



Pattern of Ocular trauma in Pediatric population of Western Odisha

Tarun Kumar Panda^{1*}, Rutayani Dash² and A.C. Raghu³

¹Department of Ophthalmology, Bhima Bhoi Medical College and Hospital, Odisha, India

²Department of Ophthalmology, Sundargarh Medical College and Hospital, Odisha, India

³Bhima Bhoi Medical College and Hospital, Odisha, India

*Corresponding e-mail: tarunpanda61@gmail.com

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ABSTRACT

Background: To assess the clinicodemographic profile and pattern of Ocular trauma in Paediatric (<15 years) patients attending Bhima Bhoi Medical College and Hospital, Balangir. **Methods:** Hospital-based observational study, over one year, was conducted at BBMCH, Balangir, Odisha. Data regarding the demographic profile, Injury details, clinical profile, and treatment outcomes were noted in children up to 15 years of age with ocular trauma and were subsequently followed up for 6 months. **Results:** The most common age group affected was between 6 years to 10 years (41% i.e. 47 eyes) followed by 11years to 15 years (31% i.e. 36 eyes) and then 0 years to 5 years (27% i.e. 31 eyes). Boys (78% i.e. 89 eyes) were affected more than girls (22% i.e. 25 eyes). It was found that closed globe injuries were more in the urban population. Most of the children presented to our OPD between 24 hours to 72 hours (54.6%). The maximum number of injuries occurred during outdoor play or activities (53.6%). During the winter season, maximum cases were recorded (56.8%). The object causing mechanical injuries were projectile objects (41%) followed by household objects (21%) and blunt objects 56.2% of patients were managed surgically and the rest 43.8% by conservative treatment. Best corrected Visual Acuity (VA) of more than 6/18 was achieved in 72% of cases, 6/18-6/60 in 10% of cases. **Conclusions:** Children between 6 years to 10 years of age are more vulnerable to ocular trauma. Rural background and lack of education and transport facilities were determinants of visual outcome. Awareness is highly needed among parents, health workers, and teachers.

Keywords: Ocular trauma, Demographic profile, Open and closed globe injury, Paediatric population

INTRODUCTION

Ocular trauma in the Paediatric population leads to the major cause of ocular morbidity and unilateral blindness of acquired origin [1]. Though this age group's ocular injuries contribute only to 8%-14% of total injuries, still many of them require hospitalization and active intervention [2]. A pattern of clinical presentation is varied, depending on the cause of trauma and the object being involved [3]. Severe complications like amblyopia and endophthalmitis can occur as sequelae of minor eye injuries. Male children are comparatively more affected [4]. Open globe injuries always require active intervention and treatment [5]. Ocular trauma can adversely affect the growth of children i.e. disturbed social relationships, delayed learning, and impaired skills acquisition. Apart from the visual outcome, Paediatric ocular trauma also shows an impact on family members, mental and economic burden, and above all on the quality of life [6]. Most ocular injuries can be prevented by the proper patient and mass education, and the use of protection gadgets. Severe cases, though minimal, still need urgent hospital treatment [7]. No elaborate clinical studies were conducted in past regarding the distribution pattern of ocular injuries in the Western Odisha population, so our present study aimed to evaluate the demographic profile, varied clinical presentation pattern, and visual prognosis in this region.

METHODS

This was a hospital-based observational study, conducted in the Department of Ophthalmology BBMCH (Bhima Bhoi Medical College and Hospital), Balangir, Odisha, India. It is a referral hospital covering tribal districts like Nabarangpur, Titlagarh, Sonapur, Boudh, Nuapada, Nayagarh, and the rural population of Balangir too. The present study was conducted over 1 year from October 2020 to September 2021 with a sample size of 114 study subjects.

Inclusion Criteria

All ocular trauma Paediatric patients of ≤ 15 years of age, who attended our eye Outpatient Department (OPD) and casualty with acute presentation and verbal consent.

Exclusion Criteria

Pediatric patients with past ocular trauma, ocular comorbidities, congenital anomalies, coexisting vision-threatening problems, unwilling or disoriented patients. The study was conducted after consent from the patient parents/guardian and the Institutional ethical committee/clearance.

The responders were uniformly accessed with a designed format and with help of trained staff. At first, patients' demographic profile details like age and sex, residence, socio-economic status, level of education, time and place of injury, mode of injury, an object that caused the injury, any precautions taken before the injury, and mainly the time interval between injury and primary eye interventional treatment.

Detailed ocular examination of all the patients was done by best corrected Visual Acuity (different VA charts), evaluation of anterior segment and measurement of intraocular pressure in closed globe injuries, Gonioscopy, Fundoscopy, Biomicroscopy with 78D/90D lenses. Imaging techniques like USG, UBM, CT Scan, and MRI were done to appreciate injury details and treatment plans. All patients were followed up at end of 1 day, 1 week, 1 month, 3 months, and 6 months, with relevance to their treatment and clinical outcomes and record of final best corrected visual activity. SPSS version 18.0 was used for statistical analysis frequency, percentage, mean and standard deviation by descriptive analysis and significant association by chi-square (X^2) test. All patients were followed up at end of 1 day, 1 week, 1 month, 3 months, and 6 months, with relevance to their treatment and clinical outcomes and record of final best corrected visual activity. SPSS version 18.0 was used for Statistical analysis. Frequency, Percentage, Mean and Standard deviation were by descriptive analysis and significant association by Chi-square (X^2) test.

