

A STUDY OF VISION SCREENING IN SCHOOL GOING CHILDREN OF 7-15 YEARS*Lakshmoji Naidu Kotipalli¹, Trimurthulu Bunga²*¹*Assistant Professor, Department of Ophthalmology, Rangaraya Medical College, Government General Hospital, Kakinada.*²*Assistant Professor, Department of Ophthalmology, Rangaraya Medical College, Government General Hospital, Kakinada.***ABSTRACT****BACKGROUND**

Good vision is key to a child's physical development, success in school and overall well-being. It is essential to check children's vision when they are first born and again during infancy, preschool and school years.

AIM

The aim of the study is to screen the vision in school going children to detect any refractive errors and to prevent permanent blindness in East Godavari district, AP.

MATERIALS & METHODS

This is a cross sectional study of 2887 school children among Government and Private Schools in the area of Rangaraya Medical College, Kakinada, over a period of 2 years.

RESULTS

The observations from the study were analysed and compared with the existing literature and the factors influencing the prevalence of refractive errors were studied.

CONCLUSION

The incidence of Refractive Errors in this study was found to be 7.34%. The present study also indicates that the school age represents high risk group for refractive errors.

KEYWORDS

Myopia, Hypermetropia, Astigmatism and Amblyopia.

HOW TO CITE THIS ARTICLE: Kotipalli LN, Bunga T. A study of vision screening in school going children of 7-15 years. *J. Evid. Based Med. Healthc.* 2016; 3(59), 3157-3161. DOI: 10.18410/jebmh/2016/686

INTRODUCTION: Vision screening is an efficient and cost-effective method to identify children with visual impairment or eye conditions that are likely to lead visual impairment, so that any refractive error can be assessed at an early stage, by which an avoidable blindness can be prevented. Refractive error is one of the most common causes of visual impairment around the world and the second leading cause of treatable blindness. It was 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. There were 180 million visually disabled people in the world out of which 45 million people were blind. Four out of five of them were living in developing countries. About 80% of the blindness is avoidable. School going years are considered as the wonder years in a person's life.

These years are also the formative years which determines one's physical, intellectual and behavioural development. Any problem in the vision during the formative years can hamper the intellectual development, maturity and performance of a person in future. 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. Uncorrected refractive errors were the reason for defective vision in 141 (77%) and 121 (90%) students of urban and rural areas, respectively. The cluster-adjusted prevalence of uncorrected refractive error among urban and rural children was 5.46% (95% CI, 5.44-5.48) and 2.63% (95% CI, 2.62-2.64), respectively.¹

About 13% of Indian population was in the age group of 7-15 yrs. and about 20% of children develop refractive error by the age of 16 years. And 6-7% of children in the age group of 10-15 years in India have refractive errors affecting their learning at school. Considering the high true negative rates and reasonably good true positive rates and the wider coverage provided by the program, vision screening in schools by teachers is an effective method of identifying children with low vision.

*Financial or Other, Competing Interest: None.
Submission 16-06-2016, Peer Review 25-06-2016,
Acceptance 07-07-2016, Published 25-07-2016.*

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DOI: 10.18410/jebmh/2016/686*

This strategy is also valuable in reducing the workload of the eye care staff.² One out of every 5 school children had some refractive error. Conducting multicentre studies throughout the Middle East can be very helpful in understanding the current distribution patterns and aetiology of refractive errors compared to the previous decade.³

AIMS & OBJECTIVES OF THE STUDY: The Aim is screening of vision and evaluate the prevalence of refractive errors among school going children from 7-15 years of age group in East Godavari District AP, during the period of October 2010 to September 2012, under the area of Rangaraya Medical College, Kakinada.

MATERIALS & METHODS: This is a cross sectional study, in which 2887 school children of age group 7-15 years were studied from both Government and private schools in East Godavari District, Andhra Pradesh. There are 3716 government schools and 1456 private schools in this area. 4,49,983 children were studied from government schools and 2,83,793 children were studied from private schools. The visual acuity was assessed with Snellen's chart in Telugu and English, based on the student's preference. 2nd to 4th standard children who could not read the Snellen's chart were assessed with the E and Numerical charts and cross verified. In this study, the vision was tested for each eye separately. The cut-off level of visual acuity to denote failure was fixed at less than 6/6 in either eye. The details of Students with poor vision was noted down in a separate register. These children are instructed to visit Government General Hospital, Kakinada on given dates for their refractive error correction. Assessment of refractive error with automated refractometer followed by objective refraction was performed with retinoscope which then followed by subjective refraction till the best corrected visual acuity was achieved. Hypermetropes underwent cycloplegic refraction with Cyclopentolate 1% eye drops. Children already wearing spectacles were also examined and change in power was noted.

