

Original article

Childhood corneal blindness: a retrospective study in a tertiary eye hospital of eastern region of Nepal

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Abstract

Introduction: Studies from Nepal show that most of the cases of unilateral childhood blindness are due to corneal causes. It was also observed that these corneal causes were mostly preventable or treatable. **Objective:** to study the patterns of corneal diseases in a pediatric out-patient department of a hospital in the eastern region of Nepal. **Methods:** A retrospective study of the patients who presented to the pediatric department of our hospital in the year 2014 was done with the help of the data received from the hospital recording system. Detail examination of every case was done in the out-patient-department of the hospital by pediatric ophthalmologists. Patients with only corneal disease were included, and those with corneal disease along with other ocular disease were excluded from the study. **Results:** Of 20,250 patients examined in the pediatric department over a one year period, 1911(9.4%) presented with isolated corneal problems. Keratitis and corneal ulcer were found in 47.8% of them. Corneal trauma was present in 5.6% and vitamin A deficiency leading to corneal opacity and keratomalacia was seen in 0.06% of the cases. Corneal blindness was observed in 66 eyes (bilateral in 3 cases). No case of trachoma or congenital corneal disease was observed. **Conclusion:** Childhood corneal blindness is mostly due to preventable and treatable causes.

Keywords: childhood blindness, corneal blindness, pediatric blindness

Introduction

It was reported that approximately 1.4 million children are blind in the world and almost 3/4th of them live in the developing countries(WHO, 1977). It was also reported that the prevalence of blindness in children varies from 3% to 15% in the developed and developing countries, respectively (WHO, 2000). Similarly, according to a study, the prevalence of childhood blindness was 8% for the South East Asian region (Resnikoff S et al, 2004).

A survey on epidemiology of blindness was conducted in 1980-81 in Nepal which reported the prevalence of childhood blindness to be 6.3% (Brilliant GE, 1988). Nepal has a total population of 29 million and almost 39% fall under this age group (CBS, 2011). Our hospital in Lahan is a high volume centre that is visited mostly by patients from the eastern terai belt of Nepal and also from the adjoining areas of India. Almost 12% (20,250) of the patients that present to us are below 16 years of age.

Most of the causes of childhood blindness are avoidable, either preventable or treatable (Foster A et al, 1992). Among the various

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causes, corneal cause accounts for the most number of the cases (Shrestha JB et al, 2012; Kansakar I et al, 2009; Gilbert CE et al, 1999). Corneal causes for childhood blindness are also important as most of them are preventable as suggested by various published studies from Nepal (Shrestha JB et al, 2012; Kansakar I et al, 2009; Adhikari S et al, 2015).

Thus we carried out this study to find out the various corneal disease cases that present to the pediatric department of our hospital.

Materials and methods

Data from our hospital recording system from 1st January 2014 to 31st December 2014 was reviewed retrospectively. Only pediatric age group patients (0-16 years) with corneal problems were included in this study. Patients with disease in other parts of the eye with or without corneal problems were excluded from the study. Ethical approval was obtained from the Institutional review board of the hospital.

Detail history of the disease was obtained from the patients or their guardian. History of cause, whether trauma or insidious, history of age of onset, duration, progression, recurrence and associated pain, history of associated other ocular or systemic disease and history of similar condition in the family were noted. Unaided and corrected distance visual acuity of each eye was assessed with the Log MAR chart at three meter distance or snellen chart at six meter distance in normal illumination for school going children. For preschool children and uncooperative children, VA testing was performed using the Kay Pictorial test. The best corrected visual acuity of less than 3/60 was used as the criteria to label an eye blind. Detailed anterior segment examination was carried out with the help of a Slit lamp biomicroscopy (Appasamy associates, Chennai, India). Cases were categorized as keratitis or corneal ulcer, corneal opacity along with its causes, corneal

dystrophies/degenerations, keratomalacia, corneal trauma and other small corneal lesions. Fundus evaluation was performed using the Heine Beta 200 direct ophthalmoscope, slit lamp funduscopy using +90 D 'Volk' lens (U.S.A) and Indirect Ophthalmoscopy (Welch Allyn model: AA107) using +20 D 'Volk' lens (U.S.A) after pupil dilatation with 0.5% cyclopentolate.

Cycloplegic refraction was performed with the help of Heine streak retinoscope in each child 45 min after instilling three 0.5% cyclopentolate drops at 5 min intervals. Every case of corneal ulcer were subjected to corneal scraping followed by direct staining of the sample with grams stain and potassium hydroxide wet mount over a glass slide. Corneal scrapings were also cultured in blood agar and chocolate agar media incubated at 37 degree Celsius for 24-48 hours and also in sabouraud's dextrose agar at 27 degree Celsius for upto 3 weeks. Details of the dimensions of the corneal lesions, ulcers or degenerations or opacities were recorded as a sketch in the standard frontal and cross-sectional diagrams of the cornea with the help of colour pencils. Ultrasonography (A and B scan) was done in cases where posterior segment could not be visualized.

Detail findings were recorded in the Performa developed for this study. SPSS software version 18 for Windows was used for statistical analysis.

