VOLUME 30 • NUMBER 98 • 2017

Community Eye Health Journal

South Asia Edition

Good vision at school is essential for learning. INDIA

MD. MAHMUDUL ISLAM/ IAPB MAKE VISION COUNT

School eye health in South Asia

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Integrating eye health into school health programmes can provide comprehensive eye health services to millions of children all over the world.

Primary education is a fundamental human right. It has the potential to change individuals' lives and fuel social transformation. Good health is critical for achieving a sound education and a bright future for a child. Vision is an integral part of a child's health and poor vision can have long-term impact on their social, cognitive and physical development. An estimated 1.26 million children are blind around the world. Furthermore, 19 million children are visually impaired, including 12 million with uncorrected refractive error—they just need spectacles.[1]

This issue of Community Eye Health Journal - South Asia edition brings you several initiatives to improve children's eye health through school based interventions that have proven to be successful. The WHO programme on School and Youth Health notes that, "An effective school health programme can be one of the most cost effective investments a nation can make to simultaneously improve education and health."[2] Integrating eye health into school health programmes can provide comprehensive eye health services to millions of children all over the world.

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About this issue

School eye health programmes have the potential to change the lives of school children and their teachers by detecting eye conditions and ensuring access to quality eye care. Health education delivered at schools also has the potential to reduce eye disease and visual impairment in the future. Comprehensive programmes should be undertaken in collaboration with ministries of health and ministries of education, and need to be monitored and evaluated to ensure they are a good use of resources and bring about positive change. Guidelines have recently been produced to help plan, implement, monitor and evaluate school eye health programmes.

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A successful school eye health programme needs to include eye health education, early detection, referral and treatment.[3] Preventive interventions can address conditions such as conjunctivitis and eye injuries among children. With early detection, conditions like cataract and uncorrected refractive error can be treated on time, leading to improved quality of life. With teachers working closely with children on a day-to-day basis, training and integrating teachers into school eye health programmes can also help identify children with low vision.

This issue begins with an overview that looks at a range of school eye health interventions in South Asia. These interventions highlight the importance of including eye health in school health programmes. Successful eye health programmes in South Asia illustrate experiences of implementing school eye health initiatives and attempt to go beyond screening for refractive errors. In Pakistan, a school eye health programme involved engaging multiple stakeholders, leading to improved access to eye health services for children in rural communities.

An eye health programme in Nepal used a holistic approach involving eye screening, health education and promoting inclusive education in schools. This approach promoted inclusive education for children with disabilities through advocacy for accessible ramps, appropriate classroom settings and sensitisation of children, adults and teachers to the needs of visually disabled children.

In Sri Lanka, mandatory periodic school medical inspections for all children and provision of free spectacles proved to be a successful strategy. Training teachers to conduct initial screening of children in Indian schools showed that teachers can become advocates for child eye care in school as well as in their communities. Other models of eye care for children applied in different parts of South Asia are showing promise in reaching out to school aged children. A hospital-based community eye health programme in India reached out to children below five years and school dropouts. This model of eye care delivery helped in empowering people, including children, living in the service area of the hospital leading to an improvement in eye health-seeking behaviour and delivery of quality eye care services. In Uttar Pradesh, the most populous state in India, a school eye health programme used a clustered approach to reach out to a large population.

DIPENDRA MAHATO/ IAPB MAKE VISION COUNT

Good vision is vital for a child's growth. INDIA

Uncorrected refractive errors, headache and asthenopia, strabismus and amblyopia, developmental cataract, inherited retinal dystrophies and globe anomalies and ocular allergies are some of the ocular problems among school aged children in the region. A brief summary of such conditions, diagnosis and methods of treatment may help in early screening and diagnosis of common eye health problems.

Through cost effective measures many eye conditions in children are avoidable. A lot can be achieved through school health programmes by including health education, which promotes healthy behaviour and leads to early detection and referral of children with eye problems. Engaging various stakeholders such as ministries of health, NGOs active in education and communities will make a school eye health programme sustainable. With this issue we hope to promote the inclusion of eye health in all school health programmes in the South Asia region.

References

1 World Health Organisation. WHO Fact Sheet no. 282. Visual impairment and blindness [Internet]. 2017 [cited on 16 Sep 2017] Available from: **http://www.who.int/mediacentre/factsheets/fs282/en/**

2 World Health Organisation. School health and youth health promotion [Internet]. 2017 [cited on 16 Sep 2017]. Available from: **http://www.who.int/school_youth_health/en/**

3 London School of Hygiene and Tropical Medicine. Standard guidelines for Comprehensive School Eye Health Programs [Internet]. 2016 [cited on 16 Sep 2017]. Available from: **http://iceh.lshtm.ac.uk/files/2014/07/Standard-Guidelines-for-Comprehensive-School-Eye-Health-Programs.png**

Community Eye Health Journal South Asia Edition

VOLUME 30 • NUMBER 98 • 2017

Address for subscriptions
Community Eye Health Journal South Asia, Indian Institute of Public Health, Plot no.1, ANV Arcade, Amar Co-operative Society, Kavuri Hills, Madhapur, Hyderabad - 500033, India.
Tel +91-40-49006000
Email editor@cehjsouthasia.org

Correspondence articles
We accept submissions of 800 words about readers' experiences in eye health. Contact:
editor@cehjsouthasia.org

Published by the International Centre for Eye Health, London School of Hygiene & Tropical Medicine.

ISSN 0953-6833

Importance of integrating eye health into school health initiatives

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A comprehensive school eye health programme includes health promotion and prevention activities; activities to increase awareness about eye health among children; screening, detection and treatment of common eye conditions (URE, infections, squint, etc.) in these children.

DR. SHEILA JOHN/ IAPB STRONGER TOGETHER

Eye screening in progress in a classroom. INDIA

Recent estimates show that there are 1.26 million children who are blind and 19 million children who are visually impaired, including 12 million with uncorrected refractive error, globally.[1,2] Uncorrected refractive error (URE), especially myopia is one of the major causes of vision impairment and blindness.[3] Prevention, recognition, referral and treatment of a child for eye diseases is linked with the United Nations Sustainable Developmental Goals (SDGs). There is a changing trend in magnitude and causes of childhood blindness (CB), in developing countries.[4] Widespread nutritional and immunisation programmes, have reduced infections and nutritional deficiencies while other conditions like childhood cataract, glaucoma, retinopathy of prematurity (ROP), uncorrected refractive error (URE) are on the rise.[4,5] According to a recent estimate, there are 312 million children around the world affected by myopia and this is set to increase to 324 million by 2025.[3]

In South Asian countries URE is one of the major causes of visual impairment in children. The prevalence of URE in children in South Asia increases with age from an estimated 5.3% (95% CI: 2.9-9.6) at 5 years to 9.2% (95% CI: 5.2-15.7) at 10 years and 13% (95% CI: 7.4-21.6) at 15 years of age.[3] As most of these children with visual impairment (VI) can be identified in schools, school vision testing for eye health is one of the major programmes in some of these countries.

Table 1 shows the prevalence of URE (including myopia) as well as other eye conditions identified and the proportion wearing spectacles in different school vision testing programmes in countries in South Asia. Looking at the table, the prevalence of URE is ranging from 2.6% to 28.5%, with myopia being the predominant cause. Apart from this, few of these studies have looked at other eye conditions identified in school eye health. Also, there is little information on health promotion and educational activities carried out in schools.

The Indian Government has a strong commitment to school health programmes, including eye health. Since 1994, school eye testing is an integral part of the National Programme for Control of Blindness (NPCB).[13] Under the national programme, which is implemented through District Health Societies (DHS), 7,57,906 pairs of spectacles were provided between 2016-2017.[13] Recently, the Ministry of Health and Family Welfare, Government of India launched the *Rashtriya Bal Swasthya Karyakram* (RBSK- National Child Security Programme) under the National Health Mission (NHM). This is an ambitious programme, which envisages child health screening, including eye screening. The aim of this programme is early identification and treatment of four Ds: defect at birth, deficiencies, diseases and developmental delays, including disability.

Efforts have been made in Pakistan by government and non-government partners to work together. Initial efforts took place in partnership with district health and education departments and Al Ibrahim Eye Hospital in Malir, Sindh Province in 2011. The programme ensured integration of eye health services into existing health and education systems. Based on this learning, the second phase has been initiated. However, there is limited information on similar commitment or initiative taken in other countries in South Asia.

Most of the school eye health programmes in these countries are due to the efforts of International Non-Governmental Organisations (INGOs) like Brien Holden Vision Institute (BHVI), Orbis, Sightsavers,

Table 1 Prevalence of Uncorrected Refractive Error as well as other eye conditions in South Asia

Country	Region	Year	Age group (years)	Number of children	Prevelance of URE in either eye (%)	Myopia (%)	Other conditions identified	% already wearing spectacles
India	Delhi (Rural)[6]	2012	11-18	1075	11.4	NA	NA	NA
India	Delhi (Urban)[7]	2015	5-15	9884	14.5	13.1	NA	24.7
India	Maharashtra (Urban)[8]	2009	5-15	5021	5.46*	3.16	Amblyopia (41, 0.8%), cataract (4), corneal opacities (6), retinal diseases (4), squint (1), others (4-phthisis, microcornea, nystagmus)	3.65
India	Maharashtra (Rural)[8]	2009	5-15	7401	2.63*	1.45	Amblyopia (17, 0.2%), cataract (2), corneal opacity (2), retinal ds (2)	4.6
India	Hyderabad (Urban)[9]	2009	7-15	1789	19.5	NA	Trachoma (0.16%), night blindness (0.33%); strabismus, amblyopia, cataract, retinal diseases and corneal opacity	11.6
India	Hyderabad (Rural)[9]	2009	7-15	1525	6.3	NA	Trachoma (3.5%), night blindness (3.2%);strabismus, amblyopia, cataract, retinal diseases and corneal opacity	9.8
Nepal	Bhaktapur and Lalitpur dist.[10]	2013	5-16	2000	8.6	6.85	NA	NA
Nepal	School for the deaf, Kathmandu[11]	2005	6-25	253	11.86	NA	Ocular morbidity (22.52%) - Strabismus (7), refractive error (32), abnormal colour vision (6), night blindness (9), corneal ulcer or scar, glaucoma suspect and amblyopia	NA
Nepal	High Mountain, Nepal[12]	2013	4-18	140	28.5	27	NA	17.5

** <6/12 as cut off; NA: Not Available*

Mission for Vision (MFV), CBM and others. Apart from this, there are limited programmes for children who are enrolled in special schools or for school dropouts. Some of the countries like Bangladesh have used the Key Informant (KI) approach.[14] KI generally refers to a group of volunteers who have a brief training in identification of children with VI in underserved and difficult to reach areas. They usually work in campaign mode. Apart from this, the other approach used is identification by community based rehabilitation (CBR) workers as well as in schools for the blind or special schools.

For effective delivery of eye care services through school eye health programmes in South Asia, there is a need to involve ministries of education and health, communities and national and international NGOs. A comprehensive school eye health programme includes health promotion and prevention activities; activities to increase awareness about eye health and screening, detection and treatment of common eye conditions (URE, infections, squint etc.) in these children. Access to a school eye health programme is also important for the following reasons:

- Educating children about good eye health practices including dietary practices to prevent vitamin A deficiencies, facial cleanliness to prevent trachoma as well as outdoor play for prevention of myopia.
- Screening can aid in early detection, referral and intervention, which helps improve educational attainment as well as have a positive psychosocial impact, including overall personality development.
- This is also an opportunity to screen school teachers for conditions like URE, presbyopia, cataract, glaucoma, diabetic retinopathy and so on.

The following are recommended for development of a good school eye health programme:

- Generate evidence for advocacy, emphasising the importance of school eye health.
- Engage Ministries of Health and Education for school health, including eye health initiatives.
- Promote 'healthy schools' i.e. health education (including eye health education) to be part of regular school curriculum.
- Promote healthy school environment and practices.
- Identify human resources needed for each level of care and define their roles and responsibilities. Develop systems for their training including training of teachers / vision champions / volunteers.
- Use appropriate technology, including instruments and equipment.
- Have a mandatory and periodic vision screening programme in

Continues overleaf ➤

COURTENAY HOLDEN / IAPB STRONGER TOGETHER

Myopia is one of the major causes of vision impairment and blindness in school-aged children. PAKISTAN

each school to identify new cases as well as follow-up for children already identified.
- Develop standard guidelines for screening protocols.
- Develop a system for improving referral uptake and follow-up services to ensure compliance with the treatment.
- Provide cosmetically acceptable spectacles.
- Monitor and evaluate to ensure quality is maintained throughout the process.
- Educate teachers and parents for improving compliance to treatment.

References

1 Chandna A, Gilbert C (2010) When your eye patient is a child. Community Eye Health 23: 1-3.

2 Kong L, Fry M, Al-Samarraie M, Gilbert C, Steinkuller PG (2012) An update on progress and the changing epidemiology of causes of childhood blindness worldwide. J AAPOS 16: 501-507.

3 Rudnicka AR, Kapetanakis VV, Wathern AK, Logan NS, Gilmartin B, et al. (2016) Global variations and time trends in the prevalence of childhood myopia, a systematic review and quantitative meta-analysis: implications for aetiology and early prevention. Br J Ophthalmol 100: 882-890.