Inclusion Criteria:

- All children in the selected schools of East Godavari between 7-15 years (Both boys and girls).
- The students present on the day of visit.

Exclusion Criteria:

- Children with Defective vision due to other reasons i.e. Corneal Opacities, Phthisis bulbi, Microphthalmos, Congenital Cataract, Squint and other Congenital abnormalities.
- Students absent on the day of school examination.

Types of Refractive Errors studied are:

- Myopia.
- Hypermetropia.
- Astigmatism.

OBSERVATION & RESULTS:

1. Age Distribution: Out of 2887 school children in the study group, 36.54% were in the age group of 7 to 9 years, 41.38% were in the age group of 10-12 years and 22.08% were in the age group of 13-15 years. The mean age of the study population is 10.91 with standard deviation of 2.91.

Age in Years	No. of Children	Percentage
7-9	1055	36.54%
10-12	1195	41.38%
13-15	637	22.08%
Total	2887	(100)%

Table 1: Showing Age Distribution of Study Population

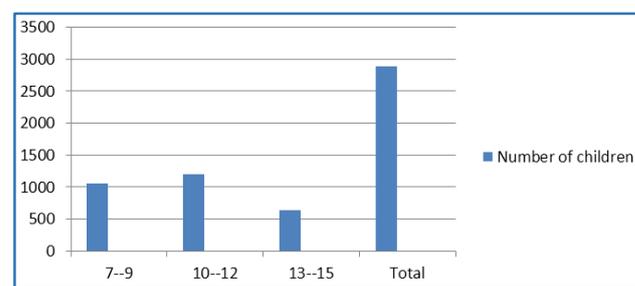


Fig. 1: Showing Age Distribution of Study Population

2. Class Distribution: It was observed that 41% of the study group was in 5th to 7th standard, 39.72% were in 2nd and 4th standard and 19.31% were from 8th to 10th standard.

Class	No. of Children	Percentage
2 nd to 4 th	1147	39.72%
5 th to 7 th	1183	40.97%
8 th to 10 th	557	19.31%
Total	2887	2887(100)%

Table 2. Showing Class Wise Distribution of Study Population

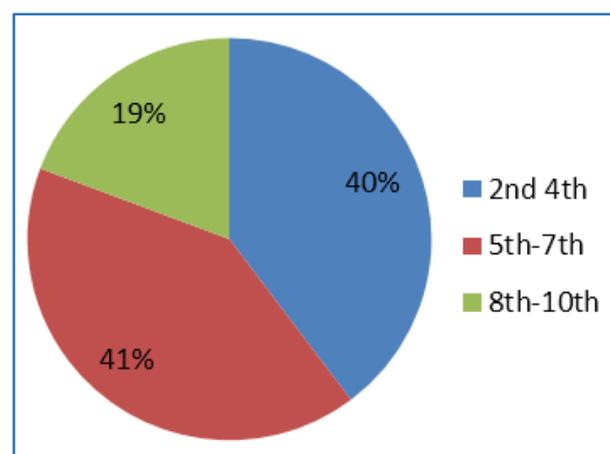


Fig. 2. Showing Class Wise Distribution of Study Population

3. Gender Distribution: The majority of the study population i.e., 52.02% were female children and male children constituted 47.98% of the study group.

Gender	No. of Children	Percentage
Boys	1385	47.98%
Girls	1502	52.02%
Total	2887	100%

Table 3: Showing Gender wise Distribution of Study Population

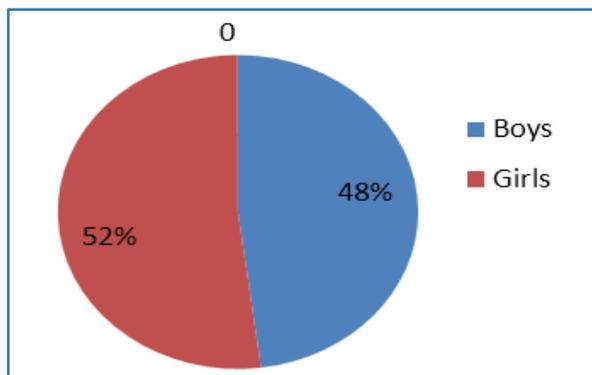


Fig. 3: Showing Gender wise Distribution of Study Population

4. Students with or without Refractive Error: The prevalence of Refractive error was found more (9.73%) in the 13- 15 year age group compared to 6.52% in 10-12 years age group, the association was not statistically significant.

