Original Research Article

Screening of school children for ocular defects: A cross sectional study

Santosh V Patil

Associate Professor, Department of Ophthalmology, MRMC, Kalaburgi, Karnataka, INDIA.
Email: sanshrut30@gmail.com

Abstract

Background: Children are the wealth of a nation because tomorrow they will become its citizens and leaders. The economy and progress depends mainly on the younger generation. Hence they are to be nurtured to be the future pillars of the nation. Thus their health and development must be monitored at every step of their life. **Methodology:** Screening was undertaken with the help and active co-operation of the school management. In each of these institutions the assistance of that particular class-teacher and the physical instructor was made available. The class teacher was given the proforma's and general aspects like name, age, sex, class, address were filled up. The physical instructor was helpful in organizing the students into batches and in their general discipline. **Results:** Majority of ocular disorders fall in the category of refractive errors (54.93%), Conjunctival lesions (23.94%) and lesions of the Lids (12.68%). These three put together account for (91.55%) of the total number of student affected (65 of 71). **Conclusion:** The burden on society is thus proportionally higher. Hence, it becomes all the more important and imperative that ocular disorders are identified, treated and prevented at the earliest opportunity lest blindness overtakes. It should be noted that blindness is the most expensive and the most undesirable of all causes of serious physical disablement.

Key Words: Screening, School Children, Ocular Defects.

***Address for Correspondence:**
Dr. Santosh V. Patil, Associate Professor, Department of Ophthalmology, MRMC, Kalaburgi, Karnataka, INDIA.
Email: sanshrut30@gmail.com

Received Date: 10/01/2018 Revised Date: 02/02/2018 Accepted Date: 20/02/2018
DOI: https://doi.org/10.26611/1009527

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 24 February 2018

INTRODUCTION

The World Health Organization (WHO), the highest international organization which protects human rights for a healthy life defines health in its constitution as "a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity". The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being, irrespective of race, religion, and political belief, economic or social condition.[1,2] To achieve this aim, the WHO has coined the motto as " Vision 2020, Right to Sight" Good vision is certainly an important part of this state of well being. How far the developing countries have been able to achieve this state is questionable, even though the possibility to achieve this state is not beyond our reach or means, needing only an effort by Government, voluntary, social organizations and last but not the least, by one and all in society.[3] The ophthalmology authorities have modified the motto of WHO as "Vision 2020, Right to Sight". Healthy eyes and good vision are nature's gift and these are to be protected and preserved if a healthy human society is to be developed. Good habits develop easily in the minds of the young and so efforts must be made to catch them young. To achieve this school health programmes must be implemented and these must incorporate eye health too. Visual hygiene must be taught to students. Parents and teachers must also be aware of the importance of visual hygiene so that they can implement them and correct the children.[4] Children are the wealth of a nation because tomorrow they will become its citizens and leaders. The nation's economy and progress depends mainly on the younger generation. Hence they are to be nurtured to be the future pillars of the nation. Thus their health and

development must be monitored at every step of their life.[5] No one can deny the fact that the eyes are the most important of our sense organs. Good eye-sight plays a vital constructive role in the development of the faculties of the child. Most of our knowledge and skills are acquired by our eyes which are said to he the windows to the world. Bad eye-sight not only affects academic improvement, but in the long run causes untold damage to the psyche and self confidence of the child.[6] A child's school life is a crucial period of his development when good or bad abits become established. "Habits die hard", and hence is vital to teach them young to provide a better and healthier future generation. Health care centres must be available at every school and are more important in the rural areas. It is here that ignorance and superstition can ruin and damage a childs life. Periodic checkup is of utmost importance. Proper eye care and visual hygiene must be taught early enough to make it habit forming, and a part of every young child. The detection and correction of defective vision, squint, and other eye diseases are very important in the school going age. Most children are unaware of their defects and so are their parents and teachers. These undetected defects result in immense emotional stress and strain for the child. It must be emphasized that if an eye with gross refractive error and/or squint is not cared for or corrected at an early stage the eye would become amblyopic and useless for fine work at a later age.[7] Undetected eye problems can affect a child's academic and professional career. Unless the child can see the blackboard clearly and read print clearly, he would be branded as below average and will be under constant strain resulting in disinterest in these studies. This would definitely interfere with his academic career and progress, causing irreparable damage to his abilities psychologically. Later in life professions requiring good visual acuity and binocular vision may be closed to that child for no fault of his. To rectify these eye problems and prevent its economical, social, religious, professional complications; the burden lies on us eye care professionals.[8] Health care roles have been enlarged because of changing attitudes towards visually impaired persons. Formerly, the blind were considered useless to themselves and a burden to the society and hence they were deprieved of social status. Presently, the belief is that the handicap of visual impairment can be overcome, and these people should be incorporated into the ‘society of seeing people’. The reason for such a drastic and sudden change comes from major advancement in the identification, treatment, and rehabilitation of these patients.

