Original Research Article

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Prevalence of ocular morbidities of children in higher primary schools in rural areas of Mangalore

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ABSTRACT

Background: Vision plays an important role in proper growth of a child, as poor vision can lead to reduction in the learning potential of a child. Various causes can bring about poor vision in children and proper evaluation at an early stage can help improve the quality of life. The objective of the study was to assess the prevalence of ocular morbidity in school children.

Methods: A cross-sectional study was conducted in 6 schools, which included Government and private schools around the field practice areas of a medical college. Eye examination was done which included testing for visual acuity, external examination and anterior segment examination with a pen torch and posterior segment examination with a direct ophthalmoscope. Statistical analysis: Data was analysed using SPSS.

Results: Of the 402 children, 51.5% of the children were males and 48.5% were females. All the children were aged between 10 and 13 years. The most common eye symptom the students presented with was headache on reading for long durations (24.6%). The overall prevalence of ocular morbidity was found to be 20.4%. Refractive errors were the most common cause of ocular morbidity (14.2%). Parental history of wearing spectacles had an association with ptosis in children (p<0.026) and faulty near vision (p<0.022).

Conclusions: Ocular morbidity is high in school going children. Since most of the causes of ocular morbidity are preventable or treatable, regular screening and early diagnosis and treatment can help improve the quality of life of children.

Keywords: Eye problems, School children, Cross-sectional study

INTRODUCTION

Vision is one of the most essential senses for daily activities. Poor vision can lead to suboptimal functioning of a person. It is very important to have good vision during childhood for proper development of the child, especially in the field of education. The learning potential of a child is affected by poor vision. This in turn leads to a poor quality of life throughout the life of the individual.

According to WHO, there are about 285 million people across the world suffering from visual impairment of which 39 million people are said to be blind.² There are

about 1.4 million children diagnosed with blindness in the world.³ Among these, 70-90% live in the low resource countries of Asia and Africa.⁴ It is seen that blindness is more prevalent in developing countries (1.5/1000) when compared to developed countries (0.3/1000).³ A national survey that was conducted in 2001-2002 on blindness showed that about 7% of the children aged between 10-14 years have eye problems. The most common causes of blindness in the developing countries are refractive errors, trachoma, xerophthalmia, and congenital cataract.⁴ As can be seen, most of these diseases are preventable or treatable. It has been found that 80% of the blindness is preventable.³

WHO along with IAPB brought out Vision 2020 in 1999 with the purpose of eliminating avoidable blindness by 2020 and to prevent increase in the number of blindness due to avoidable causes.³ In India, the National Programme for Prevention of Blindness was introduced in 1976. It constituted various components like school screening programmes, vitamin A supplementation and provision of free spectacles.⁵

An early detection and treatment of visual impairment can bring down the prevalence of blindness in the nation. Young children are unable to explain the visual symptoms that are present in visual impairment. It is seen that most of these cases get detected only after gradual decline in academic performances. School screening programmes that have been implemented since 1996 have been helpful in the screening of visual impairment at schools for early correction.⁴

METHODS

This was a cross-sectional study conducted in schools that are present in the field practice area of a medical college in Mangalore. Six schools were present in the two field practice areas, of which two were private and four were government schools. The study was conducted over a period of 3 months, from September 2016 to November 2016. Students from class 5 to class 7 were taken for the study. Permission to conduct the study in the schools were obtained from the principals and informed, written consent was taken from the parents. Children were accordingly informed regarding the eye examination. All the children who were present on the day of the examination were included in the study.

Sample size was determined taking prevalence of ocular morbidities as 22.3% from a previous study done in Chennai⁶. Using the formula N=4pq/d², where p is the prevalence, q is 100-p and d is the absolute precision of 5%, the minimum sample size was calculated to be 277. Since the total number of students in the six schools was 416, all the students present on the day of the examination were taken for the study and the final sample size was 402.

In the first part of the study, all the participants were interviewed personally. The data was collected using a semi-structured pre-tested questionnaire that consisted of:

- Socio-demographic data which included age, sex, and socio-economic status.
- 2. History of eye problems including details regarding spectacles use by either or both parents.

