



Innovative Biomedical Engineering Devices for Diagnostics in Ugandan Resource-Limited Settings

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Abstract

Diagnosing infectious diseases such as malaria and tuberculosis in resource-limited settings is critical for public health. However, these areas often lack adequate diagnostic facilities and skilled personnel, necessitating innovative solutions. A multidisciplinary approach combining bioengineering principles with clinical trials was employed. Device performance was assessed through a series of tests including sensitivity, specificity, and user acceptance surveys. The preliminary testing indicated an overall accuracy rate of over 95% in diagnosing malaria compared to standard methods. User satisfaction scores averaged above 80%. While promising results were achieved, further validation is required before widespread implementation. Immediate pilot studies should be conducted with healthcare providers and communities to refine the devices and ensure their usability in Ugandan settings. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, African, BioMEMS, SensorTechnology, DiagnosticInformatics, HealthInnovation, PointOfCareTesting*

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