Section: Ophthalmology

Original Research Article

PERSPECTIVE OF OCULAR TRAUMA IN COMMUNITY EYE HEALTH CARE IN MANIPUR: A PROSPECTIVE STUDY

Mairembam Ranjana Devi[1], Anthony Kamson[1], Rajkumari Vidyarani Devi[2], Puyam Mayawati Devi[3], Sonia Mairembam[4]

[1]Assistant Professor, Department of Ophthalmology, JNIMS, Imphal, India.
[2]Professor & Head, Department of Ophthalmology, JNIMS, Imphal, India.
[3]Ophthalmologist, JNIMS, Imphal, India.
[4]PGT, Department of Ophthalmology, JNIMS, Imphal, India.

Received : 10/03/2026
Received in revised form : 29/04/2026
Accepted : 14/05/2026

Keywords:
Community eye health, Closed globe injury, Eye injury, Ocular trauma, Open globe injury, Visual outcome.

Corresponding Author:
Dr. Sonia Mairembam,
Email: soniamairembam1993@gmail.com

DOI: 10.47009/jamp.2026.8.3.251

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (3); 1428-1435

ABSTRACT

Background: Ocular trauma is a considerable public health concern that leads to major preventable visual impairment globally. It affects patients of all ages, affecting their socio-economic status, quality of life and emotional well-being. Understanding its pattern is necessary for its effective management and prevention. So, we conducted a study to assess the epidemiological profile, causes, types of injuries and visual outcomes of ocular trauma cases presenting to a tertiary care center in Manipur. **Materials and methods:** A hospital-based observational study was conducted in JNIMS Hospital, Imphal, for a period of three years (April 2021 to April 2024). A total of 215 patients aged 1–80 years presenting with ocular trauma to the casualty, OPD, or referred from peripheral centers were included. Detailed history and demographic data were recorded. Complete ophthalmological evaluation was performed, including BCVA, slit-lamp biomicroscopy, fundus examination and B-scan ultrasonography when required. Injuries were classified using the Birmingham Eye Trauma Terminology System (BETTS). Follow-up examinations were conducted at 1 week, 3 weeks, and 6 weeks. **Results:** In the study, males were affected (81%) more than females (19%) by ocular trauma. The most affected age group was 31-40 years. Rural residents accounted for 65% of cases. Farmers and children were the most commonly affected occupational group. Closed global injuries accounted for 4 times higher than open globe injuries. Road traffic accidents were the leading mode of injury (50.23%), followed by blunt trauma (25.11%). Falls are the most common cause (55.81%). The most frequently involved structures were the lids and lacrimal system (24%), followed by the conjunctiva and cornea. Among open globe injuries, zone 1 involvement was most common (26%). Visual outcomes improved considerably over follow-up: individuals with 6/6 to 6/18 vision increased from 62.7% at presentation to 75.3% at six weeks, while poor-vision categories reduced comparably. **Conclusion:** Ocular trauma predominantly affects children and farmers in rural areas. Road traffic accidents and occupational hazards remain major contributors. Early presentation, prompt management, and strong emphasis on preventive strategies such as the use of protective eyewear and road safety measures can considerably improve visual outcomes. Strengthening community awareness and emergency eye-care services is crucial for reducing the burden of ocular injury.

INTRODUCTION

Traumatic ocular injury affects not only the quality of life of the patients and their families but also their socioeconomic status and psychological well-being. Ocular trauma is an important public health issue that is predominantly preventable and influenced by multiple factors within a rapidly changing global context. It serves as a substantial cause of visual impairment and vision loss.[1] Fortunately, the eyeball is well protected from direct injury by orbital margins, blink reflex (eyelids, eyelashes), head turning reflex and lacrimation; therefore, less than 2% cases need inpatient hospital care, and the majority of them are minor injuries which can be managed at the outpatient department or emergency room.[2]

Over 2 million cases of ocular trauma are reported every year, of which 40,000 result in significant vision loss. Ocular injuries are broadly categorized

ISSN (O): 2687-5365; ISSN (P): 2753-6556

into open and closed globe injuries as per the widely accepted Birmingham Eye Trauma Terminology system (BETTS).[3] Being of a delicate and sensitive nature of the tissue, ocular injuries are more severe than those involving any other body parts of the body, often leading to permanent blindness.

