

## A STUDY OF PREVALENCE OF OCULAR MORBIDITIES IN SCHOOL GOING CHILDREN IN A RURAL DISTRICT OF MANIPUR

Rajkumari Bigyabati<sup>1</sup>, Rajkumar Victor<sup>2</sup>, Bishwalata Rajkumari<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Ophthalmology, Jawaharlal Nehru Institute of Medical Sciences, Imphal.

<sup>2</sup>Senior Resident, Department of Ophthalmology Jawaharlal Nehru Institute of Medical Sciences, Imphal.

<sup>3</sup>Associate Professor, Department of Community Medicine, Jawaharlal Nehru Institute of Medical Sciences, Imphal.

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### ABSTRACT

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#### BACKGROUND

Children are affected by various eye disorders like refractive error, eye infections, and squint. Uncorrected refractive errors are a common, but avoidable problem. The presence of uncorrected refractive error in children has a considerable impact on their physical, mental, and behavioural development. Early detection and timely intervention can improve a child's potential tremendously during the formative years.

#### AIM

To find out the magnitude of ocular morbidities among school children of Thoubal, a rural District of Manipur and the type of refractive error prevalent in that region.

#### METHODS

A cross sectional study was conducted among school children of Thoubal, a rural area of Manipur. Excluding absentees and non-responders, students were examined by trained Ophthalmologists and Ophthalmic Assistants. Visual acuity was assessed in all students using Snellen's chart and refraction performed when required. Patients with no improvement by the above method were further examined at the tertiary hospital. Data was tabulated and analysed.

#### RESULTS

A total of 1700 students aged from 5 to 15 were examined out of which 53% were boys and 47% girls. Prevalence of ocular morbidity was 17.7% of which refractive error was found in 16.4%, cataract in 0.1%, squint in 0.1%, corneal opacity in 0.1%, chalazion/stye in 0.4%, conjunctivitis in 0.3%, and blindness in 0.1%. A significant proportion of girls suffer from refractive error (57%) as compared to boys (43%). Refractive errors prevail highest among the age group 10-12 years. Astigmatism was the most common refractive error (48%) followed by Myopia (34%) and Hypermetropia (18%).

#### CONCLUSION

The study concludes that vision screening in school children is very useful in early detection of refractive errors and other ocular morbidities leading to early treatment and prevention of development of visual disability and amblyopia as most of the children were unaware of the problem.

#### KEYWORDS

Children, Prevalence, Ocular, Morbidity, Refractive Error.

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#### INTRODUCTION

Ocular morbidity in children affects the learning ability and has a negative influence on development and maturity. Refractive error is an optical defect intrinsic to the eye, which prevents light from being brought to a single focus on the retina thus reducing good vision.<sup>[1]</sup> Refractive errors are the second major cause of blindness in India after cataract. Children form one of the main age groups requiring attention to refractive error because of its high prevalence. Most school going children are not aware of their disability and try to adjust to their poor sight. Only those children whose

disabilities are so severe as to be noticed by parents or teachers are brought to an Ophthalmologist for evaluation. Refractive errors are easily correctable and if left untreated can result in amblyopia and strabismus.

Childhood blindness and visual impairment are more disabling than adult-onset blindness because of the long span of life still remaining to be lived. School-age children constitute a particularly vulnerable group where uncorrected refractive errors may have a dramatic impact on learning capability and educational potential. Data on prevalence and causes of blindness and severe visual impairment in children are necessary for planning preventive and curative services for children. It is estimated that there are 1.4 million blind children in the world. An additional 7 million suffer from low vision and a further 10 million children have correctable refractive error causing visual impairment. It is estimated that the prevalence of blindness in India is 0.8/1000 children in the age group 0-15 years.<sup>[2]</sup> Among the blind persons in India 30% of them lose their eyesight before the age of 20 years and many of them are under five signifying the

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*Corresponding Author:*

*Rajkumari Bigyabati,*

*C/o. Dr. Chingakhom Debeshwar Singh,*

*Singjamei Wangma Kshetrileikai,*

*Imphal-795001, Manipur, India.*

*E-mail: bigyabati@gmail.com*

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importance of early detection and treatment of ocular disease and visual impairment among young children.<sup>[3]</sup>

Integration of vision screening and refractive services for school students within screening for other health issues is target for control of blindness in children in VISION 2020-THE RIGHT TO SIGHT.<sup>[4]</sup> The Refractive Error Study in Children (RESC) has been formed under this initiative to try and assess the prevalence of refractive errors in children.<sup>[5]</sup> The magnitude of refractive error is different in the urban and rural areas of India.<sup>[6]</sup> The aim of this study is to assess the magnitude of refractive error and other ocular morbidities in school children in a rural area of Manipur as no data is available in this context from this part of India.

