# Clinical profile and visual outcome of pediatric ocular trauma in a tertiary care hospital in Goa

**Tanvi Poy Raiturcar[1*], Jagadish A Cacodcar[2], Jennifer Mendes[3], Shubham Faldesai[4]**

[1]Senior Resident, [2]Professor and Head, [3]Post Graduate Student, [4]2nd Year MBBS Student, [1]Dept. of Ophthalmology, [2,3]Dept. of Preventive and Social Medicine, Goa Medical College and Hospital, Goa, India

***Corresponding Author: Tanvi Poy Raiturcar**
Email: tanvi1491@gmail.com

## Abstract
**Introduction:** Ocular trauma accounts for 8-14% of all the injuries in the pediatric age group, which if managed with timely intervention helps avert permanent visual disability. There are many such studies done in other Indian states which have studied the profile of ocular injuries in that area; however such a study was lacking in Goa. Hence this study was conducted to study the clinical profile and visual outcome of pediatric ocular trauma at a tertiary care hospital in Goa.
**Materials and Methods:** A retrospective case-series hospital based study was conducted at the Goa Medical College and Hospital, after Institutional Ethics Committee approval. The medical case records of patients in the pediatric age group, who were admitted in the hospital with ocular injuries during the period between January 2015-December 2017 were reviewed and analyzed. All the relevant data was entered in pre-tested structured proforma.
**Results:** there were 52 cases of ocular trauma among children during the 3 year period. 55.76% were in the age group between 5-10 years, 63.46% were males. 65.38% were from the rural areas. 61.53% had sustained injuries at home. 40.38% had presented to the tertiary care hospital beyond 24hours since the injury.
The most commonly encountered injuries were open globe injuries 30 (57.69%), followed by closed globe injuries 19 (36.53%) and chemical injuries 3 (5.76%). 73.07% had a presenting Snellen's visual acuity worse than 6/60, while at discharge 53.84% had a visual acuity between 6/18-6/60, 42.30% better than 6/18 and 3.84% had visual acuity worse than 6/60.
**Conclusion:** Good parental supervision and immediate medical care in case of ocular injuries is of utmost importance to reduce childhood blindness due to ocular trauma.

**Keywords:** Goa, Ocular trauma, Pediatric.

## Introduction
It is estimated that there are around 1.4 million blind children in the world,[1,2] and two-thirds of whom live in developing countries such as India. A very important cause of avoidable blindness in the pediatric age group is trauma.[3,4] Ocular trauma accounts for 8-14% of all the injuries in the pediatric age group,[5] which if managed with timely intervention helps avert permanent visual disability. The pattern and mechanism of ocular injuries is different from those in adults, and so are the objects which cause these injuries. Ocular injuries in children are commonly caused with objects such as pencils, stone, firecrackers and domestic sharps.

There are many such studies done in other Indian states which have studied the profile of ocular injuries in that area; however such a study was lacking in Goa. Hence this study was conducted to study the clinical profile and visual outcome of pediatric ocular trauma at a tertiary care hospital in Goa.

## Aims
1. To study the clinical profile of ocular injuries in the pediatric age group.
2. To study the visual outcome of ocular injuries in children.

## Materials and Methods
A retrospective case-series hospital based study was conducted at the Goa Medical College and Hospital, after Institutional Ethics Committee approval. The medical case records of patients in the pediatric age group, who were admitted in the hospital with ocular injuries during the period between January 2015- December 2017 were reviewed and analyzed. All the relevant data was entered in pre-tested structured proformas. The data so collected included; demographic details, nature and type of injury, object causing injury, place of injury, time lapse between injury and presentation to the hospital, distance from place of injury to the hospital, associated injuries, Snellen's visual acuity at presentation, type of treatment given and visual outcome.

The data so collected was entered into Microsoft excel version 2010, and analyzed using simple proportions and percentages.

## Results
A retrospective review and analysis was done of the case records of all patients in the pediatric age group who were admitted at Goa Medical College and Hospital with ocular trauma during a three year time period between January 2015- December 2017. This comprised of case records of 52 children who were admitted during the study period at Goa Medical College and Hospital.

The demographic data of the patients is summarized in table 1. Majority of the children i.e. 29 (55.76%) were in the age group between 5-10 years, and more than half i.e. 33 out of 52 (63.46%) were males. It was seen that most of the children admitted with ocular injuries were from rural areas

i.e. 34 (65.38%); while only one-third i.e. 18 (34.61%) were from urban areas.

