# Assessment of the Prevalence of Refractive Error among School Children (6-16 Years) of Rural Field Practice Area of Kims, Malkapur, Karad

**Ankitkumar Bhopalka[1], B.S. Joshi[2], V.H. Karambelkar[3]**

*[1]Resident, [2]Associate Professor, [3]Professor And Head of Department, Department of Ophthalmology, Krishna Institute of Medical Sciences deemed to be University, Karad, Maharashtra, India*

## Abstract

**Introduction:** Refractive errors are among vital causes of visual disability globally and second principal cause of preventable blindness. Refractive errors among school children remains unnoticed which have an impact on overall development of child. This study has been undertaken to estimate the prevalence of refractive errors among school going children (6- 16 years).

**Materials and Method**: This cross-sectional study was conducted in schools of Karad from October 2017 to May 2019. Sample size was determined to be 750. School Going Children of age 6-16 years of selected schools in the rural field practice area of KIMS, Karad fulfilling the inclusion and exclusion criteria were screened on school visit. All suspected students were called to Out Patient Department and subjected to Snellen's chart, pin-hole test, torch light examination, slit lamp examination, manual refractrometry, direct and indirect ophthalmoscopy and cyclopegic refraction (retinoscopy followed by post mydriatic test) to detect refractive error in children. A questionnaire was structured to gather relevant information from the students.Data was collected from the students after informed consent.

**Results**: Prevelance of Refractive Errors was 8.4%. Most frequent refractive error found was Myopia (60.3%) followed by Astigmatism (23.8%) and Hypermetropia (15.9%) . It shows that only 20.63% students were wearing spectacles whereas remaining 79.37% students were unaware of their problems.

**Conclusion:** Visual impairment due to refractive error should be addressed as early as possible, which is attainable only by screening at initial age and hence early recognition and management.

***Keyword****: Refractive error, prevalence, myopia, astigmatism, Hypermetropia ,Screen exposure time.*

## Introduction

Refractive Error is the most common cause of Visual Impairment and second principal cause of preventable blindness[1].Preventable blindness accounts for 80% blindness. Childhood blindness is a global distress. Globally, chief sources of visual impairment are uncorrected refractive errors (Myopia, Hyperopia & Astigmatism) 43%, Cataract 33%, Glaucoma 2%[2]. Roughly 12 million accounts for refractive errors out of 19 million visually disabled children. Addition of uncorrected refractive error would escalate estimates of the global preponderance of visual disability by 61%[2].

About 2.3 billion people globally have refractive errors, out of which 1.8 billion have ingress to adequate ophthalmic evaluation leaving aside 500 million populations, predominantly in developing countries with optical defect leading to either blindness or impairedvision[3].

Data on the preponderance of childhood blindness in India is accessible from few regions- Andhra Pradesh (0.61/1000), West Bengal (0.51/1000) and Delhi (1/1000)[4]. Roughly 1.4 million blind children are less than 15 years age globally, out of whom 2/3rd resides in the developing countries.

Further majority of children of above mentioned age group cannot reveal about the optical defects and complications they encounter, so most of the eye diseases in these children go on undiscovered unless an attempt is made for their disclosure e.g. if amblyopia can be diagnosed at early age and treated strenuously , further sequelae can be curbed. If the vision is grossly poor and cannot be improved much, such children can be advocated vocational training where eyes are not strained much and they can make use of whatever trace vision they have and which will make them capable to take care of oneself and not to be a concern for the society.

National programme for Control of Blindness (1994) proposed School Eye Screening Programme. Another initiative Vision 2020-THE RIGHT TO SIGHT was ventured by WHO in 1999 to annihilate preventable blindness like Cataract, Xerophthalmia , Refractive Errors ,Trachoma and other causes of childhood blindness by 2020.In India under Vision 2020 ,the priority consideration to curtail childhood blindness were refractive error, cataract related amblyopia and corneal diseases[5].

Schools are best platform to employ health awareness and prior recognition of ocular morbidity[4]. The school survey was endorsed over house to house survey because school procures an organized and disciplined group of children. Hence, this study was conducted to assess the degree of refractive error in school going children of KIMS, MALKAPUR, KARAD.