RESULTS

Table 1 shows that out of 114 patients, only 27.2% were in the age group between 0 year to 5 years as compared to 41.3% and 31.5% in the 6 years to 10 years and 11 years to 15 years age group. Male children were more commonly affected (81.5%), than female children (18.5%). More cases from rural areas (51.2%) were recorded as compared to Urban (18.9%) and semi-urban (29.9%) areas. Subjects belonging to SC/ST caste presented in a large proportion (46.2%) in comparison to OBC (29.1%) and General category (24.7%).

TABLE 1 SOCIO-DEMOGRAPHIC PROFILE DISTRIBUTION

Parameters	Number (n=114)	Percentage (%)
Age		
0-5	31	27.2%
6-10	47	41.3%
11-15	36	31.5%
Sex		
Male	89	81.5%
Female	25	18.5%
Nativity		
Urban	21	18.9%

Semi-urban	34	29.9%
Rural	59	51.2%
Caste		
SC/ST	52	46.2%
OBC	33	29.1%
General	29	24.7%

Table 2 depicts the varied pattern of ocular trauma profile. More Paediatric patients with ocular Injury presented beyond 24 hours and within 3 days (54.6%) followed by 21.8% (within 1 hour), 10.3% (between 3 days to 7 days), and 10.1% (1 hour to 24 hours), 3.2% (beyond 7 days). Maximum cases of Paediatric injuries occurred at the playground (53.6%), followed by home (23.4%), School (20.1%), work area (2.1%), and others (0.8%). During the winter season, ocular injuries occurred in higher frequency (56.8%), in context to summer (31.1%) and the rainy season (12.1%). Blunt trauma(46%) was the most common type of injury followed by intermediate and sharp one. i.e. 38% and 16% respectively. Most of the reported objects were solids (83%) and projectile type (51%).

The profile of these 73 patients of MIBC who opted for bladder preservation therapy is given in following Table 1.

Table 2 Spectrum of pediatric ocular injuries

Parameters	Number (n=114)	Percentage (%)
Time since injury		
0-1 hr	25	21.8%
1-24 hrs	11	10.1%
1 day-3 day	62	54.6%
3-7 days	122	10.3%
Beyond 7days	34	3.2%
Place of injury		
Playground	61	53.6%
Home	27	23.4%
School	23	20.1%
Work area	2	2.1%
Others	1	0.8%
Season		
Winter	65	56.8%
Summer	35	31.1%
Rainy	14	12.1%
Type of agent		
Blunt	52	46%
Intermediate	43	38%
Sharp	19	16%
State of agent		
Solids	95	83%
Fluids/ Others	19	17%
Nature of Injury		

Projectile objects	47	41%
House held objects	24	21%
Blunt objects	20	18%
Chemicals	4	4%
Sports	4	4%
Collision with Persons/Objects	7	6%
Insect/ animal bite	3	2%
Fall	3	2%
Burn/firework	2	2%

Table 3 depicts the age-wise distribution of Paediatric ocular Injuries. An increased number of cases were recorded in the age group between 6 Years to 10 years. Followed by the 11 Year to 15 years group and the 0 Year to 5 years age group. Projectile objects were observed to cause the damage.

Table 3 Age-wise injuries pattern

Age	Projectile objects	Household objects	Blunt objects	Collision	Sports	Miscellaneous
0 year to 5 Year	9	16	4	1	0	1
6 year to 10 Year	26	5	8	2	1	5
11 year to 15 Year	12	3	8	4	3	6
Total	47	24	20	7	4	12

Table 4 shows that ocular adnexal injuries were of major proportion followed by foreign body injuries. Globe perforation was seen in 4 cases of Paediatric patients aged less than 5 years. Subconjunctival hemorrhage (2 cases), Corneal tear (1 case), and Hyphaema (1 case) were evenly distributed in different age groups. Vitreous hemorrhage (2 cases) and iridodialysis were relatively seen more in children above 6 years.

Table 4 Tissue injuries pattern in pediatric age

Tissue injury	0 years to 5 years	6 years to 10 years	11 years to 15 years	Total n(%)
Eyelid				
Abrasion	5	10	6	21(18.4%)
Laceration	2	3	2	7(6.1%)
Hematoma	1	3	2	6(5.2%)
Burn	1	2	1	4(3.5%)
Conjunctiva				
Sub. Conjunctival	2	2	2	6(5.2%)
Tear	1	2	2	5(4.4%)
Foreign body	2	6	4	12(10.6%)
Cornea				
Abrasion	1	3	3	7(6.1%)
Foreign body	1	2	1	4(3.5%)
Tear	1	1	1	3(2.6%)
Hyphaema	1	1	1	3(2.6%)
Lens	3	4	4	11(9.8%)
Iridodialysis	2	3	2	7(6.1%)
Vitreous hemorrhage	1	2	2	5(4.5%)
Globe perforation	4	1	1	6(5.2%)
Miscellaneous	3	2	2	7(6.1%)

