

## A Prospective Cross–Study to Determine the Prevalence of Refractive Errors among the School Going Children in Bihar

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### Abstract

**Aim:** The objective of this study is to find out the prevalence of refractive errors among school children.

**Methodology:** The study was conducted by the Department of Ophthalmology, JLNMCH, Bhagalpur, Bihar, India from a period of 1 year. There was a random selection of 500 children from eight schools of Bhagalpur, Bihar region aged 5-15 years studying in Class 1 to Class 10. All subjects were brought to the Outpatient Department of Ophthalmology at JLNMCH, Bihar. It was a prospective study, cross-sectional in design. Written informed consent was obtained from each study participant. Confidentiality was maintained at all levels of the study. Patients who were found to have ocular complaint and refractive error were referred for further investigations and management.

**Results:** A total of 500 children participated in the study. Out of 500 children, 242 (48.4%) were boys and 258 (51.6%) were girls. The most frequently reported ocular problem was eye pain (24.6%) followed by watering from eye (23.6) while reading or watching TV/mobile (23.6%) and headache while reading (19.6%), Blackboard not seen properly (14.4%), difficulty in reading books (12.2%). Also, (5.6%) of the students reported difficulty in seeing at night. Overall, 19.6% children were suffering from refractive errors, out of which 9% were previously diagnosed and 10.6% were newly diagnosed.

**Conclusion:** Refractive error among children is a common problem and needs to be assessed regularly for early intervention. The present study indicates that the school age represents high risk group for refractive errors. Screening of the children for vision at the time of school admission and periodical eye examination of the children is recommended for early rectification of impaired vision.

**Keywords:** Refractive error, Vision, Ocular.

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### Introduction

Visual impairment is a significant public health problem. Refractive errors are one of the most common causes of visual impairment around the world and second

leading cause of treatable blindness [1]. The result of refractive errors is blurred vision, which is sometimes so severe that it causes visual impairment [2].

Over 90% of blind children receive no schooling and will be unable to realize their full potential. Thus, blindness in children accounts for one-third of the economic cost of blindness although it represents <4% of the overall magnitude [3]. Many ocular diseases have their origin in childhood and the morbidity may go unnoticed and adversely affect the child's performance in school and may also cause severe ocular disability in the later part of life [4]. The pattern of ocular diseases varies in different part of the world and is influenced by racial, geographic, socioeconomic and cultural factors [5]. Ocular Morbidity is one of the recognized causes of poor performance of a child. It may be a source of performance anxiety among school children [6]. Refractive error is one of the most common causes of visual impairment around the world and the second leading cause of treatable blindness [7].

An estimated 19 million children are visually impaired of these, 12 million are visually impaired due to refractive errors [8]. Considering the fact that 30% of India's blind lose their sight before the age of 20 years, the importance of early detection and treatment of ocular morbidity and visual impairment in young children is obvious [9]. In India, the overall incidence of refractive errors has been found to vary between 21% and 25% of the patients attending eye outpatient department [10].

Refractive errors are usually present in the childhood and continue to the adult life [11]. Undetected and uncorrected refractive errors are particularly a significant problem in school children [12]. As children are not mature enough to point out the deficiency at an early stage or the parents have no idea on the gradually developing vision problem, uncorrected refractive error can have a dramatic impact on learning process and educational capacity [13].

Early detection and management reduce the disease progression and can prevent visual disability. Schools form an effective media where mass communication can be done, and students can be taught about routine eye care and personal hygiene. In the light of above facts and with very little data available on refractive error in children especially in Bihar and early detection of refractive error will thus prevent future progression of disease. The objective of this study is to find out the prevalence of refractive errors among school children.

### **Materials and Methods:**

The study was conducted in Department of ophthalmology, JLNCH, Bhagalpur, Bihar, India from a period of 1 year. There was a random selection of 500 children from eight schools of Bhagalpur, Bihar region aged 5-15 years studying in Class 1 to Class 10. All subjects were brought to the Outpatient Department of Ophthalmology at JLNCH, Bihar. It was a prospective study, cross-sectional in design. Written informed consent was obtained from each study participant. Confidentiality was maintained at all levels of the study. Patients who were found to have ocular complaint and refractive error were referred for further investigations and management.

