Botswana combats avoidable blindness

Professor Oathokwa Nkomazana describes Botswana's journey in combating avoidable blindness and visual impairment

WHO and its partners launched *Vision 2020: The Right to Sight* initiative in 1997 as a global strategy to combat blindness and visual impairment.[1,2] In the preceding two decades, the global prevalence of blindness had increased 1.6 times from 28 million in 1978 to 45 million in 1995.[3] The first five years of implementing the global vision led to a downward trend in the blindness trajectory. The global prevalence of blindness dipped to 37 million in 2002.[4] Vision 2020 had a four-pronged strategy: advocacy; resource mobilisation, including partnerships; development and implementation of sustainable, equitable, and comprehensive eye care services at district level; and addressing avoidable causes of blindness and visual impairment.[5] The comprehensive eye-care services included developing eye-care teams with appropriate skill mixes and relevant infrastructure (equipment and consumables).

In 2002, the prevalence of blindness ranged from 0.2% in Western Europe to 1.0% in sub-Saharan Africa. The prevalence was highest in those aged 50 years and older.[6] The leading causes of blindness were cataract, glaucoma, age-related macular degeneration, diabetes mellitus, and corneal scarring.[7,8] More recently, cataract and refractive errors have been the leading causes of blindness and visual impairment, two conditions with cost-effective treatments.

In high-income countries, however, age-related macular degeneration causes more blindness and visual impairment than cataracts.[6] The Vision 2020: The Right to Sight Campaign led to impressive visual impairment reductions in most WHO regions except Sub-Saharan Africa, which made only modest improvements. Sub-Saharan Africa, however, had a substantial decrease in corneal blindness.[9] Nevertheless, the global effort did not achieve the planned 25% reduction of blindness and visual impairment.[10] Population growth and ageing, and a failure of the interventions to keep up with them, led to an inability to meet the targets. Inadequate developments in human resources and infrastructure also compromised the plan.[10,11]

Botswana's fight against blindness

Botswana conducted its first rapid assessment of avoidable blindness (RAAB) in adults aged 50 and above in 2006. The prevalence of blindness in this age group was 3.69%, and the main causes were cataract, diabetic retinopathy, and corneal scarring. Uncorrected refractive errors were responsible for almost 40% of moderate visual impairment. The major reason people who were blind in both eyes hadn't sought medical assistance was lack of knowledge about their treatable condition and that the treatment was available locally.[12] Based on the survey findings, Botswana Launched its first five-year national prevention of blindness plan in 2007. The plan's major focus was advocacy and awareness creation, developing a human resource, infrastructure and appropriate technology, and building strategic partnerships (south-south and north-south).[13] The disease focus was cataract and diabetic retinopathy. All these were in keeping with *Vision 2020: The Right to Sight* strategy.[11,14] However, a repeat RAAB in 2014 showed an increase in the prevalence of blindness to 4.5%.[13,15] The number of adults 50 years and older blind from cataracts doubled between 2006 and 2014.[13] A survey of childhood blindness in 2008 also indicated that 63% of bilateral and 89% of unilateral blindness in Botswana children was avoidable. The leading causes of bilateral blindness in children included refractive errors and congenital cataracts, and causes of unilateral blindness were trauma, refractive errors, and amblyopia.[16]

Based on all the evidence from the surveys, and learnings from the insight derived from the Vision 2020 Links Programme, the Ministry of Health and Wellness (MOHW) developed the second national eye health care plan: 2015 to 2019. In keeping with the WHO's universal eye health global action plan, the strategy aimed to reduce the prevalence of avoidable blindness and visual impairment by 2ł% in the five years.[17] The 25% reduction was achievable since cataracts and refractive errors, responsible for 80% of blindness and visual impairment, have cost-effective treatments.

Human resources development

Public health training: four eye health leaders completed a Master of Science in Community Eye Health (2006-2013).

Ophthalmologists: Two doctors completed training as ophthalmologists though one only completed training in 2020. Botswana also recruited expatriate ophthalmologists on fixed-term contracts and through bilateral international agreements with China and Cuba. The Ministry of Health and Wellness also recruited ophthalmologists from India through a recruitment agency, Indus Healthcare.

Ophthalmic nurses: Botswana trains Ophthalmic Nurses at the Institute of Health Sciences in Molepolole. The training programme admits nurses already in possession of a three-year diploma.

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Other training: Other training included leadership development, screening for eye diseases in children (teachers and primary health care workers), equipment maintenance (equipment technicians), retinal laser treatments (ophthalmologists), and diabetic retinopathy screening (ophthalmic nurses).

Infrastructural development

Botswana furnished ten theatres across the country with ophthalmic surgical equipment and instruments to increase eye care services access. The government set up eye care clinics in all the district and primary care hospitals and the two referral centers in the north (Francistown) and south (Gaborone). These centres served most parts of the country through outreach. Ophthalmologists were based in the two referral hospitals, while ophthalmic nurses serviced district and primary care hospitals.

Through a partnership with Addenbrookes (Vision 2020 Links Programme),[18] the MOHW established five diabetic retinopathy screening centers around the country and two diabetic retinopathy treatment centers. The partnership purchased and installed fundus cameras in the screening sites and Argon laser machines in the treatment centers and training staff to use them.[19]

The MOHW introduced clinical centers of excellence for different diseases from 2007/8. Serowe, in the central district and Molepolole, in the south, were declared centers of excellence for eye care. That meant moving services from Francistown and Gaborone, the two biggest cities in the country.