Age Group in years	Refractive errors		Total
	Present (%)	Absent (%)	
7-9	72(6.8%)	983(93.2%)	1055
10-12	78(6.52%)	1117(93.48%)	1195
13-15	62(9.73%)	575(90.27%)	637
Total	212 (7.34%)	2675 (92.66%)	2887 (100%)

Table 4: Showing Age wise Distribution of Refractive Errors

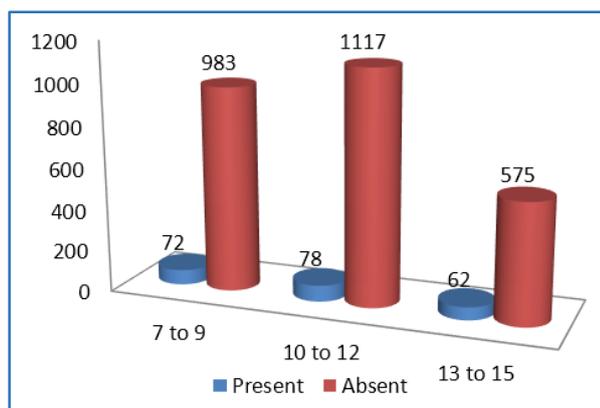


Fig. 4: Showing Age wise Distribution of Refractive Errors

Type of Refractive Errors	No. of Children	% Among the Cases	% Among the Study Group
Myopia	132	62.26%	4.57%
Hypermetropia	30	14.15%	1.04%
Astigmatism	40	18.87%	1.38%
Hypermetropic Amblyopia	10	4.72%	0.35
Total	212	100%	7.34%

Table 5: Distribution of Type of Refractive Errors among Cases & Study Group

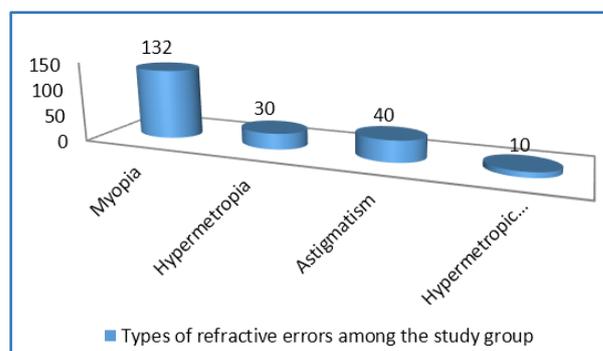


Fig. 5: Distribution of Type of Refractive Errors among Cases & Study Group

5. School wise distribution of Study population:

School Type	No. of Children	%
Government	1696	58.74
Private	1191	41.26
Total	2887	100.0

Table 6: Showing Government and Private School wise Distribution of the Study Group

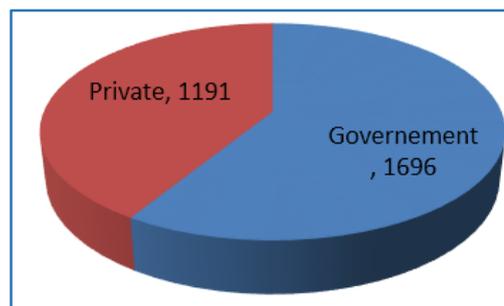


Fig. 6: Showing School wise Distribution of Study Population

6. Visual Acuity of the Children in Screening;

Vision By Investigator	No. of Children	%
6/6	2576	89.21
6/9	160	5.50
6/12	65	2.50
6/18	10	0.30
6/24	40	1.39
6/36	8	0.20
6/60	16	0.50
>6/60	12	0.40
Total	2887	100.0

Table 7: Showing Uncorrected Visual Acuity of the Children during Screening using Snellen's Chart

The above table shows the degree of vision that was detected during screening by the investigator using the Snellen's chart at a distance of 6 meters. Of the total 2887 students examined by the Ophthalmic Assistant, the number of students found to have Refractive error (vision <6/6) was 311 (10.77%), out of them 212 (7.34%) students were confirmed with presence of refractive errors by Refractionist/ophthalmologist.

7. Prevalence of refractive errors in Study Population:

No. of students examined	No. of Cases Detected by Ophthalmic Assistant		No. of Cases Confirmed by the Refractionist	
	No.	%	No.	%
2887	311	10.77%	212	7.34%

Table 8: Prevalence of Refractive Errors in Study Population

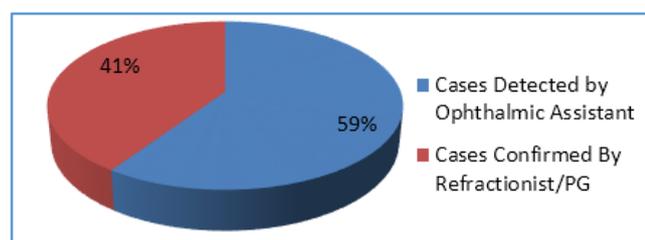


Fig. 8: Showing Prevalence of Refractive Errors in Study Population

8. Fundus Examination: Fundus pictures of all the students were within normal limits.

DISCUSSION: A cross sectional study on vision screening was undertaken in schools of East Godavari District, Andhra Pradesh. A total of 2887 students were examined out of which 58.74% were from government schools and 41.26% were from private schools. The study group had 52.02% girls and 47.98% boys. 36.54% children belonged to 7-9 years age group, 41.38% students were in 10-12 years age group and 22.08% of the children were in the age group of 13-15 years. In this study, various refractive errors were found and the results were analysed.