4 Gudlavalleti VSM (2017) Magnitude and Temporal Trends in Avoidable Blindness in Children (ABC) in India. Indian J Pediatr. 2017 Jun 23. doi: 10.1007/s12098-017-2405-2

5 Courtright P, Hutchinson AK, Lewallen S (2011) Visual impairment in children in middle- and lower-income countries. Arch Dis Child 96: 1129-1134.

6 Rustagi N, Uppal Y, Taneja DK (2012) Screening for visual impairment: outcome among schoolchildren in a rural area of Delhi. Indian J Ophthalmol 60: 203-206.

7 Saxena R, Vashist P, Tandon R, Pandey RM, Bhardawaj A, et al. (2015) Prevalence of myopia and its risk factors in urban school children in Delhi: the North India Myopia Study (NIM Study). PLoS One 26; 10(2): e0117349.

8 Padhye AS, Khandekar R, Dharmadhikari S, Dole K, Gogate P, et al. (2009) Prevalence of uncorrected refractive error and other eye problems among urban and rural school children. Middle East Afr J Ophthalmol 16: 69-74.

9 Uzma N, Kumar BS, Khaja Mohinuddin Salar BM, Zafar MA, Reddy VD (2009) A comparative clinical survey of the prevalence of refractive errors and eye diseases in urban and rural school children. Can J Ophthalmol 44: 328-333.

10 Adhikari S, Nepal BP, Shrestha JK, Khandekar R (2013) Magnitude and determinants of refractive error among school children of two districts of Kathmandu, Nepal. Oman J Ophthalmol 6: 175-178.

11 Sapkota K (2005) Visual status of deaf school students in Kathmandu, Nepal. Community Eye Health 18: 129.

12 Adhikari S (2013) Myopia in school children from high mountain region of Nepal. Nepal J Ophthalmol 5: 246-249.

13 Jose R, Sachdeva S (2009) School eye screening and the National Program for Control of Blindness. Indian Pediatr 46: 205-208.

14 Muhit MA, Shah SP, Gilbert CE, Hartley SD, Foster A (2007) The key informant method: a novel means of ascertaining blind children in Bangladesh. Br J Ophthalmol 91: 995-999.

Common eye diseases in school going children

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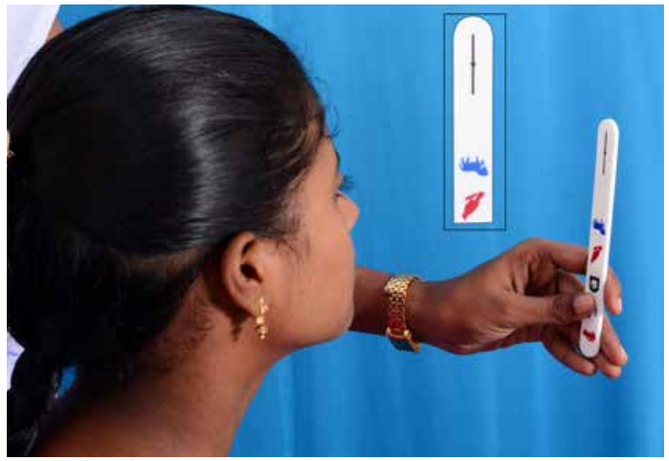
In this article we present an overview of common eye diseases or ailments identified in school-aged children in South Asia with different ways to screen and diagnose them at schools.



DR. P. VIJAYALAKSHMI/ ARAVIND EYE HOSPITAL

Examination of convergence. INDIA

Apart from refractive errors, the other ocular problems which may be encountered in this age group are:
- Strabismus,
- Amblyopia,
- Developmental cataracts,
- Inherited retinal dystrophies,
- Nystagmus,
- Ocular allergies,
- Vitamin A deficiencies and,
- Trauma-related problems and low vision.

Headache

This is a frequent yet insignificant complaint in this population. However, all children with headache need to be thoroughly evaluated to rule out optic disc edema, refractive error and fusion or accommodative imbalance. Headache and asthenopia due to manifest hypermetropia (MH), insufficient accommodation or poor convergence and fusion can negatively influence a child's academic performance. They may present with blurred vision while reading for near vision tests and face difficulty in changing the focus from near to distance. Manifest hypermetropia is said to be present when a child with unaided visual acuity of 6/6 maintains the same vision even with an addition of +1.5 DS in front of both eyes. Convergence is the mechanism wherein both eyes move towards the nose to focus on near activities. Convergence weaknesses is said to be present when the near point of convergence recedes beyond the normal level of 10 to 12 cm.

Screening for MH can be done by making all children with 6/6 acuity without correction to read the VA chart with +1.5 DS spectacles. Those who can still read 6/6 with the +1.5 DS add need to be referred for retinoscopy and further examination. The amount of convergence can be checked by using a small stick (see picture) printed with a vertical line intercepted by a central dot. The child is asked to focus on the central dot and to notice if the single line tends to appear double, as the examiner slowly brings the stick from 40 cm to 10 cm towards the nose of the child. During the process, the examiner encourages the child to concentrate on the dot, and the examiner looks for any ocular deviation. If the child sees the line as double and/or if a deviation is noticed when the stick is at a distance beyond 10-12 cm, the child needs to be referred to the base hospital for further evaluation. MH is corrected with spectacles, whereas convergence and fusion weakness can be improved with appropriate orthoptic exercises.

Strabismus and Amblyopia

With two eyes set in the straight ahead position, there is an advantage of having a wider field of vision and a capacity of perceiving the depths of different objects (stereopsis or 3D vision). Strabismus is said to be present when one eye deviates from the straight ahead position (see picture showing left esotropia and right esotropia on page 8). It can occur in one eye or alternately in both eyes. Strabismus may be hereditary, but can also occur due to uncorrected refractive errors, paralysis of the nerves involved with ocular movement or due to obstruction of vision in one eye by ptosis, corneal opacity, cataract, etc. If not detected and treated early, it might result in irreversible visual loss in the deviating eye (amblyopia or lazy eye).

Detection and management: The deviation of eyes from primary position can easily be detected by shining a torch light at a distance of 40 cm in front of both eyes and noting the position of light reflex on the cornea. Normally they are positioned at the centre of the cornea in both eyes. Depending upon the direction and amount of ocular deviation, the corneal light reflex in that eye gets displaced. Strabismus may be corrected with spectacles in the presence of refractive errors.

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Occlusion therapy and reading exercises are given for any associated amblyopia. Surgical alignment of the eyes may be indicated for improving vision or to restore normal alignment of the eyes.

Cataract

Developmental or traumatic cataract is usually detected by a torch light where the pupil either appears grey or white, with associated decreased visual acuity. Treatment by surgical removal of the cataractous lens followed by implantation of a suitable intra-ocular lens (IOL) may be indicated. It is important to mention that these children will need spectacles post-operatively especially for near vision and long term follow-up with frequent replacement of spectacles.

DR. P. VIJAYALAKSHMI/ ARAVIND EYE HOSPITAL

Bilateral cataract with a grey pupil on right side and white pupil on the left side. INDIA

Nystagmus and low vision

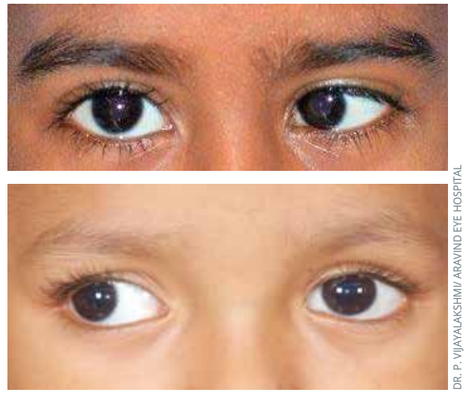
Involuntary or unsteady movements of the eye balls is called nystagmus. Children with nystagmus tend to keep their eyes, face or head turned towards the direction of least eye movements. Nystagmus occurs due to pathology in the eye structures (globe anomalies, retinal dystrophies, etc.) or in the eye movement control system. It is usually associated with poor visual acuity and/or difficulty in reading.
A torch light can be used to detect any abnormal eye movements. Initially, refractive errors need to be corrected. Where the vision cannot be improved, support to use residual vision to suit their needs by guidance at a visual rehabilitation unit in a secondary/ tertiary eye care centre is recommended.

Ocular allergies

Vernal kerato-conjunctivitis or seasonal allergic conjunctivitis can cause great discomfort affecting academic performance. It is characterized by severe itching, discharge and foreign body sensation. It can sometimes lead to refractive errors, mostly astigmatism. Since the course of the disease is long, one should be educated about preventive measures and safe use of drugs and avoiding self-medication, particularly steroids.

Vitamin A deficiency

Presence of Bitot's spots in this population gains importance only when it is associated with night blindness and other associated nutritional issues. Where necessary, this can be managed with a Vitamin A oral supplementation, as recommended by WHO.



DR. P. VIJAYALAKSHMI/ ARAVIND EYE HOSPITAL

Top: Left esotropia showing the deviation of the left eye inward along with displacement of the light reflex in the cornea, temporally.

Bottom: Right exotropia displaying the deviation of right eye outward along with displacement of the light reflex in the cornea, nasally. INDIA

A vision screening process for detecting uncorrected refractive error should include the following examinations to make it a comprehensive examination:

- Use +1.5 DS test to detect manifest hypermetropia
- During a headache with eye strain, use a target stick to look for convergence insufficiency
- Examination with a torch light, to look for strabismus, nystagmus, white reflex at the pupil (cataract), small or large eye balls, and any other abnormalities in the lids,
- Examination of the conjunctiva to look for bitot's spots or signs of allergy
- Explain any abnormal findings to the children/ parents/teachers and encourage them to undergo further examinations at a designated place.

Challenges

The above examination requires a slightly longer time and some training of the fieldworker. Investing in training of the technician makes the programme more comprehensive. Apart from having sufficient funding, processes need to be in place to keep track of children who need secondary and tertiary care to ensure complete care.

DR. P. VIJAYALAKSHMI/ ARAVIND EYE HOSPITAL

Bitot's spot on the temporal conjunctiva. INDIA

Developing an integrated school eye health programme in Pakistan

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Given the paucity of human resources for eye health, especially in developing countries, innovative approaches need to be developed and primary eye care components strengthened.

BRIEN HOLDEN VISION INSTITUTE

A child after vision correction as part of a school eye health programme. PAKISTAN

The importance of a child's eye health cannot be understated. Poor vision can affect a child's educational attainment and thereby have a negative impact on a child's future life.[1] As data from the Sustainable Development Goals suggests, educational attainment has a direct impact on future indicators for individual (and national) economic growth, and, more importantly the health and educational outcomes of children.[2] Eye health is an essential part of a school health programme. It should be comprehensive and respond to a wide range of eye conditions and diseases prevalent in the project area. Given the paucity of human resources for eye health, especially in developing countries, innovative approaches need to be developed and primary eye care components strengthened. This could include training non-clinical personnel like school teachers and community-based workers to undertake basic eye health screening and appropriate referrals to the primary eye health system for further management.

This paper describes the institutional approach to a school eye health programme in Pakistan. The programme engages multiple stakeholders to provide primary eye care and this has led to improved access, especially for children in rural communities.

The estimated population of Pakistan is 195 million[3] - 41% of which are below the age of 18 years[4] and among them 90% are enrolled at schools.[5] More than half of this population lives in rural areas. Pakistan is ranked 147th on the human development index.[6] More than one-third of the population lives below the national poverty line. According to the recently conducted Rapid Assessment of Refractive Error in Children in Pakistan (2016-2017) by the Brien Holden Vision Institute, the prevalence of significant refractive error is 5.4% in the age of 5-15 years (in a study submitted for publication). However, no reliable data exists on the prevalence of ocular morbidity in children in Pakistan and it is estimated that more than 10% of the children suffer from some form of ocular morbidity, predominantly due to Conjunctivitis, Trachoma, and Ocular Trauma. In countries like Pakistan, eye care is normally considered a subject of secondary and tertiary health interventions; increasing the cost to patients and the health system. The secondary and tertiary eye health facilities are inadequate and inequitably distributed across the country. The need for the development of primary eye health services is crucial. It requires capacity building of diverse cadres in public and private sectors to strengthen the primary eye health workforce. This needs inter- and intra- departmental partnerships with the public and private sectors, and civil society.

School health and school eye health is neither a prioritised theme for public sector education and health departments nor is eye health integrated in the school health agenda. Only Non-Governmental Organisations (NGOs) are implementing the school eye health (SEH) programmes in collaboration with public sector health and education departments in select geographical locations. In most cases, NGOs work with the education department while implementing their SEH programmes. In Pakistan, a number of other public and private sector organisations that run different types of schools, are normally discounted from such SEH programmes. In order to develop a comprehensive SEH programme that can claim to be inclusive, all such actors need to be involved that are directly or indirectly engaged in education and health interventions. There is a dire need to develop a comprehensive and practical framework that can cater to diverse needs and engage various stakeholders in education and health sectors to deliver integrated school eye health programmes.

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School Eye Health Programme

School eye health is an effective strategy for implementing eye care programmes including correction of vision impairment due to uncorrected refractive error. Early intervention can prevent the child from losing vision due to Amblyopia. Given the huge unmet need and lack of standardised approaches to school health in Pakistan, the Brien Holden Vision Institute (the Institute) prioritised SEH as a key focus for its child eye health intervention. The SEH strategy emphasises the following:

- To ensure accessibility of high quality eye health services to all children.
- To actively advocate the importance and integration of school eye health initiatives into existing education and health systems.
- To strengthen the institutional capacity of key stakeholders in planning, implementation, and effective delivery of SEH interventions leading to policy development.

