



AI-Assisted Diagnosis Tools and Cancer Early Detection in Rural Senegalese Populations: A Comparative Study

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Abstract

AI-assisted diagnosis tools have shown promise in early cancer detection but their effectiveness varies across different populations. In rural Senegal, where access to healthcare is limited and traditional screening methods are insufficient, integrating AI could improve diagnostic accuracy. A comparative cohort study was conducted in two rural communities: one using AI for screening and the other relying solely on existing methods. Data collection included patient demographics, symptoms, biopsy results, and follow-up outcomes over a six-month period. AI-assisted diagnosis led to an increase of 20% in early cancer detection rates compared to traditional methods, with a statistically significant difference ($p < 0.05$), suggesting AI can enhance diagnostic precision in resource-limited settings. The integration of AI into rural healthcare systems for cancer screening appears feasible and beneficial, warranting further implementation studies. Health authorities should prioritise funding for AI technology adoption and develop training programmes to equip local health workers with necessary skills. Public-private partnerships could facilitate wider dissemination of these tools. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Cancer epidemiology, Rural healthcare access, Early detection rates, Machine learning models, Geographic information systems, Health policy evaluation, Public health surveillance*

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