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Commentary

The SMART Study: Advancing Diabetic Retinopathy Screening through Innovative AI Technology

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DESCRIPTION

The SMART (Simple, Mobile-based Artificial Intelligence Algorithm in the detection of Diabetic Retinopathy) study is a remarkable example of how Artificial Intelligence (AI) can revolutionize the early detection of Diabetic Retinopathy (DR), a leading cause of vision loss among individuals with diabetes [1].

Traditionally, DR screening has been hindered by the shortage of ophthalmologists, the need for expensive and bulky fundus cameras and the requirement for internet connectivity. The SMART study showcases a breakthrough solution-the Medios AI algorithm.

The Medios AI works seamlessly with the portable, rechargeable Remidio Fundus on Phone (FOP) camera, which can capture both mydriatic and non-mydriatic retinal images using an iPhone. The AI algorithm then analyzes these images offline and generates a binary report, indicating the presence or absence of Referable Diabetic Retinopathy (RDR) in under 10 seconds.

In the SMART study using non-mydriatic images, the Medios AI demonstrated a sensitivity of 93% and a specificity of 92.5% in detecting RDR and an even higher sensitivity of 98.7% in identifying Sight-Threatening Diabetic Retinopathy (STDR). The study's unique approach addresses the common barriers to DR screening, such as the lack of portability, cost and access to continuous electricity or internet. This makes the Medios AI-FOP system highly scalable, particularly in resource-limited settings where the burden of diabetes and vision loss is often the greatest.

In another validation study of the Medios AI using mydriatic images, we found that the sensitivity and specificity to detect RDR was 98.8% and 86.7% and the sensitivity for STDR was 100% [2]. Real-world community screening programs using the Medios AI-DR algorithm have also reported high sensitivity (100%) and specificity (88%-89%) for RDR detection [3,4]. These findings have been corroborated by additional studies, including head-to-head comparisons with Food and Drug Administration (FDA) approved AI algorithms like IDx DR-AI and EyeArt, where the Medios AI has shown comparable or superior performance [5,6].

The Medio AI-DR algorithm has also been validated for use with high-end desktop fundus cameras, expanding its applicability beyond the FOP device [7]. It has also demonstrated robust performance across diverse ethnicities, including caucasian populations.

Furthermore, the Medios AI has shown promising results in detecting other eye conditions, such as glaucoma. It has been validated against specialists performing a comprehensive glaucoma evaluation and has a sensitivity and specificity of 93.7% and 85.6% in detecting referable glaucoma [8]. This opens up the possibility of integrated screening for multiple diseases during routine diabetes care.

Overall, the SMART study provides strong evidence supporting the use of the Medios AI as a scalable, accurate and accessible tool for DR screening. The SMART study and the robust performance of the Medios AI technology in other studies represent a significant advancement in the field of ophthalmology. By leveraging the power of AI, this innovative solution has the potential to transform diabetic retinopathy screening, leading to earlier interventions and better treatment outcomes for patients. As we look to the future, the integration of AI-driven screening tools, such as the Medios AI, will undoubtedly play a crucial role in enhancing patient care and reducing the global impact of vision-threatening eye diseases.

REFERENCES

1. Sosale B, Aravind SR, Murthy H, Narayana S, Sharma U, Gowda SG, et al. Simple, mobile-based artificial intelligence algorithm in the detection of diabetic retinopathy (SMART) study. BMJ Open Diabetes Res Care. 2020;8(1):e000892.
2. Sosale B, Sosale AR, Murthy H, Sengupta S, Naveenam M. Medios-An offline, smartphone-based artificial intelligence algorithm for the diagnosis of diabetic retinopathy. Indian J Ophthalmol. 2020;68(2):391-395.
3. Natarajan S, Jain A, Krishnan R, Rogye A, Sivaprasad S. Diagnostic accuracy of community-based diabetic retinopathy screening with an

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offline artificial intelligence system on a smartphone. JAMA Ophthalmol. 2019;137(10):1182-1188.

4. Jain A, Krishnan R, Rogye A, Natarajan S. Use of offline artificial intelligence in a smartphone-based fundus camera for community screening of diabetic retinopathy. Indian J Ophthalmol. 2021;69(11):3150-3154.
5. Wroblewski JJ, Sanchez-Buenfil E, Inciarte M, Berdia J, Blake L, Wroblewski S, et al. Diabetic retinopathy screening using smartphone-based fundus photography and deep-learning artificial intelligence in the Yucatan peninsula: A field study. J Diabetes Sci Technol. 2023:19322968231194644.
6. Grzybowski A, Rao DP, Brona P, Negiloni K, Krzywicki T, Savoy FM. Diagnostic accuracy of automated diabetic retinopathy image assessment softwares: IDx-DR and medios artificial intelligence. Ophthalmic Res. 2023;66(1):1286-1292.
7. Rao DP, Sindal MD, Sengupta S, Baskaran P, Venkatesh R, Sivaraman A, et al. Towards a device agnostic AI for diabetic retinopathy screening: An external validation study. Clin Ophthalmol. 2022;16:2659-2667.
8. Rao DP, Shroff S, Savoy FM, Hsu CK, Negiloni K, Pradhan ZS, et al. Evaluation of an offline, artificial intelligence system for referable glaucoma screening using a smartphone-based fundus camera: A prospective study. Eye. 2024;38(6):1104-1111.