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Pattern of Ocular Injuries in Children of 5-15 Years Age Group at Tertiary Care Centre of Kumaon Region, Uttarakhand

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ABSTRACT

Background: Ocular trauma is the leading cause of visual disability and non-congenital unilateral blindness in children. The incidence of ocular injury is 15.2 per 100,000 per year, but it is much higher in the developing countries and in the lower socioeconomic population. **Methods:** All patients of ocular trauma age group 5 – 15 years, attending Eye OPD, Emergency department, were studied. **Results:** In this study, the most common place of injury was outdoors (77.3%), followed by school 12.7%, and10% injuries were indoor. Most common cause of injury was recreational and sports activities (60.9%), second most common cause was road traffic accident12.7%.64.5% was closed globe injuries. 35.5% cases were of open globe injuries. Wood was the most common object causing trauma (30.9%), second most common object was pencil tip(10%), other objects were stone (8.2%) ,cricket ball(8.2%),metal wire(5.5%), firecracker injury(5.5%). **Conclusion:** This study has shown that outdoor activities like sports activities and recreational activities are the common cause of ocular injury in children followed by road traffic accidents. The poor socio-economic status and lack of parental education has impact on ocular injuries in children.

Keywords: Closed Globe Injury, Ocular Trauma, Open Globe Injury, Visual Acuity.

INTRODUCTION

Ocular trauma is the leading cause of visual disability and non-congenital unilateral blindness in children.[1] The incidence of ocular injury is 15.2 per 100,000 per year, but it is much higher in the developing countries and in the lower socioeconomic population.[2] The ocular trauma shows bimodal age distribution with maximum incidence in the young age and a second peak in elderly.[3,4] According to United States eye injury registry (USEIR), male to female ratio in pediatric population was 3.4:1. Pediatric eye injuries account for approximately 8%–14% of total injuries in children.[5] And overall cases of ocular trauma, 52% cases are of pediatric group.[6] These injuries have many diverse the costs, including human suffering, long term disabilities, loss of productivity and economic hardship. The etiology of pediatric eye injuries is directly related to the socioeconomic and educational status of the region being studied.[7] The spectrum of injury ranges from very mild and non sight threatening to extremely serious with permanent blinding consequences. Most of the injuries are minor, affecting the periorbital structures, as lids and conjunctiva.[8] Various studies have been done documenting the nature and cause of eye injuries in children in the western world. However the etiology, nature and visual outcome of ocular trauma in children is very different in the developing countries in the demography, social and cultural factors.[9] Ocular injuries can occur in almost any setting, including recreational and sport related activities, at home, rural settings and road traffic accidents.[10] By data collection, we can identify underlying factors leading ocular injuries; it may be possible to determine the most effective methods of reducing the incidence of visually damaging trauma. The cost effectiveness of well planned preventive measures based on sound epidemiologic data has been repeatedly demonstrated.[24,25]

The purpose of this study was to the study pattern of various ocular injuries in children of 5 to 15 years age group presenting at the tertiary care center of kumaon region and evaluating various factors related to injuries. The outcome of our study on this issue is relatable to the studies from developed countries.[11]

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MATERIALS AND METHODS

It was an Observational Cross-Sectional hospital based study. Total 110 patients of ocular trauma age group 5 -15 years were studied over a period of 1 year. This study was performed at the eye OPD and the casualty Department under the department of ophthalmology, Government Medical College Haldwani. This hospital is a tertiary care center and covers a large population of kumaon region and adjacent area. The patients either came directly or being referred from the other public or private hospitals of the region. Patients of age <5 and >15 years, Infectious keratitis caused by other than due to trauma, Patient suffering with any systemic illness were excluded from the study.

