Etiology and Clinical Profile of Pediatric Cataract in a Tertiary Care Center of Eastern Nepal

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ABSTRACT

Cataract is one of the leading causes of blindness in children. There are very few studies from Nepal on pediatric cataract. The present study is an attempt to get information on clinical profile and etiology of cataract in pediatric age group with an emphasis on preventable factors.

A hospital based cross sectional study was carried out in a tertiary referral hospital in Eastern region of Nepal. After obtaining detail history, all children upto14 years of age with cataract underwent examination under slit lamp or the operating microscope. Cataract is broadly classified into traumatic and non-traumatic groups. TORCH test for rubella, random blood sugar, urine reducing substance, chromosomal analysis were done in children with non-traumatic cataract

Out of 172 children 34 (88%) had non-traumatic and 65 (12%) traumatic cataract. The mean age was 5.63 ± 3.59 years and 7.39 ± 3.94 years in non-traumatic group and traumatic group respectively. 8 (9.82%) patients with non-traumatic cataract were below the age of one year. Among non-traumatic cataract, 42 (37.50%) had hereditary, 9 (8.03%) had systemic syndromes, 5 (4.46%) had cataract due to maternal infection, 3 (2.67%) had metabolic disorder. While 11 (9.82%) cataract were associated with other ocular dysmorphology, cause was not ascertained in 31 (idiopathic). 11 (9.82%) had complicated cataract. 24.1% (n=27) of children with bilateral cataract had nystagmus at the time of presentation to hospital. In traumatic group, play related injuries were more common than household injuries.

A very few children were below one year of age at the time of presentation to hospital. Establishing pediatric vision screening program in the primary health posts, genetic counseling, maternal immunization, health education to school children and use of safety glasses are some important measures that could prevent cataract blindness in our children.

Key words: *Cataract, Hereditary, Pediatric, Trauma*

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INTRODUCTION

Pediatric cataract is responsible for more than one million childhood blindness in Asia.[1] It is estimated that around 200,000 children are currently blind due to cataract. Every year 20,000 to 40,000 neonates are born with congenital and developmental cataract.[2] In developing countries like India, 7.4-15.3% of childhood blindness is due to cataract.[3-5] Prevention of visual impairment due to congenital and infantile cataract is an important component of World Health Organization's international program for the elimination of avoidable blindness by year 2020.[6] Early detection and advanced surgical techniques have improved the prognosis of pediatric cataract in developed countries. However, pediatric cataract and aphakia are still a major cause of childhood blindness in developing world.

Information regarding etiology of pediatric cataract is few and sketchy. Trauma, heredity, metabolic diseases, congenital rubella are important causes of cataract in children. Many ocular and systemic syndromes and abnormalities are associated with congenital and infantile cataract. However, in many cases the causes of cataract cannot be determined and is regarded as idiopathic.[7] Etiology of cataract in children differs much from the causes in adults and requires different strategy. The number of "blind years" lived due to blindness in childhood is much greater compared to the blindness occurring in adults. Management of cataract in children requires special knowledge, skill and equipments.

A few studies are available from Nepal on Pediatric cataract and its etiology. A study from Nepal by Thakur *et al* has focused on the surgical profile and the post operative outcomes of pediatric cataract in the Nepalese population.[8] However; there is no published data from Nepal reflecting clinical and etiological profile on cataract in pediatric age group. The present hospital based study in Eastern region of Nepal was performed to identify the causes of childhood cataract with emphasis on the factors that may be preventable.

MATERIALS AND METHODS

A hospital based cross sectional study was carried out in the department of Ophthalmology, B. P. Koirala Institute of Health Sciences, from July 2004 to August 2006. All children upto14 years of age with cataract were included in the study.

After obtaining informed consent from either parent a detailed history including family history, history of trauma, antenatal, perinatal, drug history, history of other ocular and systemic diseases and history of consanguinity was obtained. A team of Ophthalmologists and Pediatricians examined all the patients preoperatively. Children who did not cooperate for the examination were examined under anesthesia. For preoperative evaluation, pupil was dilated with combination of 1% tropicamide and 5% phenylephrine eye drops. In children less than six months of age, 0.5% tropicamide and 2.5% phelylephrine was used.

Vertical and horizontal corneal diameter and intraocular pressure were measured. Anterior segment examination and type of cataract was determined by using slit lamp biomicroscopy or operating microscope. Fundus status was evaluated with indirect ophthalmoscope, using + 20 diopter Volk lens. B scan ultrasonography was done in cases where media opacity was obscuring the posterior view. Examination of the parents of children with non-traumatic cataract was done in slit lamp to find out any lenticular opacity of inherited type. Test for reducing substance in urine after milk feeding (Benedict's method), serum calcium, and random blood sugar test were done in children with non-traumatic cataract. IgG and IgM antibody titer for Rubella (by Enzyme Linked Immuno Sorbent Assay) was done in children under age of one year. Karyotyping was done in children with systemic syndromes and dysmorphic features. Information of all children analyzed according to etiology of cataract, laterality, morphology of cataract and age of patient at presentation to hospital.

