International Journal of Contemporary Pediatrics
Vinay BS et al. Int J Contemp Pediatr. 2016 May;3(2):509-513
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20160999

Research Article

Prevalence of refractive error and other ocular morbidities among school going children aged 9-16 yrs in rural area of Mandya, Karnataka, India

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Received: 12 April 2016
Accepted: 16 April 2016

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ABSTRACT

Background: Refractive errors, strabismus, vitamin A deficiency and infections of the eye are the various disorders, which affect school children. Most children initially may not be aware of the defective vision. Early detection of these problems and prompt treatment can prevent blindness in future. Therefore the objective of the study is to find out prevalence of refractive error and to identify the other ocular morbidities.
Methods: A cross sectional study was carried out in school going children of age group 9-16 yrs in rural area of Mandya. Parental refractive error, close reading and TV watching were assessed in all children using questioners. All children were examined using Snellen's chart.
Results: In the survey of 362 children, majority of them were in 12-14 yrs of age group. The commonest cause of ocular morbidity in the present study was refractive errors which showed the prevalence of 8.28% followed by colour blindness, Squint and Vit A deficiency. The most common type of refractive error is myopia. As the age advances refractive error prevalence was also increased. Both boys and girls are almost equally affected.
Conclusions: The results of the study strongly suggest that screening of school children for ocular problems should be done at regular intervals and it should be one of the prime components of School Health Program. School teachers should be oriented and trained to identify the common eye problems among school children's so that the problems can be detected at the earliest and prevents co morbidities.

Keywords: Prevalence, Refractive error, Snellen's chart, Myopia, School children

INTRODUCTION

Refractive error is the main cause of visual impairment in children aged between 7 and 15 years in rural India. Importance of early detection and treatment of ocular diseases and visual impairment in young children lies in the fact that 30% of India s population becomes blind before the age of 20 years. [1] Uncorrected refractive error is significant cause of visual impairment in children as suggested by W.H.O.[2] Refractive eye services are to be modified according to the situation in developing countries considering the fact that 80% of the blindness is avoidable.[3]

Children do not complain of defective vision and may not even be aware of their problem. 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.[4]

The earliest signs of refractive errors are eye strain with or without redness, with watering and headache. These complaints of the child go unnoticed to the parents due to lack of awareness among them. Vision screening in school children are useful in detecting correctable causes of decreased vision, especially refractive errors in minimizing long-term visual disability.[3]

To study the pattern of ocular diseases in children is very important because some eye conditions are just causes ocular morbidity and others invariably lead to blindness. Also while some conditions such as refractive errors and cataract are treatable. Others like measles and vitamin A deficiency are largely preventable.[5]

As it is one of the major avoidable, preventable & curable causes of blindness next only to cataract. School going children form an important large target group which is easy to approach. Poor vision in childhood affects performance to school & has a negative influence on the future life of the child hence this study was conducted to determine the prevalence of refractive error and other morbidities in school Childers.

METHODS

This cross sectional study was carried out in the schools of rural area of Mandya during the period of 2 months in 2015 after obtaining permission from school authority. Schools were randomly selected in rural area of Mandya. All school going children of aged between 9-16 years were included. Students who were remaining absent even after two follow ups and not willing to participate in the study were excluded. All the schools were pre-informed and the children willing to have an eye examination were pre-registered. Using local language, structured questionnaire was used to obtain general data. Total 362 children's were participated in the stud. Proforma was sent to all the parents of 362 children after briefing.

Height (cm) was measured using stadiometer, weight (kg) by analog weight scale to assess the nutritional status. External appearance of eye was examined using torch to find out ocular morbidities like squint, chalazion, ocular injury, xeropthalmia and blindness.

Visual acuity was examined by Snellen's chart after explaining the procedure to the children. Child was made to sit at a distance of 6mt from the chart. Child one eye was covered with a plain occluder and asked to start reading from the top of the chart. If the child cannot read the largest letter at 6 metres, We Made him/her to move closer by one metre at a time, until the top letter could be seen, then repeat the whole procedure for the another eye. Colour vision examined by Ishihara chart.

Children who require treatment were referred to appropriate centers for further evaluation and management.

The data was analyzed using descriptive statistics of Epi Info software. The result were analyzed using the Chi- square test and t test and p value of less than 0.05 was considered as statistically significant at 95% confident interval.

