Prevalence and causes of ocular morbidity in school going children of Haldwani (Nainital)

Nishith Panwar[1,*], Vimlesh Sharma[2], G.S. Titiyal[3]

[1]PG Student, [2]Assistant Professor, [3]Professor & Head, GMC, Haldwani

***Corresponding Author:**
Email: doctornishith@gmail.com

Abstract

Background: School going children form an important group in which as ocular morbidity has a huge physical, psychological and socio-economic implications. Approximately one-third of blind persons in India are affected before 20 years of age, hence early detection of ocular morbidity and their management is very important. This study aims to highlight the prevalence of ocular morbidity in school going children of government and private schools of Haldwani.

Materials and Methods: Government and private schools were selected by simple random sampling, sample size was calculated and a total of 1355 school children were included in the study. Data was collected with the questionnaire and detailed ophthalmic examination was done using appropriate charts and instruments. Data was analyzed using SPSS version 21.

Results: Prevalence of ocular morbidity was found to be 23.3%. Refractive error was the most common ocular morbidity (15.6%) followed by colour blindness (2.4%) and vitamin A deficiency (1.1%). Prevalence of overall ocular morbidity and refractive errors were found significantly associated with age of the study participants. (p value < 0.05).

Conclusion: A high prevalence of ocular morbidity among high-school children was observed. Refractive errors were the most common ocular disorders.

Key words: Ocular morbidity, Prevalence, Blindness, School children, Refractive error

Access this article online	
Quick Response Code:	**Website:** www.innovativepublication.com
	DOI: 10.5958/2395-1451.2016.00028.7

Introduction

Childhood blindness and other causes visual deprivation are one of the most significant morbidities which are increasing the overall burden of blindness throughout the world. Childhood ocular abnormalities are more debilitating and disabling than the senile onset, because the child has to live their whole life ahead with that morbidity. School children are quite vulnerable to morbidities such as uncorrected refractive errors. These have a significant impact on their learning capability and educational potential.

Worldwide, approximately 285 million people are visually impaired out of which 39 million are blind and rest have low vision[1]. Out of such a large population of visually impaired globally, about 1.5 million blind constitutes children and most of them resides in Asia and Africa. The various causes of childhood blindness and has changed over the last few decades and their prevalence is different in different parts of the world[2].

The population of India has increased to about 1.21 billion in 2011 and approximately 420 million children are under 16 years of age. With such a large population, the magnitude of avoidable blindness in the pediatric age group is also huge. It has been previously reported that childhood blindness results in a total of 11.2 million blind person years which is significant when compared with 22.5 million blind person-years for senile cataracts, and 5.5 million blind person-years for glaucoma in our country[3].

Globally, initiatives like Vision 2020 are launched by the WHO and a Task Force of International Non-governmental Organizations to fight the gigantic problem of blindness in all age groups. In India, National Program for Control of Blindness (NPCB) was launched in the year 1976. It was a 100% centrally sponsored scheme with goal to reduce the prevalence of blindness from 1.4% to 0.3%. Currently, there are an estimated 2.7 lakh blind children in India[4]. The leading causes of childhood blindness are refractive errors, xerophthalmia, congenital cataracts, globe anomalies, hereditary causes, congenital glaucoma, optic atrophy due to meningitis and retinopathy of prematurity[5]. Uncorrected refractive errors in school going children may have a significant impact on their learning and personality. Early years of a child is most important in determining his physical, intellectual and behavioral development. Poor vision dramatically affects the child's performance in school and has a negative influence on his development and maturity.

School Eye Screening program became the integral part of the NPCB since 1994.There has been various studies done to estimate the prevalence of childhood blindness, ocular morbidity and refractive errors among children in different parts of India but no such study has been conducted in the Kumaun region of Uttarakhand.

The present study aims to estimate the burden of childhood eye diseases in Haldwani block of Uttarakhand and assess the need for eye services for children in this region.