Visual impairment can be sub-divided into

a. Low vision
b. Blindness

In 1977, the WHO in its 9th revision of International Classification of Diseases defined as,

a. Low vision as "that state of having a significant visual handicap with residual vision", and
b. Blindness as "that state of having no vision or no significant useable vision.

Various countries use their own yardstick to measure the grade or degree of visual impairment. In the U.K. a person is said to be 'blind' when his vision is so poor that he cannot perform any work for which eye sight is essential and a person with a vision of counting fingers at 3 meters or less is termed 'legally blind'. If it child is unable see clearly enough to read ordinary school books, they are called visually handicapped In the U.S. and Canada, an acuity of less than 6/60 has been set as the standard for blindness and in India, the standard used by Sommerset and Ghosh in 1951 was inability to count fingers at a distance of 1 meter, School children need to have a visual acuity of at least 6/18, although some of those with congenital nystagmus and a vision of only 6/60 may be able to read small print with ease. The problem of blindness in India like most socioeconomic problems is of colossal magnitude. It is extremely difficult to collect any data as to the nature of blindness in a vast country like India having different language problem, where people live in different environmental circumstances with varying socio cultural conditions, the majority of them being illiterate or ignorant.

MATERIAL AND METHODDS

The screening included both boys and girls in the age group of 5 to 15 years. Students from the Ist Standard to the Xth Standard were screened for any ocular disorders. Screening was undertaken with the help and active co-operation of the school management. In each of these institutions the assistance of that particular class-teacher and the physical instructor was made available. The class teacher was given the proformas and general aspects like name, age, sex, class, address were filled up. The physical instructor was helpful in organising the students into batches and in their general discipline. He was also briefed before the screening about what the study exactly aimed-at. He was given adequate training in the use of the "Snellens" chart for assisting in the recording of the distant visual acuity. Also with the help of pictures and charts, certain gross visual defects commonly encountered in children like for example: bitot spots, pterygium, conjunctivitis etc. were made familiar to him. First and foremost, all children included screening programme had their visual acuity tested, distance and near. Acuity for distance was tested with the standard optotypes of the "Snellen's" chart in English in big class rooms of 20' X 20' in good diffuse day light. A "Pinhole"

disc was used to find out any improvement in the visual acuity in those with defective visual acuity for distance. Each eye was tested separately. Near vision was tested with the standard near vision (printers) charts. Visual acuity was also tested with correction (with their own glasses) in those students who were already wearing glasses. Individuals with normal visual acuity of 6/ 6 were not subjected to further tests unless they had specific complaints. Colour vision in each eye of every student was tested using the 'Pseudoisochromatic test plates of Ishihara'. Visual field examination was performed as a routine by the `confrontation method' and only when necessary, was the individual asked to report at the Eye Department. Ocular muscle balance and the motor functions (extraocular muscle movements, ductions and versions) were routinely tested. Ocular muscle balance was tested using the `Maddox rod' and an illuminated light source hung over the Snellens test types. Cover test to augment the above procedure was done both for distance and near and for different directions of gaze, to determine binocular vision (Orthophoria, heterophoria or heterotropia). This was followed by the examination of the eye. This was done in two parts. In the first stage, both eyes of all students were examined carefully for the presence of any ocular lesion. If this was found, then the next stage of `special ophthalmological examination' was done at the Department of Ophthalmology of the Teaching and General Hospital on a subsequent appointment. Special examinations involved detailed examination of the eyes, as and when necessary, with the slit-lamp biomicroscope, detailed fundus examination (both direct and indirect ophthalmoscopes with mydriasis), refraction under mydriasis and cycloplepia, perimetry, campimetry, tonometry and orthoptic examination using the major amblyoscope (synoptophore). For the preliminary or primary examination, a good source of light of adequate intensity (a three celled torch) and a binocular loupe (X 2.5 magnification) and a uniocular loupe (X 10 magnification) was used. With this the anterior segment of the eyeball, viz., the bulbar conjunctiva, cornea, anterior chamber, iris, and the crystalline lens were examined, in addition to the adenexal structures like the eyelids, tarsal conjunctiva, medial canthus, the lacrimal puncta etc., particular care was taken to wash the examiners hands clean in a disinfectant lotion after the completion of the examination of each student and before the next student was examined.

