ORIGINAL ARTICLE

NORTH BENGAL MEDICAL COLLEGE JOURNAL [2024], VOL., 10, No. 1 : 16-20

Refractive Error Among School Going Children in Two Tertiary Hospital of Bangladesh

*Md Abdul Moid,[1] Shahana Begum[2]

ARTICLE INFO

Article history:
Received: 05 October 2023
Accepted: 10 December 2023

Online:
www.nbmc.ac.bd

Keywords:
Refractive Error, Myopia, School going children

ABSTRACT

Introduction: *Refractive errors (RE) are common ophthalmic disorder in children of Bangladesh. Uncorrected RE has become a major challenge for the policy makers of the health services. The aim of this study was to find out the RE among school going children (5 to 15 years).* ***Methods:*** *This cross-sectional study was conducted in the department of Ophthalmology at American Independent University, California, USA (Bangladesh Campus) from January, 2020 to December, 2022. A total of 150 school going children having refractive error were enrolled purposively for this study. Study subjects were selected from two tertiary hospitals (Hikma Eye Hospital of Dhaka and 250 bedded general hospital of Sirajganj district) of Bangladesh. Data was collected by face-to-face interview and Ophthalmological examination of the concerned subject using predesigned semi-structured questionnaire.* ***Results:*** *Among the 150 school going children with RE, most of them were male (87, 58%), residing in urban area (91, 60.67%) and monthly family income >30,000 tk BD (78, 52%). Myopia (75, 50%) was the common RE. Refractive error is significantly ($p<0.05$) associated with positive family history (127, 84.67%) and habituated with watching (134, 58.26%) of smart phone, computer and television.* ***Conclusion:*** *In this study, myopia was the common refractive error among school going children habituated with smart phone, computer and television. Reduction of screen time may limit the incidence of RE.*

[1.] *Assistant Professor, Department of Ophthalmology, North Bengal Medical College, Sirajganj, Bangladesh*

[2.] *Assistant Professor, Department of Obstetric sand Gynaecology, Shaheed M Monsur Ali Medical College and Hospital, Sirajganj, Bangladesh*

***Corresponding author:** ✉ drmoid01716@gmail.com

INTRODUCTION

Refractive error (RE) is the error of refraction in which a person can not see the object clearly. There are three types of RE i.e. myopia, hypermetropia and astigmatism. Uncorrected RE has become more challenge to the health care policy makers. Globally, there are 2.3 billion people have RE. Among the children, 12.8 million are visually impaired due to RE with prevalence of 0.97%. These RE can be easily corrected by using spectacles.[1] The higher prevalence reported in China and Urban areas of South Asia.[2] WHO launched a global initiatives-Vision 2020 "The Right to Sight" to eliminate avoidable blindness, like Refractive Error, Cataract, Xeropthalmia, Trachoma and other causes of childhood blindness by 2020.[3]

According to the National Blindness and Low Vision Prevalence Survey, about 60 million people have uncorrected RE in Bangladesh.[4] Out of them, 2.4 (4%) millions are children aged from 5 to 15 years. They have visual acuity less than 6/18. It is

estimated that, there are approximately 1.3 millions children having visual impairment due to RE and majority of them are amenable to correction.[4,5] Bangladesh have a national program for prevention of blindness.[5] In this country, prevalence of blindness put an additional burden to the socioeconomic condition. Refractive error in children of 5 to 15 years of age is an important public health problem. Myopia, hypermetropia and astigmatism are the leading causes of RE in children. Myopia is the most common RE followed by astigmatism and hypermetropia.[6] Visual impairment will persist if not corrected properly.[5] Refractive errors are the most common causes of visual impairment and usually affected neglected children especially female children.[7] The objectives of this study was to find out the refractive error among school going children (5 to 15 years).

METHODS

This cross-sectional type of descriptive study was conducted in the department of Ophthalmology at American Independent University, California, USA, (Bangladesh campus) from January, 2020 to December, 2022. Data was collected from two selected tertiary hospital (Hickman Eye Hospital of Dhaka and 250 bedded general hospital of Sirajganj district) of Bangladesh. A total of 150 school going children (5 to 15 years) having refractive error (RE) were enrolled purposively for this study on the basis of selection criteria. Autorefractometer and retinoscope were used for the diagnosis of RE. Refractive error due to cataract and vision less than 6/60 were excluded from this study. From each hospital 75 patients were selected. Data was collected from the study subjects by face-to-face interview using predesigned semi-structured questionnaire. Study approval was taken from the Institutional Review board (IRB) of American Independent University of California, USA. Prior data collection informed written consent was taken from the study subject. Statistical analysis was done by using software SPSS Version 20. P value <0.05 was considered statistically significant.