Materials and Methods

This study is a cross sectional study conducted in the rural and urban area of Haldwani, District Nainital among the school children of 6-16 year age group. Uttarakhand is located in the northern part of India and has a total geographic area of 51,125 sq kms. The population of Uttarkhand as reached 1.01 crore with an increase of 19.17 percent from the past decade. It has two mandals, namely Garhwal and Kumaun; further these two are divided into seven and six district respectively. Nainital district comes under Kumaun region which has eight blocks and Haldwani is one of them where this study has been conducted.

In Haldwani block there are 87 secondary and higher secondary schools as per the list from the District Education Officer, Nainital. Out of these 4 higher secondary schools were selected randomly, 2 each from rural and urban area. In each school, list all students in the age group of 6-16 years was made and all the students were included in our study.

The period of study was 24 months (December 2013- December 2015). Data collection was done for initial 18 months and remaining period was used for data analysis and interpretation. The total sample size was estimated by using the formula: $n = 4\ pq/d^2$.Where n is the sample size, p is prevalence of ocular morbidity (30%), q is 100-p =70% and d is error in estimation (taking absolute error 4%).The required sample size was calculated as $n = (4x\ 0.30x0.70)/\ (0.04)^2 = 525$.Assuming 10% non-respondents and applying design effect of two, the sample size came out to 1155. On checking the school records it was seen the total number of students in the age group of 6-16 years were 1404, so we decided to include all these students in our study.

After getting written permission from the school, a predesigned and pretested semi structured questionnaire was applied. All the information was obtained from the students using the interview method. The first part of the questionnaire dealt with information regarding the child age, sex, residential address, number of family members, parents occupation, income, and chief complaints related to eyes. Second part of the questionnaire included detailed examination of eye for diagnosing ocular morbidity. The cutoff of uncorrected visual acuity for defining refractive error in this study was taken as less than 6/9 Snellen in the worst eye. Torch light examination was done to check ocular adenexa, conjunctiva, cornea, anterior chamber and iris abnormalities. Both direct and consensual reaction pupils were checked in appropriate light conditions. Extra ocular movements were checked all cardinal positions of gaze. Hirschberg test and cover-uncover test was done for the detection of latest or manifest strabismus. Colour vision was assessed using Ishihara's chart. Retinal examination was done with the help of direct ophthalmoscope. Retinoscopy was performed in children suspected of having refractive error. Vitamin A deficiency was diagnosed if there was history of night blindness, or on examination there were signs of conjunctival xerosis, Bitot spots, corneal xerosis or keratomalacia as per WHO grading. Congenital disorders such as ptosis, irregular pupil, nasolacrimal duct obstruction and congenital cataract were looked for.

The data obtained on a predesigned, pretested semi structured questionnaire was coded & entered in Microsoft Excel. Analysis was done using SPSS version 21 and descriptive interpretation of data was done in the form of percentages. Chi-square test was used to test differences in proportions. Differences were considered to be statistically significant at the 5% level. Ethical clearance was obtained before conducting the study from the Institutional Ethical Committee of Government Medical College, Haldwani.

Results

Out of 1404 school children listed in the age group of 6-16 years, 49 were absent on the day of examination. Therefore a total of 1355 school children were assessed in the study. Overall prevalence of ocular morbidity was 23.3%. A higher prevalence of ocular morbidity is present in males (24.2%) in comparison to females (22.1%).

Table 1: Distribution of ocular morbidity according to sex among the study participants

Ocular morbidity	Male No. (%)	Female No. (%)	Total No. (%)
Present	188 (24.2)	128 (22.1)	316 (23.3)
Absent	589 (75.8)	450 (77.9)	1039(76.7)
Total	777 (100)	578 (100)	1355 (100)

Age wise distribution of ocular morbidity showed that maximum prevalence of eye diseases were present in 10-13 year age group (37.3%) and lowest in 6-9 year age group (22.5%). Ocular morbidity was more prevalent among private schools (24.2%).

