



Original Article

Study of Refractive Errors on School going Children in North West Zone of Bangladesh

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Abstract

Refractive error is one of the most common cases of visual impairment around and it is quite common among the children but neglected. Children of age 5-15 years constitute a large portion of the country population. If the refractive errors may not corrected lead to reduced vision (amblyopia) and strabismus. Main ophthalmic problem in children is refractive errors and maximum children live in rural area of Bangladesh but a few studies on such ground had been carried out previously. Therefore it is matter of investigation in this ground. As such study of refractive error of age 5-15 years of low health facilitated area like Chapainawabgonj district situated in the North West Zone of Bangladesh have been considered in this study. On basis of the collected 500 samples the prevalence of refractive error has been computed and it was found to be 9.2% which is similar with the existing study.

Keywords: *Refractive Error, Prevalence of Refractive Error, Myopia, Hyperopia, and Astigmatism.*

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Introduction

Refractive error is one of the most common cases of visual impairment around the world and second leading cause of treatable blindness (Dandona and Dandona, 2006). Blindness due to uncorrected or inadequately corrected refractive error is problem which may start at the younger age than older aged people. Any person who have the refractive errors may not corrected at younger age may suffer many more years of blindness that may create a social problem also. To avoidable blindness World Health Organization (WHO) are given main priorities to the refractive errors (Pizzarello, *et al.* 2004). Based on WHO blindness in Singapore is

0.5%, Malaysia is 0.3%, Taiwan is 0.6%, Bangladesh is 1.5%, Indonesia is 2.2% and India is 4.3% (Wong, *et al.* 2006).

Bangladesh is one of the most densely populated countries in the Asia as well as in the World with 180 million people. Among these huge population % are old aged, % are middle aged and % are children. In the children, there are % children belongs to the age group 5-15. Due to the lack of nutrients and balanced diet under 15 aged populations are suffering by so many health problems. As the treatment facilities are inadequate in Bangladesh in the rural areas, under

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15 aged populations are at high risk in consideration with the refractive error. People living in low facilitated area may have the higher rate of visual problems. Chapainawabgonj is a district in the border region of Bangladesh is situated in the north west of the country. Basically the population is not so rich in comparison to the capital city and some other developed districts in the country. Therefore, the population are facing some health problems and also the medical facilities are very poor in this region.

Although a series of studies have been done in Asian countries in last few years which could give the scenario of such problem in this region, it is not frequent in the rural area of Bangladesh. Khan *et al.* carried out a study on refractive errors in school going children in rural areas of Bangladesh in 2004. Their study involved 8.24% boys and 9.01% girls from the study area and they conclude that the refractive errors of the study population are very much neglected. No such large scale studies have been found in the North West region of Bangladesh. As such following the previous study, to determine the refractive errors and the visual acuity of school going student the authors are given attention on prevalence of refractive errors of school going children in Chapainawabgonj district of Bangladesh.

Material and Methods

The data of 500 children of aged 5 to 15 years from five schools (Chatra Primary School, Amnura K. M. High School, Trimohoni Primary School, Chowdala High School and Golabari Primary School) of Chapainawabgonj district have been collected for the period of 1st July 2014 to 31st December 2014.

In this study refractive error like facial asymmetry, head posture, condition of eye, eye lids, conjunctiva, cornea, pupil, lens, estimate of ocular muscle balance both for near and distance and ocular motility test were done. The test of visual acuity included unaided, with the existing glass, with pin-hole and corrected visual acuity. Torch, measuring tape, Snellen's test type, E-chart, trial set, streak retinoscope, ophthalmoscope, drugs like Tropicamide & Atropine eye drops have used as the materials in this research. To detect the refractive error a vision screening test and retinoscopic examination used accordingly.

Observation and results

The collected data of 245 children from the selected schools have been analysed using SPSS program for windows version 21. The bivariate distribution of the collected data by sex and age group are given in the Table 1.

Table 1. Bivariate table of the respondents by age and sex

Age Group	Boys	Girls	Total
5-7	38 (40.43%)	56 (59.57%)	94 (18.80%)
8-10	75 (68.18%)	45 (40.90%)	110 (22.00%)
11-13	90 (51.43%)	85 (48.57%)	175 (35.00%)
14-15	77 (63.64%)	44 (36.37%)	121 (24.20%)
Total	270 (54.00%)	230 (46.00%)	500 (100.00%)

From the above table, it is shown that among the collected data there are about 40.43% respondents are boys and 59.57% of the respondents are girls for the age interval 5-7 years. To make a comparison the above data have been shown graphically in a multiple bar diagram in the figure 1.

