PATTERN OF OCULAR MORBIDITY AMONG SCHOOL CHILDREN IN BAGALKOT CITY

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ABSTRACT

Background: The objective of learning begins in childhood and the accuracy of a child's vision can immensely affect or alter the learning capacity. School going years are crucial in a person's life. Any problem in the vision during these formative years can hamper the intellectual development and performance of a person in future life.

Aim: To assess the prevalence and pattern of ocular morbidity among school children in Bagalkot city and to recognize avoidable causes of ocular morbidity.

Method: A cross-sectional study was undertaken in school children aged 6-16 years in Bagalkot city. Two schools were selected by simple random sampling and a total of 1010 students underwent complete ocular examination.

Results: Prevalence of ocular morbidity was found to be 9%. Refractive error (6.73) was found to be the most common cause of ocular morbidity followed by allergic conjunctivitis (0.9%).Other morbid conditions were strabismus, external hordeolum and blepharitis.

Conclusion: The prevalence of ocular morbidity in our study was 9%, uncorrected refractive errors (6.73%) being the most common, followed by allergic conjunctivitis (0.9%). There was no much difference in the prevalence of ocular morbidity between boys and girls. Higher prevalence was seen among high school students.

Key Words: Ocular morbidity, School children, Refractive error

BACKGROUND

The eye is a beautiful as well as an important sensory organ of the human body. Our eyes give us the sense of light, enabling us to learn more about the surrounding world. It is the mirror of the soul and the body's window to the outside world.

Child's ability to see plays a crucial role in his learning capacity. School going years are very important in a person's life and any problem in the vision during this formative period can hamper the intellectual development and performance of a person in his future life.

In India, during 2010 total child population was 345 million and number of blind children were 2,80,000 and the prevalence of blindness declined to 1.4% after vision 2020[1]. Childhood eye morbidity is defined as "Any eye disease or condition that requires ophthalmic care and treatment which if untreated can often progress to serious and sight-threatening disease" [2]. The pattern of ocular diseases varies in different parts of the world and is influenced by various factors such as racial, geographic, socioeconomic and cultural factors[3]. India has the second highest incidence of blindness in the world, particularly in younger age group and for the prevention of blindness, school is the best centre for implementing comprehensive eye health care[4]. Children do not complain about the defective vision. They adjust to the poor eyesight by sitting near the blackboard, holding the books closer to their eyes, squeezing the eyes and even avoiding work requiring visual concentration. Early detection and

treatment of defective vision to prevent permanent disability is of utmost importance. Schools are one of the best centres for effectively implementing the comprehensive eye health-care programme [5]. A study on ocular diseases in children is very important because while some eye conditions cause ocular morbidity, others invariably lead to blindness. In the light of above facts and with very little data available on ocular morbidity in children especially in our geographic area, the present study was conducted.

OBJECTIVES

(i) To assess the prevalence and pattern of ocular morbidity among school children in Bagalkot city.

(ii) To recognise the avoidable causes of visual impairment.

MATERIALS AND METHODS

Study design: This is a cross sectional and time bound study.

Source of data: Two schools were selected by simple random sampling in Bagalkot city.

Study population: All children between 6-16yrs of age (class 1 to class 10) in the selected schools were examined for visual impairment.

Inclusion criteria:
1) All children in the selected schools of Bagalkot city aged 6-16 years (class 1-class 10)
2) Children whose parents/legal guardians signed an informed consent.

Exclusion criteria
1) Those who are not willing to participate and absentees on the day of examination.

Sampling method:
Assuming 10.7% prevalence of ocular morbidity based on a pilot study and considering 95% confidence limit and 20% relative error, sample size worked out to be 905.

Sample size was calculated using formula,
$n=DEFF*N_p(1-P)/[d^2/Z^2_{1-a/2}]*N-1+P*(1-P)$
where-DEFF=Design effect
N_p=Infinite population.
P=prevalence of refractive error. d=20% relative precision.
But we examined a total of 1010 students.

METHODOLOGY

Two schools were selected in Bagalkot city by simple random sampling. Students in the age group of 6-16 years present on the day of examination were examined. Head master/

mistress of both the schools were approached and the permission was taken for the examination.

