

CLINICAL PROFILE OF OCULAR FOREIGN BODY INJURIES AND AWARENESS OF PROTECTIVE EYEWEAR AMONG INDUSTRIAL WORKERS: A CROSS-SECTIONAL STUDY

Ophthalmology

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ABSTRACT

Background: Ocular trauma is a significant cause of preventable visual morbidity worldwide. Occupational activities such as welding, grinding, and hammering expose workers to high-velocity foreign bodies that may result in superficial or intraocular injuries. The use of protective eyewear is known to significantly reduce such injuries; however, compliance remains poor in many developing countries. **Aim:** To evaluate the clinical profile of ocular foreign body injuries and assess awareness and utilization of protective eyewear among industrial workers. **Methods:** A hospital-based cross-sectional study was conducted among 150 industrial workers presenting with ocular foreign body injuries at a tertiary eye care center between April 2025 and April 2026. Demographic details, occupational exposure, type of foreign body, location of injury, and use of protective eyewear were recorded. Slit-lamp examination and dilated fundus examination were performed. **Results:** Among 150 patients, the majority were males (92.7%) with a mean age of 32.4 ± 10.6 years. Metallic foreign bodies were the most common type (63.3%), followed by vegetative material (21.3%) and dust particles (15.4%). Superficial corneal foreign bodies accounted for 78% of cases, while intraocular foreign bodies accounted for 6%. Only 34.7% of workers reported consistent use of protective eyewear. **Conclusion:** Ocular foreign body injuries remain a common occupational hazard among industrial workers. Lack of awareness and poor compliance with protective eyewear significantly contribute to preventable ocular trauma.

KEYWORDS

INTRODUCTION

Ocular trauma is a major cause of preventable visual impairment worldwide and contributes significantly to monocular blindness and visual disability among working-age individuals [1]. Millions of ocular injuries occur each year, many of which are related to occupational hazards.

Industrial and agricultural occupations expose workers to high-velocity particles, ultraviolet radiation, chemicals, and mechanical trauma, making them particularly susceptible to ocular injuries [2]. Activities such as welding, hammering, grinding, and construction work frequently generate metallic particles that can lead to superficial corneal foreign bodies or penetrating ocular injuries.

Several studies have demonstrated that occupational eye injuries predominantly affect young male workers engaged in manual labor [3]. Corneal foreign bodies are among the most common ocular emergencies encountered in ophthalmology outpatient departments.

A cross-sectional study among welders reported a **62% prevalence of ocular trauma**, with metal chips being the most common causative agent [4]. Similar findings have been reported in industrial settings where workers are frequently exposed to flying particles during welding and grinding activities.

Despite the availability of protective equipment, compliance with protective eyewear remains low in many occupational settings. Poor safety awareness, inadequate training, and absence of workplace enforcement contribute significantly to the occurrence of preventable ocular injuries [4].

Studies have shown that ocular foreign body exposure can occur in up to **38% of industrial workers**, with welders being the most affected group [5]. Superficial foreign bodies remain the most common form of occupational ocular injury, accounting for more than half of work-related eye injuries in certain industries [6].

Given the preventable nature of these injuries, evaluating the clinical profile of ocular foreign body injuries and assessing awareness regarding protective eyewear are essential for developing effective occupational safety strategies.

Materials and Methods

Study Design: Hospital-based cross-sectional observational study.

Study Duration: April 2025 – April 2026.

Study Population: Industrial workers presenting with ocular foreign body injuries.

Sample Size: 150 patients.

Inclusion Criteria

- Age ≥ 18 years
- Occupational ocular foreign body injury
- Willingness to participate in the study

Exclusion Criteria

- Chemical injuries
- Pre-existing ocular disease unrelated to trauma

Clinical Examination

All patients underwent:

- Visual acuity assessment
- Slit-lamp examination
- Fluorescein staining
- Fundus examination

Data Collection

Information recorded included:

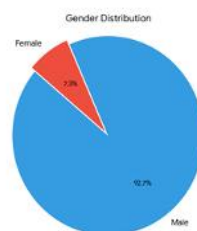
- Age and gender
- Occupation
- Type of foreign body
- Location of injury
- Use of protective eyewear

RESULTS

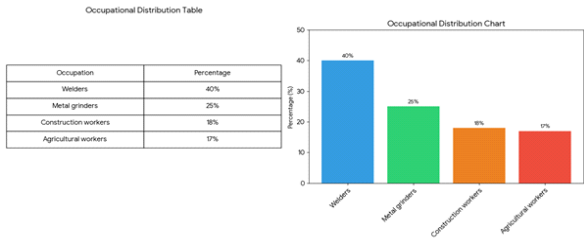
1) Demographic Profile

Demographic Profile Table

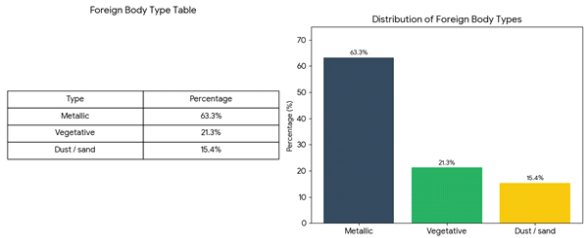
Variable	Value
Male	92.7%
Female	7.3%
Mean age	32.4 ± 10.6 years