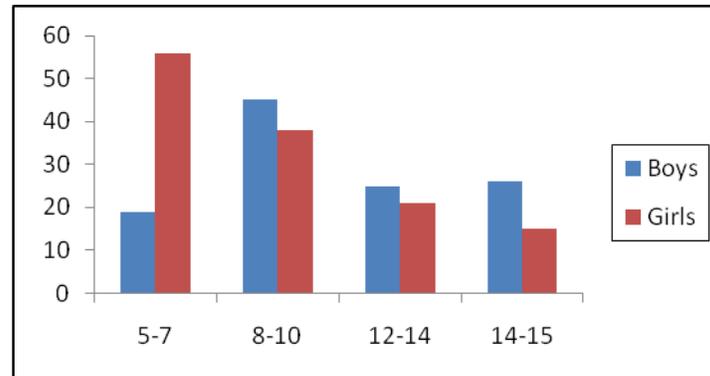


Fig.1. Multiple bar diagram of the respondents for different age intervals

It is clear from the above figures that except for the age group 5-7 year all other age group having higher number of boys than girls. The first age group contains maximum 59.7% respondent and the last class contain the minimum of 36.37% respondent.

The expected frequencies have been computed to test the contingency chi-square and the test statistic value is found to be 224.68 with its critical value 7.81 indicating that the test is significant at 5% level. Therefore, age group difference is somehow related to sex difference of the respondents in this research.

Table 2. Frequency distribution of the respondent presenting feature

Complications type	Myopia	Hyperopia	Astigmatism	Total
Defective vision	12	4	4	20
Headache	3	2	5	10
Blurring of vision	6	5	2	13
Eyeache	2	1	2	5
Deviation of eyes	1	0	0	1
Asymptomatic	4	3	1	8
Total	29 (5.8%)	15 (3.8%)	13 (2.6%)	57

Myopia, Hyperopia and Astigmatism are three major ophthalmic diseases occur among the eye patients. Also Defective vision, Headache, Blurring of vision, Eyeache, Deviation of eyes and Asymptomatic are common phenomenons that have seen as the causes of different eye complications. So we have considered these complications in our study and a two-way contingency table have been constructed to make a meaningful conclusion. In this study there are 29 children have found in the selected different causes under the head Myopia. Similarly, Astigmatism is found 13 and Hyperopia are found 15 children among the total complication of 57 children. The pictures of complications with their cases can be depicted nicely from the multiple bar diagram that are given bellow.

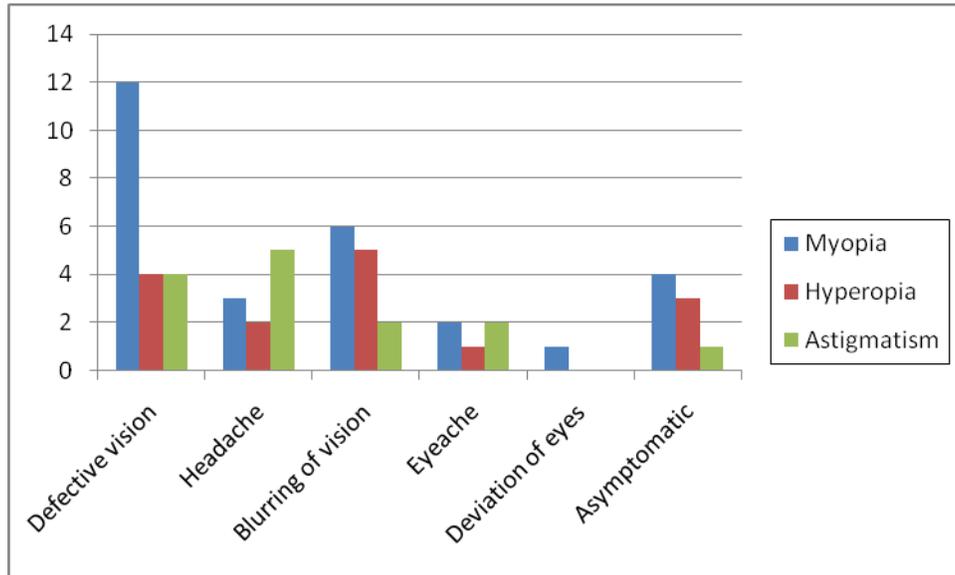


Fig.2. Multiple bar diagram of the respondent presenting feature

Table 3. Sex-wise frequency distribution of types of refractive errors

Types of refractive errors	Boys	Girls	Total
Myopia	14	15	29
Hyperopia	8	7	15
Astigmatism	7	6	13
Total	29	28	57

Table 3, there are 29 boys and 28 girls have refractive errors among the total 57 sufferers. It is noted that among the Hyperopic one having amblyopia.