We observed that majority of the cases i.e. 32 (61.53%) were as a result of injuries sustained at home, followed by 11 (21.15%) injuries sustained on the playground, 8 (15.38%) injuries at school and only one case (1.92%) as a result of a road-traffic accident (Fig. 1). Most of the patients i.e. 21 (40.38%) had presented to the tertiary care hospital beyond 24hours of the injury, 17 (32.69%) had presented within 12 hours of the injury and 14 (26.92%) presented within 12- 24 hours of the injury (Table 2). Among the objects involved in the causation of the injuries, the most common were sharp objects such as pens, pencils and knives which accounted for 22 out of 52 i.e. 42.30% of all ocular injuries, followed by other objects such as stone, wooden stick, ball and fire cracker injuries.

The most commonly encountered injuries were open globe injuries 30 (57.69%), followed by closed globe injuries 19 (36.53%) and chemical injuries 3 (5.76%). (Table 3)

Majority of the participants i.e. 38 (73.07%) had a presenting Snellen's visual acuity worse than 6/60, 9 (17.30%) patients had visual acuity between 6/18-6/60 and only 3 (5.76%) patients had visual acuity better than 6/18. (Table 4)

Out of the 52 patients, 39 (75%) had to undergo a surgical procedure for management of the ocular injury, while only 13 (25%) cases were managed conservatively. Only 3 (5.76%) patients were referred to a higher center for management while the remaining cases were managed at our institute itself.

At discharge 28 (53.84%) patients had a Snellen's visual acuity between 6/18-6/60, while 22 (42.30%) had visual acuity better than 6/18 and only 2 (3.84%) had visual acuity worse than 6/60. (Table 5)

**Table 1: Demographic data**

| Demographic Data | Number (percentage) |
|---|---|
| **Age distribution** | |
| <5 years | 19 (36.53%) |
| 5-10 years | 29 (55.76%) |
| >10 years | 4 (7.69%) |
| **Sex distribution** | |
| Males | 33 (63.46%) |
| Females | 19 (36.53%) |
| **Location*** | |
| Rural | 34 (65.38%) |
| Urban | 18 (34.61%) |

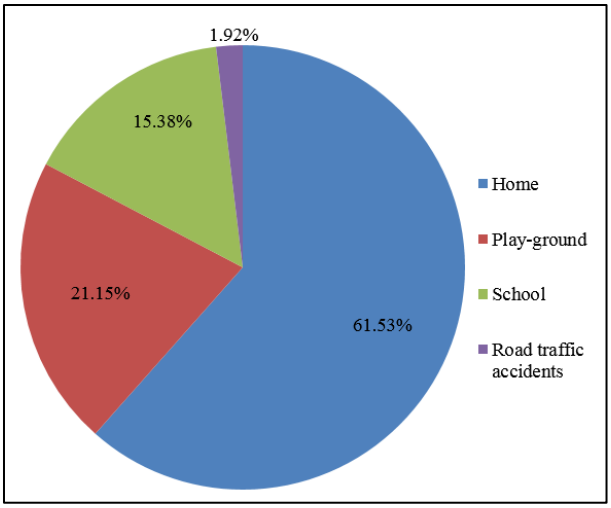


**Fig. 1: Distribution according to place at which injury occurred**

**Table 2: Time delay between injury and presentation to the tertiary hospital**

| Time between injury and presentation | Number (percentage) |
|---|---|
| < 12 hours | 17 32.69%) |
| 12-24 hours | 14 (26.92%) |
| >24hours | 21 (40.38%) |
| **Total** | 52 (100%) |

**Table 3: Distribution according to nature of injury**

| Type of injury | Number (percentage) |
|---|---|
| **Closed Globe Injuries** | 19 (36.53%) |
| 1) Adnexal injuries | 5 (9.61%) |
| 2) Sub-conjunctival hemorrhage | 3 (5.76%) |
| 3) Corneal abrasions | 11 (21.15%) |
| **Open Globe Injuries** | 30 (57.69%) |
| 1) Corneo-scleral tears | 28 (53.84%) |
| 2) Globe ruptures | 1 (1.92%) |
| 3) Intra-ocular foreign bodies | 1 (1.92%) |
| **Chemical Injuries** | 3 (5.76%) |

**Table 4: Snellen's visual acuity at presentation**

| Visual acuity | Number (percentage) |
|---|---|
| 6/6-6/18 | 3 (5.76%) |
| 6/18-6/60 | 9 (17.30%) |
| <6/60 | 38 (73.07%) |
| uncooperative | 2 (3.84%) |
| **Total** | 52 (100%) |

