Preventing Childhood Blindness: Synergy Between Ophthalmology and Community Medicine

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Pediatric ophthalmology is gaining importance in the bigger picture of preventive ophthalmology bringing together Ophthalmology and Community Medicine in India. It is evident that childhood blindness has a far greater impact on the individual and the society compared to adult blindness considering the total number of disability-adjusted life years lost (number of years that a blind person lives after going blind), the difficulty in integrating the child socially and functionally, and the long-term burden on the caregiver and society. Appreciating the importance of reducing disability from vision loss in childhood, the World Health Organization (WHO) chose childhood blindness to be one of the five avoidable ocular conditions under the VISION 2020-Right to Sight initiative. In India, the initiative has been clubbed under the National Program for Control of Blindness (NPCB) and numerous measures have been started. These include setting up and upgrading pediatric ophthalmology units, school screening program, and providing facility for refraction and low cost spectacles in children. However, the goal of eliminating avoidable blindness in children (ABC) is still some distance away. Feasibility issues have thus far limited the setup of a vision center in every primary health center and at the moment, less than 20% have facility for refraction and even fewer cater to pediatric population.

Defining Childhood Blindness and Visual Impairment

Although WHO uses the definition of best corrected vision of <3/60 in the better eye for defining blindness and a best corrected vision of <6/18 to define visual impairment, this tends to ignore uncorrected refractive errors as an important cause of visual impairment in children. Due to this, WHO has changed the definitions to presenting visual acuity instead of best corrected to define visual impairment and blindness with the same cutoffs. However, studies targeted towards refractive error have suggested that presenting visual acuity of <6/12 in the better eye may be a more appropriate criterion for defining visual impairment in children as good vision in a child is essential for learning and sports.

Magnitude of the problem

In the pediatric age group, the prevalence of blindness in India is estimated to be 0.8/1,000 in the 0-15 year age group with around 280,000 blind children. It is fortunate that on the whole, childhood blindness is not very common and nearly half of the causes are avoidable. Due to the low prevalence of blindness in children, population-based surveys require large sample sizes, and are very costly so much of the data used for estimating prevalence and etiology of childhood blindness comes from blind school surveys. Unfortunately, these may not be reflective of the true picture of magnitude of childhood blindness as they make up only a small proportion of the total blind in the community and children with multiple disabilities are unlikely to be enrolled in these schools. Other sources of information are hospital statistics, blindness registries and key informant interviews, but generating reliable information on childhood blindness and visual impairment has been fraught with difficulties.
Childhood blindness can be categorized as preventable and curable. Preventable causes include corneal scars due to vitamin A deficiency, injuries, etc., while curable cause include pediatric cataract, glaucoma, retinopathy of prematurity (ROP), refractive errors, etc. ABC includes both the preventable and curable causes. Dandona et al. showed that treatable refractive error caused 33.3% of the blindness, followed by 16.6% due to preventable causes (8.3% each due to vitamin A deficiency and amblyopia after cataract surgery). The important causes of visual disability in children are showing a shift over the past two decades and interventions like provision of good nutrition, vitamin supplementation, and universal immunization has led to a reduction in the incidence of keratomalacia, measles infection, trachoma and pediatric corneal infections, and conditions amenable to primary prevention. The newer challenges include adolescent refractive error, cataract, ROP, and consequences of ocular trauma.

Community-Based Pediatric Eye Care
Currently most interventions in controlling childhood blindness are hospital based. More appropriate interventions would be ones targeted towards whole communities or children within the population so that the intervention yields results not only for an individual, but for the whole community. Studies have shown that childhood blindness is a greater concern in children in rural and less developed areas and children in urban slums where such targeted interventions can have a greater impact yet have poor healthcare infrastructure.