RESULTS

In our study, a total of 362 children between the age group of 9-16 years were participated. Among 362 school going children, out of which 215 (59.3%) children are between the age group of 12-14yrs followed by 89(24.5%) between 9-11yrs and 58 (16%) between 15-16yrs. 179 were male and 183 were females (Table 1).

Table 1: Distribution of study subjects according to age, sex & class.

Studying class	Age (years)	Sex				Total	
		Male		female			
		No	%	No	%	No	%
5-6	9-11	34	38.2	55	61.8	89	100
7,8,9	12-14	103	47.9	112	52.1	215	100
10	15-16	42	72.4	16	27.6	58	100
Total	-----	179	49.4	183	50.6	362	100

Table 2: Distribution parents educational status.

Education	Mothers Number (%)	Fathers Number (%)
Illiterate	13 (3.60)	7 (2.00)
Primary school	172 (47.60)	127 (35.20)
High school	120 (33.30)	147 (40.70)
PUC	13 (3.60)	27 (7.50)
Degree	2 (0.40)	9(2.40)
Not answered	42 (11.50)	45 (12.40)

Parents educational status revealed that most of the fathers studied till high school 147 (40.70%) and most mothers 172 (47.60) studied till only primary school. 42 mothers and 45 fathers had not answered their education status (Table 2).

Table 3: Distribution of visual acuity.

Visual acuity	Number	%
6/6	332	91.71
6/9	19	5.24
6/12	6	1.65
6/18	3	0.82
6/24	1	0.27
Counting Finger (CF) at 3mts	1	0.27
Total	362	100

Among 362 children's, 30 (8.28%) found to had refractive error. Among 30 children 19 had 6/9, 6 had 6/12, 3 had 6/18 and 1 each had 6/24 and CF at 3 mts (Table 3).

Table 4: Age wise distribution of refractive error.

Age group	Refractive present number (%)	Refractive absent number (%)
9-11	5 (5.6)	84 (94.4)
12-14	19 (8.8)	196 (91.2)
15-16	6 (10.3)	52 (89.7)
Total	30 (8.3)	332 (91.7)

p >0.05

Table 5: Distribution of close TV watching and refractive error.

Close TV watching	Refractive error present number (%)	Absent number (%)
Present	19 (38)	31 (62)
Absent	10 (3.58)	269 (96.42)
Not answered	1 (1.96)	32 (98.04)
Total	30 (8.28)	332 (91.7)

p <0.05* (*statistically significant)

Among 362 children's, 19 (8.8%) children in the age group of 12-14 years had refractive error followed by 6 (10.3%) in 15-16yrs then 5 (5.6%) in the age group 9-11yr age (Table 4).

In the present study, Out of 362 children, 50 children gave history of close TV watching. Among them 19 (38%) had refractive error as compared to 10 (3.58%) who didn't give history of close TV watching but had refractive and it was found to be statistically significant (Table 5).

Table 6: Distribution of close reading & refractive error.

Close reading	Refractive error present number (%)	Absent number (%)
Present	11 (33.3)	22 (66.66)
Absent	18 (6.08)	278 (93.91)
Not answered	1 (3.12)	32 (96.87)
Total	30 (8.28)	332 (91.7)

p >0.05

In the present study, 33 children gave history of close reading, among them, 11 (33.3%) children had refractive error. Out of 30 children who had refractive error 18 (6.08%) didn't give history of close reading and it was not found to be statistically significant (Table 6).

Table 7: Distribution of ocular morbidities.

Ocular morbidities	No. of children (%)
Refractive error	30 (56.65)
Squint	3 (5.66%)
Ocular injury	2 (3.77%)
Chalazion	1 (1.88%)
Vitamin A Deficiency	1 (1.88%)
Colour blindness	16 (30.18%)
Total	53 (100%)

In the present study, out of 53 ocular morbidities, 30 (56.65%) children had refractive error and constitutes major ocular morbidity followed by 16 (30.18%) colour blindness, Squint (5.66%), ocular injury (3.77%), Chalazion (1.88%) and xeropthalmia (1.88%) (Table 7).

DISCUSSION

Poor vision in childhood affects performance in school or at work and also it might affects the future of a child. Planning of the youth's career is very much dependent on visual acuity, especially in jobs for the navy, military, railways, and aviation. Through screening for ocular morbidities at school level, intervention can be done at early.

