

Eye Screening in Children : Its Relevance and Implications.

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Childhood blindness and visual impairment are as important and perhaps more devastating and disabling than adult onset blindness, because of the long span of life ahead. **School-age children** constitute a particularly vulnerable group where uncorrected refractive errors may have a dramatic impact on learning capability and educational potential. The ultimate moulding of a person's personality and potentiality rests with his nature, surroundings and quality of eye sight. The school going years are formative for children in determining their physical, intellectual and behavioral development. Poor vision in childhood affects performance in school and has a negative influence on the development and maturity. Further, most school children do not realize that they are suffering from the ocular disability as they adjust to poor eye sight in different ways. They compensate for their poor vision by sitting closer to the blackboard, or by holding their books close to their eyes. They may also squeeze their eyes. They may also tend not to undertake any work that needs visual concentration, thus affecting their performance¹.

Refractive errors are the second major cause of blindness in India after cataract and the most common reason for patients to consult ophthalmologist or ophthalmic assistant. Over a quarter of the outpatient attendance at all eye clinics and hospitals is due to refractive errors². Children form one of the main age groups requiring attention to refractive errors because of the high prevalence of myopia, hypermetropia and astigmatism.

MAGNITUDE OF PROBLEM

It is estimated that there are **1.4 million** blind children in the world. An additional 7 million suffer from low vision and a further 10 million children have a correctable refractive error causing visual impairment (bilateral visual acuity of <6/18). There is very limited data on the prevalence and causes of childhood blindness, which is the basic requirement for developing strategies towards its prevention or management. Though no population based nation wide survey has been undertaken on the prevalence of blindness in India, it is estimated to be **0.8/1000** children in the age group of 0-15 years. Currently, there are an estimated **270,000** blind children in India^{3,4} and approximately **15,000** are in schools for the blind.

Approximately 50% of all childhood blindness in India is preventable or treatable. Childhood blindness and visual loss is important because of the impact on the child's development, education, future work, opportunities & quality of life. This handicap has serious social & economic consequences on the family and the society. These negative effects are experienced throughout the child's life often lasting 50 or more years.

Most of the available studies demonstrate that **corneal and lenticular** conditions are the predominant causes of blindness whereas amongst children outside blind schools, refractive errors are important causes of visual impairment and blindness. Myopia is a common cause of visual impairment which is usually acquired and nearly always progressive. It rarely occurs before the age of 5 years and new cases appear throughout childhood and adolescence, particularly between the ages of 6 to 15 years.

EYE CARE SERVICES IN INDIA

Though management of common eye care ailments is done by general health care staff, refraction services in India are primarily provided by ophthalmologists and paramedical workers. Out of 23,000 Primary Health Centers (PHCs) in the country, only forty percent are equipped to provide refractive services. Ideally, ophthalmic assistant should be available at each PHC. However, currently, they are serving a

larger population as they are based at Community Health Centers (CHCs) or Block PHCs.

SCHOOL EYE SCREENING PROGRAM

National Program for Control of Blindness (NPCB) was initiated by Ministry of Health and Family Welfare, Government of India in the year 1976 and primarily administered by respective State Governments in collaboration with district health authorities through public and NGO institutions.

School Eye Screening (SES) program became an integral part of the NPCB since 1994 after successful implementation at five pilot districts. This program focused initially on screening of students in "middle and secondary schools" or schools having 5th to 10th standard students. The activities under **SES program** include identification of schools, collection of information on number of students and teachers, screening and referral centres, training of school teachers, training of general health care personnel, confirmation of "suspect" students by ophthalmic assistant/ ophthalmologist, prescription of glasses, and provision of free glasses to students from poor socioeconomic strata.

ORGANIZATION OF SES PROGRAM

The actual planning of SES is carried out by respective District Health Societies (DHS) keeping various parameters under consideration like holidays, examinations, involvement of teachers in academic activities, availability of human resource, other events in the district etc. In general, it is usually carried out during April-September of each year as the number of cataract surgery increases from the month of October onwards.

From each school, one teacher is selected for a one-day training course. Preference is given to women, so as to counteract prejudice against girls wearing spectacles, and to teachers who themselves wear spectacles as they are likely to be more motivated. During the training, teachers are provided with a kit for screening the children in their schools. The teacher's kit contains a six-meter (20 feet) measuring tape, standard vision screening "E" card, referral card for children with suspected poor vision, and educational material.

PROCEDURE FOR SCREENING OF REFRACTIVE ERRORS AMONGST SCHOOL CHILDREN

For the initial screening, a single optotype of the Snellen's chart or the 'E' chart can be easily administered by minimally trained personnel. This is a low cost, non-invasive, rapid, reliable and acceptable method. The conventional Snellen's charts with all the 7-lines of the optotypes may be confusing for use by personnel like the school teachers and staff. In addition, the conventional charts are easily memorized by the children thus making them less useful for screening. A single optotype like the 'E' can be rotated each time the child sees it, and thus each eye can be tested differently. With the limbs of the 'E' facing in different directions, children are asked to identify at least three optotypes with each eye (rotating the card for the second eye, so that the letters are in different configuration) before labeling them as having abnormal or normal vision. The screening is carried out in the following way: From a distance of six meters (measured with the tape provided), child is shown the vision card, which is white with four black "Es" of standard size (6/9 of Snellen's chart). For each eye, child has to indicate the direction of the open end of the "E". By simply rotating the card, the sequence can be changed. The child indicates the direction correctly (eyesight "good") or incorrectly

(eyesight "not good"). If there is any doubt, the teacher should record the eyesight as "not good".