Students were examined by taking brief history and anterior segment examination was done using torch light and fundus examination with direct ophthalmoscope in undilated pupil. Snellen's chart in English and Kannada was used on the basis of the students' preference. The vision was tested for each eye separately. The cut off level of visual acuity to denote failure was fixed at less than 6/9 in either eye. Children failing this test were listed.

Details of the students with poor vision were noted down in a separate register. These students were given a parental consent form to be signed by their parents/legal guardians. The schools were revisited for refraction procedure on a pre-fixed date. All children with poor vision, who got the consent for detailed evaluation and dilated refraction were taken up to assess the refractive error under the cycloplegic effect of 1% Cyclopentolate, by streak retinoscopy and the appropriate glasses were prescribed after 1 week by post mydriatic test. Children who were already using spectacles were also examined and change in power was noted. Children with other ocular problems were referred to department of Ophthalmology in S. Nijalingappa Medical College, where they underwent examination by slit lamp biomicroscopy. Fundus examination was also done with indirect ophthalmoscopy after dilatation.

Children having following conditions were considered to have ocular morbidity:

- Visual acuity of <6/9 and improving with pinhole was considered to be refractive error.
- Vitamin A Deficiency was considered by recording Bitot's spot, Conjunctival and Corneal xerosis and night blindness. The history of night blindness was obtained from the child.
- Strabismus was diagnosed by recording corneal light reflex combined with extraocular movements and cover-uncover tests.
- A probable diagnosis of amblyopia was made if the vision was <6/9, not improving with pin hole and no organic lesion was detected after complete ocular examination.

The data was entered in microsoft excel spreadsheet and analysis was done using the statistical package for social sciences. Chi-square test has been used to find the significance of study parameters.

RESULTS

A cross-sectional study was undertaken to determine the prevalence and pattern of ocular morbidity in school children aged 6-16 years in Bagalkot city.

We examined a total of **1010** school children.

Table 1: Age-wise distribution of students in our study population

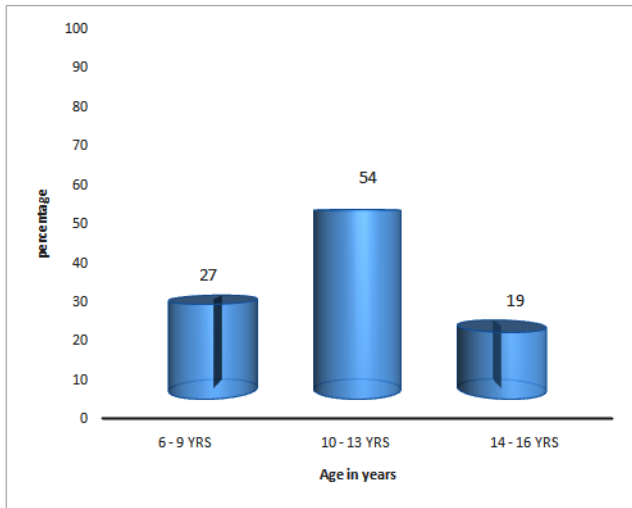| Age (in years)	Frequency	Percentage
6 – 9	268	26
10 – 13	549	54
14 – 16	193	20
Total	1010	100

Figure 1: Age-wise distribution of students in our study population.

Majority of the students in the school were in the age group of 10 – 13 years accounting for 54%. The mean age of the students was 11.13 years with Standard Deviation of 2.75 years. (Table 1, Figure 1)

Table 2: Gender – wise distribution of the students in the school

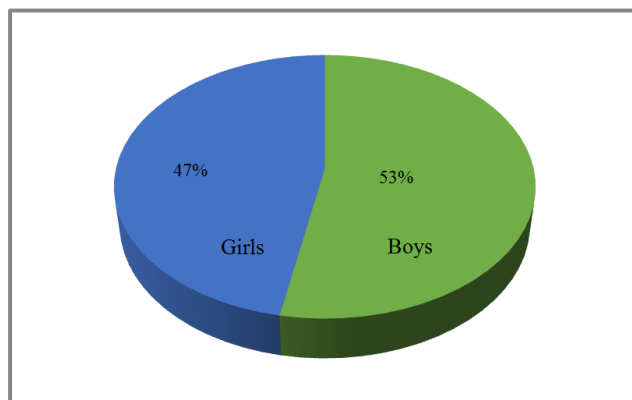| Gender	Frequency	Percentage
Boys	534	53
Girls	476	47
Total	1010	100

Figure 2: gender wise distribution of the students in the school.

