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An epidemiological study on ocular morbidities among school students in an urban area of South 24 Parganas, West Bengal

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ABSTRACT

Background: The estimated national prevalence of childhood blindness was 0.8 per 1000. Childhood blindness is a priority area because of the number of years of blindness in the life-time of a child. About one-third of India's blind lose their eye-sight before the age of 20 years making early detection and treatment of ocular morbidity very crucial. This study aimed at estimating the proportion of ocular morbidities among school students in a secondary school in an urban area of West Bengal.

Methods: It was a cross-sectional institution-based observational study conducted in August 2017 among 151 school students of 7th to 9th standard in an urban area of West Bengal. Data was obtained using a structured questionnaire followed by checking of visual acuity by Snellen's chart. Visual acuity of 6/9 or more in any one eye was taken as a sign of visual impairment. Data was analysed using SPSS version 16.0.

Results: Out of 151 students, 51.0% were found to have refractive error. The most frequently reported was difficulty in seeing among 43.7% of the students followed by headache while studying (36.4%) and pain in eyes (35.1%). Also, 9.9% of the students reported difficulty in seeing at night. Tests of association revealed that posture and screen time were significantly associated with presence of refractive error.

Conclusions: The study revealed that high prevalence of refractive error among school students. Periodic screening of school children and spreading of awareness regarding correct posture and screen time are very essential to improve the quality of eye sight.

Keywords: Ocular morbidities, School students, Refractive error, Ocular complaints

INTRODUCTION

Visual impairment is a worldwide challenge that affects all age groups and has a major socio-economic impact. In 2010, an estimated 285 million people worldwide suffered from visual impairment, out of which about 39 million were blind and 246 million were had low vision, with a sumptuous figure of nearly 90 percent of them residing in developing countries. Estimated prevalence of childhood blindness/low vision in India was 0.8 per

1000.² According to 2006-07 National Survey on Blindness, the common causes of blindness in India are cataract (62.6%), refractive error (19.7%), glaucoma (5.8%), followed by posterior segment pathology, corneal opacity, surgical complications and posterior capsular opacification.² Among the preventable causes of blindness, the priority goes to uncorrected refractive errors which could be easily diagnosed and corrected and xerophthalmia which is largely under control with vitamin A distribution in immunization programmes.

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Childhood blindness is a priority area because of the number of years of blindness that succeeds in the lifetime of a child who has lost vision at a tender age. It is estimated that the cumulative number of blind-personyears worldwide due to childhood blindness ranks second only after the cumulative number of blind-person-years due to cataract blindness.³ Early detection and treatment of ocular morbidity and visual impairment among young children is very important because 30% of India's blind lose their eyesight before the age of 20 years and many of them are under five when they become blind.⁴ Most children with refractive error remain asymptomatic and may not be even aware of their problem. They try to adjust to the poor eyesight by sitting near the blackboard, holding the books closer to their eyes, squeezing the eyes and even avoiding work requiring visual concentration.⁵ This calls for an early detection and treatment to prevent permanent disability. Screening of vision by Snellen's chart in school children is effective and useful in detecting decreased vision, especially refractive errors which can be corrected and thus minimizing long-term visual disability.

Children in the school-going age group (6-16 years) represent 25% of the population in the developing countries.⁵ Since they belong to the age group where blindness can be prevented and are easily accessible through schools, it is the best forum for imparting health education to the children and also one of the best centres for effectively implementing the comprehensive eye health care program. The "Vision 2020, the right to sight" which envisages to reduce avoidable (preventable and curable) blindness by 2020 has also emphasised on school eye screening programmes at the primary eye care level to meet its aim.⁶

Thus, with this background, the present study on the pattern of ocular diseases among school children was planned since some eye conditions are just causes of ocular morbidity while others invariably lead to blindness. The objective of this study was to assess the proportion of ocular morbidities and identify its associates among school going adolescents studying from 7th to 9th standard in a secondary school in an urban area of South 24 parganas district of West Bengal.

