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Is task-shifting of screening for diabetic retinopathy (DR) from eye specialists to technicians accurate?

Authors

Jefitha Karimurio¹, Stephen Gichuhi¹, Joseph Nyamori¹, Muchai Gachago¹, Hilary Rono², Michael Gichangi³, Alice Mwangi⁴, Ronald Kefa⁴, Peter Situma⁵, Manasseh Kipsang⁶

Affiliation

¹University of Nairobi

²Kitale Hospital

³Ophthalmic Services Unit of the Ministry of Health

⁴Operation Eyesight Universal

⁵Lodwar Hospital

⁶Kapenguria Hospital

Abstract

Background: DR is a growing cause of blindness and there are few eye specialists. Consequently, technicians are being trained to screen for DR using digital fundus cameras.

Objective: To assess accuracy of diagnosis of DR made by a technician using digital retina photos

Materials and Methods: A technicians was trained to screen for DR in patients aged 18+ years at diabetic medical clinic of Kitale County Referral Hospital in March- April 2018 and report whether the patients had DR or not. The same patients were clinically examined for DR by an ophthalmologist who had not seen the photos. The photos were transmitted to the University of Nairobi for assessment by a retina specialist. Sensitivity and specificity were calculated to measure accuracy of diagnosis made by the technician using photos compared to clinical grading by ophthalmologist. The minimum threshold for both sensitivity and specificity was 80%.

Results: The technician screened 253 patients at and 234(92.9%) had gradable photos. Fifty-eight patients had signs of DR and prevalence was 24.8%(95%CI:19.3%-30.3%). Photos of 244 patients were assessed by retina specialist and 216 had gradable photos. Thirty three out of 216 patients had signs of DR and prevalence estimate by retina specialist was 15.3%(95%CI:10.6%-20.0%%). Ophthalmologist examined 251 patients and 41 had. Prevalence estimate by Ophthalmologist was 16.3% (95%CI:11.8%-20.8%). Accuracy of diagnosis by technician was: sensitivity $32/35 \times 100 = 91.4\%$ (95%CI:76.9% - 98.2%) and specificity $172/198 \times 100 = 86.9\%$ (95%CI:81.4% - 91.2%).

Discussion: Diagnosis of DR is not possible in ungradable Photos which may be due to opacity inside the eye or poor-quality photos. Only 7.1% of the photos in this study were

ungradable and the technician had advantage of viewing retina directly using the fundus camera.

Conclusion and recommendation: Screening for DR can accurately be done by technicians using digital retina photographs