Refractive errors are the most common (15.6%) ocular morbidity followed by colour blindness (2.4%) and Vitamin A deficiency (1.1%).Other ocular diseases such as allergic conjunctivitis (0.9%), vernal keratoconjunctivitis

(0.7), infectious conjunctivitis (0.6) and blepharitis (0.6) were less prevalent. Diseases such as squint (0.2%), ptosis (0.1%) were least common.

On comparing various socio-demographic variables, it was observed that refractive errors were significantly associated with age of the study participants (0.008).

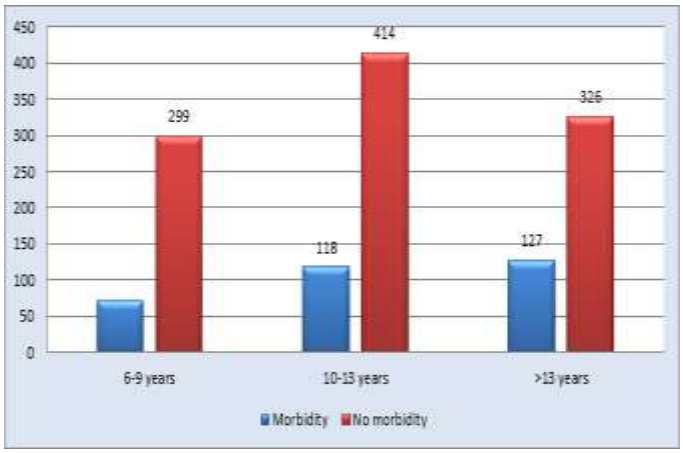

Fig. 1: Distribution of ocular morbidity across different age groups among the study participants

Table 2: Distribution of study participants according to different types of ocular morbidities

Ocular morbidity types	No.(%)
Refractive error	212 (15.6)
Colour blindness	33 (2.4)
Vitamin A deficiency	15 (1.1)
Allergic conjunctivitis	12 (0.9)
VKC	9 (0.7)
Infectious conjunctivitis	8 (0.6)
Blepharitis	7 (0.5)
Congenital cataract	4 (0.3)
Traumatic cataract	3 (0.2)
Chalazion	4 (0.3)
Stye	3 (0.2)
Squint	3 (0.2)
Ptosis	1 (0.1)
Molluscum contagiosum	2 (0.2)
Total	316 (23.3)

Table 3: Distribution of study participants according to ocular morbidity in different sex, school and age groups

Socio-demographic variables		n	Ocular morbidity		Pearson Chi-square value	p-value
			Present	Absent		
Sex	Male	777	188 (24.2)	589 (75.8)	0.779	0.377
	Female	578	128 (22.1)	450 (77.9)		
School	Government	586	130 (22.2)	456(77.8)	0.746	0.338
	Private	769	186 (24.2)	583 (75.8)		
Age	6-9 yrs	370	71 (19.2)	299(80.8)	9.546	0.008
	10-13 yrs	532	118(22.2)	414 (77.8)		
	>13 yrs	453	127 (28)	326 (72)		

Discussion

School children constitute an age group which is particularly vulnerable ocular morbidities such as uncorrected refractive errors. They have a drastic effect on a child's academic performance, and his personal social development. Regular screening of children in school is an effective way of detecting ocular morbidities such as refractive errors and thus minimizing the impact of such disabilities in long term. Therefore a school is the appropriate place for successful implementation of a comprehensive eye healthcare program.

In our study, the overall prevalence of ocular morbidity in school children of age 6-16 year age group was 23.3%. This is comparable to the similar studies conducted in Delhi[8] (22.7%), Tripura[9] (23.17%), North Maharashtra[10] (27.65%) and Shimla[11] (31.1%).

