

# Prevalence Of Refractive Errors In School Children

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Assessment of vision in school children is not routinely performed in our country. A survey of screening programme for vision in school was performed in the city of Lahore, 1996-97. Total of 1310 children examined in high and low socioeconomic classes. The prevalence of refractive error is about 22.21% in the total screening population of school children from age 4-15 years.

**Key words :** Refractive errors

Survey aimed to identify the major treatable or preventable causes of visual loss in children attending the school.

Significant visual impairment in children has long been over looked and under estimated in terms of prevalence, personal impact and the social and economic implications.

Visual activity screening at age 4 years of age seem to be advantageous and efficacious in order to detect and thereafter initiate successful treatment of most cases of amblyopia without obvious squint.<sup>1</sup>

The children were examined between 4 and 15 years of age and the results are discussed in terms of changes in refraction between different ages and correlation between refraction and development of strabismus and amblyopia. During the length of study the refraction changed towards emmetropic in the majority of the children. The greatest change towards emmetropia occurred during the first two years. Ingram et al found that uncorrectable amblyopia was likely if a children had +3.5 or more dioptre of meridional hypermetropia at the age of 1 year. It is generally believed that amblyopia and disorder in binocular function should be detected and treated as early as possible but is no easy and reliable method of detecting these disorders in young children. Nor is it known how many people are actually suffering from visual problem which could have been prevented. Ingram suggested that refraction should be the basis for screening young children. He argued that there was a close association, between hypermetropia and the development of squint and/or amblyopia. He also found that amblyopia was highly likely if a child had a meridional hypermetropia of more than 3 dioptres at the age of 1 year.<sup>2</sup>

According to Steward-Brown and Haslum<sup>3</sup> the condition that commonly detected in vision screening in school children are refractive errors, amblyopia and ocular muscle imbalance (latent or manifest squint) although identification of these cases may be a useful by products of continued screening such a justification has to rest solely on the value of detecting and treating refractive errors, squint and amblyopia in school children.

Amblyopia is a preventable visual disability affecting 1 to 3% of the general population and upto 5% of the pre-school age group. It is the commonest disorder encountered in paediatric ophthalmology clinics. Strabismus and refractive abnormalities are the commonest causes of amblyopia but are not readily detected by routine infants screening methods.<sup>4</sup>

Childhood blindness has profound consequences not only for the individual child but also for the family and the community this is particularly true in the developing world. An estimated 1.5 million children are blind of whom 1 million live in Asia.<sup>5</sup>

The WHO estimated the number of blind children in the world to be 1.5 million with half a million new cases of prevalence of blindness. This accounts for 75 million years of blindness, to the figure 1.5 million had to be added those children whose vision is impaired to the extent that they are classified as having low vision from the 1994. WHO update of country statistics on blindness and low vision available data on blindness there are typically three times as many people with low vision as there are blind.<sup>6</sup>

All visual defects apart from puberty onset myopia, fewer than half were detected through screening at 3 1/2 years. Screening at age 1 year, however achieved a 10% higher response rate and the use of refraction at this age may provide a better means of identifying those children likely to have the most severe amblyopia.<sup>7</sup>

Approximately 75% of the childhood blindness in developing countries is preventable or curable.<sup>8</sup>

## Subjects and Methods

This study for the prevalence of refractive errors in school children comprised of 1310 children in the city of Lahore. The high and low socioeconomic classes in which private English medium and Government schools are included.

Screening was performed by testing visual acuity. Distant visual acuity of upto 4 years of age will be tested by Snellen's E Chart and Snellen's Letter Chart was be used in general above 5 years of age at a distance of six meters. lens trial set, trial frame and atropine 1% eye drops as a cycloplegic agent, torch, retinoscope and ophthalmoscope were also used.

## Results

A total of 1310 school children examined in both upper and lower classes in the city of Lahore. The age group was 4-15 years of age. Table I shows percentage of refractive error in the different age group, that is from 4-5 years of age i.e. 8.57% children. Out of 70, six children had refractive error. In age group from 5-10 years, in which total 274 children examined 40 had the refractive error that is 14.59%. In the age group from 10-15 years in which the



total of 966 were children were examined, out of which 235 had the refractor error that suggests a increasing high rate of myopia in the three different types of refractive errors. Only myopia commonly develops during school age.

