



STUDY OF DIFFERENT REFRACTIVE ERRORS IN 10 TO 15 YEARS SCHOOL GOING CHILDREN

Ophthalmology

Dr. A. Venkateswara Rao

Professor & HOD Department of Ophthalmology Alluri Sitarama Raju Academy of Medical Sciences Eluru-534004 West Godavari district, Andhra Pradesh, India

Dr. M Venkatesh*

Postgraduate Department of Ophthalmology Alluri Sitarama Raju Academy of Medical Sciences Eluru-534004 West Godavari district, Andhra Pradesh, India *Corresponding Author

ABSTRACT

Objective: To study the prevalence of refractive errors in school going children of 10 to 15 years age group and to assess the spectacle wear compliance rate.

Materials and methods: 1378 school children of age 10 to 15 years of selected urban and rural schools in the field practice area were included in a cross sectional study. Follow up after 3 months was done to assess compliance rate.

Results: The prevalence of refractive errors was higher in 14-15 years age group, in girls, urban school children.

Conclusion: The 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 minimizing long term visual disability.

KEYWORDS

Refractive errors, Myopia, Hypermetropia, Astigmatism

INTRODUCTION :

The objective of learning begins in childhood and the accuracy of a child's vision can immensely affect or alter his/her learning capacity. In fact visual acuity to a child's future career is as fundamental as the act of breathing to sustain life.

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%¹. 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.

The World Health Organization has launched the Global Initiative Vision 2020 in 1999 with the slogan "The Right to sight," that has five priority areas. They have been chosen on the basis of the burden of blindness they represent and the feasibility and affordability of interventions to prevent and treat them². In context of vision 2020, the priorities for action to reduce childhood blindness in India are refractive error, cataract related amblyopia and corneal diseases³. The ultimate objective is to eliminate avoidable blindness by the year 2020⁴.

About 13% of Indian population is in the age group of 7-15yrs. And about 20% of children develop refractive error by the age of 16 years⁵. And 6-7% of children in the age group of 10-15 years in India have refractive errors affecting their learning at school⁶.

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.¹

In view, of the importance of detecting eye defects in school children this study is undertaken to know the prevalence of refractive errors among school children of selected age group and also to assess their compliance after intervention.

School age constitutes a vulnerable group. Uncorrected refractive error may have dramatic impact on the learning capability and educational potential of student. This warrants early detection. Timely detection and intervention can tremendously improve child's potential during his/her formative years.

PATIENTS AND METHODS:

1378 school children of age 10-15 years from selected government schools of urban and rural field practice area around our tertiary care hospital in south India from January 2016 to June 2017 were included in a cross sectional study.

Compliance after intervention was assessed after 3 months.

Each school was considered as a cluster. And three clusters from each area were selected randomly by lottery method. All the students in the age group of 10 to 15 years present on the day of examination in that school were examined. Headmaster of all the schools were approached before the screening and their written permission was obtained and a date was fixed for screening.

Materials used for vision test

1. Snellen's chart
2. Retinoscope
3. Trial set
4. Direct ophthalmoscope

Snellen's chart in English, Telugu and numbers was used on the basis of the students' preference. 5th and 6th standard children who could not read the Snellen's were assessed with the E 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. Children failing this test were listed.

The trial frame set also contains trial lenses which are a spherical, cylindrical and a prism. By a combination of spherical and cylindrical lenses excellent range of possible effect can be produced. Other accessories like plano lenses, opaque disc, pin hole and Maddox rod are all enclosed in a trial case.

All children with refractive error in the urban and rural schools were provided with spectacles free of cost with the help of Sri Bairaju foundation, Eluru. Children and their class teachers were briefed about the importance of wearing spectacles regularly. Children were instructed to wear spectacle in the school and also at home when studying and watching television.

An unannounced follow up visit to the schools to assess whether children were wearing their spectacles and to determine the reasons for noncompliance was conducted three months after the students received their spectacles. Direct inspection was done to see if the student was wearing spectacles. Children not wearing spectacles were asked the reasons for not wearing. Other information including age,

gender, and place of residence were noted from previous records. Teachers and students were again instructed about the importance of wearing corrective spectacles.

OBSERVATIONS AND RESULTS:

Table 1. Distribution of the study population according to age

Age in yrs	No. of children	Percentage
10 to 11	275	18.6
12 to 13	384	27.9
14 to 15	737	53.5
Total	1378	100

Table 2: Standard wise distribution of the study population

Standard	No. of children	Percentage
5 to 6	445	32.3
7 to 8	244	17.7
9 to 10	689	50
Total	1378	100

Table 3: Association of Socio-demographic variables with type of refractive errors

