



## Brief Communication

# Myopia in school children from high mountain region of Nepal

Adhikari S  
Tilganga Institute of Ophthalmology, Kathmandu, Nepal

### Abstract

**Objective:** Myopia is emerging as a public health problem in school going children. Prevalence of myopia differs in different geographical areas, race, ethnic groups and socioeconomic background. Purpose of this study was to find out myopia prevalence in schoolchildren from very high mountain region of Nepal. **Materials and methods:** It was a cross sectional descriptive study. Vision screening was conducted in Snowland School among the children who come from high mountain region. Vision screening was done by volunteers using standard Snellen's chart. Those who failed screening test underwent a detailed ophthalmological examination by a pediatric ophthalmologist. **Results:** A total of 140 children had their vision assessed. Mean age was 13.9yrs ( $\pm 2.8$ yrs SD). On screening, 28.5% children (n=40) had vision less than 6/9 in at least one eye. Seven children were already wearing myopic glasses, among which only 2 had vision 6/9 or better. Out of 40 children, 10% (n=4) had vision 6/9 or better and 90% (n=36) had refractive error. Out of these 36 children, myopia was present in all (100%). Hence prevalence of Myopia in total school population was 27% (n=38). All the children had simple Myopia from 0.5D-3.5D. After refractive correction, all the children had best corrected visual acuity of 6/9 or better. 86 % (n=120) children never had their eyes checked before. **Conclusion** The study showed high prevalence of myopia and was only ocular morbidity present in children. The result of this study can be a baseline in conducting large population based study in children from high mountains of Nepal.

**Keywords:** Myopia, Nepal, high mountains, schoolchildren

### Introduction

Myopia is one of the major causes of preventable visual loss worldwide. Increased prevalence of myopia in teenagers and young adults attending schools has been well documented (Lin LL, 1995; Chung KM, 1996; Pokharel A, 2010). However cause of myopia is still a subject of an intense debate. Etiology of myopia, whether genetic or environmental is still a controversial issue. Myopia no doubt is emerging as a public health problem

worldwide. Prevalence of myopia varies greatly among the races and societies (Sew-Mei Saw, 2003; Tay MT, 1992). Epidemiological studies have shown myopia prevalence higher in Asian population. In Nepal, many reported studies showed that prevalence of myopia among school children varies from 3 to 11% ( Pokharel GP, 2000; Nepal BP et al, 2003; Pokharel A, 2010). The Snowland School is located in the outskirts of Kathmandu. It is a boarding school for the children from rural Himalayan villages, mainly from the regions of Solukhumbu, Mustang, Mugu, Dolpa, Jumla, Humla of Nepal and some from Tibet. Many of these children are orphanages or from poor families who have limited access to education. The teachers in

Received on: 01.03.2013 Accepted on: 10.06.2013  
**Address for correspondence:** Dr Srijana Adhikari, MD  
Associate Professor, Pediatric Ophthalmology Unit  
Tilganga Institute of Ophthalmology  
Tel: 977-1-4493684; Fax: 977-1-4474937; Mob: 977-1-9849287387  
Email: srij\_a@yahoo.com



the school noticed a large number of children having difficulties seeing a distant board or taking part in the activities that involved accurate distant vision. Hence, vision screening was carried out to find out the prevalence of ocular morbidity in these school children.

### Materials and methods

The type of study: A cross sectional descriptive study was carried out.

#### The screening in school

Vision screening was done by the volunteers who were elective medical students from United Kingdom in their final year of medical school. Monocular visual acuity examination was done by using standard Snellen E chart kept at the distance of 6 meters. The children who had vision less than 6/9 were retested to confirm the accuracy of screening and prevent unnecessary referral. Children wearing glasses were screened with their current glasses. All the children with vision less than 6/9 in at least one eye was referred to the pediatric ophthalmologist for further examination.

#### Examination in pediatric out-patient department

Children who failed vision screening were examined by a pediatric ophthalmologist in out-patient department of International Children's Hospital. All the children underwent the following examinations.

Visual acuity examination by using standard Snellen chart kept at a distance of 6 meters. Cycloplegic retinoscopy and the subjective refraction. Tropicamide 1% was used as the cycloplegic agent as it had a short onset of action and short recovery time. Refraction was done by a manual retinoscope (Heine, Germany), anterior segment examination by using a slit lamp, and fundus examination by using a direct ophthalmoscope. Myopia was included when there was spherical equivalence of 0.5 D or more.

### Results

A total of 140 children had their vision assessed by the volunteers. Age ranged from 4-18 years. The mean age was 13.9yrs ( $\pm 2.8$ yrs SD). The male children were 61% while female were 39%.

#### The result of vision screening

Out of 140 children, only 40% (n=56) had presenting visual acuity of 6/6 in both the eyes and 31 % (n=44) had vision 6/9. The remaining 29 % (n=40) children failed the vision screening criteria and referred to Pediatric Ophthalmologist (Table 1).

There were seven children who were already wearing glasses, out of which, only 2 had vision 6/9 or better with the current myopic glasses. 86 % (n=120) children never had their eyes checked before.

#### The result of ophthalmologist's examination

A total of 40 children fulfilled the referral criteria. On examination, 10% (n=4) of them had a vision of 6/9 or better in both the eyes, i.e. false positive result, whereas 90% (n=36) had a vision worse than 6/9 in at least one eye. Of them, 100% of the children had a myopia. Among the children who were on glasses, 2 had a vision better than 6/9 with glasses and they had been diagnosed as myopes beforehand.

