

PREVALENCE OF VISUAL MORBIDITY IN URBAN PRIMARY SCHOOL CHILDREN IN WESTERN INDIA

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ABSTRACT

Background and objectives: Pediatric ophthalmology is not yet well established as a separate subspecialty in India in most eye care programs. Six percent to seven percent children aged 10-14 years have problems with their eyesight affecting their learning in India. Present cross-sectional study assesses prevalence and pattern of eye diseases among school-going children aged 6-14 years.

Material and Methods: Three schools from each of the ten wards of the city were selected by simple random sampling method. Then, 60 children in the age group of 6-14 years from each of the selected school were selected with simple random sampling. In all we studied 1722 children. All children received eye examination by an Ophthalmology Resident.

Results: The overall prevalence of various eye problems in the school children on examination was 14.8%. Refractive error was found to be the commonest ocular morbidity (78%), followed by squint (5%) and Vitamin A deficiency (4%) amongst the ones having morbidity.

Conclusion and Recommendation: As Refractive error was found to be the primary ocular morbidity, it is concluded that school children can be helped by regular eye checkups, for most conditions are easily treatable if not fully preventable.

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INTRODUCTION

In India, several studies have been carried out on the health status of school age children. These have reported morbidity as, malnutrition (10.0-98.0%), dental ailments (4.0-70.0%), worm infestation (2.0-30.0%), skin diseases (5.0-10.0%), eye diseases (4.0-8.0%) and anemia (4.0-15.05%).¹

Current prevalence of blindness (Visual acuity <6/60) in India is 1.1% and after correction it is 0.56% as estimated in 2001-2002.² The goal of National Program for Control of Visual Impairment and Blindness is to reduce the prevalence of blindness (1.49% 1986-89) to less than 0.3%² Pediatric ophthalmology is not yet well established as a separate subspecialty in most eye care programs, although there are an estimated 200,000 blind children in India.³ Six percent to seven percent children aged 10-14 years have problems with their eyesight affecting their learning in India.³ Studies have also reported that, 16.3% to 37% of blindness in these children is preventable & avoidable.³⁻⁵ In children of 5 -15years of age the visual impairment is 6.4% and major cause of which is refractive error (81.7%).²

Revised strategies under the national program include & emphasize strengthening services for corneal blindness and refractive errors in school going children. Gujarat is committed to reduce the burden of avoidable

blindness by the year 2020 by adopting strategies advocated for vision 2020.⁶

Present study among selected primary school children was carried out in 2008 (February 2008 to July 2008) with the objective; of finding out the prevalence and pattern of eye diseases in children aged 6-14 years.

Material and Methods:

Study population: This is a cross-sectional study carried out among municipal primary school children of a city located in western India. The schools studied were catering to children from lower and middle socio-economic group. There were 2260 primary schools where 57,800 children were enrolled. Considering an expected prevalence of 30% of eye disease among primary school children³⁻⁵, relative allowable error of 8% and 20% as nonresponders, sample size calculated was 1750, using formula $4pq/l^2$ for qualitative data.⁷

Sampling Method:

In order to draw a sample size of 1750 it was decided to study 30 urban schools (each school represented one cluster) from 10 wards of the city. List of Primary Schools of the city was obtained from "Nagar Prathmic Shiksha Samiti"(Municipal School Board), under Municipal Corporation showing number of students in each school, ward wise. Gender segregated numbers of students

was available. It included schools of both English and Local (Gujarati) medium of instruction. To obtain a representative sample, at the first stage, we selected three schools from each ward by simple random sampling method, thus making 30 schools. As the number of students in school showed wide variation, schools in each ward were stratified into three groups A, B and C according to number of students. A Group of school having number students less than 200. B Group of school having number students between 200 to 500. C Group of school having number students more than 500. Then, schools in each group were assigned a serial number on cards and by using lottery method of simple random sampling at this stage, one school per group from each ward was drawn, thus making 30 schools (cluster). It was decided to study 60 students per school from classes one to seven. Pilot study showed that more number of schools were having standard five to seven. So, by lottery method of simple random sampling, eight students each from class one to class five and ten each from class 6th and 7th were selected for the study. It was also decided to study only those students who were present in school during the study period.