**Table 5: Visual acuity at discharge**

| Visual acuity | Number (percentage) |
|---|---|
| 6/6-6/18 | 22 (42.30%) |
| 6/18-6/60 | 28 (53.84%) |
| <6/60 | 2 (3.84%) |
| **Total** | 52 (100%) |

## Discussion

Ocular injuries represent a large proportion of all injuries in children[5] and are a very important cause of blindness in the pediatric age group.[3,4] It is also seen that the pattern of ocular injuries, the objects causing them and the management protocols followed by ophthalmologists incases of pediatric ocular trauma are much variable as compared to adults. Hence it becomes utmost important that we study the clinical profile and visual outcomes of such injuries.

In our study we found majority of the patients i.e. 29 (55.76%) were in the age group between 5-10 years. Also, more than half the patients i.e. 33 out of 52 (63.46%) were males. Our study findings correlate with those found in other similar studies[6-8] where the maximum victims were male children between 5-10 years. This can be explained by the fact that children younger than 5years are usually more supervised by their parents and those above 10 years have attained some amount of maturity thus reducing their level of activity. Also male gender increases the susceptibility to ocular injuries as male children are usually more active than females and also because male children are usually less supervised than female children.

We noted that majority i.e. 32 (61.53%) cases were as a result of injuries sustained at home, followed by 11 (21.15%) injuries on the playground, 8 (15.38%) injuries at school and only one case (1.92%) as a result of a road-traffic accident. This is similar to the findings of other similar studies[8] conducted in other Indian States. Similar studies conducted in the United States[5] and Iran[9] also showed comparable results.

It was seen that most of the patients with ocular injuries were from rural areas i.e. 34 (65.38%); while only a few i.e. 18 (34.61%) were from urban areas. One possible explanation for this could be that in urban areas people are financially stronger than in the rural areas hence there is better supervision and care given to the children. Whereas, in rural areas because of poverty and the need for the parents to be out of the house most of the time in order to earn, there is lack of parental supervision. In the rural areas there is also prevalence of child labour and many children are made to help in household activities or in the agricultural field thus exposing them to a greater risk of ocular injuries.

Most of the children i.e. 21 (40.38%) had presented to the tertiary care hospital 24 hours since the injury, 17 (32.69%) had presented within 12 hours of the injury and 14 (26.92%) presented within 12- 24 hours of the injury. Among those who presented to the hospital later than 24 hours were those belonging to the rural areas as compared to those who presented earlier who were from urban areas. The reason for this could be the difficulties faced by the rural population in transportation to the tertiary Centre. It was also seen that most i.e. 27 (52%) of the children who presented to us later than 24hours had visited another health-care facility such as primary health Centre or Urban health Centre where immediate treatment was given. This shows that there is a good network of health care system in the state where emergency medical care is being delivered to the patients before referral to a higher Centre. It was seen that only 10% of the children were seen by private Ophthalmologists before they presented to the tertiary hospital. This is possibly because most private ophthalmologists in Goa do not see patients outside the office hours and do not manage trauma in emergency situations.

Among the objects that caused the injuries, the most common were sharp objects such as pens, pencils, knives accounting for 32 out of 52 i.e. 61.53% of all ocular injuries, followed by other objects such as stone, wooden stick, ball and fire cracker injuries.

The most commonly encountered injuries were open globe injuries (57.69%), followed by closed globe injuries (36.53%) and chemical injuries (5.76%). Injuries in children are more common with sharp objects as compared to blunt trauma, hence open globe injuries tend to be more common than other injuries. A similar pattern was noted in a study conducted by Saxena R et al in New Delhi[10] and another by Singh et al[11] in Madhya Pradesh. We also noted that 38% children had associated hyphema, 10.6% had lens injuries including traumatic cataract and dislocated lens, 2 (3.84%) children had retinal detachment and 1 (1.92%) child had vitreous hemorrhage.

Majority of the children i.e. 38 (73.07%) had a presenting Snellen's visual acuity worse than 6/60, 9 (17.30%) children had visual acuity between 6/18-6/60 and only 3 (5.76%) children had visual acuity better than 6/18. The children who had a visual acuity of worse than 6/60 were those who had large corneo-scleral lacerations, traumatic hyphema or who had associated posterior segment injuries such as retinal detachment. Those who had visual acuity better than 6/60 were mostly closed globe injuries with adnexal damage or small sealed perforations of the cornea.