RESULTS

Of total 110 patients 52(47.3%) patients were between 5-10 years of age group, and 58(52.7%) patients were 11-15 years age group. It shows that majority of patients were in age group of 11-15 years. 37(33.6%) cases presented directly to our facility and 73(66.4%) patients were referred from other health care centers like Primary health care, Community Health center, and local doctors. Out of total 110 cases , 69(62.7%) cases presented to the hospital with in < 24 hours of trauma, 16 cases (14.5%) cases presented after 24-48 hours of trauma, 20(18.2%) cases presented after 48 hours but with in 1week , 3 (2.7%) >1 week – 4 week and 2(1.8%) cases presented after 4 weeks of trauma. According to Kuppuswamy's socioeconomic scale, 50 (45.5%) patients belonged to lower socioeconomic class, 35(31.8%) belonged to upper lower class, 21(19.1%) belonged to Lower middle, and 4(3.6%) belonged to upper middle class. Out of 110 cases maximum no of injuries occurred outdoors 85(77.3%), 14(12.7%) injuries occurred at school, and 11(10%) Occurred during indoor activities Maximum injuries were sustained during recreational, sports and outdoor activities 67(60.9%), second most common cause was Road traffic accident 14(12.7%), followed by injuries sustained at domestic area 10 (9.1%), 1 patient was affected by Dog bite, 2(1.8%) patient were related to assault. Rest 16 (14.5%) were classified under other including fall, injuries sustained at school etc. [Table 1]

Table 1: Cause of injury

Cause of injury	No.	%
Recreational Activities	67	60.9%
Road traffic accidents	14	12.7%
Domestic area	10	9.1%
Assault	2	1.8%
Animal bite	1	0.9%
Others	16	14.6%
Total	110	100

Out of total case 71(64.5%) were closed globe injuries, 39(35.5%) were open globe injuries. [Figure 1]

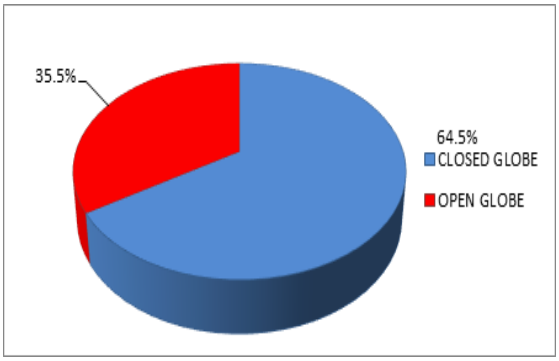

Figure 1: Type of injury

Out of 71 closed globe injuries, 64(90.1%) patients had zone 1 injuries, 3(4.2%) had zone 2 and 4 (5.7%) cases had zone 3 injuries. Out of 39 open globe injuries, 28(71.8%) were zone 1, 5(12.8%) were zone 2, and 6(15.4%) cases were zone 3 open globe injuries. [Table 2 & Figure 2]

Table 2: Distribution of Zone of injury (closed and open globe injury)

Zone Of Injury	Closed Globe No. (%)	Open Globe No. (%)
I	64(90.1%)	28(71.8%)
II	3(4.2%)	5(12.8%)
III	4(5.7%)	6(15.4%)
Total	71	39

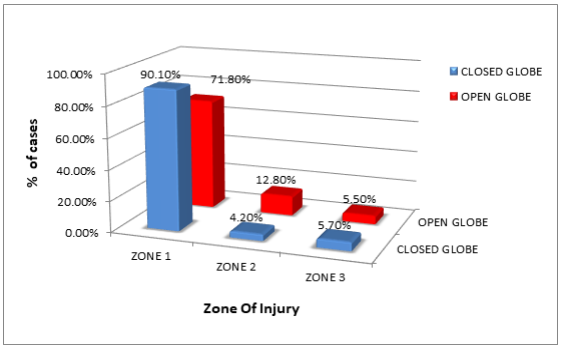

Figure 2: Zones of injuries open and closed.

