

Smartphone Fundus Photography by Primary Healthcare Workers: Feasibility and Diagnostic Potential

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Introduction: Smartphone fundus photography is a tool for obtaining photographs of the retina using a combination of convex lenses and a smartphone, with or without adapters. Smartphones are ubiquitous while the convex lenses are readily available in most eye clinics with facility for binocular indirect ophthalmoscopy. This technique is relatively inexpensive when compared to traditional table-top or handheld fundus cameras. The images obtained through this technique can be used for diagnostic and educational purposes. Previous studies on smartphone fundus photography have mostly employed the skill of ophthalmologists, ophthalmology residents, optometrists, medical students and trained technicians.¹ This study aimed at determining the feasibility and diagnostic potential of smartphone fundus photography by primary healthcare workers.

Methods: An iPhone SE smartphone with installed FiLMiC Pro video capturing software, mounted on a Paxos Scope Adapter with an attached Pan-Retinal 2.2 Volk lens was used for fundus image capturing. The adapter fixes the lens-phone distance, which reduces the learning curve and retinal image acquisition time, although previous studies done in Nigeria did not use an adapter.^{1,2} A junior community health extension worker underwent a one-hour training on smartphone fundus photography. Eight out of the 25 adult patients who were referred to the retina clinic of Enugu State University Teaching Hospital, Parklane

from March 15, to June 14, 2018 and who met the inclusion criteria, accepted to participate in the study. After pupil dilatation, the patients laid supine on a couch in a darkened clinic room. Image acquisition time per eye was limited to 60 seconds, with an intervening break period if patient felt discomfort. Screenshots were taken from video frames, labelled and sent through WhatsApp to the medical retina specialist for rating of image

Selected Fundus Photographs

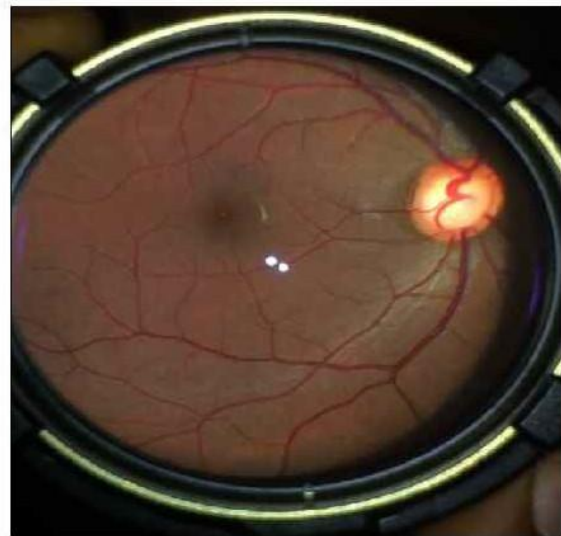


Fig. 1: A case of glaucomatous optic disc, right eye



Fig. 2: A case of proliferative diabetic retinopathy, left eye

readability/quality and diagnosis. Data was entered and analyzed using SPSS 20.

Results: All fundus photographs (100%) of 13 eyes taken were readable. Fundus image quality was adjudged excellent in 4 eyes (30.8%) and good in 9 eyes (69.2%). Diagnosis made from the fundus images were in total agreement with diagnosis stated in the patients' hospital folders in 8 eyes (61.5%). Diagnosis was in partial agreement in 4 eyes (30.8%) and missed in 1 eye (7.7%).

Conclusion: Smartphone fundus photography by a primary healthcare worker may be feasible, of appropriate quality for diagnostic review by a specialist in a tele-ophthalmology set up.³

References

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