Table 5 depicts that the right eye environment is relatively more (68 eyes) as compared to the left eye (46 eyes). Irrespective of the laterality of the eye involved, maximum cases were recorded with visual acuity between 6/60 to no perception of light. Only 6 cases were recorded with visual activity better than 6/12, at the time of presentation, as compared to 24 cases after 2 months of treatment. The visual acuity of thirty-two patients could not be assessed. Patients with relatively better vision ($>6/60$) needed conservative treatment, unlike more impaired or blind patients ($<6/60$), who were managed surgically with medical treatment in follow-up. Unassessed patients were due to their less cooperation or reliability and less age.

Table 5 Visual acuity-wise pediatric injuries pattern

Visual acuity (VA)	Pre-treatment VA right eye n (%)	Pre-treatment VA left eye n (%)	Post-treatment VA right eye n (%)	Post-treatment VA left eye n (%)
$\geq 6/12$	4(6.0%)	2(4.3%)	16(23.5%)	8(17.4%)
6/18-6/60	16(23.5%)	12(26.1%)	14(20.6%)	10(21.7%)
$<6/60$ -PLnegative	28(41.1%)	20(43.5%)	18(26.5%)	16(34.8%)
Un accessible	20(29.4%)	12(26.1%)	20(29.4%)	12(26.1%)

DISCUSSION

Though Paediatric ocular injuries contribute in larger proportion to childhood visual impairment and blindness, varied data exists in our reference kinds of literature [8]. More prevalence cases were reported in the age group above 5 years like Mac Ewen, where 84% were covered between 5 years to 14 years age group [1,9,10]. Our study showed maximum male predominance as compared to females in a ratio of 4:1 which is almost similar to another study [11-14]. The reason behind this is boys are more adventurous and aggressive with more outdoor activities. In our study, the prevalence of Paediatric ocular trauma was relatively less in the age group below 5 years as compared to above age groups, due to constant supervision and precautions, which coincided with Dulal et al study [9]. However, El-Sebaity et al reported maximum trauma cases in the age group between 7 years to 12 years as compared to 12 years to 16 years aged children [14]. This can be better justified by young children's less ability to judge, lesser coordination abilities, and fewer skills to face danger and escape from it. Most ocular injuries occurred during outdoor play followed by, during home activities which were quite contradictory to Mac Ewen C and Desai T et al studies [1,8]. Because preschool and school-going children spend most of their hours in school, hence this may be the contributing factor for more prevalent cases outside the home area. Even they were at higher exposure to more toys and devices on school premises. Thompson et al, Luff et al and Kuhn et al too reported home as the commonest place of injury, unlike our study outcome [15-17]. More Paediatric ocular trauma cases were reported during the winter season by other authors too [18-19].

This seasonal variation in presentation is due to fewer outdoor activities in hot climates and school vacations. In winter, sports events and outdoor play are organized on a larger scale. Al-B dour, Schein et al, and Blomdahl et al reported high numbers of sports injuries unlike Luff et al and Kuhn et al. In our study blunt injuries were found in more proportion (46%) coinciding with Mac Ewen et al study. However, Kaur et al, and Krishnan et al, reported penetrating injuries in 74% and 70% of their study cases respectively. Wooden stick injuries are reported as more common in India like Kaur et al study unlike low values in our results. Assault injuries were found less in our study unlike in developed countries [20-26]. In our study, closed globe and adnexal injuries were found in 51% and 38% of cases unlike Desai T et al study, where it was reported as 27% and 32% respectively. One case of corneal tear was associated with iridodialysis and vitreous hemorrhage in one patient, iridodialysis and hyphaema were found together. Those with open globe injuries were treated to restore the anatomical integrity with poor visual prognosis [27-28]. Three lens injury cases were treated surgically with posterior chamber intraocular lens implantation. Corneal tear patients underwent suturing. Globe perforation cases were treated by evisceration and implants. After 2 months of treatment follow-up, 21% of Cases had VA $\geq 6/12$ and between 6/18-6/60, unlike 29.8% of cases in the range between 6/60 to no perception of light. Poor visual outcomes in some cases were due to delay in injury presentation, social taboos, the severity of injuries, quack bias, and poor compliance of patient [29-31]. Quality of life is hampered due to disfigurement, less efficiency, Amblyopia, and economic crisis [32].

Strength of the study

This study covers the population belonging to both rural and Urban areas that cater to patients from adjacent states of Eastern India. Sunetra eye program of Odisha implementing free services for preventable blindness is an integral section of this study. Apart from the demographic profile variation, we have registered varied clinical pattern presentations over this study period. The findings contribute to community Ophthalmology preventive measures and comprehensive eye care.

CONCLUSION

Pediatric ocular trauma is more prevalent and preventable. Because it tends to change personality, skills, and amblyopia, hence active referrals and interventions are highly essential to check visual impairment. Proper health education, awareness in all sectors of society, safety precautions, and supervision can check the morbidity of a larger event.

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Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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