



Original Research Article

## Evaluation of Childhood Ocular Injuries in a Tertiary Care Hospital of Eastern India

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### ABSTRACT

The purpose of the study was to evaluate the clinical and epidemiological characteristics of childhood ocular injuries referred to a tertiary eye care centre in eastern India. The study group comprised of children aged fifteen years or less presenting with ocular injury from March 2014-February 2015. Demographic data, clinical profile, cause of injury, duration between injury and medical attention were recorded. All the children underwent detailed ophthalmic examination. Out of 290 children, male outnumbered the female by a ratio of 5:1. Majority of injuries occurred in 5-10 years age group (47.9%) and commonest cause of injury was wooden splinter/stick (21.7%) followed by stone and other household appliances. Two hundred and twenty eight (78.6%) children presented within 24 hours of injury while 62 (21.4%) came after > 24 hours. Open globe injury was the commonest type (65%) of injury and cornea being the most commonly (29.6%) injured ocular structure. Based on Log MAR scale best corrected visual acuity of <0.5 (6/18) or better was achieved only in 40 (13.79%) children at the time of discharge. Thus ocular injury is a common cause of childhood ocular morbidity and it is often associated with poor visual prognosis. Preventive measures and early medical attention are essential to reduce such morbidity.

**Keywords:** ocular injury, childhood, epidemiology.

### INTRODUCTION

Ocular injury is an important cause of visual impairment with an immense impact on individual suffering, family and community with loss of productivity. Worldwide 1.6 million people are blind from ocular injuries, 2.3 million with bilateral visual impairment and 19 million with unocular vision loss. <sup>[1]</sup> Children account for 20-50% of all ocular injuries. <sup>[2]</sup>

Next to amblyopia, ocular injuries are the main reason for preventable monocular visual loss in childhood. <sup>[3]</sup> Several hospital-based studies have also documented that ocular injury is a leading cause of non-congenital unilateral blindness in children. <sup>[4]</sup> These injuries may range from mild, non-sight-threatening to extremely serious with potentially blinding consequences. Ocular injury as a cause of blindness is rather

unique as nearly 90% of the blindness can be prevented by relatively simple measures. [5]

Epidemiology of ocular injury may vary from country to country depending on its geographic location, socioeconomic development and health care delivery system. In order to prevent the devastating consequences of potentially avoidable childhood ocular injury, it is necessary to understand the epidemiology and mechanisms of this diverse group of injuries. Yet in different developing countries including India they have not received the attention that they deserve.

The aim of this study is to evaluate the epidemiologic factors, clinical presentation, mechanism and the outcome of childhood ocular injury in a tertiary eye care institution of eastern part of India.

## MATERIALS & METHODS

A cross-sectional study was conducted from March 2014 - February 2015. Children aged fifteen years or less presenting with ocular injury at Regional Institute of Ophthalmology, Kolkata were included in the study. All patients had baseline clinical examinations which included Snellen's visual acuity examination; naming picture or matching letters for young children; slit lamp biomicroscopy; applanation tonometry in closed injury; fundus biomicroscopy with Volk 78 diopter lenses; and dilated fundus examination with indirect ophthalmoscopy in relevant cases.

Data included the demographic features of the patients, object causing injury, time interval between injury and medical attention, duration of hospital stay, initial and final visual acuity. Ocular injury were classified into close globe injury and open globe injury based on the ocular injury classification system [6]. An open-globe injury was defined as a full-thickness

eyeball wound. A closed-globe injury was defined as a contusion (defined as no corneal or scleral wound), a lamellar laceration (a partial thickness wound) or a superficial foreign body.

**Statistical analysis:** Data were entered in the master chart in statistical package for social science (SPSS, IBM SPS Package 20) and analyzed with the help of SPSS itself and MS Excel. Descriptive statistics were used to describe the socio-demographic characteristics.

The study followed the guidelines of the Declaration of Helsinki (1964) and the subsequent amendments. The study protocol was approved by the Institutional Ethical Committee.