RESULTS

In the present study a total of 1012 (100%) school children between the ages 5-15 were screened from various schools in Gulbarga city. Of them 542 (53.56%) were boys and 470 (46.44%) were girls. Thus the number of boys screened were more than the number of girls.

Table 1: Number of Students screened

Boys	Girls	Total
542	470	1012
53.56%	46.44%	100%

Out of the total number (1012) of children screened, 71 students (7.02%) were discovered to have some or the other ocular defect. Among the 542 boys screened, 42 i. e., 7.75% had ocular defects while amongst the girls, 29 i. e., 6.17% had ocular defects. Thus a higher incidence of ocular disorders were seen in boys as compared to the girls.

Table 2: Percentage of Students Affected

Sex	Number screened	Number Affected	Percentage incidence
Girls	470	29	6.17%
Boys	542	42	7.75%
Total	**1012**	**71**	**7.02%**

The break-up the figures for boys and girls screened and those affected in the different classes are as follows:

Table 3: Class-wise Distribution of Screened and Affected Students

Sex	Class1st	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Total
Boys	Number screened	51	48	46	49	53	59	51	53	57	55	542
	Number Affected	3	3	4	3	5	9	6	3	1	5	42
Girls	Number Screened	47	52	48	48	52	48	44	45	42	44	470
	Number Affected	4	1	1	3	3	1	4	6	4	2	29
Total	Number Screened	98	100	94	97	105	107	95	98	109	109	1012
	Number Affected	7	4	5	6	8	10	10	9	5	7	71
	% Affected in each class	7.14	4	5.32	6.19	7.62	9.35	10.53	9.18	4.59	6.42	7.02

From the above table it is observed that higher percentage of children were affected in 6th, 7th and 8th classes. Their percentage being 9.35%, 10.53% and 9.18% respectively. The various ocular disorders encountered in those 71 affected school children is classified as follows:

Table 4: Distribution of Various Ocular Disorders

Group Nature of Disorder	Number affected	Percentage	
I	REFRACTIVE ERRORS	39	54.93%
II	CONJUNCTIVAL LESIONS	17	23.94%
III	LESIONS OF THE LIDS	09	12.68%
IV	OTHER LESIONS	06	8.45%
Total	**71**	**100%**	

From the above table it is observed that the majority of ocular disorders fall in the category of refractive errors (54.93%), conjunctival lesions (23.94%) and lesions of the Lids (12.68%). These three put together account for (91.55%) of the total number of student affected (65 of 71).

Table 5: Detailed Distribution of Ocular Defects and their Percentage in Boys

Nature of the Disorder	Group Total	No. of Boys Affected	% Affected	Group%
I. REFRACTIVE ERRORS	25			59.52%
Myopia		18	42.86%	
Hyperopia		05	11.90%	
Astigmatism		02	4.76%	
II. CONJUNCTIVAL LESIONS	06			14.29%
XerosisandBitot spots		04	9.52%	
Spring catarrh		01	2.38%	
Conjunctivitis		01	2.38%	
III. LESIONS OF THE LIDS	06			14.29%
Blepharitis		02	4.77%	
Chalazion		03	7.14%	
Hordeolum		01	2.38%	
IV. OTHER LESIONS	05			11.90%
Squint and Amblyopia		02	4.77%	
Night blindness		01	2.38%	
Colour blindness		01	2.38%	
Corneal opacity		01	2.38%	
TOTAL	**42**	**42**	**100%**	**100%**

Total Number of Girls Screened	470
Total Number of Girls Affected	29
Percentage of Girls Affected	6,17%