The second part of the study was the ocular examination which was done in a well lit room, 6 metres in length as per requirement.

 Visual acuity was assessed using Snellen's chart for distance vision and Jaeger's chart for near vision.

- 2. All the children who presented with poor visual acuity underwent pinhole testing.
- 3. Colour vision was tested using Ishihara's cards.
- 4. A torch light examination was done for anterior segment examination which included lids, cornea, conjunctiva, anterior chamber, pupil, iris and lens. Hirschberg test, extraocular movements, pupillary reaction, and convergence assessment were also done.
- 5. Cover test using distant and near targets was done to evaluate strabismus.
- Suspected cases of posterior segment abnormality underwent fundoscopy by an ophthalmologist in a dark room.

Refractive errors were diagnosed if a child presented with visual acuity 6/9 or less that improved on pinhole test. Children with poor visual acuity (6/18 or less) which didn't improve with the pinhole test and had no anterior segment abnormalities underwent the posterior segment examination.

Statistical analysis

The data obtained were entered into excel sheet and analysed using SPSS version 22. Descriptive data were analysed using frequency, percentage and proportion. If a student had more than one type of eye problem, he/she would represent as one case when calculating the prevalence of ocular morbidity. Appropriate statistical tests were done and p<0.05 was considered as significant.

RESULTS

In Table 1, of the 402 children, 51.5% of the children were males and 48.5% were females. All the children were aged between 10 and 13 years. Most of the children were 11 years old (35.6%) followed by 10 year olds (31.8%).

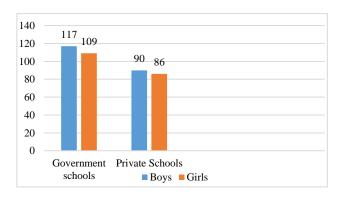


Figure 1: Distribution of students according to type of school (N=402).

In Figure 1, there were more number of children from government schools (56.2%) when compared to private schools (43.8%). In both types of schools, there were more male students than female students.

Table 1: Distribution of the students by age, class and sex (N=402).

		Males (%)	Females (%)	Total (%)	
Class	5 th Standard	64 (56.7)	49 (43.3)	113 (100)	
	6 th Standard	73 (49.6)	74 (50.4)	147 (100)	
	7 th Standard	70 (49.3)	72 (50.7)	142 (100)	
	10	72 (56.2)	56 (43.8)	128 (100)	
AGE (in years)	11	68 (47.5)	75 (52.5)	143 (100)	
	12	57 (50.9)	55 (49.1)	112 (100)	
	13	10 (52.6)	9 (47.4)	19 (100)	

Table 2: Frequency of symptoms of ocular diseases (N=402).

Symptom	Number of students (%)	
Redness of either eye	31 (7.7)	
Watering of the eyes	61 (15.2)	
Itching	60 (14.9)	
Foreign body sensation	19 (4.7)	
Difficulty in reading the blackboard	41 (10.2)	
Unable to read small letters	38 (9.5)	
Headache on reading for long durations	99 (24.6)	

Table 3: Distribution of students according to type of ocular morbidity (N=402).

Type of ocular morbidity	Overall number (%)	Males (%)	Females (%)
Refractive errors	57(58.2)	32(32.7)	25(25.5)
Allergic conjunctivitis	13(13.3)	7(7.1)	6(6.2)
Strabismus	10(10.2)	4(4.1)	6(6.1)
Ptosis	8(8.2)	5(5.1)	3(3.1)
Amblyopia	3(3.1)	3(3.1)	0(0)
Corneal opacity	2(2)	1(1)	1(1)
Xeropthalmia	2(2)	1(1)	1(1)
Cataract	1(1)	0	1(1)
Glaucoma	1(1)	0	1(1)
Colour blindness	1(1)	1(1)	0
Total	98(100)	54(55.1)	44(44.9)

Table 4: Association of spectacle use by parents with ocular morbidity of students.

