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Original Research Article

A clinical study to know the pattern of refractive error in children attending a tertiary care hospital

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ABSTRACT

Background: Refractive error is a major cause of low vision in children. Uncorrected refractive error causes amblyopia, poor school performance and severe visual impairment. The purpose of the present study was to know the pattern of refractive error in children attending a tertiary care hospital.
Methods: A hospital based observational retrospective study which was conducted in Gauhati Medical College and Hospital for a period of 15 months from January 2021 to March 2022. 300 children with refractive errors in the age group of 3 years to 15 years were included. Interpretation and analysis of the results were done using appropriate statistical method.
Results: Age of presentation of children was more in >10 years to 15 years (51%) followed by 5 years to 10 years (38%). Boys (61.66%) outnumbered girls (38.33%). There was a positive family history of refractive errors (57.33%). More children were found with refractive errors in parents with higher educational qualification. Myopia (49%) was most common followed by astigmatism (43%).
Conclusions: Refractive error is a preventable cause of visual impairment. A regular periodic screening for refractive errors should be done in children and it can be corrected simply by prescribing spectacles.

Keywords: Astigmatism, Myopia, Refractive error

INTRODUCTION

Ametropia (a condition of refractive error) is defined as a state of refraction wherein the parallel rays of light coming from infinity (with accommodation being at rest) are focused either in front or behind the sensitive layer of retina, in one or both the meridian. Ametropia includes-myopia, hypermetropia and astigmatism.[1] Uncorrected refractive errors are a major cause of visual impairment in children. After cataract it is 2nd most common cause of blindness and main cause of low vision. Visual impairment in children causes significant impact in their school performance, in development and in quality of future life. Maximum of the children are not aware of their defective vision and detected accidentally by parents and teachers. Diagnosis of refractive error is easy and simple spectacle correction is the most cost-effective treatment option.

Aim

To know the pattern of refractive error in children attending a tertiary care Hospital.

METHODS

The retrospective hospital-based study was conducted in Gauhati Medical College and Hospital for a period of 15 month from January 2021 to March 2022. Total sample size was 300. Interpretation and analysis were done using SPSS version 22 for descriptive studies.

Inclusion criteria

300 children with refractive error in the age group of 3 years to 15 years. Parents and guardian who gave consent for examination were included.

Exclusion criteria

Children with- corneal opacity/scars, congenital eye disease, media opacity. Uncooperative children were excluded.

Demographic indices including age, sex, address and socio-economic status of the children were documented. Unaided visual acuity along with pin hole vision of the children were measured with Snellen chart. All children under 5 years undergo retinoscopy with atropine ointment. Extraocular movements, cover test and pupillary reaction were done. Anterior segment was examined with slit lamp microscopy. posterior segment was examined with direct or indirect ophthalmoscopy.

Children were divided according to age <5 years, 5 years to 10 years and >10 years to 15 years.

On the basis of unaided visual acuity, visual impairment of the children categorized as mild (VA 6/6 to 6/12), moderate (VA <6/12 to 6/36) and severe (<6/36 to <6/60).

Refractive errors were classified according to standard definitions as myopia, hypermetropia and astigmatism. Interpretation and analysis of the results were done using appropriate statistical method.

Ethical committee clearance was taken from Institute ethical board and study follows declaration of Helsinki.

RESULTS

Total number of 300 children with refractive error were enrolled in the present study from ophthalmology OPD of Guwahati Medical College and Hospital from January 2021 to March 2022.

Age distribution

In the present study, the common age group of presentation of children with visual impairment was >10 years to 15 years (51%) followed by 5 years to10 years (38%) and <5 years (11%). Table 1 is showing age distribution.

Table 1: Showing age distribution.

Age group (years)	No. of children	Percentage
<5	33	11
5 to 10	114	38
>10 to 15	153	51

Sex distribution

Table 2 showing sex distribution among boys and girls with 61.66% and 38.33% respectively.

Table 2: Sex distribution.

Sex of children	Total number	Percentage
Boys	185	61.66
Girls	115	38.33

Education of the parents

The study shows more refractive error in children with parents with more educational qualification. Table 3 is showing education of parents.

Table 3: Education of the parents.