## RESULT AND ANALYSIS

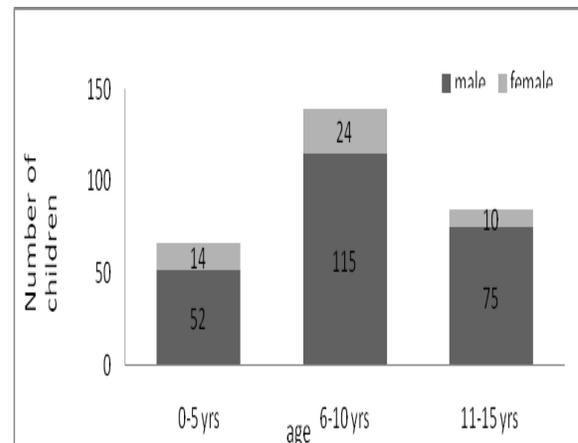


Figure:1 Age and sex distribution of cases

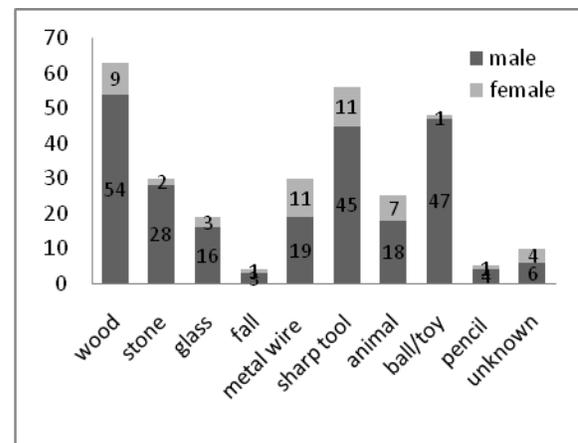


Figure: 2 Distributions of cases based on cause of injury

Figure 1 shows majority of injuries occurred in 5-10 years age group and male outnumbered the female.

Figure 2 shows majority of injuries occurred by wooden stick/splinter followed by sharp tool with male preponderance.

Table-1 shows majority of the incidences occurred in the evening hours at home in the form of open globe injury where

most of the patients seek medical help within 24hrs of injury.

Table 2 shows cornea is the most commonly affected ocular structure whether isolated or along with sclera, conjunctiva and lens.

Table 3 shows although there is improvement in final visual acuity in most of the cases still a considerable number of patients remains legally blind.

**Table 1: Characteristics of ocular injury:**

	Number (n=290)	Percentage (%)
<b>Time of injury</b>		
Morning	67	23.10
Midday	53	18.28
Evening	170	58.62
<b>Place of injury</b>		
Home	151	52.06
Street	117	40.34
School	17	5.87
Other	5	1.72
<b>Type of injury</b>		
Open globe	190	65.51
Closed globe	98	33.79
Chemical injury	2	0.68
<b>Time interval between injury and medical care</b>		
<24 hrs	228	78.62
>24 hrs	62	21.48
<b>Hospital stay (days)</b>		
1-3	60	20.69
4-10	198	68.28
>10	32	11.03

**Table 2: Distribution of ocular injury according to clinical findings**

Diagnosis	Number of cases (n=290)	Percentage (%)
Lid injury	4	1.37
Subconjunctival hemorrhage	16	5.51
Corneal wound	86	29.65
Scelerocorneal wound	68	23.44
Hyphema	26	8.96
Traumatic cataract	18	6.20
Cornea wound +traumatic cataract	61	21.03
Endophthalmitis	7	2.41
Vitreous hemorrhage+retinal detachment	4	1.37

**Table: 3 Distribution of initial and final visual acuity**

Log MAR Visual acuity	Initial visual acuity		Final visual acuity	
	Number (n= 290)	Percentage (%)	Number (n= 290)	Percentage (%)
<0.5	16	5.51	40	13.79
>0.5-1	30	10.34	77	26.55
<1-PL	233	80.34	164	56.55
No PL	11	3.79	9	3.10

PL- perception of light

Log MAR- log of Minimum Angle of Resolution

## DISCUSSION

Our hospital-based study among 290 children attending the ophthalmology

department of Regional Institute of Ophthalmology, Kolkata for a period of 1 year showed that 83.44% injury occurred in

male children. Male preponderance expressed by Male: Female ratio of 5:1 (Figure 1) this finding is consistent with previous research, indicating that males have a significantly higher frequency of paediatric eye injuries. [7-10] Such male predominance may be related to more aggressive nature of male as well as social or environmental factors like more outdoor exposure and participation in hard jobs with high levels of physical contact.

