PREVALENCE OF OCULAR MORBIDITIES AMONG SCHOOL CHILDREN IN A RURAL AREA OF SOUTH INDIA

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ABSTRACT

Schools are ideal setting to implement screening services for eye healthcare program. We conducted a study in schools around the Primary Health Centre Sampaje which is under the KVG Medical College, Sullia with objectives of appraising various ocular symptoms in the children and studying the prevalence of refractive errors, squint, vitamin A deficiency, conjunctivitis and color blindness among the children.

This was a cross sectional study conducted between July and October 2009 using a predesigned structured questionnaire and ocular examination on a total number of 1938 students attending 30 schools in the Sampaje Primary Health Centre (PHC) area. Prevalence of total ocular morbidity was 20.12% of which Refractive errors constituted 17.1%. (Myopia 16.9% and Hyperopia 0.20%), Squint 2.1%, Vitamin A deficiency 0.6%, Conjunctivitis and Color blindness 0.5%. An alarming prevalence of ocular morbidity of about 20% was demonstrated in the present study.

Also, since majority of children (76%) with ocular morbidity in the present study were asymptomatic, the need for active screening of all school going children for the various ocular morbidities is imperative.

KEYWORDS

Ocular symptoms, Refractive errors, Rural school children, India

INTRODUCTION

A large proportion (approximately 41%) of the over 1 billion population of India is aged younger than 16 years. 4 Blindness and visual impairment in children is now recognized as a priority by blindness control programs including VISION 2020—The Right to Sight initiative.5 An estimated number of 200 000 to 300 000 children in India suffer from severe visual impairment or blindness.6-8 This represents only a small percentage of the estimated 5 million blind in India but it is significant in terms of 'blind person years'.

Childhood blindness and visual loss will have an impact on the child's development, education, future employment opportunities and quality of life leading to serious social & economic consequences on the family and the society. Fifty percent of all childhood blindness in India is preventable or treatable. Knowledge of the prevalence and causes of visual impairment and blindness is required especially in rural India. School is an ideal setting to implement screening services for eye healthcare program, especially in rural areas. Hence, this study was conducted to estimate the prevalence of ocular morbidity among rural school children.

METHODS

A cross-sectional study was conducted among school children of Sampaje Primary Health Centre area of Kodagu District (Karnataka State, South India) from the months of July to October 2009. The total population of Sampaje PHC is approximately 18800. Languages spoken by the locals are Tulu and Kannada. There are 30 schools (27 Government and 3 Private). Out of 2090 students registered in all the schools, 1938 students who were present on the day of examination were included. The local district literacy rate is 82.5% and school enrolment proportion is 99%.9

A pre-designed structured questionnaire based on the review of literature was used to interview the school children. The questionnaire included questions on detailed history about present and past ocular problems and treatment, history of any other medical or surgical treatment and family history. Questions were administered in Kannada, the local language, by trained medical interns. The questionnaire was pilot tested for comprehension on a group of 50 school children. For children between 5-7 years, parents were contacted for confirming the history given by the child. A standard examination procedure was used for each study subject.

Ocular examination included assessment of visual acuity for distance with Snellen's chart at room illumination and for near with near vision test types. A pinhole test was followed by refraction under cyclopegia by an ophthalmic assistant to confirm presence of refractive error.

Ishihara's chart was used to identify presence of color blindness and Axis deviation (squint) was assessed by torch light examination. Vitamin A deficiency diagnosis was made if child had history of night blindness, or on examination there were signs of conjunctival xerosis, Bitot's spots, corneal xerosis or keratomalacia. Examinations of the students were conducted after obtaining consent from the respective school authorities and parents.

All children identified with ocular morbidities were provided appropriate management through an ophthalmic assistant and /or an ophthalmologist. Ethical committee clearance was obtained from the ethics committee of KVGMC, Sullia (Institutional Review Board). Investigations were performed according to the guidelines of Declaration of Helsinki. Interviews were conducted before all ocular examinations. Statistical analysis was performed using SPSS Version 11.5. Chi-square test was used as test of significance of difference between proportions at 95% significance level.

RESULTS

A total of 1938 children attending 30 schools were screened. The age of children was in the range of 5 to 17 years. There were 1024 (52.8%) male children while 914 (47.2%) were females. The distribution of children by gender and education level is given in Table 1. Ocular symptoms were found only in 93 children (93/1938, 4.8%). However, a greater proportion of children (390/1938, 20.12%) presented with one or combination of ocular morbidities. Two hundred and ninety seven students who were identified with one or more ocular morbidities were asymptomatic (297/390, 76.1%). However a significantly greater proportion of children with ocular morbidity presented with symptoms (Table 2). The most common symptom (Table 3) was persistent headache (32/1938, 1.7%) followed by watering of eyes (29/1938, 1.5%).

Refractive errors were the commonest ocular morbidity and were seen in 17.3% (336/1938) of students, followed by squint, Vit. A deficiency, conjunctivitis and color blindness (Table 4). Out of the 336 children presenting with refractive errors, myopia was predominant (332/336, 98.8%) compared to hyperopia (4/336, 1.2%). Myopia was uniocular in 88 and binocular in 244 children (Table 5). Refractive errors did not differ significantly between the genders. Only a small proportion of myopics were symptomatic (16/332, 4.8%).