In our study, boys outnumbered the girls. Among **1010** students, **534 (53%)** were boys and **476 (47%)** were girls. (Table 2, Figure 2)

Table 3: showing Prevalence of ocular morbidity among school children

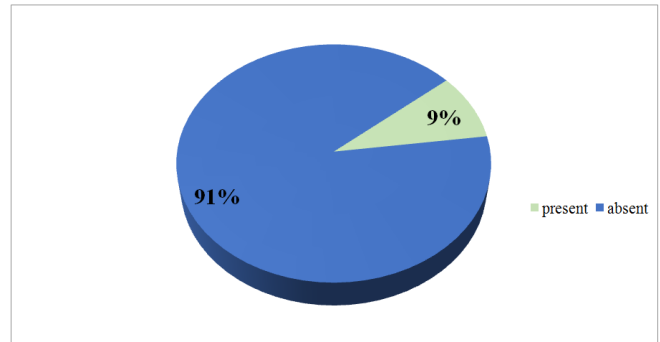| Ocular morbidity	Frequency	Percentage
Present	91	9
Absent	919	91
Total	1010	100

Figure 3: Showing Prevalence of ocular morbidity among school children

Out of 1010 students examined, prevalence of ocular morbidity was found to be 9%. (Table 3, Figure 3)

Table 4: Showing prevalence of ocular morbidity according to age:

Age in years	Ocular Morbidity		Total	Age-wise prevalence
	Yes	No		
6 - 9 yrs	23	245	268	8.58%
10 - 13 yrs	42	507	549	7.65%
14 - 16 yrs	26	167	193	13.47 %
Total	91	919	1010	

In our study, though more number of students was in the age group 10-13 years, there was higher prevalence of ocular morbidity in the age group of 14-16 years. (Table 4)

Table 5: prevalence of ocular morbidity according to Gender:

		Ocular Morbidity		Total	Gender wise Prevalence	Overall prevalence
		Yes	No			
Gender	Boys	48	486	534	8.98%	4.75
	Girls	43	433	476	9.03%	4.25
Total		91	919	1010		9.00

There was no much difference in the prevalence of ocular morbidity between boys and girls. But there was no statistically significant association between ocular morbidity and gender.(Table 5)

Table 6: showing pattern of ocular morbidity among school children:

Types of ocular morbidities	Frequency
Refractive error	68
Allergic conjunctivitis	9
Squint	4
External hordeolum	4
Bitot spots	3
Chalazion	2
Blepharitis	2
Bilateral limbal dermoid	1
Severe ptosis and lisch nodules in both eyes	1
Blepharitis and external hordeolum in right eye	1
Left eye macular toxoplasmic scar	1
Nystagmus with ptosis.	1
Vernal keratoconjunctivitis	1

The most common cause of ocular morbidity in our study was refractive error, accounting for 6.2%. (Table 6)
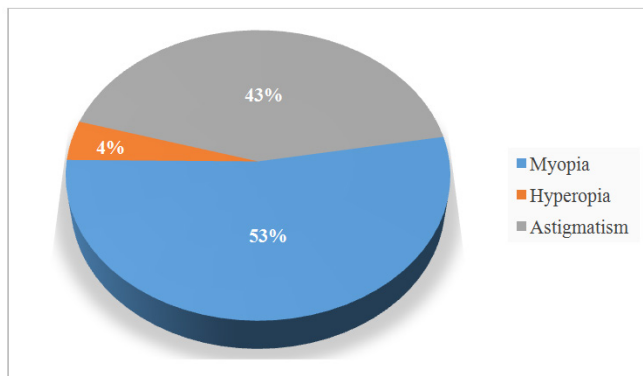

Figure 4: Showing Type of Refractive Error among School Children

Out of 68 students with refractive error, 36 (53%) of them had myopia, that being the most common type of refractive error in our study, followed by astigmatism which was seen in 29(43%) students. The least common was hypermetropia(4%)