### **Inclusion criteria:**

All the students' whether boys or girl belongs to 1st to 10<sup>th</sup> standard from defined schools and selected as per sampling method willing to participate in the study and given written consent.

### **Exclusion criteria:**

Anyone not fulfilling inclusion criterion

### **Methodology:**

A pre-designed and pre-tested semi structured questionnaire was used to interview the study participants to elicit the information on personal and family characteristics. Chief investigator herself asked about ocular complaint from

selected children and thereafter by personal interview method information on personal and family characteristics were elicited, followed by the assessment for visual acuity was tested for distance vision using Snellen's test type (Hindi) placed at a distance of 6 meters from the student and near vision using near vision test type (Hindi) with the student holding the chart in his/her hand at a distance of approximately 30 cms from the face.

### Results:

A total of 500 children participated in the study. Out of 500 children, 242 (48.4%) were boys and

258 (51.6%) were girls. The most frequently reported ocular problem was eye pain (24.6%) followed by watering from eye (23.6) while reading or watching TV/mobile (23.6%) and headache while reading (19.6%), Blackboard not seen properly (14.4%), difficulty in reading books (12.2%). Also, (5.6%) of the students reported difficulty in seeing at night.

**Table 1: Gender and Self-reported ophthalmic symptoms**

Variables		Number (%)
Gender	Males	242 (48.4%)
	Females	258 (51.6%)
Ophthalmic symptoms (Multiple response)	Headache while reading	98(19.6)
	Watering from eye while reading or watching TV/mobile	118 (23.6)
	Content of blackboard not seen clearly	72(14.4)
	Difficulty in reading books	61 (12.2)
	Pain in eye	123(24.6)
	Difficulty in seeing at night	28 (5.6)

Overall, 19.6% children were suffering from refractive errors, out of which 9%

were previously diagnosed and 10.6% were newly diagnosed.

**Table 2: Prevalence of refractive errors among school going children**

Refractive error	Total N (%)
Normal	402 (80.4)
Previously diagnosed	45 (9.0)
Newly diagnosed	53 (10.6)
Total	500 (100)

### Discussion:

Vision plays an important role in a child's development for learning and communication [14]. Uncorrected refractive error has become a major challenge to the health care policymakers [15].

An estimated 19 million children are visually impaired worldwide of which 12 million are due to refractive errors which could be easily corrected [16]. While many screening programs in schools are being

carried out, there is a lack of accurate data in the prevalence of visual impairment [17]. Active screening and timely intervention at the right time will not only help in vision restoration but will also influence a child's growth and development [18, 19]. In 1960, the Government of India constituted a school health committee which recommended medical examination of the children at the time of entry into school, but this has hardly been in practice in India [20].

Globally main causes of visual impairment are uncorrected refractive errors (myopia, hyperopia and astigmatism) 43%, cataract 33%, glaucoma 2% [21]. Poor vision in childhood affects performance in school or at work and has a negative influence on the future life of a child. Moreover, planning of the youth's career has a strong relation with visual acuity. Refractive errors are the most common reasons for a visit to an ophthalmic surgeon or an ophthalmic assistant [22].

In the present study over all prevalence of refractive errors was 19.6%. Singh V et al. reported 17.36% [23], Parmar A. et al [24] reported 29.5%, Vidusha KSS et al. reported 10.5% [25] Jayanth et al. reported 10.12% [26] Singh et al. reported 13.09% [27]. In present study it was observed that watching TV and/ or Smart phone for longer time every day positively associated with refractive error. Similar observation reported by more recent studies has demonstrated a positive correlation between the presence of myopia and prolonged work requiring near vision use [28-30]. Dixit R. et al did not find any significant association between screen usage and refractive error [31, 32].

### Conclusion:

Refractive error among children is a common problem and needs to be assessed regularly for early intervention. The present study indicates that the school age represents high risk group for refractive errors. Screening of the children for vision at the time of school admission and periodical eye examination of the children is recommended for early rectification of impaired vision.

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