## MATERIALS AND METHODS

This cross sectional study was conducted among school children of Thoubal District, a rural area of Manipur, which is a North-Eastern State of India. Thoubal is one of the valley districts of Manipur with a population of 4, 21, 517 and located at a distance of 25 kilometres from Imphal, the capital of Manipur. Majority of population belong to middle and lower socioeconomic group. Our study population includes all school children residing in the rural areas of Thoubal District. Refusal to participate and students absent on the day of visit were excluded from the study.

### Sample Size Calculation and Sampling

Sample size was calculated based on a prevalence of refractive error of 8% among rural school children.<sup>[7]</sup> Using 1.5% precision and a 5% significance level a sample size of 1257 was calculated. Assuming a little more than 10% non-responders, the sample size was increased to 1383 rounded off to 1700.

### Sampling Design

From the list of high schools located in rural areas of the district, the schools were sampled sequentially using lottery method and all eligible students in the selected schools were included. A total 5 (Five) schools were selected till the required sample size was reached.

### Operational Definition

Visual acuity <6/6 was taken as criteria of defective vision because criteria of low vision according to WHO (VA <6/18 in better eye) is grossly subnormal for school children.<sup>[8]</sup>

### Procedure

After obtaining verbal informed consent from children and parents/guardians, the socio-demographic profile of the children were recorded in a structured proforma. Vision was recorded with a Snellen's chart at a distance of 6 metres. Visual acuity <6/6 was taken as criteria of defective vision. If the distant visual acuity was <6/6 those students were subjected to refraction. Refraction was done by subjective and objective methods and appropriate spectacles prescribed. Students with no improvement by the above methods and those with other ocular morbidities were referred to the tertiary hospital for further evaluation.

### Statistical Analysis

Descriptive statistics were generated using mean, proportions, percentages, and standard deviation. Analytical

statistics like chi-square test were used. A p-value of <0.05 was taken to be significant.

### Ethical Issues

Ethical clearance was obtained from the Institutional Ethical Committee. Prior permission from school authorities were obtained for the visits. Purpose of visit was explained and verbal informed consent was obtained from students as well as guardians and strict confidentiality was maintained.

### RESULTS

Five schools were visited and 1921 students were selected for the study. A total of 151 students were absent on the day of visit and 1770 students were examined. Therefore the students' response rate was 92.1%. Among the participants, 53% were boys and 47% girls (Table 1). Students from age of 5 to 15 studying in class 1 to 10 were examined out of which ocular morbidity was seen in 17.7%. Ocular morbidity prevails highest among the age group 10-12 years (Table 1). Defective vision of visual acuity between <6/6 to 6/12 was seen in 9.1% of students, low vision of visual acuity between 6/18 to 6/60 was seen in 4% of students and very low vision to no PL was seen in 0.1% (Table 1).

Refractive error was the commonest ocular morbidity and found in 16.45%, cataract in 0.1%, squint in 0.1%, corneal opacity in 0.1%, chalazion/stye in 0.4%, conjunctivitis in 0.3%, and blindness in 0.1% (Table 2). A significant proportion of girls suffer from refractive error (57%) as compared to boys (Table 3). Among those having refractive error, 98% could be corrected by prescribing glasses (Table 1). The refractive errors in girls could be corrected by prescribing glasses whereas some of the refractive errors in some boys could not be corrected by prescription of glasses (Table 4). Astigmatism (48%) was the most common refractive error followed by myopia (34%) and hypermetropia was the least common with a prevalence of 18% (Table 5).