The severity of ocular injury encompasses a wide range of conditions, ranging from subconjunctival hemorrhage and lid laceration to even lens subluxation or dislocation, vitreous hemorrhage, retinal detachment, traumatic optic neuropathy, orbital fracture and globe rupture.[4]

Due to the financial cost associated with ocular trauma and the economic burden on the healthcare system resulting from the cost of treatment and rehabilitation services, raising awareness and implementing prevention measures are highly justified.

Many injuries can be prevented by increasing public awareness about potential risk factors and agents that may cause injury. Eye injury has received little attention as a cause of blindness and poor vision, although it is largely preventable with appropriate eye protection use.

Incidence of ocular trauma reportedly ranges from 1 to 5 %.[5] Reported prevalence of eye injury ranged from 0.6% to 7.5% in India.[6] There may be inter-zonal differences in the pattern of the injuries. Yet, understanding it is important for effective management and prevention purpose. Hence, the present study was done with the aim of assessing the epidemiological profile, causes, types of injuries and visual outcomes of ocular trauma cases presenting to a tertiary care center in Manipur.

MATERIALS AND METHODS

A hospital-based observational study was done in the Department of Ophthalmology, JNIMS, Imphal during the period Apr 2021-Apr 2024. The study participants were patients with ocular trauma attending the casualty and out-patient department and also cases referred from PHCs and CHCs. All patients irrespective of gender and age were recruited consecutively after obtaining written informed consent.

A pre-tested semi-open proforma was used for data collection. It had sections socio-demography, clinical history of the mishap and circumstances, along with the nature of injury and clinical findings. A complete ophthalmological examination, including Best Corrected Visual Acuity (BCVA), lid or facial injury, pupillary defect, extraocular movement defect, presence or absence of foreign body and corneal or corneoscleral perforation, was noted. Then, slit lamp examination and direct and indirect ophthalmoscopy were done for every patient, and ocular B scan was used to examine the anterior and posterior segments and the orbits if necessary. The presence or absence of vitreous haemorrhage, retinal breaks, retinal detachment and choroidal rupture was noted. Intraocular pressure was measured in all but was avoided in fresh open globe injuries. Ocular trauma was classified according to the Birmingham Eye Trauma Terminology (BETT), which categorises eye injuries as open (full-thickness eye wall wound) or closed globe injuries (no or partial thickness eye wall wound). Monocular blindness was defined as a best corrected VA of worse than 3/60 in one eye.

The patients were followed up at regular intervals initially at one week and subsequently at three & six weeks. At every visit, the patients underwent a detailed ocular examination, which included a vision assessment using the Snellen's chart and slit lamp examination. After treatment, the patients were followed up-to 6 weeks. Remarkable changes, if any, were noted at each visit.

Data collected were entered in MS excel sheet and later transported to SPSSv23 for statistical analysis. Only descriptive analysis was done and presented in the form of proportions. Ethical approval of the study was obtained from the Institutional Ethics Committee of JNIMS, Imphal.

RESULTS

A total of 215 patients participated in the study. The highest number of ocular traumas (75; 34.8%) occurred in the age group from 31-40 years of age, i.e., in the fourth decade. It was found that, elderly patients (aged >60years) had the least number of ocular traumas. Males constituted 91% of them. More than two-thirds (140; 65.1%) were from the rural areas. Farmers (86; 40%), school students (45; 21%) and farmers (22.102%) were the people mostly affected. [Table 1]

Table 1: Distribution of patients by socio-demographic variables (N=215)

Variables	No. of patients (%)
Age-groups (years)	
• 1-10	15 (6.9)
• 11-20	23 (10.6)
• 21-30	62 (28.8)
• 31-40	75 (34.8)
• 41-50	18 (8.3)
• 51-60	15 (6.9)
• 61-80	7 (3.2)
Gender	
• Male	174 (81)
• Female	41 (19)
Residency	

