

OPINION

Preventing diabetic blindness: A priority for South Africa

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The prevalence of diabetes in South Africa is increasing rapidly, and diabetes is a significant cause of blindness. Diabetic complications can induce a cycle of poverty for affected families. Early detection of retinopathy and appropriate management can prevent blindness. Screening for retinopathy using a mobile retinal camera is highly cost-effective, with costs of screening and follow-up treatment being less than the expense of one year of a disability grant. Such a programme is a prime example of a 'best buy' that should be part of the national diabetes care package.

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Around 300 million people worldwide are affected with diabetes, and this number is forecast to increase to over 550 million by the year 2030.^[1] Of those affected, 80% live in low- and middle-income countries (LMICs).^[1] In South Africa (SA), the prevalence of type 2 diabetes rose from 5.5% in adults in 2000 to 9.0% in 2009. Currently approximately 2 million South Africans live with type 2 diabetes, with a projected 115 000 new cases per year.^[1] It is of concern that about 55% of people with diabetes are likely to suffer from diabetic retinopathy.^[2] Diabetes is the third leading cause of blindness in SA, with retinopathy and cataracts^[2] accounting for 8 000 new cases of vision impairment every year. In a 2010 survey in Cape Town, diabetic retinopathy was responsible for 8% of blindness and 11% of severe visual impairment.^[3] In LMICs, including SA, diabetic blindness creates a poverty cycle that disables breadwinners and burdens caregivers. The fact that timely treatment of diabetic retinopathy can reduce the risk of visual impairment by 90%^[2] implies a need for screening and early detection. The Ophthalmology Society of South Africa has recommended a strategy for diabetic retinopathy screening using a validated grading system, an internet-based database and tracking system, and a patient-held 'scorecard'.^[4]

In 2007, a pilot study in Cape Town evaluated the impact of mobile fundus photography to screen for diabetic retinopathy.^[5] Following the screening, an ophthalmic specialist reviewed the photographs and if necessary referred the patient. This proved effective and allowed a single technician to screen about 10 000 patients annually, suggesting that scale-up is feasible.

Despite this, a systematic review revealed a lack of information on the cost-effectiveness of using mobile fundus cameras as a screening method.^[6] In response, PRICELESS-SA and collaborators measured the prevalence of type 2 diabetes and its associated complications in SA based on 2009 data.^[7] Using these estimates together with data from the pilot project, modelling was performed on the cost and consequences of using a mobile fundus camera in a primary care setting.^[7] Screening via camera alone cost an average of ZAR189 per person, including follow-up operation procedures, ranging from a lower limit of ZAR10 500 to an upper limit of ZAR23 327 per case of blindness averted.

Relevance to policy

Advocacy for preventive screening of diabetic retinopathy intersects early stages in the development of SA's National Health Insurance (NHI). As the NHI will not cover diagnostic procedures outside its approved guidelines and protocols, it is essential that screening for diabetic retinopathy be considered for scale-up nationally and therefore for inclusion in these guidelines. At present, screening for retinopathy at primary care level is almost non-existent, despite current guidelines recommending annual screening.^[6,8] In addition, ophthalmic referral and treatment in the form of laser therapy and operations are reserved for the tertiary care sector.^[9]

Difficulty of access to screening and treatment of diabetic blindness is exacerbated by the 55% of diabetic patients who remain undiagnosed. The government provides support through monthly disability grants for the blind, totalling ZAR12 120 per year per blind person.^[10] In comparison, the cost-effectiveness study showed that the ZAR10 500 per blindness case averted is less than the expense of one year of a disability grant. Prevention of blindness would also extend the number of working years for every diabetic patient. The use of mobile fundus cameras has huge savings potential compared with the current situation of diabetes treatment and disability coverage.

International comparisons

Canadian researchers found fundus cameras to be cost-effective compared with their alternative specialist-based programme. Camera screening saved 67 sight-years at US\$3 900 per sight-year, while the alternative programme saved only 56 sight-years at US\$9 800 per sight-year.^[11] Although the SA pilot project was performed in an urban setting, similar projects in rural communities in Australia^[12] and France^[13] proved to be effective. US researchers^[14] have also built a prototype mobile fundus camera that will cut costs significantly and potentially make screening for diabetic blindness even more cost-effective. Smartphone technology that might allow screening for diabetic retinopathy using mobile phones is now being tested elsewhere in Africa.^[15]

International examples show that camera screening for diabetic vision impairment is successful at a national scale. Such systematic screening

has been established in Iceland for over 30 years. In 1980, 2.4% of Iceland's population was legally blind, but by 2005 the prevalence had dropped to 0.5%.^[16] Similarly, Israel's prevalence of preventable blindness dropped by half from 33.8/100 000 in 1999 to 16.6/100 000 in 2008.^[17] These declines can be attributed to the availability of treatment and preventive measures and illustrate the importance of implementing treatment guidelines for diabetic vision impairment.

In sub-Saharan Africa, countries have utilised other alternatives by task-shifting cataract operations from ophthalmologists to non-physician cataract surgeons (NPCSs). NPCSs in Kenya, Tanzania and Ethiopia, for example, performed over 77 000 operations in 2000 - 2004.^[18] Results showed no difference between specialised ophthalmologists and NPCSs in respect of the quality of surgeries conducted.^[19] Although the use of NPCSs is not widely accepted, they represent a cost-effective alternative solution. Laser treatment for diabetic retinopathy by appropriately trained doctors at secondary level and district hospitals would be a feasible solution to deal with diabetic retinopathy-related blindness in SA.

'Best buys' for policy makers

Under the current economic circumstances, every ZAR must work more effectively, efficiently and equitably. In order for the SA government to discern a 'best buy' among cost-effective options, it needs access to valid, reliable and comparable information on costs and consequences of policy alternatives. International examples do provide useful information, but this must be complemented by local context-specific evidence. Prevention interventions offer particularly good value, as they produce the largest gain.

Conclusion

The use of mobile fundus cameras to screen for diabetic vision impairment is a paradigm of an innovative approach to achieve economies of scale to reduce preventable blindness effectively on a national level. The use of mobile fundus cameras would interface well with the screening strategy recommended by the Ophthalmology Society of South Africa. One of the challenges for the evolving NHI

is how value for money and affordability can be balanced across competing priorities. This approach is one example of a 'best buy' that could potentially be incorporated in a diabetes care package.

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