METHODS

This was a cross-sectional institution based observational study conducted in the month of August 2017 in a private secondary school located in an urban area of South 24 parganas district of West Bengal. The study population included students of 7th, 8th and 9th standards of the school. A health camp was organized on 12th of August 2017 in the school premises. Prior notice was given to all the parents of the concerned students by the school authority about the schedule for the day and consent was obtained. Students attending the health camp on were included in the study. Parents of the students who did not give consent and those students who did not give assent were excluded from the study. A total of 177 students

were enrolled in school in these three classes. Out of these, 151 students from whom consent and assent was obtained were finally included in the study.

Data was obtained using a pre-designed, pre-tested, structured, questionnaire containing questions regarding socio-demographic profile, personal habits and self-identified ocular problems. Face validity of the instrument was checked by the experts of All India Institute of Hygiene & Public Health (AIIH&PH), Kolkata. The questionnaire was translated into Bengali and back translated into English. The Bengali version was administered to the students. Visual acuity was tested by Snellen's chart for distant vision-keeping it at 6 meters distance from the subject. Visual acuity of 6/9 or more in any one eye was taken as a sign of visual impairment. Students with refractive error were thus screened. Battery torch was used for examination of the eyes.

On the particular day, all the students were first briefed by the researcher and given instructions to fill up the anonymized questionnaire. Data was obtained regarding socio-demographics and personal habits comprising of social site use which included smart phone use and screen time- hours of watching television, using computers or laptops on both holiday and working day. Self-reported ocular morbidities like refractive error, difficulty in seeing, headache, watering, pain in eyes, unable to clearly see the blackboard from the last bench, difficulty seeing at night was also noted. After submission of the filled questionnaire, visual acuity was recorded following standard operating procedures and inspection of the anterior segment of the eye was done by torch light for any obvious deformity or disease of the eye. Ocular morbidities detected by the researcher during the clinical examination were either treated or referred whenever necessary. At the end, an interactive session on proper maintenance of ocular health and hygiene was held with the students.

The data entry and statistical analysis was performed using SPSS version 16.0. Data were expressed as mean (standard deviation) for continuous variables and as frequencies and percentages for categorical variables. Test of association was used to observe the association of ocular morbidity with respect to the various independent variables. Results were considered significant at p<0.05 level. Ethical clearance for all aspects of data collection was obtained from Institutional Ethics Committee of AIIH&PH, Kolkata.

RESULTS

A total of 151 school students were present on the day of survey, out of which, boys were 55.6% and girls were 44.4%. Age of the school students ranged from 12 to 15 years with mean (SD) age of 13.7 (0.9) years. Among the students, 90.1% were Hindus and 55.6% belonged to nuclear family. The father of 53.7% of the students were in service while 84.1% of their mother were homemaker.

Table 1: Distribution of the study participants according to their self-reported ocular complaints (n=151).

Complaints *	n (%)
1. Difficulty in seeing	66 (43.7)
2. Headache while studying	55 (36.4)
3. Watering from eyes	47 (31.1)
4. Pain in eyes	53 (35.1)
5. Could not see blackboard clearly from last bench	47 (31.1)
6. Difficulty seeing at night	15 (9.9)

^{*} Multiple response.

Among the students, 52.3% actively accessed social sites, while 26.5% used smart phones and 37.7% had high screen time exposure (≥3 hours/day) i.e. hours of watching television, using computers or laptops on both holiday and working day. Also, 62.9% of the students had correct sitting posture while studying at school i.e. they sat straight, while the others had incorrect posture i.e. they bent forward or lifted books close to their eyes. 31.1% were already using spectacles for some reason or the other.

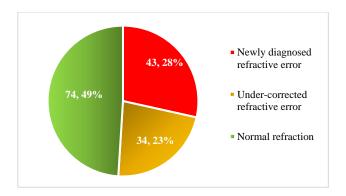


Figure 1: Distribution of study participants according to their refraction status (n=151).

From Table 1, it was evident that students had varied ocular problems. The most frequently reported was difficulty in seeing among 43.7% of the students followed by headache while studying (36.4%) and pain in eyes (35.1%). Also, 9.9% of the students reported difficulty in seeing at night.

Refractive error was the only ocular morbidity detected among the students. The proportion of students with refractive error was 51.0% (Figure 1).