The information was compiled using Microsoft excel. Data analysis was done using Statistical Package for Social Science (SPSS) version 10. The cases were broadly divided into traumatic and non-traumatic groups.

Non-traumatic cataract was further divided into sub groups on the following basis:

Isolated Hereditary cataract: This group included isolated congenital and developmental cataract with positive family history. The presence of any lenticular opacity of inherited type in either parent confirmed the cataract in children as hereditary type.

Complicated cataract: This group included cataract complicated by intraocular inflammation or drugs (steroids).

Cataract associated with other ocular dysmorphology: The dysmorphology were identified as coloboma of iris/

Table 1. Age of the patient with non-traumatic cataract at presentation to the hospital

Age in years	n = 112
0-0.5	3 (2.67%)
>0.5-1	8 (7.42%)
>1-2	18 (16.07%)
>2-5	32 (28.57%)
>5-8	28 (25%)
>8-11	15 (13.39%)
>11-14	8 (7.14%)

lens/choroids/optic disc, anirida, microcornea, and persistent fetal vasculature.

Syndromic cataract: Cataract associated with syndromes or dysmorphic features.

Metabolic cataract: Cataract associated with galactosemia or hyperglycemia based on biochemical tests.

Cataract due to maternal infection: This group includes cataract caused by maternal rubella, confirmed by the presence of rubella antibody in TORCH serology.

Idiopathic: In this group, the cause of cataract could not be determined despite detail history, thorough examination and investigations.

Traumatic cataract was analyzed according to age of children and the agents causing trauma. The agents of trauma were divided into two groups: *Play related injury* which included trauma with wood stick (Dandi Biyo: a traditional Nepali game popular among young children), bow and arrow, stones, fire cracker, football. Injury with broom stick, kitchen knife, sickle, needle, safety pins were included in *household injuries.*

RESULTS

A total of 172 children coming for check up were included in the study period. Out of these, 60 (34.88%) children had traumatic and 112 (65.12%) children had non-traumatic cataract.

Non-traumatic cataract:

Out of 112 children with non-traumatic cataract 16.64% (n= 22) had unilateral and 80.35 %(n= 80) had bilateral disease. There was slight female predominance with M:F ratio of 46:54. The mean age of children with non-traumatic cataract was 5.63 ± 3.59 years, ranging from 3 months to 14 years. Only 11 children (9.82%) were below age of 1 year (Table 1). Nystagmus was present in 24.10% children (n=27) with bilateral cataract. 2.67% (n=3) of children with unilateral cataract had sensory strabismus.

The most common etiology of non-traumatic cataract was isolated heredity cataract found in 37.5% (n=42) (Table 2). In 28.57% (n= 32) of children, cause of cataract could not be determined even after detailed history, thorough examination and investigations. Morphological types of the cataract are given in table 3.

Table 3. Morphology of non-traumatic cataract.

Morphology of cataract	n = 112
Lamellar	42 (37.5%)
Nuclear	35 (31.25%)
Total cataract	15 (13.39%)
Posterior sub-capsular	11 (9.8%)
Posterior Polar	9 (8.03%)

Hereditary cataract: 71.42% (n=30) of children had positive family history and in 28.57% (n=12) lens opacity was found in either parent after evaluation in slit lamp. Eight of them had lamellar opacities while four had blue dot cataract. Parents of nine children had history of consanguineous marriage.

Syndromic cataract: Out of nine children, four had Downs and two had Turner syndrome confirmed by Karyotyping. Three children had dysmorphic face and cataract, the

Table 2. Etiology of Non-traumatic cataract

Etiology	Unilateral	Bilateral	Total
Hereditary	–	42 (37.5%)	42 (37.5%)
Idiopathic	11 (9.82%)	20 (17.85%)	31(27.67%)
Cataract with other Ocular malformations	6 (5.35%)	5 (4.46%)	11(9.82%)
Complicated cataract	5 (4.46%)	6 (8.03%)	11(9.82%)
Cataract in systemic syndrome	–	9 (5.35%)	9 (5.35%)
Maternal Infection	–	5 (4.46%)	5 (4.46%)
Metabolic cataract	–	3 (2.67%)	3 (2.67%)
Total	22 (16.64%)	90 (80.35%)	112 (100%)

Table 4. Age of the patient with non-traumatic cataract at presentation to the hospital.

Age in years	n = 112
0-0.5	3 (2.67)
>0.5-1	8 (7.42)
>1-2	18 (16.07)
>2-5	32 (28.57)
>5-8	28 (25)
>8-11	15 (13.39)
>11-14	8 (7.14)
Total	112 (100)

syndrome in which could not be determined.

Complicated cataract: Out of 11 children with complicated cataract, one had uveitis associated with Juvenile rheumatoid arthritis, two had tuberculous panuveitis, four had idiopathic anterior uveitis. Four children had steroid induced cataract. The steroid was taken for allergic conjunctivitis for a range of duration, ranging from one to three years.

