

Original Article

REFRACTIVE ERRORS IN SCHOOL GOING CHILDREN – DATA FROM A SCHOOL SCREENING SURVEY PROGRAMME

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ABSTRACT

Background: The prevalence of blindness in children ranges from approximately 0.3/1000 children in affluent regions to 1.5/1000 in the poorest communities. the importance of early detection and treatment of ocular diseases and visual impairment in young is obvious.

Aim and objective - The basic aim of this study was to assess the status of refractive errors in school going children through school screening program.

Method: the study was done on students aged 05 years to 15 years, selected randomly from rural and urban schools in and around the periphery of Bhopal, Madhya Pradesh.

Result: A total of 18,500 children were screened, Out of them 10730 were boys (58.00%) and rest 7770 (42.00%) were girls. Ocular morbidity (refractory errors) was found in 2422(13.09%) children out of which 1059 (5.72%) were boys and 1363(7.36%) were girls. Of these there were a total of 1,313 myopes ; 740 hypermetropes ; 277 with astigmatism and 92 amblyopic children.

Conclusion: school screening program is an effective way to detect the causes of visual impairment in school children.

Key words: Refractive error, amblyopia, myopia

INTRODUCTION

India has an estimated of 320,000 blind children, more than any other country in the world.¹ Even though this represents a small fraction of the total blindness, the control of blindness in children is one of the priority areas of the World Health Organization's (WHO) "Vision 2020: the right to sight" program. This is a global initiative, which was launched by WHO in 1999 to eliminate avoidable blindness from worldwide by the Year 2020².

Importance of early detection and treatment of visual impairment in children is very important aspect of our screening programme. In most of the countries school screening programmes are done routinely to detect the causes of ocular morbidity .The objective of school screening programme is to detect the cases of refractive errors, amblyopia, strabismus and other ocular disease. Early detection and correction of refractive error result in a decrease in the number of school children with poor sight. ³

Visual impairment due to myopia typically appear during school going years. It is the commonest type of refractive error in school going children and its timely and proper correction saves permanent ocular morbidity.⁴ Hypermetropia is just the opposite of myopia in a strict optical sense. The child's eye can easily increase its refractive power by ten or more diopters with accommodation, so that except in rare, extreme degree of hypermetropia, vision remains normal. Astigmatism is the second commonest refractive cause of decrease vision in childhood. It is optically correctable by cylindrical lenses.⁵ Amblyopia is the decreased vision in one or both eyes even after best optical correction, resulting from altered visual development despite normal retinal and optic nerve anatomy.⁶

The prevalence of blindness in children ranges from approximately 0.3/1000 children in affluent regions to 1.5/1000 in the poorest communities. Globally there are estimated to be 1.4 million blind children, almost three-quarters of them live in developing countries.⁷

Major causes of childhood blindness are easy to detect and approximately 40% are preventable. School children are a captive audience and can be reached more easily in comparison to general population.

Considering the fact that 30% of India's blind population loses their sight before the age of 20 years, the importance of early detection and treatment of ocular diseases and visual impairment in young is obvious.

School screening programmes have been an established part of the school health services since 1907 and remained universally recommended. These programmes are primarily aimed at detecting refractive errors and amblyopia.⁸

In this three year study, we are presenting the result of the on going school screening programme in department of ophthalmology peoples college of medical sciences and research centre Bhopal (MP).

MATERIAL AND METHODS

This is a community based study. School surveys were conducted in various government schools of rural, urban and semi urban areas of Bhopal between JAN-2006 to JAN-09. A total of 18,500 school children between age group 5 to 15 years

had undergone the complete ocular examination. The School was informed well in time for appropriate arrangements at a given date and time. Formal permission was taken from the principals of these schools; informed consent was obtained from the parents or guardian. The list of the students was taken from the attendance registers.

Our survey Team consisted of an Ophthalmologist, Optometrist, ophthalmic technician and two other staff. All the Children underwent comprehensive ocular examination which included detailed history of present and past ocular problems, along with relevant family history. Visual Acuity was taken unaided, with pinhole, with glasses on Snellen's or 'E' chart at a distance of 6 meters. anterior segment was examined with torch light. Color vision was tested on Ishihara chart. Convergence test and test for Squint were carried out. where vision was not improving with pinhole fundus examination done to rule out any organic cause.

Criteria's for inclusion of children for ocular morbidity:-

Visual acuity of $<6/9$ and improving with pinhole was considered to be refractive error.

Vitamin A Deficiency was considered by recording Bitot's spot, Conjunctival and Corneal xerosis and night blindness. The history of night blindness was obtained from the child.

Strabismus was diagnosed by recording corneal light reflex combined with extra ocular movements and cover -uncover tests.

A probable diagnosis of amblyopia was made if the vision was $<6/9$, not improving with pin hole and no organic lesion was detected after complete ocular examination.

The student who were found to have a vision equal to or less than $6/9$, improving with pinhole was considered as refractive error, appropriate spectacles were prescribed to the children.

OBSERVATIONS

The data are collected from school surveys conducted in various government schools of rural, urban and nearby areas of Bhopal (MP). A total of 18,500 children were screened, Out of them 10730 were boys (58.00%) and rest 7770 (42.00%) were girls. Ocular morbidity (refractory errors) was found in 2422 (13.09%) children out of which 1059 (5.72%) were boys and 1363

(7.36%) were girls. Of these there were a total of 1,313 myopes; 740 hypermetropes; 277 with astigmatism and 92 amblyopic children. The distribution of decreased visual acuity in males and females is shown in table - 1.