The programme demonstrates the potential for adoption by the government and other eye care and non-eye care development partners.

Roles of various stakeholders

Developing a comprehensive school health programme requires partnerships both at the substructure and superstructure levels. Partnership at the level of superstructure results in ownership of the programme, its sustainability and integration of best practices into the policy discourse. Active engagement at substructure level ensures the effective transfer of knowledge and skills to clinical and non-clinical primary cadres, extensive school screening, community participation, and appropriate referrals. In the implementation of a SEH programme, diverse organisations can be engaged to reach out to a larger number of children. The table below explains the types and roles of the different organisations engaged in the programme to promote SEH (Table 1).

A comprehensive SEH programme, developed with the active ownership of diverse stakeholders serves the following key functions:

- Links schools, communities, government departments, private sector and civil society organisations.
- Increases early detection of vision impairment among children and facilitates provision of appropriate solutions.

Table 1 Type and role of the different organisations engaged in the programme to promote SEH

Nature of the organisations	Role in school eye health
Public sector • Ministries of Education, Health, Social Welfare, Child Welfare • District Governments • School management committees • Police departments	• Integrating eye health into school health and primary health systems • Resource allocation for spectacle provision for those children who cannot afford them • Introducing SEH in schools run by government departments • Permitting different cadres for trainings on SEH to provide primary eye care at department, community and school levels • Generating evidence to further incorporate in policy discourse
Civil society organisations • Local non-governmental organisations (NGOs) • International non-governmental organisations (INGOs) working on education, health, hygiene, gender, livelihoods and child rights	• Development of demonstration approaches based on best practice • Integrating child eye health into community-based projects on education, health, hygiene, sanitation, child rights, and other relevant issues • Increasing eye health awareness among communities and schools in the project area • Promoting SEH in schools run by NGOs and associated communities • Advocating and lobbying at local levels with education and health departments
Private sector • Social entrepreneurs • Private eye hospitals and businesses	• Integrating SEH in regular eye and health services • School screening and referring children with eye care needs to secondary and tertiary eye health facilities • Ensuring the availability of affordable and good quality spectacles frames, lenses and accessories for children of all ages
Media (print, electronic, social media)	• Disseminating information on SEH to broad audiences • Promoting targeted eye health education and health promotion • Mobilising the communities in rural areas
• **Academia, particularly, health professionals** • **Eye health professional forums**	• Integrating SEH in eye health curriculums at all levels • Facilitating the engagement of optometry and ophthalmology graduates/under-graduates in SEH programmes especially in trainings and outreach activities

BRIEN HOLDEN VISION INSTITUTE

Provision of good quality eye care enhances the confidence of children, especially girls. PAKISTAN

In the last three years, through its SEH programme, the Institute has reached 520,000 children including 47% girls by engaging with public and private sector organisations, academia and civil society organisations. The Institute has dispensed over 25,000 spectacles and 1,300 low vision devices to boys and girls in the programme's geographical areas. Contributing to the broader SEH agenda along with other civil society organisations, the Institute has built the capacities of more than 2,500 diverse cadres including teachers, social workers, NGO employees, hygiene promoters and others in child eye health and vision screening.

Key Lessons

A SEH system needs to be compatible with local culture and policy environment. Factors which facilitated the effective implementation of SEH programmes in Pakistan are:

- Partnership with education and health departments to build synergies; bring ownership, ease of getting necessary approvals, continuity and sustainability.
- Training teachers in primary eye health and appropriate referrals to build a community-based cadre, given the scarcity of human resources for health care.
- Availability of training material in the local language enables non-clinical cadres to learn and understand SEH better.
- Better-equipped trainers will keep the diversity of the participants in mind and provide local and contextual examples.
- Raises eye health awareness at school, community and organisation levels.
- Enables children with vision impairment to continue their education.
- Promotes inclusiveness by providing primary eye care to all children regardless of any difference.
- Identifying potential women and men, especially in rural areas, to establish micro-social enterprises, contributes to reaching more children both in and out of schools.
- Strict implementation of a code of conduct for child protection reduces the risk of harm to children and presents the staff engaged in SEH as positive role models for children.
- Eye health, being a high priority subject, is acceptable to all stakeholders involved in the community development process.
- Eye health is thematically and operationally compatible with regular education, health and hygiene programmes.
- Media is a valuable partner in eye health awareness especially in rural communities.
- In low-income countries, different departments in public and non-government sectors run their own schools. These schools need to be engaged in broader school health programmes.

Challenges

There were several challenges in implementing this programme and the following lessons were learnt:

- An enabling policy framework to support education and health sector reforms is needed in Pakistan.
- Education and health departments work independently, with little coordination between them. An effective SEH programme requires efficient coordination among key stakeholders.
- Non-availability of data related to schools run by NGOs, social welfare and other departments.
- A mechanism to provide financial assistance to children whose families cannot afford to pay for services including spectacles.
- Developing consensus to implement a broad monitoring, evaluation and learning framework requires considerable discussion.

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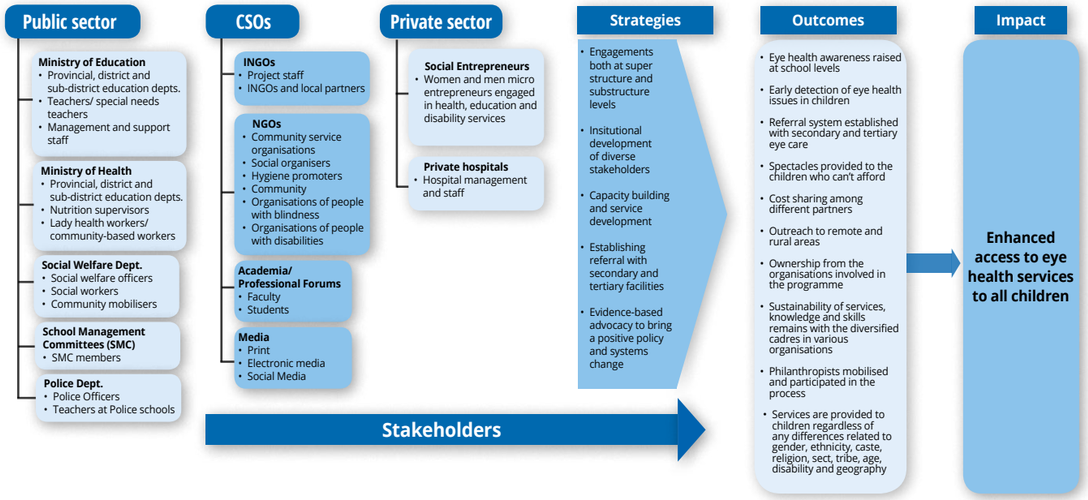
Figure 1 School eye health system with non-clinical and diverse stakeholders



Conclusion

In order to be effective and sustainable, a SEH programme must be integrated within the education and health systems, particularly within the school health programme. It is crucial to engage with diverse stakeholders for the implementation of SEH in low income countries, especially ones which have large populations and a large number of school-going children. Developing countries also have fewer eye health workers, thus creating a space and need for other cadres to be involved in eye care. Coordination is essential at all levels. Roles and responsibilities need to be clearly defined for this system to function effectively. Integrating SEH into the broader health agenda will also help in the pursuit of Sustainable Development Goals.

References

1 JJaggernath J, Øverland L, Ramson P, Kovai V, Chan VF, Naidoo KS. Poverty and eye health. Health published online July, 2014 **http://file.scirp.org/pdf/Health_2014072816174123.pdf.** (accessed on 29 May 2017).

2 Uvalić-Trumbić S, Daniel J. Sustainable Development Begins with Education. Journal of Learning for Development-JL4D published online November, 2016 **http://unesdoc.unesco.orgimages/0023/002305/230508e.pdf.** (accessed on June 19, 2017)

3 Country Meters. Pakistan population – Demographics of Pakistan **http://countrymeters.info/en/Pakistan** (accessed on May 31, 2017)

4 Unicef. Statistics (Pakistan) **http://www.unicef.org/infobycountry/pakistan_pakistan_statistics.html** (accessed on May 31, 2017)

5 Ministry of Finance, Government of Pakistan. Pakistan Economic Survey 2014-15 **http://www.finance.gov.pk/survey/chapters_15/10_Education.pdf.** (accessed on June 6, 2017)

6 UNDP. Human Development Report 2016 - Human Development for Everyone **http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf.** (accessed on June 6, 2017)

Hospital-based community eye health programme: A model for elimination of avoidable blindness on a sustainable basis

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There is a need for inclusive approach that targets not just the medical causes but also the socio-economic causes of avoidable blindness.

SHIVAM MAINI/ OEU

A cataract awareness session. INDIA

The eye health sector shares a uniform approach to eliminating avoidable blindness: making eye care services available to people who would otherwise go unreached. There is a need for an inclusive approach that targets not just the medical causes but also the socio-economic causes of avoidable blindness. Despite significant strides in making services available, avoidable blindness continues to remain a public health issue in many developing countries.

We present a model developed by Operation Eyesight which has proven to be both practical in eliminating avoidable blindness as well as replicable. Our school eye health programme is an integral part of this model and also addresses eye health-related problems of children who have dropped out or have not enrolled in school, children below the age of five and the larger community.

Hospital-Based Community Eye Health Programme (HBCEHP): The model

Problem analysis

Poor eye health-seeking behaviour usually stems from inadequate knowledge of eye diseases, harmful cultural beliefs and practices, eye problems viewed as low priority, gender discrimination, lack of affordability and poor mobility amongst the elderly. Often hospitals:

- Provide eye care services but do not empower targeted communities;
- Do not focus on the elimination of avoidable blindness; and
- Make services available free of cost, but poor patients at risk of losing their sight do not access these services.

Developing the model

The above analyses led us to the conclusion that there were gaps in the services offered by hospitals and that greater effort was needed to empower the target communities.

Through a pilot project implemented from 2009 to 2013 in southern India, we learned that by empowering people living in the service area of the hospital and improving their eye health-seeking behaviour, while continuing to deliver quality eye care services, hospitals could significantly contribute to the elimination of avoidable blindness on a sustainable basis.

This insight led us to develop and successfully scale up a model, named Hospital-Based Community Eye Health Programme (HBCEHP). This model aims to:

- Clear the backlog of avoidable blindness cases, and thereby eliminate avoidable blindness from the service area of a hospital or vision centre;
- Empower target communities and community health workers so that they can address the incidence of blindness and visual impairment.

The projects based on the model are comprehensive and include strengthening hospitals to ensure delivery of quality services; strengthening primary health services, including primary eye care services; and empowering target communities to take ownership and responsibility for their eye health needs. The target communities include school children in the service area of the hospital or vision centre.

Key components of our HBCEHP model

1. Assess the quantity and quality of services currently being delivered by the hospital.
2. Develop an action plan for implementation of the HBCEHP and improving services.

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Target area selection and cluster formation

The target area is the immediate service area of a secondary eye care centre or vision centre. We delineate the target area into clusters by identifying surrounding villages in such a way that any village can be reached within two hours from the most centrally-located village in the cluster. Each cluster has a population of 5,000 to 25,000 people.

Recruitment of community health workers or volunteers and other staff

For each cluster, we recruit two community health workers/ volunteers who are part of the target community and live within the cluster. They are usually part of the existing public health system, preferably female, with a minimum qualification of secondary school. Other staff include a project coordinator and a data entry operator.

Training community health workers or volunteers and other staff

The community health workers or volunteers and other staff undergo a training programme spread over 10 to 20 days. Training is conducted by trained staff from the hospital, based on a curriculum developed by Operation Eyesight.