ISSN (O): 2687-5365; ISSN (P): 2753-6556

• Urban	75 (34.9)
• Rural	140 (65.1)
Occupation	
• Worker	86 (40)
• School-goers	45 (21)
• Farmer	22 (10.2)
• Home-maker	20 (9.5)
• Sports-person	19 (8.8)
• Others	23 (11.3)

Half of the injuries (108; 50.23%) were because of road-traffic accidents, followed by blunt trauma (54; 25.11%). Sharp objects, assault, agriculture-related trauma, chemical and electrical injuries were the other modes of injury. By cause of trauma, fall constituted more than half of the injuries (120; 55.81%). This was followed by wooden stick/piece (22; 10.23%), stone particles and iron particles (17; 7.9% each), toy gun injury, glass particle etc. [Table 2]

Table 2: Distribution by mode of injury and cause of trauma

Variable	Frequency (%)
Mode of injury	
• Road-traffic accident	108 (50.23)
• Blunt trauma	54 (25.11)
• Sharp objects	20 (9.3)
• Assault	14 (6.51)
• Agri-related trauma	7 (3.25)
• Chemical injury	5 (1.86)
• Electrical injury	4 (1.85)
• Gunshot	3 (1.42)
Cause of trauma	
• Fall	120 (55.81)
• Wooden stick/piece	22 (10.23)
• Stone	17 (7.9%)
• Iron particle	17 (7.9%)
• Toy gun injury	15 (6.9)
• Glass particle	8 (3.6)
• Pencil	6 (2.8)
• Others	10 (5.0)

Table 3: Distribution by type of injury, zone and structure involved

Variable	Frequency (%)
Type of injury	
• Open globe	43 (20)
• Close globe	172 (80)
Zone of injury (out of open globe injuries)	
• Conea & limbus	55 (26)
• Limbus to 5mm posterior into sclera	4 (3)
• Posterior to 5mm of limbus	10 (5)
• Cornea to 5 mm posterior into sclera	6 (3.3)
Structure involved	
• Lid & lacrimal injury	52 (24)
• Conjunctival injury	37 (17)
• Hyphema	34 (16)
• Cornea	30 (14)
• Corneal perforation	19 (9)
• Sclera	13 (6)
• Uvea	11 (5)
• Lens	9 (4)
• Endophthalmitis	6 (3)
• Vitreous/retina	2 (1)

Four-fifths of the injuries (172; 80%) were close globe injuries, the remaining being open globe injuries. On further classifying the open globe injuries based on the zone of injury, 26% had an injury in zone 1 (Cornea & limbus), 5% had an injury in zone 3 (posterior to 5mm of limbus), while 4 patients (3%) had an injury in both zones 1 and 2 (corneoscleral tear). The most common structures involved were lid and lacrimal, comprising about 24%, followed by conjunctival injury, hyphema in the anterior chamber, and corneal perforation, constituting about 17%, 16%, 14% respectively. [Table 3]

Table 4 depicts the mode of treatment given and the outcome (visual acuity) at different times. The treatment was based on the structure involved. Lid suturing (32%), FB removal (18%) and corneal tear repair (13%) were the most common form of

ISSN (O): 2687-5365; ISSN (P): 2753-6556

treatment. The visual acuity developed significantly by 8 weeks after treatment.

Table 4: Comparison of Maternal, Socio-Demographic and Clinical Factors among Early, Late and Combined Non-Responders

Variable	Frequency (%)
Treatment given	
• Lid suturing	68 (31.6)
• FB removal	38 (17.6)
• Corneal tear repair (CTR)	27 (12.5)
• Conservative management	
• CTR + iris excision	23 (10.7)
• CTR + cataract extraction + iridectomy	15 (6.9)
• Evisceration	29 (13.4)
• Corneal perforation sealed + cataract extraction + anterior vitrectomy + PCIOL	5 (2.3)
	10 (4.6)
Visual acuity at presentation	
• 6/6 – 6/18	135 (62.7)
• <6/18 – 6/60	18 (8.3)
• <6/60 – 3/60	8 (3.7)
• <3/60 – perception to light	54 (25.0)
Visual acuity at 3 weeks of treatment	
• 6/6 – 6/18	145 (67.)
• <6/18 – 6/60	30 (13.9)
• <6/60 – 3/60	16 (7.4)
• <3/60 – perception to light	24 (11.1)
Visual acuity at 6 weeks of treatment	
• 6/6 – 6/18	162 (75.3)
• <6/18 – 6/60	16 (12.0)
• <6/60 – 3/60	10 (4.6)
• <3/60 – perception to light	17 (7.9)

