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Original Research Article

Pattern of ocular morbidity in school children and its association with academic achievement

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ABSTRACT

Background: Ocular morbidity describes any eye disease regardless of resultant visual loss. India is plagued by ocular morbidities in school going children. Refractive error is considered to be the major cause of visual impairment. The objectives of the present study were to compare the pattern of ocular morbidity in urban and rural school children, to study the association of academic achievement with ocular morbidity in study population and to suggest appropriate recommendations for addressing the problem of ocular morbidity in school children.
Methods: A cross sectional study was conducted in the 9 primary and 5 junior high schools of field practice areas of Rural Health Training Centre and Urban Health Training Centre respectively, under Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh from September 2005 to August 2006.
Results: Prevalence of ocular morbidity in the present study was 23.3%. Maximum prevalence of 28.7% of ocular morbidity was seen in the age group of 14-16 years. Prevalence of ocular morbidity was found to be 100 (51.6%) in males and 64 (40.1%) in females. 29.3% of the 164 school children having ocular morbidity showed poor academic achievement compared to 18.7% of the 541 children not having ocular morbidity and the association was found to be statistically significant.
Conclusions: Refractive error was one of the major causes of ocular morbidity among school going children but most of them were of mild degree. Ocular morbidity was found to affect the academic achievement of school going children.

Keywords: Ocular morbidity, School children, Refractive errors

INTRODUCTION

Eyes are the organs of the visual system.[1] Ocular morbidity describe any eye disease regardless of resultant visual loss. Various ocular morbidity surveys have estimated the magnitude of eye diseases among children. In a survey conducted in Nigeria, refractive errors (25.7%), vernal conjunctivitis (25.3%), eye injuries (13.3%), and corneal inflammation (12.5%) were the leading causes of childhood eye morbidity.[2] Refractive error is also one of the leading causes of ocular morbidity.[3] "Vision 2020: the right to sight program" is a global initiative which was launched by WHO in 1999 to eliminate avoidable blindness from worldwide by the year 2020.[4] India was the first country to launch the National Programme for Control of Blindness in 1976, as a 100% centrally sponsored programme.[5,6] The prevalence of eye problem was seen more in defective vision with13.6% and less was observed in stye with 0.7%.[7] The present study was carried out to suggest appropriate recommendations for addressing the problem of ocular morbidity in school children.

The objectives of the present study were to find out the prevalence of ocular morbidity in the study population, to study the sociodemographic factors associated with ocular morbidity in school children, to compare the pattern of ocular morbidity in urban and rural school children, to study the association of academic achievement with ocular morbidity in study population and to suggest appropriate recommendations for addressing the problem of ocular morbidity in school children.

METHODS

The school based cross sectional type of study was conducted in the 9 and 5 primary and junior high schools of field practice areas of 9 primary and 5 junior high schools of field practice areas of rural health training centre (RHTC) and urban health training centre (UHTC) respectively, under Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh for a period of one year from September 2005 to August 2006. The study unit consisted of a school going child of 5-16 years of age studying in classes from pre-primary to mid school (up to class VIIIth).

The sample size was collected by the following formula.

$$\text{Sample size} = \frac{(1.96)^2 \times prevalence\ (1-prevalence)}{Precision^2}$$

Where, prevalence= 28% (of ocular morbidity in school going children); precision= 5% = 323 school children

Because of non-response/non co-operation from the students, the sample size is increased by 10% making the sample size was 355. Total was doubled for two different geographical/topographical areas i.e., 367 for rural and 338 for urban. A total of 705 students were examined.

The students from pre-primary to class 8th were selected for the study with the permission of the principal of the schools. For each school a list of students was prepared for each of the above mentioned classes or sections from class attendance register. The total population of students was 2560 out of which 705 (367 from RHTC and 338 from UHTC) were selected for the study by simple random sampling. The requisite number of students from each school and class were obtained by using proportional probability sampling. These students were randomly selected from class register and in case the child was absent, the next child was selected. Those students who were not willing to get interviewed and examined were excluded from the study.

The data was analysed using SPSS 10 software. Chi-square test was used wherever necessary.

RESULTS

Table 1 shows that out of the 705 children, ocular morbidity was found in 164 (23.3%). Prevalence of ocular morbidity was 24.5% in rural areas and 21.9% in urban areas.

Table 1: Distribution of children according to ocular morbidity (n=705).

Ocular morbidity	Rural		Urban		Total	
	No.	%	No.	%	No.	%
Present	90	24.5	74	21.9	164	23.3
Absent	277	75.5	264	78.1	541	76.7
Total	367	100.0	338	100.0	705	100.0

$\chi 2$=0.682, df =1, p>0.05; Not significant.

