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CORRESPONDENCE

Diabetic retinopathy screening in rural India with portable fundus camera and artificial intelligence using eye mitra opticians from Essilor India

Alok Bahl[1] · Sujata Rao[2]

To the Editor:

Aim

To set up a sustainable diabetic retinopathy screening programme initially in rural villages of north India.

Background

Screening for diabetic retinopathy in rural India is lacking due to shortage of trained personnel.

With advancing technology, smartphone-based fundus photography is available with Edge based offline artificial intelligence [1], to analyse retinal images in remote areas with no access to specialists.

Setting

Two eye camps were held in two villages around Sardhana and Gajraula near Meerut in Uttar Pradesh in North India by Eye Mitra Opticians (EMOs) from Essilor India.

Method

We trained (EMOs) to use digital retinal colour photography with the portable, handheld Remidio Non Mydriatic Fundus on phone camera. This camera incorporates offline Medios Artificial Intelligence (AI) software for automated analysis of the images in screening for referable diabetic retinopathy.

Eye Mitra Opticians are a cadre of personnel trained by Essilor India Pvt Ltd to carry out refraction in rural India. We trained three EMOs (theory and practical hands-on training) to use the Remidio Non Mydriatic Fundus on phone camera to take images of the retina (disc centred and macula centred). The images were analysed using the in-built AI software and a report was generated informing the EMO if the patient had referable diabetic retinopathy, within 20 s of the image being taken. The EMOs successfully used the portable fundus camera with AI to screen the patients for diabetic retinopathy.

Results

From ~1000 persons who attended the eye camps, 250 persons above the age of 40 years were randomly selected and screened using the fundus on phone camera. Good quality images were obtained in 197 cases of which 7 cases of referable diabetic retinopathy were detected by the AI software.

In persons with cataract, small pupils, corneal opacity or other media opacities, the quality of the images was not good enough for analysis by the AI software. This implies there is scope for improvement in either the software or the base technology itself.

Other ocular pathology was also identified including six cases of age-related macular degeneration and eight cases of glaucoma.

Conclusion

We found this method of screening to be feasible, cost effective and user friendly, not taking more than 1–2 days

✉ Alok Bahl
  alok.bahl@nhs.net

1   University Hospitals Plymouth NHS Foundation Trust, Plymouth, UK

2   The Medical Specialist Group, Guernsey, UK

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of hands on training. A previous study has shown a high sensitivity of 100% and specificity of 88.4% with the same device and with time this can be achieved [2].

Using the infrastructure of Essilor India Pvt Ltd who has 4000 EMOs spread over several states in rural India will enable us to roll out this programme quickly to a large population in a short period of time. This model can be replicated in other countries like Bhutan, Nepal, Bangladesh, Kenya and Indonesia using the Essilor infrastructure.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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