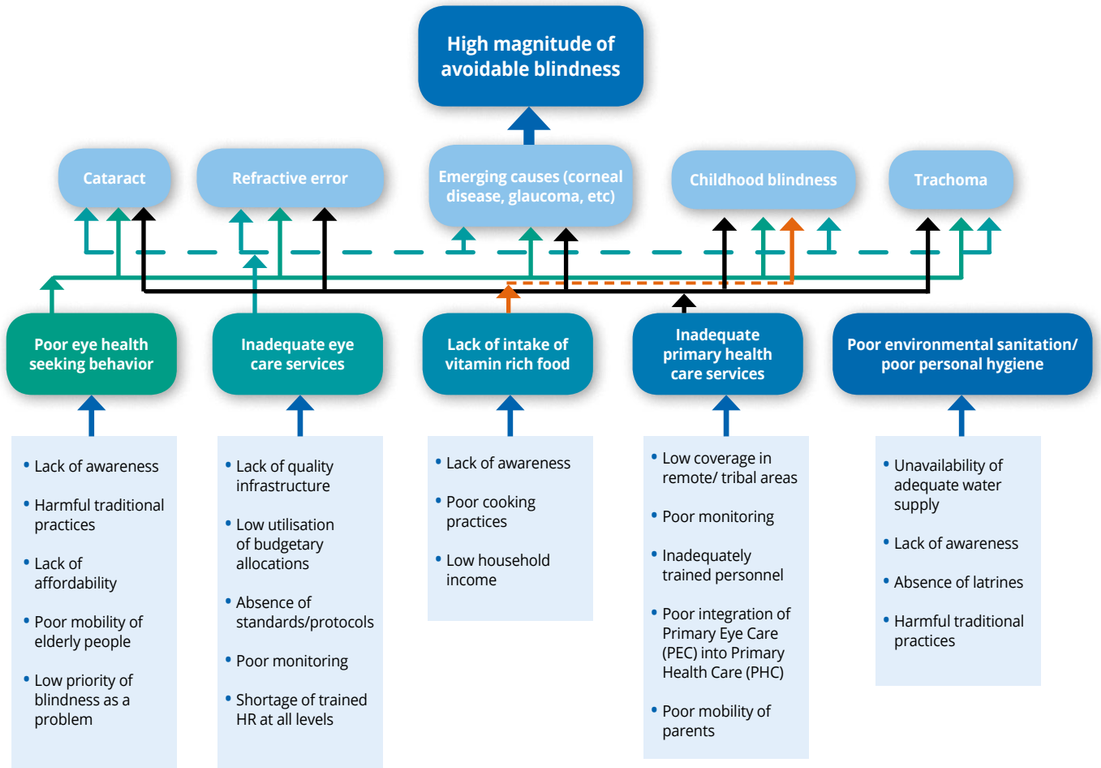
The training programme focuses on:

- Diseases of the eye, measurement of visual acuity, and classification of blind and visually impaired persons;
- Door-to-door survey methodology and a Knowledge, Attitude, Practice (KAP) survey;
- Formulation of cluster-based micro plans;
- Eye care, maternal and child health care, and immunisation;
- Screening programme methodology, social marketing, referral system and follow-up;
- Health promotion and women's empowerment;
- Monitoring and reporting;
- Other health topics relevant to the target communities.

Door-to-door surveys

Teams comprising two trained community health workers or volunteers conduct door-to-door surveys in their respective clusters for the entire cluster area using a standard format. The survey lasts two to five months, depending on the population of the area. The survey focuses on identifying people who are blind or visually impaired, with special emphasis on identifying those with cataract, trachoma and refractive errors; assessing people's knowledge, attitude and practice when it comes to eye health (KAP survey); and assessing the immunisation and antenatal/ postnatal care status of the population. Validation of the survey is done on a periodic basis by qualified ophthalmic personnel, and the validated data is computerised by a data entry operator.

Figure 1 Operation Eyesight Problem Tree.



Cluster-based annual action plans

Each community health worker or volunteer is assisted to develop a cluster-based annual action plan. This is based on the results of the door-to-door survey and tailored to meet the specific needs of the target community. These plans serve as the basis for all the work undertaken by the workers/ volunteers and ultimately contribute to achievement of the project's specific objectives. A project problem tree guides the development of these plans (Figure 1).

Community eye care

The following activities are undertaken mainly by the community health workers or volunteers with support from the base hospitals:

- Screening programmes: eye check-ups, treatment for minor ailments and referral to the vision centre and/ or base hospital for appropriate care.
- Implementation of social marketing strategies to encourage target communities to access eye care services being provided by the hospitals.
- Implementation of health promotion and education activities to increase eye care awareness.
- Training of self-help groups in eye care.
- Creation of village vision committees to help identify and refer patients and ensure those needing eye care services access treatment.
- Community-based rehabilitation for those with incurable blindness or visual impairment or other disabilities.

Primary health care

We work with relevant community-based organisations, NGOs and government departments to implement maternal and child health care activities with a special focus on immunisation services and maternal clinics for antenatal and postnatal care. We also work with these partners to promote primary and non-formal education.

Hospital care

Community health workers or volunteers and ophthalmic staff running vision centres ensure that all those who require further diagnosis and care present themselves at the base hospitals for surgery or other medical treatment. The staff in the field ensure 100 per cent follow-up.

Monitoring and reporting

Continuous monitoring of all activities is done by the project coordinator on a daily basis, and by the hospital management on a weekly basis. The results of door-to-door surveys and cluster-based implementation plans serve as the basis for monthly and quarterly monitoring by the hospital management. There are over 30 different registers maintained by field staff. These registers are reviewed regularly, and necessary measures are taken to ensure projects stay on track.

SIVAM MAINI/ OEU

Screening in progress. INDIA

Declaration of avoidable blindness-free villages/ communities

Everyone, regardless of gender, age, religion or abilty to pay, is treated for curable eye conditions. We have a tested methodology based on which we declare villages/ communities as 'avoidable blindness-free.' This methodology includes the following key components:

- Verification of cleared of backlog cases, identified through a door-to-door survey;
- A post-project door-to-door survey conducted by community health workers or volunteers under the supervision of an ophthalmologist;
- Treatment of remaining cases and follow-up;
- Certification from local government authorities and ophthalmologists of patients who cannot be treated due to medical or other reasons; and
- A post-project KAP survey to assess the community's current level of eye health-seeking behaviour.

If the results are satisfactory, we declare the village/ community as avoidable blindness-free during a public event, which is typically attended by district authorities, elected representatives and other agencies operating in the area.

Sustainability

The community health workers or volunteers together with the primary eye care/ vision centres (which are linked vertically to secondary hospitals) ensure sustained delivery of appropriate care to target populations beyond the project's duration. Community-based action groups, such as village vision committees, women's groups and youth groups, are trained and encouraged to work with community health workers to increase community participation and ensure the project reaches as many people as possible. We also network with relevant government programmes and public health departments to ensure they will provide the required support to hospitals after the projects have ended.

No permanent positions are created for implementation of the projects. In addition, all recurring expenses related to surgical consumables, spectacles, etc. are absorbed by the hospitals as part of their regular annual plans and budgets.

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Table 1 **A snapshot of school children covered under Operation Eyesight's HBCEHP in India**

Details	2014	2015	2016
Number of schools covered	279	261	217
Number of teachers trained	335	313	97
Number of children screened	21,647	18,463	15,101
Number of children prescribed spectacles	414	383	229
Number of children provided with spectacles	375	349	211
Number of children identified with other eye diseases (conjunctivitis, other infections, etc.) and referred to a hospital	1,086	1,114	954
Number of children operated on through the project	71	103	126
Number of children identified with Vitamin A deficiency during school screening and provided with Vitamin A supplementation	211	76	3
Children below five years			
Number of children who received immunisation as a result of the project	11,665	11,822	37,011

Results

- Eighty-five per cent of the primary eye care centres are financially sustainable.
- About 70 per cent of the patients who participate in screening programmes and receive treatment are those who were identified during a door-to-door survey and attended health promotion events conducted by community health workers. The remaining 30 per cent of identified patients are counselled at their homes by community health workers, village leaders, etc., and they too eventually undergo treatment (Table 1).
- Surgical conversion rates range between 75 and 92 per cent, and spectacle conversion rates are over 90 per cent.
- Participating hospitals have seen an increase of up to 55 per cent in direct walk-ins from the project areas as compared to pre-project days.

Conclusion

Operation Eyesight has developed a model that is effective in eliminating avoidable blindness on a sustainable basis, benefiting children and adults alike. By targeting the root causes of avoidable blindness and tailoring our projects to the specific needs of the community, we are able to provide much-needed services that lead to improved eye health and general health for children both within and outside the school system. After successfully piloting our HBCEHP in India, we have expanded our model to other areas of South Asia and Africa where we will continue to prevent blindness and restore sight for more individuals, families and communities.

Acknowledgements

The author wishes to thank Operation Eyesight India team, especially Mr. Franklin Daniel, Head of Programmes, who is successfully leading the implementation of the model community eye health programme.

REACH: An innovative model for child eye health

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School-based eye health programmes are a golden opportunity to recognise that the timely provision of effective interventions can be a life-changing experience for a child in need.

GEOFF BUGBEE

School screening programme. INDIA

School is the first formal space for learning. Using this space to reach the vast cohort of school-aged children who constitute a particularly vulnerable group because of the high prevalence of refractive error is a common practice. There are several models of school eye health programmes currently operational across India. REACH – Refractive Error Among Children is a model aiming to address challenges in the school eye health space and build innovative, sustainable and scalable programmes.

The REACH model

The REACH model employs a three-phased deployment approach.

Phase I: Prepare

This phase involves four steps:

- Generate a database of all the schools in the project area
- Establish initial contact with local authorities, schools and other stakeholders to get their buy-in and necessary permissions
- Generate a list of enrolled students in each of the participating schools
- Plan and schedule service delivery activities with an adequate lead time

This phase sets the foundation for subsequent service delivery activities.

Phase II: Deliver

- The first activity in this phase is primary screening where the vision screener confirms the identity of the child. The screener performs a visual acuity assessment using a backlit pocket vision screener with LogMAR 0.2 optotypes (Snellen 6/9.5). Children who fail the vision screening test or have any other ocular complaints even in one eye or are already wearing spectacles are selected for secondary evaluation.
- During secondary examination, the team which includes an optometrist or ophthalmologist conducts a detailed visual acuity assessment, refraction and ophthalmic evaluation. All children who require spectacles are given a prescription. Three intervention categories may emerge:

- Children identified with simple refractive error may receive spectacles on the spot
- Complex prescriptions that need custom spectacles are delivered at a later date. Nevertheless, children are also given an opportunity to select their frames.
- Children who need cycloplegic refraction may receive it on the spot or are referred to the nearest fixed facility. Any child who may need further evaluation or other intervention is also referred to the base hospital or nearest vision centre for necessary investigation and treatment.
- All children who require spectacles are counseled by a counselor on spectacle care, need for continuous wear of the prescribed spectacles as well as provided information on contacting the concerned person in case of any difficulty, for ensuring acceptance of the dispensed glasses.

In addition to addressing children's eye health needs, the REACH team also screens all teachers and provides orientation on the basics of primary eye care using Orbis' 'Vision Screening Handbook for School Teachers.'

Phase III: Consolidate

Often the end-point of school-based programmes is the distribution of spectacles and the entire exercise is a one-off event. It is important to investigate whether children who are given spectacles are using them or not.

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ORBIS INDIA

A screener performs a visual acuity assessment using a backlit pocket vision screener. INDIA

In REACH, a team member visits the school unannounced three months after giving glasses to determine compliance and complete a compliance/non-compliance questionnaire. This approach has provided the teams not only with an opportunity to evaluate the success of the intervention but also a chance to identify specific reasons for compliance/non-compliance. The team can also identify children whose glasses need repair or replacement in case of minor problems or breakage of the glasses that were provided earlier.

REACH also has an annual follow-up visit scheduled within the programme. A year later, the same team visits the school to re-evaluate children who underwent a secondary evaluation. New admissions including first grade (elementary), all students in 8th (secondary) and 11th grade (higher secondary) and any students identified by the oriented teachers to have an eye health issue are screened. This visit is planned on an annual basis.

The REACH model is built on four defining features:

Knowledge Attitude Practice (KAP) study

A KAP study on refractive errors in children amongst children themselves, their parents, teachers and eye health service providers is conducted. The findings of this study guide the development of appropriate Information Education Communication (IEC), training material as well as other awareness generation activities. This creates a strong mechanism to effectively communicate with stakeholders and empower them with the right information to make them receptive and accept the treatment provided. Evidence of any change in eye health seeking behaviour within the community will be documented through a repeat KAP study in the same area.

Standardisation

Standardisation of process, hardware and software all contribute to making REACH a unique initiative. A common guideline has been developed to standardise both clinical and non-clinical processes. All implementing partners are utilising the same guidelines for vision screening cut-off, spectacle prescription, cycloplegia, referral, compliance evaluation and follow-up, among others. Similarly, key pieces of hardware are standardised across sites, e.g. internally illuminated pocket vision screeners, auto-refractors, LogMAR visual acuity charts as well as child-friendly occluders. And REACHSoft, a bespoke software, is deployed across all sites to manage data at all points of activity within REACH.

Data Management

To facilitate all of the above and provide good quality information to drive future initiatives, there is a strong focus on data management at all levels and at all steps of REACH. To that end, Orbis has developed REACHSoft, a software solution tailored for this programme. REACHSoft is designed to support the planning, implementation and management (including monitoring and evaluation) of the programme. From the first step of scheduling a visit to a school, REACHSoft supports every step of the planning process and implementation: developing the school database, collecting the school-wise student database, scheduling and planning service delivery activities, collecting data at the individual student level during service delivery (primary screening, detailed examination, spectacle prescription and dispensing, referral management, etc.) as well as monitoring progress and generating reports aiding management of the programme.

Multi-centric research

While better data management and real-time monitoring facilitates the smooth implementation of the programme, the huge data set which will be developed is intended to be used for multi-centre research. This will in turn provide evidence-based recommendations for improving similar initiatives in the future.

Considering that 80% of what a child learns is visual,[1] good vision is critical to a child's ability to participate in and benefit from educational experiences. School-based eye health programmes are a golden opportunity to recognise that the timely provision of effective interventions can be a life-changing experience for a child in need. Addressing this need across the country is a mammoth challenge but it is imperative that we REACH out to the millions of children across India.

References

1 American Optometric Association. School-aged Vision: 6 to 18 Years of Age [Internet] [cited on]. Available from: **https://www.aoa.org/patients-and-public/good-vision-throughout-life/childrens-vision/school-aged-vision-6-to-18-years-of-age**

School eye health in Nepal: A holistic model

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The integration of eye health into comprehensive school eye health programmes not only helps to identify children with significant refractive error and associated ocular morbidities but also helps to promote a healthy school environment.