Results

Out of 20,250 patients examined in the year 2014, in the pediatric department of our hospital, 1,911(9.43%) patients presented with isolated corneal problems. Male patients (n=1000) were more than female patients (n=911). Almost sixty-three percent of these cases (n=1201) presented from Nepal. Among them about sixty-seven percent were from the Terai region.

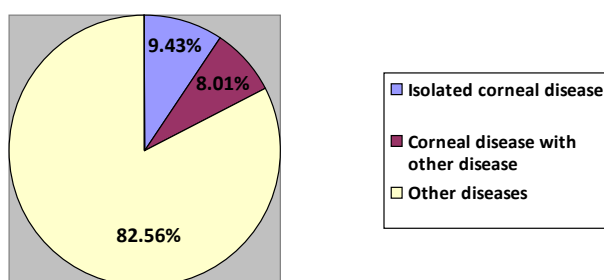


Figure 1: shows the distribution of corneal and other diseases observed over a one year period in 2014.

Keratitis and corneal ulcer was the most frequently presenting disease (47.8%) followed by other corneal lesions (42.5%). Trauma was responsible for most of the cases of corneal ulcer. Smear positivity and culture positivity of the corneal scrapes was 51.9% and 42.9% respectively. Among the smear positive cases, gram positive cocci were seen in 52.8%, fungal elements were seen in 28.2%. Streptococcus pneumonia was the most frequently isolated bacteria (61.8%) from the corneal scrapes after media culture. Ninety (4.7%) cases presented with unilateral corneal opacities. Trauma was the leading cause of corneal opacity followed by xerophthalmia. Twenty-nine patients (1.5%) presented with penetrating corneal injury in one of their eyes. Vitamin A deficiency leading to unilateral corneal opacity and keratomalacia was seen in 13 cases. Unilateral blindness due to corneal infection was observed in 60 patients, 3 patients were bilaterally blind. Table 1 shows the different causes of corneal morbidity recorded that year.

Table 1: Causes of corneal morbidity in pediatric patients.

Disease	Number of patients	Percentage
Keratitis/corneal ulcer	913	47.8
Corneal dystrophy/ degeneration	2	0.1
Corneal opacity due to xerophthalmia	11	0.6

Corneal opacity due to trachoma	0	0
Corneal opacity due to trauma	79	4.1
Keratomalacia	2	0.1
Corneal trauma	29	1.5
Blindness due to corneal infection	63	3.3
Other corneal lesions	812	42.5

Discussion

It was estimated that 30,000 children in Nepal are blind and another almost 100,000 children are visually impaired (MoHP, 2011). According to the Rapid Assessment of Avoidable Blindness study, the infant mortality rate-based prevalence of childhood blindness was 0.05% (NNJS, 2012).

In a population based study from Nepal, it was reported that approximately 80% of the affected children had avoidable causes of blindness and visual impairment. In that study they reported corneal opacity to be the commonest cause of unilateral blindness in children (Adhikari S et al, 2015).

A study conducted in schools for blind and visually impaired reported 40.9% avoidable causes of visual impairment. Almost 23% of the affected children had corneal cause for visual impairment (Shrestha JB et al, 2012). Similarly, another study conducted in the schools for blind and visually impaired reported that 64.1% of children were blind due to avoidable causes, out of which 48.07% were preventable and 16.14% were treatable. Almost 36% of the students were blind because of the corneal cause (Kansakar I et al, 2009).

In our study we observed that among the corneal causes for OPD visits, corneal ulcer/ keratitis was the commonest cause (47.8%). This may be because of the fact that the children in this part of the country usually help their parents in the fields who are mostly farmers. This increases the risk of the children sustaining ocular injury with vegetative material. Corneal

ulceration leading to corneal scar, staphyloma or phthisis is the commonest cause of visual impairment leading to blindness in many developing countries (O'Sullivan J et al, 1997).

Another important preventable cause for corneal blindness is vitamin A deficiency. Over 60% of children in Nepal are undernourished (Gilbert C et al, 1993). Though cases of night blindness and bitot's spots were not included in this study, total case of vitamin A deficiency was 83 (0.41% of total OPD visits). Keratomalacia and corneal opacity due to xerophthalmia accounted for 0.7% of total corneal causes for OPD visits. In a study, vitamin A deficiency related corneal blindness was observed in 8% of the children. Children under 10 years of age were also affected though the government has an effective Vitamin A supplementary programmes running for over 15 years now (Shrestha JB et al, 2012). According to Nepal Blindness Study 1981, nutritional causes accounted for 17.9% of childhood blindness (Brilliant GE, 1988). A study shows 15.44% of the children blind or visually impaired due to nutritional factors (Kansakar I et al, 2009). No case of trachoma (active or inactive) presented to our OPD. Similarly, no active case of trachoma was reported in a recently published population based study (Adhikari S et al, 2015).

Conclusion

Nearly one in every two cases of corneal disease that presented to our OPD was of corneal ulcer and keratitis. Most of them gave a history of injury by vegetative matter. Awareness programmes on corneal ulcer and vitamin A supplementation should be run frequently. Training of local traditional healers and drug retailers should be done at regular intervals.

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