RESULTS

Refractive error (RE) was common in male than female (Table I).

Table I: Gender distribution of the patients (n-150)

Gender	Number	Percentage (%)	X^2	*p* value
Male	87	58%	7.68	0.005
Female	63	42%		
Total	**150**	**100%**		

More patients were from urban area (Figure-1).

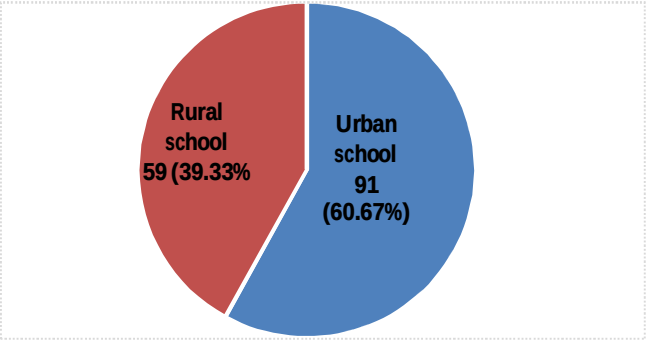

Figure 1: Regional distribution of the study subjects (n-150)

In this study, most (78, 52%) of the patients had monthly family income >30,000 to (Table II).

Table II: Distribution of the patients on the basis of monthly family income (n-150)

Monthly family income	Number	Percentage	X^2	*p* value
Taka <15000	40	26.67%		
Taka 15000 to 30000	32	21.33%	36.24	0.00001
Taka >30000	78	52%		
Total	**150**	**100%**		

Myopia (75, 50%) was common refractive error among the school going children. Myopia and Astigmatism were common in male but hypermetropia was commonly found in female (Table III).

Table III: Different types of refractive errors among the study subjects (n-150)

Refractive error / Gender	Myopia (%)	Astigmatism (%)	Hypermetropia (%)	Total (%)
Male	51 (34%)	32 (21.33%)	4 (2.67%)	87 (58%)
Female	24 (16%)	31 (20.67%)	8 (5.33%)	63 (42%)
Total	**75 (50%)**	**63 (42%)**	**12 (8%)**	**150 (100%)**

Watching of smart phone, Computer and Television was the major risk factor of refractive error in school going children (Table IV). Risk factors are significantly (*p*-0.00001) associated with RE of patients.

Table IV: Risk Factors of Refractive Error

Risk Factors	Number	Percentage	X^2	*p* value
Habituated with watching of Smart phone, Computer and Television	134	58.26%	138	0.00001
Reading and writing in insufficient lighting	59	25.65%		
Intake of low caloric diet	37	16.09%		

*Multiple responses

Most (127, 84.67%) of the patients had positive family history of RE (Table V).

Table V: Family History of the patients (n-150)

Family History	Number	Percentage (%)	X^2	*p* value
Present	127	84.67%	144.21	0.00001
Absent	23	15.33%		
Total	**150**	**100%**		

DISCUSSION

Association of risk factors, family history, gender and regional distribution as well as socio-economic status of the school going children with refractive error (RE) were analyzed in this study.

In this study, RE was common in male (87, 58%) than female. In Bangladesh, Kader et al.[2] from Rajshahi and Das et al.[8] from Chottogram were observed similar findings in their studies. In India, Rahman et al.[7] (53.7%) and Hsian et al.[9] (52.95%) reported males were commonly affected by RE. Exposure to risk factors of RE in male children are more than female. Nutritional deficiency due to intake of junk foods and lack of interest to wearing spectacles in proper time are responsible for RE in male children.

Most (78, 52%) of the patients had monthly family income Taka >30,000 in Bangladesh. This finding is consistent with the study conducted by Das et al.[8] of Bangladesh (Chottogram) and Nicola et al.[10] in Nepal. Children from affluent family were more prone to develop RE due to their negligence in taking proper vitamins and minerals like vitamin-A, B_6,B_{12}, Zn, and Cu etc.

Myopia (75, 50%) was common RE among the school going children. Myopia and astigmatism

were common in male but hypermetropia was commonly found in female. Similar findings were observed by Bhutiaet al.[11] (31.10%) and Sheathe et al.[12] (44.79%). Myopia was common RE due to excessive use of smart phone, computer, inadequate lighting during reading and writing, taking inadequate diet with low calorie. Haina et al.[9] reported astigmatism as most common RE in rural areas of Jammu and Kashmir in India. They did not mention the actual reason but it may be due to environmental variation.