The severity of myopia has been shown in **table II**. All the children with myopia improved to vision 6/9 or better after refractive correction. The prevalence of myopia in this school population was 28 % (n=36+2).

On analyzing the relationship of myopia with the age, there was no statistically significant relationship ( $p=0.543$ ) Myopia was more common in the age group of 15 years (Figure 1).

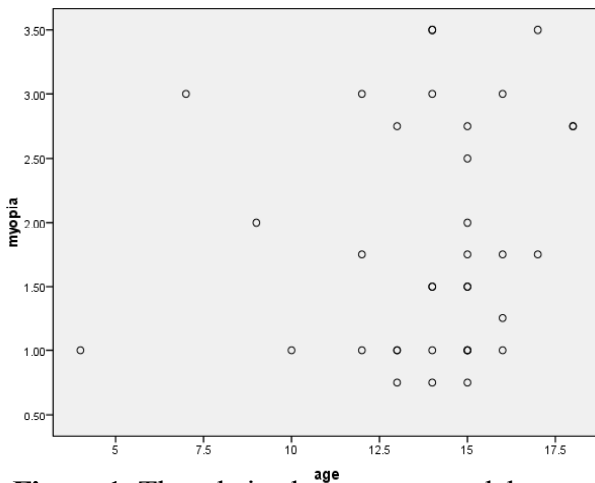
**Table I: The presenting visual acuity in children**

Presenting visual acuity	Number(%) of children
6/6	56(40%)
6/9	44(31%)
6/12	12(8.6%)
6/18	10(7.3%)
6/24	7(5%)
6/36	6(3%)
6/60	5(4.3%)
Total	140(100%)



**Table II The severity of Myopia in children**

Myopia in Diopter	No(%)
0.5-1	13(34.2%)
>1-2	11(28.9%)
>2-3	9(23.6%)
>3-4	5(13.1%)
total	38(100%)



**Figure 1:** The relation between age and degree of myopia in children

### Discussion

Our study has shown a very high prevalence of mild to moderate myopia in the school children. None of these children had any other ocular abnormalities like strabismus or amblyopia. In Nepal there was a similar study done in children from the high mountain region (Gamer FL, 1999). In this study, the Sherpa children residing in the Kathmandu valley and children who reside in the high mountain region were compared. The study showed prevalence of myopia 2.9% in the Sherpa children and 21% in the Tibetan children. In our study, the prevalence of myopia was 28% which is the highest prevalence among all the studies done in school children in Nepal. The prevalence of myopia is different in the different geographical area, race, ethnicity and the socioeconomic environment. The studies from Singapore and Korea show high prevalence of Myopia in the school children (Tay MT 1992; Lim HT, 2005) similar to our study. There is no study done to compare the prevalence of myopia in

different races. In Nepal there are mainly two races, Aryans and Mongolians. The people from the high mountain region are mainly of Mongolian race similar to the Chinese origin. May be this is one factor that myopia is common in this race of people. The limitation of our study is the small sample size. The large population based study would be better to find out the prevalence of myopia and other ocular morbidity in the children from the Himalaya regions.

### Conclusion

The study showed high prevalence of myopia in school children native of high mountain region of Nepal. This was the only ocular morbidity present in these children. The results of this study will help as a baseline to conduct large population based study in schoolchildren from the high mountains of Nepal.

### Acknowledgement

I acknowledge the volunteer medical students from the United Kingdom who helped in vision screening of the children.

### References

- Chung KM, Mohidin N, Yeow PT, Tan LL, O'Leary D (1996). Prevalence of visual disorders in Chinese schoolchildren. *Optom Vis Sci*; 73:695–700.
- Garner LF, Owens H, Kinnear RF et al (1999). Prevalence of myopia in Sherpa and Tibetan children in Nepal. *Optom Vis Sci* ;76(5):282-5.
- Lim HT, Yoon JS, Hwang SS (2012). Prevalence and associated socio-demographic factors of myopia in Korean children: the 2005 third Korea National Health and Nutrition Examination Survey (KNHANES III). *Jpn J Ophthalmol*; 56(1):76-81. doi: 10.1007/s10384-011-0090-7.
- Lin LL, Shih YF, Tsai CB et al (1999). Epidemiologic study of ocular refraction among schoolchildren in Taiwan in 1995. *Optom Vis Sci*; 76:275–81.
- Nepal BP, Koirala S, Adhikary S et al (2003). Ocular morbidity in school children in Kathmandu.



Br J Ophthalmol; 87(5):531-534.

Pokharel GP, Negrel AD, Munoz SR et al (2000). Refractive error study in children: results from Mechi Zone, Nepal. Am J Ophthalmol ;129(4):436-444.

Pokharel A, Pokharel PK, Das H et al (2010). The patterns of refractive errors among the school children of rural and urban settings in Nepal. Nepal J Ophthalmol;2(4):114-120.

Sew-Mei Saw (2003). A synopsis of the prevalence rates and environmental risk factors for myopia Clin Exp Optom; 86: 5: 289-294

Tay MT, Au Eong KG, Ng CY et al (1992). Myopia and educational attainment in 421,116 young Singaporean males. Ann Acad Med Singapore; 21:785-91.

**Source of support: nil. Conflict of interest: none**