

## Clinical Profile and Visual Outcome of Pediatric ocular trauma in a tertiary care teaching hospital

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### Abstract

**Background:** Ocular trauma is a frequent and avoidable cause of monocular visual impairment in children. Injuries range from a small corneal epithelial abrasion to penetrating and globe rupture leading to blindness or poor vision. Younger children suffer mostly from toy injuries while older ones suffer mostly from outdoor recreational activities. Pediatric ocular trauma are commonly caused by sticks, stones and metallic objects.

**Objectives:** To determine the clinical profile and visual outcome of ocular trauma in children up to 16 years of age.

**Methods:** Hospital based observational study was carried out in Regional Institute of Ophthalmology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, during September 2016 to June 2018 where 83 children up to 16 years of age with history of ocular trauma were included. The data were collected from the clinical records which included detailed history of patients and comprehensive ophthalmic examination findings.

**Results:** A total of 84 eyes in 83 children were studied. The age group most affected was 6-10 years (44.58%). Boys (61.45%) were affected more than girls (38.55%). Adnexal injuries found in (16.66%) eyes. Most of children reported to casualty within 24 hours (72.29%). The objects causing injury were wooden stick (43.37%), iron objects (27.71%) and stone (19.28%). Best corrected visual acuity of more than 6/18 was achieved in 40.48% of cases.

**Conclusion:** Early detection and treatment of ocular trauma is a best way to improve child health and avoid ocular morbidity. Parents and guardians should be educated regarding proper indoor care and using appropriate safety measures for their child.

**Key words:** Ocular trauma, Adnexa, Ocular morbidity, Avoidable blindness

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### I. Introduction

Ocular trauma is preventable public health issue throughout the globe. It is one of the common causes of ophthalmic morbidity and unocular blindness in the world<sup>[1]</sup>. These injuries can occur in almost any setting like sports and recreational activities, work place, home, rural and agricultural activities and road traffic accidents<sup>[2]</sup>. Ocular trauma is damage to the eye as a result of mechanical, electrical, thermal, or chemical energy. Presentation of ocular trauma may vary ranging from minor injuries like subconjunctival haemorrhage to perforating injuries and globe rupture. Epidemiology of ocular trauma has been studied in detail in developed countries but there is limited data on its severity, mode and outcome from developing countries<sup>[3]</sup>.

Childhood blindness is one of the major causes of blindness, following cataract. Globally, approximately 70 million blindness per year are caused by childhood blindness<sup>[4]</sup>. There are an estimated 1.4 million blind children worldwide, 73% of whom live in developing countries<sup>[5]</sup>. The estimated national prevalence of Childhood Blindness/Low Vision is 0.80/1000 in India<sup>[6]</sup>. In children of age group 5-15 years, the visual impairment is 6.4%, with refractive errors as the major cause<sup>[7]</sup>. Vision 2020 aims to reduce global prevalence of childhood blindness from 0.75/1,000 to 0.4/1,000 children by the year 2020<sup>[8]</sup>.

Younger children below 5 years age group mostly suffer from handler-related injuries such as fingernails of parents, caretakers, or siblings. In the upper age group most of the ocular injuries are caused by household objects, blunt objects, accidental fall, playground and sports related activities. Wooden stick injuries are also common in childhood. Males usually suffer more than females due to their adventurous and aggressive nature. Pediatric ocular injury is of particular concern as it is prone to amblyopia. Even small trauma to the eye may lead to permanent visual impairment affecting the future and quality of life.

Knowledge about causes and prevalence of ocular trauma in children is vital for planning and evaluation of preventive and curative services for children<sup>[9]</sup>. The objective of the present study was to analyse the risk factors, profile and visual outcome of childhood ocular trauma at a tertiary care centre.

## II. Material and Methods

The present prospective observational study was conducted in the Regional Institute of Ophthalmology (RIO), Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, India. The duration of the study was from September 2016 to June 2018. Ethical clearance to conduct the study was obtained from Ethics Committee of the institute. Written consent was taken from parents and guardians of all patients. All the patients up to 16 years of age attending the Emergency or Ophthalmology Outpatient Department (OPD) during the study period constituted our study population. A total of 84 eyes of 83 children were included in the study.

