

A Study on Refractive Errors Among the School Children of Guwahati City

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ABSTRACT

Introduction: Refractive error is one of the commonest causes of visual impairment around the world. Undetected and uncorrected refractive errors are particularly a significant problem in school children. With these rationales this study has been undertaken in schools of Guwahati city with the objective to assess the magnitude of refractive error and assess the degree of myopia among school-going children of Guwahati city of Assam, India.

Materials and Methods: This cross-sectional study was conducted in schools of Guwahati city from May 2014 to April 2015. Sample size was calculated to be 400. The 6 to 16 years children of selected schools of Guwahati City who were present on the day of the interview were interviewed and examined. Snellen chart, pinhole, a trial box, a trial frame, self illuminated vision box and streak Retinoscope were used to detect refractive error. MS excel package and SPSS11.5 software was used for analysis.

Results: Prevalence of refractive errors was 23.5%. Myopia was the major refractive error (81.92%) among total refractive errors, followed by astigmatism (14.89%) and hypermetropia (3.19%). Majority of the myopic children were of low degree myopia. (89.61%). Study reveals that only 24.47% students were already wearing spectacles where as remaining 75.53 % of students are unaware about their problems.

Conclusion: refractive error was a significant cause of visual impairment among school children and screening of school children plays a major role in detecting refractive errors.

Keywords: Refractive error, prevalence, myopia, school students

INTRODUCTION

Uncorrected refractive error is one of the most common causes of blindness around the world. About 80% of blindness is treatable or preventable. Refractive errors are one of the common causes of this treatable blindness. Globally, the major causes of blindness are cataract, uncorrected refractive errors and glaucoma and their prevalence are 33%, 43% and 2% respectively.¹ An estimated 19 million children are visually impaired worldwide of which 12 million are due to refractive errors which could be easily corrected.¹

Refractive error is one of the commonest causes of visual impairment around the world. Around 2.3 billion people worldwide is estimated to have refractive errors and of these 1.8 billion have access to adequate eye examination and affordable corrections.² In India refractive error is the second most major cause of patients to consult ophthalmologists³

Epidemiological study indicates that among the refractive errors, prevalence of myopia is increasing worldwide in economically developed societies.⁴ This is mainly the case in East-Asian populations like China, Japan, and Singapore⁵

Different study reveals that refractive errors are usually present in the childhood and continue to the adult life.⁶ Undetected and uncorrected refractive errors are particularly a significant

problem in school children. Children generally never complain of defective vision. Generally they are not aware of their problem or they may adjust to their poor vision. Even some time they used to avoid work which need visual concentration. Uncorrected refractive error can cause adverse impact on learning process and educational capacity.⁷ Blindness due to refractive error can also have dramatic effect in personality development and career opportunities, along with causing an economic burden to the society.² Most of the children with such diseases are apparent and hence, screening helps in early detection and correction with spectacles.⁸ Refractive error has been given high priority under the National Programme for Control of Blindness. It took central part in the global initiative Vision 2020, for the elimination of avoidable blindness.⁸

With these rationales this study was done to assess the magnitude of refractive error and to assess the degree of myopia among school-going children of Guwahati city of Assam, India,

MATERIALS AND METHODS

Ethical clearance was taken from institutional ethical committee of Gauhati Medical College and hospital before doing this study.

Study Design: This cross sectional study was carried out in the schools of Guwahati city from May 2014 to April 2015

Study population: All the children in the age group of 6 to 16 years (i.e from class 1 to class 10) of selected schools of Guwahati City who were present on the day of the interview.

Exclusion Criteria: Children having defective vision because of other reasons like trachoma, corneal injuries or ulcers.

Sample size and sampling technique: The sample size was calculated by taking the prevalence rate of refractive error as 8.8 (from previous study done in the region)⁹ at 5% significance level and 3% absolute error as follows:

$$n = 4pq/L^2$$

Where, p = 8.8% (prevalence of refractive error)³

$$q = 100 - p = 100 - 8.8 = 91.2$$

$$L = 3\% \text{ (absolute error)}$$

$$N = 4(8.8)(91.2)/9 = 357 \text{ which can be rounded off to 400.}$$

In this study, 5 schools were taken at random by lottery method from the total no of 21 schools present in Guwahati city.

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Schools were visited until we got the desired sample size of 400 children. From each selected school all the students of 6 – 15 years were included in the study. The list of schools was taken from the Office of District Educational Office, Kamrup District. Prior information about the study was provided to the Principals of the selected schools and permission sought from them to conduct the study in their schools.

Refractive error was tested using the following instruments:

1. Snellen's chart
2. Opaque disc perforated by small central hole
3. Occluder-
4. A trial box, a trial frame, self illuminated vision box, streak Retinoscope

STATISTICAL ANALYSIS

The Data collected was compiled, tabulated and subjected to descriptive analysis wherever applicable. The analysis was done in computer using MS excel package and SPSS 11.5 software.

