



Original Research Article

Comparison of Refractive Errors between Urban and Rural School Going Children

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Abstract

Purpose: To compare Spectrum of refractive errors in Urban and Rural School going children.

Material and Methods: A total of 100 children between 6-16 years of age were included in this study (50 rural and 50 urban). Refractive errors were calculated and compared between the two groups.

Results: Out of 100 children 22% were in the age group of 6-8 years, 30% in the age group of 9-11 years with a frequency of 30% and 34% in the age group of 12-14 years and 14% of ≥ 15 years. The mean age was 11.2 years. Out of 100 patients uncorrected visual acuity between 6/6 to 6/12 was 51% in right eye and 48% in left eye. Visual acuity between 6/18 to 6/24 was 27% in right eye and 30% in left eye. Visual acuity 6/36 was 15% in right eye and 14% in left eye. Visual acuity worse than 6/36, 7% in right eye and 8% in left eye. Out of 100 children majority of patients are hypermetropia of 61.3% with refractive errors of 2-6D and more than 6D, majority are myopic (19.5%) and less than 2D are myopic astigmatism. Frequency of anisometropia more than 1.5D was 20% and less than 1.5D was 80%. Myopia was more common in urban (52%) followed by hyperopia (26%) whereas hyperopia was more common in rural (36%).

Conclusion: We concluded from this study that refractive error is one of the most common causes of visual impairment. Myopia is the commonest refractive error in school going children, which is slightly higher in urban children due to indoor games and use of computers and video games. Hypermetropia is the most common cause of refractive error in children of rural area.

Introduction

Refractive error is the second leading cause of treatable blindness and one of the most common causes of visual impairment in school going children¹.

As per the estimates across the globe, 2.3 billion people have refractive errors; out of these 1.8 billion people have eye care facilities at affordable cost. The remaining 500 million have no significant eye care services and are living in developing countries. These mainly include children^{2,3}. In Indian school going children,

refractive error is the second most common eye problem.

Visual impairment in children is an important cause for poor performance in studies, inability to actively participate in sports and other cultural activities. This leads to the development of an inferiority complex and increased school dropouts. This can be reduced by an early detection of refractive errors in school children through screening. Uncorrected refractive errors are responsible for as much as 19.7% of blindness. About 13% of the Indian population is in the age

group of 7-15 years and about 20% children develop refractive error by the age of 16 years⁴. Considering the importance of this common eye problem we took this topic to study the school going children in urban and rural parts of Uttar Pradesh, India.

Material and Methods

This study was carried out at a tertiary eye care hospital in northern India from February 2019 to November 2019. A total of 100 children were studied (50 rural and 50 urban). Patients of both sex aged 6-16 years were included in this study.

Results

Out of 100 children 22% were in the age group of 6-8 years, 30% in the age group of 9-11 years with a frequency of 30% and 34% in the age

group of 12-14 years and 14% of ≥ 15 years. The mean age was 11.2 years.

Out of 100 patients uncorrected visual acuity between 6/6 to 6/12 was 51% in right eye and 48% in left eye. Visual acuity between 6/18 to 6/24 was 27% in right eye and 30% in left eye. Visual acuity 6/36 was 15% in right eye and 14% in left eye. Visual acuity worse than 6/36, 7% in right eye and 8% in left eye. Out of 100 children majority of patients are hypermetropia of 61.3% with refractive errors of 2-6D and more than 6D, majority are myopic (19.5%) and less than 2D are myopic astigmatism (Table-1). Frequency of anisometropia more than 1.5D was 20% and less than 1.5D was 80%. Myopia was more common in urban (52%) followed by hyperopia (26%) whereas hyperopia was more common in rural (36%) (Table-2).

Table 1: Distribution of refractive error in study eyes

Eye	Error	< 2 Diopters		2-6 Diopters		> 6 Diopters	
		No.	%age	No.	%age	No.	%age
Right Eye	Myopia	18	43.9	15	36.6	8	19.5
	Hypermetropia	11	35.5	17	54.8	3	9.7
	Astigmatism	8	44.4	7	38.9	3	16.7
Left Eye	Myopia	17	41.5	16	39.0	8	19.5
	Hypermetropia	10	32.3	19	61.3	2	6.5
	Astigmatism	9	50.0	6	33.3	3	16.7

Table 2: Distribution of refractive errors as per residence

Refractive Error	Rural		Urban	
	No.	%age	No.	%age
Myopia	15	30	26	52
Hypermetropia	18	36	13	26
Astigmatism	11	22	7	14
Anisometropia	6	12	4	8
Total	50	100	50	100

Discussion

Uncorrected refractive errors are an important cause of blindness and visual impairment in many countries (Dandona L et al 1998). In developing countries however, it is often difficult to provide efficient refraction services for a variety of reasons, and this results in a high prevalence of uncorrected refractive errors in these regions. Avoidable blindness and low vision can restrict progress in education, limit motor development in

children, affect mobility, limit career opportunities and restrict access to information. It is a burden on the community and its social and income generating services. So there is a priority need to control and prevent these disorders. He Met al⁵ found that Myopia (spherical equivalent of at least -0.50D in either eye) measured with retinoscopy affected 73.1% of children of 15 years of age. Hyperopia (+2.00D or more) measured retinoscopy was present in 16.7% of 5 year old.

Astigmatism (cylinder of $\geq 0.75D$) was present in 33.6% of children, he found prevalence of reduced vision due to myopia is high in urban children. In our study we found myopia of more than $-0.50D$ 43.9% in right eye and 41.5% in left eye. Hyperopia of more than $+0.50D$, 35.5% in right eye and 32.3% in left eye, we also found that prevalence of myopia is high in urban children. **Yoon KC, et al**⁶ Conducted a study and found prevalence of myopia, hyperopia, astigmatism and strabismus in participants over 3 years of age was $53.7\pm 0.6\%$, $10.7\pm 0.4\%$, $58.0\pm 0.6\%$ and $1.5\pm 0.1\%$ respectively. In our study we found prevalence of myopia, hyperopia, astigmatism and strabismus in participants over 6 years of age was 41%, 31%, 18% and 9% respectively. **Lim HT et al**⁷ conducted a study to evaluate the sociodemographic factors of myopia in Korean children. The prevalence of child myopia in Korea was 22.6%. Participants living in homes owned by their parents or in urban areas were more likely to have myopia. In our study we compared refractive errors between rural and urban school going children were we found prevalence of myopia was high in urban (52%) in comparison to rural which was only (30%) **Ghosh S, et al**⁸ conducted a study on 2570 children, myopia and hyperopia was present in 307 and 65 children respectively. Visual acuity of less than 6/12 in better eye was present in 109 children, 18 children had amblyopia. In our study of 100 children of refractive errors myopia and hyperopia was present in 41 and 31 children respectively. Visual acuity of less than 6/12 in better eye was present in 40 children, 17 children had amblyopia.

Conclusion

We concluded from this study that refractive error is one of the most common causes of visual impairment. Myopia is the commonest refractive error in school going children, which is slightly higher in urban children due to indoor games and use of computers and video games. Hypermetropia is the most common cause of refractive error in children of rural area.

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