However higher prevalence has been reported from the states like Haryana[12] (58.8%), Rajasthan[13] (71.7%) and Punjab[14] (64.25%). It could be because of the higher prevalence of trachoma and conjunctivitis in these states. Moreover, the range of age groups covered in the above mentioned studies was also more as compared to the present study. Lower prevalence of ocular morbidity has been reported from Ahmednager, Maharashtra[15] (9.66%), Kolar district[16] (13.3%) and Western India[17] (14.6%) because of the lower prevalence of refractive errors found in these studies. Review of international studies revealed low prevalence of ocular morbidity. Children in rural area of Tanzania[18] (16.25%) and Nepal[19] (11.7%). These differences in prevalence can be explained partly by different characteristics of the study population such as race, different lifestyles and living conditions.

Refractive errors in our study were found to be 15.6% which are comparable to the studies done in Western India (11.5%) and Shimla (22%).[11] The overall incidence has been reported to vary between 21% and 25% of patients attending eye outpatient departments in India.[95] Low prevalence was observed in studies from Tripura (8.33%)[9] and Maharashtra (10.12%).[15] Higher prevalence has been observed in the studies from South India[20]. This higher (32%) prevalence rate of refractive errors among school children of age 3-18 years was attributed to the optometrists due to their higher case detection rate in that study.

Prevalence of colour blindness was found to be 2.4% which is comparable to the study conducted in Shimla (2.3%).[11] Comparable results have been reported in studies from Rajasthan (2.9%)[13].

Prevalence of Vitamin A deficiency in our study (1.1%) is comparable to that of Shimla (1.3%)[11]. Higher prevalence (5.4-9%) in 4 to 16 years has been reported from Rajasthan[13] and Kolkata[21] respectively as compared to 1.1% in the present study. This can be explained by lower socioeconomic status associated with unhealthy dietary pattern of children in those studies. Lower prevalence in the present study also shows that better prophylaxis measures and living conditions are present in recent years as compared to the older studies.

Conjunctivitis was found to 0.6% which is similar to that of study in Shimla (0.9%)[11]. Higher (3-17.5%)[12,13,21,22] prevalence of conjunctivitis has been reported in other parts of India. . internationally lower prevalence was observed in Nepal (0.65%)[23] whereas higher prevalence was noted in Nigeria (7.4%).[24] The difference in prevalence in these studies may be due to seasonal variation of conjunctivitis and probably because of shorter duration of the illness.

Prevalence of blepharitis is 0.5% in our study which is comparable to the study from Delhi (1%)[8]. Slightly higher prevalence was noted in studies from Rajashthan (1.6%)[13], Tripura (2.17%)[9] Maharashtra (3.48%)[13]. Lower prevalence may be explained by the better living conditions in our study area.

Prevalence of squint (0.2%) in the present study is comparable to the study of Delhi (0.5%). Higher prevalence was observed in states like Tripura (1.33%) and Maharashtra (6.39%). Internationally, Wedner et al conducted a study and observed lower prevalence of squint (0.5%) among children of 7-19 years in Tanzania, Africa[18].

The limitation of this study was that we did not include children less than 6 years of age. Therefore we could have underestimated the prevalence of childhood ocular morbidities as they also contribute to the pediatric eye diseases.

This study confirms the high prevalence of ocular morbidity among school children of Kumaun region of Uttarakhand. This highlights the urgent need to implement health facility-based, cost effective strategies, and appropriate eye care programs targeting school children to reduce the burden of visual impairment among the younger population.

References

1. Visual impairment and blindness key facts. [cited on 2015oct10] Available from: http://www.who.int/mediacentre/factsheets/fs282/n/.
2. Vision 2020-Right to sight-pdf. [Cited on sept201514] Available from: http:// www .aios.org/cme/cmeseries9.
3. Dandona L, Williams JD, Williams BC, Rao GN. Population-based assessment of childhood blindness in southern India. Arch Ophthalmol 1998;116(4):545-6.
4. School eye screening and the National Program for Control of Blindness-R Jose, Sandeep Sachdeva, Directorate General of Health Services, Ministry of Health and Family Welfare, Nirman Bhawan, New Delhi. Indian Pediatrics. Page 205-208 Volume 46__March 17, 2009.
5. Eyecare-in-India-A-Situaltion-Analysis.pdf. [Cited on 2015 oct11] Available from: http://www.sightsaversindia.in/wp-content/uploads/2014/06/16482.
6. Murthy GVS, Gupta SK, Bachani D, editors. The Principles and Practices of Community Ophthalmology. New Delhi: Community Ophthalmology Section, RP Centre, AIIMS; 2002.
7. Grover A.K, Arora S. Eye Screening in Children: Its Relevance and Implications. JIMSA 2012;25(4):221-2.