DISCUSSION

In our study majority of the students in the school were in the age group of 10 – 13 years. This observation is similar to the study conducted by Harpal Singh in Bhopal where more number of students was seen in the age group 9-12 years followed by 13-16 age group. [6]

Prevalence of ocular morbidity in our study was found to be 9%. Similar finding was observed in a study by Jha K N in

their Baseline Ophthalmic Data of School Children aged 15 years or younger in Leh, Jammu and Kashmir, India where they found the prevalence of ocular morbidity to be 10.79 %[7]. In other study by Lu P, Chen X, et al., the prevalence of ocular disease in Tibetan primary school children focused on assessing childhood ocular morbidities showed a prevalence of 11.07%[8].

Prakash Prajapati, Jaydeep Oza, et al., in their study found the prevalence of ocular morbidity among school adolescents to be 13% [9].

On the other hand various other studies conducted across India showed higher prevalence. Rajesh Kumar *et al.*, in their study found the prevalence of ocular morbidity to be 24.6%[10]. Madhu Gupta, Bhupinder P Gupta et al. conducted study on prevalence of ocular morbidity among school children and observed the prevalence to be 31.6%[5]. S Mahapatro et al. studied the prevalence of ocular disorders in school children in rural area surrounding Bhubaneshwar which was found to be 16.8%[11]. A study was conducted by Deshpande Jayant D et al., to find the prevalence of ocular morbidities among schoolchildren in rural area of North Maharashtra where the prevalence of ocular morbidities was 27.65%[12]. In another study by Harpal Singh in Bhopal, Madhya Pradesh the prevalence of ocular morbidity was found to be 14.5% [6].

These variations might be due to different geographical, socio economical variations among study participants.

There was no much difference in the prevalence of ocular morbidity between boys and girls in our study. Similar observation was found in a study done by B P Nepal *et al.,* among schoolchildren in Kathmandu, Nepal where the prevalence among males and females was 5.10% and 5.9 % respectively [13]. But high prevalence was found in a study by Madhu Gupta *et al.,* 32.5% males and 30.6% females were having ocular morbidity[5].

The most common cause of ocular morbidity in our study was refractive error, accounting for 6.2%. Similar results were found in the following studies: Refractive error was the most common cause of ocular morbidity in the study conducted by Pankaj Kumar *et al.*, accounting for 6.22% [14]. Madhu Gupta *et al.,* also observed refractive error to be the most common cause of ocular morbidity, but the prevalence was as high as 22% [5].The commonest cause of ocular morbidity in the study conducted by Rajesh Kumar *et al.*, in Delhi was refractive errors with a prevalence of 5.4% [10].

In a similar study by Harpal Singh in Bhopal, refractive error was found to be the most common cause of ocular morbidity (6.94%) followed by vitamin A deficiency (1.98%) and strabismus (0.30%)[6].In another population based study in Gujarat conducted by Vivek T, Sandip Z, *et al.,* it was found that refractory error was the main cause of ocular morbidity (7.5%)[15].

In our study 53% students had myopia, that being the most common type of refractive error, followed by astigmatism which was seen in 43% of students. The least common was hypermetropia seen in 4% of the students. This was similar to the results found by Sonam Sethi *et al*., in Ahmedabad where 63.3% of students with refractive error had myopia, 11.4% had hypermetropia and 20.4% had astigmatism [16]. When refractive errors was studied by S Matta *et al*., among the adolescents attending out-patient department of ophthalmology in New Delhi, it was found that out of 124 children with refractive error 55.6% had myopia, hypermetropia was seen in 16.9% of the cases and astigmatism was seen in 27.4% of the cases [17] Whereas in a study done by Kalkivayi V *et al*. it was found that hypermetropia was the commonest type of refractive error which was seen in 22.6% of the school children, myopia was seen in 8.6% and astigmatism in 10.3% of the study population aged 3-18 years [18].

CONCLUSION

The prevalence of ocular morbidity in our study was 9%, uncorrected refractive errors (6.73%) being the most common, followed by allergic conjunctivitis (0.9%). Other morbid conditions were strabismus, external hordeolum and blepharitis. There was no much difference in the prevalence of ocular morbidity between boys and girls. Higher prevalence of ocular morbidity was seen among high school students.