Table 6: Detailed Distribution of Ocular Defects and their Percentage in Girls

Nature of the Disorder	Group Total	No. of Girls Affected	% Affected	Group°/
I. REFRACTIVE ERRORS	14			48.82%
Myopia		10	34.48%	
Hyperopia		03	10.34%	
Astigmatism		01	3.45%	
II.CONJUNCTIVAL LESIONS	11			37.93%
XerosisandBitot spots		08	27.59%	
Conjunctivitis		03	10.34%	
III. LESIONS OF THE LIDS	03			10.34%
Blepharitis		02	6.90%	
Hordeolum		01	3.45%	
IV. OTHER LESIONS	01			3.45%
Squint and Amblyopia		01	3.45%	
TOTAL	**29**	**29**	**100%**	**100%**

Table 7: Distribution Different Refractive Errors

Refractive Error	No. of Students Affected	Percentage
Myopia	28	71.80%
Hypermetropia	08	20.5 1 %
Astigmatism	03	7.69%
Total	**39**	**100%**

It is observed from the above table that among the refractive errors totalling 39, the pride of place goes to myopia (28 cases) followed by hypermetropia (8 cases) and the last place goes to astigmatism (3 cases). It is also observerd that nearly 2/3 of all myopes were boys and the number of boys with astigmatism and hyperopia is nearly twice as high as compared to girls.

Table 8: Showing Sex-wise Distribution of Refractive Error

Refractive Error	Boys	Percentage	Girls	Percentage	Total
Myopia	18	64.29%	10	35.71%	28
Hyperopia	05	62.50%	03	37.50%	08
Astigmatism	02	66.67%	01	33.33%	03
Total	**25**	**64.10%**	**14**	**35.89%**	**39**

The above table indicates that the type of refractive errors seen in both boys and girls, in the decreasing order was found to be myopia, hyperopia and astigmatism.

Table 9: Sex-wise Distribution of Different Conjuctival Lesions

Conjunctival Lesions	Boys	%	Girls	%	Total	
XerosisandBitot spots	04	33.33%	08	66.67%	12	0.59%
Conjunctivitis	01	25.00%	03	75.00%	04	3.53%
Spring catarrh	01	100%	--	--	01	5.88°/
Total	**06**	**35.29%**	**11**	**64.71%**	**17**	**100%**

Of the conjunctival lesions, totalling 17 in both boys and girls, xerosis accounted for 12(70.59%); followed by conjunctivitis 4(23.53%) and spring catarrh 1(5.88%). Girls showed twice the incidence ofxerosis as the boys. Xerosis was seen more prevalent in the junior classes (i.e, from Ist to VIth class). The other conjunctival lesions seemed to be more common among the girls than among the boys. Of the total 12 cases of xerosis, all of them showed patches of Bitot's spots (nasal, temporal or bilateral) in both eyes.

Table 10: Sex-wise Distribution of Lid Lesions

Lid Lesions	Boys	%	Girls	%	Total	%
Blepharitis	2	50.00%	2	50.00%	4	44.44%
Chalazion	3	100%	--	--	3	33,33%
Hordeolum	1	5000%	1	50.00%	2	22.22%
Total	**6**	**66.67%**	**3**	**33.33%**	**9**	**100%**

It is seen from above tabular data that lesions of the lids accounted for 9 out of 71 (12.68%) of all the affected cases. In this group, blepharitis was the commonest 4 /9 (44.44%) followed by Chalazion 3/9 (33.33%) and Hordeolum 2/9 (22.22%).

Table 11: Distribution of Curable and Incurable Ocular Defects

Defects	In Nos. In %	In Nos. In %
I. REFRACTIVE ERRORS	39	0
II. CONJUNCTIVAL LESIONS	17	0
III. LESIONS OF THE LIDS	09	0
IV. OTHER LESIONS	98.60%	1.40%
Squint and Amblyopia	03	0
Night Blindeness	01	0
Colour Blindness	0	01
Corneal Opacity	01	0
Total	**70**	**01**

Only 1.40% (i. e., only one case) of these cases fell into the category of incurable blindiness. In that too, genetic counselling and occupational guidance was advised.