Table1: Prevalance of refractive errors according to the age groups

Age(Years)	n=	Refractive error	%age
4-5	70	6	8.57
6-10	274	40	14.59
11-15*	252	54	21.42
11-15**	714	191	26.75

\* in upper socioeconomic group, \*\* Lower socioeconomic group

Figure 2 shows the total number of children examined in the upper class, the awareness of visual impairment in upper class in which 59.25% were aware of their visual impairment, 40.75% were not aware of their visual impairment. Figure 3 shows only 5.25% of awareness in the lower socioeconomic class, 94.77% children were unaware of their visual impairment. Figure 1 also shows difference of upper and lower middle class in respect of difference of refractive errors in upper and lower socioeconomic classes.

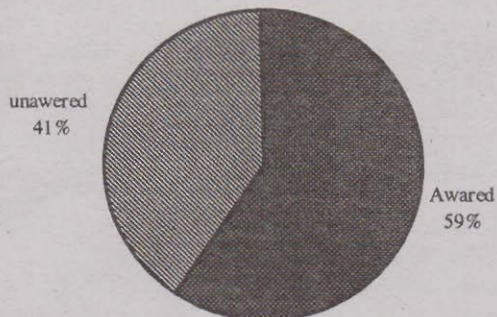


Fig. 2 : Awareness of visual impairment in high class

In the upper socioeconomic class total children examined were 252 out of which 54 had refractive error but only 32 children were aware of their refractive error which comes to about 59.25% awareness and 39.75% of unawareness in the population.

In the lower middle class total of 714 children were examined, out of which 191 had refractive error. Of which only 11 of them were aware of their refractive error. In this class only 5.23% of the total children were aware of their refractive errors while 94.77% children were unaware.

#### Discussion

The visual defect that were commonly detected in vision screening in school are refractive error (myopia, astigmatism and hypermetropia), amybyopia and ocular

muscle imbalance (latent or manifest squint).

All the children with severe congenital disorder are identified before school entry by their parents or by the relatives. The only other condition that can be detected on screening are rare progressive visual disorders (such as retinitis pigmentosa).

Screening test of distant vision should identify children with appreciable degree of myopia astigmatism and amblyopia. Children with severe hypermetropia will also fail such tests, but those with milder hypermetropia are unlikely to and some of these children will be identified by a screen of their near vision.

Whether minor degree of hypermetropia are of consequences to school children is being debated. Some evidence may suggest that the condition may interfere with learning to read<sup>9</sup>.

Unlike the refractive errors, which are simply treatable, rates of success for treating amblyopia and squint vary. The effectiveness of treatment for both these conditions decline further after the age of 6 or 7 years.

Our results suggest that there is a very high percentage of refractive errors in our screening of school children that 22.21% as compared to Turacli et al<sup>10</sup> reported about 11% of the total screening population.

#### References

1. Joan L, Sjostrand J. Anisometric and strabismic amblyopia in the age group 2 years and above: A prospective study of the results of treatment. *Br J Ophthal* 1991; 75: 111-16.
2. Aurell E, Norrsell K. A longitudinal study of children with family history of strabismus. *Br J Ophthal* 1990; 74: 589-94.
3. Stewart-Brown SL, Haslum M. Screening of vision in school. *Br J Ophthal* 1988; 297: 1111-13.
4. Williamson T, Andrews R. Assisment of an inner city visual screening programme for pre school children. *Br J Ophthal* 1995; 79: 1068-73.
5. World Health Organization. Prevention of childhood blindness. Geneva: WHO, 1992.
6. Keefe J, Taylor H. Visual impairment in children. *Br J Ophthal* 1995; 79: 624-25.
7. Ingram RM, Holland WW. Screening for visual defects in school children. *Br J Ophthal* 1986; 70: 16-21.
8. Eckstein MB, Foster A, Gilbert CE. Causes of childhood blindness in Srilanka. Results from children attending six schools of the blind.
9. Stewart Brown S, Butler NR, Haslum M. Education attainment of children with treated and untreated visual defects. *Dev Med Child Neurol* 1985; 27: 504-13.
10. Turacli ME, Aktan SG, Duke K. Ophthalmic screening of school children in Ankara. *Eur J Ophthal* 1995; 5(3): 181-86.