Variable	No.	%	
Gender	Male	956	53
	Female	814	47
Age Group (Yrs.)	4-6	174	9.8
	7-9	546	30.8
	10-12	769	43.4
	>12	281	15.9
Vision (Rt Eye)	Normal	1544	87.2
	<6/6 to 6/12	159	9.0
	6/18 to 6/60	66	3.7
	Very low vision to No PL	1	0.1
Vision (Lt Eye)	Normal	1528	86.3
	<6/6 to 6/12	165	9.3
	6/18 to 6/60	76	4.3
	Very low vision to No PL	1	0.1
Refraction (Rt eye)	No need for correction	1503	84.9
	Correction with glasses	265	15.0
	Cannot be corrected with glasses	2	0.1
Refraction (Lt eye)	No need for correction	1487	84.0
	Correction with glasses	278	15.7
	Cannot be corrected with glasses	5	0.3

**Table 1: Distribution of Students by Selected Variables**

Findings	Number	Percentage
Normal	1456	82.3
Refractive error	208	11.8
Cataract	2	0.1
Squint	2	0.1
Corneal ulcer/opacity	2	0.1
Chalazion/Stye	6	0.4
Conjunctivitis	4	0.3
Blindness	2	0.1

**Table 2: Associated Ocular Morbidity Among Students**

Variable	Categories	Gender		P value
		Male, N (%)	Female, N (%)	
Right Eye vision	Normal	860 (55.7)	684 (44.3)	0.000
	Refractive error	96 (42.4)	130 (58.6)	
Left Eye vision	Normal	850 (55.6)	678 (44.4)	0.001
	Refractive error	106 (43.8)	136 (56.2)	

**Table 3: Comparison of Vision by Gender Among the Students (N=1770)**

Variable	Categories	Gender		P value
		Male, N (%)	Female, N (%)	
Right Eye refraction	No need for correction	832 (55.4)	671 (44.6)	0.008*
	Correction with glasses	122 (46.0)	143 (54.0)	
	Cannot be corrected with glasses	2 (100.0)	0 (0)	
Left Eye refraction	No need for correction	826 (55.5)	661 (44.5)	0.001*
	Correction with glasses	125 (45.0)	153 (55.0)	
	Cannot be corrected with glasses	5 (100.0)	0 (0)	

**Table 4: Comparison of Refraction by Gender Among the Students (N=1770)**

\*Fisher’s exact test

Refractive Error Type	Affected Side			Total	%
	Right Eye, N (%)	Left Eye, N (5%)	Both Eyes, N (%)		
Myopia	13 (0.7)	20 (1.1)	75 (4.2)	108 (6.1)	34
Hypermetropia	9 (0.5)	6 (0.3)	41 (2.3)	56 (3.2)	18
Astigmatism	18 (1.0)	27 (1.5)	110 (6.2)	155 (8.8)	48

**Table 5: Distribution of Type of Refractive Error Among Students (N=1770)**

**DISCUSSION**

Our study showed a prevalence of ocular morbidity of 17.7%, which is similar to prevalence of 15.6% ocular morbidity in a study in Tanzania.<sup>[9]</sup>, but lower than a study conducted in Shimla where the prevalence was reported to be 31.6%.<sup>[10]</sup>

This may be due to difference between the study populations. Refractive error was the commonest ocular morbidity with a prevalence of 16.4%, which is comparatively similar to that of studies conducted in Surat with a prevalence of 15.22%.<sup>[11]</sup>, 15.8% in Chile.<sup>[12]</sup>, 17.1% in Malaysia.<sup>[13]</sup>, and 14.7% in urban school children of low-income families in Kolkata.<sup>[14]</sup>, but lower than the finding of prevalence of 23.67% refractive error in a study conducted at a Tertiary Eye Care Hospital in Kolkata.<sup>[15]</sup> However, the findings in this study are much higher than that of urban and rural Maharashtra of 5.46% and 2.63% respectively.<sup>[6]</sup> and the study from Pokhara City in Nepal of 6.43%.<sup>[16]</sup> Astigmatism was the most common refractive error in this study accounting for 48% of all refractive errors. These findings are comparable with the prevalence of 52% of astigmatism in the Kampala study.<sup>[17]</sup> In contrast to our study, myopia is the most common refractive error in the Surat and urban Kolkata study.<sup>[11,13]</sup> This may be due to use of different operational definition and other demographic factors. A significant proportion of girls suffer from refractive error (58%) as compared to boys (42%), which is comparable to the Haryana and Kolkata study.<sup>[8,15]</sup> and also to the Rohtak study.<sup>[18]</sup> where higher prevalence of refractive errors was observed in girls (73.53%) as compared to boys (73.53%). It was concluded that high prevalence of ocular morbidity was observed in rural area of Manipur. The school eye screening program should be strengthened to reduce the prevalence of visual impairment due to refractive error and other ocular morbidities. Thus, a large number of visual impairment and blindness can be avoided.

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