Abstract:

Aim: To assess the magnitude of refractive errors in the school going children of the urban population of Kolkata, West Bengal and to study its age and sex distribution, types, distribution and the possible factors associated with them. Study Design: The study was a review of school based vision screenings conducted from 2005-2009. Materials and Methods: Survey of Refractive Error in school going children in the age group of 5-14 years and studying in class I to class VIII was done in 42 schools in and around Kolkata. Results: 16,597 school students were screened. Number of students detected with refractive errors was found to be 1,615 (10.2%). Out of the refractive error detected Myopia accounted for 58.2%, Hypermetropia for 17.7% and Astigmatism for the remaining 16.3%. Conclusion: Uncorrected refractive errors constitute a major public health problem in urban school aged children in and around Kolkata with myopia being the most common and early detection and timely intervention can easily eliminate these treatable causes of visual impairment.

Key words: Refractive error; School children; Spectacles; Myopia; Hypermetropia

Introduction:

Refractive error is one of the most common cause of visual impairment around the world and second leading cause of treatable blindness and school aged children are no exception to it [1]. Reduced vision because of uncorrected refractive error is well known to be a major public health problem in school aged children. Most of the children with uncorrected refractive errors are asymptomatic. They often adjust to the poor eyesight by sitting near the blackboard, holding the books closer to their eyes, squeezing the eyes and even avoiding work requiring visual concentration [2-4]. Hence screening helps in early detection and timely intervention in these children and simple the provision of correctly prescribed spectacles can prove out to be a cost effective health intervention [5,6].

Indications of retinoscopy in children are:
- Gross loss of vision of gradual painless nature.
- Concomitant squint
- Asthenopia, Phoria, Recurrent Stye, Chalazion, Chronic Blepharitis.
- Vague headache.
- Nystagmus.

Roughly speaking, a gross loss of vision ie 6/60 or less that improves with pinhole, is most probably myopia. Children with hypermetropia of same amount have better vision as they can use accommodation to improve their vision. While myopes report for treatment earlier than hypermetropes, Hypermetropia causes more muscle imbalance and asthenopia.

Materials and Methods

The survey was done in 42 schools in and around Kolkata amongst the school going children in the age group of 5-14 years and studying in class I to class VIII. Fixation reflex and Pupillary responses were seen in all the school children and visual acuity measurement was done by Snellen’s chart while E chart was used for the students in lower standards. Visual acuity with Pin hole was then noted which gave the extent to which vision can be improved with spectacles. School children detected with refractive errors were advised retinoscopy after full cycloplegia with atropine ointment applied twice daily for two days. 2-3 mm length of the Atropine ointment was told to be put in the eye. Fundus examination was also done on diluted pupils to exclude other causes of visual impairment.

Prescription of spectacles was done based on retinoscopy value up to class IV as it was found that objective test was more reliable than subjective test in these children. Students in standards above class IV, PMT test was also done; after a fortnight. In a nonverbal, non-cooperative child reliance was given on retinoscopic findings.

Results:

A total of 16,597 school students were screened in this study and 1,615 (10.2%) students were found to have refractive errors. Myopia was most common of the refractive errors detected in this study, accounting for 58.2% of the refractive errors while Hypermetropia accounted for 17.7% and astigmatism 16.3%. [refer table 1,2,3] Myopia risk was associated with female gender 65% and having a father with higher level of schooling. There was an age related shift in refractive error from Hyperopia in young children towards Myopia in older children. In age group of 5 - 10 yrs prevalence of myopia and Hypermetropia was nearly same and in age group of 10 - 14 yrs Myopia was more common.

<table>
<thead>
<tr>
<th>Total Students with myopia</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>960</td>
<td>620</td>
<td>340</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Father of Myopic Children</th>
<th>Illiterate (never went to school)</th>
<th>Primary Schooling</th>
<th>Secondary Schooling</th>
<th>Higher Secondary Schooling &amp; above</th>
</tr>
</thead>
<tbody>
<tr>
<td>960</td>
<td>58</td>
<td>102</td>
<td>180</td>
<td>620</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total Students</th>
<th>Myopia</th>
<th>Hypermetropia</th>
<th>Astigmatism</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10 Yrs</td>
<td>715</td>
<td>310</td>
<td>315</td>
<td>90</td>
</tr>
<tr>
<td>10-14 Yrs</td>
<td>900</td>
<td>650</td>
<td>200</td>
<td>50</td>
</tr>
</tbody>
</table>

Discussion:

Visual impairment is a worldwide problem that has a significant socioeconomic impact. Childhood blindness is a priority area because of the number of years of blindness that ensues. Data on the prevalence and causes of blindness and severe visual impairment in children are needed for planning and evaluating preventive and curative services for children, including planning special education and low vision services. The available data suggest that there may be a tenfold difference in prevalence between the wealthiest countries of the world and the poorest, ranging from as low as 0.1/1000 children aged 0-15 years in the wealthiest countries to 1.1/1000 children in the poorest [7]. It is estimated that the cumulative number of blind-person-years worldwide due to childhood blindness ranks second only after the cumulative number of blind-person-years due to cataract blindness [8]. Considering the fact that 30% of India's blind lose
their eyesight before the age of 20 years and many of them are under five when they become blind, the importance of early detection and treatment of ocular disease and visual impairment among young children is obvious [9].

Children do not complain of defective vision, and may not even be aware of their problem. They adjust to the poor eyesight by sitting near the blackboard, holding the books closer to their eyes, squeezing the eyes and even avoiding work requiring visual concentration. This warrants early detection and treatment to prevent permanent disability. Effective methods of vision screening in school children are useful in detecting correctable causes of decreased vision, especially refractive errors and in minimizing long-term visual disability [9].

Reduced vision because of uncorrected refractive error is a major public health problem in urban school aged children in and around Kolkata and the same was reflected in our study in the 1,615 (10.2%) students found to have refractive errors out of the total of 16,597 students screened.

Myopia was most common of the refractive error detected in this study. Out of total refractive error Myopia detected was 58.2%, Hypermetropia 17.7% and Astigmatism 16.3%.

Myopia risk was associated with female gender 65% and having a father with higher level of schooling. Previous studies have also shown prevalence of Myopia more in Asian children and higher in urban children. There was an age related shift in refractive error from Hyperopia in young children towards Myopia in older children. In age group of 5-10 yrs prevalence of Myopia and Hypermetropia was nearly same and in age group of 10-14 yrs Myopia was more common. Cost-effective strategies are needed to eliminate this easily treated cause of vision impairment which definitely will increase the productivity of the nations in the long run.

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References: