International Journal of Clinical and Biomedical Research
Vol. 11, No. 3 (2026)
pISSN: 2521-0394 · eISSN: 2395-0471

ORIGINAL RESEARCH

CLINICAL PROFILE OF CORNEAL INJURIES AND THEIR VISUAL OUTCOMES AT 12 WEEKS: AN OBSERVATIONAL STUDY FROM A TERTIARY CARE HOSPITAL IN TAMIL NADU

Jamuna K [1*], **Aravind Rajendran** [2], **Sathya S** [3]

[1] *Assistant Professor, Department of Ophthalmology, Government Thiruvarur Medical College and Hospital, Thiruvarur, Tamil Nadu, India*
[2] *Assistant Professor, Department of Ophthalmology, Dhanalakshmi Srinivasan University, Samayapuram, Trichy, Tamil Nadu, Inida*
[3] *Assistant Professor, Department of Ophthalmology, Government Nagapattinam Medical College and Hospital, Nagapattinam, Tamil Nadu, India*

*Correspondence: Jamuna K <jamunambbs86@gmail.com>

ABSTRACT

Background: Corneal injuries are an important and largely preventable cause of ocular morbidity, ranging from superficial epithelial abrasions and foreign bodies to full-thickness lacerations. Visual prognosis depends on the mechanism, depth and location of injury and on the interval before treatment. **Methods:** An observational analytical hospital-based study was conducted in the cornea clinic of a tertiary care hospital. One hundred and thirty-three consecutive patients with a primary corneal injury were enrolled. Patients with pre-existing corneal opacity, ocular trauma without corneal involvement, previous corneal surgery, posterior segment involvement, corneal degeneration or dystrophy were excluded. History, visual acuity, slit-lamp examination and fluorescein staining were recorded at presentation, and patients were reviewed on days 1 and 3 and at weeks 1, 4, 8 and 12. Visual status was graded by World Health Organization categories. Associations with visual outcome at 12 weeks were tested by the Pearson chi-square test in SPSS version 23.0. **Results:** Mean age was 41 years (range 3–91) and 85 patients (63.9%) were men; 115 (86.5%) presented within 24 hours. Manual workers formed the largest occupational group (61; 45.9%), and industrial exposure was the commonest source of injury (46; 34.6%), followed by domestic injury (39; 29.3%). External corneal foreign body was the commonest mechanism (58; 43.6%), followed by blunt (32; 24.1%), penetrating (23; 17.3%) and chemical injury (20; 15.0%), of which 15 (75.0%) were alkali. Injury was confined to the epithelium in 74 patients (55.6%) and was full thickness in 25 (18.8%); the central cornea was involved in 71 (53.4%). Treatment was medical in 110 patients (82.7%) and surgical in 23 (17.3%). Normal vision rose from 52 patients (39.1%) on day 1 to 106 (79.7%) at 12 weeks, while blindness fell from 16 (12.0%) to 4 (3.0%). Outcome at 12 weeks was significantly associated with time to presentation ($\chi^2 = 47.784$, $p < 0.001$), mechanism ($\chi^2 = 17.966$, $p = 0.006$), depth of involvement ($\chi^2 = 40.518$, $p < 0.001$), central corneal involvement ($\chi^2 = 7.096$, $p = 0.029$) and final corneal clarity ($\chi^2 = 74.560$, $p < 0.001$). **Conclusion:** Corneal injuries in this cohort occurred predominantly in working-age men through occupational and domestic exposure. Early presentation, superficial involvement, sparing of the visual axis and preservation of corneal clarity were each associated with better visual recovery. Workplace eye protection, public awareness and prompt ophthalmic assessment offer the clearest opportunities to reduce preventable visual loss.

Keywords: Corneal injury; Ocular trauma; Corneal foreign body; Chemical eye burn; VIsual outcome; Occupational eye injury

INTRODUCTION

The cornea is the principal refracting surface of the eye, and its transparency and structural integrity are essential to clear vision. Its exposed anterior position makes it vulnerable to mechanical, chemical and penetrating trauma. Corneal injuries span a wide clinical range, from superficial epithelial abrasions and retained foreign bodies to stromal lacerations and full-thickness wounds. Even minor injuries may cause considerable pain and temporary incapacity, while deep or centrally located injuries can leave permanent scarring and lasting visual impairment.

Ocular trauma remains an important cause of avoidable visual morbidity worldwide, and hospital-based studies from India consistently show that it falls disproportionately on men of working age, reflecting occupational, recreational, domestic

and road-related exposures. In a large teaching-hospital series from northern India, men accounted for nearly three-quarters of cases and mechanical injuries for the majority of the burden, and the authors stressed the importance of prevention and timely treatment [1]. Population-based data from southern India likewise identified male sex and manual occupation as risk factors for ocular injury [2].

The clinical consequences of corneal trauma depend on the mechanism of injury, the depth and location of corneal involvement, the presence of infection, involvement of the visual axis and the presenting visual acuity. Studies of open-globe injury have repeatedly shown that presenting acuity and anatomical severity are among the strongest predictors of the final visual result [3-5].

Corneal foreign bodies form an important category of ocular trauma, particularly among workers exposed to metallic, agricultural or construction materials. Delay in removal may lead to persistent epithelial defects, secondary infection, stromal inflammation and scarring, whereas prompt removal of an uncomplicated superficial foreign body is usually followed by full recovery [6,7]. Chemical injury is a separate emergency in which the nature of the agent governs the pattern of damage: alkalis saponify membrane lipids and penetrate the cornea and anterior segment rapidly, whereas acids precipitate tissue proteins and tend to produce more superficial, self-limiting coagulative damage. Immediate copious irrigation and structured early management are decisive for the eventual outcome [8-10].

The occupational dimension is especially relevant in low- and middle-income settings, where protective eyewear is often unavailable or unused. An Indian series of occupational open-globe injuries found that 79.1% of those affected were young men and that 76.7% were not wearing the recommended eye protection at the time of injury [11], and a prospective study of occupational corneal foreign bodies reported a similar predominance of young male workers, with metalwork accounting for a large share of cases [12].

The final visual result after corneal injury is therefore shaped not only by treatment but by the initial severity and anatomical characteristics of the wound and by the interval between injury and ophthalmic assessment. The present study was undertaken to describe the clinical patterns of corneal injury, their management and their visual outcomes over 12 weeks of follow-up in patients attending a tertiary care hospital.

MATERIALS AND METHOD

Study design and setting

This was an observational, analytical, hospital-based study conducted in the Cornea Clinic of the Department of Ophthalmology at Government Thiruvarur Medical College and Hospital, with prior approval from the Institutional Ethics Committee (IEC NO: 21/IEC/GTMC/2025). Written informed consent was obtained from all participants, or from a parent or guardian/ assent form in the case of minors, after explanation of the study procedures. Patient confidentiality was maintained throughout. Patient enrolment was conducted from January 2025 to February 2026. The enrolled patients were followed up for 12 weeks, with the last 12-week follow-up visit completed in May 2026. A total of 133 eligible patients were included in the study.

Participants

All eligible patients during enrollment period of either sex or any age presenting with a primary corneal injury mechanical, accidental, occupational, road traffic, assault-related or other traumatic were eligible. Patients were excluded if they had a pre-existing corneal opacity, ocular trauma without corneal involvement, previous corneal surgery, previous posterior segment involvement, corneal degeneration or corneal dystrophy. One hundred and thirty-three patients fulfilling these criteria were enrolled.

Central corneal involvement was defined as involvement of the central 4 mm diameter zone of the cornea and was recorded separately. Chemical injuries were graded according to the Roper-Hall classification based on the extent of corneal involvement, limbal ischemia and conjunctival involvement

Further investigations were performed as clinically indicated, including direct and indirect ophthalmoscopy, B-scan ultrasonography, orbital radiography and computed tomography of the orbit, together with routine laboratory

investigations where required. Treatment was determined by the nature and severity of the injury: medical management for superficial and suitable non-perforating injuries, and surgical intervention where operative repair was necessary.

Follow-up and outcome measures:
Patients were reviewed on postoperative days 1 and 3 and at weeks 1, 4, 8 and 12. Visual acuity and corneal status were assessed at every visit, and slit-lamp examination and fluorescein staining were repeated when clinically indicated. The primary outcome was visual status at 12 weeks, graded according to the World Health Organization (WHO) categories of visual impairment [13] as follows: normal or near-normal vision (6/6 to 6/18), low vision (worse than 6/18 to 3/60), and blindness (worse than 3/60 to no perception of light). The standard WHO visual-acuity boundary of 3/60 was used to distinguish low vision from blindness, and counting-fingers acuity was categorized according to the corresponding Snellen-equivalent visual acuity.

Statistical analysis

Data were entered and analysed in IBM SPSS Statistics version 23.0 (IBM Corp., Armonk, NY, USA). Categorical variables are presented as frequencies and percentages and continuous variables as mean and standard deviation. Associations between categorical variables and visual outcome at 12 weeks were examined with the Pearson chi-square test. A two-sided p value below 0.05 was considered statistically significant and below 0.01 highly significant.

RESULTS

Demographic characteristics

One hundred and thirty-three patients with corneal injuries were analysed. All 133 were assessed at each scheduled visit through to 12 weeks with no loss to follow up. The mean age was 41± 2.7 years (range 3–91). The 21–30-year group was the largest single band (25 patients; 18.8%), and 60.2% of the cohort was aged between 21 and 70 years. Eighty-five patients (63.9%) were men and 48 (36.1%) women. Most patients presented promptly: 115 (86.5%) attended within 24 hours of injury, 12 (9.0%) between 24 and 48 hours and 6 (4.5%) after 48 hours (Table 1).

Table 1. Demographic characteristics and time to presentation (n = 133)

Variable	n	%
Age group		
≤ 10 years	11	8.3
11–20 years	15	11.3
21–30 years	25	18.8
31–40 years	20	15.0
41–50 years	15	11.3
51–60 years	15	11.3
61–70 years	18	13.5
71–80 years	8	6.0
> 80 years	6	4.5
Sex		
Male	85	63.9
Female	48	36.1
Time to presentation		
Within 24 h	115	86.5
24–48 h	12	9.0
> 48 h	6	4.5

Table 2. Occupation and source of injury (n = 133)

Variable	n	%
Occupation		
Worker	61	45.9
Homemaker	27	20.3
Student	26	19.5
Farmer	19	14.3
Source of injury		
Industry	46	34.6
Domestic	39	29.3
Sports	20	15.0
Agriculture	19	14.3
Assault	3	2.3
Construction	3	2.3
Road traffic accident	3	2.3

Percentages recalculated from the counts; the submitted table gave industry as 34.5% and sports as 15.1%.

Mechanism and anatomical characteristics

External corneal foreign body was the commonest mechanism (58; 43.6%), followed by blunt injury (32; 24.1%), penetrating injury (23; 17.3%) and chemical injury (20; 15.0%). Among the chemical injuries, 15 (75.0%) were caused by alkali and 5 (25.0%) by acid. The left and right eyes were affected almost equally (67; 50.4% and 66; 49.6%). Injury was confined to the epithelium in 74 patients (55.6%), involved the anterior stroma in 20 (15.0%) and the mid stroma in 14 (10.5%), and was full thickness in 25 (18.8%). The central cornea was involved in 71 patients (53.4%) (Table 3).

Table 3. Mechanism and anatomical characteristics of corneal injury (n = 133)

Variable	n	%
Mechanism of injury		
External foreign body	58	43.6
Blunt injury	32	24.1
Penetrating injury	23	17.3
Chemical injury	20	15.0
Chemical injury subtype (n = 20)		
Alkali	15	75.0
Acid	5	25.0
Eye involved		
Left	67	50.4
Right	66	49.6
Depth of corneal involvement		
Epithelium	74	55.6
Anterior stroma	20	15.0
Mid stroma	14	10.5
Full thickness	25	18.8
Central cornea involved		

Variable	n	%
Yes	71	53.4
No	62	46.6

Percentages for chemical injury subtype use the 20 chemical injuries as denominator; all others use the full cohort.

Management and final corneal status

One hundred and ten patients (82.7%) were managed medically and 23 (17.3%) surgically. At 12 weeks the cornea was clear in 80 patients (60.2%), while nebular, macular and leucomatous opacities were present in 27 (20.3%), 22 (16.5%) and 4 (3.0%) respectively (Table 4).

Table 4. Management and corneal status at 12 weeks (n = 133)

Variable	n	%
Management		
Medical	110	82.7
Surgical	23	17.3
Corneal status at 12 weeks		
Clear	80	60.2
Nebular opacity	27	20.3
Macular opacity	22	16.5
Leucomatous opacity	4	3.0

Visual recovery over 12 weeks

Visual status improved steadily throughout follow-up. The number of patients with normal vision rose from 52 (39.1%) on day 1 to 69 (51.9%) at 1 week, 89 (66.9%) at 8 weeks and 106 (79.7%) at 12 weeks, while those with low vision fell from 65 (48.9%) to 23 (17.3%) and those classified as blind from 16 (12.0%) to 4 (3.0%) (Table 5, Figure 1). The largest single gain occurred between 8 and 12 weeks, when a further 17 patients moved into the normal-vision category.

Table 5. Visual status at each follow-up visit (n = 133)

Follow-up visit	Normal vision, n (%)	Low vision, n (%)	Blindness, n (%)
Day 1	52 (39.1)	65 (48.9)	16 (12.0)
Day 3	62 (46.6)	58 (43.6)	13 (9.8)
Week 1	69 (51.9)	52 (39.1)	12 (9.0)
Week 4	81 (60.9)	41 (30.8)	11 (8.3)
Week 8	89 (66.9)	37 (27.8)	7 (5.3)
Week 12	106 (79.7)	23 (17.3)	4 (3.0)

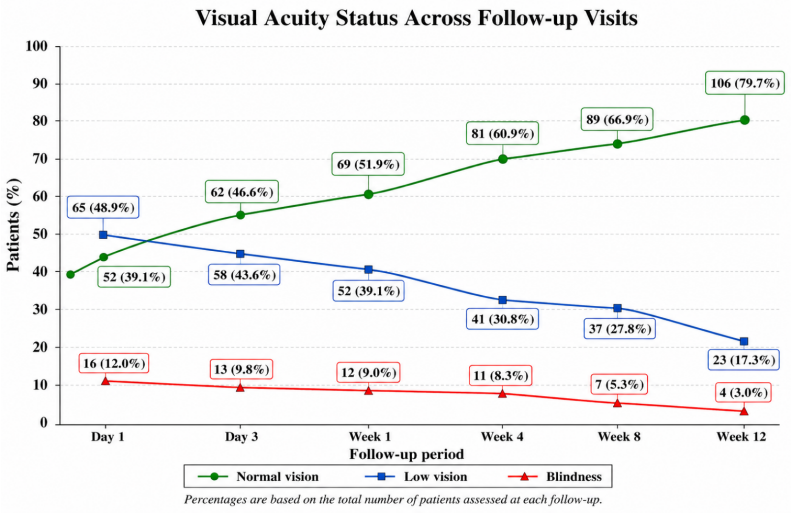

Figure 1. *Visual acuity status across follow-up visits (n = 133).*

Factors associated with visual outcome

All six variables examined were significantly associated with visual status at 12 weeks (Table 6). Among patients presenting within 24 hours, 102 of 115 (88.7%) achieved normal vision, compared with 4 of 12 (33.3%) presenting between 24 and 48 hours and none of the 6 presenting later ($\chi^2 = 47.784$, $p < 0.001$). By mechanism, normal vision was achieved by 18 of 20 patients with chemical injury (90.0%), 50 of 58 with foreign body (86.2%), 26 of 32 with blunt injury (81.3%) and 12 of 23 with penetrating injury (52.2%) ($\chi^2 = 17.966$, $p = 0.006$).

Table 6. Association between clinical characteristics and visual outcome at 12 weeks (n = 133)

Variable	Category	n	Normal vision n (%)	Low vision n (%)	Blindness n (%)	χ^2	p value
Time to presentation	Within 24 h	115	102 (88.7)	11 (9.6)	2 (1.7)	47.784	<0.001
	24–48 h	12	4 (33.3)	6 (50.0)	2 (16.7)		
	>48 h	6	0 (0.0)	4 (66.7)	2 (33.3)		
Mechanism of injury	External foreign body	58	50 (86.2)	7 (12.1)	1 (1.7)	17.966	0.006
	Blunt injury	32	26 (81.3)	5 (15.6)	1 (3.1)		
	Penetrating injury	23	12 (52.2)	8 (34.8)	3 (13.0)		
	Chemical injury	20	18 (90.0)	2 (10.0)	0 (0.0)		
Depth of corneal involvement	Epithelium	74	72 (97.3)	2 (2.7)	0 (0.0)	40.518	<0.001
	Anterior stroma	20	15 (75.0)	4 (20.0)	1 (5.0)		
	Mid stroma	14	7 (50.0)	5 (35.7)	2 (14.3)		
	Full thickness	25	12 (48.0)	12 (48.0)	1 (4.0)		
Central corneal involvement	Yes	71	51 (71.8)	17 (23.9)	3 (4.2)	7.096	0.029
	No	62	55 (88.7)	8 (12.9)	0 (0.0)		
Management	Medical	110	94 (85.5)	14 (12.7)	2 (1.8)	24.917	<0.001
	Surgical	23	12 (52.2)	11 (47.8)	0 (0.0)		
Corneal status at 12 weeks	Clear	80	79 (98.8)	1 (1.3)	0 (0.0)	74.560	<0.001
	Nebular opacity	27	21 (77.8)	5 (18.5)	1 (3.7)		
	Macular opacity	22	6 (27.3)	13 (59.1)	3 (13.6)		
	Leucomatous opacity	4	0 (0.0)	3 (75.0)	1 (25.0)		

p value <0.05 significant Chi square Test Used

Depth of involvement showed the expected gradient: normal vision was reached by 72 of 74 patients with epithelial injury (97.3%), 15 of 20 with anterior stromal injury (75.0%), 7 of 14 with mid-stromal injury (50.0%) and 12 of 25 with full-thickness injury (48.0%) ($\chi^2 = 40.518$, $p < 0.001$). Sparing of the visual axis was also advantageous: 55 of 62 patients without central involvement (88.7%) achieved normal vision, against 51 of 71 with central involvement (71.8%) ($\chi^2 = 7.096$, $p = 0.029$). Final corneal clarity showed the strongest association of all: normal vision was recorded in 79 of 80 eyes that remained clear (98.8%), 21 of 27 with nebular opacity (77.8%), 6 of 22 with macular opacity (27.3%) and none of the 4 with leucomatous opacity ($\chi^2 = 74.560$, $p < 0.001$). Management category was likewise significantly associated with outcome ($\chi^2 = 24.917$, $p < 0.001$).

DISCUSSION

This study evaluated 133 patients presenting with corneal injury to a tertiary care hospital. Corneal trauma affected predominantly men of economically productive age, arose largely from occupational and domestic exposure, and carried a good overall prognosis: four in five patients had normal vision at 12 weeks. Early presentation, superficial involvement, sparing of the central cornea and preservation of corneal clarity were each associated with better recovery.

The mean age of 41 years, the peak in the 21–30-year band and the male predominance of 63.9% accord with the established epidemiology of ocular trauma. The Andhra Pradesh Eye Disease Study reported higher odds of ocular injury among men and manual labourers [2], northern Indian hospital data show a comparable male excess [1], and the International Globe and Adnexal Trauma Epidemiology Study has documented a substantial male predominance in open-globe injury [5]. The explanation is largely one of exposure rather than susceptibility: men in this setting undertake most industrial, agricultural and construction work.

The occupational contribution was prominent, with workers accounting for 45.9% of patients and industrial exposure for 34.6% of injuries. This matters because such injuries are among the most preventable in ophthalmology. An Indian series of occupational open-globe injuries found that 76.7% of patients were not using recommended eye protection at the time of injury [11], and a prospective study of occupational corneal foreign bodies described a similar profile of young male workers injured during metalwork [12]. A cluster-randomised trial among stone-quarry workers in Tamil Nadu showed that an enhanced education package delivered over six months improved compliance with protective eyewear more than a single session [14], indicating that sustained intervention, rather than one-off instruction, is what changes behaviour.

External foreign body was the commonest mechanism, at 43.6%. Superficial corneal foreign bodies are among the most frequent presentations in emergency ophthalmic practice and, when removed promptly, are generally followed by complete recovery; retained or deeper foreign bodies risk infection, stromal scarring and lasting visual loss [6,7]. The excellent outcome in this subgroup 86.2% achieving normal vision is consistent with early presentation and prompt removal in a cohort of whom 86.5% attended within 24 hours.

Chemical injuries formed 15.0% of the cohort, three-quarters of them alkali. Unexpectedly, this group had the highest proportion of good outcomes of any mechanism (90.0%). Alkali injury is generally regarded as the more destructive pattern because saponification of membrane lipids permits rapid penetration into the stroma and anterior segment, with limbal stem-cell loss in severe cases [8]. The favourable results here most plausibly indicate that the chemical injuries encountered were predominantly of low grade, and that prompt irrigation and early presentation limited tissue damage; a systematic review supports immediate irrigation as the single most important intervention after ocular chemical exposure [10], and structured early management protocols improve outcomes further [9]. Because injury severity was not graded by an established system such as the Roper-Hall or Dua classification, this interpretation cannot be confirmed from the present data, and the finding should not be read as evidence that alkali injury carries a benign prognosis in general.

