Ocular morbidity among primary school children of Dhulikhel, Nepal

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Abstract

Background: Knowledge of disease pattern in children can help design preventive and curative strategies.

Objective: To study the pattern of ocular morbidity among the primary school children.

Subjects and methods: All the children of randomly-selected five government primary schools of Dhulikhel were included in this study. A complete eye examination was done in all children including color vision, loupé examination, refraction and Schiotz tonometry. Funduscopy and automated perimetry were done in selected children.

Results: A total of 466 primary school children were included in the study, of which 466 children 47 (10.08 %) had ocular morbidity. Refractive error was the commonest type of ocular morbidity in 11 (2.36 %). Hypermetropia was the commonest type of refractive error (0.84 %) in contrast to myopia (0.64 %). Conjunctivitis was the second common type of ocular morbidity (1.71 %). Glaucoma suspects accounted for 1.28 %, xerophthalmia 1.07 %, blephatitis 0.85 %, amblyopia 0.43 %, color blindness 0.43 %, conjunctival nevus 0.43 %, glaucoma 0.43 %, and strabismus 0.43 %, while congenital abnormalities were less common.

Conclusion: Refractive error is the commonest form of ocular morbidity in primary school children.

Key words: primary school children, refractive error

Introduction

Childhood blindness refers to a group of diseases and conditions occurring in childhood or early adolescence, which, if left untreated, result in blindness or severe visual impairment that are likely to be untreatable later in life. Using the World Health Organization (WHO) classification of levels of visual impairment (WHO, 1992) it is estimated that globally almost one in 1000 children are blind, which is less than a tenth of the prevalence in adults (Foster & Gilbert, 1997; Foster & Gilbert, 1992). However, the 1.5 million blind children in the world account for about 75 million person years of blindness (Eckstein et al 1995) equivalent to the burden due to cataract-related blindness, which accounts for 40 % of adult blindness worldwide (Smith & Smith, 1996). Blindness has an enormous personal, social and economic cost, limiting the education and life choices of otherwise healthy people, and placing a significant weight on family, community, and social and health services. The magnitude of childhood blindness has not been studied in this purposed area. A study ‘Ocular morbidity in school children’ done
in Kathmandu (Nepal et al 2003), the adjoining
district of Kavre by Nepal et al (2002), revealed
11% of ocular morbidity. A program to provide
basic eye screening to schoolchildren with an aim
to provide services as well as gather information on
ocular morbidity was carried out. This research study
could contribute in the prevention of this problem
through awareness programs related to eye health
in schools and in the community. Also, the problems
could be treated through mobile eye camps with
referrals to eye hospitals. This study was carried out
to determine the prevalence of ocular morbidity
among primary school children of Dhulikhel.

Subjects and methods
A descriptive cross-sectional study was carried out
to see ocular morbidity in primary school children
of Dhulikhel Municipality of Kavre Palanchowk
District of Nepal. Study area and sampling
technique: The children of five government primary
schools of Dhulikhel municipality were selected by
stratified random sampling technique. An informed
consent was obtained from the school headmasters.
All the children attending the allocated primary
schools of Dhulikhel were included in the study.
Children who were unwilling to participate or were
absent at the time of the school visit were excluded.

Data collection tool: Data were collected by
interviews and clinical examinations. Data
collection procedure: Appropriate arrangements
were made for the screening at a given date and
time. Cooperation was sought from the teachers
at schools. They were trained on the spot in vision
screening and detection of common ocular
problems. A short talk supported by charts, posters
etc, regarding eye health education was given to
the children at each visit. The team carrying out
the school screening consisted of an
ophthalmologist, an optometrist, a senior
ophthalmic assistant, an intern, a health assistant
trainee and a driver.
The materials taken with the team were Snellen E
charts, binocular loupes, torch lights, rulers, direct
ophthalmoscopes, retinoscopes, trial sets, trail
frames, Ishihara color vision charts, posters and
pro formas.
The students underwent the following examination.
Detailed history taking was performed and the
findings recorded in pro formas. Visual acuity-unaided, pinhole and with glasses from a distance of
6 metres were assessed with the help of a Snellen’s
E chart and a tumbling E chart. Color vision was
assessed with an Ishihara color vision chart.