Figure 1: Pellete injury and surgical removal

ISSN (O): 2687-5365; ISSN (P): 2753-6556

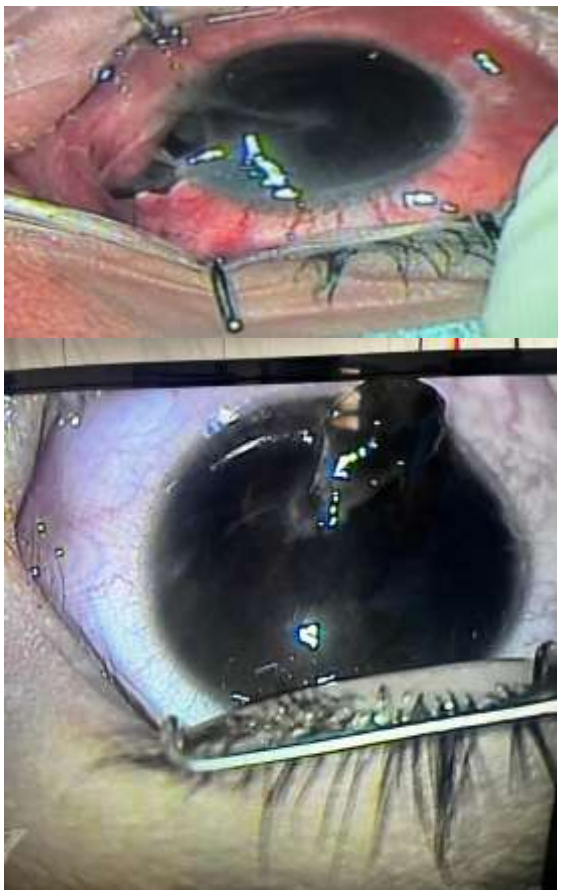

Figure 2: Image showing globe rupture

Figure 3: Image of corneal sutures after 2 weeks

Figure 4: Image showing hyphema following blunt trauma

Figure 5A: Full thickness eyelid laceration. 5B: Full thickness eyelid laceration repair

DISCUSSION

In the study, the majority of the patients belonged to the 31–40-year age group. This age-group represents the most active and economically productive segment of the population, making them more prone to occupational-related injuries. In the study conducted by Choi et al (2008), the mean age of patients with ocular trauma was 23.7±7.1 years.[7] A strong male predominance (81%) was observed. This may be due to males engaging more frequently in outdoor, high-risk activities, driving, and manual labor, leading to greater exposure to accidental injuries. In the study conducted by Keel et al (2017), males exhibited a

ISSN (O): 2687-5365; ISSN (P): 2753-6556

higher prevalence of vision loss from ocular trauma compared to females in both non-Indigenous (0.47% vs. 1.25%) and Indigenous populations (0.12% vs. 0.38%).[8] In another study conducted by Salama et al (2014) also found that ocular trauma is higher in males than in females, which found that 58.5% of the 82 patients being male. The research also highlights that males are more susceptible to developing permanent infirmity after eye trauma, particularly among workers and farmers. This increased risk is attributed to factors such as occupational exposure, participation in dangerous situations, and risk-taking behaviors. Overall, the findings emphasize the significant gender disparity in ocular trauma cases.[9]