In our study about 47.93% of childhood ocular injury occurred in children belonging to 5-10 years age group, followed by 11-15 years age group (29.31%) with the lowest incidence (22.75%) in children aged 0-5 years (Figure 1). Dulal Set al (2012) mentioned that 5-10 years was the most vulnerable for the injury 38.1 % of them were of this age group. [11] Probable explanation may be children of this age group show curiosity and a desire to explore, which may expose them to serious hazards. Although in a separate study by Nelson et al. (1989) [12] the distribution of paediatric ( $\leq 15$  years of age) eye injury showed no significant trends with age. The variation in observations could result from demographic and socioeconomical differences.

In this study, open globe injuries (penetrating) formed 65.51% of cases and closed globe 33.79% and chemical injuries 0.68% (Table.1). This finding is similar to previous studies conducted in the United States [13] and Jordan. [14] Relatively less number of closed globe injuries may be due to less referral to tertiary center or simply lack of awareness. Prognosis of penetrating injuries was comparatively poor. [15]

However besides nature of injury, late presentation ( $> 24$  hrs) also carried a poor visual prognosis (Table 3) and it prolonged the hospital stay ( $> 3$  days). Almost 79% children presented within 24 hrs after the injury. Desai et al (2013) mentioned that about 70% patient appeared

for medical attention within 24 hour time period and during these crucial hours substantial damage to the ocular structures usually sets in. [16]

An important finding of our study showed that most of the eye injuries occurred at evening hours (58.62%) than at other times of day, and the injuries occurred most commonly in the home (52.06%), followed by street (40.34%), school (5.86%), and at other places (1.72%) (Table.1) In South Africa (2001) penetrating ocular injury occurred most commonly at home (55%) and away from the supervision of an adult. [17] In Colombia injuries occurred most commonly at home (44%), with only 14% occurring in school. [18]

Wooden splinter/stick was the cause of injury in (21.7%) of patients. Older children often injure themselves accidentally with sharp edged tools, spikes of toys, stones and metal wires (Figure 2). In an Egyptian study by Dalia M et al (2011) wood was the cause of injury in 20% of patients, followed by stones (17.3%), [19] This is in contrast to other studies done in African countries which stated that 25% of ocular injuries in children are from gunshots, 24.2% from tools, and 21.8% from assault which reflect the cultural and socio-economical differences between the countries. [20] Injuries with animal tail, nails were more prevalent in rural areas.

Cornea was the most commonly injured ocular structure (29.65%) followed by sclerocorneal wound (23.44%), hyphema (8.96%), traumatic cataract (6.20%), subconjunctival hemorrhage (5.51%) endophthalmitis (2.41%), vitreous hemorrhage, retinal detachment (1.37%) and lid laceration (1.37%). (Table 2). Traumatic cataract was common in both open and closed injuries. In chemical injuries, there were corneal abrasions in addition to lid and conjunctival laceration. Arıturk et al found that hyphema is the most common outcome

in blunt injury, and corneal laceration in open globe injury. <sup>[21]</sup>

**Limitations of the study:** As it is a hospital based study, we cannot estimate the number of ocular injury patients who did not receive medical attention at all or injuries treated in some other hospitals so the overall prevalence of childhood ocular injury and associated outcome is not exposed entirely. Further studies should be planned accordingly to overcome these limitations.

## CONCLUSION

The findings of our study correspond with other studies carried out in different countries of the world. Although 79% patient received medical attention within 24 hours almost 60% children remained legally blind. Such irreversible nature of childhood ocular injuries lead us to conclude that rather than treatment prevention of injury is more essential for reducing the ocular morbidity. This can be made possible by increasing awareness and health education among the children, parents, teachers and care givers with proper utilisation of media and upgradation of ophthalmic care delivery system.

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