Original Research Article

A study on prevalence of myopia among high school children in an urban area of Shivamogga: a cross sectional study

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Received: 25 April 2017
Accepted: 24 May 2017

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ABSTRACT

Background: Blindness is one of the significant social problem in India with uncorrected refractive error as the second major cause accounting for 19.7% of the blindness. Prevalence of myopia in children varies between the countries and it ranges from 7% to 30%. Among all refractive problems myopia is the major cause of disability in children. The objective of the study was to determine the prevalence and causes of myopia among high school children.
Methods: This study was a descriptive Cross sectional study. Present study was conducted among high-school children of 13 - 16 years in an urban area of Shivamogga city of Karnataka state from July- August 2015. With expected frequency of 20%, confidence limit at 5% and confidence level at 95% the total sample size was 246. A pretested questionnaire was used for collection of data. Snellen's chart was used to find out the myopia.
Results: The overall prevalence of myopia was found to be 23%. Out of 300 students 16%, 5%, and 1.7% of the students had mild, moderate and sever visual impairment respectively.
Conclusions: The prevalence of myopia was higher among high school children in urban area and it was more among girls than the boys. Early diagnosis and correction of the refractive error has to be done to prevent future development of blindness.

Keywords: Refractive error, Myopia, School children

INTRODUCTION

Eyes are windows of the soul and these are the God gifted Jewells of life in the Universe. The external beauty of world is beautiful because of these Jewells. Therefore eyes are very important organ of the body, so care should be taken to protect these eyes. Any disturbances or error in the vision causes the disability of the life.

Emmetropia or no refractive error is the ideal condition in which incident parallel rays come to a perfect focus upon the light sensitive layer of the retina, when the accommodation is at rest. Ametropia or Refractive error is the opposite condition where the parallel rays of light are not focused exactly upon retina, when the accommodation is at rest. Refractive errors are 3 types-Hypermetropia, Myopia and Astigmatism. These refractive errors commonly causes blurring of vision for near and distant vision, eye strain and squint.[1]

Myopia is the most common refractive error occurs in school going children. It causes blurring of distant vision, eye strain, divergent and squint. In severe cases (progressive myopia) it causes blindness.[2] Blindness means inability to perceive the light and it is one of the

significant social problems in India. Uncorrected refractive errors act as second major cause accounting for 19.7% of the blindness.[3]

"VISION 2020 - the Right to Sight" is a global initiative launched by WHO and IAPB in 1999 to eliminate main causes of avoidable blindness by the year 2020 by giving priorities on cataract, refractive errors, trachoma, onchocerciasis and certain causes of childhood blindness[4].

Refractive error can have a significant impact on a child's life affecting their future income, employment, and eventually leading to social stigmatization[5]. Thus the objectives of present study were to know the prevalence and causes of myopia among high school children in an urban area of Shivamogga.

METHODS

A descriptive cross sectional study was carried out among high school children in an urban area of Shivamogga city, Karnataka for a period of two months. Study population comprises of high school children in the age group 13 – 16 years studying in 8th, 9th and 10th standards. Sample size was calculated with an expected prevalence of 20%, allowable error at 5% and confidence level at 95%. The Sample size was found to be 246 which were rounded off to 300. All children of age 13-16 years were included in the study and children who were absent at the time of examination were excluded from the study.

Ethical clearance was obtained from the Shivamogga Institute of Medical Sciences. A prior permission was obtained from the school principal to conduct the study by explaining the study protocol.

A pretested, semi-structured questionnaire was used for the collection of data regarding Socio demographic details. Snellen's distant vision chart was used to find out refractive error in the children. Child was positioned at 6 m (20 feet) distance from Snellen's chart. When performing visual acuity, each eye was tested independently, child's right eye was tested first by covering the left eye. Child was instructed to read the line from top to downward. The last line that the child read was recorded as his visual acuity of that eye. Same procedure was repeated to left eye by covering the right eye. If the child not able to read first line (i.e., his visual acuity less than 6/60 or 20/200) then the child was brought to near to the chart at a distance of 5 meters, 4 meters, 3 meters and so on till he was able to read top line of the chart. If the child was not able to read at a distance of 1 meter then he was asked to count examiners finger and that was recorded. If the vision was still less then movement of the examiners hand in front of the child and perception of light was tested. The children's having the visual acuity ≥6/9 (≥20/30) was considered as myopic.