Ophthalmic examination for screening of eye problems: Blindness is categorized as Visual acuity (VA) of 3/60 and no perception of light (NPL), low vision which is further categorized in to severe visual impairment (less than 6/60-3/60), visual impairment (less than 6/18-6/60) and normal range (less than 6/6-6/18).⁸ The cut-off taken for refractive error was visual acuity less than 6/9 in the better eye ⁹, which was agreed upon for referral by the experts in Ophthalmology department where students were supposed to be referred. Standard snelle’s charts for both illiterate and literate were used for vision testing. Children having V/A less than 6/9 or any obvious pathology on torch examination were examined in detail, Anterior Chamber (AC) examination with torch and Posterior Chamber (PC) examination with direct ophthalmoscope without pupil dilatation. Ishiara’s chart was used to test colour blindness. Those diagnosed as having refractive errors and needing surgical intervention (stye, chlazion, squint, etc) were given referral cards and their teachers including principal of school were consulted, motivated and educated who then tried to contact and motivate parents of these children, regarding the importance of referral and immediate management of their eye condition. The children were referred to the department of Ophthalmology at district hospital, of the city. Despite personal efforts and persuasiveness 23 children out of 254 attended Ophthalmology department for necessary treatment follow-up.

Data Collection and Statistical Analysis: A survey team was formed consisting of one ophthalmologist, one medical social worker, and two post- graduate medical students, for screening sampled children for their ophthalmic disorders. The findings were recorded in a structured proforma that was pre-tested. Training was imparted to the research team members regarding proper data collection and eye examination for screening of eye disorders. The data was entered and analyzed in Epi info package (Version 6.04b 2001) and proportion and chi-square calculated where appropriate.

Ethical Issues: This study was financially supported by the Department of Health and Family Welfare, Government of Gujarat, India and did not involve any kind of

intervention. To tackle other ethical issues prior informed and written consent was taken from Administrative Officer, Municipal School Board. Any child found to be suffering from eye disease was referred for necessary treatment. Teacher concerned was informed about the same, explaining the need to inform parents for further action.

Observations: In all, 1722 primary school children studying in standard one to standard seven from 30 schools of the city were clinically examined for the presence of eye problems during the study. Standard wise distribution showed that more number of children from standard five to seven and also who were more than nine years of age were studied, a feature observed from all the schools. The reason was that, it was a bit difficult to examine vision (refractive error) of children studying in standard one and two and also due to the reason that more schools were having standard five and seven. Gender wise distribution showed that 52.7% (907) were females and 47.3% (815) were males. Age wise distribution showed that 16.6% (285) were of five to seven years age group, 34.4% (593) were of eight to ten years and rest were of more than ten years.

The overall prevalence of various eye problems in the school children on examination was 14.8% (254/1722). These complaints were otherwise unattended to. Refractive error was found to be the commonest ocular morbidity and they were all having undiagnosed myopia (11.5%), this was followed by Squint (0.7%), Vitamin A Deficiency (0.6%) & Chalazion (0.5%). Other problems found in the order of < 0.5% prevalence were Trachoma, Stye, Accidental Trauma, Color Blindness, Naso Lacrimal Duct Block, Blephritis, Unilateral Blindness, Corneal Ulcer/Opacity, Congenital Cataract, Blackouts, Pseudoaphakia, and Nystagmus & Micro cornea. 14 children (14/1722) were not cooperative, so they could not be examined (Table 1).

Table 1: Frequency of various Eye Problems in Primary School Children studied

Eye Problem	n=1722	%
Refractive errors	198	11.5
Squint	12	0.7
Any sign or symptom of Vitamin A Deficiency	11	0.6
Chalazion	9	0.5
Trachoma	6	0.3
Stye	5	0.3
Accidental Trauma	3	0.2
Color Blindness	2	0.1
Nasolacrimal duct block	1	0.05
Blephritis	1	0.05
Unilateral blindness	1	0.05
Corneal ulcers/opacity	1	0.05
Congenital Cataract	1	0.05
Black outs	1	0.05
Pseudophakia	1	0.05
Nystagmus & Micro cornea	1	0.05
Not cooperative	14	0.81
Normal	1454	84.4

Out of those children identified as having eye problems, refractive error was found to be the commonest ocular morbidity 78% (198/254), followed by squint 5%, Vitamin A deficiency 4% and chalazion 3% (Table 2).