Table 3: Pattern of ocular injuries No.(%)

Pattern	No.	%
Lid Laceration	23	20.9%
Lid ecchymosis	22	20.0%
Sub conj Hemorrhage	8	7.3%
Intra orbital Foreign body	1	0.9%
Perforating Corneal injury	35	31.8%
Traumatic cataract	4	3.6%
Scleral Tear	4	3.6%
Intraocular Foreign Body	1	0.9%
Corneal laceration(partial thickness)	9	8.2%
Choroidal rupture	1	0.9%
Traumatic optic neuropathy	1	0.9%
Hyphema	1	0.9%
Total	110	

Out of 110 cases 35 (31.8%) cases was of perforating corneal injuries, 23(20.9%) cases of adnexal injuries(lid laceration), 9(8.2%) cases were of partial thickness corneal laceration, 4(3.6%) were traumatic cataract., 4(3.6%) were scleral tear.1(.09%) case of each IOFB, Choroidal rupture, traumatic optic neuropathy were presented. [Table 3 & Figure 3]

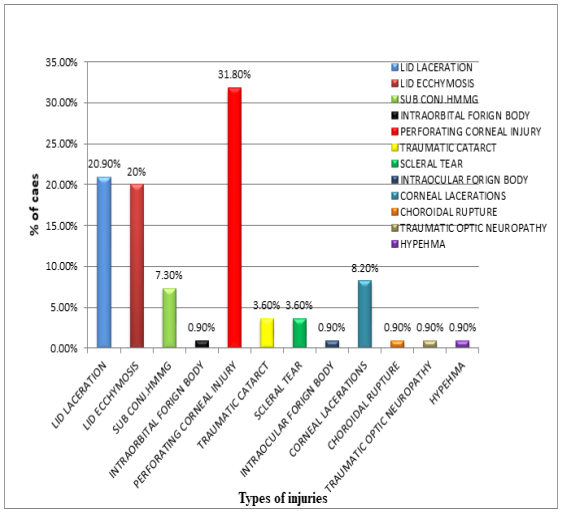

Figure 3: Pattern of ocular injuries

Injury with wooden object was most common 34(30.9%), second most common object was pencil tip injury 11(10%), followed by stone 9(8.2%), and cricket ball 9(8.2%). 7 (6.4%) patients were injured by metal wire, 6 (5.5%) cases were of fire cracker injury. 2(1.8%) cases were injured due to assault, 1 case was of Dog bite. Remaining 26(23.6%) cases were injured by other means including RTA, fall from height, fingernail injuries etc. [Table 4 & Figure 4].

Table 4: Types of object causing ocular injury

Object	Male	Female	Total
Wooden	24	10	34(30.9%)
Stone	6	3	9(8.2%)
Knife	3	2	5(4.5%)
Cricket ball	9	0	9(8.2%)
Fire cracker	6	0	6(5.5%)
Assault	1	1	2(1.8%)
Dog bite	1	0	1(0.9%)
Metal wire	5	2	7(6.4%)
Pencil tip	5	6	11(10%)
Others	17	9	26(23.6%)
Total	77	33	110

DISCUSSION

In this study, the children of age group 11-15 years were more affected. It explains that children >10 year age are at higher risk for trauma, as they have more hours of outdoor activities and are not supervised by their parents. Also the male were more affected than female children. The explanation to this could be that, greater risk taking behavior and active participation in sports and recreational activities makes male patients more prone for ocular injuries. An institutional study conducted at Helsinki's University Eye Hospital, Finland also showed that most likely age group presenting with ocular trauma was 13-16 years.[12] In this study, 77 patients were male and 33 were female and male to female ratio was found 2.3:1. In this study 45.5% patients belong to lower socioeconomic class, 31.8% belong to upper lower class, 19.1 % to the lower middle and 3.6% belong to upper middle class. The higher incidence of ocular trauma in lower socioeconomic class can be explained by that; in modern times, mobile and video games are easily accessible to upper, upper middle & lower middle socioeconomic class children , so the outdoor and sports activities are very much restricted in these groups. In a study by Satendra et al. (2017), they concluded that children from lower socioeconomic status had the higher prevalence (50.90%) of ocular injury as compared to other socioeconomic groups.[16] In this study, most of the injuries take place at outdoors (77.3%) followed by at school (12.7%) and 10% injuries in indoors. According to the United States Eye Injury Registry (USEIR) (41%) and Hungarian Eye Injury Registry (HEIR), (35%) the most frequent place of injury was Home.[20] Puodzuviene E, et al,2013 did a 5 years retrospective study on epidemiological characteristics and visual outcomes of pediatric ocular injuries, the study showed that the leading place of eye injury was home (60.4%),followed by outdoors (31.7%), School (5.2%) and the sporting area (2.2%).[17] In 2017, Haavisto AK, Sahraravand A et. Al. conducted Helsinki eye trauma study, and concluded that 33% of ocular injuries occurred at home and 24% at schools or in Day Care faculties.[18] In this study, it was found that Maximum injuries were sustained during recreational, sports and outdoor activities 67(60.9%), the second most common cause was Road traffic accidents 14 (12.7%), followed by injuries sustained at domestic area 10 (9.1%), 1 patient was affected by Dog bite, 2(1.8%) patient were of assault. Rest 16 (14.5%) were classified under others (fall, finger nail, toys, pencil tip injuries etc).In 2012, Krystin N.Miller et al., conducted a retrospective study of sports related and recreation related eye injuries in the children < 17 years age. It showed 26.9 cases of sports and recreation related eye injuries per 100,000 children. The age group of 10-14 and 15-17 had the highest rates of eye injuries. 3/4th injuries were sustained by boys. The most common sports and recreational injury were associated with basketball (15.9%), softball (15.2%).[19]