## Materials and Method

**STUDY DESIGN -** "A CROSS-SECTIONAL STUDY ON PREVALENCE OF REFRACTIVE ERROR AMONG SCHOOL CHILDREN IN THE FIELD PRACTICE AREA OF KIMS,MALKAPUR, KARAD"**.**

**Duration Of Study**- 18 Months.

Period of Collection of Data- 12 Months.

Period of Analysis and Compilation- 6 Months

**Inclusion Criteria:** All children from 6-16 years of age of selected schools in the rural field practice area of KRISHNA INSTITUTE OF MEDICAL SCIENCES, KARAD.

**Exclusion Criteria –** a) Mentally retarded children. b) Children with congenital disorder. c) Absentees on the day of examination. d) Children below 6 years of age and above 16 years age.

**Source of Data –** School Going Children of age 6-16 **years** of selected schools in the rural field practice area of KIMS,MALKAPUR,Karad fulfilling the inclusion and exclusion criteria from OCTOBER 2017 to MAY 2019.

**Rationale of Sample Size -**

Considering the study done by Megala.M on Prevalence of Refractive error in school children, the prevalence rate of Refractive error (p) was **20.4%**[11]. The sample size is

$$Sample\ size(n) = \frac{4pq}{L^2}$$

Taking P VALUE as 20.4%

Taking L = 3% and q=100-p

The estimated sample size is 722, roundabout to **750.**

## Method of Data Collection

Based on existing prevalence of ocular morbidities in school going children, the ideal sample size was about 750. By selecting three schools by simple random sampling by lottery method, we obtained sufficient sample size to derive meaningful results.

All the students in the age group of 6 to 16 years ($2^{nd}$ to $10^{th}$ standard) present on the day of assessment in those schools were examined. Principal of all the schools were approached before the screening and their granted permission was obtained and a date was fixed for screening. Two visits were given to each school and the students absent on the day of visits were missed.

A questionnaire was structured to gather relevant information from the students. Data was collected from the patient after informed consent. Patients fulfilling the inclusion and exclusion criteria were taken.

Refractive error was tested using following instruments:

1. Snellen's chart.

2. Direct and Indirect Ophthalmoscopy.

3. Slit-lamp.

## Results

In the present study, out of total study participants (750), 51.6% were male students and remaining 48.4% were female students.

**Table -1** show that 53.4% students belong to the age group of 13-16 yrs, 27.9% students belong to the age group 10-12 years and 18.7% students belong to the age group 06–09 years. The mean age of study population is found to be 12.25 with standard deviation of 3.01.

84(11.2 %) out of Total study participants (750 students) were found to have refractive error (vision <6/6). Out of 84 cases detected with defective vision by the

| Age-Group(in yrs) | Frequency | Percentage |
|---|---|---|
| 06-09 | 140 | 18.7 |
| 10-12 | 209 | 27.9 |
| 13-16 | 401 | 53.4 |
| Total | 750 | 100 |

**Table-1: Division based on Age-Group.**

| Complaints | Frequency | Percentage |
|---|---|---|
| Blurred Vision | 26 | 41.27 |
| Headache | 20 | 31.75 |
| Eye Strain | 13 | 20.63 |
| Half shutting of the eye enhancing vision | 4 | 6.35 |
| Total | 63 | 100 |

**Table-2: Chief complaints among study participants with Refractive Error.**

Investigator while screening, 63(8.4%) were confirmed as the true cases of refractive error by Refractionist.

41.27% participants (out of 63) complaint of blurred vision, while rest 58.73% were having other complaints shown in **Table-2**.

Most frequent refractive error found was Myopia (60.3%) followed by Astigmatism (23.8%) and Hypermetropia (15.9%) in the present study given in **Table-3**.

