PREVALENCE OF LOW VISION AMONG SCHOOL CHILDREN IN A RURAL BLOCK OF HARYANA

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ABSTRACT

BACKGROUND

Low vision and blindness in children are important because of their impact on the child's development, education, future work opportunities and quality of life. These negative effects are experienced throughout the child's life. It leads to serious social and economic burden to the family and the society.

The objective of this study is to assess the visual acuity and prevalence of visual impairment among the students in a rural block of Haryana.

MATERIALS AND METHODS

This cross-sectional study was done in Govt. Senior Secondary Schools of Block Lakhnamajra, Haryana. Out of 16 Govt. Senior Secondary Schools, 4 were randomly chosen. Students aged 6 - 15 years studying in class 1 to 10 were included in the study. The age of students was ascertained as per the school records. Visual Acuity (VA) test was performed using Snellen's E chart. Assessment of VA of all the students was done at 6 meters in a well-illuminated room. The findings of clinical examination were recorded on a pre-tested proforma. After collection, the whole data was compiled, analysed and appropriate statistical tests like simple proportions and chi-square (χ^2) test were applied.

RESULTS

The prevalence of VA $\leq 6/9$ either in better eye or worse eye was more in girls as compared to boys. Low vision according to WHO criteria (VA $\leq 6/18$ in better eye) was found to be more prevalent in girls (3.4%) as compared to boys (1.7%). Out of total 34 students (2.6%) were having low vision according to WHO criteria. The prevalence VA $\leq 6/9$ either in better eye or worse eye was more in higher age groups as compared to lower age groups. VA $\leq 6/18$ was not found before the age of 10 years. The association of visual acuity with increase in age group was found to be highly significant.

CONCLUSION

Vision screening of school children in developing countries could be useful in detecting curable causes of vision problems provided detected at the early stage, especially refractive errors by which long-term visual disability could be avoided.

KEYWORDS

Visual Acuity, Impaired Vision, Low Vision, Rural Area, School Children.

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BACKGROUND

Visual acuity is the sharpness of vision measured as the maximum distance at which a person can see certain objects, divided by the maximum distance at which a person with normal eyesight can see the same object. Visual acuity (VA) commonly refers to the clarity of vision. Visual acuity is dependent on optical and neural factors.

Around 39 million people are blind and 246 million have low vision. An estimated 19 million children below age 15

years are visually impaired. Of these 12 million children are visually impaired due to refractive errors, a condition that could be easily diagnosed and corrected; 1.4 million are irreversibly blind for the rest of their lives and need visual rehabilitation interventions for a full psychological and personal development.¹

Vision is the most important special sense in human beings. Normal vision is essential for normal physical, mental, psychological development and education. Considering the fact that 30% of India's blind lose their eyesight before the age of 20 years and many of them are under five when they become blind, the importance of early detection and treatment of ocular disease and vision impairment among young children is obvious.²

Visual impairment is a worldwide problem that has a significant socioeconomic impact. Childhood blindness is a priority area because of the number of years of blindness that ensues. Data on the prevalence and causes of blindness and severe visual impairment in children are needed for planning and evaluating preventive and curative services including planning special education and low vision services.³

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Child's vision is essential for successful learning in school. When the vision suffers, pupil's routine school work and day-to-day activities also get affected. The students are not mature enough to point out the deficiency at the early stage or the parents have no idea on the gradually developing vision problem. This results in tiredness, distraction, headache and a few other disorders. Children who have been affected could not concentrate on studies or on any other curricular, extracurricular or recreational activities.⁴

Sometimes 20/20 vision is used in place of 6/6 vision; 20/20 vision is a term used to express normal visual acuity measured at a distance of 20 feet. If you have 20/20 vision, you can see clearly at 20 feet what should normally be seen at that distance. If you have 20/100 vision, it means that you must be as close as 20 feet to see what a person with normal vision can see at 100 feet.⁵

According to WHO (ICD-10), visual impairment is the consequence of a functional loss of vision rather than an eye disorder itself, which is defined as vision of equal to or better than 6/18 in the better eye.⁶

Objective

The main intention of this study is to assess the visual acuity and visual impairment among the students in a rural block of Haryana.

