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Original Research Article

Refractive errors in age group seven to fifteen years: North-east India scenario

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ABSTRACT

Background: The objectives of study were to find out the different types of refractive errors in children between seven to fifteen years age group and the cause of uncorrected defective vision.
Methods: A prospective study was designed of two thousand children aged between seven to fifteen years, attending outpatient department. Study period was one year. Consent was obtained from their guardian. Inclusion criteria were children with refractive errors. Children presenting with organic defects of ocular structures, infections, corneal opacity, cataract, choroid and retinal disorders were excluded from study. Data were collected by history taking and comprehensive ocular examination, visual tests for both near and distant vision. Refractive error assessed by cycloplegic drug with one percent Homatropine eye drops, by streak retinoscopy. Objective refraction were carried out and documented. Subjective refraction was done after one week. Both BCVA and uncorrected refractive errors were ascertained and recorded.
Results: Out of two thousand children examined, myopic = 34%, hypermetropic = 11%, and astigmatic = 55%. M: F = 900:1000. Study showed headache as the commonest symptom. 17% of the patients had positive family history. Correctable errors constitute 91% of the total cases.
Conclusions: Myopic astigmatism was found to be the most frequent refractive error in children. Mass screening is required for early diagnosis of refractive error. Prescribing corrective glasses for children with refractive errors at an early age will prevent childhood morbidity.

Keywords: Refractive error, North-east India scenario

INTRODUCTION

Refractive error is a major contributor to visual impairment.[1] Almost about 3 percent of world population is visibly impaired which means that more than 180 million people in the world is visibly disabled and 33% of this population resides in South East Asian Region.[2] Refractive error is one of the leading causes of treatable blindness in India after cataract accounting for about 20% of total visual impaired population in India.[3]

Out of estimated 1.5 million blind children in world, 27 lac blinds belonging to pediatric age group resides in India. Since children do not usually complain of visual difficulties, early detection and prompt treatment of eye disease is important.[4] Poor vision especially in age group of 7-15 years has adverse influence in child's performance in school and his/her future development. Visual impairment due to refractive error has huge impact on Indian economy. Having the knowledge of prevalence and type of refractive error in pediatric age group (7-15

years) in various region of India will be helpful in making proper strategy for eliminating this preventable cause of blindness.

The aim of this study was to estimate the various types of refractive error in age group of 7-15 years attending the tertiary health care center and analyzing the causes of uncorrected defective vision.

METHODS

Our study was hospital based cross-sectional study carried out for period of 1 year from January 2015 to December 2015. Relevant data and consent for the study was obtained from the parents. Proper history and thorough ocular examination of 2000 children aged between 7-15 years attending O.P.D with refractive error were taken for the prospective study.

Detailed comprehensive examination including vision (Snellen's chart/ E-chart), slit lamp examination, dilated fundoscopy, etc. was carried out.

Refractive error assessed by streak retinoscopy following cycloplegia drug – Homatropine (1%) eye drops administered twice, 10-15 min apart. Cycloplegic drug were re-instilled after 20-30 min, if dilation is incomplete. Patients were further re-evaluated for light reflex and pupil dilatation. Cycloplegia was considered complete if the pupillary dilation was more than 6 mm with no light reflex.

Objective refraction were carried out and documented. Subjective refraction was done after one week. The BCVA was ascertained and recorded.

Exclusion criteria

Children having coexisting organic defects in eye were excluded from study.

RESULTS

In our study most common age group affected with refractive error was found to be 10-12 years age groups (48% of total) followed by 13-15 years age groups (40% of total) and refractive error was least among 7-9 years age group (12% of total study population) (Table 1).

In this study the most common refractive error was of astigmatism (55% of total) followed by myopia (34% of total) & least was of hypermetropia (11% of total) (Table 2). In our study refractive error was more common among female child with 55% of total proportion of refractive errors (Table 3). Based on clinical types myopic astigmatism (41% of total refractive error cases) was found to be commonest followed by simple myopia (34% of the total) with maximum prevalence among age group of 13-15 years and 10-12 years (Table 4 and 5).

Table 1: Age distribution in refractive errors.

Age in years	No of patients	Percentage
7	80	4%
8	80	4%
9	80	4%
10	340	17%
11	120	6%
12	500	25%
13	320	16%
14	260	13%
15	220	11%

Table 2: Percentage of subjects in each group.

Clinical Type	No. of patients	Percentage
Myopia	680	34
Hypermetropia	220	11
Astigmatism	1100	55

Table 3: Gender distribution of refractive error.

Sex	No. of children
Female	1100
Male	900

Table 4: Gender distribution in myopia, hypermetropia and astigmatism.

Types of refractive errors	No. of males	%	No. of females	%
Myopia	280	14%	400	20%
Hyperopia	60	3%	160	8%
Astigmatism	560	28%	540	27%
Total	900		1100	

Table 5: Comparison of age and sex with myopia.

