Adoption and Clinical Outcomes of a Smartphone-Based Vision-Testing Application by School Nurses in Lusaka Province, Zambia

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Abstract

Uncorrected refractive error is a leading cause of visual impairment among children in sub-Saharan Africa, yet school-based vision screening remains limited. Smartphone-based applications such as Peek Acuity offer a potential solution to increase access, but evidence of their adoption and clinical performance in routine school health settings is scarce. This study aimed to evaluate the adoption and clinical outcomes of the Peek Acuity smartphone vision-testing application when used by school nurses during routine school health checks in Lusaka Province, Zambia. A cross-sectional study was conducted. School nurses were trained to use the Peek Acuity application. They performed vision screenings on primary school children during standard health assessments. Data on usage patterns, screening times, and reasons for non-use were collected via questionnaires and application analytics. A subset of children screened by the application received a subsequent comprehensive eye examination by an optometrist to determine the application's sensitivity and specificity. Adoption among school nurses was high, with 88% reporting regular use of the application after training. The median screening time per child was 2.1 minutes. Compared to the optometrist's examination, the Peek Acuity application demonstrated a sensitivity of 92% and a specificity of 85% for detecting visual acuity of 6/12 or worse. The Peek Acuity application was successfully adopted by school nurses and integrated into routine school health activities. It proved to be a clinically valid tool for rapid vision screening in this setting, accurately identifying children requiring further eye care. The integration of validated smartphone vision-testing applications into national school health programmes should be considered. Sustainable implementation requires ongoing technical support, supervision, and clear referral pathways for children who fail the screening. mHealth, school health, vision screening, refractive error, Zambia This study provides evidence on the feasibility and diagnostic accuracy of a smartphone-based vision screening tool operated by school nurses within a routine school health system in Zambia.

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