MATERIALS AND METHODS

The present cross-sectional study was carried out in block Lakhnamajra, which is the field practice area attached to the Department of Community Medicine, Pt. B. D. Sharma Postgraduate Institute of Medical Sciences, Rohtak. The study subjects were school going children in the age group of 6 - 15 years. Out of total 16 Govt. schools existing in the block, two girls' schools and two boys' schools were randomly selected and all the students between 6 - 15 years of age, studying in class 1st to 10th were included in the study. The students were divided into three age groups: 6 - 10 years, 10 - 13 years and 13 - 15 years. All concerned Principals, teachers and students were briefed about the study. The students present on day of visit were included in the study. No followup visits were done. The age of students was ascertained as per the school records. Visual Acuity (VA) test was performed using Snellen's E chart. Assessment of VA of all the students was done at 6 metres in a well-illuminated room.

If distant visual acuity was < 6/6, then those students were subjected to refraction by ophthalmic assistant. VA

<6/6 was taken as criteria of defective vision, because criterion of low vision according to WHO (VA ≤ 6/18 in better eye) is already grossly subnormal for school children.

Information was collected on a pretested semi-structured schedule. After collection, the whole data was compiled, analysed and appropriate statistical tests like simple proportions and chi-square (χ^2) test were applied.

RESULTS

The prevalence of VA ≤ 6/9 either in better eye or worse eye was more in girls as compared to boys. Low vision according to WHO criteria (VA ≤ 6/18 in better eye) was found to be more prevalent in girls (3.4%) as compared to boys (1.7%). Out of total 34 students (2.6%) were having low vision according to WHO criteria. The association of visual acuity with sex was found to be strongly significant in both better eye as well as worse eye (Table I).

The prevalence VA ≤ 6/9 either in better eye or worse eye was more in higher age groups as compared to lower age groups. VA ≤ 6/18 was not found before the age of 10 years. Both the tables show that the no. of cases were much more after the age of 10 yrs. The association of visual acuity with increase in age group was found to be highly significant (Table II).

Visual Acuity	Better Eye			Worse Eye		
	Sex		Total [%]	Sex		Total [%]
	Boys [%]	Girls [%]		Boys [%]	Girls [%]	
6/6	474 [92.9]	643 [85.2]	1117 [88.3]	464 [90.9]	629 [83.3]	1093 [86.4]
6/9-6/12	30 [5.9]	84 [11.1]	114 [9.1]	31 [6.1]	86 [11.4]	117 [9.3]
6/18-6/60	6 [1.2]	28 [3.7]	34 [2.6]	15 [3.0]	40 [5.3]	55 [4.4]
Total	510 [100]	755 [100]	1265 [100]	510 [100]	755 [100]	1265 [100]
χ^2 Value (df-2)	27.735			17.702		
P Value	0.000*			0.000*		

Table I. Sex Wise distribution of Visual Acuity

Visual Acuity	Better Eye				Worse Eye			
	Age Groups (Years)			Total n=1265 [%]	Age Groups (Years)			Total n=1265 [%]
	(6-10) n=282 [%]	(10-13) n=536 [%]	(13-15) n=447 [%]		(6-10) n=282 [%]	(10-13) n=536 [%]	(13-15) n=447 [%]	
6/6	270 [95.7]	463 [86.4]	384 [85.9]	1117 [88.3]	269 [95.4]	459 [85.6]	365 [81.7]	1093 [86.4]
6/9-6/12	12 [4.3]	53 [10.0]	49 [10.7]	114 [9.1]	13 [4.6]	54 [9.9]	50 [11.4]	117 [9.25]
6/18-6/60	0 [0]	20 [3.6]	14 [3.4]	34 [2.6]	0 [0]	23 [4.5]	32 [6.9]	55 [4.4]
Total	282 [100]	536 [100]	447 [100]	1265 [100]	282 [100]	536 [100]	447 [100]	1265 [100]
χ^2 Value (df-4)	26.535				32.057			
p Value	0.003*				0.000*			

Table II. Age Wise distribution of Visual Acuity

DISCUSSION

The present study observed that mean age of the study population was 10.99 ± 2.706 years and $VA \leq 6/9$ was taken as defective vision. Out of total 172 children (13.6%) were found to have defective vision in one or both eyes. Among boys 9.1% had defective vision and among girls 16.7% had defective vision. The difference observed between them was significant. The prevalence of defective vision was more in higher (early adolescent) age groups as compared to lower (preadolescent) age groups. Maximum 14.1% students with defective vision belonged to 13 - 15 years' age group followed by 13.6% and 4.3% in 10 - 13 years' and 6 - 10 years' age groups respectively. The defective vision was significantly associated with increase in age group.

In this study, a total of 172 children (13.6 %) were found to have visual acuity $< 6/6$ in one or both the eyes. This finding is similar to those of Gupta et al,⁷ where prevalence was found to be 13.2% in school children (4 - 12 yrs.) of Aligarh. Batra et al⁸ also observed the prevalence of $VA \leq 6/9$ in 12.7% school children (5 - 15 yrs.) from both rural and urban areas of Ludhiana city.