Table 1 - comparison of decreased visual acuity in males and females

Refractive Error	Total (n=18500)	Male (n=10730)	Female (n=7770)
Myopia	1313 (7.09)	551 (5.13)	762 (9.8)
Hypermetropia	740 (4.0)	332 (3.09)	408 (5.25)
Astigmatism	277 (1.49)	131 (1.22)	146 (1.87)
Amblyopia	92 (0.49)	45 (0.41)	47 (0.60)

Figure in parenthesis indicate percentage

Table 2 - comparison of decreased visual acuity in different age groups

	5- 10 yr age (n=8325)	11-15 yr age (n=10175)	Total (n=18500)
Myopia	616 (7.4)	697 (6.85)	1313 (7.1)
Hypermetropia	332 (3.98)	408 (4.0)	740 (4)
Astigmatism	107 (1.2)	170 (1.6)	277(1.5)

Figure in parenthesis indicate percentage

From this table girls with decreased visual acuity (refractory error) are more as compared to males. The distribution of decreased visual acuity did not differ between boys and girls, in a study conducted by Murthy et al, 2002.⁹

The comparison of decreased visual acuity in different age groups is shown in table-2. The number of students with decreased visual acuity increased with age. However, since there were more children with decreased vision in this age group (11-15 years age group), therefore we may have found more children with decreased vision in this group. Similar findings were reported in by Kalikivayi et al in 1999.¹⁰

Table 3- comparison of decreased vision in children from rural versus urban schools

Refractive error	Rural (n=10545)	Urban (n=7955)
Myopia	1014 (9.9)	299 (3.75)
Hypermetropia	572 (5.42)	168 (2.1)
Astigmatism	134 (1.27)	143 (1.79)

Figure in parenthesis indicate percentage

The children with decreased visual acuity were more common in the children from rural schools, when compared to urban schools. These findings were different from findings of Dandona et al 1999 of Andhra Pradesh.¹¹ may be because more students were from rural areas.

A study done on visual impairment in school children in southern India by Kalikivayi et al¹⁰ in 1990 reported prevalence rate of myopia to be 8.6%; hypermetropia 22.6%; astigmatism 10.3% and amblyopia 1.1%.

However, in our study we did not consider the predictors of refractory errors mainly myopia as reported in various studies. These include socioeconomic status, parent's education, hereditary factors and prolonged use of visual display terminals and television viewing. The data presented here pertains only to decreased visual acuity due to refractive errors, improved with the proper prescription of correct spectacles glasses.

DISCUSSION

The ocular morbidity if detected and treated early in life can prevent the social and intellectual under development of the child. Despite the recognized importance of correcting ocular morbidity in children, population based data on this issue is limited. More over there is a large global variation in the prevalence and causes of ocular morbidity. In our study the prevalence of ocular morbidity (refractory errors) was found to be 13.09%. Results were comparable to the study of Kalikivayi et al¹⁰ Visual impairment in school children in southern India (1997). The high prevalence of preventable causes of blindness like refractive error as highlighted by the present study needs to be addressed first. WHO introduced the global initiative called 'VISION 2020' is based on the identification of prevalence of such avoidable causes. Refractive error has been chosen in part because they are very common and corrective spectacles provide a remedy that is inexpensive, effective and associated with huge functional improvement.

As outlined by the study issues to reduce visual impairment due to uncorrected refractive errors are:

1. Increase parental awareness of symptoms in a child suggestive of poor vision.
2. Attempt to link visual screening with other population based activities.
3. Involvement of school teachers in visual screening of children.
4. Children with history of refractive error in family should be screened at an early age.

CONCLUSION

Though we have to be cautious in extrapolating the results of this study to the entire population of school children in India, but these data validate the need for vision screening of school children. School screening programmes should be mandatory by the government health authorities.

REFERENCES

1. Gilbert C, Rahi J, Quinn G. Visual impairment and blindness in children. In: Johnson, Minassian, Weale, West, editors. Epidemiology of eye disease. 2nd edition UK: Arnold Publishers; 2003.
2. World Health Organization, Global initiative for the elimination of avoidable blindness. WHO/PBL/97.61. Geneva: WHO; 1997.
3. Greenwald MJ. Refractive abnormalities in childhood. Ped Clinic N Am 2003;50:197-212.
4. Chandra DB, Swarup D, Shrivastav RK. prevalence and pattern along with socioeconomic factor of myopia in school-going children 8 to 16 years. Indian J Ophthalmol 1982;30:517-518.
5. Greenwald MJ. Refractive abnormalities in childhood. Ped Clinic N Am 2003;50:197-212.
6. Rubin SE, Nelson LB. Amlyopia- Diagnosis and management. Ped Clinic N Am 1993;40:727-735.
7. Rahi JS, Gilbert CE, Foster A, Minassian D. Measuring the burden of childhood blindness. British journal of ophthalmology 1999;83:387-
8. Spoward KM, Simmers A, Tappin DM. Vision testing in school: an evaluation of personnel, test and premises. J Med Screening 1998;5:131-132.
9. Murthy, GVS, Gupta, SK, Ellwein, LB, Refractive error in children in an urban population in New Delhi Investigative Ophthalmology Visual Science 2002(43),623-631
10. Kalikivayi V, Opt B, Naduvilath TJ, et al. Visual impairment in school children in southern India. Indian J Ophthalmol 1997;45:129-134.
11. Dandona R, Dandona L, Naduvilath TJ, shriniwas M, Me Carty CA, Rao GN : Refractive errors in an urban population in southern India: The Andhra Pradesh Eye Disease Study. Investigative Ophthalmology Visual Sciences, 1999; 40(12),2810-2818.