

# Ocular morbidity in school children in eastern region of Nepal

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## Abstract

**Background:** 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 for children.

**Objective:** The aim of the study is to determine the prevalence of ocular morbidity among school children in eastern Nepal.

**Method:** A cross-sectional study was designed to evaluate ocular status of primary school children in six government schools of the eastern region of Nepal. A complete eye examination was carried out in all children including slit lamp examination, fundus examination, retinoscopy and subjective refraction. Data was analyzed using Microsoft excel. The screening is based on the Indiana school vision screening guideline.

**Results:** A total of 847 children were examined in visits. The mean age of study population was 10.25 years. Among them 450 were males and 397 were females. The results showed that 12.05% of the total students had ocular and visual morbidities. Refractive error was found to be the commonest abnormality (62%) in school children. The commonest type of refractive error found in the study was myopia followed by hyperopia. Alternate divergent squint is the commonest type of strabismus. Other abnormalities found were BSV (binocular single vision) abnormalities, amblyopia and conjunctival disorder.

**Conclusion:** The vision screening program has proved to be very helpful in early detection, diagnosis, referral and management of ocular morbidities in school children. 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.

**Key words:** Children, Ocular, Screening

## INTRODUCTION

Visual impairment is a worldwide problem that has significant socio-economic impact<sup>1</sup>. Childhood blindness is a priority area because of the number of years of blindness that ensues. Poor vision and an inability to read material on the chalkboard due to refractive error can profoundly affect a child's participation and learning in the classroom<sup>2</sup>. The ocular morbidities in children need to be detected and treated on time; otherwise, it will cause irreversible loss of vision. It also has serious social implications for the child in school. According to the National Blindness Survey of Nepal of 1981, refractive error was identified as a primary ocular disorder in 1.3% of the 39,887 examined persons of all

ages<sup>3</sup>. In the study done by the Refractive Error Study in Children (RESC) group, refractive error was the major cause of visual acuity of 0.5 (20/40) or worse in at least one eye in 89.5% of children in China and 56% in Nepal. The study further reported that reduced vision, because of myopia, was an important public health problem in school-age children; and more than 9% of children could benefit from prescription of glasses<sup>4,5</sup>.

Data on the prevalence and causes of blindness and severe visual impairment in children are needed for planning and evaluating preventive and curative services for children. The available data suggest that there may be tenfold difference in prevalence of childhood blindness and severe visual impairment between the wealthiest countries of the world and the poorest ranging from as low as 0.1/1000 children aged 0-15 years in the wealthiest countries to 1.1/1000 children in the poorest<sup>1</sup>. It is estimated that the cumulative number of blind-person-years worldwide due to childhood blindness

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ranks second only after the cumulative number of blind-person-years due to cataract blindness<sup>2</sup>. According to Nepal blindness survey conducted in 1981, the main causes of blindness in the children were ocular infections, xerophthalmia, and congenital cataract etc<sup>3</sup>. Nepal xerophthalmia survey conducted in 1981 show that 1.65% of children below 14 years of age had Bitot's spot presumed to be due to vitamin A deficiency<sup>4</sup>. A refractive error study from the Mechi zone of Nepal conducted in 1997 showed that 2.9% had visual morbidity of which 56% was due to refractive error<sup>5</sup>. An estimated 153 million people over 5 years of age are visually impaired as a result of uncorrected refractive errors, of which 8 million are blind. Approximately 12.8 million children in the age group 5–15 years are visually impaired from uncorrected or inadequately corrected refractive errors, estimating a global prevalence of 0.96%<sup>1</sup>.

## METHODS

A cross-sectional school-based study was conducted in 847 students in six government primary schools of Biratnagar during the period of three months. All the children attending the schools were included in the study. Among these school children, 450 were male and 397 were female. The screening is based on the Indiana school vision screening guideline<sup>1-3</sup>. Children unwilling to participate or absent during our visit were excluded from our study. Schools were briefed in advance and necessary arrangements were made for the screening.

The ophthalmic examinations included:

1. Visual acuity was measured using Snellen's chart (E- chart) at a distance of six meters. Unaided visual acuity, visual acuity with pin hole and glasses were taken.
2. Motility test and cover test was done using a torch light.
3. Ocular examination was done with a torch light
4. Convergence test was done using Royal Air Force rule.
5. Slit lamp biomicroscopy was performed with handheld slit lamp.
6. Retinoscopy and subjective refraction was performed in all the children. A cycloplegic refraction was performed with cyclopentolate HCL 1% in all the cases of hypermetropia, strabismus, and amblyopia, unstable end point of refraction, scissor reflex, anisometropia more than 1.00 D, high refractive error, and the cases where vision couldn't be improved with normal refraction, and suspected case of pseudomyopia. When family history of strabismus, amblyopia or high refractive error was

present, cycloplegic refraction was also considered in those children. A cyclopentolate drop was instilled two times at an interval of 10 minutes, and refraction was carried out after 45 minutes from the first instillation. This process was followed by subjective refraction after 3 days.

7. Fundus evaluation was done with a direct ophthalmoscope. Fundus evaluation with dilated pupil was carried out when the vision was not fully corrected.

## RESULTS

A total of 847 children were examined in visits. The mean age of study population was 10.25 years. Among them 450 were males and 397 were females. The results showed that 12.05% of the total students had ocular and visual morbidities. The common ocular morbidities seen were refractive error, BSV abnormalities, amblyopia and conjunctival disorder. The most common cause of ocular morbidity was refractive error. The conjunctival disorder includes: conjunctivitis, conjunctival cyst. The strabismic and refractive amblyopia were present, the lid disorder included: sty, chalazion and blepharitis. The other includes: episcleritis, ocular allergy and meibomian gland dysfunction.

