

Ocular morbidity among school children of Pokhara valley

Gurung J,¹ Poudel R,¹ Tuladhar S,² Joshi K,³ Singh P⁴

¹Jamuna Gurung, ¹Renu Poudel, Lecturer; ²Sarita Tuladhar, Professor; Department of Ophthalmology, Gandaki Medical College and Teaching Hospital, Pokhara, Kaski, Nepal; ³Kripa Joshi, Ophthalmologist, Tilganga Institute of Ophthalmology, Gaushala, Kathmandu, Nepal; ⁴Priyanka Singh, Resident, Department of Ophthalmology, Gandaki Medical College and Teaching Hospital, Pokhara, Kaski, Nepal.

Abstract

Background: Ocular morbidity is common among school going children. The uncorrected refractive error is an important cause of childhood blindness and visual impairment. School based eye screening programs help to identify the ocular abnormalities so that early intervention can be done and prevent children from permanent visual disability.

Objectives: This research was done to find the prevalence of ocular morbidity and their pattern among primary school children of Pokhara Valley, Nepal.

Methods: A descriptive cross-sectional study was conducted among children of three primary schools of Pokhara Valley from January to March 2021. Children who needed further evaluation were referred to ophthalmology department, Gandaki Medical College. After the ethical clearance from the institutional review committee, 1034 children were taken by convenient sampling method. Visual acuity, objective and subjective refraction, extraocular motility, cover test, anterior and posterior segment findings were documented in predesigned proforma. Point estimate at 95% confidence interval along with frequency and proportion were calculated. SPSS 20.0 was used for data analysis.

Results: A total 1034 children between 5-16 years were examined. Ocular morbidity was observed in 181 (17.5%) at 95% confidence interval (15.4-18.6). The mean age of children with ocular morbidity was 12.33 ± 2.39 years with male to female ratio of 1.18:1. The common type of ocular morbidity was refractive error 107 (10.35%), conjunctivitis 35 (3.38%) and eyelid diseases 26 (2.5%). Myopia 83 (8.02%) was the most common type of refractive error.

Conclusion: Refractive error was the commonest form of ocular morbidity among school children.

Key words: Children; Ocular morbidity; Refractive error.

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Address for correspondence

Dr. Jamuna Gurung,
Lecturer, Department of Ophthalmology
Gandaki Medical College and Teaching Hospital,
Pokhara, Kaski, Nepal.
E-mail: jamunaorama@gmail.com

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INTRODUCTION

Childhood ocular morbidity involves a group of eye diseases which can affect on child's mental development, education, and quality of life if left untreated. Visual impairment due to refractive error is one of the important health disabilities in the school going children.¹ Refractive error changes with the development of a child. Poor vision and inability to read due to refractive error have an impact on child's mental development and school performance. Visual disability in school children is preventable or treatable, but if not detected and treated in time can cause amblyopia and blindness in children.²

In Nepal, the prevalence of ocular morbidity was reported to range from 3.7% to 31.6%.^{1,3-5} The Nepal Blindness Survey found ocular infections, xerophthalmia, and congenital cataract to be the main causes of childhood blindness.⁶ However, there has been change in the pattern of childhood blindness with refractive error and

amblyopia to be the common causes.³ School based eye screening program helps to identify the common ocular abnormality in school children so that we can treat early and prevent them from childhood blindness.

The objective of this study was to identify the prevalence of ocular morbidity and their pattern in school children of Pokhara Valley, Nepal.

METHODOLOGY

A descriptive cross-sectional study was conducted in children of three primary schools of Pokhara municipality from January to March 2021. Ethical approval was obtained from the Institutional Review Committee of Gandaki Medical College (Ref. 042/2076/2077). All the children between 5-16 years attending the schools were included. The school principal informed the parents regarding the study and informed consent was taken from parents and teachers. Children unwilling to participate or absent at the time of examination were excluded from the study. A convenient sampling method was used and the sample size was calculated using the formula, Sample size (N) = Z^2pq/e^2 ; Where Z = 1.96 at 95% confidence interval; p = 0.11 (11% prevalence of ocular morbidity)³; q = 1-p; e = 0.02 (2% margin of error). After taking 10% non-response rate, the total sample size taken was 1034.

A team of ophthalmologists, ophthalmic assistant, an intern, and a driver attended each school with necessary equipment for the screening. Each student underwent the following examinations: visual acuity measurement of both eyes separately with Snellen's vision chart (unaided, pinhole, and with glasses) from a distance of six metres. Objective and subjective refraction was done. Cycloplegic refraction when needed followed by subjective refraction after three days was performed. Assessment of extraocular movements, cover-uncover test, convergence, accommodation, and anterior segment examination done with a loupe and torch light, funduscopy with direct ophthalmoscope was performed. Students who needed further evaluation was referred to ophthalmology department of Gandaki Medical College.

Myopia was defined as a spherical equivalent of ≥ -0.5 DS in one or both eyes, hyperopia when spherical equivalent power of +2 DS or more in one or both eyes and astigmatism when the cylindrical power of -0.50DC or greater. Amblyopia was diagnosed when the visual acuity was 6/12 or worse after cycloplegic refraction and detailed fundus examination.⁷ Strabismus was

diagnosed by recording the corneal light reflex along with the cover test.

The data was analysed in IBM statistical package for social sciences (SPSS) Statistics for Windows, version 20 (IBM Corp., Armonk, N.Y., USA). Descriptive statistics like frequency, percentage, mean, and standard deviation along with point estimate at 95% confidence interval were calculated from the collected data.

RESULTS

A total of 1034 children were examined during the school visit (Table 1). Ocular morbidity was found in 181 (17.5%) at 95% confidence interval (15.4-18.6). The mean age of the children was 12.33 ± 2.39 years. There were 98 male and 83 females with male to female ratio of 1.18:1 (Table 2).