Cataract associated with other ocular dysmorphology : Among 11 children with associated ocular abnormalities, 3 had Persistent Fetal Vasculature, three had typical iris and choroidal coloboma, one had aniridia, and four cases had microcornea along with cataract.

Maternal infection: In four cases below one year of age TORCH titer for rubella antibody was positive. They had cataract and other features of congenital rubella syndrome (microcephaly, valvular heart disease and delayed developmental milestones).

Table 5. Agents causing trauma

Agents of injury of injury	Male	Female
Play related injury		
Wood stick	14 (23.33%)	2 (3.33%)
Bow and arrow	6 (10%)	1 (1.66%)
Stone	4 (6.66%)	1 (1.66%)
Fire cracker	4 (6.66%)	1 (1.66%)
Football	4 (6.66%)	–
Household injury		
Kitchen knife	2 (3.33%)	8 (13.33%)
Broom	2 (3.33%)	3 (5%)
Sickle	1 (1.66%)	2 (3.33%)
Needle	1 (1.66%)	2 (3.33%)
Safety pin	–	2 (3.33%)
Total	38 (63.33%)	22 (36.66%)

Metabolic cataract: Two had Galactosemia confirmed by urine for reducing substance after milk feeding, while one child had random blood glucose level of 189 mg/dL. The mother of this child gave history of gestational diabetes.

Traumatic cataract

Out of 60 children with traumatic cataract, 70% (n=42) children were male and 30%(n=18) were female. The mean age of children with the traumatic cataract was 7.39 (±3.94). Most common age group was 5-8 years. 30% (n=20) children were below the age of five years (Table 4). 70% of children had penetrating trauma while 30% of children had blunt trauma. Most common agent of trauma was wooden stick. Play related injury 61.7% (n=37) was more common than the household injuries 38.3% (n=23). Play related injury was more common in males than in females (Table 5).

DISCUSSION

Many etiological studies have been carried out both in developed and developing countries to determine the causative factor for pediatric cataract.[9-11] Studies performed in various parts of world shows variation in the etiological factors affecting childhood cataract. The study by Thakur et al reported only 10.7% of children with traumatic cataract, which is far below compared to our study.[8] Similarly in one study conducted in western India by Johar et al, only 11.6%of children had traumatic cataract while remaining 88.4% had non-traumatic cataract.[12] In our study, 34.88% percent of children had traumatic cataract which is quite a large number. This may be because of the fact that our institute is a tertiary referral centre with general anesthesia facility and the 24-hour emergency service, which is lacking in surrounding peripheral eye hospitals. Our study shows that only 9.82% of children with non-traumatic cataract were below one year of age. While the study from western India showed 40% of children were below one year of age.[12] Lack of awareness in community about the disease, poor health care facility in the remote villages, are some of the factors that might be contributing to this delayed presentation of patients to health care providers.

24.1% of children in our study already had developed nystagmus and 15.17% of children had strabismus, which is an indication of severe, difficult to treat deprivation amblyopia in these children. This result compares well

with the study by Thakur *et al*.[8]

Most common cause of cataract in our study was hereditary followed by idiopathic. While the study from India by Johar et al shows idiopathic as leading cause of cataract in these children. History of consanguinity was present in 7.14% of patients with hereditary cataract in our study which is less than that found in the previous reported studies.[13,14] However, this is comparable to the study done by Johar et al.[12]

Maternal infection was not a common cause of congenital cataract in our study as compared to the study from south India and Oman.[10,13] It may be due to the fact that only few children presented before the age of one year. However out of 11 children below one year of age, four had serology positive for rubella. Galactosemia is the most common metabolic disturbance causing cataract in children Angra reported a higher frequency (2.5%) of sugar cataract among congenital cataract from north India.[11] In our study three children had positive reducing substance in urine.

Idiopathic cataract accounted for the 27.67% of children with non-traumatic cataract. Out of these children, five were born prematurely, three had low birth weight less than 1500 gm and three had history of septicemia and complicated post natal period. In five of these children with idiopathic cataract, the mother had history of ingestion of some drugs for some type of illness during the pregnancy but precise information about the illness and the drug was not known. The relationship between the congenital cataract and the maternal drug use has been mentioned in the literature.[14] However large studies with adequate sample size will be required to verify these associations.

Traumatic cataract was an important cause of unilateral cataract in the pediatric age group in our study. Male patients were more in the traumatic group than the female patients, and play related injuries were more common than the household injuries. This may be due to the fact that boys in our society are more exposed to the outside activities and girls are confined to their home doing household chores.

CONCLUSION

One important finding of our study was delayed presentation of children to health care providers. Health personnels posted in village health posts should be trained with some simple examination tools like red reflex test for early detection and referral of children with congenital and infantile cataract. 40% of children had cataract due to preventable factors. These could be avoided by genetic counseling, and immunization. Parents, school children and caregivers should be educated about the traumatic eye injuries and use of safety goggles should be promoted. Large epidemiological studies are needed to prove the possible association between cataract and the various antenatal and the parinatal factors.

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