A Study of Refractive Status of School Going Children Aged Between 10 to 15 Years in Kishoreganj District of Bangladesh

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A cross sectional study was conducted among the children between 10 to 15 years of age attending in rural and urban government school of Kishoreganj district. Children were screened in their respective school and those were VA < 6/9 and improving with pinhole was considered as refractive error. A total 6500 were screened, out of them 60% were boys and 40% were girls. In our study refractive error was found in 15% of student, out of which 7.9% were girls and 7.1% were boys. Myopia was the most common refractive error (8%) followed by astigmatism (4%) and hypermetropia (3%). These data show that vision screening in school children in developing countries is an only way to detect the refractive errors and there by prevent development of amblyopia and visual disability.

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Key words: Refractive error, visual acuity, amblyopia

Introduction

Eyes are the mirror of the soul and the body's window to the outside world**.** In every five seconds one person goes blind and in every minute one child goes blind in this world. Blindness is one of the important public health problems in Bangladesh. Several millions of people have been suffering from blinding conditions or from visual impairment. A big share of this problem comprises of refractive correction problem. Refractive error, in particular, has in these days' excellent treatment scopes which is cheap, convenient, comfortable and finally within people's capabilities. Bangladesh, having a total population of 140 million, has estimated 586,880 to 784,000 blind in the age group of over 30 years in the country. Yet many of the blinding conditions are preventable and treatable, particularly refractive error and low vision. Eye problems decreases productivity significantly and if the condition is not treated early. It raises a huge burden on economy as well as on productivity.[1] According to Bangladesh National Blindness and Low Vision Survey (2002) there are about 3.3 million cases of refractive error in adults and 1.3 million cases among children (i.e. 3.5 % of the whole population). Despite the huge numbers of people are in need of refractive error correction, only 3% of them use spectacles and the rest remain uncorrected. Additionally, about 7.2 million people suffer from visual impairment and low vision.[1] Bangladesh has an estimated of 40,000 blind children, more than any other country in the world.[2]

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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 2020.[3] Importance of early detection and treatment of visual impairment (Refractive Error) in children is very important aspect of our screening program. In most of the countries school screening programs are done routinely to detect the causes of ocular morbidity. The objective of school screening program 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.[4] 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.[5] 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.[6] 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.[7] The prevalence of blindness in children ranges from approximately 0.5/1000 children in affluent regions to 1.8/1000 in the poorest communities. Globally there are estimated to be 1.4 million blind children, almost three-quarters of them live in developing countries.[8] 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 38% of India's blind population loses their sight before the age of 15 years, the importance of early detection and treatment of ocular diseases and visual impairment in young is obvious. School screening program have been an established part of the school health services since 1907 and remained universally recommended .These program are primarily aimed at detecting refractive errors and amblyopia.8 In this 6 months study, we are presenting the result of the ongoing school screening program in 250 BED District hospital, Kishoreganj, Bangladesh.

Methods

Official estimates for the year 2000 indicated that Bangladesh had a total population of 130 million people 12,13. Accordingly, there were an estimated 44.8 million people within the target age group of age 30 years or older (34.5% of the total population). Demographic data indicate that the majority of the population resides in rural areas (79.9%) while the remaining fifth lives in urban zones (20.1%).[14]

This is why we considered a community based study. School surveys were conducted in various government and nongovernment school in the district of kishoreganj, Bangladesh, between June 2015 to December 2015. A total of 6500 school children between age group 10 to 15 years had under gone 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 of the School. Our survey Team consisted of an Opthalmologist, Medical

officers (eye) ophthalmic technician, and two other staff. All the Children underwent comprehensive ocular examination. 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 Ischihara chart. 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. A probable diagnosis of amblyopia was made if the vision was <6/9, not improving with pin hole and no organic lesion was detected with fundoscopy 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.

Results

The data were collected from School surveys conducted in various government, Private schools of rural, urban and semi urban areas of Kishoreganj District, Bangladesh. A total of 6500 children were screened, Out of them 3900 were boys (55%) and rest 2600 (45%) were girls. Ocular morbidity (refractory errors) was found in 975(15%) children out of which 290 (4.46%) were boys and 307(4.73%) were girls. Of these there were a total of 510(8%) Myopia; 185(3%) Hypermetropia; 250(4%) Astigmatism and 30(0.46%) Amblyopic children.