Vision-2020: Targets for control of childhood blindness
Vision-2020 aims to reduce global prevalence of childhood blindness from 0.75/1,000 to 0.4/1,000 children by 2020. This requires intervention to remove avoidable blindness and can be achieved by:

- Eliminating corneal scarring due to vitamin A deficiency, measles, and ophthalmia neonatorum.
- Eliminate new cases of congenital rubella syndrome.
- Making surgery for pediatric cataract accessible and available. Setting up centers and increasing awareness to ensure that all babies at risk of ROP are examined at 6-7 weeks after birth and are provided appropriate treatment. Ensure coverage of all schools by the School Eye Screening Programme and providing spectacles to all children with refractive errors. Upgrading the available infrastructure to ensure that there is one refractionist/50,000, one trained person for low vision/5 million, and one Pediatric Ophthalmology Unit/10 million population by 2020.

Community-based strategies for control of childhood blindness
In communities with high levels of childhood blindness due to preventable corneal scar, the focus should be to encourage consumption of vitamin A rich foods and 6 monthly vitamin A supplementation for all children between 9 months and 5 years of age and discourage traditional topical medicines and using medicines without proper prescription.

Encouraging SAFE strategy: This is part of the International Trachoma Initiative (ITI) that aims at the elimination of blinding trachoma, the most common cause of preventable blindness. It involves measures to improve personal hygiene, environmental sanitation, water supplies, availability of antibiotics to combat trachoma, and surgery for managing complications of trachoma.

There is a need to increase awareness in the population about ways to prevent children from ocular injuries. Provide education about risks in contact sports, especially with projectile games, for example, cricket, gulli danda, BB guns, avoiding high risk behavior in festivals that result in eye injuries from firecrackers, bow and arrows, holi balloons, and colors that cause chemical burns and ways to child proofing the home.

An annual vision screening of school children for refractive errors and provision of spectacles is essential.

Pediatric eye care needs a good link between all levels of eye care. It is important to developing good referral services for cataract, corneal ulcers, glaucoma, and ROP and increase corneal graft services and eye banking facilities with specialized pediatric ophthalmology units at the tertiary level. According to WHO, there should be one such center for every 10 million population by 2020 AD.

Integrating eye health into child health initiatives
Instead of having vertical eyecare programs under the National Programme for the Control of Blindness, they should be integrated with the existing Mother and Child Care and school health programs to increase coverage and acceptability. Incorporate the School Eye Screening Programme as a part of a comprehensive child care program which also targets the overall growth and development of a child. This should focus on vision, hearing, nutrition, cleanliness, and hygiene along with encouraging sports and physical activity. The current focus of the school eye program on only refractive errors limits its utility. School-going children are very receptive in school and interacting with children in schools provides a unique opportunity for health education and to increase awareness about healthy lifestyles. It can
have a positive impact on the child, his/her siblings, and parents at home.

**Tailoring services specifically for children**

Most services in the community are designed for adults and are extended to children. As a child is not a small adult, a holistic, child-centered approach involving the parents, caregivers, Anganwadi workers, and teachers is essential. As the prevalence of childhood blindness is low, plan services for a population of 10 million people to reduce overall cost, and improve feasibility.

**Improving coverage, acceptability, and uptake of services**

It is very important to intervene early if the child has a preventable or treatable disease. Delayed treatment is not only less effective, but also as the immature visual system of the child may develop permanent visual loss due to amblyopia, outcomes remain poor even though appropriate intervention is done at a later stage. Currently the child accesses the health service when a problem is identified, parents/caregivers have time and resources to access a health facility and the accessible facility is able to cater to the need. We have to be much more proactive in finding children who need treatment (e.g., by using local key informants). The services must be made affordable so that cost is not a barrier for early referral. Health education for mothers is crucial and they should know how to prevent potentially blinding conditions and where they should go if their child has a problem.

**Increasing eye health training in medical education**

It is important to educate and train medical undergraduates and allied medical professionals about preventable eye disorders and managing ocular emergencies. Most residency programs for ophthalmology do not have a component of pediatric ophthalmology and developing and emphasizing this subspecialty and exposure to managing pediatric eye problems is essential. Information about preventing and managing eye disorders should be integral to any community medicine training and service delivery.

To conclude, pediatric ophthalmology is a growing subspecialty that requires joint initiative between ophthalmology and community medicine to eliminate ABC. It is essential to emphasize on integrated eye care with healthcare and training of all levels of healthcare personnel from community to tertiary care.

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