### Inclusion criteria:

1. Ocular trauma in pediatric age group up to 16 years.
2. Either sex
3. No systemic complications

### Exclusion criteria:

1. Previous established eye diseases like glaucoma or congenital cataract.
2. Patients with genetic disorders
3. Patients with age above 16 years

Clinical history from parents regarding the time of onset of symptoms, duration and progress, mode of injury was taken. Detailed ocular examination included visual acuity by snellen's (5 years and above) and pediatric acuity chart (below 5 years), adnexal, anterior segment examination by slit lamp biomicroscopy, intraocular pressure (IOP) measurement, and fundus examination. The ocular trauma was classified according to BETTS (BIRMINGHAM EYE TRAUMA TERMINOLOGY SYSTEM) classification. B scan was carried out to assess posterior segment status, particularly retinal detachment, vitreous haemorrhage and to rule out retained intraocular foreign body (IOFB) in patients with hazy media. X-ray and or computed tomography (CT) scan of the orbit was done if required.

### Statistical analysis

The data were recorded on a predesigned proforma and analyzed by IBM Statistical Package for Social Sciences (SPSS) version 20 using the principles of descriptive statistics. P-value less than 0.05 was considered statistically significant.

## III. Results

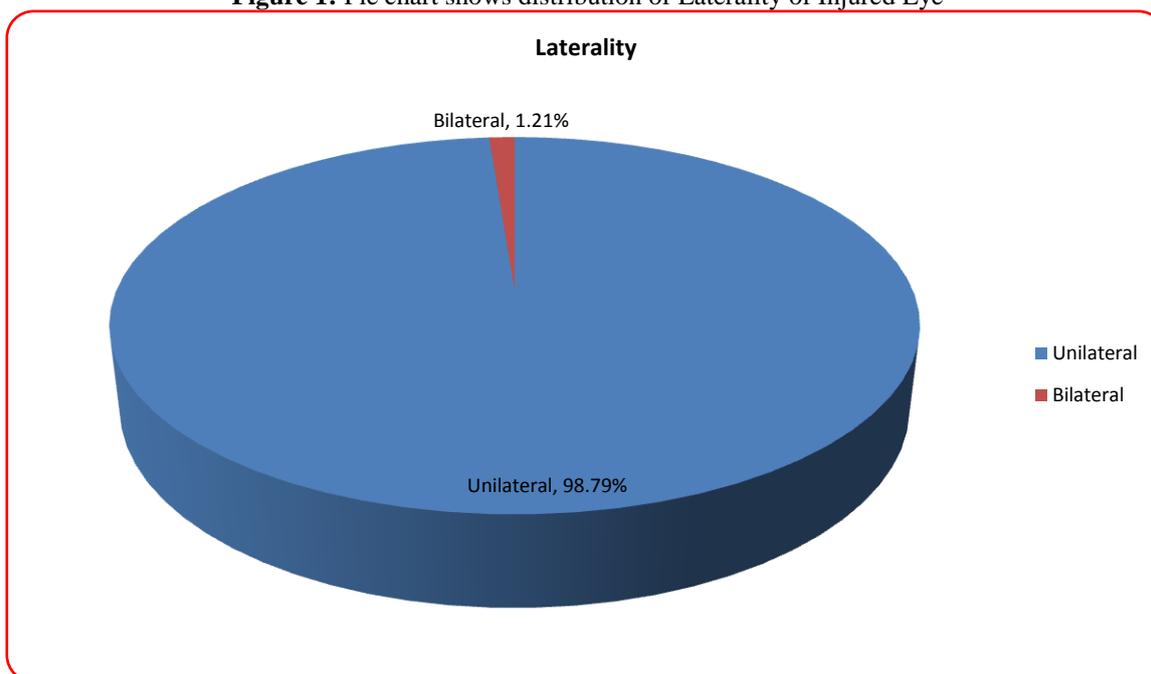
In the present study a total 84 cases (84 eyes) of 83 patients were analysed.

**Table 1:** Socio-demographic profile

Age (In Years)	No. of patients	Percentage
0-5	25	30.12
6-10	37	44.58
11-16	21	25.30
Sex		
Male	51	61.45
Female	32	38.55
Residence		
Urban	36	43.37
Rural	47	56.63
Ethnicity		
Tribal	57	68.67
Non Tribal	26	31.33
Socioeconomic status		
Upper class	10	12.05
Middle class	29	34.94
Lower class	44	53.01

The above table shows age and sex distribution, residence, ethnicity and socioeconomic characteristics of the study population.

**Figure 1:** Pie chart shows distribution of Laterality of Injured Eye



In this study 98.79% of patients had monocular injury.