Total 362 children were examined out of which 179 (49.4%) were boys and 183 (50.6%) females. The survey included children of age 9–16 years. The mean age was 12.65 yrs. Maximum children were in the age group of 12-14 years. 53 children had one or the other form of ocular morbidities. Refractive errors was found to be 56.65% constitute the major cause of ocular morbidity followed by color blindness (30.18%), squint (5.6%), ocular injury (3.7%), vitamin A deficiency (1.8%), Chalazion (1.8%).

In the present study, 53 (14.64%) had ocular morbidity this is in concurrence with a study conducted in Maharashtra by Naik R et al showed prevalence of 10.5% in the age group of 6-15yrs.[6] And our results are much lower than a study conducted in Delhi, where prevalence was reported to be 34.04% in the 5-14 years age group.[7] In the above two studies there is a slight variation in the age group. Survey of Blindness India estimated a prevalence of ocular morbidity 27.99 per cent for all India.[8]

Our results are much comparable to the international studies which revealed lower prevalence of 15.6% of ocular morbidity in children aged 7-19 years in rural area of Tanzania, Africa.[9] This shows that in spite of the economical development and technical advancement in health, the prevalence of ocular morbidity had remained more or less the same.[10,11]

Refractive error

Majority of the ocular diseases observed in the subjects were either preventable or treatable. The commonest cause of ocular morbidity in the present study was refractive errors which showed the prevalence of 56.6%. Previous reports have shown an overall incidence between 21% and 25% of patients attending eye outpatient departments in India.[12]

A study conducted in Mysore district showed near prevalence of 49.6%.[13]Among children of 12-17 years in Ahmedabad city similar prevalence of refractive errors has been observed.[14] From South India, high (32%) prevalence rate of refractive errors among school going children of age 3-18 years was observed. However, low prevalence of refractive errors of 2% has been reported from Eastern India by Datta et al and 5.4% from Delhi by Rajesh et al among primary school children, which could not be explained.[15] Internationally, lower prevalence of refractive errors (2.7-5.8%) has been reported among children of age 5-15 years from Africa, Finland, Chile and Nepal as compared to the present study.[9,16-18] These differences may be explained by the different diagnostic criteria used by different authors, racial or ethnic variations in the prevalence of refractive errors, different lifestyles or living conditions.

The most common visual acuity was found to be 6/9 in 19 children's. Among 362 children 32 (8.28%) had refractive error. There was a statistical significant difference between TV watching and refractive error with a p value of <0.05 but close book reading and refractive error did not show any significant difference.

Squint

Studies done on abroad revealed lower prevalence of squint (0.5%) by Wedner et al among children of 7-19 years in Tanzania, Africa, which is much lower to our study i.e. 5.66%. However, higher (7.4% in 5-15 years) and lower (0.2-0.6% in 4-18 years) prevalence of squint has been reported from Haryana, Rajasthan, West Bengal and Delhi.[10,12,15,19,20]

Colour blindness

A study conducted in Rajasthan, the prevalence of color blindness was found to be 2.9% in 4-16 years [20]. However in our study the prevalence was found to be 30.18%, which is too high compared to any other studies.

Vitamin A Deficiency

Vitamin A deficiency up to an extent of 5.4- 9% in 4 to 16 years has been reported from Rajasthan and Kolkata respectively as compared to 1.8% in the present study[15,20]. Lower socioeconomic status associated with an unhealthy dietary pattern of children may explain this.

The present study most of the children were unaware of their refractive errors. Therefore, screening in schools and pre- schools ages should be carried out periodically. In addition, children in these ages and their parents should be educated about signs and symptoms of refractive error, ocular hygiene.

The main limitations of the present study are – because of time limits we selected only 3 schools in Mandya and could not follow up the children, to whom we prescribed spectacles to know the compliance.

CONCLUSION

The results of the study strongly suggest that screening of school children for ocular problems should be done at regular intervals and it should be one of the prime components of the School Health Program. School teachers should be oriented and trained to identify the common eye problems among school children's so that the problems can be detect early and refer for early treatment. They should also impart awareness regarding ocular hygiene among school children. In this manner the incidence of preventable causes of blindness among school children will be minimized. Parents should also be aware about the common eye problems and about ocular hygienic.

Poor vision in childhood affects performance in school or at work and has a negative influence on the future life of a child.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Vinay BS, Shruthi BN. Prevalence of refractive error and other ocular morbidities among school going children aged 9-16 yrs in rural area of Mandya, Karnataka, India. Int J Contemp Pediatr 2016;3:509-13.