RESULTS

It was seen that out of 400 children 94 children had refractive errors (23.5%). Out of these 94 children with refractive errors, 86 were confirmed as myopia by the refractionist. The prevalence of Myopia, Hypermetropia, Astigmatism are shown in Table-1. It was observed that Myopia was the major refractive error (81.92%) among total refractive errors, followed by astigmatism (14.89%) and hypermetropia (3.19 %).

Among myopia detected cases majority complaint of difficulty in reading blackboard from back benches (46.35%) followed by headache (39.36%) and eye strain (11.70%). (Table-2).

Study reveals that the majority of the myopic children were of low degree myopia. (89.61%) followed by moderate degree of myopia (10.39%). No cases of high myopia was detected in this study (Table-3).

Table 4 shows that in 77.66% myopic children, both the eyes were involved. Only Right eye was involved in 12.77% cases and only 9.57% children showed left eye involvement.

It was observed from the study that out of 94 children having refractive error, 23 children (24.47%) were already wearing spectacles (old cases) where as rest 71 cases (75.53%) were detected during the study.

DISCUSSION

This study shows that the prevalence of refractive errors were 23.5% among the school children which was more than the studies conducted by Rahman M, Devi B, Kuli JJ, Gogoi.⁹ Pavithra MB, et al.¹⁰ EL-Bayoumy BM, Saad A, Choudhury AH¹¹ and Kaushik Tripura, N. C. Luwang, Subrata Baidya, Phani Sarkar.¹² But study by Prema N found the prevalence similar to our study.¹³ Similar observations were also found in the study done by Hussein A Bataineh, Ahmed E Khatatbeh.¹⁴ where prevalence of refractive errors was 25.32%. These variations in prevalence could have been due to differences in demographic factors.

Our study showed that myopia was the most common refractive error (81.92%) followed by astigmatism (14.89%) and hypermetropia (3.91%). Similar observations were found in the study done by Rahman M, Devi B, Kuli JJ, Gogoi G.⁹ Study by Nisha Dulani and Harish Dulani on Prevalence of Refractive Errors among School Children in Jaipur, Rajasthan also found

Type of Refractive Error	No	%
Myopia	77	81.92
Hypermetropia	3	3.19
Astigmatism	14	14.89
Total	94	100

Table-1: Distribution of children according to the type of refractive errors

Complaint	No	%
Difficulty in seeing blackboard from back benches	44	46.35
Headache	38	39.36
Eye Strain	11	11.70
Half shutting of the eye gives better vision	7	7.45

** multiple response

Table-2: Common Complaints among children with refractive errors (N=96)

Degree of Myopia	No	%
Low (< -0.5D to -2.00D)	69	89.61
Moderate (-2.00D to -6.00D)	8	10.39
High (> -6.00D)	0	0
Total	77	100

Table-3: Classification of myopia based on degree of myopia (N=77)

Eye involved	No	%
Right eye	12	12.77
Left Eye	9	9.57
Both Eye	73	77.66
Total	94	100

Table-4: Distribution of children according to involvement of eye

similar observation where Myopia was 63.4%, Astigmatism was 25.8% and followed by Hypermetropia of 11.35%.¹⁵

It was evident from this study that among refractive error detected cases majority complaint of difficulty in reading blackboard from back benches (46.35%). EL-Bayoumy BM, Saad A, Choudhury AH reported a similar finding where the prevalence of refractive error was higher among those who had problem in seeing distant objects.¹¹ Similar finding were found in the study done by Kumar KS, Akojam BS.¹⁶

Our study revealed that the majority of the myopic children were having low myopia (89.61%), followed by moderate degree of myopia (10.39%). Study by Rahman M, Devi B, Kuli JJ, Gogoi G found that maximum students had low myopia (60.4%).⁹ These finding are similar to our study.

This study revealed that 75.53 % cases of refractive errors were detected during the study where as only 24.47% were already wearing spectacles (old cases). Prema N in the study done in Kancheepuram Dist., Tamil Nadu, India found that Only 7% of students with poor vision who wore eyeglasses but 93% of student having poor vision did not have glasses.¹³ Study done by Rahman M, Devi B, Kuli JJ, Gogoi G in Dibrugarh, Assam⁹ and Kumar KS, Akojam BS in Imphal, Manipur¹⁶ also found the high prevalence of uncorrected refractive errors. The possible reasons for students for not wearing glasses may be lack of awareness about refractive errors. These finding comply with the present study.

CONCLUSION

From this study we can conclude that refractive error was a significant cause of visual impairment among school children and screening of school children can play an important part in detecting refractive errors. As prevalence of uncorrected refractive error was also found to be high, therefore students, parents, and teachers must be educated about signs and symptoms of refractive errors, so that they can get early detection and correction with spectacles to prevent progression of visual impairment. The existing school health services should be strengthened and implemented effectively so that it would be helpful to attain the global initiative for elimination of avoidable blindness by the year 2020.

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