DISCUSSION

Childhood is the period of growth and development and is subjected to factors of stress and strain. The defence mechanism is not fully geared to combat external infections, and cannot sustain for long internal deficiencies. Hence, childhood is a very vulnerable period. Children of school going age are exposed to communicable eye diseases, nutritional deficiencies and many may be suffering from refractive errors needing only simple corrections. Any negligence, however slight might at times cost the child his vision or even the loss of his eye. Hence many Indian ophthalmologists of repute have taken particular interest in screening school children for causes of visual impairment and blindness. The following are few such studies: In 1977, Sharma *et al*, examining 4900 primary school children in urban areas of Jodhpur city of Rajasthan found that nearly 4550 i.e., 92.86% were visually defective.[9] In the present study, trachoma was not detected in any of the student whereas the incidence of conjunctivitis is 0.39%, that of xerosis and bitot spots together is 1. 19%, both on the lower side. In contrast, the incidence of refractive errors is on the higher side i.e. 3.85%. In another study in 1974 by Surinder Singh *et al* on 11,813 school children in Patiala city, 7590 i.e, 64.25% were found to be harbouring some or the other eye disease.[10] It is observed that the present study has higher percentage of refractive errors (54.93%) whereas lower percentage of conjunctivitis (5.63%) and no case of trachoma was detected. The above study did not detect any case of xerosis and bitot spots in their screening of 11813 school children. Another interesting study is in from the same state (i.e., Karnataka) as is the present study which will perhaps be more comparable. James Kuruvilla *et al* examined 8,496 school children aged between 5-12 years in UdipiTaluk of South Karnataka district. 1061 (i.e., 12.5%) students were visually defective out of total 8496 students.[11] As with the present study no cases of trachoma were detected (as Udipi comes under low endemic region as classified by the trachoma control pilot project, India, I.C.M.R. 1956-63). Also the northern Indian states have higher incidence trachoma infection as has been seen from the various studies conducted in Northern India. K. Indirabai *et al* conducted a study of school children at Tirupati in Adhra Pradesh, while evaluating school Health Service Programme. Nearly 5900 primary school children within the age group 5-14 years were examined they noted Vit. A deficiency in 17.5% of the children screened.[12] The present study detected vitamin A deficiency in 1.28% of the 1012 school children screened. Athavale *et al* noticed xerosis in 1.2% of their cases screened. P.M. Shah *et al* observed incidence of xerosis ranging from 2.9% - 14%.Santhana Krishnan *et al* from Madras found 20.4% of school children having Vit.A deficiency.

CONCLUSION

A comparative study with a few other standard school surveys has been done in this work. Although the results are not numerically comparable (nor do they tally among themselves), they are helpful in arriving at certain common inferences. Thus, the principle causes of preventable visual impairment vary from one region to another and are ultimately related to ecological, environmental, socio-economical, seasonal and cultural factors, not to mention about the dietary habits and personal hygiene. In developing countries, in children, visual impairment associated with infections, nutritional deficiencies and trauma is much more common than it is in developed countries and affects the lower age groups.

REFERENCES

1. Ocular morbidity in school children in rural coastal area of Karnataka. J Kuruvilla et al , Indian Journal of Ophthalmology 1978.
2. Eye examination of school children in Madurai city. Venkatswamy G et al , 1966/volume:14 issue 4/ page 165-170 . IJO
3. Prevalence of myopia among urban school children. K Sandeep et al, JEMDS 2015
4. Prevalence of refractive error in school children. N Prema et al, Indian Journal of Science and technology 2011
5. The Kariapatti, pediatric eye evaluation project:baseline ophthalmic data of children aged 15yrs of younger in Southern India. P K Nirmalan et al, American Journal of Ophthalmology 2003
6. Ocular manifestations of vitamin A deficiency G Venkatswamy et al BJO 1967
7. Ocular morbidity prevalence among school children in Shimla North India. M Gupta et al , IJO 2009 ncbi.nlm.nih. gov.
8. Study of prevalence and pattern of refractive errors among school children 7 to15 yrs in urban schools [Peelamedu]. R Sushma - University Journal of Surgery 2017.
9. Study of procedures used for screening elementary school children for visual defects: Referrals by screening procedures versus Ophthalmological findings Crane MM et al, AMJ Public health Nations Health 1952.Nov: 42[11]1430-9
10. School eye health appraisal S Desai et al, IJO 1989
11. Refractive errors in school chidren in a rural population of India. R Dandona et al, investigative Ophthalmology and visual Science 43-3/2002/ 615-622.
12. Refractive errors in children in urban population in New Delhi. GVS Murthy et al, Investigative Ophthalmology and visual science 2002.

Source of Support: None Declared
Conflict of Interest: None Declared