- Extra-ocular movements cover tests, and
convergence tests were done.
- Examination of anterior segment was done with
the help of binocular loupe and a torch light.
- Retinoscopy and subjective refraction were
done.
- A cycloplegic refraction was done followed by
subjective refraction after 3 days.
- Intraocular pressure was measured with the help
of a Schiotz tonometer when glaucoma was
suspected.
- Fundus evaluation with a direct
ophthalmoscope. Fundus evaluation under full
mydriasis was done whenever needed with
instillation of 1% tropicamide eyedrop.
- Children with glaucoma suspect were taken to
B.P. Koirala Lion Centre for Ophthalmic
Studies, where visual field analysis was done
by an automated perimeter.
The diagnostic criteria used in the study were as
follows. A diagnosis of myopia was made if the
refractive error was more than -0.5 dioptre.
Similarly, hypermetropia was recorded if it was
more than +0.75 dioptre after cycloplegic
refraction. The drug used for cycloplegic refraction
was tropicamide 1% used twice, one drop in each
eye, at an interval of 10 minutes. Astigmatism was
recorded if it was more than 0.50 dioptre. A
diagnosis of amblyopia was made if the vision was
6/9 or worse after a careful eye examination
including funduscopy through dilated pupil and
cycloplegic refraction. Strabismus was diagnosed
by recording the corneal light reflex combined with
the cover test.
Vitamin A deficiency was determined by recording conjunctival dryness and Bitot’s spot with or without a history of night blindness. The history of night blindness was obtained from the students themselves, which was later confirmed by their parents on a subsequent visit. Glaucoma suspects were diagnosed based on the criteria that included a cup disc ratio of >0.5 with glaucomatous optic nerve head changes, a cup disc asymmetry between the fellow eyes of >0.2, and/or intraocular pressure (IOP) >21 mmHg by a Schiotz tonometer. Glaucoma was diagnosed by the presence of glaucomatous optic nerve head changes and visual field changes. Statistics: Collected data were analyzed using SPSS version 11.5.

The parameters studied were age and gender, ocular morbidity, visual acuity, and the causes of visual impairment.

Results
A total of 466 primary school children were included in this study. Of these, 47 children had ocular morbidity which accounted for 10.08%. Table 1 shows the age and gender distribution of the primary school children included in the study. Out of 466 children, there were 223 males and 243 females. 129 male children (27.68%) and 127 female children (27.25%) were in the age group of 5 - 10 years. The mean age of the primary school children included in this study was 9.26 ± 2.49 years. Table 2 shows the ocular morbidity pattern of primary school children. There were 47 patients with ocular morbidity, of which 11 (2.36%) were children with refractive error and, 8 (1.71%) with conjunctivitis (1 was allergic and 7 were infective in etiology). There were 6 (1.28%) children with glaucoma suspect, 5 (1.07%) with xerophthalmia, 4 (0.85%) children were suffering from blepharitis, 2 (0.43%) children had amblyopia (1 child had anisometropic amblyopia and the other child had ametropic amblyopia). There were 2 (0.43%) children with color blindness, 2 (0.43%) with conjunctival naevus, 2 (0.43%) had glaucoma, 2 (0.43%) had strabismus, 1 (0.21%) had congenital ptosis, 1 (0.21%) had pingeuclea and 1 (0.21%) had iris coloboma. There were 3 (0.64%) children with myopia, 4 (0.84%) with hypermetropia and 3 (0.64%) had astigmatism.

There were 4 (0.85%) children with visual acuity of 6/9 - 6/18 and 2 (0.43%) children with visual acuity of 6/18 - 6/60. There were 6 (1.29%) children with visual morbidity. Of these, refractive error accounted for 100% for the cause of visual morbidity. Of these, 1 (0.21%) was due to simple hypermetropic astigmatism, 1 (0.21%) was due to compound myopic astigmatism, 2 (0.21%) were due to simple myopia, 1 (0.21%) was anisometropic amblyopia and 1 (0.21%) was due to ametropic amblyopia.

### Table 1

<table>
<thead>
<tr>
<th>Age group (in years)</th>
<th>Male</th>
<th>Percentage ( N=223 )</th>
<th>Female</th>
<th>Percentage ( N=243 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5</td>
<td>18</td>
<td>3.86</td>
<td>21</td>
<td>4.50</td>
</tr>
<tr>
<td>5 - 10</td>
<td>129</td>
<td>27.68</td>
<td>127</td>
<td>27.25</td>
</tr>
<tr>
<td>10 - 15</td>
<td>76</td>
<td>16.30</td>
<td>95</td>
<td>20.38</td>
</tr>
</tbody>
</table>

### Table 2

<table>
<thead>
<tr>
<th>Ocular morbidities</th>
<th>Number of children</th>
<th>Percentage ( N=466 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refractive error</td>
<td>11</td>
<td>2.36</td>
</tr>
<tr>
<td>Conjunctivitis</td>
<td>8</td>
<td>1.71</td>
</tr>
<tr>
<td>Glaucoma suspects</td>
<td>6</td>
<td>1.28</td>
</tr>
<tr>
<td>Xerophthalmia</td>
<td>5</td>
<td>1.07</td>
</tr>
<tr>
<td>Blepharitis</td>
<td>4</td>
<td>0.85</td>
</tr>
<tr>
<td>Amblyopia</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>Colour Blindness</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>Conjunctival naevus</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>Strabismus</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>Congenital ptosis</td>
<td>1</td>
<td>0.21</td>
</tr>
<tr>
<td>Pingeuclea</td>
<td>1</td>
<td>0.21</td>
</tr>
<tr>
<td>Iris coloboma</td>
<td>1</td>
<td>0.21</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>10.05</td>
</tr>
</tbody>
</table>
Discussion

