

Diabetic retinopathy screening and management in India: Challenges and possible solutions

Diabetes is a major public health problem in India. Diabetic retinopathy (DR) is an important cause of avoidable blindness. We need to understand that DR has a chronic course with a long latent phase. Up to 98% of DR-related visual impairment can be avoided by early screening and prompt management. The prevalence of DR is increasing at an alarming rate in India. The exact epidemiology of DR remains understated due to the lack of dilated fundus examinations in routine surveys. Recently, R.P. Center for Ophthalmic Sciences conducted the National Diabetic Retinopathy Rapid Assessment of Avoidable Blindness (RAAB) Survey 2015–2019, under the aegis of the Ministry of Health and Family Welfare, Government of India. The prevalence of DR among diabetics came out to be 16.9%, a reasonably high figure in a RAAB survey.^[1] This calls for the formulation of an integrated DR screening and management program within the existing healthcare system in India.^[2] Currently, the National Program for Control of Blindness (NPCB) relies only on opportunistic screening of DR in a high-risk population in India, which emphasizes early diagnosis, referral, and management at every possible point of contact of the patient with the healthcare provider.^[3]

Management of DR involves active collaboration between primary care physician/diabetologist and ophthalmologist. Lack of knowledge among physicians about DR, deficient education of patients, lack of adequate infrastructure for DR screening, and poor cross-referral to ophthalmologists are the major challenges that need adequate attention to ensure comprehensive DR management in India.^[4,5] Special DR educational and awareness modules should be incorporated in the training of various healthcare providers including hospital staff.^[3,6] For example, it would be helpful if a pharmacist or an ASHA worker motivates the patient for diabetic check-ups and DR screening in the community. Community sensitization and participation should also be increased. To ensure standardized grading and management of DR, adequate reforms and innovations must be incorporated into the academic curriculum of ophthalmologists and optometrists.^[7-9]

Praveen *et al.* have shown the feasibility and efficacy of comprehensive DR screening even at the level of tertiary diabetic care facility.^[10] This model consists of comprehensive DR screening at the diabetic clinic, patient education sessions, and annual follow-up screening camps for detection of diabetic complications. However, only one-third of the patients reached the eye care facility when referred for DR management. This emphasizes the need for coordinated efforts among physicians, ophthalmologists, patients, and policy planners to develop a sustainable model that provides affordable DR care to patients with minimum discomfort to patients. The potential benefits of early screening would be lost if the patient defaults on follow-up or encounters inadequate treatment of DR. In a recent review, Piyasena *et al.* found that lack of awareness about DR-related complications, financial constraints, and disabilities are the major barriers which prevent patients to access timely

eye care in low-middle-income countries.^[4] One of the most important barriers in accessing DR care in India is the distance, followed by the cost of travel.^[11] This should encourage policy planners to focus on patient targeted programs involving more DR outreach screening facilities.^[12]

The combination of mydriatic retinal photography with ophthalmoscopy is the most effective strategy for DR screening.^[3] Lack of DR screening facilities at the primary and secondary level and absence of referral mechanisms often results in overcrowding of patients at the tertiary healthcare facilities. These can be tackled by the incorporation of nonmydriatic fundus cameras, smartphone technology, and teleophthalmology solutions which can be operated by trained allied healthcare providers.^[13] A similar strategy has shown success in various screening programs for retinopathy of prematurity.^[14] Customized artificial intelligence-based systems such as IDx DR can help in the early identification of DR which may be especially helpful to physicians.^[15] At the primary level facility, early identification of diabetic patients from the community should always be emphasized and an efficient referral system should be ensured to refer all diagnosed cases of diabetes to secondary or tertiary level for further diagnoses and treatment of DR.^[3]

Traditionally, fundus fluorescein angiography (FFA) and optical coherence tomography (OCT) are employed for managing patients with DR at tertiary centers of excellence. Active efforts should be taken to incorporate novel imaging platforms such as ultra-widefield imaging and OCT angiography. Ultra-widefield imaging can image up to 200 degrees of the retina (82% of the retinal area) allowing better visualization of the peripheral ischemic retina. Thus, it has utility in early detection of peripheral neovascularization elsewhere (NVE), localization, and quantification of areas of capillary nonperfusion (CNP).^[16] These nonperfused areas are usually anterior to the equator and aid in the pathogenesis of recalcitrant diabetic macular edema. These are not captured by traditional imaging systems. Ultra-widefield fluorescein angiography (UWFA) image 3.9 times more areas of nonperfusion than conventional seven standard fields. It can also act as a guide in planning targeted retinal photocoagulation in some cases of proliferative diabetic retinopathy (PDR).^[16] OCT angiography has also emerged as a noninvasive imaging tool to detect microaneurysms, CNP areas, and NVEs, especially in cases where the injection of fluorescein dye is contraindicated.^[17] It has also become a reliable tool for monitoring and serial follow-up of patients having PDR [Fig. 1]. It can also document macular ischemia based on the morphology of the foveal avascular zone. These new imaging advances have revolutionized the diagnosis, monitoring, and management of DR.

There is also an increasing need to establish nationwide DR screening and research network in our country. Efforts must also be directed towards the building of a national registry of diabetic patients.^[12] This requires standardized case definitions, screening, referral and management protocols, dedicated training of personnel, and adequate infrastructure. The consensus-based article published in this issue is an important initiative that has described various relevant

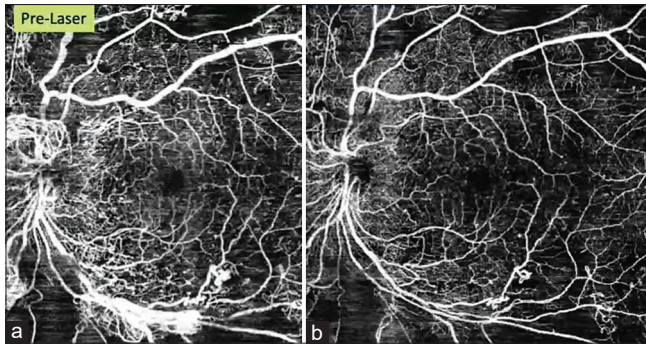


Figure 1: OCT angiography (12*12 mm montage) helping in the serial follow-up of a patient having PDR showing (a) neovascularization at disc and NVEs with venous changes at baseline, (b) Areas of neovascularization have regressed following pan-retinal photocoagulation at 6-weeks follow-up. The need for further laser augmentation can also be assessed on OCTA

aspects of DR screening in detail.^[18] These evidence-based technical guidelines along with operational guidelines for fieldworkers will help in achieving the goal of successful DR management.^[2] Lastly, we must also utilize the emerging potential of DR screening in identifying individuals at risk of developing other systemic complications, widening our horizon beyond visual impairment.

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