Statistical analysis

The collected data was tabulated on Microsoft excel sheet. Analysis was done by using Epi-Info-7 version software. Chi-square test was used to analyse association between the refractive error and various factors.

RESULTS

Present study was conducted among 300 high school children aged 13 – 16 years in an urban area of Shivamogga. Out of 300 children 165 (55%) were boys and 135 (45%) were girls. 53.33% and 46.67% of the children were in the age group of 13-14 years and 15-16 years respectively.
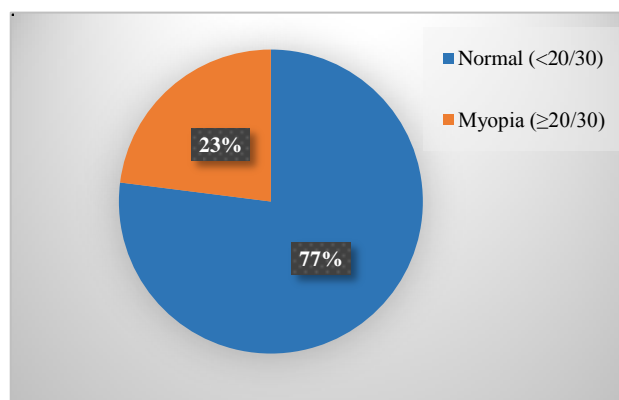

Figure 1: Prevalence of myopia among high school children.

Table 1: Classification of distant vision according to study subjects

Classification	Frequency	Percentage
Normal (<20/20)	232	77.33%
Mild (20/30-20/50)	48	16%
Moderate (20/70-20/200)	15	5%
Sever (>20/200,FC,HM)	5	1.67%

The overall prevalence of myopia was 23% (Figure 1) in our study. But the amount of the severity the problem varies in the present study. Hence in this study, 16% of the students had mild refractive error, 5% had moderate and 1.7% had severe refractive error (Table 1).

In this study we found that prevalence of myopia was more (39%) among the age group of 15-16 years than the age group of 13-14 years (30%). Prevalence of myopia was more (43%) among girls than the boys (26%). Students watching TV for more than 2 hours and playing video/mobile games for more than 2 hours were found to be statistically significant. Prevalence of myopia was more among children having mixed diet and socio-economic class IV and class V but these were not significantly associated with myopia (Table 2).

Table 2: Association between various factors and myopia.

Factors		Visual acuity		Total N (%)	Chi square value	P value
		Myopia N (%)	Normal N (%)			
Age	13-14 years	30 (18.75)	130 (81.25)	160 (100)	3.49	0.061
	15-16 years	39 (27.86)	101 (72.14)	140 (100)		
Sex	Boys	26 (15.76)	139 (84.24)	165 (100)	10.86	0.001*
	Girls	43 (31.85)	92 (68.15)	135 (100)		
Diet	Vegetarian	43 (74.14)	15 (25.86)	58 (100)	0.332	0.8234
	Mixed	188 (77.69)	54 (22.31)	242 (100)		
TV	≤2 hour	45 (19.91)	181 (80.09)	226 (100)	4.93	0.026*
	>2 hour	24 (32.43)	50 (67.57)	74 (100)		
Playing video/mobile game	≤2 hour	27 (16.77)	134 (83.23)	161 (100)	7.61	0.005*
	>2 hour	42 (30.22)	97 (69.78)	139 (100)		

*= $p < 0.05$, N=Numbers, %=Percentage.