Depth of involvement showed a clear gradient, from 97.3% good outcomes in epithelial injury to 48.0% in full-thickness injury. This is biologically expected: the corneal epithelium regenerates rapidly and without scarring, whereas injuries breaching Bowman layer and the stroma heal by fibrosis, with permanent loss of transparency where the repair lies within the visual axis. Studies of open-globe injury have similarly identified anatomical severity as a principal determinant of final acuity [3,5]. The same reasoning explains the effect of central corneal involvement, where good outcomes fell from

88.7% to 71.8%: because the cornea provides roughly two-thirds of the refractive power of the eye, even a modest scar overlying the pupil degrades acuity through both opacity and irregular astigmatism, while an identical scar peripherally may be visually silent.

The association between early presentation and recovery was the most striking finding, with 88.7% of those attending within 24 hours achieving normal vision against none of those presenting after 48 hours. This association must be interpreted cautiously. The observational design cannot establish causation, and delay is likely to be confounded by injury severity and by distance from services in both directions patients with trivial injuries may delay because symptoms are mild, while those with severe injuries may present late from remote areas. Nonetheless, the direction of effect is consistent with clinical principle: early assessment permits prompt foreign-body removal, timely treatment of epithelial defects and chemical exposure, and early surgical repair where indicated, each of which reduces the risk of infection and scarring.

Visual recovery continued throughout the follow-up period, with normal vision rising from 39.1% on day 1 to 79.7% at 12 weeks and blindness falling from 12.0% to 3.0%. Much of the early gain reflects resolution of epithelial defects, oedema and inflammation rather than structural repair, while later improvement reflects corneal remodelling and clearing of superficial opacity. That gains were still accruing between 8 and 12 weeks suggests that follow-up beyond 12 weeks would capture further recovery in some patients, and that the outcomes reported here may be a conservative estimate of the eventual result.

Final corneal clarity was the variable most strongly associated with vision, with 98.8% of clear corneas but no eye with leucomatous opacity achieving normal vision. This is close to a tautology in mechanistic terms corneal transparency is the proximate determinant of corneal vision but it usefully quantifies the clinical stakes of preventing deep stromal damage. Patients left with visually significant central opacity form the group in whom optical or surgical rehabilitation, including rigid contact lens correction or keratoplasty, should be considered.

Taken together, the findings carry a consistent preventive message. The predominance of occupational and foreign-body injuries, the concentration of cases among working-age men and the strong prognostic value of early presentation indicate that a substantial share of the visual morbidity observed here was avoidable through protective eyewear, workplace safety enforcement, public education about first aid and irrigation after chemical exposure, and accessible emergency ophthalmic care [11,12,14].

Limitations

This was a single-centre hospital-based study, and its findings reflect the case mix of a tertiary referral service rather than the community burden of corneal trauma; injuries managed at primary facilities or never presented are not represented. The sample of 133 was one of convenience, without a formal size calculation, and subgroups such as leucomatous opacity (n = 4) and late presentation (n = 6) were too small to support firm inference. Follow-up ended at 12 weeks, by which time recovery was still improving, and no formal assessment of loss to follow-up is reported. Analysis was limited to unadjusted chi-square tests, so the associations described are not adjusted for confounding in particular, mechanism, depth of injury and delay in presentation are interrelated, and a multivariable model would be required to establish which of them carries independent prognostic weight. Chemical injuries were not graded by a standard severity classification, and refractive outcome, astigmatism and contrast sensitivity were not measured, so functional recovery may not be fully captured by Snellen acuity alone.

Conclusion

Corneal injury is an important and largely preventable cause of visual morbidity. In this cohort it affected chiefly working-age men, arising most often from occupational and domestic exposure, with external foreign body the commonest mechanism and epithelial involvement the commonest anatomical pattern. Most patients presented within 24 hours and were managed medically, and visual recovery improved progressively to reach normal vision in 79.7% at 12 weeks. Early presentation, superficial involvement, an uninvolved visual axis and preservation of corneal clarity were each associated with better outcomes. Protective eyewear in occupational settings, safety education, public awareness of immediate

irrigation after chemical exposure and prompt ophthalmic assessment after injury remain the most effective means of reducing avoidable corneal blindness.