Out of 107 (10.35%) children with refractive error, myopia was the most common type (83, 8.02%) followed by astigmatism (13, 1.25%) and hypermetropia (11, 1.06%). Refractive error was found more in male (61, 5.8%) than female (46, 4.4%). The higher percentage of refractive error was observed in 11-13 years age group (48, 4.6%) (Table 3). Refractive error was prevalent in Janajati (40, 37.4%) followed by Chhetri (24, 22.4%) and Brahmin (22, 20.6%). The percentage of refractive error was found more in individuals with non-vegetarian diet (83, 8.02%) than vegetarian (24, 2.32%).

Conjunctival diseases (35, 3.38%) consisted of conjunctivitis (26, 2.51%), pinguecula (5, 0.48%) and nevus (4, 0.38%). Eyelid diseases included blepharitis (17, 1.64%), chalazion (4, 0.38%), sty (3, 0.29%), and ptosis (2, 0.29%). Of the seven miscellaneous cases, corneal opacity constituted (2, 0.19%), nystagmus (2, 0.19%), iris and choroidal coloboma (1, 0.10%), pseudophakia secondary to congenital cataract surgery (1, 0.10%), and retinitis pigmentosa (1, 0.10%). The rest of the 853 (82.5%) cases had no significant ocular morbidity at the time of examination.

Table 1: Age and gender distribution of the school children (N = 1034)

Age group (years)	Male n (%)	Female n (%)	Total n (%)
5-7	38 (3.7)	20 (1.9)	58 (5.6)
8-10	81 (7.8)	82 (7.9)	163 (15.8)
11-13	286 (27.7)	234 (22.6)	520 (50.3)
14-16	159 (15.4)	134 (13)	293 (28.3)

Table 2: Ocular morbidity pattern of the school children (N = 181)

Types of ocular morbidity	Male (n)	Female (n)	Total n (%)
Refractive error	61	46	107 (10.35)
Conjunctival diseases	13	22	35 (3.38)
Eyelid diseases	15	11	26 (2.51)
Strabismus	1	2	3 (0.29)
Amblyopia	1	-	1 (0.09)
Convergence insufficiency	1	1	2 (0.19)
Miscellaneous	6	1	7 (0.67)

Table 3: Age versus types of refractive error (N = 107)

Age group (years)	Myopia n (%)	Hyperopia n (%)	Astigmatism n (%)	Total n (%)
5-7	5 (0.48)	2 (0.19)	1 (0.10)	8 (0.77)
8-10	7 (0.67)	1 (0.10)	-	8 (0.77)
11-13	38 (3.67)	4 (0.38)	6 (0.58)	48 (4.6)
14-16	33 (3.19)	4 (0.38)	6 (0.58)	43 (4.15)

DISCUSSION

Childhood ocular morbidity has a major impact on child's mental development, education and quality of life. Identification of childhood ocular morbidity is important so that we can reduce disease progression and prevent them from permanent visual disability. Regular eye screening programmes helps to identify these problems and plan for early treatment strategies.

This study showed ocular morbidity in 181 (17.5%) children. The prevalence of ocular morbidity among school children ranges from 3.7% to 31.6% in different study conducted in Nepal which is comparable to this study.^{1,3-5} Males were affected more than the females which was similar to Shrestha et al.¹ This variation in ocular morbidity may be due to difference in research methodology, age group of the study population, different ethnic background, and geographical location.

Refractive error was the commonest cause of ocular morbidity. School based studies done in Nepal showed prevalence ranging from 2.4-21.9%.⁸⁻¹¹ In India, they reported prevalence of refractive error between 2.6% to 8.8%.¹² A study done in Pokhara reported the prevalence of myopia 4.05% which was twofold less than this study.¹¹ In rural India, the prevalence of myopia has increased from 4.6% (1980-2008) to 6.8% (2009-2019) compared to urban children from 7.9% to 8.9% during the same period.¹³ Myopia has been found to be the commonest form of refractive error in various studies.^{3,9,11} The increased trend of myopia is a public

health problem worldwide. It is estimated that the myopia and high myopia will affect five billion people and one billion people respectively by 2050 globally.¹⁴ This may be due to lifestyle changes with daily access to screen-based technologies. As a result, less activities are pursued outdoor with excessive near work which causes visual stress and fatigue ultimately increasing the risk of myopia.¹³ Children aged 11-16 years had a higher prevalence of myopia compared to the younger age group similar to Nepal et al.³ There is natural eye growth which changes shape of the eyes with growing age of the children. In addition, prolonged use of digital devices and limited outdoor play time increase their risk of developing myopia.

Conjunctival disorder was the second commonest cause of ocular morbidity similar to Sherpa et al.⁸ A study from eastern Nepal reported 10.8% which was comparatively higher than this study.¹⁵ Blepharitis was the most common eyelid disease. Conjunctival and eyelid condition were commonly noted in school children which may be due to poor hygiene. Such problem can be prevented by educating them about the importance of maintaining proper ocular hygiene. The prevalence of strabismus and amblyopia was noted less in this study similar to Shrestha et al.¹

This study showed refractive error in Gurung, Magar, Thakali, Rai followed by Chhetri, Brahmin, and Newar. Karki et al. found refractive error more in Newar community. This may be due to variation of ethnic groups in different geographical location.¹⁶

The limitation of this study was sampling bias as it was a school-based eye screening. Another limitation is that the sample was taken from only few private schools.

CONCLUSION

This study concludes refractive error, conjunctival, and eyelid disorder to be the common causes of ocular morbidity. The periodic school screening targeting vision and ocular health is necessary to find the common ocular

morbidity to prevent children from long term permanent visual disability.

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