DISCUSSION

Present study was carried out among 300 high school children in urban area of Shivamogga to find out the prevalence of Myopia. Prevalence of Myopia in our study was 23%. Study done by Pavithra et al and Ishfaq showed low prevalence of myopia that is 4.4% and 4.74% among school children respectively.[6,7] But studies done by Rohul et al and Sood showed high prevalence of myopia that is 50.59% and 45% respectively.[8,9] This differences in the prevalence rate is may be due to different geographical distribution of the students, different life style pattern and different socio economic status of the students.

In the present study prevalence of myopia was high among girls than boys which shows statistical significant at p=0.001. This may be due to girls attain puberty earlier and their physical growth occurs earlier than boys. Similar findings were observed by the studies done by Pavithra et al and He et al.[6,10]

In the present study prevalence of myopia was more among children watching TV more than 2 hours in a day and playing video/ mobile games more than 2 hour in a day. This could be due to playing video games and watching TV for more hours in a day causes eye strain and affect the eye. Similar findings were observed in the studies conducted by Kumar et al in UP, Saxena et al in New Delhi and Rajendran et al.[11-13]

CONCLUSION

Prevalence of uncorrected refractive error especially myopia was higher among high school children in urban area. Causes of higher prevalence, barriers to refractive error and correction services should be identified and addressed. Eye screening of school children is necessary to prevent myopia.

Recommendations

Inspite of presence of a National Program for the control of blindness still the prevalence of refractive error is high. Hence the study recommends;

- Screening of refractive errors in all school children should be done.
- Training of the school teachers to identify the refractive error in students should be done.

REFERENCES

1. Basak SK. Essentials of Ophthalmology. 4th ed, Kolkata: Crrent Book International Publishers; 2007: 61.
2. Khurana AK. Comprehensive Ophthalmology. 4th edi, New Delhi: New Age International Publishers; 2007: 28.
3. Govt. of India (2004), Annual Report 2003-2004, Ministry of Health and Family Welfare, New Delhi, 2005.
4. World Health Organization, The State of the World's Sight, 2005. VISION 2020: The Right to Sight. 1995-2005.

5. World Health Organization, Geneva. Preventing blindness in Children: Report of a WHO/IAPB Scientific meeting, Hyderabad, India; 1999: 13–14.

6. Pavithra MB, Maheshwaran R, Rani Sujatha MA. A study on the prevalence of refractive errors among school children of 7-15 years age group in the field practice areas of a medical college in Bangalore. Int J Med Sci Public Health. 2013;2:641-5.

7. Ahmed I, Mian S, Mudasir S, Andrabi KI. Prevalence of Myopia in Students of Srinagar City of Kashmir, India. Int J Health Sciences, Qassim University. 2008;2:77-81.

8. Rohul J, Maqbool A, Hussain SA, Shamila H, Anjum F, Hamdani ZA. Prevalence of refractive errors in adolescents in Out- patient attendees of the preventive ophthalmology clinic of community medicine, S K I M S, Kashmir, India. NUJHS. 2013;3(1):17-20.

9. Sood RS, Sood A. Prevalence of myopia among the medical students in western India vis-à-vis the East Asian epidemic. IOSR Journal of Dental and Medical Sciences. 2014;13(1):65-7.

10. He M, Zeng J, Liu Y, Xu J, Pokharel GP, Ellwein LB. Refractive Error and Visual Impairment in Urban Children in Southern China. Investigative Ophthalmol Visual Sci. 2004;45(3):793-9.

11. Kumar P, Pore P, Dixit AK, Singh N. Prevalence and demographic distribution of refractory error in school children of Pune, India. Int J Res Health Sci. 2014;2(1):58-67.

12. Saxena R, Vashist P, Tandon R, Pandey RM, Bhardawaj A, Menon V, et al. Prevalence of Myopia and Its Risk Factors in Urban School Children in Delhi: The North India Myopia Study (NIM Study). PLoS ONE. 2015;10(2):1-11.

13. RajendraN K, Haneef M, Chandrabhanu K, Krishnamoorthy, Muhammed M, Pillai RT. A Prevalence Study on Myopia Among School Going Children in a Rural Area of South India. Indian J Clin Practice. 2014;25:374-80.