

**SCREENING FOR SIMPLE MYOPIA AMONG HIGH SCHOOL CHILDREN IN HYDERABAD CITY***Vundi Krishna Kumari<sup>1</sup>, Manem Suryaprabha Lakshmi<sup>2</sup>*<sup>1</sup>Tutor, Department of Community Medicine, Government Medical College, Ananthapuramu.<sup>2</sup>Professor, Department of Community Medicine, Osmania Medical College, Hyderabad.**ABSTRACT****BACKGROUND**

Refractive error is one of the most common causes of visual impairment around the world and the second leading cause of treatable blindness. Due to the high magnitude of uncorrected refractive errors, myopia is considered as one of the important public health problems, especially in the urban population in India. It has been given high priority under the National Programme for Control of Blindness.

**AIM**

The aim of the present study is to know the prevalence of myopia and assess the degree of myopia among school going children.

**SETTINGS AND DESIGN**

Cross-sectional study done for one year.

**METHODS AND MATERIAL**

Age group of children 13-15 years, a total of 1600 were included in the study. Refractive error was tested using Snellen's chart, Pin hole test, Occluder, Retinoscope. Statistical Analysis was done using the Epi Info version 7.

**RESULTS**

The prevalence of refractive errors was more in private schools (28.6%) than in government schools (23%). It was observed that myopia was the major refractive error (89.8%) among total refractive errors, followed by astigmatism (6.1%) and hypermetropia (4.1%). In myopic children, both eyes were involved in 71.5%, right eye alone in 16.4%. Only 60% (478) and 98.4% (788) have undergone eye checkups yearly once, 36% and 0.3% didn't have eye checkups so far in private and government schools respectively.

**CONCLUSION**

We conclude that prevalence of refractive errors more in private schools than government schools and myopia is the major among refractive errors. In most of them both the eyes are involved. Bitot's spots were more in government schools, suggesting the need of vitamin A supplementation.

**KEYWORDS**

Simple Myopia, High School Children, Ocular Morbidity.

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**INTRODUCTION:** The human eyes are by far the most precious of all our sense organs. They help us to see, appreciate and capture all that is of importance in the world to our life. It is the mirror of the soul and the body's window to the outside world. Blindness is one of the significant social problems in India. There are 1.4 million blind children in the world, two thirds of whom live in the developing countries, and of all the blind children it is estimated that 2,70,000 live in India.<sup>1</sup>

Refractive error is one of the most common causes of visual impairment around the world and the second leading

cause of treatable blindness. Inclusion of uncorrected refractive error would increase estimates of the worldwide prevalence of visual impairment by 61%.<sup>2</sup>

It is estimated that 2.3 billion people worldwide have refractive errors, out of which 1.8 billion have access to adequate eye examination and affordable corrections leaving behind 500 million people, mostly in developing countries with uncorrected error causing either blindness or impaired vision.<sup>3</sup>

Children usually do not complain of defective vision. They may not be aware of their problem. They adjust to poor vision or even avoid work that requires visual concentration. Blindness due to natural refractive error can hinder education, personality development, and career opportunities, in addition to causing an economic burden on society.<sup>2</sup>

Patterns emerging from epidemiological research indicate that the prevalence of myopia is increasing in

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economically developed societies worldwide.<sup>4</sup> This is particularly the case in East-Asian populations such as China, Hong Kong, Japan, Singapore and Taiwan<sup>5</sup> where the magnitude of this increase has led some researchers to suggest that East-Asia is host to a myopia epidemic.<sup>6</sup>

The prevalence of myopia has been reported to be as high as 70-90% in some Asian population with Taiwan reporting a myopic prevalence of 84% among 16-18 years old high school students.<sup>7,8</sup> About 13% of Indian population is in the age group of 7-15 yrs and about 20% of children develop refractive errors by the age of 16 years.<sup>9</sup>

Due to the high magnitude of uncorrected refractive errors, myopia is considered as one of the important public health problems, especially in the urban population in India. It has been given high priority under the National Programme for Control of Blindness. The school vision-screening programme is fully sponsored by the Government of India and free spectacles are provided to poor children. The programme is aimed to eliminate blindness due to refractive error by providing refractive error services at primary level with the availability of qualified paramedical ophthalmic assistants in the vision centre for every 50,000 population by the year 2020.<sup>10</sup>

On the basis of above literature as well as from the experience of the investigator with students and the responses, it was clear that the knowledge about the refractive errors is inadequate. Schools should be responsible for the early detection of refractive errors, treatment of squint and amblyopia, and detection and treatment of eye infections such as trachoma. The school child needs adequate knowledge about eye care, good health habit and prevention of eye disease. This has motivated us to conduct a study to provide an access to the school children to receive information regarding myopia.