A descriptive cross-sectional study was carried out to see ocular morbidity in primary school children of Dhulikhel Municipality of Kavre Palanchowk District of Nepal from September 2007 to November 2007. A total of 466 primary school children were included in this study. Out of 466 primary school children, 47 children had ocular morbidity which accounts for 10.08%. This result is comparable with the study ‘Ocular morbidity in school children’ done in Kathmandu, the adjoining district of Kavre, which revealed 11% of ocular morbidity (Nepal et al 2003).

Out of the 466 children, there were 223 (47.85%) males and 243 (52.14%) females. 129 male children (27.68%) and 127 female children (27.25%) were in the age group of 5 - 10 years. The mean age of the primary school children included in this study was 9.26 ± 2.49 years. This is comparable to a study by Nepal et al (2003), where 505 (45.90%) were males and 595 (54.09%) were females. The mean age of the study population was 9.5 years. In this study 11 (2.36%) were children with refractive error, the most common cause of ocular morbidity. The Nepal Blindness Survey (Brilliant GE 1988) found refractive error, based on pinhole correction, to be 1.3%. However, refractive error was not measured here. Another study conducted in eastern Nepal found refractive error in schoolchildren to be less than 3% (Pokharel GP et al 2000).

Refractive error was the commonest type of ocular morbidity (8.1%) in a study by Nepal et al (2002). Studies (Jialiang Zhao et al 2000, Maul E et al 2000, Chaturvedi S 1999) in China revealed refractive error to be 12.8%, Chile 15.8% and Delhi, India 7.4%. On the other hand, a study (Wedner SH et al 2000) in rural Tanzania of primary school children showed a refractive error of (1%). These large differences in the prevalence of refractive error among these studies may be because that the Nepal Blindness Survey was conducted more that 20 years ago and was a population-based survey and the study in eastern Nepal involved a different geographical location and different ethnic groups. The primary school children included in our study were from a rural area. This finding implies that difference in lifestyles (for example reading, watching TV, or computer and visual display units), living conditions (for example nutrition) or medical care (for example unnecessary or overcorrection of refractive errors which may worsen the refractive error by inhibiting natural “emmetropisation”) may be more important than racial/ethnic differences. There were 3 (0.64%) children with myopia, 4 (0.84%) with hypermetropia and 3 (0.64%) had astigmatism. Hyperopia was the commonest refractive error which was comparable to a study conducted in Nigeria where hyperopia (7.8%) was the predominant refractive error (Faderin et al 2001). Conjunctivitis (1.71%) was the second common cause of ocular morbidity in our study. Among 8 (1.71%) children of conjunctivitis (one had an allergic and seven had an infective etiology). A study conducted in the city of Pataila in India showed the prevalence rate of conjunctivitis to be 3.27% (Singh et al 1974).

In our study, the prevalence of glaucoma suspect was 1.28%. A similar study conducted in Nigeria showed the prevalence of glaucoma suspect to be 0.8% (Abdulkabir et al 2008). Vitamin A deficiency was found to be 1.71% in our study. This is comparable with the prevalence of Vitamin A deficiency of 1.65% in the Nepal xerophthalmia survey (Upadhyay et al 1985), of 0.76% in Nepal Blindness Survey (Brilliant (1988) and of 0.67% in the study from eastern Nepal (Pokharel et al 2000). In our study, blepharitis accounted for 0.8% of ocular morbidity. This is similar with the study which shows the prevalence rate of blepharitis to be 0.6% (Singh Set al 1074). Strabismus accounts for 0.43% in our study. This prevalence of strabismus is similar to the study conducted in India in which the prevalence of strabismus was 0.3% (Reddy 1987). Exotropia and exophoria were the predominant types of strabismus. Exotropia was more prevalent than esotropia in studies in Chile.
There were 4 (0.85%) children with visual acuity of 6/9 - 6/18 and 2 (0.43%) children with visual acuity of 6/18 - 6/60. There were 6 (1.29%) children with visual morbidity. Out of the 6 (1.29%), refractive error was present in 4 (0.8%), this being the commonest cause of visual impairment (67%) among primary school children, the rest as a result of amblyopia (33%). This is comparable with a refractive error study from the Mechi Zone of Nepal (Pokharel et al 1997), which showed that 2.9% children had visual morbidity of which 56% was due to refractive error (Pokharel 2000).

Conclusion
Refractive error is the main cause of visual impairment in primary school children of Dhulikhel. Amblyopia is the second important cause of visual disability. This study clearly depicts the need to launch a periodic school eye screening to prevent permanent visual disability of the school children.

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References