In the present study, the majority of the patients who identified having ocular trauma reside in rural areas. The higher ocular trauma in rural populations may be due to increased agricultural activities, unsafe work practices, limited awareness regarding ocular protection, and delayed access to healthcare facilities. Workers constituted the majority of the occupational group affected, followed by school-going children & farmers. Many of these injuries can be prevented with basic workplace safety practices, including the use of protective eyewear. In the study by Puodžiuvienė et al (2018), it was indicated that ocular trauma is more prevalent in children, particularly in home settings (60.4%) and outdoors (31.7%), rather than specifically in farming or school environments. While 5.2% of injuries occurred at school, the majority of injuries were associated with activities at home and outdoor play.[10] In another study, which was conducted by Traore et al (2023) found that ocular trauma is more prevalent among farmers, as indicated by the study, which found that 38.2% of the cases involved individuals in this occupation. The research highlights that farmers and stockbreeders are particularly exposed to accidents in a rural context, contributing to the higher incidence of ocular injuries.[11]

Closed globe injuries were more common than open globe injuries in our study. Closed globe injuries often result from blunt trauma and can range from minor superficial lesions to severe internal damage, whereas open globe injuries typically follow sharp object trauma and carry a worse visual prognosis. Salman et al (2014) found that Closed globe injuries (CGI) were more prevalent, comprising 68.3% of all cases, compared to open globe injuries (OGI) at 31.7% .[9]

Road traffic accidents were the most common mode of injury (50.23%), followed by blunt trauma and sharp object injuries. This may be due to the factors contributing to the increased road usage, poor enforcement of safety protocols, and lack of protective helmets or visors. Overall, falls accounted for the largest cause of ocular trauma injury. The same result was found in the study conducted by Amudhavadivu et al (2019), where the most common cause of ocular trauma was accidental falls (29.1%), followed by stick injuries (18.3%) and road traffic accidents (14.1%).[12] In another study conducted by Wagh et al (2022), road traffic accidents were the most common cause of ocular trauma, accounting for 56.67% of cases in the study. This highlights the significant impact of such incidents on ocular injuries among patients in the rural hospital setting.[13]

Sharp and blunt objects such as wooden sticks, stones, soft toy guns, glass particles, and iron fragments were common causes of injuries. Cid et al (2015) found that the primary objects causing ocular injuries were wooden objects (21.85%), toys (17.65%), and chemicals (16.81%).[14] In another study, Awny et al found that the most common cause of ocular trauma was injury by sharp objects (45%), followed by blunt trauma (16.7%) and trauma by stones (13.3%).[15] The most frequently involved structures were the lid and lacrimal, followed by conjunctiva, hyphema, and corneal perforation. Kundan et al (2024) found that among ocular trauma cases, the most common injuries were closed globe injuries, specifically lid laceration (14%), ecchymosis (12%), and subconjunctival hemorrhage (7%).[16]

Among open globe injuries, zone 1 involvement was most common (26%), followed by zone 3 injuries. Zone 1 injuries, which involve the cornea and limbus, are frequently encountered due to their anterior location and direct exposure to external trauma. Posterior zone injuries, though less frequent, generally carry a poorer prognosis due to potential retinal or choroidal involvement. Tu YF et al found that among ocular trauma cases, the most common injuries were closed globe injuries, specifically lid laceration (14%), ecchymosis (12%), and subconjunctival hemorrhage (7%).[17]

Visual acuity improved considerably from presentation to the 6-week follow-up period. At presentation, only 62% of patients with normal or mild visual impairment had (6/6-6/18) vision, which increased to 75.3% at six weeks. The proportion of patients with very poor vision (counting fingers or only light perception) markedly decreased with appropriate management and follow-up. Nadeem et al (2013) indicate that at presentation, only 26% of patients had 6/6 vision, which improved to 41.8% by the six-week follow-up. This demonstrates a significant enhancement in visual acuity following treatment for ocular trauma.[18]

The study, being of a small sample size and limited availability of infrastructure in the study institution may limit the external validity of the findings.

CONCLUSION

Ocular trauma is a cause for concern irrespective of geographical area, economic status, gender and occupation, as visual disability makes a person physically, economically and psychologically disabled. The young age, rural status and illiteracy are probably factors responsible for delayed presentation. It has become very important to raise awareness about getting treatment immediately

ISSN (O): 2687-5365; ISSN (P): 2753-6556

following injury. Resources should be mobilized to provide quality ocular emergency care to our rural and illiterate population, with emphasis on immediate attention to any ocular trauma, including promotion of the use of protective gears while working and raising awareness about traffic rules to reduce RTA.