Table 2 depicts the distribution of ocular morbidity with age. Maximum prevalence of 28.7% of ocular morbidity was seen in the age group of 14-16 years and minimum prevalence of 19.1% was seen in the age group of 8-10 years in rural population. Though there was an increase in ocular morbidity with increase in age these findings were not found to be statistically significant. The presence of ocular morbidity in Hindus and Muslims was 100 (44.0%) and 64 (45.1%) respectively and no statistical difference in relation to ocular morbidity with reference to religion. Family size showed higher prevalence of ocular morbidity with increasing number of siblings or increase in family size of study subjects. In small families (four or less) ocular morbidity was 39.4% as compared to 47.3% in larger families (more than four). The association was not statistically significant. The prevalence of ocular infections is nearly equal in school children having poor personal hygiene compared to school children having good or fair personal hygiene and this association was not statistically significant. The choice of games in children with ocular morbidity was similar to that of children without ocular morbidity. 93.7% normal children played outdoor as well as indoor games while 94.5% children with ocular morbidity played outdoor games as well as indoor games. The presence of ocular morbidity was observed in 4 (2.5%) children using lantern/kerosene lamp for reading at home whereas 160 (46.3%) children using electric bulbs or lamps and their association of ocular morbidity with electric lamp and lantern was not statistically significant.

Table 3 shows that the prevalence of ocular morbidity was observed to be 100 (51.6%) in males and 64 (40.1%) in females. The association of ocular morbidity amongst the two sexes was not statistically significant in rural areas but it was significant in urban areas and that there were 135 cases of ocular infections (stye, conjunctivitis, dacryocystitis and others i.e., refractive errors), out of which 29 (15.7%) with maximum prevalence of refractive error in males and 10 (6.5%) in females therefore showing no association with gender.

Table 4 depicts that 29.3% of the 164 school children having ocular morbidity showed poor academic achievement compared to 18.7% of the 541 children not having ocular morbidity. This association was statistically significant. The school children having refractive errors

showed that 30.1% have poor academic achievement compared to 19.8% children without refractive errors. Thus it was found that poor academic achievement was more common in school children having refractive errors. This association was statistically significant. The prevalence of poor academic achievement was 32.3% in school children having strabismus compared to 20.6% in school children with no strabismus but the association was not statistically significant. Poor academic achievement was seen in 28.6% colour blind children and 21.1% normal children and thus were found to be not statistically significant.

Table 2: Distribution of ocular morbidity according to socio-demographic variables (n=705).

Socio-demographic variables	Rural						Urban						Chi-square, df, P value
	Ocular morbidity				Total		Ocular morbidity				Total		
	Absent		Present				Absent		Present				
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Age (in years)													
5-7	67	77.9	19	22.1	86	100.0	45	81.8	10	18.2	55	100.0	$\chi2$=5.338, df=3, p>0.05
8-10	114	80.9	27	19.1	141	100.0	92	79.3	24	20.7	116	100.0	
11-13	63	67.1	31	32.9	94	100.0	65	81.2	15	18.8	80	100.0	
14-16	33	71.8	13	28.2	46	100.0	62	71.3	25	28.7	87	100.0	
Religion													
Hindu	221	74.7	75	25.3	296	100.0	109	81.3	25	18.7	134	100.0	$\chi2$=0.001, df=1, p>0.05
Muslim	56	78.9	15	21.1	71	100.0	155	76.0	49	24.0	204	100.0	
Family size													
Four or less	31	79.5	8	20.5	39	100.0	30	81.1	7	18.9	37	100.0	$\chi2$=0.215, df=1, p>0.05
More than four	246	75	82	25.0	328	100.0	234	77.7	67	22.3	301	100.0	
Personal hygiene													
Good	10	4.6	209	95.4	219	100.0	7	3.8	178	96.2	185	100.0	$\chi2$=0.134, df=2, p>0.05
Fair	4	3.1	123	96.9	127	100.0	6	4.7	121	95.3	127	100.0	
Poor	1	4.8	20	95.2	21	100.0	1	3.8	25	96.2	26	100.0	
Choice of games													
Indoor	18	81.8	4	18.2	22	6	16	76.2	5	23.8	21	6.2	$\chi2$=0.140, df=1, p>0.05
Outdoor	259	75.1	86	24.9	345	94	248	78.2	69	21.8	317	93.8	
Light (reading at home)													
Electric lamp	268	75.1	89	24.9	357	97.3	261	78.6	71	21.4	332	98.2	$\chi2$=0.028, df=1, p>0.05
Lantern	9	90.0	1	10.0	10	2.3	3	50.0	3	50.0	6	1.8	

Table 3: Distribution of children according to ocular morbidity and its relation with gender (n=705).