DILIP SINGH/BIRATNAGAR EYE HOSPITAL

Sensitising school children on eye health through wall painting of *saag-bahadur bhaat-bahadur*. NEPAL

Health including visual health is inextricably linked to school achievement, quality of life and economic productivity.[1] The school eye health programme organised by eastern regional eye care programme (EREC-P) in the eastern region of Nepal is designed to improve the visual health of pupils, by directly influencing school personnel, families and indirectly influencing other members of the community through schools.

Globally, 19 million children live with visual impairment, and approximately 12 million children have significant refractive error.[2] The prevalence of refractive error (0.5 dioptres or more for myopia, 1.00 dioptre or more for hypermetropia and ≥ 0.75 DC for astigmatism) among school going children in eastern part of Nepal was 8.6% and myopia was the most common type (44.79%) of refractive error.[3] As per the recently adopted National Eye Health Policy 2017 the school eye health programme needs to develop and strengthen comprehensive eye examination by eye health professionals at the time of school enrollment in Nepal.

The integration of eye health into comprehensive school health programmes not only helps to identify children with significant refractive error and associated ocular morbidities but also helps to promote a healthy school environment. With this, eye health education can reach a large number of children and their families through a child-to-child approach.[4]

The elements of the school eye health programme are as follows:
1. Primary eye care for early diagnosis and treatment of common eye diseases, management of refractive errors and low vision by providing high quality, appealing and free of cost spectacles and low vision devices.
2. Increasing awareness about healthy school environments amongst children, teachers and communities.
3. Making schools inclusive for children with visual impairment so that they can learn together with normal children.

Activities include:

- Eye care teams screen students and staff, provide medicine and spectacles at schools, and refer children with complex refractive error and associated ocular morbidities to a base hospital or eye care centre for further evaluation by an ophthalmologist.
- Health promotion and prevention activities on a sustained basis through art by conducting school eye health exhibitions and wall painting.
- Counselling students who received spectacles along with their families and school authorities to ensure they wear spectacles at school and at homes.
- Promoting inclusive education for children with disabilities through advocacy for improved accessibility such as ramp, classroom setting for children with visual impairment especially low vision, etc., and also sensitise children, adults and teachers on how to help and interact with children with visual impairment.

Established models of school screening programme in Nepal

1. Teacher-oriented approach

A single day's training was provided to school teachers to identify, refer and enable children with complex refractive errors and associated ocular morbidities for vision screening at a nearby primary eye care centre or base hospital, by giving a referral slip. The referred children had to go through a comprehensive eye examination to receive medicine, spectacles and low vision devices free of cost. This approach uses local resources and these resources are based on

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the willingness of trained teachers and support from educational authorities. It requires accuracy of screening in school settings. The main drawback of the programme was the high referral dropout.

2. Eye care team approach
School screenings were done by an eye care team comprising of an optometrist or ophthalmic assistant (OA) and an eye health worker. Eye health workers were responsible for conducting vision screening whereas optometrist or ophthalmic assistants did the screening and retinoscopy of all children irrespective of visual acuity. Referral to an ophthalmologist was done only for children whose best corrected visual acuity (BCVA) in their better eye was less than or equal to 6/9 and had associated ocular morbidities that warrant further evaluation by an ophthalmologist. The instruments used during the screening programme were Snellen chart, ophthalmoscope, retinoscope and a torch light. Even though this approach enhances the accuracy of the programme, questions about tracking children referred to a hospital or eye care centre, and prevention and promotion aspects still remain.

3. Holistic approach
This approach involved eye screening, health education and inclusion.

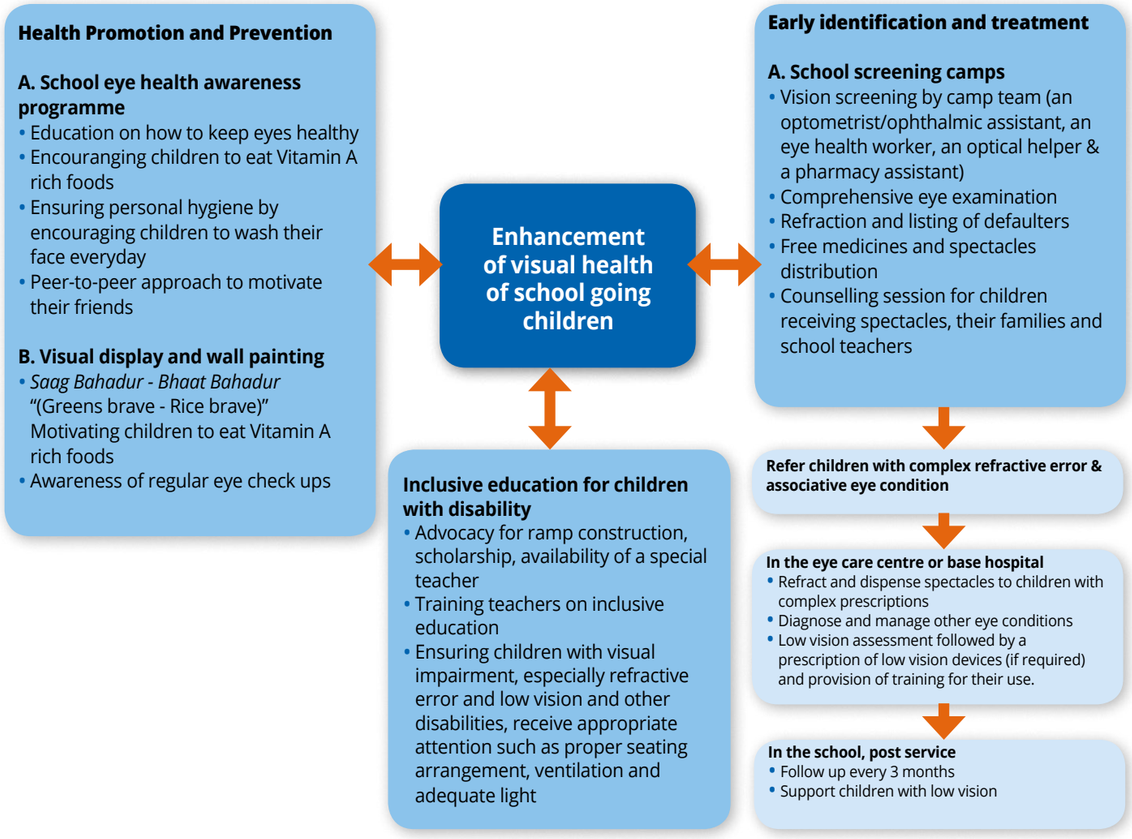
School Screening

Key learnings from the above two approaches led us to reformulate the screening programme using a mixed approach (Figure 1). Screening is done by camp team comprising an optometrist or ophthalmic assistant (OA), eye health worker, optical helper and a pharmacy assistant.

- Eye health worker is responsible for conducting vision screening and eye health exhibitions,
- Optometrist or ophthalmic assistant for screening and retinoscopy of all children irrespective of visual acuity,
- Optical helper for processing and fitting of spectacles and
- Pharmacy assistant for medicine distribution.

The vision screening is followed by comprehensive eye examination, refraction and provision of free medicines and spectacles, provided as per the need at a school site and referring children with complex refractive errors and associated eye conditions to an ophthalmologist. A counselling session was organised for children who obtained spectacles along with their families and school authorities to ensure spectacle wearing in schools and homes. The session also addressed proper seating arrangement in classrooms to ensure attention and participation in class activities.

Figure 1 **Holistic approach of school screening camp**



AFAQUE ANWAR/ IAPB STRONGER TOGETHER

A Vitamin A Awareness Programme. NEPAL

School eye health education

Along with screening, the school eye health awareness programme also included awareness about keeping eyes healthy by eating Vitamin A rich foods every day; attention to personal hygiene by making sure children wash their face daily and encouraging mass awareness through a child-to-child approach. A wall painting *"Saag Bahadur- Bhaat Bahadur"* (Motivating children to eat Vitamin 'A' rich foods daily) was also displayed at a school site to create awareness regarding eye health.

Inclusion

Another unique aspect of the programme, were the activities to promote inclusive education in schools where children with disabilities study. These were advocacy for construction of ramps in schools and ensuring scholarships to children with disabilities. Sensitising important stakeholders in the government for mobilisation of funds to those children as well as providing orientation and training to teachers and school management on inclusive education was also part of this project. The aim of these activities was to sensitise and impart knowledge on inclusive education and create a welcoming learning environment in classrooms which will help in minimising the dropout rates of children with visual impairment.

Though this holistic approach had many positive outcomes one important concern was the long term follow up mechanism. Follow up of children with refractive error and complex eye conditions by field level staffs every three months at schools, will ensure spectacle wearing and minimise the dropouts. This model holds promise in ensuring no child is left behind.

Key factors that contribute to success and sustainability of school eye health programme includes

- Continuous support and engagement of local education authorities
- Active participation of parents and care-takers
- Financial and technical support from public and private agencies
- Continuous commitment of the eye health workforce
- Continuous supply of high quality spectacles and low vision devices

Eye health is an essential part of any school health programme, should be aligned in such a way that services are available and accessible to all children. The school eye health programme should not only focus on correction of refractive errors, but also be comprehensive and holistic in nature.

References

1 International Agency for the Prevention of Blindness. IAPB Briefing Paper: School Health Programme Advocacy Paper. 2011 **http://www.iapb.org/sites/iapb.org/files/School%20Health%20Programme%20Advocacy%20Paper%20BP.pdf.** (accessed June 2017).

2 World Health Organization. Visual impairment and blindness – Fact Sheet No. 282. 2014 **http://www.who.int/mediacentre/factsheets/fs282/en/.** (accessed August, 2017).

3 Shrestha GS, Sujakhu D, Joshi P. Refractive error among school children in Jhapa, Nepal. J optom.2011 Apr; 4(2):49-55.

4 Hawes H, Scotchmer C. Children for Health. Child-to-Child Trust. 1993

School eye health services in Sri Lanka: An innovative way of approaching eye health in children

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The country has achieved remarkable progress in health sector domains of the millennium development goals compared to the peers in the South Asian region.

ASELA ABEYDEERA

Performing refraction for a child with significant vision impairment by a volunteer optometrist. SRI LANKA

Sri Lanka, historically known as the "Pearl of the Indian Ocean," is home to a population of 20.27 million in the year 2012 and comprised of 25 districts and nine provinces. Sri Lanka is a lower middle income country which has transitioned from an agriculture based economy towards a more urbanised economy of industry and service delivery. The country has achieved remarkable progress in health sector domains of the millennium development goals compared to its peers in the South Asian region. Further it has a unique free education and health system in the public sector, established for decades. The high literacy rate [overall 92.6% (Male 93.6% and Female 91.7%)] reflects universal access to free education system in the country. Sri Lanka provides free education, starting from primary school up to the level of post graduate higher education under public sector institutions.

School Medical Inspection (SMI)

School children's well-being is a cornerstone of development of a country. There are 4.14 million school children in 10,162 schools in Sri Lanka. The Government of Sri Lanka spends 2.2% of GDP on education,[1] management of human resources and development of infrastructure, centrally and, school uniforms through local governments. In addition there is a successful sponsorship programme for pupils who come from the families below poverty line. The "School Medical Inspection" (SMI) programme began in Sri Lanka in the year 1918[2] with the objective of identifying infectious diseases among children.[3] This has been recorded as one of the earliest such programmes, initiated globally. The SMI is a collaboration between the Ministry of Education (MOE) and Ministry of Health (MOH) through the Family Health Bureau. As part of this programme, every child entering the government school system is examined periodically for health conditions, including visual problems.

Structure of the SMI programme

The main cadres involved in SMIs are medical officers of health (identified as MOH – a medically qualified and a registered practitioner from the public sector), public health inspectors (PHI) and public health midwives (PHM) in the local government. Based on the size of population, geographical regions have been divided among medical officers of health who work under a regional director of health services (MOH). The MOHs are responsible for conducting SMIs in their assigned areas. In the school based programme, children are examined in grade 1, 4, 7 and 10 by the SMI team. In the conventional programme, visual acuity is checked by a trained Public Health Inspector (PHI). Children who have been identified as having any visual impairment are referred to the nearest hospital with an eye clinic. At the eye clinic, children undergo refraction and prescriptions are given for spectacles. Parents have the choice of buying spectacles of their choice from private stores. It has been observed that the cost of a pair of glasses was unaffordable for most parents, especially those below the poverty line. Often at the end of the SMI process many children ended up not having appropriate vision correction with spectacles. Many limitations were observed in achieving satisfactory screening and spectacle usage under the conventional approach.

Innovative SMI approach under the Vision 2020 programme

Having observed this scenario, the Vision 2020 Programme of the Ministry of Health – Sri Lanka initiated an action plan to to correct refractive errors in children. In this programme spectacles are issued free of charge to school children with significant refractive errors. The Vision 2020 initiative has adopted strategies locally to supply good quality spectacles, in bulk, to such children in a cost effective manner, at no cost to their parents. The results have been encouraging. The school eye health initiative is a collaboration between the Ministries of Health and Education and this programme has been successfully replicated using varied sources of non-governmental funds.