Disease prevention strategies

The first National Eye Heath Care Plan's (2007-2011) primary focus was cataract blindness and Diabetic retinopathy. The second plan continued to prioritise cataract and diabetic retinopathy in addition to refractive errors and child eye care.

Cataract: the programme aimed to treat all the prevalent cases of severe visual impairment and blindness from cataracts. Removing the backlog required an average of 4,000 cataract operations a year or a cataract surgical rate (CSR) of 2,000 surgeries per million population per year.[20] In 2014 the CSR was only 1,200.[21] Ophthalmic nurses were case finders through outreach services and while ophthalmologists performed surgeries at their base stations and district hospitals through outreach. The Eye Health Programme and its partners conducted regular catch-up cataract surgery campaigns.[13] During the annual world site day commemorations, eye care workers in the public and private sector congregated to perform cataract surgeries and provide refractive services. The MOHW, through a North-South-South Partnership with the Ad- denbrookes Abroad (Cambridge University NGO), Dr. Shroff's Charity Eye Hospital (India), Combat Blindness International (USA), eliminated the 6,000 cataract blind- ness backlog in three years (2016-2019).[22]

Diabetic retinopathy: The MOHW, with its partners, developed diabetic retinopathy screening and treatment services. The team that initiated the programme received training at Moorfields Eye Hospital in London. The programme exceeded its human resources development and laser treatment goals but not the screening and referral goals.[21] The programme also availed laser treatment training to ophthalmologists working in the private sector.[18,20,22]

Training ophthalmologists. Credit: Kahir Rahemtull.

Refractive services: In collaboration with Addenbrookes Abroad, the MOHW set up a vision center in Serowe to provide refractive services and supply spectacles. The center services the whole country. The MOHW also recruited optometrists into the public health care system to perform refractions. Through the vision center, the government provides free spectacles to children under 16, the elderly, and the indigent.[18,20,22]

Child eye health services: The MOHW and Addenbrookes Abroad also partnered to set up eye care services for children, including case finding, referral system, and treatment. PEEK Vision provided the technology to screen primary school children.[24] The country included eye screening tools in the national under-five development monitoring card facilitating early identification and referral of children with eye diseases.[23] The programme trained teachers and primary health care workers to screen children for eye diseases.

Funding

The different eye health care initiatives were funded primarily by the Botswana government with varying partners' inputs. The Botswana Addenbrookes Abroad partnership had funding from MOHW, and Standard Chartered Bank, through its 'Seeing is Believing' campaign for the diabetic retinopathy management, children's eye care, and refractive services. In child eye health screening, PEEK was funded by the Queen Elizabeth Diamond Jubilee and Standard Chartered Bank and supported by Botswana UPenn Partnership, Botswana Optometrists Association, and Addenbrookes Abroad. The cataract treatment programme received funds from Combat Blindness International and Dr. Schroff's Charity Eye Hospital.[13,19,21,24]

Discussions

This manuscript traces Botswana's journey in combating avoidable blindness and visual impairment. By all accounts, the country should exceed all the Vision 2020 and the Global Action Plan goals.[17] Botswana had among the highest per capita inputs in human resources and possibly infrastructure on the continent.[11] Botswana also had the advantage of developing national eye health care plans based on locally derived information, which allowed for context specificity. The evidence of a significant increase in visual impairment between 2006 and 2014[13] is surprising and troubling considering the sizeable investments.

The disparity between the inputs and outputs is probably a result of multiple factors. A policy change that migrated the eye care referral centers from major population centers with more readily available transport may compromise care. In the north, moving services from Francistown to Serowe left a large area of the country without specialist eye care services. Moving eye care to district hospitals that do not have congruent supporting services like radiology, anesthesia, and other medicine branches limit its capacity to manage complex cases and children. The move compromises coordination of care, which is integral to the proposed integrated people-centered eye care (IPCEC) promoted by WHO.[25]

However, there is evidence that many countries in Sub-Saharan Africa fall short of the target cataract output of 500 surgeries per year per ophthalmologist.[11,26] According to Courtright et al., effective supervision and adequate support are key to high cataract surgery rates.[26] An enabling environment that pays attention to all the six health system pillars will create efficiency in eye care services.[25] As the world vision report recognises, eye health workers also attend to many non-blinding conditions, detracting from the blinding conditions.[25] The majority of ophthalmologists in Botswana are expatriates on short-term contracts. Therefore, the eye care services have periods of a high ophthalmologist to population ratios[21] and periods where only two service the whole public sector. This lack of reliability of services makes them unsustainable.

Prioritising eye-care services by the government is likely to increase support and commitment to the services. Although the Botswana government, even at the highest levels, made promises of support for the eye care services, this hasn't translated to signing off and launching the plan. In 2016, for instance, the 2015-2019 strategy was still in draft form.[21] Unless the eye care plans become part of the national health plans, they will remain inadequately supported and monitored.[25]

Despite her failure to meet the targets, Botswana has made significant inroads in eye care development. The extensive infrastructure and trained eye health workers and forged partnerships with the Ministry of Education are invaluable. Botswana also has supportive partnerships with Addenbrookes Abroad and PEEK vision to take full advantage of and nurture. Botswana has the opportunity, through the Medical School, to train ophthalmologists.

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