Ocular morbidity	Rural						Urban					
	Male		Female		Total		Male		Female		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Present	50	24.6	40	24.4	90	24.5	50	27.0	24	15.7	74	21.9
Absent	153	75.4	124	75.6	277	75.5	135	73.0	129	84.3	264	78.1
Total	203	100.0	164	100.0	367	100.0	185	100.0	153	100.0	338	100.0
Type of ocular morbidity												
Stye	1	0.5	2	0.6	3	0.5	2	1.1	0	0.0	2	0.6
Dacryocystitis	1	0.5	5	3.0	6	1.6	1	0.5	2	1.3	3	0.9
Corneal opacity	1	0.5	0	0.0	1	0.3	0	0.0	0	0.0	0	0.0
Strabismus	10	5.0	4	2.4	14	3.3	9	4.3	8	4.6	17	4.4
Colour blindness	2	1.0	1	0.6	3	0.8	3	1.1	1	0.7	4	0.9
Refractive errors	28	13.8	26	15.9	54	14.7	29	15.7	10	6.5	39	11.5
Others	1	0.5	1	0.6	2	0.5	2	1.1	0	0.0	2	0.6
Conjunctivitis	5	2.5	0	0.0	5	1.4	3	1.1	3	2.0	6	1.5
Vitamin A deficiency	1	0.5	1	0.5	2	0.3	1	0.5	0	0.0	1	0.0
No morbidity	153	75.4	124	75.6	277	75.5	135	73.0	129	84.3	264	78.1
Total	203	100.0	164	100.0	367	100.0	185	100.0	153	100.0	338	100.0

$\chi2$=3.047; df=1; p>0.05; Not significant.

Table 4: Distribution of children according to ocular morbidity and its relationship to academic achievement (n=705).

Variables	Academic achievement				Total		Chi-square, df, P value
	Present		Absent				
	No.	%	No.	%	No.	%	
Ocular morbidity							
Poor	48	29.3	101	18.7	149	21.1	$\chi2=8.598$, df =2, p<0.05
Average	79	48.2	292	54.0	371	52.6	
Good	37	22.6	148	27.4	185	26.2	
Refractive error							
Poor	28	30.1	121	19.8	149	21.1	$\chi2=6.429$, df =2, p<0.05
Average	40	43.0	331	54.1	371	52.6	
Good	25	26.9	160	26.1	185	26.2	
Strabismus							
Poor	10	32.3	139	20.6	149	21.1	$\chi2=1.104$, df =2, p>0.05.
Average	16	51.6	355	52.7	371	52.6	
Good	5	16.1	180	26.7	185	26.2	
Colour blindness							
Poor	2	28.6	147	21.1	149	21.1	$\chi2=0.598$, df=2, p>0.05.
Average	4	57.1	367	52.5	371	52.6	
Good	1	14.3	184	26.4	185	26.2	

Table 5: Distribution of school children according to health seeking behaviour with respect to eye care (n=705).

Health seeking behaviour with respect to eye care	Rural		Urban		Total	
	No.	%	No.	%	No.	%
What do you do when you have an eye disease						
Goes to an eye specialist/hospital	95	25.9	161	47.6	256	36.3
Goes to a private practitioner or govt. dispensary	196	53.4	121	35.8	317	45.0
Resort to home remedies	55	15.0	41	12.1	96	13.6
Do not seek any treatment	21	5.7	15	4.5	36	5.1
Time taken for consulting a doctor						
Immediately (same day)	110	30.0	107	31.6	217	30.8
When symptoms become worse	53	14.4	49	14.5	102	14.5
After a day or two	128	34.9	126	37.3	254	36.0
When home remedies fail	55	15.0	41	12.1	96	13.6
Do not consult doctor	21	5.7	15	4.5	36	5.1
Reasons for non-utilization of eye care services for ocular diseases						
Not aware of the services available	132	36.0	107	31.7	239	33.9
Cannot afford expenses	134	36.5	145	42.9	279	39.6
Scarcity of time/other domestic priorities	87	23.7	71	21.0	158	22.4
No faith in doctors	9	2.4	12	3.5	21	3.0
No response	5	1.4	3	0.9	8	1.1