**Table 2:** Causes of Ocular Trauma

Causes of Ocular Trauma	No. of patients	Percentage
Playing/recreation	62	74.70
Road traffic accidents	7	8.43
Assault	8	9.64
Fighting	5	6.02
Others	1	1.21

Majority of the pediatric ocular trauma were due to outdoor playing and recreational activities (74.70%).

**Table 3:** Time between Injury and report for medical examination

Time between Injury and report for medical examination	No. of patients	Percentage
Within 24 hours	60	72.29
24-72 hours	11	13.25
72 hours - one week	7	8.44
More than one week	5	6.02

Most of children reported to casualty within 24 hours (72.29%) followed by 2 days to 1 week (21.69%).

**Table 4:** Types of objects causing Injury

Types of objects causing Injury	No. of patients	Percentage
Wood/thorn	36	43.77
Iron	23	23.71
Stone	16	19.28
Cricket ball	3	3.61
Fire crackers	2	2.41
Thermal burns	2	2.41
Traumatic fall	1	1.21

Most common object causing pediatric ocular trauma was wood or thorn (43.77%), followed by iron and stone.

**Table 5:** Types of Ocular Injuries

Types of Ocular Injuries	No. of cases	Percentage
Eye lid abrasion	3	3.57
Eyelid laceration	5	5.95
Eyelid hematoma	6	7.14
Subconjunctival haemorrhage	12	14.29
Subconjunctival tear	3	3.57
Subconjunctival foreign body	5	5.95
Corneal abrasion	8	9.52
Corneal foreign body	4	4.76

Corneal tear	10	11.90
Corneo-scleral tear	7	8.33
Hyphaema	9	10.71
Traumatic cataract	11	13.10
Globe rupture	1	1.21

Most common types of ocular injuries were Eyelid injuries (16.66%),Subconjunctival haemorrhage (14.29%) and Traumatic cataract (13.1%).

**Table 6:** Pre and post treatment best corrected visual acuity (BCVA)

BCVA	Pre treatment		Post treatment	
	No. of cases	Percentage	No. of cases	Percentage
>6/18	19	22.62	34	40.48
6/18-6/60	30	35.71	24	28.57
<6/60-CF	24	28.57	17	20.24
PL+ PR +	8	9.53	6	7.14
NO PL	3	3.57	3	3.57

Best corrected visual acuity (BCVA) of more than 6/18 was achieved in 40.48%, 6/18-6/60 in 28.57%, < 6/60-counting finger close face (CFCF) in 20.24% of Eyes.

#### IV. Discussion

Pediatric ocular trauma was more common in age-group 6 to 10 years (44.58%), followed by 0-5 years (30.12%) and 11-16 years (25.30%). Mac Ewen et al, Dulal S et al and Al Bdour MD et al reported similar findings in their study<sup>[10,11,12]</sup>. In the present study proportion of males (61.45%) were more than females which is quite similar to study done by Wagle N et al, where 70.7% were male and 29.3% were female<sup>[13]</sup>. Boys tend to affect more commonly than the girls because of adventurous and aggressive behaviour of boys for getting severe ocular trauma<sup>[14]</sup>. Rural population was affected more commonly (56.63%) and so were the tribals (68.67%). Most of the ocular injuries were caused by household objects, blunt objects,traumatic fall, playground and sports. Wooden stick and thorn injuries (43.37%) were still common followed by iron objects (27.71%) and stones (19.28%).

Most of the children reported to ophthalmic emergency within 24 hours (72.29%), 24-72 hours (13.25%), 72 hours - one week (8.44%). Late reporting was related with poverty, extremely remote area, and uneducated parents.Those patients who visited within 24 hour of ocular trauma had good visual prognosis<sup>[15,16]</sup>.This study found that a sixth (16.66%) of mechanical injuries involved the ocular adnexa, followed bySubconjunctival haemorrhage (14.29%), traumatic cataract (13.1%) andcorneal tear (11.90%). Other studies on ocular trauma have also found a large number of adnexal injuries affecting the visual outcome<sup>[17,18]</sup>. Open globe injuries, late hospital presentation and posterior segment involvements are associated with poor visual prognosis in children<sup>[19]</sup>.

#### V. Conclusion

Ocular trauma is one of the causes of avoidable blindness in childhood and these can be prevented by adopting various protective measures. Parents should be educated regarding the preparation of safe and healthy environment for their children. Smaller children should not be given sharp objects to handle.Another measure would be the creation of trauma centres in ophthalmology far from the metropolitan region, seeking an earlier care to the traumatized children to avoid irreversible damages to the vision.

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