DISCUSSION

In all, 1938 school children were examined out of which 390 children were found to have one or the other ocular problems showing an ocular morbidity rate of 20.12%. Lower rates of ocular

morbidity has been reported by Kuruvilla et al10 (12.5%) in rural coastal area of Karnataka. Chaturvedi et al11 showed an ocular morbidity prevalence of 40% among school children in rural parts of Delhi whereas Madhu Gupta et al4 showed 31.6% in urban areas of Shimla. The present study showed lower prevalence of ocular morbidity compared to other studies done in north India.

It was observed that, of all the ocular morbidities, refractive error was the most common with a prevalence of 17.3% which is lower than the findings by Madhu Gupta et al4 (Shimla), Sethi et al12 (Ahmedabad) and Desai et al13 (Jodhpur) where the prevalence of refractive error was 22%, 25.31% and 20.8% respectively. The prevalence of squint as reported by Madhu Gupta et al4 (Shimla), of 2.5% is comparable to 2.1% prevalence in this study. However, higher (7.4%)14 and lower (0.215& 0.19%16) rates of squint have been reported from studies done in other parts of India. Vitamin A deficiency up to an extent of 5- 10.6%6, 11, 15 has been reported in various studies as compared to 0.6% in our study.

The lower rates may be due to better utilization of Vitamin A prophylaxis program and better nutrition (people in this region routinely consume green leafy vegetable called “basale” which is rich in vitamin A). Higher prevalence 3.27% of conjunctivitis has been seen in the past in a study conducted by Singh S et al16 in Patiala but a recent study2 showed a prevalence of 0.8% comparable to 0.5% in this study. In the present study, color blindness showed a prevalence of 0.5%. Identification of color vision defects in school children with concurrent vocational counseling can save the child the frustration later on and help him to choose a suitable vocation.

Apart from testing for refractive errors, (for which screening is already being done routinely in schools under the yearly medical examination in India) comprehensive ocular examination should be done at regular intervals and should be a prime component of school health program. The teachers have to be trained in recognizing common ocular symptoms among children so that they can be referred for further treatment.

CONCLUSIONS

In the present study, refractive error was the most common ocular disorder. The present study demonstrates a prevalence of ocular morbidity of about 20% among rural school children which is disturbing. However, the present study documented lower prevalence of various ocular morbidities compared to the other studies especially vitamin A deficiency and conjunctivitis. Majority of school children (76%) with ocular morbidity were asymptomatic. Therefore symptoms may not be good criteria to screen children for a detailed ophthalmic examination. School health programs should focus on early recognition of the ocular disorders by active screening of locally important ocular morbidities including refractive errors by trained teachers.

Ethical approval: Ethical approval was taken from the ethics committee of KVG Medical College. Informed consent was taken from school authorities.

Funding: None

Competing interests: None

Acknowledgements: None

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LEGEND FOR TABLES

TABLE 1. Distribution of the study population by gender and education.

TABLE 2. Proportion of children with ocular morbidities who were symptomatic in the study population.

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TABLE 1. Distribution of the study population by gender and education.

Education levels	**Total children N = 1938**		**Total (%)**
	Female n = 914(%)	**Male n = 1024(%)**	
Primary school	376 (41.2)	366 (35.7)	742 (38.3)
Middle school	322 (35.2)	355 (34.7)	677 (34.9)
High school	216 (23.6)	303 (29.6)	519 (26.8)
Total	914(100)	1024(100)	1938(100)

TABLE 2. Proportion of children with ocular morbidities who were symptomatic.

Symptoms	Ocular morbidity		Total (%)
	Present (%)	**Absent (%)**	
Symptomatic	39(41.9)	54(58.1)	93(100)
Non-symptomatic	351(19)	1494(81)	1845 (100)
Total	390(20.1)	1548(79.9)	1938 (100)

$p < 0.01$; $X^2 = 28.913$; df = 1

TABLE 3. Prevalence (%) of ocular symptoms among total study population and symptomatics.

Symptoms	No. Of children in the group	Among all children N=1938	Among symptomatics n=93
Persistent headache	32	1.7	34.4
Watering of eyes	29	1.5	31.2
Difficulty in reading blackboard	20	1.0	21.5
Difficulty in reading text book	9	0.5	9.7
Redness of eyes	8	0.4	8.6
Difficulty of vision at night	1	0.05	1.1

TABLE 4. Prevalence of ocular morbidity in the study population.

Morbidity	Prevalence (%) N= 1938
Refractive errors	336 (17.3)
Squint	41 (2.1)
Vat. A deficiency signs	11 (0.6)
Conjunctivitis	10 (0.5)
Color blindness	10 (0.5)

Table 5. Proportion of children having myopia and hyperopia in the study population.

Refractive errors		No. of children (%) N=1938
Myopia	Uniocular (88)	332 (17.1)
	Binocular (244)	
Hyperopia		4 (0.2)