In this study, habituated with watching of smart phone, computer and television was the major risk factor of RE in school going children. These risk factors are significantly (*p*-0.00001) associated with RE of patients**.** This result is consistent with various studies[10,11,13] conducted by many authors in different countries. During watching electronic devices specially use of smart phone in dark room causes more stress on eye, which lead to RE.

Most (127, 84.67%) of the patients had positive family history of RE in this study. Kader et al.[2] and Das et al.[8] found the positive family history of RE in 73.46% and 69.12% of patients respectively. First degree relatives are prone to develop refractive errors due to heredity.

CONCLUSION

This study concluded that, myopia was the common refractive error. They were invariably male children, came from urban area, habituated with smart phone and have got positive family history. Arrangement of vision testing program in school, counseling the children, teachers and guardians regarding the limited use of smart phone and ensure proper balanced diet may reduce the incidence of refractive error.

Acknowledgements: The authors are grateful to the authorities of General Hospital, Sirajganj and Hikma Eye Hospital, Dhaka, Bangladesh for their cordial cooperation during this study.

Conflicts of interest: None.

REFERENCES

1. Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global Magnitude of Visual Impairment Caused by Uncorrected Refractive Errors in 2004. Bull World Health Organ. 2008; 86(1): 63-70.
2. Kader MA, Tarafder SR, Anwar A, Sajj AB, Karmokar PK. Study of Refractive Errors on School going Children in North West Zone of Bangladesh. TAJ. 2016; 29(1): 28-32.
3. Trivenic C, Divya T, Devi PR, Chawdary NL, Sirisha G. Prevalence of Refractive Error among School going Children in Rural and Urban Area- A cross sectional Study. Trop J Ophthalmic Otolaryngol. 2021; 6(2): 22-27.
4. Bourne R, Dineen B, Ali SM, Huq DMN, Johnson GJ. The National Blindness and Low Vision Prevalence Survey of Bangladesh: Research design, eye examination methodology and results of the pilot study. Ophthalmic Epidemiol. 2002; 9(2): 119-132. doi:10.1076/opep. 9.2.119.1520
5. Das T, Keeffe J, Sivaprasad S, Rao GN. Capacity building for universal eye health coverage in South East Asia beyond 2020. Eye. 2020; 34(7): 1262-1270.
6. Rahman T, Chowdhury S, Sultana F, Habib MA, Chowdhury AI, Alam MR, et. al. Determinants of Early Refractive Errors on School going Children (10-12 years) in Dhaka City in Bangladesh. Indian J Public Health Res Dev. 2021; 12(2): 381-388. doi: 10.37506/ijphrd.v12i2.14162
7. Rahman MZ, Ahmed SR, Syed M. Refractive Error among School going children in Hyderabad. Int J Med Sci Public Health. 2017; 6(4): 703-706.
8. Das A, Bari A. The Incidence of Refractive Errors in Children 5-10 Years age Due to Excess use of Smart Phone and Computer in 200 Cases. Int J Med Res Prof. 2020; 6(1): 12-15.
9. Hasina R, Slathia A. Pattern of Refractive Error in Primary School Children in Rural Area of Jammu City of Jammu and Kashmir in India. Int J Sci Study. 2017; 5(6): 115-119.
10. Niroula DR, Saha CG. Study on the refractive errors of school going children of Pokhara city in Nepal. Kathmandu Univ Med J (KUMJ). 2009; 7(25): 67-72. doi: 10.3126/kumj.v7i1.1769. PMID: 19483457.

11. Bhutia KL, Bhutia SC, Gupta N, Shenga DO. Prevalence of refractive errors among the school-going children in East Sikkim. Indian J Ophthalmol. 2021; 69(8): 2018-2020. doi: 10.4103/ijo.IJO_112_21. PMID: 34304168; PMCID: PMC8482929.
12. Shrestha GS, Sujakhu D, Joshi P. Refractive error among school children in Jhapa, Nepal. J Optom. 201; 4(2): 49–55. doi: 10.1016/S1888-4296(11)70041-3. Epub 2011 Jun 28. PMCID: PMC3974394.
13. Iqbal F, Khalil I, Zahid M. Prevalence of refractive errors in school going children in district Faisalabad, Pakistan. Adv Ophthalmol Vis Syst. 2020; 10(1): 4-6. doi: 10.15406/aovs. 2020.10.00372.