Table 2: Distribution of various Eye Problems in Primary School children studied

Eye Problem Identified	Total eye problems n=254	%
Refractive errors	198	78
Squint	12	4.72
Any sign or symptom of Vitamin A Deficiency	11	4.33
Chalazion	9	3.54
Others	24	9.4

By WHO definition of Visual Acuity, 71 children out of 1722 examined (4.12%) were diagnosed as having visual impairment (visual acuity <6/18-6/60) in the right eye, 65 (3.8%) in the left eye and 62 (3.6%) in both the eyes. Ten of them (0.6%) had severe visual impairment (<6/60-3/60) in right and both the eyes and 13 (0.8 %) had it in the left eye, inclusive of those having it in both the eyes. One child was diagnosed as blind (NPL), the blindness prevalence being 0.06% in the current study. 14 children (0.81%) were not cooperative, so they could not be examined (Table 3).

Table 3: Distribution of Visual Acuity in Primary School children studied (By WHO definition of Visual Acuity)⁸ (n=1722)

Vision	Right Eye		Left Eye		Both Eyes	
	n	%	n	%	n	%
Blind(3/60-NPL)	1	0.06	1	0.06	1	0.06
Severe Visual Impairment(<6/60-3/60)	10	0.6	13	0.8	10	0.6
Visual Impairment(<6/18-6/60)	60	3.5	51	2.9	51	2.9
Normal(6/6,6/9,6/12 & 6/18)	1637	95.06	1643	95.4	1646	95.58
Not Cooperative	14	0.81	14	0.81	14	0.81
Total	1722	100	1722	100	1722	100

NPL: No Perception to Light

DISCUSSION

This school based study was conducted in primary school children studying in schools run by Municipal Corporation, mainly to study the pattern of eye diseases. The overall prevalence of various eye problems in children was 14.6%, out of which 78% was refractory error. The Refractory Error survey in children (RESC) in the age group of 5-15 years using population based cross-sectional sampling, consistent definitions and a common methodology (Visual acuity of <6/12 in the better eye)¹⁰ reported a prevalence of 12.8% in the rural country outside Beijing, China¹¹, 15.8% in an urban area of Santiago, Chile¹², 11.6% in a study carried out in Uganda¹³ and 13% in Turkey.¹⁴

These figures are comparable to the findings of current study. Where as in studies conducted in Pakistan (2%)¹⁵ and in rural district of Nepal (2.9%)¹⁰ it is less than the prevalence observed in the current study. Studies conducted in India from rural Delhi and rural South India, on health status of school children in the age group of 5-15 years have reported that 4%-8% of children suffer from eye diseases.^{1,16,17} The high prevalence of undiagnosed refractive error in the current study might be due to lack of awareness about eye diseases among teachers and parents.

Refractive error was found to be the commonest ocular morbidity 78% (198/254), followed by squint 5%, Vitamin A deficiency 4% and chalazion 3% amongst the ones having morbidity. A study conducted in South India¹⁶ report refractive error as the commonest eye problem and myopia being present in majority of cases which is comparable to the finding of our study. In our study squint was found as the second most eye problem. These findings are supported by study conducted in Katmandu¹⁸ and New Delhi.¹⁷

Vitamin A deficiency was not a significant ocular morbidity in the current study. This may be due to the initiatives undertaken through National Program for Prophylaxis against Blindness in Children caused due to Vitamin A deficiency.²

A low prevalence of bilateral blindness (VA <3/60-NPL) of 0.06% (one child) is found in the current study as compared to Asia (0.9%)¹⁹ and national average of 1.1%.²

Studies conducted in Mongolia²⁰ found bilateral blindness as 0.16/1000 and in Pakistan as 2.7/1000.¹⁵ This may be due to the reason that 14 children (0.81%) were un-cooperative and difficult to examine who may actually be having the problem.

Despite the persuasion and repeated follow-ups of those children who were referred with referral cards, only 9% of them (23/254) reached the tertiary care center for treatment. The refractory error diagnosed at the tertiary care center was myopia. This finding is similar to study conducted in Turkey¹⁴ where as in Uganda¹³ astigmatism was found to be the commonest cause.

Our study had certain limitations: The low level of awareness and attitude of teachers and parents limited the scope of the study as very few children attended the tertiary care centre. The field conditions (facilities, un-illuminated snelle's chart) limited proper examination of non-co-operative students.

CONCLUSIONS

To conclude, the overall prevalence of various eye problems in the school children on examination was 14.8%. Refractive error was found to be the commonest ocular morbidity (78%) followed by squint (5%) and Vitamin A deficiency (4%) amongst the ones having morbidity. 4.12 % children were diagnosed as having visual impairment (visual acuity <6/18-6/60) in the right eye, 3.8% in the left eye and 3.6% in both the eyes. One child was diagnosed as blind (NPL), the blindness prevalence being 0.06% in the current study.

