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Staging of diabetic retinopathy using an artificial intelligence-based software platform

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Objective: The aim of our study was to evaluate the potential of artificial intelligence in real-world population screening to detect stages of diabetic retinopathy, identify patients with previously undiagnosed diabetes, and establish and optimise patient pathways.

Materials and methods: This prospective, multicentre, open-label observational study evaluated the feasibility of automated analysis of colour fundus images to identify individuals with suspected undiagnosed diabetes mellitus by detecting signs of diabetic retinopathy in a real-world screening programme. It was conducted at primary healthcare facilities in collaboration with The Filatov Institute of Eye Diseases and Tissue Therapy of NAMS of Ukraine. Patients were not preselected based on diabetes status, allowing assessment of fundus examination as a tool for opportunistic detection of systemic metabolic disease.

Results: A total of 12,922 patients were included in the population-based screening and divided into three groups: 2940 patients with established diabetes mellitus (used to assess detection of diabetic retinopathy in a confirmed population), 7411 individuals without diagnosed diabetes but with risk factors (the key group for evaluating opportunistic detection), and 2571 controls without diabetes or significant risk factors.

Fundus image analysis identified signs of diabetic retinopathy in 1308 patients (10.1%), while no retinal pathology was detected in 9005 individuals (69.7%). Disease staging showed: mild non-proliferative retinopathy in 835 patients (6.5%), moderate in 256 (2.0%), severe in 65 (0.5%), and proliferative retinopathy in 152 (1.2%).

Conclusions: Artificial intelligence demonstrated high efficacy in population-based screening for diabetic retinopathy. The screening revealed a significant prevalence of diabetic retinopathy among the population. Among the 12,922 individuals screened, signs of diabetic retinopathy were detected in 10.1% of patients. These findings highlight the importance of early detection and large-scale screening programmes. AI algorithms enable effective identification of at-risk patients, including those without a confirmed diabetes diagnosis, creating new opportunities for early diagnosis and prevention of severe complications. Automated disease staging supports clinical decision-making, while AI-based screening improves access to care, reduces the risk of vision loss, and optimises ophthalmology services, especially in resource-limited settings.

Angaben zu potentiellen Interessenkonflikten: Valeriia Shcherbakova

Consulting: No

Employee: No

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Other: No

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AI-assisted smartphone-based retinal imaging for diabetic retinopathy screening and awareness at a large religious mass gathering in India

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Topic: Early detection of diabetic retinopathy (DR) remains challenging in low- and middle-income countries because of limited specialist access and low public awareness. This study evaluated an AI-assisted optometrist screening model using a smartphone fundus camera at Maha Kumbh 2025 in India and assessed awareness of DR screening.

Methods: This cross-sectional screening and survey study included adults aged ≥ 18 years attending Netra Kumbh 2025. Non-mydiatic retinal images were obtained using a smartphone-based fundus camera with offline AI for detection of DR, glaucoma, and age-related macular degeneration. A subset of gradable images was independently assessed by two ophthalmologists and two optometrists; one ophthalmologist and one optometrist graded with AI assistance, the others without AI. Ophthalmologists' grading served as the reference standard. Image grading was performed at the Sudharshan Retina Reading Centre, Sankara Eye Hospital, Bengaluru. Inter-grader agreement and referral accuracy were analyzed. A structured survey assessed demographics, diabetes status, prior awareness of DR, and self-reported knowledge gain after screening.

Result: A total of 4329 individuals underwent retinal screening. Referable DR was identified in 13.5% and glaucoma suspicion in 8.5%. Diagnostic performance analysis included 736 participants (1472 eyes; mean age 52.6 ± 14.4 years; 38% female). Ophthalmologists graded 98.1% of images as evaluable and identified retinal pathology in 2.4% of eyes. Inter-ophthalmologist agreement was 91.2%. The AI-assisted optometrist achieved 95% agreement with the ophthalmologist reference standard and reduced false-positive referrals by 28% versus unaided grading. Among 1477 survey respondents, only 7% reported prior awareness of DR screening, and 54% of participants with diabetes were unaware of the need for regular retinal examinations. After participation, 68% reported improved awareness of diabetic eye disease and screening importance.

Conclusion: AI-assisted smartphone retinal imaging showed high agreement with ophthalmologist grading and reduced unnecessary referrals, supporting scalability in resource-limited settings. Large community gatherings may offer an effective platform for retinal screening and public health education to improve awareness and reduce avoidable vision loss from DR.

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Knowledge and attitude toward retinopathy of prematurity screening and its associated factors among mothers with premature babies at Muhimbili National Hospital

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Background: Parents/caregivers' knowledge and attitude affect retinopathy of prematurity screening programs among premature and low birth weight babies. Involvement of parents/caregivers in the whole process of ROP screening program is a key, educating them on risks factors, complications and importance of early screening, will improve knowledge and good attitudes toward screening of ROP and in turn reduce childhood blindness.

Objective: To assess knowledge and attitude toward ROP screening and its associated factors among mothers with premature babies at Muhimbili National Hospital.