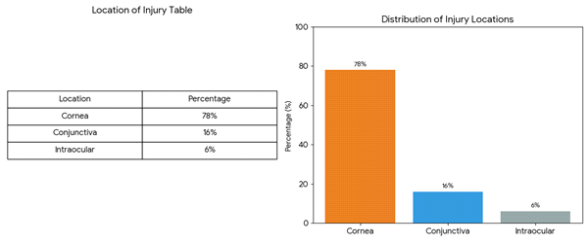
2) Occupational Distribution



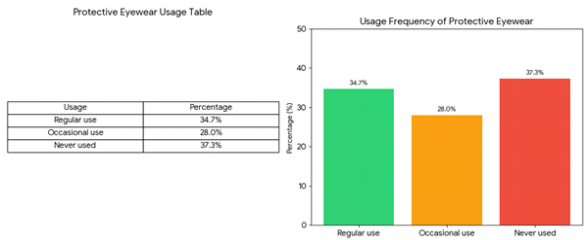
3) Type of Foreign Body



4) Location of Injury



5) Protective Eyewear Usage



DISCUSSION:

The present study demonstrates that occupational ocular trauma predominantly affects young male workers engaged in industrial activities such as welding, grinding, and construction work. This demographic pattern has been consistently reported in previous epidemiological studies of occupational eye injuries [3].

Metallic foreign bodies were the most common cause of ocular injury in our study. This finding is consistent with earlier reports that high-velocity metal particles generated during welding and grinding are the leading cause of occupational ocular trauma [4].

Superficial corneal foreign bodies constituted the majority of injuries in the present study. Similar findings have been reported among quarry workers and industrial laborers where superficial foreign bodies accounted for more than half of ocular injuries [6].

A substantial proportion of workers in our study did not regularly use protective eyewear. Previous studies have shown that although many workers report using personal protective equipment, a large number rely on non-certified sunglasses rather than appropriate protective goggles [4].

Inadequate workplace safety enforcement and lack of occupational health education have been identified as major barriers to protective eyewear use. Studies have shown that workers without safety training are significantly more likely to experience ocular trauma [4].

The protective effect of certified safety goggles has been emphasized in several studies, which suggest that the majority of occupational eye injuries are preventable through appropriate protective eyewear and workplace safety regulations [7].

Furthermore, research among agricultural workers has demonstrated that the use of safety eyewear can significantly reduce the incidence of ocular injuries and improve visual comfort during hazardous tasks [8]. Our findings highlight the need for improved occupational safety measures, including mandatory use of protective eyewear, regular safety training programs, and stricter workplace regulations.

CONCLUSION

Occupational ocular foreign body injuries remain a significant public health concern among industrial workers. Metallic foreign bodies and superficial corneal injuries were the most common findings in the present study.

Poor compliance with protective eyewear remains a major contributing factor to these injuries. Strengthening workplace safety policies, increasing awareness regarding ocular protection, and ensuring access to certified protective equipment are essential measures for preventing avoidable ocular trauma.

REFERENCES

1. Kuhn F, Morris R, Witherspoon CD. Epidemiology of ocular trauma. *Ophthalmol Clin North Am.* 2002.
2. World Health Organization. Global data on visual impairment. WHO Report.
3. Koli S, Shinde C, Shirwadkar S. Clinical profile and visual outcome of work-related traumatic eye injuries. *J Popul Ther Clin Pharmacol.* 2024.
4. Thakali S, Shrestha M, Gauchan A, et al. Prevalence of ocular trauma and barriers to use of personal protective devices among welders in Nepal. *PLoS One.* 2025.
5. Ulutaş HG, Özdemir L, Hamidi NA, et al. Investigation of the prevalence of foreign body exposure to the eyes and the use of protective equipment in industrial workers. *Int J Health Serv Res Policy.* 2024.
6. Olatunji FO, et al. Ocular disorders and compliance with protective eyewear among quarry workers. *World J Adv Res Rev.* 2024.
7. Sinha S, Nishant P, Morya AK, Bejjanki P. The untapped potential of protective eyewear for primary prevention of ocular trauma. *Indian J Ophthalmol.* 2023.
8. Patel P, et al. Occupational hazards and ocular morbidities among agricultural workers in India. *Indian J Occup Environ Med.* 2024.
9. Glynn RJ, et al. Epidemiology of eye injuries in occupational settings. *Am J Public Health.*
10. Négrel AD, Thylefors B. The global impact of eye injuries. *Ophthalmic Epidemiol.*
11. Wong TY, Klein BE. Ocular trauma and visual outcomes. *Surv Ophthalmol.*
12. International Labour Organization. Occupational safety and health in hazardous work environments.