From these data we can say that vision screening of school children could be useful in detecting the correctable causes of defective vision, especially refractive errors. By doing vision screening of school children, long term visual disability can be minimised. Most of the children were unaware of their refractive errors. The prevalence of undetected refractive errors and other ocular morbidities still remains high therefore the eye health services which is a component of school health services should be intensified and implemented effectively.

ACKNOWLEDGEMENT

REFERENCES

1. Chandra Arvind, Gilbert Clare. When your eyepatient is a child. Community eye healthjournal.2010;23(72):l-3.Available on http://www.cehjournal.org.(Cited on 12/10/2011)

2. VISION 2020: The Right to Sight-How Does Vision 2020 Work? Available from http://www.vision2020.org (Cited on 10/6/2010).

3. Sharma Seema, Bashisth BM, Kalhan Minakchi, Goel Manish. Ocular infection in school children in a rural block of Haryana. The Internet Journal of Epidemiology 2009; 6(2).DOI number: 10.5580/1b57.

4. Sharma SP, Albal MV, Chadrorkar AG. Xeropthalmia in rural & urban anganwadi children. Indian J of ophthalmology1984; (32):335-337.

5. Gupta Madhu, Gupta Bhupinder P, Chauhan Anil, Bhardwaj Ashok. Ocular morbidity among school children in Shimla, Himanchal, North India. Indian J of ophthalmology2009; 57(2):133-138.

6. Singh Harpal. Pattern of ocular morbidity in schoolchildren in central India. National J of Community Med 2011;2 (3):429-431.

7. Jha KN, Baseline Ophthalmic Data of School Children Aged 15 Years or Younger in Leh, Jammu and Kashmir, India. Journal of Clinical and Diagnostic Research2008;4(2):1186-1190.

8. Lu P, Chen X, Zhang W, Chen S, Shu L. Prevalence of ocular disease in Tibetanprimary school children. Canadian J of Ophthalmology 2008; 43(1):95-99.

9. Prajapati Prakash, Oza Jaydeep, PrajapatiJagruti , KediaGeeta-Chudasama, Rajesh K. Prevalence of Ocular Morbidity Among School Adolescents of Gandhinagar District, Gujarat. Online Journal of Health and Allied Sciences 2010; 9 (4):102-103.

10. Kumar Rajesh, Dabas Pratibha, Mehra Malti, Ingle G.K., Saha Renuka, Kamlesh. Ocularmorbidity amongst primary school children in Delhi. Health and population 2007; 30(3):222-229.

11. MahapatroS, M K Das, G K Padhy, S S Kar, A K Nanda, Prevalance of Ocular Disorders In School children In Rural Area Surrounding Bhubaneswar, Indian J of Community Med 2010;6 (1):502-504.

12. Deshpande J D, Malathi K. Prevalence of Ocular Morbidities Among School Children In Rural Area Of North Maharashtra In India. National J of Community Med 2011; 2(2):302-304.

13. Nepal BP, Koirala S, Adhikary S, Sharma AK. Ocular morbidity in school children in Kathmandu. British Journal of Ophthalmology2003; 87(5): 531–534.

14. Pankaj Kumar et al. Sch J App Med Sci 2013; 1(5):645-652 646.

15. Trivedi V, Zalawadiya S, Bhatt JV, Pawar T, Kupmavat B. Prevalence of refractive errors in children (age group 7-15 yrs) of rural and urban area of Gujarat: A population based study. Journal of Applied Basic Medical sciences 2006; 8(1):128-35.

16. Sethi S, Kartha GP. Prevalence of refractive errors among school children (12-17years) of Ahmedabad city. Indian J of Community Med 2000; 25: 181-83.

17. Matta S, Matta P, Gupta V, Dev A. Refractive errors among adolescents attending Ophthalmic OPD; Indian J Community Med. 2006-04 - 2005-06; 31(2)

18. Kalikivayi V, Naduvilath TJ, Bansal AK, Dandona L. Visual impairment in school children in Southern India. Indian J Ophthalmology 1997;45:129-34.