Sex	7	8	9	10	11	12	13	14	15	Total
Male	-	20	-	40	40	80	20	40	40	280
Female	-	20	20	60	60	100	40	100	0	400
Total	0	40	20	100	100	180	60	140	40	680

Table 6: Comparison of age and sex with hyperopia.

Sex	7	8	9	10	11	12	13	14	15	Total
Male	20			20		60	20		40	160
Female				20		20			20	60
Total	20			40		80	20		60	220

Table 7: Age distribution in astigmatism.

Age in years	No. of patients
7	60
8	40
9	60
10	200
11	20
12	240
13	240
14	120
15	120

Table 8: Breakup of astigmatism into different groups.

Types	No. of children with error	Percentage
Simple hypermetropic astigmatism	140	7%
Compound hypermetropic astigmatism	100	5%
Simple myopic astigmatism	420	21%
Compound myopic astigmatism	400	20%
Mixed astigmatism	40	2%
Total	1100	55%

Table 9: Comparison of refractive errors which are correctable with respect to age

Age	Correctable	Non-correctable
7	60	20
8	80	-
9	80	-
10	320	20
11	120	-
12	460	40
13	240	80
14	240	20
15	220	-
Total	1820	180

Table 10: Clinical symptoms with respect to age.

	7	8	9	10	11	12	13	14	15	Total
Diminution of vision	20	20	40	180	0	120	160	140	100	780
Headache	60	60	20	160	120	320	120	120	120	1100
Others	0	0	20	0	0	60	40	0	0	120

Table 11: Clinical symptoms with respect to sex.

Symptoms	Male	Female	Total
Dimunition of vision	400	380	780
Headache	440	660	1100
Others	60	60	120

Among myopic male's most common age group was 10-12 years group (140 of 220; 66.6% of total myopic male) followed by 13-15years group (80 of 220; 33.3% of total) while in females, myopia was most prevalent in 10-12 years of age (240 of 480; 50% of total myopic female) followed by 13-15 year of age (180 of 480; 37.50% of total). Hypermetropia was more common in males with most common in 13-15 years age groups (60 0f 160; 37.50% of total hypermetropic males) (Table 6).

In our study astigmatism was most common in 12-14 years age (700 of 1320; 53% of total astigmatism) followed by 10-12 years age (300 of 1320; 22.72% of total) (Table 7 and 8).

Most importantly 91% of the cases of refractive errors are correctable with refractive corrections (Table 9).

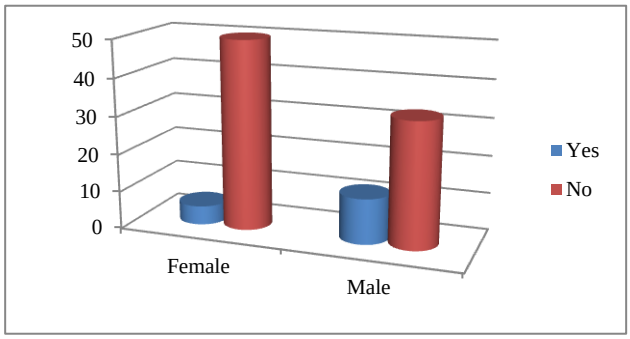

Figure 1: Family history present in the total study group.

Most common presenting symptoms in our study were headache (55%) followed by blurring of vision (39%) (Table 10 and 11). Other presenting symptoms like difficulty in near work, watering, redness, recurrent infection were uncommon in these age groups.

Family history was present in 17% of cases, and more common among male child (12 of 45) as compared to female child (5 of 50) (Figure 1).

DISCUSSION

In our study it was found that 55% of refractive error were either simple myopic (34%) or simple myopic astigmatism (21%) followed by compound astigmatism (25%) and hypermetropia (16%) which was consistent with Matta, Laatkeinin and Seth study.[8]

Padhye et al reported that the prevalence of myopia, hypermetropia and astigmatism in urban children were 3.16%, 1.06% and 0.16%, respectively. They have also reported that in rural children, the prevalence of myopia, hypermetropia and astigmatism was 1.45%, 0.39% and 0.21%, respectively. In their study simple myopia was more prevalent.[5]

In our study refractive error was more common among girls than in boys and similar results were obtained in other studies.[6,7] Most common age group presenting with refractive error was 10-12 years followed by 13-15 years.[6,8,9] In our study family history was present in 17% of cases, various studies have shown similar results.[10]

CONCLUSION

Refractive error is quiet common among school going children especially in developing countries like India & large fractions of cases remain undiagnosed & never report to the hospitals. Myopic astigmatism was found to be the most frequent refractive error in children. Mass screening is required in the school going children, for early diagnosis and simple interventions, like glass correction can reduce the burden of preventable cause of childhood morbidity in the society.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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