

Pattern of refractive errors in 5-15 year age children at tertiary care centre in Kumaon region

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Abstract

Objective: To determine prevalence and pattern of refractive errors in children in the age group of 5-15 years, at tertiary care hospital, in Haldwani, Uttarakhand.

Materials and methods: All patients aged 5-15 years were examined thoroughly. Cycloplegic refraction was done and type of refractive error was decided.

Results: Prevalence of refractive error is 18.6% of children in 5-15 year age group. It is more prevalent in males (19.2%) in comparison to females (17.9%). Hypermetropia is more common in 5-10 year age group (63.4) whereas myopia is more prevalent in compared with 11-15 year age group (62.8%).

Conclusion: This study shows that myopia, hypermetropia, and type of astigmatism have different distribution in different age group like myopia is more common in older children and hypermetropia is more common in younger age group children.

Key words: Astigmatism, Children, Hypermetropia, Kumaon, Myopia, Refractive error.

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Introduction

Defective vision and childhood blindness may affect undesirably the life style of particular child for rest of his social and educational life. Childhood blindness needs special attention due to number of years a child spent with defective vision.

An impairment of vision is defined as a patient having best corrected visual acuity less than 6/18 in better eye. Blindness is defined by WHO as visual acuity less than 3/60 with best possible correction in the better eye on Snellen visual acuity chart.

Prevalence of childhood blindness varies from 1.5/1000 in developing countries to about 0.3/1000 in developed nations¹. Refractive errors remained most important cause of visual impairment in childhood worldwide, and contributes for about 19% of total blindness in the world²

Around 12.8 million peoples in the age group of 5-15 years are visually compromised due to under correction of refractive error or uncorrected refractive errors, worldwide prevalence of 0.96%, with highest prevalence reported in urban and highly developed urban areas in south-east Asia and China³.

In study by Dandona et al in rural areas of Andhra Pradesh, prevalence of visual impairment was 2.7%. Of

this, refractive error was responsible for 61% of cases. Vision disruption due to myopia appears typically in school years (Mantjarvi 1983). Myopia is commonest refractive error in childhood. Patients having myopia need to be corrected as early as possible, due to its greater impact on development. However hypermetropic eyes must be cured due to more amount of asthenopic symptoms which get worse during reading.

Anisometropia must be addressed to prevent development of amblyopia. As refractive errors are effectively treated by simple visual aids, the amount and pattern of refractive errors need to be discovered and treated to improve quality of life and prevention of blindness.

In school screening program, children with low visual acuity and asthenopic symptoms are referred to eye care centers they are also included here in this study.

Due to availability of proper equipment and manpower, precise cause of visual impairment and pattern of refractive errors can be decided here. Being a tertiary care center, it deals with most of the patients from different regions, data obtained from study can be used to redirect the local guidelines in this area according to pattern of refractive errors.

Most of the studies conducted in this region are based on school screening programs, and pattern of refractive errors were not decided in most of these studies. So this study may provide important data based on pattern of refractive errors in childhood.

Materials and Methods

Present study is a prospective cross sectional conducted from January 2016 to June 2016. All children of age group 5 to 15 years, attending OPD of Department of Ophthalmology at Sushila Tiwari Hospital, associated government medical college Haldwani, Uttarakhand have been included in this study.

Patients were divided in two age groups 5 -10 years and 11-15 years. All variables were calculated in both the groups and compared.

A thorough history was taken regarding asthenopic symptoms, and previous history of ocular disease including history of wearing glasses before was given due consideration.

Basic ocular examination included:

- Visual acuity
- Slit-lamp examination
- Pupils
- Fundus examination

All patients having visual acuity less than or equal to 6/9 or having asthenic symptoms or with other symptoms of refractive errors undergo dilated retinoscopic examination (cyclopentolate 1%), so that any type of hidden refractive errors could not be missed. Patients having refractive errors were corrected and if appropriate aids were given.

Patients having other associated disease like stye, blepharitis, conjunctivitis, cataract, retinal diseases and diseases of optic nerve have been excluded from study. As most of the patients in age group of 0- 5 years remain unaware of symptoms of refractive errors, they don't consult due refractive problems, so this group was excluded.

Results

In this study, a total of 2425 children were included and examined. Out of these, 1419 were males and 1006 were females. 452 children were diagnosed to have refractive error. Among this 272 were males and 180 were females.

Table 1: Distribution of refractive error according to age and sex

	Age group (years)		Total
	5-10 years	11-15 years	
Male	123 (66.1)	149 (56)	272 (60.2)
Female	63 (33.9)	117 (44)	180 (39.8)
Total	186 (100)	266 (100)	452 (100)

Refractive error was found in 18.6% children attending OPD. Gender wise distribution showed that refractive error was more prevalent in males (19.2%) in comparison to females (17.9%).

Age wise distribution showed that 41.15% of patients were in 5-10 year group and 58.84% of children in of 11-15 year age group have refractive error.