**Table-4** shows statistical significant relationship between class $8^{th}$-$10^{th}$ students and screen exposure time (>1hr/day) probably due to more exposure to computers/ laptops/mobilephones/videogames.

| Types | No. | Percent among cases | Percent in Total study |
|---|---|---|---|
| Myopia | 38 | 60.3 | 5.1 |
| Hypermetropia | 10 | 15.9 | 1.3 |
| Astigmatism | 15 | 23.8 | 2.0 |
| Total | 63 | 100 | 8.4 |

**Table-3: Proportion of types of refractive error among cases and study group.**

| CLASS | N | Screen Exposure Time per day | | | | |
|---|---|---|---|---|---|---|
| | | 30 min | 1 hr | 1.5 hrs | 2 hrs | >=2.5 hrs |
| 2nd -4th | 190 | 32 | 68 | 51 | 33 | 6 |
| 5th-7th | 235 | 47 | 150 | 11 | 8 | 19 |
| 8th-10th | 325 | 13 | 145 | 75 | 65 | 27 |
| Total | 750 | 92 | 363 | 137 | 106 | 52 |

**Table-4: Class wise allocation of screen exposure time per day.**

## Discussion

In the present study, 51.6% were male students and remaining 48.4% were female students. Study by Vidusha KSS et al (year 2018) showed similar findings – 50.6% male students and 49.4% female students[6].

The mean age of study population is found to be 12.25. Similar Observation found in study by Naik R et al(9.5 years)[7], Kalkivayi V et al (9.3 years)[8].

8.4% rate of prevalence of refractive error found in present study. Similar prevalence rate was observed in study by Pradhan N et al(7.0%)[9], Naik R *et al7.5*(7.57%)[7] but contrast findings were seen in Vidusha KSS *et al* (10.5%)[6] and Sonam Sethi *et al*(25.32%)[10].

Most frequent refractive error found was Myopia (60.3%) followed by Astigmatism (23.8%) and Hypermetropia (15.9%) in the present study. Similar impression was observed by Sonam Sethi *et al* - 63.3 % students had Myopia followed by Astigmatism (20.4%) and Hypermetropia (11.4%)[10]. Pradhan N et al conducted a study on refractive error in Haryana showed – 61.9% had Myopia followed by Astigmatism (24.1%) and Hypermetropia (14%)[9].

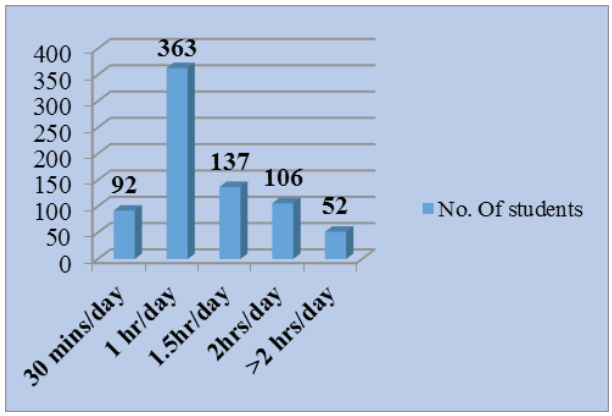


**Figure-1: Allocation of screen exposure time per day.**

The study shows that students with refractive error were complaining more about inability to see blackboard from back benches than those without refractive error. It is also seen that students exposed to screen for longer time (=>1hr/day) were having refractive error. Even students reading continuously (<30mins/day) complaint of symptoms relating to refractive errors.

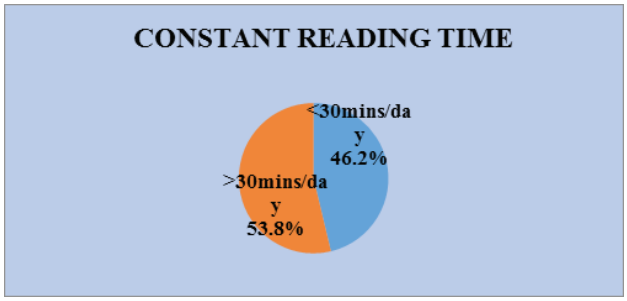


**Figure-2: Allocation of constant reading time per day.**

## Conclusion

"**What our eyes cannot see, our mind cannot read".** Therefore, visual impairment due to refractive error should be addressed as early as possible, which is attainable only by screening at initial age and hence early recognition and management. The present study supports the fact that school age forms a high risk group of refractive error.

**Ethical Approval :** All procedures performed on human participants were in agreement with ethical standards of the Institutional and/or National Ethics Committee.

**Source of Funding :** In this project , the cost of investigations of the studyparticipants was born by the institute research fundings**.**

**Conflict of Interest :** None

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