Steps followed in the innovative approach were as follows:

1. Initial planning including identification of logistics involved, budgeting, and scheduling.

2. Signing agreements with local stakeholders, meeting regional stakeholders to schedule the project and discuss probable issues and challenges.

3. School teachers' training: Pre-screening was taught to teachers with practical illustrations in order to make them familiar with identifying children with visual impairment. A batch of approximately 50 school teachers was selected. Each teacher has the capacity to screen up to 500-1,000 children. Trained teachers were assigned to transfer skills gained to the rest of the teachers at their institution. The number of teachers to be trained was decided based on the need and if it was inadequate, higher secondary level school prefects were trained.

4. A single optotype E card was introduced to the system in order to make the pre-screening procedure easy and simple. Only a few seconds of time was spent per child for vision screening. This optotype was piloted and validated to prove its accuracy. Teachers were requested to reproduce copies of the card in similar size and quality and share with others. A Vision 2020 toll free telephone number was opened to tackle the queries they have about screening. Teachers were screening children with great success and they were listing children who had impaired vision as they were instructed. In the practical setup, it took less than half a minute to screen a child in contrast to two to three minutes with Snellen chart. Schools with lesser number of children could be screened rapidly and the schools with larger populations could be screened within two weeks.

5. Lists of children who were unable to pass through the vision test were referred to regional health authorities. Later, further examination and refraction were organised in close proximity to the MOH office or school. Mass refraction programmes were organised with participation of several optometrists and prescriptions were issued to children who had significant refractive errors (myopia or myopic astigmatism > -0.50 D sphere or cylinder or hyperopia > +0.75).

6. Children were given the choice of type, design and colour of the spectacle frame. Each child was given the best suited spectacle, which was custom made according to the prescription.

7. Eye glasses were given free of cost to those in need, with funds available from the Vision 2020 Programme of the Ministry of Health. These funds were sourced from different donor organisations. Vision 2020 programme coordinators monitored the production of good quality spectacles at a low cost. The cost of a complete pair of spectacles was around 600 LKR (4 USD), which consisted of a custom-made CR 39 lens, metal frame in the desired colour, a plastic box and a cleaning cloth.

8. Selection of suppliers for eye glasses took place annually according to tender procedures and regulations about instrument procurement under the Ministry of Health. A technical evaluation committee, comprised of eye health professionals, decided the minimum specifications of spectacles. Terms and conditions were made and an agreement was signed in order to supply spectacles as per specifications and provision of after sales services with a warranty for defects.

ASELA ABEYDEERA

Pupils were given an opportunity to select their favourite spectacle frame. SRI LANKA

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VEERASAMY M/ IAPB STRONGER TOGETHER

A teacher pre-screening in class. INDIA

9. Once manufactured, spectacles were received at the head office of Vision 2020 in the capital city, a random sample was checked with an automatic lens metre prior to dispatch. The spectacles were securely sent to different regions across the country via local courier services.

10. At the district level spectacles were handed over to students through the local health and education officials with an instruction sheet to the parents on usage and care of glasses.

11. Trained teachers in each school were assigned to follow up on children who received spectacles. This included periodic checks to see whether they were using them in the correct way and to report back to the health officials with details of follow up.

12. Follow up programmes were organised in each area to replace broken and misplaced glasses and to provide new spectacles to those who needed a change in prescription.

By adapting a conventional programme in the health system and using new innovations to control avoidable blindness, the school eye health programme is a success story in Sri Lanka. This programme illustrates the possibility of achieving complete screening coverage of a targeted population using cost effective interventions. Sri Lanka could screen the entire student population and provide eye care free of charge, by integrating an eye care programme into the existing system through public-private partnerships and a multi-disciplinary approach. Several case studies from the country showed improvements in the quality of life of spectacle recipients, with many regaining better sight. Lessons learned from Sri Lanka could be useful to other neighbouring countries and the rest of the world to develop strategies to control childhood blindness.

Highlights of Sri Lanka School Eye Screening Programme:

- Totally free of cost for school children
- Pre-screened by trained teachers
- Funded by non-governmental organisations
- Total student population covered
- Government mediated, credibility ensured

References

1 The World Bank. Government expenses on education **http://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?locations=LK** (accessed June 24, 2017).

2 Family Health Bureau, Sri Lanka. A short history of school health programme **http://medicine.kln.ac.lk/depts/publichealth/Fixed_Learning** (accessed June 24, 2017).

3 Family Health Bureau, Ministry of Health, Sri Lanka. School Health Promotion Programme, Mid Term Plan 2008-2012. (accessed June 24, 2017).

Importance of colour vision testing in school based eye health examination

It is recommended that, in the context of rapid improvements in the educational needs of the children, which are currently more inclined towards colour-based learning, the government should make efforts in formulating policies and guidelines for comprehensive school eye health programmes to screen children for colour vision deficiencies.

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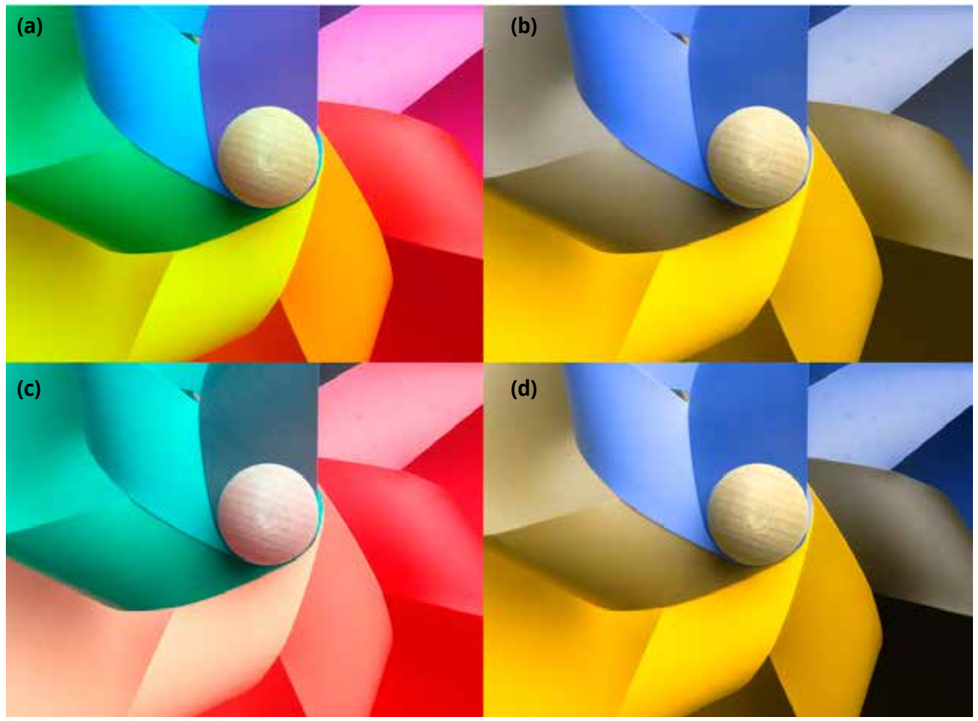

JOHANNES AHLMANN/ FLICKR.COM

Comparison between the types of blindness; (a) Normal colour vision; (b) green-blindness (deuteranopia); (c) blue-blindness (tritanopia); (d) red-blindness (protanopia).

What is colour vision?

Colour vision is the ability of the eye to detect different wavelengths of light and to distinguish between these different wavelengths and their corresponding colours.[1] The Young Helmholtz theory of trichromatic colour vision, postulates the existence of three kinds of cones, each containing a different photo pigment which is maximally sensitive to one of the three primary colours. Normal, or trichromatic, colour vision is mediated by three types of cone photoreceptors – designated short- (S), middle- (M), and long- (L) wavelength-sensitive, showing peak absorbencies at light wavelengths of 415 nanometres (nm), 530 nm and 560 nm, respectively. Blue, green and red are thus called primary colours as any colour can be produced by mixing appropriate proportion of these three colours.[2]

What is colour vision deficiency?

Colour Vision Deficiency (CVD) is the inability to distinguish certain colours. The defects in colour vision result from the absence, malfunction, or alteration of one, two or all of the photo-pigments. There are broadly two types of CVD:
(i) total colour blindness and
(ii) partial colour blindness.
Partial colour blindness is again sub-classified as red–green and blue-yellow.[3,4] Impairment in colour vision can be either hereditary or acquired. Many people are affected by colour blindness, but many of them remain undetected as they simply adapt to the environment.[3] The prevalence of CVD has been studied in various population groups around the world, with the prevalence in most populations reported to be from 2% to 10% for boys and less than 0.1% to 3% for girls.[5,6]

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(a) Normal vision; (b) Deuteranopia; (c) Protanopia; (d) Tritanopia.

Impact of colour vision deficiency on children

Most people with colour vision defects develop effective adaptive strategies and behaviours, and they use other clues, such as a colour's saturation, to deal with any potential limitations in their professional and personal lives. Increasing use of colour in education has raised concerns for children with CVD, but robust evidence is lacking.[7] Children with CVD may perform poorly on tests or assignments that employ color-coded materials. If the student and their parents are unaware of the issue, those students may struggle in class, leading teachers to group them in the wrong academic track at school. Dr. Varma and other researchers from the Multi-Ethnic Paediatric Eye Disease Study Group tested 4,005 Californian preschool children, aged three to six years in Los Angeles and Riverside counties for colour blindness. Their findings suggest that successful colour vision deficiency testing can be done starting at age four.[8] Prof. Chandak and colleagues recently reported on 850 children aged 10 to 15 years in Wardha district of Maharashtra, India emphasising the importance of early diagnosis of this dysfunction in children that would enable them to adapt well and better plan for their future, professional lives.[9] Cole stressed that school children should know if they have CVD so they can be helped more quickly to find adaptive strategies and be able to take it into account when planning their career.[10] Evidence from other studies in India suggests higher prevalence of this condition in certain pockets of the country.[11]

Screening of colour vision defects are relatively quick and easy. The Ishihara charts are the most widely used in India among children that help diagnose the type of deficiency and its severity, although emphasis on computer-based approaches have been recommended recently.[12] Screening children for these disorders is an established practice in the United Kingdom and the rest of the western world. This is so that those affected can be advised about occupational preclusions such as driving, aviation, art, photography, jewellery, tailoring, fashion design, defence services, engineering and medicine. However, there are no such colour vision screening guidelines or policies available in India.

Furthermore, robust scientific evidence on CVDs amongst the Indian populations is scanty. In the absence of standard guidelines in our country, parental education, awareness, genetic testing and counselling strategies in the regions with high CVD prevalence, could help children and their families cope with the condition and plan their respective professional futures. It is recommended that, in the context of rapid improvements in the educational needs of the children, which are currently more inclined towards colour-based learning, the government should make efforts in formulating policies and guidelines for comprehensive school eye health programmes to screen children for CVDs.

References

1 Park K. Park's Textbook of Preventive and Social Medicine. 19th edition. Jabalpur: Banarasidas Bhanot Publishers; 2012.

2 Ganong WF. Review of Medical Physiology. 20th edition. New York: McGraw-Hill Medical; 2001

3 Diez MA, Luque MJ, Capilla P, et al. Detection and assessment of colour vision anomalies and deficiencies in children. J Pediatr Ophthalmol Strabismus. 2001;38(4):195–205.

4 Melanmud A, Hagstrom S, Traboulsi EL. Color vision testing. Ophthal. Genetics. 2004;25(3):159-187.

5 Mahajan OP, Gogna RS. Study of Color Blindness in School Children. Indian J Physiol Pharmacol 1977;21(1):59-62

6 Choi TB, Lee DA, Oelrich FO, et al. A retrospective study of eye disease among first grade children in Los Angeles. J Am Optom Assoc. 1995; 66:484–8.

7 Lampe LML, Doster ME, Beal BB. Summary of three-year study of academic and school achievement between color-deficient and normal primary age pupils: phase 2. J Sch Health 1973;43: 309-11.

8 Xie JZ, Tarczy-Hornoch K, Lin J, Cotter SA, Torres M, Varma R. Color vision deficiency in preschool children: the multi-ethnic pediatric eye disease study. Ophthalmology. 2014 Jul;121(7):1469-74.

9 Chandak NR, Daigavane SV, Sharma SR. Screening of colour vision deficiency in school children of Wardha District. Indian Journal of Clinical and Experimental Ophthalmology. 2017;3(1): 80-84.

10 Cole BL. Impact of congenital colour vision deficiency: congenital colour vision deficiency does cause problems. BMJ. 2005;330(7482):96.

11 Mahajan OP, Gogna RS. Study of colour blindness in school children. Indian J Physiol Pharmacol. 1977 Jan-Mar;21(1):59-62.

12 Pandey N, Chandrakar AK, Garg ML. Tests for color vision deficiency: Is it time to revise the standards? Indian J Ophthalmol. 2015 Sep; 63(9): 752–753.

Mission Roshni: Lighting up the world of India's children

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Childhood blindness is a priority because of the number of years of blindness. It is estimated to be the second leading cause of years of blindness after cataract.

