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Detection of Diabetic Retinopathy Using an Artificial Intelligence–Based Software Platform. Report 1

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Objective: Diabetes mellitus (DM) is one of the leading medical and social challenges of modern healthcare and is rapidly increasing in global prevalence. Research aimed at evaluating the effectiveness of artificial intelligence (AI)-based software platforms for diabetic retinopathy (DR) screening is extremely relevant and critically important for improving the quality of care and preserving vision in patients with DM.

Methods: An open prospective study was conducted at The Filatov Institute of Eye Diseases and Tissue Therapy of the National Academy of Medical Sciences of Ukraine in collaboration with Oftacentro SA (Lugano-Paradiso, Switzerland) and the startup CheckEye© (Ukraine), under a scientific cooperation agreement. All participants underwent non-mydratic color fundus photography. Imaging was performed in a single central field at a 45° angle, capturing the macula and optic disc, with the macula positioned at the center. The resulting images were uploaded to a cloud environment for analysis. Digital color retinal images were assessed using the Retina-AI CheckEye© artificial intelligence platform. In all cases, the presence or absence of diabetic retinopathy and DR severity were determined.

Results: Digital fundus images were obtained from 22 patients (44 eyes) with type I and II diabetes mellitus. In 3 cases, image quality was insufficient, and those photographs were excluded from analysis. Therefore, the final analysis included images from 22 patients (41 eyes). In all cases (n = 41), the AI-based software platform determined the diagnosis using fundus images. DR was not diagnosed in 12 cases; non-proliferative DR (NPDR) was identified in 24 cases and proliferative DR (PDR) in 5 cases. Discrepancies between the AI-generated diagnosis and the diagnosis confirmed by an experienced ophthalmologist were observed in 2 cases (5% of all cases). Thus, the percentage of eyes with DR was **70.73%**, and the percentage of eyes without DR was **29.27%**.

Conclusion: The Retina-AI CheckEye© artificial intelligence–based software platform demonstrates high effectiveness (95%) in detecting diabetic retinopathy (70.73%) and determining DR stages (70.74%) during screening of patients diagnosed with diabetes mellitus. The use of AI in DR screening software opens new opportunities for improving the accuracy, speed, and accessibility of diagnostics for patients with diabetes.

Disclosure of Interest: None Declared