RECOMMENDATIONS

This study shows a prevalence of 14.8% of undiagnosed visual morbidity among urban primary school children. Because visual impairment can have a significant impact on the child's life in terms of education and development, there is a need to have regular and simple vision testing in primary school children at least at the commencement of school so as to detect those who may suffer from these disabilities. Besides this, programme also needs to consider a range of issues related to teachers' and parents' awareness who can use the existing primary, secondary and tertiary preventive strategies. This would help to formulate better strategies for eye care services in children and provide a basis for future research in this area.

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REFERENCES

- 1) Vector Control Research Centre, Pondicherry, India. Extent and Pattern of Health Status of School age Children. ICMR Report; Pondicherry (March)2001.
- 2) Kishore J. National Health Programmes of India, 9th Edition, New Delhi: Century Publications 46, Masih Garh; 2011. p: 420-421.
- 3) Nirmalan P K, Vijayalakshmi P, Sheeladevi S, Kothari M B, et al. The Kariapatti Pediatric eye evaluation project (KPEEP); Baseline gather data of children aged 15 year or younger in south India .Am J Ophthalmology 2003; (136): p:703-9.
- 4) Rahi J S, Sripathi S, Gilbert C.E, Foster A. Childhood Blindness in India: Causes in 1318 blind school students in nine states. Eye 1995 ;(9) :p:545-50.
- 5) Gilbert C E, Canovas R, Hagan M, Rao S, et al. Causes of childhood blindness; results from West Africa, South India and Chile. Eye 1993; (7):p:184-8.
- 6) Govt. of India, Ministry of Health & Family Welfare. Annual Report. Nirman Bhawan, New Delhi; 2005-2006.
- 7) Mahajan BK. Methods in Biostatistics for Medical Students and Research Workres, 6th Edition. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi; 1997, p: 93.
- 8) Gilbert C. Childhood blindness: the epidemiology of eye disease. Johnson GJ, Minassian DC, Weale R. (edi.) London: ChapmanandHa// 1998; p:181-207
- 9) World Health Organization, Geneva. International Statistical Classification of Diseases and Related Health Problems; 10th revision, Current version for 2003, Chapter VII H54 Blindness and low vision. Available from <http://www.who.int/classifications/icd/en/> (Accessed on March 6 , 2013)
- 10) Pokharel G P, Negrel A D, Manoz S R, et al. Refractory error study in children results from Mechi zone, Nepal. Am J Ophthalmol 2000; 129:p:436-44.
- 11) Zhao J, Prax Sui R.. Refractory Error study in children; results from Shwnyi District; China. Am J Ophthalmol 2000; 129:p:427-35.
- 12) Maul E, Barroso S, Manoz S R, et al. Refractory error study in children; results from La Florida Country, Chile. Am J Ophthalmol 2000; 129: p: 445-54.
- 13) Dept of Ophthalmology, Mukerere University, Kampala District. A survey of the prevalence of refractory errors among children in lower primary schools in Kampala district. A Report from the Dept of Ophthalmology, Mukerere University, Kampala District; 2002.
- 14) Faculty of Medicine Eye Hospital, Ankara University Turkey. Ophthalmic screening of School children in Ankara. Eur J Ophthalmol July-Sept 1995; 5(3): 181-6.
- 15) Sajida Parveen Shiekh, Taziq M, Aziz. Pattern of eye diseases in children of 5-15 Years at Bazarrertatine area (South Karachi) Pakistan. J Coll Physicians Surg Pak 2005; 15(5): p:291-4.
- 16) International Center of Advancement of Rural Eye Care, L U Prasad eye Institute, Hyderabad, India. Refractory error in children in a rural population of India (Community). Invest Ophthalmol Vis Sci March 2002; 43(2): 615-22.
- 17) Chaturvedi S, Aggarwal O P. Pattern and distribution of ocular morbidity in primary school children of rural Delhi. Asia Pac J Public Health 1999;11:30-3.
- 18) Nepal B P, Koirala S, Adhikari S, et al. Ocular morbidity in school Children in Katmandu. Br J Ophthalmol 2003; 87:p:531-4.
- 19) Al-Shifa, Trust Eye Hospital, Rawalpindi. Control of Childhood blindness in Pakistan. A Report of a workshop at the Al-Shifa, Trust Eye Hospital, Rawalpindi 1996; No 24-26.
- 20) Gilbert C, Bulgan T. Prevalence and causes of severe visual impairment and Blindness in children in Mongolia. Ophthalmic Epidemiol 2002; 9:271-81.