Education	Father (%)	Mother (%)
Illiterate	13 (4.33)	35 (11.66)
Upto 10th pass	76 (25.33)	68 (22.66)
HS pass	97 (32.33)	95 (31.66)
Graduate and above	114 (38)	102 (34)
Total	300 (100)	300 (100)

Refractive error and family history

In the present study, 172 (57.33%) children were found to have positive family history of refractive errors. Table 4 shows refractive error and family history.

Table 4: Refractive error and family history.

Family history of refractive error	Boys	Girls	Total (%)
Present	109	63	172 (57.33)
Absent	76	52	128 (42.66)
Total	185	115	300 (100)

Distribution of children on the basis of visual acuity

In this study, children had mild to moderate grade of visual impairment. Table 5 shows distribution of children on the basis of visual acuity.

Table 5: Distribution of children on the basis of visual acuity.

Visual acuity	No. of children	%
6/6 to 6/12 (mild)	155	51.66
<6/12 to 6/36 (moderate)	104	34.66
<6/36 to <6/60 (severe)	41	13.66

Distribution on the basis of types of refractive error

In the present study, most common type of refractive error was myopia (49%) followed by astigmatism (43%)

and hypermetropia (8%). Table 6 is showing distribution on the basis of types of refractive error.

Table 6: Distribution on the basis of types of refractive error.

Type of refractive error	Boys (%)	Girls (%)	Total (%)
Myopia	79 (26.33)	68 (22.66)	147 (49)
Hypermetropia	9 (3)	15 (5)	24 (8)
Astigmatism	67 (22.33)	62 (20.66)	129 (43)

DISCUSSION

The present study was conducted in the OPD of ophthalmology department of a Guwahati Medical College and Hospital with the help of limited resource of equipment and staff. Childhood refractive errors are difficult to measure accurately as the patients are not much reliable due to less developmental age or conveying their symptoms or ophthalmic assessment.[2]

In the present study, 61.66% of children were boys and 38.33% were girls. Similar kind of results were found in hospital-based study done by Rai et al where 58% of children were male. Matta et al and Sethi et al also get more refractive errors in male. Since it was a hospital-based study, as society gave less importance to female child leads to less OPD attendance.[3-5]

In the present study, average age of presentation was 10±3.5 years. Study of Yamamah et al reports similar age of presentation.[6]

In the present study, refractive errors are more in parents with higher level of education. It may be due to parents giving more importance to study. So, more near work and less outdoor activity.

In the present study, 57.33% children with refractive errors have positive family history. Studies of Pavithra et al and Ali et al also gave similar results. This may indicate a hereditary relationship in refractive errors[7,8]

In the present study, uncorrected visual acuity of children at presentation were mainly mild (6/6 to 6/12-51.66%) to moderate (<6/12 to 6/36-34.66%) decrease in visual acuity. Sethi et al also got similar results.[5]

Myopia is the most common refractive error in children in our study (49%) followed by astigmatism (43%). Studies of Pant et al and Dandona et al found myopia as most common refractive error in children. In this study, most children are school going and attend ophthalmology OPD due to difficult to see blackboard in classroom.[9,10]

Pokharel et al found hyperopia risk was more with female gender.[11] It is comparable with our study. Czepita et al found a slightly higher prevalence of astigmatism in girls than boys. But in our study boys had more astigmatism.[12]

Limitation of the study was since it was a hospital-based study, detection of refractive error in children may be less. In our study children with less than 3 years were not included. Therefore, we could have under-estimate the number of children with refractive error. School-based program may increase the detection of more child with refractive error. Our study may not represent the real population distribution. There may be selection bias as it was a hospital-based study. The childhood ocular disorders are very difficult to diagnose and manage as they were unable to convey their problems due to less developmental age and are not cooperative for ocular examination.

CONCLUSION

Childrens are the future of a country. Screening of children should be done for early detection and management of refractive errors. It will prevent visual impairment from uncorrected refractive error and amblyopia. The school children should be screened at regular interval for decrease visual acuity. It can be treated by simply prescribing spectacles. After it is corrected, the performance of the child improved in school. In the present study, children with refractive error were around 10 years. A positive family history and higher education of the parents were found. Majority of the children with refractive error were with mild to moderate decrease in visual acuity. Myopia is the most common refractive error in the study.

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