As family history of refractive errors is an important matter of suffering in different complications and its cause may have the positive role in ophthalmic diseases, we have studied the family history and it has been shown in the Table 4.

Table 4. Family history wise refractive errors of the respondents

Family History	Refractive error		Total	Prevalence of Refractive error with family history
	Present	Absent		
Present	47	37	84	9.2%
Absent	10	406	416	
Total	57	443	500	

The above table showing the family history of refractive errors 84(16.8% %) of which 47 students having refractive error and 37 had no refractive errors and 416 students having no family history but among them 10 has refractive errors and 406 students having no refractive errors.

Table 5.Socioeconomic status of the respondents

Socioeconomic status	Refractive error		Total
	Present	Absent	
High	15 (16.67%)	75 (83.33%)	90
Middle	28 (8.00%)	322 (92.00%)	350
Low	14 (23.33%)	46 (76.67%)	60
Total	57	443	500

Above table showing the refractive errors of high socioeconomic status are more than middle class & low class but the percentage of absent of refractive errors is high among the three classes.

Discussion

The main objective of the present study was to determine the Prevalence of refractive error of school going children and the other objectives was to find out prevalence of the types of refractive error, age and sex specific prevalence, the influence of role of family history, near work, activities, socioeconomic status or refractive error. The result in this study they overall prevalence of refractive error was 9.20%.

In Egypt, the Prevalence of retroactive error was 22.1 and this figure rising due to environmental condition like near work activities, Socio economic status and positive family history (Saad-2007)

In Uganda it was 11.6 % (Kawuma 2002) which corresponds to the present study, exact cause was not mentioned but might be due to limited representativeness and ethnical. Among the refractive error myopia is higher than other type of retractiveerror due to more positive family history, middle and high socioeconomic condition and extended near work activities such as reading, writing watching television.Playing computer ganus etc. The prevalence of miopic in Singapur is higher 36.3% but 13.4% in Malaysia (Saw SM 2006) is comparable with my study. This study the prevalence of myopic 5.8% in the present study is higher than 8.6% in southern india (Kalikivayi V 1997)

Regarding the sex specific prevalence of myopic there was no significant defference between boys (54%) and girls (46%). Higher Prevalence of

myopic in girlwas observed by Dandona 2000 and Zhao (2000) exact cause was not clear.

Regarding hyperopic the prevalence in this study was 3.8% .which could be comparable with this study of rural india 0.8% (Dandona et al 2002).

The Prevalence of astigmalism is 2.6%..Table no 2. which could be compared with Nepal 2.2% and rural india 2.8%.

The Prevalence of refractive error was significantly higher with positive family history of refractive error. In Table 5, thestudents belongs to the low and high class having greater percentage than middle socio-economic class. Furthermore, high class possess double percentage of refractive error than that of middle class most probably due to utilizing more time in reading, writing, watching Television, Playing computer games.

A large number of about 80.86% ametropic have been found in this research.Among cases having refractive error 8 (14.3 %) are asymptomatic, they had no any complain it may be due to the fact that having no awarness of such problem or in other words they can see the near object clearly and it is noted that most of them are myopic .

Most important is that the complication like amblyopia and strabismus which are easily treatable and correctable if diagnosis & Treatment done in proper time.

Conclusion

The refractive error of school going children which is amajor health concern in our country but

most of the general people and students are not aware about such a major problem. The parents' teachers and students should be ensured about such Problems children complaining any eye problem should be consulted with an ophthalmologist. Knowledge about refractive error should be incorporated in Primary eye care Program. Importance of vision screening should be emphasized it might be done as a part of physical examination before beginning new session. Teachers might be involved in vision screening Procedure by supplying visual acuity testing chart. Uncorrected refractive error is a global challenge that will keep us from meeting the vision 2020 goal unless challenges are made between now and then. Policy maker, politician, Primary eye care providers, ophthalmologist may have a role to combat vision impairment caused by uncorrected refractive error and it should be borne in mind that use of spectacles is not only for the adults but it may require for children also. In this context, radio, television, newspapers, posters and leaflets may play an important role. As the study was done among the children of rural area and urban area was not covered, so to find out a complete Picture further study is needed.

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