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IDENTIFICATION REFRACTION ERROR IN SCHOOL CHILDREN FOR AVOID REFRACTIVE BLINDNESS AGE GROUP 6 TO 15YEARS

Mohd. Mizanur Rahman*
Mohd. Golam Rasul**
Abdur Rashid***

Abstract:

Background:

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. The prevalence of refractive blindness in children ranges from approximately 0.5/1000 children in affluent regions to 1.8/1000 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 age group 06 to 15 years through school screening program.

Method:

The study was done on students aged 06 years to 15 years, selected randomly from rural and urban schools in and around the periphery of Buighar, Sonargaon in Narayangong district, Bangladesh.

Result:

A total of 4,625 children were screened, Out of them 3084 were boys (67.00%) and rest 1541 (33.00%) were girls. Ocular morbidity (refractory errors) was found in 439(9.5%) children out of which 205 (4.43%) were boys and 234(5.06%) were girls. Of these there were a total of 139 myopes; 156 hypermetropes; 121 with astigmatism and 23 amblyopic children.

Conclusion:

School screening program is an effective way to detect the refractive error causes identification of visual impairment in school children.

Key words:

Refractive error, Hypermetropia, Myopia, Astigmatism, Amblyopia

*B.Optom, M.Optom, MBA (HM), PhD Research Scholar, Singhania University, Jhunjhunu, Rajasthan

**MBBS, MS, MPH, PhD(Opth)

***MBBS, MS(Opth)

INTRODUCTION

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. Many of the people are unnecessary suffering. Eye problems decreases productivity significantly and if the condition is not treated early, it adds on compound effect. 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 1.3 million blind children, more than any other country in the world [2]. 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[3].

Importance of early detection and treatment of visual impairment (Refractive Error) 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 [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 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 6 months study, we are presenting the result of the ongoing school screeining programme in city lions eye hospital & Optometry Research Institute, Dhaka, Bangladesh.

MATERIAL AND 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 a community based study. School surveys were conducted in various Private schools and Madrasha of rural, urban and semi urban areas of Narayangonj Distric , Bangladesh, between June 2011 to December 2011. A total of 4625 school children between age group

06 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 Optometrist, ophthalmic technician, Refractionist 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 Ischihara 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 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.

OBSERVATIONS

The data are collected from. School surveys conducted in various government, Private schools and Madrasha of rural, urban and semi urban areas of Narayangonj District, Bangladesh. A total of 4,625 children were screened, Out of them 3084 were boys (67.00%) and rest 1541 (33.00%) were girls. Ocular morbidity (refractory errors) was found in 439(9.5%) children out of which 205 (4.43%) were boys and 234(5.06%) were girls. Of these

there were a total of 139 Myopia; 156 Hypermetropia; 121 with Astigmatism and 23 Amblyopic children.

Table 1 – comparison of decreased visual acuity in Boys and Girls

Refractive error	Total (n=4,625)	Boys (n=3084)	Girl (n=1541)
Myopia	139	77	62
Hypermetropia	156	64	92
Astigmatism	121	56	65
Amblyopia	23	08	15

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

Refractive Error	Total (n=4,625)	06-10 years (n=2056)	11-15 years (n=2569)
Myopia	139	15	124
Hypermetropia	156	103	53
Astigmatism	121	22	99

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-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 etal in 1999.10

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

Refractive Error	Total (n=4,625)	Rural (n=2715)	Urban (n=1910)
Myopia	139	101	38
Hypermetropia	156	117	39
Astigmatism	121	77	44

The children with decreased visual acuity were more common in the children from rural schools, when compared to Semi 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 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, television viewing and unable to see the school blackboard from distance. The data presented here pertains only to decreased 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 aetiological 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 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 al[10] 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 Bangladesh, but these data validate the need for vision screening of school children. School screening programmes should be mandatory by the government health authorities.

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