Bayoumy et al⁹ found 51.3% prevalence of $VA < 6/6$, Mondal et al⁶ found 31.1%, Rustagi et al¹⁰ found 23.1% prevalence of $VA \leq 6/9$ in school children of rural area of Delhi. The higher prevalence was probably due to older age group covered in the study. Yared et al,¹¹ Shaffi et al¹² and Madhavi MR et al¹³ observed 8.1%, 3.11% and 6.3% prevalence respectively.

In the present study, $VA \leq 6/12$ in better eye was found in 72 students (5.7%). Ghosh S¹⁴ et al found 4.2% prevalence among urban school children of low-income families in Kolkata. Rustagi et al¹⁰ and Yared et al¹¹ found 2.6% and 1.1% prevalence respectively, while Mondal et al⁶ and Bayoumy et al⁹ found greater prevalence in 13.7% and 9.7% respectively.

According to WHO criterion of vision impairment, i.e. $VA \leq 6/18$ in better eye was found in 32 students (2.5%) in this study. This finding is comparable to study of Yared et al,¹¹ who found 2.4% prevalence. Mondal et al⁶ found 3.7% and Byoumy et al⁹ found 11.3%.

As per WHO severe vision impairment, i.e. $VA \leq 6/60$ in better eye was found in 2 students (0.16%) in this study. Madhavi MR,¹³ Yared et al,¹¹ Rustagi et al¹⁰ and Bayoumy et al⁹ found 0.37%, 0.4%, 0.6% and 1.1% prevalence respectively.

CONCLUSION

Screening of the refractive errors in school should be carried out periodically. In addition, school going children and their parents should be educated about signs and symptoms of refractive errors, ocular hygiene and the risk factors involved in the development of refractive errors and other ocular pathological problems. Vision screening of school children in

developing countries could be useful in detecting curable causes of vision problems provided detected at the early stage, especially refractive errors by which long-term visual disability could be avoided.

REFERENCES

- [1] WHO fact sheet. Available from <http://www.who.int/mediacentre/factsheets/fs282>.
- [2] Vision screening in school children. Training module. Danish assistance to the national programme for control of blindness. New Delhi, India: 2004.
- [3] Gilbert CE, Anderton L, Dandona L, et al. Prevalence of visual impairment in children: a review of available data. *Ophthalmic Epidemiol* 1999;6(1):73-82.
- [4] Prema N. Prevalence of refractive error in school children. *Indian Journal of Science and Technology* 2011;4(9):1160-61.
- [5] Visual acuity: what is 20/20 vision? Available at: <https://www.aoa.org/patients-and-public/eye-and-vision-problems/glossary-of-eye-and-vision-conditions/visual-acuity?sso=y>.
- [6] Mondal K, Manna N, Dasgupta U, et al. A study of visual acuity among the students in a rural girls high school of West Bengal. *IOSR Journal of Dental and Medical Sciences* 2013;10(2):12-6.
- [7] Gupta M, Gupta Y. A survey on refractive error and strabismus among school children in a school at Aligarh. *Ind J Public Health* 2000;44(3):90-3.
- [8] Batra N, Kaushal D, Gill AS. Refractive errors in school children-data from a school. *Tropical Ophthalmology* 2007;7(3):43-7.
- [9] EL-Bayoumy BM, Saad A, Choudhary AH. Prevalence of refractive error and low vision among schoolchildren in Cairo. *Eastern Mediterranean Health Journal* 2007;13(3):575-9.
- [10] Rustagi N, Uppal Y, Taneja DK. Screening for visual impairment: outcome among schoolchildren in a rural area of Delhi. *Indian J Ophthalmol* 2012;60(3):203-6.
- [11] Yared AW, Belaynew WT, Destaye S, et al. Prevalence of refractive errors among school children in Gondar town, northwest Ethiopia. *Middle East Afr J Ophthalmol* 2012;19(4):372-6.
- [12] Shaffi M, Bejiga A. Common eye diseases in children of rural community of Goro district, central Ethiopia. *Ethiop J Health Dev* 2005;19(2):148-52.
- [13] Madhavi MR, Kesuraju VK, Nagrale P, et al. Ocular morbidity among school aged children in Indian scenario. *Int J Res Med Sci* 2015;3(6):1431-4.
- [14] Ghosh S, Mukhopadhyay U, Maji D, et al. Visual impairment in urban school children of low-income families in Kolkata, India. *Indian J Public Health* 2012;56(2):163-7.