**Table 1: Ocular morbidity among school children**

Type of ocular morbidity	Number	Percent
Refractive error	525	62
Conjunctival disorder	92	10.8
BSV Binocular single vision	83	9.8
Amblyopia	69	8.2
Lid disorder	27	3.2
Other	51	6

**Table 2: Pattern of refractive error in children**

Type of refractive error	Number	Percent
Myopia	602	71
Hypermetropia	77	9
Astigmatism	168	20

The most common ocular morbidity was refractive error among which 71% was myopia followed by astigmatism (20.5%) and hyperopia (8.5%).

## DISCUSSION

In our study, total of 847 students were examined among which 12.05% had ocular and visual morbidity. In a similar study done by Nepal et al in 2003 in Kathmandu valley<sup>6</sup>, 11% of the school children had ocular morbidity

whereas 31.6% of school children had ocular problems in another study done in Himanchal Pradesh, North India by Gupta et al<sup>7</sup>.

Refractive error was found to be the commonest abnormality (62%), in school children. These findings are similar to that of the study from the Mechi zone of Nepal conducted in 1997 which showed 56% of visual morbidity due to refractive error<sup>5</sup>.

The commonest type of refractive error found in the study was myopia followed by hyperopia which was similar to the study done by BP Nepal et al in Kathmandu valley<sup>6</sup>. BSV abnormalities were present in 9.8% of the total abnormalities. This finding is different from the study done by BP Nepal et.al which shows strabismus is the second commonest cause of ocular morbidity<sup>6</sup>. The prevalence of refractive error among school children in the study done by Gaurishankar et al<sup>8</sup> was 8.6% (myopia 3.9%, hyperopia 1.7%, and 3% astigmatism). Alternate divergent squint is the commonest type of strabismus as opposed to alternate convergent squint which is similar to the study done by Nepal et al<sup>6</sup>. However, finding from western countries are contrary to our findings.<sup>5</sup> This may be due to the variation in the facial structure and interpupillary distance in different communities.

Conjunctivitis and conjunctival disorder are found in 10.8%. The infective conjunctivitis were more common than allergic type, The other conjunctival disorders like conjunctival cyst, and nevus were also found. High prevalence of conjunctivitis in a children studying in government schools in this study could be because of

lower socioeconomic status and poor personal hygiene.

Amblyopia is found in 8.2% of the total study population. The main causes of amblyopia were refractive error and strabismus. This may be due to late presentation and diagnosis of the problems. This study is similar to the study done by Nepal et.al which found 12.4% of children with amblyopia<sup>6</sup>. This compares well with studies from eastern Nepal (9%) Chile<sup>3</sup> (6.5%) and China<sup>4</sup> (5%).

The sample size of the study was small due to time constraint. More detailed study including both private and government school could be done in the future so that we can compare the status of ocular morbidities among government and private schools.

## CONCLUSION

The vision screening program has proved to be very helpful in early detection, diagnosis, referral and management of ocular morbidities in school children. 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. For this, school teachers should be oriented and trained in identifying common eye problems among school children so that these children can be referred for prompt treatment. They should impart awareness regarding ocular hygiene among school children. A school eye screening cum intervention program with periodic evaluation seems to be appropriate for countries like Nepal as most of the ocular morbidities found are preventable or treatable.

## REFERENCES

1. Negrel AD, Maul E, Pokharel GP, Zhao J, Ellwein LB. Refractive error study in children: sampling and measurement methods for a multicountry survey. *Am J Ophthalmol*. 2000; 129:421–6.
2. Shrestha SP, Bhat KS, Binu VS, Barthakur R, Natarajan M, Subba SH. Pattern of refractive errors among the Nepalese population: a retrospective study. *Nepal J Ophthalmol*. 2010; 2:87–96.
3. Brilliant GE, Pokhrel RP, Grasset NC, Brilliant LB. The epidemiology of blindness in Nepal: report of the 1981 Nepal blindness survey. Chelsea, MI: The Seva Foundation, 1988.
4. Jialiang Z, Xiangjun P, Ruifang S, Sergio RM, Robert DS, Leon BE. Refractive error study in children: results from Shunyi District. *China Am J Ophthalmol*. 2000; 129:427–35.
5. Gilbert CE, Anderton L, Dandona L, Foster A. Prevalence of visual impairment in children: a review of available data. *Ophthalmic Epidemiol*. 1999;6:73–82.
6. Nepal BP, Koirala S, Adhikary S, Sharma AK. Ocular Morbidity in school children in Kathmandu. *Br J Ophthalmol*. 2003; 87(5):531–4.
7. Gupta M, Gupta BP, Chauhan A, Bhardwaj A. Ocular morbidity prevalence among school children in Shimla, Himachal North India. *Indian J Ophthalmol*. 2009; 57(2):133–8.
8. Shrestha GS, Sujakhuat D, Joshi P. Refractive error among school children in Jhapa, Nepal. *J Optom*. 2011; 4(2):49–55.
9. Foster A. Worldwide blindness increasing but avoidable. *Semin Ophthalmol*. 1993;8:166–70.
10. Upadhyay MP, Gurung BJ, Pillai KK, Nepal BP. Xerophthalmia among Nepalese children. *Am J Epidemiol*. 1985;121; 71–7.