Analysis of the data with according to health seeking behaviour with respect to eye care revealed that 36.3%, the parents of study subjects consulted the eye specialist or hospital, whilst only 45.0% of the times they reported visiting general practitioners or govt. dispensaries. The parents resorted to home remedies in 13.6% cases. Only 5.1% of the times, the parents did not take any treatment. More people in the urban area (47.6%) as compared to the rural area (25.9%) reported preference for eye specialist which could perhaps be attributed to the existence of Jawaharlal Nehru Medical College in close proximity to the urban area. 30.0% of the parents consulted the doctor immediately on the same day in rural area, whilst 31.6% consulted after a day or two in urban area, 50.0% subjects when home remedies failed and 14.4% consulted when the symptoms got worse and 5.7% did not consult any doctor as observed in rural area. Of the 705 respondents, the main reason given by 279 (79.4%) for non-utilization of eye care services was that they were not able to afford the expenses. Other domestic priorities or scarcity of time was the reason for non-utilization cited by 22.4%. Unawareness of health service availability was

responsible for 33.9% non-utilization. Of the total 705, 21 (3.0%) of the subjects did not have faith in doctors. Eight (1.1%) subjects did not respond to the question administered.

DISCUSSION

Ocular morbidity is a major health problem in many countries. Presently it is estimated that there are 180 million people worldwide who are visually disabled and 45 million people are blind, out of this, 80% blind are in developing countries. In India, National Programme for Control of Blindness survey was reported that 50-60 million people are visually impaired and more than 10 million people are blind.[5,6] The present study was done with an aim to study about the sociodemographic factors associated with ocular morbidity, comparing the pattern between urban and rural school children and to study the association of academic achievement with ocular morbidity in study population followed by providing appropriate recommendations for addressing the problem of ocular morbidity in school children. A total of 705 children were examined in the present study in which the prevalence of ocular morbidity was 24.5% in rural areas and 21.9% in urban areas. Similarly, studies by Singh et al observed that maximum prevalence was seen in rural schools with 30.05% and 28.65% in urban schools.[3]

The present study found out that the maximum prevalence of 28.7% of ocular morbidity was seen in the age group of 14-16 years and minimum prevalence of 19.1% was seen in the age group of 8-10 years in rural population. The study findings were supported by Sarkar et al in which maximum prevalence was seen in the age group of 11-17 years with 76.3%.[8] The present study findings observed that there was no statistical difference in ocular morbidity with reference to religion as compared to the study findings by Kumari et al in which maximum prevalence was observed in Hindu religion.[9] The present study presented that the choice of games in children with ocular morbidity was similar to that of children without ocular morbidity as compared to the study findings by Kumari et al which showed maximum prevalence with indoor games.[9] The present study observed that the maximum prevalence of ocular morbidity was 100 (51.6%) in males and 64 (40.1%) in females. The present study was supported by Prajapati et al, Venkatramana et al which also showed maximum prevalence among males with 57.3% and 51.3% respectively.[10,11] The present study conducted showed main cause of ocular morbidity by refractive error which was similar to the study conducted by Khan et al.[12] The present study carried out among school children according to health seeking behaviour with respect to eye care was in contrast to the study by Ntsoane.[13]

CONCLUSION

A cross sectional study was carried out with 705 children of rural and urban health training centres and reached to the following conclusions. Prevalence of ocular morbidity was 23.3%. In both sexes there was a gradual increase in the prevalence of ocular morbidity with the advancement of age. Considering both the sexes the majority of children develop defects during 11-13 years age group. Refractive error was one of the major causes of ocular morbidity among school going children but most of them were of mild degree. Majority of the children were unaware of their defects and taking no treatment. Ocular morbidity was found to affect the academic achievement of school going children. The association was significant for refractive errors but not for strabismus and colour blindness. Different types of ocular morbidities were nearly equally prevalent in rural and urban areas, religion and gender. Ocular morbidity has a significant association with academic achievement. Inability to afford the expenses was cited as the main reason for non-utilization of eye care services.

Recommendations

Refractive errors should be corrected with suitable corrective glasses. For all cases of refractive errors especially for myopia follow up examination should be done at least annually to note its progress. The principles of ocular hygiene and mode of spread of ocular infections and their prevention should be fully explained to the children, parents and the school teachers. Children should be educated about the possible chances of ocular injuries while playing and during festivals. They should be educated to take necessary precautions to avoid such injuries. If the eyes are injured, they should avail prompt, proper and adequate treatment. Whenever children complain of poor vision or read by placing books too close to the eye or have difficulty in seeing the black board they should be motivated to see an eye specialist. School children should have their vision examined at the time of entry to the school and annually thereafter for detection of any ocular morbidity. School teachers should be educated about the school health techniques, so that they can serve as a link between the children and their parents on one hand and eye specialist on the other. Parents should be educated so that they can detect visual difficulties by observing the behaviour of the child and consult an ophthalmologist in time. Liberal and adequate ophthalmic services should be provided to rural and urban school children. Active participation of teachers, students and parents (community participation) and proper utilization of school health service is important for its overall success.

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