**METHODS AND MATERIAL:** This is an institutional based cross-sectional study done for one year in Government and Private High Schools in Harazpenta which is the urban field practice area of Osmania Medical College, Hyderabad. Institutional Ethical Committee approval has been taken before doing this study.

**Inclusion Criteria:** All the children in the age group of 13-15 years of selected schools of urban field practice area who were on the day of the interview.

**Exclusion Criteria:** Children with defective vision due to other reasons like trachoma, corneal injuries or ulcers.

Out of 44 high schools enlisted in the Amberpet Mandal, Hyderabad, 12 were government high schools and 32 were private high schools. The list of schools was obtained from the Office of District Educational Office, Hyderabad District. A pilot study was carried out in one government and one private school.

After pilot study, necessary corrections were made and main study was done. Separate list of all the high schools, both the government and private were made and out of each list, 5 schools were picked up by lottery method of simple

random sampling method. From each selected school, all the students of 13–15 years were included in the study.

The sample size was calculated as follows:  $N=4 pq/l^2$ .

Where,

N=Number of participants included in the study.

p=Prevalence of myopia in school going children in the age group of 13-15 years (taken as 23%)<sup>40</sup>

q=100-p (77).

l=Allowable relative error, here taken as 10% of p i.e., 2.3.

Hence, the sample size is,

$$N=4 \times 23 \times 77.$$

$$(2.3)^2$$

$$=1339.$$

Non response rate taken as 15%, hence the final sample size is 1540 rounded to 1600.

#### **Refractive Error was Tested Using:**

1. Snellen's chart-for testing visual acuity.
2. Opaque disc perforated by small central hole- to conduct pin hole test.
3. Occluder-used for each eye testing separately.
4. Retinoscope—a trial box, a trial frame, self-illuminated vision box, streak Retinoscope.

Using pretested methods, pre designed questionnaire information was obtained from the children. The students were asked to fill the questionnaire, which was explained to them one day before the study. General data regarding socio demographic factors, family history pertaining to refractive errors and vitamin A deficiency, their life style activities involving near work activity were collected.

Visual acuity was tested using Snellen's chart—The details of students with poor vision were noted down in a separate register. The schools were revisited with a refractionist on a pre-fixed date. All the students with poor vision were examined by the refractionist. Objective refraction was performed with Streak Retinoscope which was followed by subjective refraction till the best corrected visual acuity was achieved. Children already wearing spectacles were also examined and change in power was noted.

Children with other ocular problems were referred to Dr. Sarojini Devi Eye Hospital, Hyderabad.

**Pin Hole Test:** Steps in procedure: The opaque disc perforated by a small hole is kept in front of the eye and evaluating vision whether better or worse or unchanged.

A substantial improvement of visual acuity with the pin hole test was found when refractive error or minor degree of opacification of the media are present. No improvement indeed some worsening of vision, may be found in retinal or neuroophthalmic disease and in cases having substantial opacification of the media.

**Retinoscopy:** Noncycloplegic retinoscopy was done, when best correction of visual acuity could not be achieved

cycloplegic refraction was advised for students and it was done at refraction unit at Sarojini Devi eye hospital.

**Subjective Verification of Refraction:** Performed by trial and error method with the help of a refractionist, both the eyes were tested separately.

Data was entered in Microsoft Excel 2007 and analysis was done using the Epi Info version 7. Data was summarized in percentages and proportions. The difference was considered to be statistically significant if  $p < 0.05$ .

**RESULTS:** A total of 1600 study population, each 50% were taken from government and private schools. 800 students from government schools and 800 students from private schools (in two private schools, few tenth class students were not included in the study to adjust the sample size) were included in the study. It was observed that among study population (1600), 1072(67%) school children were without any ocular morbidities and only 413(25.8%) children had refractive errors.

The prevalence of refractive errors was more in private schools (28.6%) than in government schools (23%) and prevalence of Bitot's spots was more in government schools (4%) when compared with private schools (2%) among studied population. Out of 413 refractive errors, 371 were confirmed as myopia by the refractionist. The prevalence of myopia, hypermetropia, astigmatism was tabulated in (Table 1). It was observed that myopia was the major refractive error (89.8%) among 413 studied children with total refractive errors, followed by astigmatism (6.1%) and hypermetropia (4.1%).