Out of the 52 children, 39 (75%) had to undergo a surgical procedure for management of the ocular injury, while only 13 (25%) cases were managed conservatively. Only 3 (5.76%) children were referred to a higher center for management while the rest cases were managed at our Hospital itself. Among those who needed referral were those who needed Vitreo-retinal surgery for retinal detachment and intra-ocular foreign body removal for a stone that was present in the vitreous.

At discharge 28 (53.84%) children had a Snellen's visual acuity between 6/18-6/60, while 22 (42.30%) had visual acuity better than 6/18 and only 2 (3.84%) had visual acuity worse than 6/60, which is highly suggestive of successful management of the injury at the tertiary care hospital. Those who had poor visual outcomes were patients who had sustained large corneo-scleral tears, globe ruptures or posterior segment injuries. Our study findings are consistent with similar studies which showed that large corneo-scleral lacerations or posterior segment involvement was associated with poor visual outcome.[6,11-14]

## Conclusion

The pattern of ocular injuries in children and their management protocols are much different from those in adults. Hence knowledge of the same helps us in the management, as well as to prevent permanent visual disability as a result of ocular trauma. Good parental supervision and seeking immediate medical care in case of ocular injuries is the most important measure to reduce childhood blindness due to ocular trauma.

**Financial Implications:** Nil.

**Conflicts of Interests:** None.

## References

1. World Health Organization. Global initiative for the elimination of avoidable blindness. Program for prevention of blindness and deafness. Geneva: WHO, 1997 (WHO/PBL?97.61)
2. World Health Organization. Preventing blindness in children: report of WHO/IAPB scientific meeting. Program for the prevention of blindness and deafness, and international agency for prevention of blindness. Geneva. WHO, 2000 (WHO/PBL/00.77).
3. Mac Ewen CJ, Baines PS, Desai P. Eye injuries in children: the current picture. *Br J Ophthalmol* 1991;83:933-6.
4. Kaur A, Agarwal A. Pediatric ocular trauma. *Curr Sci* 2005;89:43-6.
5. Brophy M, Sinclair SA, Hostetler SG. Pediatric eye injury-related hospitalizations in the United States. *Pediatr* 2006;117:e1263-71.
6. Katiyar V, Bangwal S, Gupta SK. Ocular trauma in Indian Pediatric population. *J Clin Ophthalmol Res* 2016;4:19-23.
7. Selvaraj S, Karan A. Deepening health insecurity in India: Evidence from national sample survey since 1980s. Econ Polit Wkly. 2009;44:55-60.
8. Qayum S, Rather S. Epidemiological profile of pediatric ocular trauma in a tertiary hospital of Northern India. *Chin J Traumatol* 2018;21(2):100-3.
9. Hosseini H, Masoumpour F, Keshavarz Fazi. Clinical and epidemiological characteristics of severe childhood ocular injuries in Southern Iran. *Middle East Afr J Ophthalmol* 2011;18(2):136-40.
10. Saxena R, Sinha R, Purohit A. Pattern of pediatric ocular trauma in India. *Indian J Pediatr* 2002;69(10):863-7.
11. Singh S, Sharma B, Kumar K. Epidemiology, clinical profile and factors predicting final visual outcome of pediatric ocular trauma in a tertiary eye care center in Central India. *Indian J Ophthalmol* 2017;65(11):1192-7.
12. Sarrazin L, Averbukh E, Halpert M. Traumatic pediatric Retinal detachment: A comparison between open and closed globe injuries. *Am J Ophthalmol* 2004;137:1042-9.
13. Maurya R P**,** Singh V P**,** IshanYadav, Singh M K, Mishra C P , Sen P R, Kunwar A Profile of pediatric ocular trauma at a tertiary eye care center in Northern India. *Indian J Clin Exp Ophthalmol* 2015;1(2):76-83
14. Maurya R P**,** Kumar A**,** Singh V P**,** Mishra C P , Jain P, Bhushan P,Singh M K, Srivastava T . Pattern of pediatric ocular trauma in a Eastern Uttar Pradesh. *Indian J Clin Exp*
15. *Ophthalmol* 2017;3(3):252-8.

**How to cite this article:** Raiturcar TP, Cacodcar JA, Mendes J, Faldesai S. Clinical profile and visual outcome of pediatric ocular trauma in a tertiary care hospital in Goa. *Indian J Clin Exp Ophthalmol* 2019;5(2):198-201.