Table I: Comparison of decreased visual acuity in boys and girls

Refractive error	Total (n=6500)	Boys (n=39oo)	Girl (n=2600)
Myopia	510	240	270
Hypermetropia	185	84	101
Astigmatism	250	110	140
Amblyopia	30	12	18

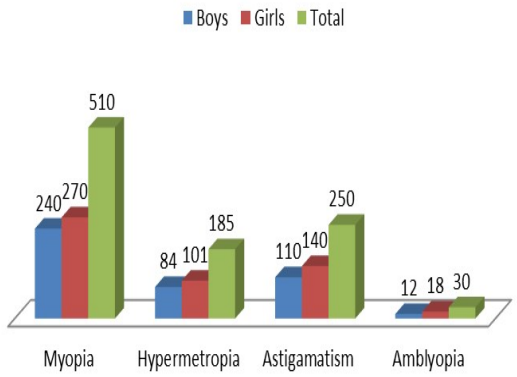

Figure 1. Comparison of decrease visual acuity in boys and girls

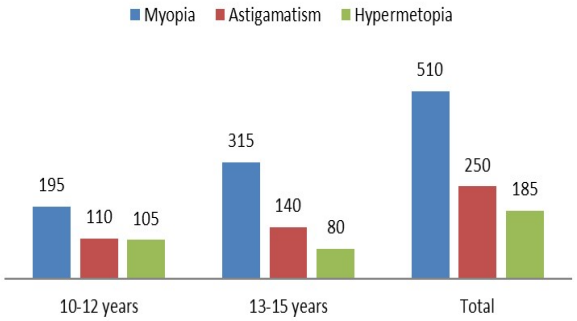

Figure 2. Comparion of visual acuity in different age group

Table II: Comparison of decreased visual acuity in different age groups

Refractive Error	Total (n=6500)	10-12 years (n=3756)	13-15 years (n=2744)
Myopia	510	195	315
Hypermetropia	185	105	80
Astigmatism	250	110	140

From this table girls with decreased visual acuity (refractory error) are more as compared to boys. 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 II. The number of students with decreased visual acuity increased with age However, since there were more children with decreased

vision in this age group (13-15 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]

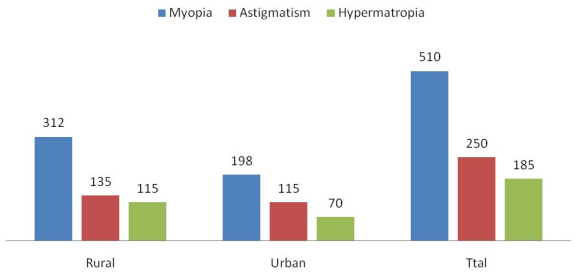

Figure 3. Comparison of visual acuity in rural versus urban

Refractive Error	Total (n=6500)	Rural (n=4073)	Urban (n=2427)
Myopia	510	312	198
Hypermetropia	185	115	70
Astigmatism	250	135	115

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 999 of Andra Pradesh.[11] may be because more students were from rural areas. A study done on visual impairment (Refractive error) in school children in southern India by Kalikivayi et al[10] in 1990 reported prevalence rate of myopia to be 8.6%; hypermetropia 22.6%; astigmatism 10.3% and amblyopia 1.1%. The data presented in our study only showed to decrease visual acuity due to refractive errors, improved with the proper prescription of correct spectacles glasses. A number of studies were done in Asia to find out the cause of childhood blindness. A study in schools for the blind in nine states of India found that corneal scar was the leading anatomical site of visual loss (26%) followed by the whole globe (25%), retina (21%) and cataract (12%), meanwhile postnatal factors (28%) and hereditary factors (23%) are the leading etiological causes. This study also showed a marked state to state variation in causes of blindness.

In South East Asia, a study in 4 schools for the blind in Thailand and the Philippines found similar distribution of causes between the two countries, with whole globe (27.7% and 27.4%), retinal diseases (29.2% and 23.0%) being the most important causes, followed by cataract (16.9% and 16.8%). Cornea diseases accounted for 13.8% and 13.4% of the anatomical site of abnormalities, respectively.[15]

Discussion

Refractive error is a very important cause of visual blindness and amblyopia. The ocular morbidity if detected and treated early in life can prevent the social and intellectual underdevelopment 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 15%) 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 development.

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

This study shows that screening of school children can play an important part in detecting refractive errors. Early detection can prevent refractive errors and amblyopia. It could be helpful to achieve better quality of life in our children who are the future of the nation as well as it would be helpful to attain the global initiative for elimination of avoidable blindness by the year 2020.Though we have to be cautious in extrapolating the results of this study to the entire population of school children in Bangladesh, but these data validate the need for vision screening of school children. School screening program should be mandatory by the government health authorities.

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