Among myopia detected cases in private schools, major complaint was headache among 124(60.2%) patients followed by difficulty in reading blackboard from back benches among 97(47.1%) children. In government schools, 65 patients presented with difficulty in reading black board from back benches (39.5%), followed by 51 patients with headache (31%) (Table 2).

Among the study population, prevalence of myopia was found to be 23.18% and it was 20.6% and 25.7% in government and private schools respectively among 1600 total studied children. In myopic children, both eyes were involved in 71.5%, right eye alone in 16.4% (Fig. 1).

It was observed that in the present study the number of newly detected myopia cases were 68(33%) and children who were already wearing spectacles (old cases) were 138 (67%) in private schools which were more than that of Government schools (64(38.8%) new & 101(61.2%) old cases).

In present study, both in government and private schools the majority of the myopic children were of mild degree myopia. Children with moderate degree myopia were more in private schools (15.5%) than in government schools (9.1%) (Table 3).

Out of 1600 children, only 478(60%) and 788(98.4%) were attending routine eye checkups yearly once at various hospitals on their own and 36% and 0.3% didn't have eye checkups at all so far in private and government schools respectively (Fig. 2).

Type of refractive error	Government school		Private schools		Total	
	Number	%	Number	%	Number	%
Myopia	165	89.7	206	90	371	89.8
Hypermetropia	8	4.3	9	3.9	17	4.1
Astigmatism	11	6	14	6.1	25	6.1
Total	184	100	229	100	413	100

**Table 1: Distribution of type of refractive errors in study population (n=413)**

Complaint*	Government schools		Private Schools		Total	
	Number of children	%	Number of children	%	Number of children	%
Difficulty in seeing blackboard from back benches	65	39.5	97	47.1	162	43.7
Headache	51	31	124	60.2	175	47.2
Eye Strain after near work	25	15.2	42	20.4	67	18.1
Half-shutting of the eye gives better vision	14	8.5	21	10.2	35	9.4

**Table 2: Common Complaints among myopia detected cases in Government and Private Schools**

(\*Multiple answers).

Degree of Myopia	Government Schools		Private Schools		Total	
	Number	%	Number	%	Number	%
Mild (<-0.5 D to -3.00 D)	149	90.3	174	84.5	323	87
Moderate (-3.00 D to -6.00 D)	15	9.1	32	15.5	47	12.7
Severe (<6.00 D)	1	0.6	0	0	1	0.3
Total	165	100	206	100	371	100