Type of ocular morbidity		Parents of school who wear spectacles (N=153)	Parents of students who do not wear spectacles(N=249)	P value	
Refractive	Yes	32	30	- 0.022 ⁺	
errors	No	121	219		
Squint	Yes	3	7	- 0.748*	
Squint	No	150	242	0.748*	
D4	Yes	0	8	- 0.026*	
Ptosis	No	153	241	0.020*	
Amblyopia	Yes	1	2	0.676*	
	No	152	247	0.070**	

^{*}Fisher's Exact Test was used; +Chi square test was used.

In Table 2, the most common eye symptom that the students presented was headache on reading for long durations (24.6%), followed by watering of eyes (15.2%) and itching of the eyes (14.9%). History of spectacle use

by either or both parents was seen in 38.1% of the parents. In Table 3, the overall prevalence of ocular morbidity was found to be 20.4%. Refractive errors were the most common cause of ocular morbidity with 14.2%.

Refractive errors were seen more commonly in boys (56.1%) than girls (43.9%) but this difference was not found to be statistically significant.

In Table 4, parental history of wearing spectacles had a statistically significant association with ptosis in children (p<0.026) and visual impairment in children (p<0.022).

DISCUSSION

The overall prevalence of ocular morbidity in this study was 20.4%. Studies conducted in India have shown a wide range of prevalence of ocular morbidity, from 9.66% in Ahmednagar to 71.7% in Rajasthan.^{7,8} As per studies, higher ocular morbidity was seen in the North Indian states when compared to South Indian states. On comparison with international studies, the prevalence in the present study was found similar to studies done in Nigeria which showed a prevalence of 19.9% and Ethiopia which showed a prevalence of 18.6%. 9,10 However, the prevalence was much lower than a study done in Ghana which showed a prevalence of 47.1%, but much higher than a study done in South-east Nigeria which had a prevalence of 6.1%. This could probably be ascribed to the difference in sample size, wider age groups covered and geographical location of these studies as compared with the present study.

The most common cause of ocular morbidity in our study was found to be due to refractive errors with a prevalence of 14.2%. This was similar to a study done in Nainital, where the prevalence was 15.6%. Prevalence was much higher than studies conducted in Warangal (2.36%), Khammam (2.04%) and Kolkata (9.4%) and lower than (19.3%)studies conducted in Chennai Shimla(31.6%). 6,14-17 Certain studies done in other countries have shown variable prevalence of refractive errors, with a study done in Bangladesh showing a prevalence of 7.66% and 26.3% in a study done in Kwabre, Ghana. 11,18 The variation in the prevalence of refractive errors could be because of the difference in the lifestyles between urban and rural populations.

Allergic conjunctivitis was seen in 3.2% of the children. Similar results were seen in a study conducted in Maharashtra (2.57%).¹⁹ Higher prevalence was seen in studies conducted in Delhi (4.6%) and Gujarat (5.1%).^{20,21} The difference in prevalence in these studies may be due to seasonal variation and because of short duration of the illness.

Strabismus was seen in 2.5% of the children. This was similar to a study done in Ethiopia, which had a prevalence of 1.8%. Lower prevalence was seen in studies done in Ghana (0.9%), Warangal (0.42%) and Nainital (0.2%). 11,13,14

CONCLUSION

This study shows that there is a high prevalence of ocular morbidities in school going children and most of the causes like refractive errors, conjunctivitis and xerophthalmia are preventable or treatable. An early diagnosis of refractive errors can prevent blindness and hence regular eye screening should be strictly enforced in schools. School teachers should be properly trained to conduct the school eye screening programmes as a routine to detect eye problems in children at an early stage.

Limitations of the study

The age group taken for the study represents only a small part of school population. Screening all school children could have given a better picture of the current status of eye problems among school children.

Only school going children were taken for the study. Children who do not attend school do not undergo any screening and hence are at risk of going undiagnosed for early correctable visual impairment and might end up with visual complications and blindness.

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Institutional Ethics Committee

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