A boy being screened as part of this study. INDIA

MISSION ROSHNI PROJECT TEAM

Childhood blindness is due to a group of diseases and conditions occurring in childhood or early adolescence (<16 years of age).[1] Childhood blindness is a priority because of the number of years of blindness. It is estimated to be the second leading cause of years of blindness after cataract.[2]

Mission For Vision, in collaboration with Dr. Shroff's Charity Eye and ENT Hospital (SCEH), New Delhi has launched Mission Roshni in the year 2015. The purpose of this initiative is to ensure that all children aged 0-16 years in villages of Sardhana and Daurala blocks in Meerut district of Uttar Pradesh are screened and provided with necessary and adequate eye health services.

The setting: Why Uttar Pradesh?

Meerut is a bustling town in the populous state of Uttar Pradesh (UP), where 16.5% of Indians live. With a literacy rate of 56%, life expectancy of 60 years and infant mortality of 75/1,000 children, UP is ranked 15th amongst the Indian states on the Human Development Index (HDI) as per the Planning Commission's 2008 estimates.[3] The under-five mortality rate in UP was 78 deaths per 1,000 live births which is the highest in India.[4] Almost eight million people in UP live below the poverty line, constituting over one-fifth of the total poor in the country. UP fairs badly in terms of basic health care, though there are wide inter-region and inter-district variations. In education, UP registered the highest proportion of children aged six to 14 years who were out-of-school in 2016. UP also has the lowest school attendance rates of children, at 50-60%, along with Bihar, Manipur, West Bengal and Madhya Pradesh.[5]

The intervention: Mission Roshni

According to the 2011 census, Meerut district's population was 3,443,689.[6,7] The intervention concentrated in two distinct administrative blocks in Meerut district – Sardhana and Daurala.
The objectives of Mission Roshni were to:

- Provide comprehensive eye health services to about 40,000 children annually in the age group (0 – 16 years) with any eye condition. The children included those who are enrolled in schools and *madrasas* (a school for Islamic instruction) and also those who are school dropouts.
- Build the capacity of 200 teachers, 550 Accredited Social Health Activists (ASHA) and *anganwadi* centre staff to identify and refer children with various eye conditions.
- Raise awareness about childhood blindness and promote increased utilisation of eye care services for children through the involvement of the community.

In the two years since its inception, children in both government and private schools and *madrasas* were screened by trained optometrists for ocular morbidities including visual acuity. Apart from screening children in schools and *madrasas*, efforts were made to reach out to those who were out-of-school by visiting homes in these two administrative blocks with the help of ASHAs and *anganwadi* workers. In order to ensure comprehensive coverage of eye-care services in the region, Mission Roshni enhanced the capacities of non-medical personnel who regularly interacted with the children – teachers, ICDS functionaries, ASHAs and *anganwadi* workers and family members of these children, to identify children with eye health conditions.

Programme strategy

Cluster-based approach

The approach of providing primary eye care at the community level in rural and underserved urban areas is a promising strategy in creating awareness and reducing the burden of avoidable eye diseases.[8] The entire project intervention area was clustered into different zones, within which training of teachers and stakeholders, screening of children and provisioning of services were undertaken. This cluster approach helped concentrate work in a systematic manner and optimised the resources available, thereby leading to greater programme efficiency and results.

Integrated primary eye care service approach

The project team consisted of a well-trained paediatric counsellor and a dedicated full-time paediatric ophthalmologist along with others. The team also recruited local *anganwadi* and ASHA workers to engage with the community. This integrated approach to

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Table 1 **Achievements of Mission Roshni in two years.**

Indicator	Outcome
Children aged 0-6 years screened	12,906
Children aged 6-16 years screened in schools and *madrasas*	59,826
Out-of-school children aged 6-16 years screened	16,701
Total number of children aged 0-16 years screened	89,433
Number of schools and *madrasas* where screening was completed	283
Number of teachers trained	662
Number of *anganwadi* workers (AWW) trained	460
Children identified with refractive errors	3,161
Percentage of children identified with refractive errors	3.5%
Children provided with corrective glasses for refractive errors	3,147
Children identified with low vision	10
Children provided with low vision devices	7
Children identified for surgical treatment	139
Surgical treatment – Retina	3 (2.2%)
Surgical treatment – Strabismus	103 (74.1%)
Surgical treatment – Cataract	22 (15.8%)
Surgical treatment – Ptosis	9 (6.5%)
Surgical treatment – Dacryocystorhinostomy (DCR)	1 (0.7%)
Surgical treatment – Secondary intra-ocular lens (IOL)	1 (0.7%)
Children provided with free surgical treatment	136
Number of family members counselled	4,090
Number of family members re-contacted for follow-up counselling	352
Number of community meetings held	270

primary child eye health facilitated complete coverage of children enrolled in schools and *madrasas* as well as those who were out-of-school. Building the capacities of school teachers and community level volunteers like ASHAs, proved to be beneficial in tapping and channeling paediatric patients to avail primary eye care services in local communities. By doing so Mission Roshni envisages improved uptake of eye health services in the region in future.

Counseling for Behavior change

Public health programmes can only deliver benefits if they are able to sustain activities over time. Refractive error is a leading cause of avoidable visual impairment globally, and India is not an exception. Children with refractive errors are prescribed appropriate spectacles which significantly improve their functionality and productivity. However, many studies point to compliance with spectacle use as an issue that is overlooked. One of Mission Roshni's core strategies was to have a dedicated full-time paediatric counsellor in place who would provide regular counselling to children and their immediate family members in order to ensure uptake of vision correction services and improve compliance with spectacle use.

Way forward

Mission Roshni has achieved its desired results. The implementation approaches that were attempted have proven their merits while also showing different ways of working. These approaches can certainly be replicated in other geographic zones. While the deliverables may vary depending on the need of the area, the clustered approach with the help of different stakeholders in the community, coupled with quality service provision is surely the approach that would yield desired and sustained intervention impacts.

Acknowledgements

The authors wish to thank the staff at our partner hospital, Dr. Shroff's Charity Eye and ENT Hospital, New Delhi for their support in planning, designing and implementing the Mission Roshni project in Meerut district in Uttar Pradesh.

References

1 World Health Organization (Prevention of Blindness and Visual Impairment). Childhood blindness in priority eye diseases. **http://www.who.int/blindness/causes/priority/en/index4.html** [accessed: 20th June 2017].

2 Rahi JS, Gilbert CE, Foster A, Minassian D. Measuring the burden of childhood blindness. Br J Ophthalmol. 1999 Apr;83(4):387–388.

3 Planning commission of India. The Uttar Pradesh human development report – 2008. Planning commission, Government of India. 2008. New Delhi, India.

4 International Institute for Population Sciences (IIPS) and Macro International. National Family Health Survey-4, 2015–16: India: Volume I. Mumbai: IIPS; 2007.

5 Pratham Education Foundation. The Annual Status of Education Report (ASER) 2016 **http://www.asercentre.org//p/289.html** [accessed 20th June 2017].

6 Census of India. Meerut District Population Census 2011, Uttar Pradesh literacy sex ratio and density. Directorate of Census Operations, Uttar Pradesh **www.census2011.co.in** [accessed 20th June 2017].

7 Census of India 2011 - Provisional Population Totals - Uttar Pradesh - Data Sheet (PDF). Directorate of Census Operations, Uttar Pradesh. [Last accessed: 20th June 2017].

8 Misra V, Vashist P, Malhotra S, Gupta SK. Models for primary eye care services in India. Indian J Community Med. 2015 Apr-Jun;40(2):79-84.

Children's eye health programmes: Successful strategies and challenges

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School eye health programmes provide a unique opportunity to positively influence the health of 700 million children globally. The impact of school eye health (SEH) goes far beyond good vision—it encompasses education, social development and economic productivity.

SRI MARMAMULA/ LVPEI

A little girl being screened at her school. INDIA

Vision plays an important role in the learning and development of a child. Globally, 19 million children, are estimated to be visually impaired.[1] A comprehensive eye health programme should include screening in schools, *anganwadis* (pre-school), use of a key informant approach and household screening to aid in screening and identification of children with visual impairment.[2-4] One such comprehensive eye health programme is being implemented by L V Prasad Eye Institute in India.

This programme aims to provide eye screening to all children between the ages 0 and 15 in project service areas and facilitate necessary interventions. The schematic of the programme is shown in Figure 1. School vision screening is one of the major components. In this article, key steps, strategies and challenges encountered in a school screening programme in one administrative block of Krishna District in the Indian state of Andhra Pradesh are described.

The process

Step 1: Obtaining necessary approvals

Necessary approvals were obtained from appropriate local government authorities such as the district collector, district education officer and key stakeholders such as *mandal* (sub-district) development officer, mandal education officer, *anganwadi* supervisor, village *sarpanch* (Head) in case of household screening in the community.

Step 2: Teacher training

After all the due permissions were obtained, school authorities were requested to nominate one teacher from each school. All the nominated teachers were invited for one day of training at a central location. The central location was usually the *mandal* (sub-district) education office or a school. Typically, 25-28 teachers were trained at each session. The content, duration, training materials and delivery methods were standardised and provided by an experienced vision technician. This content included a brief description on the structures and functions of the eye, refractive errors, common eye conditions in children and vision screening procedures to diagnose and correct them.

Our initial research revealed a large variability in diagnostic accuracy among trained teachers compared to Community Eye Health Workers (CEHW).[5] Although having trained teachers will add sustainability to the programmes, attributes required for a teacher to be a consistent screener remain elusive.

For further screening, CEHWs were also trained as there was variability in screening skills of teachers. An optometrist trained in detecting low vision and ophthalmologist were involved in screening children in special schools and schools for the blind.

Teachers' vision assessment was part of the teachers training programme. Of the 738 teachers screened, 400 (54.2%) were using glasses and 35 (4.7%) were referred for further examination. This assessment helped us in identifying those requiring intervention and who can potentially become an advocate for eye care for children in their respective school as well as in the community.

Step 3: School vision screening

After training, the school authorities were approached for screening. It is sometimes difficult to get access to screen children and to examine referred children. Children who did not attend referral services, were examined by the vision technician at the schools. It took a lot of time and effort to follow up with the school authorities at the school level. Development of a tentative School Eye Health Calendar involving school authorities helped.

In the project area, there is one integrated school for the blind and three schools for intellectually challenged children. Teachers in these schools also helped in managing children while screening. An optometrist and an ophthalmologist trained in paediatric eye care conducted eye examinations and referred to the

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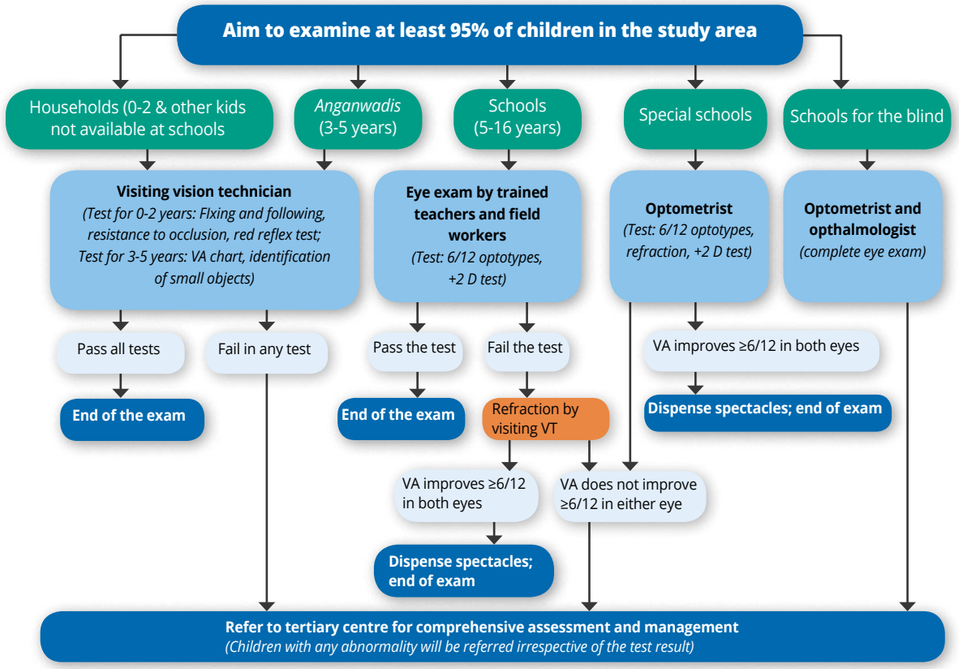


Figure 1 **Screening, referral and management process.**

tertiary centre for further management. Referral uptake from the school for the blind was a challenge inspite of repeated visits. Service uptake from special schools was relatively better.

Step 4: Referral tracking

All the children who either failed the screening test or had any abnormality were referred to a primary eye care centre (vision centre, VC) in the vicinity of the school. A full time CEHW along with coordinator was assigned for referral follow up. With this system in place, the referral conversion rate was 61%. To improve upon the referral conversion rate, vision technicians went to schools and examined the children including non-cycloplegic refraction, resulting in increased uptake to 90%. Parent meetings were organised at schools for increasing awareness and uptake of spectacles. For the children, whose parents did not turn up for the meeting, teachers took the responsibility to get spectacles. Those who needed further management were referred to secondary or tertiary centres (TC). Among those referred, 41% utilised the services. However, active intervention in the form of telephone calls to parents and provision of travel cost for those who cannot afford it, improved the uptake to 61%. Considerable time and effort was required to counsel and convince parents and care givers to bring the children to access services.

In schools, where there were more than ten referrals to tertiary centres, the ophthalmologist visited the centre and examined the children. However, as this is not sustainable, a tele-consultation programme is being introduced in schools, thus avoiding travel of the child to tertiary centres.