8. Kumar Rajesh, Pratibha Dabas, Mehra Malik, Ingle. G.K, Saha Renuka, Kamlesh. Ocular morbidity amongst primary school children in Delhi. Health and Population-Perspectives and Issues 30(3):222-229,2007.
9. Kaushik Tripura, N.C. Luwang, Subrata Baidya, Phani Sarkar. A study on the prevalence of ocular mobidity amongst school children aged between 6 and 14 years in rural area of west Tripura.:jemds/2015/257.
10. Deshpande Jayant D, Malathi K. Prevalence of Ocular morbidities among school children in rural area of North Maharashtra. National Journal of Community Medicine 2011;2(2):254.
11. Gupta Madhu, Gupta P Bhupinder, Chauhan Anil, Bhardwaj Ashok. Ocular morbidity prevalence among school children in Shimla, Himachal Pradesh, North India. Indian J Ophthalmol: 2009;57:133-38.
12. Khurana AK SK, Parmar IPS, Aggarwal SK. Ocular morbidity among school children in Rohtak city. Indian J Public Health. 1984,28:217-20.
13. Desai S, Desai R, Desai NC, Lohiya S, Bhargava G, Kumar K. School eye health appraisal. Indian J Ophthalmol 1989;37(4):173-5.
14. Singh S, Singh H, Joshi VS. Eye diseases among primary school children. Indian J Ophthalmol 1974:22:1-3.
15. Naik R, Gandhi J, Shah N. Prevalence of Ocular Morbidity among School Going Children (6-15years), Sch. J. App. Med. Sci., 2013:1(6):848-51.
16. Bansal A, Krishnappa K, Datti N P, B S Guruprasad, Guha J. Ocular morbidity in school going children of Kolar District ,South India. J Clin Biomed Sci 2012;2(4):175-84.
17. Mishra S Baxi R K, Damodar J R, Prajapati N B, Patel. Prevalence of visual impairment in urban primary school children in Western India. Innovative Journal of Medical and Health Science 2013:193-96.
18. Wedner SH, Ross DA, Balira R, Kaji L, Foster A. Prevalence of eye diseases in primary school children in a rural area of Tanzania. Br J Ophthalmol 2000;84:1291-7.
19. Marasini S, Sharma R, Sthapit PR, Sharma D, Koju U, Thapa G, Nepal BP. Refractive errors and visual anomalies in school children in the Kavrepalanchowk District. Kathmandu Univ Med J 2010;9(32):362-6.
20. Kalikivayi V, Naduvilath TJ, Bansal AK, Dandona L. Visual impairment in school children in southern India. Indian J Ophthalmol 1997;45(2):129-34.
21. Datta A,Chaudhaery N, Kundu K.An epidemiological study of ocular condition among school children of Calcutta Corporation. Indian J Ophthalmol 1983;31:505-10.
22. Pratap VB, Lal HB. Pattern of paediatric ocular problems in North India. Indian J Ophthalmol 1989;37:171-2.
23. Marasini S, Sharma R, Sthapit PR, Sharma D, Koju U, Thapa G, Nepal BP. Refractive errors and visual anomalies in school children in the Kavrepalanchowk District. Kathmandu Univ Med J 2010;9(32):362-6.
24. Ajaiyeoba AI, Isawumi MA, Adeoye AO, Oluleye TS. Prevalence and Causes of Eye Diseases amongst Students in South-Western Nigeria. Annals of African Medicine 2006;5:197–03.