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Original Research Paper

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# TO STUDY THE TYPE OF REFRACTIVE ERRORS AND ITS SEVERITY IN CHILDREN OF BAREILLY DISTRICT IN SCHOOL HEALTH CHECK UP CAMPS.

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ABSTRACT To study the type of refractive errors and its severity in children of Bareilly district in school health check up camps. AIMS AND OBJECTIVES To study the type of refractive errors in children of Bareilly. To study the age-wise distribution of refractive errors. To study the severity of refractive errors

MATERIAL AND METHODS The present study was conducted in all those children with refractive errors in school health check up camp over a period of 6 months from November 2017 to April 2018.

Type of study: Cross sectional observational study.

Inclusion Criteria: All children in age group 5-15 years having refractive errors of 0.5D or more.

Exclusion Criteria: children with dense media opacities, prior intraocular surgery.

**RESULTS:** Out of 1080 children screened, 214 were found to have refractive errors. Myopia was most common refractive error being 42.86% (92/214). Astigmatism, both simple and mixed/compound was 35.64% (76/214) while hypermetropia was least common i.e. 12% (46/214). **SUMMARY:** There should be periodic examination of the school children at least on annual basis.

KEYWORDS : Refractive error, myopia, school health check-up.

# INTRODUCTION

Childhood visual impairment due to refractive errors is one of the most common problems among school age children and is second leading cause for treatable blindness<sup>[1]</sup>. Vision 2020: The Right to sight, a global initiative launched by a coalition of non government organization and the World Health Organization (WHO)<sup>[2]</sup>, is to eliminate avoidable visual impairment and blindness on a global scale.

Refractive error is a state in which the optical system of a non accommodating eye fails to bring parallel rays of light to focus on the retina<sup>[3]</sup>. Categories of refractive errors are myopia, hypermetropia and astigmatism<sup>[4]</sup>. Refractive errors requiring correction are uncommon in pre-school children. However, nearly 20% of children develop refractive errors that require the use of eye glasses before late adolescence.

Myopia is the condition in which parallel rays of light converge to a focus in front of the retina, with accommodation relaxed<sup>[5]</sup>. The prevalence of myopia increases during and after puberty, when the eye undergoes its adolescent growth phase<sup>[5]</sup>. Myopia is broadly classified into 2 groups. Simple myopia, secondly, pathological myopia also known progressive myopia<sup>[6]</sup>. Myopia needs correction with concave spherical lens to focus the light rays on the retina. Myopia of any magnitude requires correction since it alters the child's educational and social development. Uncorrected severe myopia (> 6D) carries added risk of developing refractive amblyopia and must be addressed on priority even in asymptomatic children<sup>[5]</sup>.

Hypermetropia is a condition in which parallel rays of light converge to a focus behind the retina, with accommodation at rest. Hypermetropia occurs when the overall refractive power of eye is too weak, to focus image on the retina.

Astigmatism is a refractive condition in which the eye's optical system is incapable of forming a point image for a point object<sup>[4]</sup>. Astigmatism occurs when the optical system of the eye, particularly the cornea, is not perfectly spherical.

Worldwide, refractive error is the most common visual impairment and the second leading cause of blindness<sup>[7]</sup>. It is estimated that globally 153 million people over 5 years of age are visually impaired as a result of uncorrected refractive error. Some 12.8 million in age group of 5-15 years are visually handicapped for uncorrected or inadequately corrected refractive errors, with a global prevalence of 0.96%. The highest prevalence is reported among highly developed urban population, especially in south-east Asia and in China<sup>[8]</sup>.

The significance of early detection of refractive errors in childhood springs from the fact, that this condition is largely avoidable with a cost effective treatment <sup>[9]</sup>. Screening activity is essential since children do not complain of defective vision, and at times may be unaware of their problem. They adapt to the poor eyesight by activities such as sitting near the blackboard, holding the books closer while reading squeezing their eyes and even avoiding work that calls for visual concentration. Such activities warrant high index of suspicion from parents and teachers to avoid a permanent disability <sup>[10]</sup>. It is noteworthy that poor vision during childhood & adolescence effect academic and overall school performance and may have a negative influence on the future life. Moreover, diagnosis and treatment of refractive errors is one of the easiest way to eliminate the condition<sup>[11]</sup> while provision of spectacle is the most effective health intervention<sup>[9]</sup>.

# MATERIAL AND METHODS

The present study was conducted in school screening camps organized by the department of ophthalmology, Rohilkhand Medical College and Hospital, Bareilly, over a period of 6 months. Certificate from ethical review committee was taken before conducting this study.Children with defective vision and asthenopia were referred to the ophthalmology Out-Patient Department (OPD).

In this study we have included children of age group of 5-15 years with refractive errors 0.5D or more.

We have excluded children with dense media opacities and history of any intraocular surgery.

# Study protocol

Demographic indices were recorded in subject Proforma that included age, sex, address & socio-economic status. Relevant personal and family history was taken which included history of spectacle usage among parents and siblings, educational status of both mother and father. History of previous use of spectacles by the child was also recorded. Unaided visual acuity of all children was measured with help of Snellen's E chart under standard illumination. On the basis of unaided visual acuity, visual impairment was graded as mild (VA <6/6 to 6/12), moderate (VA 6/18 to 6/36), and severe (VA 6/60 and below). Pinhole vision was also taken in eyes with visual acuity worse than 6/6. Hirschberg test was done in all cases. Extra-ocular movements were assessed in all the cardinal gazes. Cover test was performed for both distance and near. Pupillary reaction was assessed in all cases with the help of pencil torch light. All children were evaluated under slit lamp to see any abnormality in the anterior segment. Fundoscopy was performed in all the cases using direct and indirect ophthalmoscopes. Cycloplegic refraction employing 1% cyclopentolate, was carried out. This was followed by Post Mydriatic Test (PMT) after 1 week.