The incidence and proportion of myopia are relatively low in contemporary white UK population in comparison to other worldwide studies. The proportion of myopes in the UK has more than doubled over the last 50 years in children aged between 10-16 years and children are becoming myopic at a younger age. Differences between the proportion of myopes in the UK and in Australia apparent at 12-13 years were eliminated by 17 years of age.⁴ Though the difference in age wise prevalence of refractive error was not statistically significant ($p=0.1390$), higher prevalence (9.73%) was seen in the age group of 13-15 years and among children of 8th-10th standard (8.61%). The prevalence of refractive error was more in girls (9%)

compared to boys (5.48%) and this difference was statistically significant ($P=0.001$).

Myopia was the commonest type of refractive error; it constitutes 62.26% of the refractive errors. Hypermetropia was seen in 14.15% of the cases. Astigmatism was seen in 18.87% of the cases which includes myopic (more common) and Hypermetropic Astigmatism and Amblyopia (Hypermetropic more common) was seen 4.72%. The prevalence of myopia among primary and middle school students surveyed was 55.7%, the gender specific difference was statistically significant (59.7% for girls, 51.9% for boys) ($P<0.01$). The prevalence of myopia increased with age obviously. The prevalence was 35.8% in age group 6-8 years, 58.9% in age group 10-12 years, 73.4% in age group 13-15 years and 81.2% in age group 16-18 years, the differences were statistically significant ($P<0.001$).⁵ Whereas the prevalence of hypermetropia was found to be significantly higher in the younger age group of 7-9 years (71.4%), and also hypermetropia was significantly associated with female gender.

Future studies should use standardised methods to classify hyperopia and sufficient sample size when evaluating age-specific prevalence. Furthermore, it is necessary to deepen the understanding about the interactions among hyperopic refractive error and accommodative and binocular functions as a way of identifying groups of hyperopic children at risk of developing visual, academic and even cognitive function sequelae.⁶

Astigmatism was associated significantly with increase in age ($p<0.001$) and higher prevalence of 59.1% was seen in the age group of 13-15 years. In the present study, 10 children were found to be having Amblyopia. The burden of reduced visual acuity in preschool children in China was similar to that of Asian children of similar ages in the United States. Uncorrected refractive error and amblyopia were the principal causes for reduced visual acuity among preschoolers (aged three to 6 years) in China.⁷

CONCLUSION: These data support the assumption that vision screening of school children in developing countries could be useful in detecting correctable causes of decreased vision, especially refractive errors and in minimising longterm visual disability. The present study also indicates that the school age represents high risk group for refractive errors. Most of the children were unaware of their refractive errors. Amblyopia, strabismus, and refractive errors are common in young children. During the study period, the rates of hypermetropic amblyopia and strabismus remained stable, indicating the need for continued vision screening and treatment services. A van-based model, travelling directly to schools, appears to be effective in reaching young children in underserved communities.⁸

It is important to promote public education on the significance of early detection of refractive errors, and have periodic screening in schools.⁹ School children have a bright future and their formative years must not be hampered because of treatable blindness which if detected early and

treated timely can prevent children from developing Amblyopia as in some children of the present study group.

So emphasis has to be on screening children for any refractive error as a routine during admission into school and every 6 months thereafter and treated if any error found. National efforts to reduce preventable vision loss from amblyopia are hampered because children are not available for screening and because providers miss many opportunities to screen vision at pre-school age. Efforts to improve vision screening should target paediatrician-led practices, because these serve greater numbers of children.¹⁰ The teachers and health personnel who is working at root level has to be trained vigorously to rule out refractive errors in school going and below 15 years children by using simple Snellen's chart, there by referring those who has difficulty reading Snellen's chart to higher centre. Policy makers and Government officials have to be monitored regularly to avoid treatable blindness in school going children.

The high prevalence of amblyopia in our subjects in comparison to developed countries reveals the necessity of timely and sensitive screening methods. Due to the high prevalence of amblyopia among children with refractive errors, particularly high hyperopia and anisometropia, provision of glasses should be specifically attended by parents and supported by the Ministry of Health and insurance organisations.¹¹

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