observed Therapy, Mobile Populations*

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