Conflict of interest: None to declare

Funding: Nil.

REFERENCES

1. Négrel AD, Thylefors B. The global impact of eye injuries. Ophthalmic Epidemiol. 1998 Sep;5(3):143-69.
2. Macewen CJ. Eye injuries: a prospective survey of 5671 cases. Br J Ophthalmol. 1989 Nov;73(11):888-94.
3. Kuhn F, Morris R, Witherspoon CD, Mester V. The Birmingham Eye Trauma Terminology system (BETT). J Fr Ophtalmol. 2004 Feb;27(2):206-10.
4. Kuhn F, Maisiak R, Mann L, Mester V, Morris R, Witherspoon CD. The Ocular Trauma Score (OTS). Ophthalmol Clin North Am. 2002 Jun;15(2):163-5.
5. Wong TY, Klein BE, Klein R. The prevalence and 5-year incidence of ocular trauma. The Beaver Dam Eye Study. Ophthalmology. 2000 Dec;107(12):2196-202.
6. Shah M, Shah S. Prevalence of eye injury in India: A meta-analysis. J Clin Ophthalmol Res 2024;12:3-7.
7. Choi JS, Shin KH. Epidemiology of leisure sports-related ocular trauma. J Korean Ophthalmol Soc. 2008 Oct 1;49(10):1658-64.
8. Keel S, Xie J, Foreman J, Taylor HR, Dirani M. The prevalence of vision loss due to ocular trauma in the Australian National Eye Health Survey. Injury. 2017 Nov;48(11):2466-69.
9. Salama N, Badr-El-Dine F. Ocular Trauma Characteristics in Cases Admitted to Alexandria University Main Hospital: A Medicolegal Study. Ain-Shams J Forensic Med Clin Toxicol. 2014;23(2):21-9.
10. Puodžiuvienė E, Jokūbauskienė G, Vieversytė M, Asselineau K. A five-year retrospective study of the epidemiological characteristics and visual outcomes of pediatric ocular trauma. BMC Ophthalmol. 2018 Jan 18;18(1):10.
11. Traore M, Keita S, Samake Y, Traore S, Sékou M, Bamani S, et al. Epidemiological and Etiological Aspects of Ocular Trauma at the Fana Reference Health Center. East African Scholars J Med Sci. 2023;6:296-9.
12. Amudhavadivu S, Rogavi Y, Gnanaselvan J. Ocular trauma in school going children- An analytical study. Indian J Clin Exp Ophthalmol. 2019;5(3):398-400.
13. Wagh V, Tidake P. Clinical study and profile of ocular trauma: findings from a rural hospital in Central India. Cureus. 2022 Jul 16;14(7).
14. Cid NCQ, Zimmermann-Paiz MA, Ordoñez-Rivas AM. Características clínicas y epidemiológicas del trauma ocular en menores de 14 años. Archivos argentinos de pediatría. 2015 Jan;113(5):e260-3.
15. Awny I, Hassan A, Abdallah A. Pattern, risk factors and outcome of ocular trauma in children treated at Sohag University Hospital. Egypt J Clin Ophthalmol. 2019 June;2(1):33-40.
16. Kundan S, Sharma A, Sahu PK, Das GK, Jatab AS, Aamir PA. Epidemiology of ocular trauma. Lat Am J Ophthalmol. 2024;7:17.
17. Tu Y, Soni NG, Bauza AM, Zarbin MA, Bhagat N. Characteristics of Open-globe Eye Injuries with Respect to Zone of Injury. J Adv Med Med Res. 2014 May 5;4(20):3767-76.
18. Nadeem S, Ayub M, Fawad H. Visual outcome of ocular trauma. Pak J Ophthalmol. 2013;29(1):34-9.

ISSN (O): 2687-5365; ISSN (P): 2753-6556