African Water Resources Engineering

Biomedical Engineering Innovations for Diagnostic Devices in Zambian Resource-Limited Settings

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Abstract

Diagnostic devices in resource-limited settings often face challenges such as high costs, limited infrastructure, and inadequate training for healthcare workers. The study employed a mixed-methods approach involving design of low-cost diagnostic tools, pilot testing in five clinics, and a user satisfaction survey among healthcare workers. Pilot tests indicated an average accuracy rate of 95% for the new devices, with minimal variability across different settings. User feedback supported device usability and acceptance. The developed diagnostic tools demonstrated high performance and broad applicability in resource-limited Zambian healthcare environments. Further large-scale deployment should include continuous monitoring of device operation to ensure consistent accuracy over time. Diagnostic Devices, Resource-Limited Settings, Biomedical Engineering Innovations, Healthcare Facilities The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Zambian, Biomedical, Engineering, Innovations, Point-of-Care, Diagnostic, Devices, Resource-Limited, Community Engagement, Prototyping, Microfluidics, Telemedicine*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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