**Table 3: Classification of myopia based on degree of myopia (n=371)**

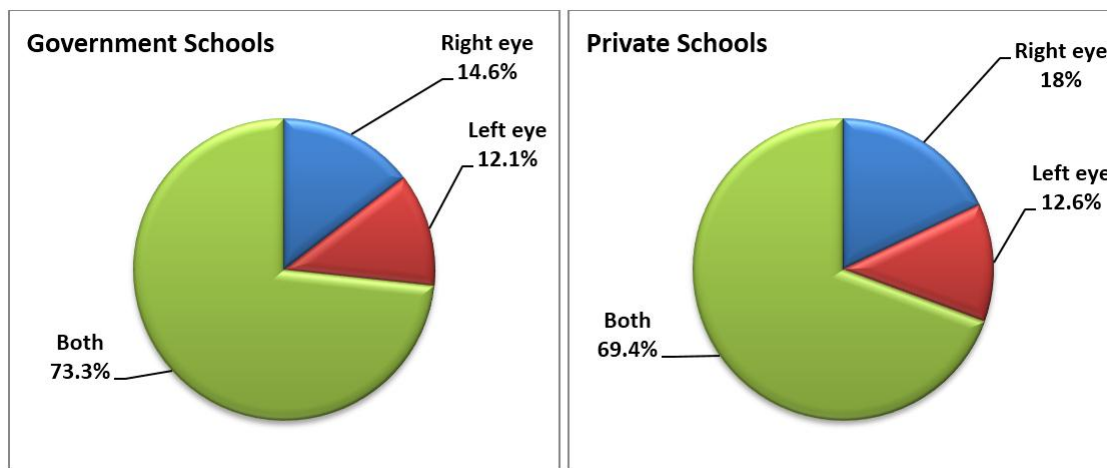


Fig. 1: Distribution of Myopic children according to involvement of eye

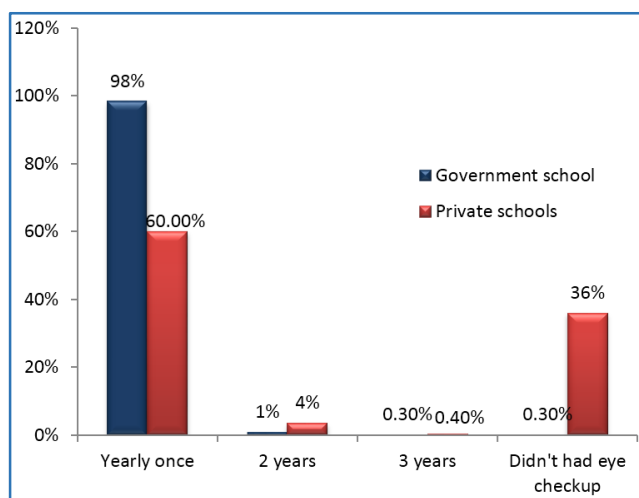


Fig. 2: Frequency of eye checkups among study population

**DISCUSSION:** A total of 285 million people are estimated to be visually impaired worldwide: 39 million are blind and 246 have low vision. About 90% of the world's visually impaired live in low-income settings. Globally, uncorrected refractive errors are the main cause of moderate and severe visual impairment; cataracts remain the leading cause of blindness in middle- and low-income countries.

The prevalence of refractive errors was more in private schools (28.6%) than in government schools (23%) and prevalence of Bitot's spots was more in government schools (4%) when compared with private schools (2%) among the studied population.

A study by Gupta M et al,<sup>11</sup> ocular morbidities were 31.6%. Prasanna Kamath BT et al<sup>12</sup> study on "prevalence of ocular morbidity among school going children (6-15 years) in rural area of Karnataka, South India" found the prevalence of ocular morbidity as 44.7% and in Kallikivayi et al<sup>13</sup> at Hyderabad observed that ocular morbidities were 43.5%.

In the present study, the prevalence of refractive errors was found to be 25.8%. From government and private schools, prevalence of refractive errors was found to be 23% and 28.6% respectively. Similar observations were found in the study done by Hussain A et al<sup>14</sup> in Tafila city where prevalence of refractive errors was 25.32% and in Sonam

Sethi et al,<sup>15</sup> prevalence of refractive errors were found to be 25.3%.

In contrast, Jabeen Rohul et al<sup>16</sup> in Kashmir found the refractive errors to be 54.62% and in Kallikivayi et al<sup>13</sup> prevalence of refractive errors found to be 41.5%.

In the study done by Shrestha RK et al<sup>17</sup> found that prevalence of refractive error was 10.6% in government schools and 11.66% in private schools. In study done by Ayub Ali<sup>3</sup> in Lahore found that refractive errors 16.3% in government and 23.3% in private schools.

Myopia (89.8%) was the major refractive error in the present study followed by astigmatism (6.1%) and hypermetropia (4.1%).

Study by Nisha Dulani on "Prevalence of Refractive Errors among School Children in Jaipur, Rajasthan" found myopia at 63.4%, astigmatism (25.8%) and followed by hypermetropia (11.35%).

Jabeen Rohul et al<sup>16</sup> observed that prevalence of myopia as 59.59% followed by astigmatism (35.23%) and hypermetropia (14.17%).

Among the myopic children in study population, new cases were 37.3% (n=132) and old cases were 62.7% (n=239). Similar observations were found in study done by Nisha Dulani et al<sup>18</sup> observed that new cases were 32.97% and old cases were 67.03% and in Sonam Sethi et al<sup>15</sup> new cases were 33.6% and old cases 66.4%.

We conclude that prevalence of refractive errors more in private schools than government schools and myopia is the major among refractive errors. In most of them both the eyes are involved. Bitot's spots were more in government schools suggesting the need of vitamin A supplementation. Only 60% (478) and 98.4% (788) have undergone eye checkups yearly once, 36% and 0.3% didn't have eye checkups so far in private and government schools respectively.

The school health services which are being implemented in government schools should be strengthened with adequate followup services and should include private schools also. Those children with family history of myopia should be screened at an early age. Health education should be imparted to children and parents about symptoms and complications about refractive errors.

**CONCLUSION:** We conclude that prevalence of myopia more in private schools than government schools. In most of them both the eyes are involved. The association between age detection of myopia and type of school was found to be statistically significant. ( $P < 0.001$ ). Bitot's spots were more in government schools suggesting the need of vitamin A supplementation. There is a need for the school health services which are being implemented in government schools to be strengthened with adequate followup services and should include private schools also. Health education should be imparted to children and parents about symptoms and complications about refractive errors.

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