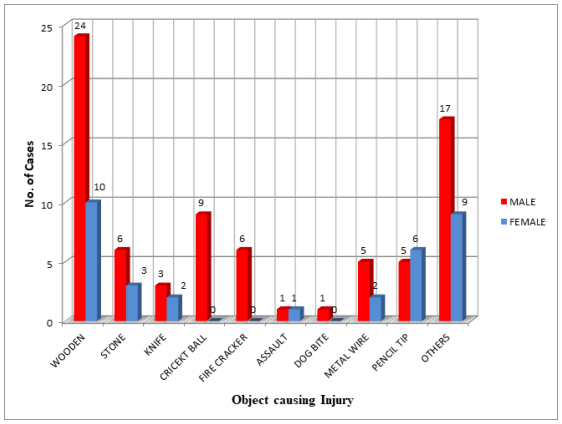

Figure 4: Types of object causing ocular injury.

Out of total case 71(64.5%) were closed globe injuries, 39(35.5%) were open globe injuries. Qayum S, et al concluded in his study on ocular trauma (2014-15), 67.8% case presented with the closed globe injury and 32.2% with open globe injury.[14] Most pediatric ocular injuries occur at home and are due to trauma by sharp objects.[15] In general, injuries that results from a sharp force carry a much better prognosis. In this study most common object of injury was wooden 34 (30.9%), the second most common object was pencil tip 11(10%), followed by stone 9(8.2%), cricket ball 9(8.2%). metal wire 7 (6.4%), firecracker injury 6 (5.5%). assault 2(1.8%), Dog bite 1 (0.9%). Remaining 26 (23.6%) cases were injured by other means including RTA, fall from height, fingernail injuries etc. In a study by S.Singh et al. (2017); the most common cause of the injury was wooden objects (29.54%).[16] This can be explained by the fact that, children play with gully danda, dhanush baan and other modes of games with wooden sticks, or they fall and hit by the tree's branches and bushes. In the children most common form of open globe injuries are penetrating injuries (48.4% to 83%), followed by rupture (9.9-34%) and IOFB (4-16.1%).[9,21-23]

CONCLUSION

On the basis of results and observation of this study, the preventive measures are recommended to reduce the chances of ocular trauma in children. Educating parents, teachers and students about risk of ocular trauma and safety precaution (use of protective eyewear during recreational/ sports activities) can reduce the ocular injuries significantly. Along with this Parental supervision is recommended to reduce the chances of ocular injuries. It is further recommended to develop appropriate health facilities at peripheries, to reduce the potential complications of ocular trauma due to delayed primary eye care facilities. And a proper urgent referral system should be designed for emergency care services for ocular trauma patients. It is also recommended to establish an ocular trauma registry; it will help in doing more research work on this area and implementation of improved emergency eye care services.

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