#### DISCUSSION

Childhood blindness due to uncorrected refractive errors has emerged as a major public health problem, the cognizance of which has been taken by WHO in its Vision 2020 programme. Worldwide, uncorrected refractive errors account for up to 42% of visual impairment and equally affect both developing and developed nations <sup>[12]</sup>. Refractive errors among children are particularly important since it leaves a permanent imprint on the developing eye making it liable to associated conditions like amblyopic and strabismus.

The present study has been designed as a cross-sectional hospital based observational study on school children in school health checkup camps falling in the age group of 5-15 years hailing largely from the Bareilly district of Northern India.

Of the 214 assessed children during the study period of 6 month, the mean age of presentation was noted to be  $10\pm 2.96$  years (range 5-15 years). This was comparable with the report of  $9.3\pm 3.4$  years,  $9.7\pm 3.3$  years and  $10.7\pm 3.1$  years by Kalikivayi et al in Hyderabad <sup>[13]</sup>. Wu et al in China <sup>[14]</sup> and Yamamah et al in Egypt <sup>[15]</sup> respectively.

A lack of consensus similarly remains in the prevalence level of myopia, hypermetropia and astigmatism. In our study, myopia was noted in 42.86% of children while hypermetropia and astigmatism in 21.5% and 35.64% of patient respectively. This was in agreement with the study done by Ayub Ali et al in Pakistan<sup>[16]</sup>.

Other studies designed on similar basis in various geographical regions of the world like China <sup>[17]</sup>; Saudi Arabia <sup>[18]</sup> and India subcontinent <sup>[19]</sup> have reported myopia as the commonest refractive error.

Majority of children in the study had a correctable mild to moderate visual impairment. Severe visual loss (<6/60) was reported in only 14.01% eyes. This mild to moderate presentation of refractive error was observed in all categories of refractive error. The percentage of mild, moderate and severe degrees of myopia was 54.34%, 25.0% and 16.30% respectively. Similarly, 56.52%, 10.86% and 21.73% cases were having mild, moderate and severe degrees of hypermetropia respectively. 69.73%, 22.35% and 6.57% of the patient were having mild, moderate and severe degree of astigmatism respectively. Hashemi et al reported the prevalence of mild, moderate and severe myopia is 19.4%, 1.2% and 1.2% respectively <sup>[20]</sup>. This finding is in agreement with studies by Alam et al. (07), Sethi et al <sup>[21]</sup>, Krishnanmurthy et al <sup>[22]</sup> and Shreshtha et al <sup>[23]</sup>.

Present day studies investigating refractive errors in children are essentially population based surveys. They employ identical protocol as outlined by refractive error survey in children (RESC) employing cluster sampling. Despite these limitations, the study provided an insight into the quantum, extent and form of visual impairment prevalent in Bareilly District. It furnishes essential data for planning & evaluating preventive & curative services for visual impairment of children in this region.

# CONCLUSION

In the present study on "Type of refractive errors and its severity in children of Bareilly District in School Health Check up Camp" following conclusions were drawn:

- The prevalence of refractive error among children was 19.81% (214/1080).
- 2. The average age of presentation was 10±2.96 years.
- Most of the children with refractive error, nearly 81.30%, presented with mild to moderate decrease in visual acuity (<6/36).</li>
- 4. Myopia was the most common type of refractive error seen in 42.86% children followed by astigmatism 35.64% and hypermetropia 21.5%.
- 5. The percentage of mild, moderate and severe degrees of myopia was 54.34%, 25.0% and 16.30% respectively.
- 6. Similarly, 56.52%, 10.86% and 21.73% cases were having mild, moderate and severe degrees of hyperopia, respectively.
- 7. 69.73%, 22.35% and 6.57% of the patient were having mild, moderate and severe degree of astigmatism respectively.

### **OBSERVATION TABLES:**

 Table 1: Percentage of refractive error among school children (n=1080)

Refracti		
Present	Absent	Total
214 (19.85%)	866 (80.18%)	1080

**Table 2:** Types of refractive errors among screened children:

Type of refractive errors	No. of children	%(percentage)
Муоріа	92	42.86
Hypermetropia	46	21.5
Astigmatism	76	35.64
Total	214	100

Table 3: Age-wise distribution	of refractive	errors am	iong scre	ened
children:				

Age( in years)	Age( in years) Male		Total	
5-10	56	41	97	
	(57.44%)	(42.55%)	(45.11%)	
11-15	67	50	117	
	(56.99%)	(43.01)	(54.86%)	
Total	123	91	214	

Table 4: Distribution of types of refractive errors by severity (n=214)

Type of refractive errors	Mild (<=1.5D)	Moderate (1.75- 2.75D)	Severe (3.0-5.0D)	Very Severe (>5.0D)	Total
Myopia	50	23(25.0%)	15(16.30%)	4(4.3%)	92
	(54.34%)				
Hypermetro	26(56.52%)	5(10.86%)	10(21.73%)	5(10.86%)	46
pia					
Astigmatism	53(69.73%)	17(22.36%)	5(6.57%)	1(1.31%)	76
Total	129	45	30	10	214
	(60.28%)	(21.02%)	(14.01%)	(4.67%)	

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