Table 2: Association of various factors and refractive error (n=151).

Variables	Frequency	Refractive error		χ ^{2†} , df [‡] , p value*
Variables		Yes n (%)	No n (%)	χ , ui , p value.
Age (in completed years)				
12-13 Years	68	31 (45.6)	37 (54.4)	1.45, 1, 0.22
14-15 Years	83	46 (55.4)	37 (44.6)	
Gender				
Male	84	42 (50.0)	42 (50.0)	0.07 1.070
Female	67	35 (52.2)	32 (47.8)	0.07, 1, 0.78
Religion				
Hindu	136	70 (51.5)	66 (48.5)	0.12, 1, 0.72
Muslim	15	7 (46.7)	8 (53.3)	
Education of father		•	•	•
Below higher secondary	13	6 (46.2)	7 (53.8)	0.13, 1, 0.72
Higher secondary and above	138	71 (51.4)	67 (48.6)	
Education of mother				
Below higher secondary	13	4 (40.0)	6 (60.0)	0.52, 1, 0.47
Higher secondary and above	138	73 (51.8)	68 (48.2)	
Social site use				
Yes	79	46 (56.1)	36 (43.9)	1.87, 1, 0.17
No	72	31 (44.9)	38 (55.1)	
Smart phone use				
Yes	40	23 (57.5)	17 (42.5)	0.92, 1, 0.34
No	111	54 (48.6)	57 (51.4)	
Screen time		•		
Optimum (<3 hours/day)	94	41 (43.6)	53 (56.4)	5.42, 1, 0.02
High (≥3 hours/day)	57	36 (63.2)	21 (36.8)	
Posture				
Correct	95	40 (42.1)	54 (57.9)	7.09, 1, 0.007
Incorrect	56	37 (66.1)	20 (33.9)	

 $^{^{\}dagger}$ χ^2 - Chi-square value; ‡ df - degrees of freedom; * p < 0.05 was considered to be statistically significant.

From Table 2, it was seen that high screen time (\geq 3 hours/day) and incorrect posture were significantly associated with presence of refractive error among the school students.

DISCUSSION

Our study found that 51.0% of the school students had refractive error. Of them, 28.5% were newly diagnosed while 22.5% were under-corrected previously. This is much higher than studies conducted in rural Bangalore (10.5%), Goa (18.0%), Mangalore (14.2%) and Shimla (31.6%). The substitution of the study on ocular morbidity and its associates among Madrasah students of Kolkata, the overall prevalence of ocular morbidity was 12.67% with refractive error being the commonest (9.40%). These differences may be attributed to the difference in sample size, wider age groups covered and setting of these studies as compared with our study. Also, the variation in prevalence of refractive can arise due to differences in the lifestyle of the school children between the urban and rural populations.

The most commonly reported ocular complaints were difficulty in seeing (43.7%) followed by headache (36.4%) and pain in eyes (35.1%). This was slightly higher than that reported by other studies in South India. 8,11

Tests of association revealed that high screen time (\geq 3 hours/day) and incorrect posture were significantly associated with presence of refractive error. There is evidence that extensive viewing of the computer or TV or cell phone screen can lead to eye strain. ¹² Poor lighting and glare may accelerate the situation.

As refractive error ensues, children try to adjust to the poor vision by holding books close to the eyes and bending over the study table and going closer to the television or computer screen and blackboard. This aggravates the situation as additional eye strain and frequent rubbing of eyes to improve vision lead to other ocular infections and increase in the magnitude of error at a faster pace. This was also reflected in our study where refractive errors were significantly more in students with improper posture which is similar to the findings of another study by Matta et al in which posture of 61.2% adolescents was found to be incorrect.¹³

CONCLUSION

Refractive error among children is a common problem. This being a preventable and correctable cause of visual impairment demands early detection and prompt treatment. Early diagnosis of refractive errors through screening for vision at the time of school admission and periodic eye screening of the students is essential to provide early correction of impaired vision. Training of school teachers to conduct eye screening programmes

and educating the students about ocular hygiene and early symptoms of refractive error would help early detection and prevention of long term visual disability at large.

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