Table 2: Distribution of different refractive errors according to age group

Type of refractive error	Age-group		Total
	5-10 years	11-15 years	
Simple Myopia	13(7)	77(29)	90(19.9)
Simple Hypermetropia	37(20)	29(11)	66(14.6)
Myopic astigmatism	51(27.4)	90(33.8)	141(31.2)
Hypermetropic astigmatism	81(43.5)	68(25.5)	149(33)
Mixed astigmatism	4(2.1)	2(0.7)	6(1.3)
Total	186(100)	266(100)	452(100)

In 5-10 years of age group, hypermetropia is more prevalent refractive error (63.4%), whereas myopia is more prevalent (62.8%) in 11-15 years of age.

Simple myopia was 19.9% of total refractive error diagnosed. Age wise distribution showed that it is more prevalent in 11-15 year age group (29%). In 5-10 year group, it is less common (7%) type of refractive error.

Overall data shows that hypermetropia is present in 14.6% all cases of refractive error. However it was more common in 5-10 years age group (20%).

Myopic astigmatism was the second most common (31.19%) type of refractive errors, and it was more common (33.8%) in 11-15 years age group.

Hypermetropic astigmatism (32.96%) was most prevalent refractive error in 5-15 year age group. It more common (43.5%) among 5-10 years age group, when compared with 11-15 years age group (25.5%).

Mixed astigmatism was least common error. It was noted in only 1.32% of cases, and was more (2.1%) in lower age groups.

Table 4: Distribution of refractive error according to sex

	Male	Female
Simple Myopia	57 (20.9)	33 (18.3)
Simple Hypermetropia	38 (13.9)	28 (15.5)
Myopic astigmatism	84 (30.8)	57 (31.6)
Hypermetropic astigmatism	89 (32.7)	60 (33.3)
Mixed astigmatism	4 (1.4)	2 (1.1)
Total	272 (100)	180 (100)

Among males hypermetropic astigmatism was most common (32.7%) followed by myopic astigmatism (30.8%).

Among females also hypermetropic astigmatism was most common (33.3%) followed by myopic astigmatism (31.6%).

Discussion

Till date, most of the studies done to analyze the pattern of refractive errors in children are either school screening or population based and require greater amount of resources. The present study being a hospital based study is unique as it has been conducted in the OPD premises with ample amount of manpower and equipment's. In our study, 58.51% were male and 41.48% were female. The refractive error was more in male (19.2%) compared to female (17.19%). But this difference is not very large and may vary region to region.

Seema et al. reported little higher pre-valence of refractive error as 23.7% in female and only 12.2% in males⁴. Similar results were observed by Pavithra et al. where prevalence in female children (9%) compared to male children (5.3%) showing little lesser prevalence in female compared to male⁵.

Similar reports seen Quatar with prevalence of refractive error in females of 23.7% and males 15.5%⁶, another study with similar reports in India is by Prema et al with 17.2% females and 13.4% males⁷⁻⁹.

In present study hypermetropia is more prevalent in 5-10 years age group however myopia is more prevalent in 11-15 years age group. This distribution in two different age groups is due to progressive shift towards myopia with increasing age.

A study by Dandona et al¹⁰, in rural population of Andhra Pradesh, prevalence of uncorrected refractive error was 2.7%. The refractive error was the cause of visual impairment in 61% cases, and amblyopia in 12% cases of childhood. Myopia-0.50 D or more was seen in 4.1% of the cases. Similar pattern reported by Murthi et al and Batra et al¹¹⁻¹².

In present study prevalence of astigmatism is slightly higher(Myopic astigmatism -31.19% and Hypermetropic astigmatism- 32.96%). Similar results have been reported from Qatar(70%) (Al-Naimi et al., 2010)⁶, Ghana (49.3%) (Ovenseri-Ogbomo & Assien, 2010)⁸, Jordan (20.4%) (Bataineh & Khatatbeh 2008)¹³, Pakistan (35.5%) (Ali et al., 2007)¹⁴ and in Nepal(9.2%) (Pokharel, 2010)¹⁵ and China (8.3%) reported by Rose et al. in 2010¹⁶.

No studies had been done before to determine type of astigmatism before. In our study, myopic astigmatism is more prevalent in 11-15 years of age group and hypermetropic astigmatism is more prevalent in 5-10 years age group. However contribution of mixed type of astigmatism is very less amounting about 1.3%.

Conclusion

Present study shows that myopia, hypermetropia, and type of astigmatism have different distribution in different age group like myopia is more common in older children and hypermetropia is more common in younger age group.

As this study is a hospital based study, some population based studies are needed to accurately decide the prevalence of refractive errors and its types. No significant association was found between age of children and the prevalence of astigmatism. As this is tertiary care hospital appropriate aids can be prescribed, long term problems due to refractive error can be prevented.

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