Ethical approval

Approval was obtained from the Institutional Ethics Committee before commencement of the study (REF NO: IEC NO: 21/IEC/GTMC/2025).

Informed consent

Written informed consent was obtained from all study participants.

Authors' contributions

All authors contributed to the conception of the study, data collection, analysis and interpretation, and the preparation and review of the manuscript. All authors approved the final version.

Body Section

Start writing here...

Occupation and source of injury

Manual workers formed the largest occupational group (61; 45.9%), followed by homemakers (27; 20.3%), students (26; 19.5%) and farmers (19; 14.3%). Industrial exposure was the commonest source of injury (46; 34.6%), followed by domestic injury (39; 29.3%), sports (20; 15.0%) and agriculture (19; 14.3%); assault, construction and road traffic accidents accounted for 3 patients (2.3%) each (Table 2). Occupational and domestic settings together accounted for approximately two-thirds of all injuries.

Funding

No external funding was received for this study.

Conflicts of Interest

The authors declare that there is no conflict of interest.

References

1. Maurya RP, Srivastav T, Singh VP, Mishra CP, Al-Mujaini AS. The epidemiology of ocular trauma in Northern India: a teaching hospital study. Oman J Ophthalmol. 2019;12(2):78-83.
2. Dandona L, Dandona R, Srinivas M, John RK, McCarty CA, Rao GN. Ocular trauma in an urban population in southern India: the Andhra Pradesh Eye Disease Study. Clin Exp Ophthalmol. 2000;28(5):350-6.
3. Tan SI, Hoskin AK, Khatri A, Dave VP, Bhalerao S, Romero J, et al. Prognostic factors of open-globe injuries: a review. Indian J Ophthalmol. 2023;71(12):3587-94.
4. Zhou Y, DiSclafani M, Jeang L, Shah AA. Open globe injuries: review of evaluation, management, and surgical pearls. Clin Ophthalmol. 2022;16:2545-59.
5. Toh ZH, Agrawal S, Raje D, Hoskin AK, Agrawal R, Khandelwal R. International Globe and Adnexal Trauma Epidemiology Study (IGATES): a report from Central India on visual outcome in open globe injuries and correlation with ocular trauma score. Int Ophthalmol. 2020;40(11):2797-806.
6. Camodeca AJ, Anderson EP. Corneal foreign body. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2026 Sep 1].
7. Siedlecki J, Zajac-Pytrus H, Kociecki J, Wroblewska A, Szaflik JP, Szaflik J. Foreign body traumas of the eye managed in an emergency department of a single institution. Klin Monbl Augenheilkd. 2012;229(5):465-9.
8. Dua HS, Ting DSJ, Al Saadi A, Said DG. Chemical eye injury: pathophysiology, assessment and management. Eye (Lond). 2020;34(11):2001-19.
9. Iyer G, Srinivasan B, Agarwal S. Algorithmic approach to management of acute ocular chemical injuries — I's and E's of management. Ocul Surf. 2019;17(2):179-85.

10. Chau JPC, Lee DTF, Lo SHS. A systematic review of methods of eye irrigation for adults and children with ocular chemical burns. Worldviews Evid Based Nurs. 2012;9(3):129-38.

11. Vasu U, Vasnaik A, Battu RR, Kurian M, George S. Occupational open globe injuries. Indian J Ophthalmol. 2001;49(1):43-7.

12. Agrawal C, Girgis S, Sethi A, Sethi V, Konale M, Lokwani P, et al. Etiological causes and epidemiological characteristics of patients with occupational corneal foreign bodies: a prospective study in a hospital-based setting in India. Indian J Ophthalmol. 2020;68(1):54-7.

13. World Health Organization. International statistical classification of diseases and related health problems, 10th revision (ICD-10): categories of visual impairment. Geneva: WHO; 2016.

14. Marmamula S, Keeffe JE, Raman U, Rao GN. Increasing compliance with protective eyewear to reduce ocular injuries in stone-quarry workers in Tamil Nadu, India: a pragmatic, cluster randomised trial of a single education session versus an enhanced education package delivered over six months. Inj Prev. 2013;19(5):314-19.

15. Soleimani M, Naderan M. Management strategies of ocular chemical burns: current perspectives. Clin Ophthalmol. 2020;14:2687-99.

16. Singh P, Tyagi M, Kumar Y, Gupta KK, Sharma PD. Ocular chemical injuries and their management. Oman J Ophthalmol. 2013;6(2):83-6.