	Type of Refractive error			P Value
	Myopia	Hypermetropia	Astigmatism	
Age in years				
10 to 11	4 (6.6%)	10 (71.4%)	3 (13.6%)	<0.001**
12 to 13	16 (26.2%)	3 (21.4%)	6 (27.3%)	
14 to 15	41 (67.2%)	1 (7.2%)	13 (59.1%)	
Gender				
Male	28 (45.9%)	0 (0%)	11 (50%)	0.004**
Female	33 (54.1%)	14 (100%)	11 (50%)	
Class				
5-6 std	9 (14.8%)	13 (92.9%)	5 (22.7%)	<0.001**
7-8 std	11 (18%)	0 (0%)	4 (18.1%)	
9-10 std	41 (67.2%)	1 (7.1%)	13 (59.1%)	
Region				
Urban	38 (62.3%)	9 (64.3%)	12 (54.5%)	0.783
Rural	23 (37.7%)	5 (35.7%)	10 (45.5%)	
Total	61 (100%)	14 (100%)	22 (100%)	

DISCUSSION :

Present study was conducted to discuss the prevalence of Refractive errors so that an effective approach can be planned to tackle the burden of readily correctable refractive problems in school children.

Table 1 shows the age wise distribution of the school children in the urban and rural areas. Out of 1378 school children in the study group 53.5% were in the age group of 14 to 15 years, 18.6% were in the age group of 10-11 years and 27.9% were in the age group of 12-13 years.

The mean age of the study population is 12.5 with standard deviation of 2.45. This observation was similar to the one done by Sonam Sethi et al in their study on refractive errors in school children of Ahmedabad city where the mean age was 13.22 years⁵

In current study table 2 shows that 50% of the study group were in 9th to 10th standard, 17.7% were in 7th and 8th standard and 32.3% were from 5th to 6th standard.

Table 3 shows Association of Socio-demographic variables with type of refractive errors.

In our study most common refractive error seen among children is Myopia, which was more prevalent in females 33 (54.1%) as compared to males 28 (45.9%). Similar result was seen in the study by Sonam Sethi et al in Ahmedabad who found that 63.3% of students with refractive error had Myopia, 11.4% had Hypermetropia and 20.4% had Astigmatism.

The study shows the prevalence of refractive error is more with increasing age group, especially in the age group 14 to 15 years 41 (67.2%) when compared to age group 12 to 13 years 16 (26.2%) and 10 to 11 years 4 (6.6%).

Similar results were seen in a study conducted by S. Matta et al among the adolescent attending the ophthalmology OPD.

They found that the refractive error increased with increasing age especially in the age group of 10-14 years.⁷

The prevalence of refractive error was found to be significantly high in the urban area compared to Rural area in the present study.

This results are similar to the one found by Vivek Trivedi et al who compared prevalence of refractive error in children in urban and rural area of Gujarat in their population based study and observed that the prevalence was 4.9% in urban when compared to only 2.6% in rural children in the age group of 7-15 yrs.⁸

CONCLUSION:

Results of present study concluded that

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 minimizing long term 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. In spite of recommendations of the government the eye health services which is a component of school health services is not being implemented effectively in many parts of the country and prevalence of undetected refractive error still seems to be high.

There are very few Indian literature on prevalence of refractive errors and none on spectacle wear compliance after intervention. But they are essential to plan cost effective strategies to eliminate this easily treated cause of vision impairment. In this study, spectacle use compliance was only moderate, even when spectacles were provided free of cost. Compliance was poor among children with power of -0.5 or less, older and male children.

Barriers to spectacle use in children are likely to exist in all populations, but may vary in their nature and importance and therefore should be investigated in existing and new screening programs.

Much more needs to be done to determine the extent of the problem and more manpower and resources are needed to solve the problem of uncorrected refractive error. In addition to the prevalence data and compliance studies quality of life issues and impact of visual impairment on economic issues need to be studied so that their importance can be demonstrated to the public health decision makers.

REFERENCES

- Dandona R, Dandona L. Refractive error blindness. Bull World Health Organ. 2001; 79:237-243.
- World Health Organization. Preventing blindness in children: report of WHO/IAPB scientific meeting. Program for the Prevention of Blindness and Deafness, and International Agency for Prevention of Blindness. Geneva: HO, 2000 (WHO/PBL/00.77).
- Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. Bull World Health Organ 2008; 86:63-70.
- World Health Organization. Global initiative for the elimination of avoidable blindness. Programme for the Prevention of Blindness and Deafness. Geneva: WHO, 1997 (WHO/PBL/97.61).
- Sethi S, Kartha GP. Prevalence of refractive errors among school children (12-17 years) of Ahmedabad city. Ind Journal of Com Med; 2000; 25: 18183.
- Government of India (2004), Annual report 2003-2004, ministry of health and family welfare, New Delhi.
- Matta S, Matta P, Gupta V, Dev A. Refractive errors among adolescents attending Ophthal-mic OPD; Ind Joun Comm Medicine. 2006-04 - 2005-06; 31(2)
- Vivek T, Sandip Z, Janardhan V, Tapasi P. Prevalence of refractive errors in children aged 7-15 years in Gujarat, India, Feb 2006- April 2006. Url. <http://www.nhlmmcgym.com/indian-journal6.htm>. Retrieved on 15/9/2008.