Step 5: Key informants

As part of the programme, key informants such as *Anganwadi* teachers and ASHA (Accredited Social Health Activist) workers were asked to inform the CEHW if they suspected any child with visual impairment. The children identified were referred to the vision technician.

Management Information System for school screening

This was developed to track and report the number of children referred and attended. A framework for monitoring the school vision screening programme included:

- Developing and assigning a unique ID system to identify each child in the project.
- Process indicators were developed, which included average screening per CEHW, primary referral conversion rates (conversion at vision centre), secondary referral conversion rate (conversion at secondary and/or tertiary centres) and spectacle uptake on a monthly basis.
- Output indicators included were number of schools covered, children screened and children referred.
- Data collection forms populated by school with a summary report highlighted the response rate.
- Referral register for recording details of children who failed screening tests by CEHW highlighted the service provided.
- Referral conversion details were tracked weekly
- Structured weekly reporting formats, describing the weekly activity and plan for the next week were developed.

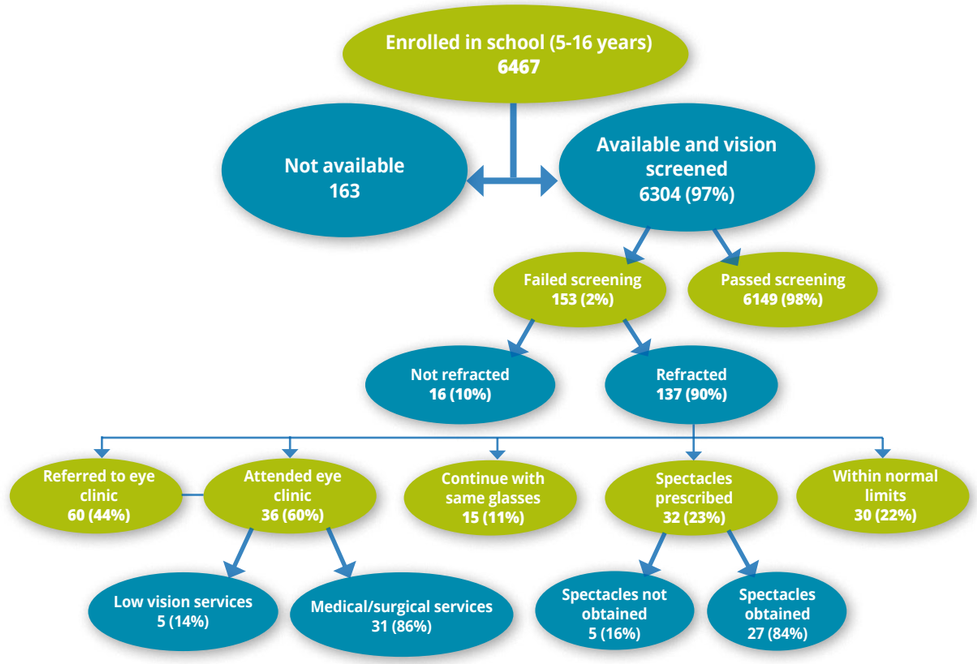


Figure 2 **Coverage and service uptake in one block of Krishna District, Andhra Pradesh.**

Monitoring and evaluation helped us ensure the quality of screening and review of service uptake. As of date, 2,43,695 children were screened in sub-districts, out of which 11,412 (4.7%) were referred. Among these, 9,546 (84%), children attended the vision centre. Follow up services are ongoing. Data flow of a sub-district is presented in Figure 2.

One of the major issues identified with this programme was the poor uptake of services and additional intervention required to increase the referral uptake. Additional intervention may be an important aspect that has to be considered if the programme has to be replicated sustainably on a large scale.

Barriers

Children who did not turn up for services at the vision centre level and TC level were identified. Parents were contacted by the CEHW. Responses were collected from 61 parents whose children did not attend vision centre and from 22 parents who did not attend a TC. Major barriers identified are lack of time (22%), lack of priority to eye health (18%) and no one to accompany the child (10%).

Way forward

If the programme has to be scaled up and be sustainable, it is essential to identify the right teachers who can help with the initial screening. At the same time, there is a need for a qualified technical team, including a technician and an ophthalmologist, to ensure that the referrals are examined. Awareness of parents and school teachers is also a priority. Once, spectacles are delivered, systems need to be put in place to ensure compliance with spectacles usage. It is also essential to measure the impact of the intervention in terms of change in scholastic performance. Use of technology for data collection like tablet-based applications and cloud storage may help for rapid data collection and real-time monitoring. This could be an important factor for replication to a large scale or to support a nationwide programmes.

Acknowledgements

This project is supported by United States Agency for International Development (USAID), Lions Clubs International Foundation, Sun Pharma and Hyderabad Eye Institute.

References

1 Gudlavalleti VSM. Magnitude and Temporal trends in avoidable blindness (ABC) in India.Indian J Pediatr. 2017 Jun 23.

2 Kaur G, Koshy J, Thomas S, Kapoor H, Zachariah JG, Bedi S. Vision Screening of School Children by Teachers as a Community Based Strategy to Address the Challenges of Childhood Blindness. J Clin Diagn Res. 2016 Apr;10(4):NC09-14.

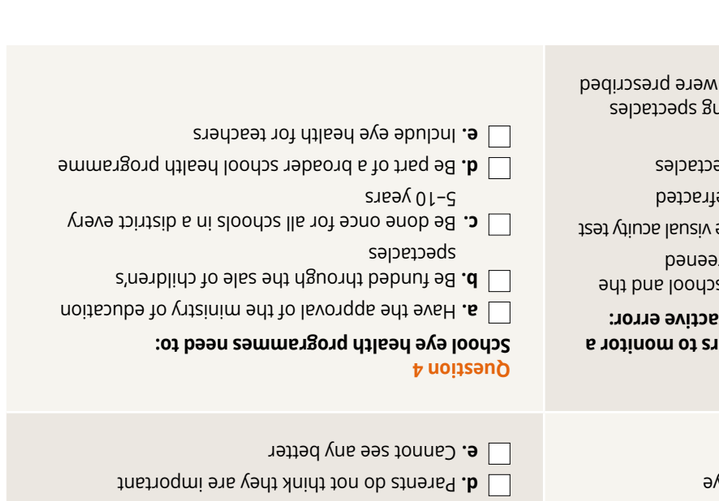
3 du Toit R, Courtright P, Lewallen S. The Use of Key Informant Method for Identifying Children with Blindness and Severe Visual Impairment in Developing Countries. Ophthalmic Epidemiol. 2017 Jun;24

4 Muhit MA, Shah SP, Gilbert CE, Hartley SD, Foster A. The key informant method: a novel means of ascertaining blind children in Bangladesh. Br J Ophthalmol. 2007 Aug;91(8)

5 Marmamula S, Khanna RC, Mettla AL, Pehere NK, Keeffe JE, Yameneni DK, Rao GN. Agreement and diagnostic accuracy of vision screening in children by teachers, community eye-health workers and vision technicians. Clin Exp Optom. 2017 Jun 28.

Test your knowledge and understanding

This page is designed to help you to test your own understanding of the concepts covered in this issue, and to reflect on what you have learnt.



IAPB MAKE VISION COUNT

New spectacles make all the difference for this school girl. INDIA

We hope that you will also discuss the questions with your colleagues and other members of the eye care team, perhaps in a journal club. To complete the activities online – and get instant feedback – please visit **www.cehjournal.org**

Tick ALL that are TRUE

Question 1
The following children, seen by a school teacher, need referral to an eye trained health worker:

- ☐ **a.** Child with a red eye
- ☐ **b.** Child with convergent squint
- ☐ **c.** Child with 6/18 vision in both eyes
- ☐ **d.** Child with a white pupil in one eye
- ☐ **e.** Child with 6/6 and 6/9 vision

Question 2
The following are reasons why children may not wear prescribed spectacles:

- ☐ **a.** Too expensive
- ☐ **b.** Do not fit properly
- ☐ **c.** Teased by other children
- ☐ **d.** Parents do not think they are important
- ☐ **e.** Cannot see any better

Question 3
The following are important indicators to monitor a school screening programme for refractive error:

- ☐ **a.** Total number of children in the school and the number who had their vision screened
- ☐ **b.** Number of children who failed the visual acuity test
- ☐ **c.** Number of children who were refracted
- ☐ **d.** Number of children who had spectacles prescribed
- ☐ **e.** Number of children who are using spectacles 3–6 months after the spectacles were prescribed

Question 4
School eye health programmes need to:

- ☐ **a.** Have the approval of the ministry of education
- ☐ **b.** Be funded through the sale of children's spectacles
- ☐ **c.** Be done once for all schools in a district every 5–10 years
- ☐ **d.** Be part of a broader school health programme
- ☐ **e.** Include eye health for teachers

ANSWERS

1. a, b, c and d are correct. A white pupil (leukocoria) may be due to a cataract or other serious eye condition. It is unlikely that the child in (e) will need (or wear) spectacles.
2. All are correct.
3. All are correct.
4. a, d and e are correct. The programme should ideally be funded by the ministry of education or other institutional donors, not from sale of spectacles to children (which can limit uptake). The screening should occur in each school every 1–2 years, when new students are screened and those who failed the test in previous years are re-examined; every 5–10 years is too infrequent.

Picture quiz

PRIYA MORJARIA

At school screening, an 8-year-old child is found to have presenting visual acuities of 6/6 in the right eye and 6/60 in the left.

Tick ALL that are TRUE

Question 1 **Which of the following conditions may be responsible?**

- ☐ **a.** Myopia
- ☐ **b.** Amblyopia
- ☐ **c.** Congenital cataract
- ☐ **d.** Toxoplasmosis
- ☐ **e.** Optic atrophy

Question 2 **What further tests are appropriate in this case?**

- ☐ **a.** Refraction
- ☐ **b.** Dilated fundus examination
- ☐ **c.** Corneal topography
- ☐ **d.** Cover test
- ☐ **e.** Ishihara test for colour blindness

Question 3 **Which of the following can be associated with visual impairment in a child?**

- ☐ **a.** Prematurity
- ☐ **b.** Family history of squint
- ☐ **c.** Maternal history of rubella infection
- ☐ **d.** Prolonged close work from an early age
- ☐ **e.** Photophobia

Question 4 **Amblyopia. Which statements are true?**

- ☐ **a.** Amblyopia may occur in a child with straight eyes
- ☐ **b.** Amblyopia is more commonly associated with short sight than long sight
- ☐ **c.** Unilateral cataract may cause amblyopia
- ☐ **d.** Severe astigmatism can cause bilateral amblyopia
- ☐ **e.** Unilateral congenital ptosis will not cause amblyopia

ANSWERS

1. All may be responsible, except for optic atrophy, which would be more likely to affect both eyes. Myopia may be unilateral. Amblyopia may be due to unilateral hypermetropia or anisometropia. Congenital cataract in the left eye may have gone unnoticed until screening took place. A retinal lesion such as toxoplasmosis could also be responsible.
2. (a), (b) and (d). Refraction and a dilated fundus examination are essential to pick up refractive error or a retinal lesion. A cover test would confirm straight eyes or pick up a small squint that could be associated with amblyopia.
3. All may be associated with visual impairment in a child. Prematurity is a risk factor for ROP and myopia; squint and associated amblyopia are commonly inherited; maternal rubella is a risk factor for cataract; prolonged close work can induce myopia. Photophobia may be a sign of a condition leading to visual loss such as glaucoma or retinal dystrophy.
4. (a), (c) and (d) are true. Amblyopia is more commonly associated with long sight. Unilateral ptosis will cause amblyopia if the pupil is covered.

Courses

MSc Public Health for Eye Care, London School of Hygiene & Tropical Medicine
Ten fully funded scholarships are available for Commonwealth country nationals. The course aims to provide eye health professionals with the public health knowledge and skills required to reduce blindness and visual disability. For more information visit **www.lshtm.ac.uk/study/masters/mscphec.html** or email **romulo.fabunan@lshtm.ac.uk**

Correspondence article: online only

USAID Child Blindness Programme partners have identified areas that have the greatest impact on on project sucess, including recording gender data to ensure equitable access. Read more on **www.cehjournal.org/Lessons-from-the-USAID-Child-Blindness-Programme**

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Next issue

LV PRASAD EYE INSTITUTE

The next issue of the *Community Eye Health Journal* will be on the theme: **Retinopathy of prematurity**

Key community eye health messages

A comprehensive school eye health programme:

PRIYA MORJARIA

- should be integrated into a broader school health programme
- requires a goal that will result in positive change
- must have the engagement of the ministries of health and education
- needs 'SMART' objectives for each component of the programme

A key issue in a school eye health programme is that children may not wear their spectacles.

PRIYA MORJARIA

- Parents should understand why a child needs spectacles
- The child's vision must improve with correction
- The child must feel comfortable wearing spectacles and like the frames
- The spectacles should be affordable
- Teachers should encourage children to wear their glasses

A school eye health programme requires careful planning, with a goal and specific objectives which address:

VASIUR RAHMAN/ IAPB MAKE VISION COUNT

- school children, with refractive errors and other eye conditions
- teachers, who may themselves have refractive errors or other eye conditions
- eye health education, involving children to can act as 'agents of change' in their families and communities