PROVISION OF SPECTACLES

Each child with a refractive error will require a specific frame according to his/her head size and power of corrective lenses depending on the degree of error. An agreement is usually made by District Health Society with one or more of the local opticians for supply of low cost quality spectacles (acetate frame with white English lenses) for all children referred to them or orders placed with them under the program. Experience has shown that contractual agreement can be arrived at half the usual retail price prevalent in the local area.

Since this activity generates publicity about the need for spectacles amongst the children and adults outside the school as well, the additional clientele for the optician increases his volume of business. This serves as an additional incentive for the opticians on contract and they agree for reduced rates in the contract. If there is nonavailability of optician in the concerned district, arrangements are made with an outside optician for supply of spectacles. In the event of non arrangement of spectacles, SES is not started at all!

DEVELOPMENTS

Children eye care programs are different from programs targeting adults, as the primary decision maker in the case of children with eye problems is often not the subject with the problem. Additionally, the decision maker is often not aware of the problem, as the child is unable to express his discomfort.

The effective and efficient delivery of SES program is ensured by making the district education department and schools to run the program themselves after the initial thrust and support. The cost of SES component is borne by Government of India including provision of Rs 125/- for glasses for poor children through District Health Society funds. This amount was being enhanced during 11th five year (2007-2012) plan period with additional provision of in-service training of ophthalmologist in pediatric ophthalmology. Other initiatives proposed by Government of India for ameliorating childhood blindness for the 11th five year period include development of Pediatric Ophthalmology units, Low Vision Services Centres, provision of latest equipment and Low-Visual aids at identified public institutions (Medical colleges and Regional Institutes of Ophthalmology) and non-governmental organizations (NGO), strengthening of eye banks and services for corneal transplantation, provision of financial assistance of corneal transplantation in NGO sector and development and dissemination of resource material on various childhood eye disease like Vitamin A deficiency, eye injury, refractive errors, corneal opacities and retinopathy of prematurity (ROP).

THE CHALLENGES

The availability and access of infrastructure, services, trained manpower, cost of spectacles, and community awareness is an area of concern. It is a challenge to reach the community residing in under/unserved areas and out-of-school children within available resources, infrastructure and trained manpower. Pediatric ophthalmology, as a separate subspecialty, is not yet well established, and services targeting children are not often offered separately by ophthalmologists. Training to address ocular problems relating to children is not always a part of every residency program and very few institutions offer post-residency training programs in pediatric ophthalmology, although this has improved during the past few years⁵⁻⁸.

SCOPE FOR IMPROVEMENT

1. Services should be targeted at Neonates / infants (birth to 6 months), Pre-school (6months to 5 years), School children (5 to 15 years)
2. The services should be delivered As part of P.H.C. & ICDS at the community level, Integrated into a district eye care programme at the secondary level of care . At a specialized referral and training centre at the tertiary level
3. The personnel involved in this programmes at the community level (like Child Development Project Officer, Supervisors, ANMs and Anganwadi workers in ICDS) should be given some basic training in detection of eye conditions that need to be referred and the basic fundamentals of eye health, stressing the importance of nutrition.
4. Educating the paramedical staff involved in maternal & child care at primary & secondary health centers.
5. The importance of cross referral between Paediatrician, obstetrician, general practitioners & ophthalmologists.
6. Train adequate number of paediatric ophthalmologist in the country along with training paramedical staff especially Orthoptists and optometrists. This can be done by developing a structured training programmes at Institutions in India dealing with the large volume of childhood eye disorders.

CONCLUSION

There is a need for epidemiological research for realistic needs assessment. There should be Community based programmes to control Vitamin A deficiency & eye infections towards the prevention of childhood blindness. Basic treatment should be done at PHC and District level hospitals. There should be provision of affordable spectacles for children with significant refractive errors .There should be development of tertiary centers to provide curative service. There should be provision of low vision services for children with a best corrected visual acuity of 6/24 – 1/60. Community based rehabilitation programmes and education should be encouraged.

BIBLIOGRAPHY

1. **Murthy GVS, Gupta SK, Bachani D**, editors. *The Principles and Practices of Community Ophthalmology*. New Delhi: Community Ophthalmology Section, RP Centre, AIIMS; 2002.
2. **Vision screening in school children**. In: *Training Module, Ophthalmology/Blindness Control Section, Directorate General of Health Sciences, Ministry of Health and Family Welfare*. New Delhi: Government of India; 2004.
3. **A Study on Childhood Blindness, Visual Impairment and Refractive Errors in East Delhi**. New Delhi: Community Ophthalmology Section, RP Centre, AIIMS; 2001.
4. **Community Based Screening of Children for Detection of Visual Impairment in Rajasthan and Uttar Pradesh**. Blindness Control Division, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, Nirman Bhawan, New Delhi; 2006.
5. **Rahi JS, Sripathi S, Gilbert CE, Foster A**. Childhood blindness in India: Causes in 1318 blind school students in nine states. *Eye* 1995; 9: 545-550.
6. **Nirmalan PK, Vijayalakshmi P, Sheeladevi S, Kothari MB, Sundaresan K, Rahmathullah L**. The Kariapatti Pediatric Eye Evaluation Project (KPEEP): Baseline ophthalmic data of children aged 15 years or younger in south India. *Am J Ophthalmol* 2003; 136: 703-709 .
7. **Gilbert CE, Canovas R, Hagan M, Rao S, Foster A**. Causes of childhood blindness: results from West Africa, South India and Chile. *Eye* 1993; 7: 184- 188.
8. **Nirmalan PK, Sheeladevi S, Tamilselvi V, Victor AC, Vijayalakshmi P, Rahmathullah L**. Perceptions of eye diseases and eye care needs of children among parents in rural South India: The Kariapatti Pediatric Eye Evaluation Project (KEEP). *Indian J Ophthalmol* 2004; 52: 163-167.

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