

## OCULAR SURFACE FOREIGN BODIES: THEIR INCIDENCE, CLINICAL CHARACTERISTICS AND DEMOGRAPHIC PATTERNS

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### ABSTRACT

**Background:** Ocular surface foreign body (OSFB) is the most common and preventable eye injury. It is the leading cause of ocular morbidity and utilization of ophthalmic services.

**Objective:** To study the incidence and demographic patterns of ocular surface foreign bodies (OSFB) and their correlation with location in eye and preventive measures taken to avoid them.

**Methods:** This is retrospective cross-sectional study conducted at Eye Department, DHQ Teaching Hospital, Gujranwala from 1<sup>st</sup> January 2020 to 31<sup>st</sup> December 2020 (12 months). After obtaining informed consent and IRB approval, demographic data of patients presenting with OSFB was collected. Type, location and laterality of OSFB were also noted, foreign bodies were removed with 27-gauge hypodermic needle. Patients were inquired about use of protective equipment. Data was saved on excel sheets and analyzed on SPSS v. 25.0.

**Results:** Three hundred and twenty-nine patients were included in study out of which 294 (89.3%) were males and 35 (10.7%) females. OSFB were present in right eyes in 149 (45.3%), left in 170 (51.6%) and bilateral in 10 (3.1%) patients. Corneal foreign bodies were present in 220 (66.9%) patients, upper tarsal foreign bodies in 64 (19.4%) followed by scleral, lower forniceal, medial canthal and lower lid foreign bodies collectively present in 24 (7.4%) patients. Metallic OSFB were found in 252 (76.6%), dust particles in 36 (10.9%) and “miscellaneous” (stones, paint particles, glass pieces and lashes) in 16 (4.9%) individuals. Only 48 (14.5%) people used protective measures at their workplace.

**Conclusion:** Ocular surface foreign bodies are more common in males and most commonly involve superficial cornea. Most of the times, they are metallic particles in origin and people scarcely use any protective equipment. With proper awareness, their incidence can be reduced significantly.

**Key Words:** Ocular Surface Foreign Bodies, Ocular Injuries, Ophthalmic Emergency

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### INTRODUCTION

Ocular surface foreign body (OSFB) is the most common and preventable eye injury.<sup>1</sup> It is the leading cause of ocular morbidity and utilization of ophthalmic services.<sup>2</sup>

According to World Health Organization, annual incidence of ocular trauma is approximately 55 million out of which ocular injuries account for 5% to 16%. Approximately 1.6 million go blind from ocular injuries, additionally about 2.3 million people present with bilateral low vision and almost 19 million with unilateral low vision resulting from ocular trauma.<sup>3</sup>

Ocular surface foreign bodies cause extreme discomfort and if not appropriately managed may lead to permanent visual loss.<sup>4</sup> Ocular surface foreign bodies are encountered at working places, playing or sports areas,

road traffic accidents, assaults or even at domestic works.<sup>5</sup>

Ocular surface foreign bodies range from eye lashes, dust particles, sand particles, metal particles, insect wings, paint particles.<sup>6</sup> It gives redness, watering, foreign body sensation and pain in eye.<sup>7</sup> Ocular surface foreign bodies are graded as mild according to ocular trauma classification based on the severity of injury.<sup>8</sup> Ocular surface foreign bodies, if not timely managed can lead to conjunctivitis, Keratitis, corneal ulceration and even perforation.<sup>9</sup> Iron foreign bodies lead to rust ring formation.<sup>10</sup> Due to worldwide modernization and use of high-speed machinery, incidence of such injuries is very high even with use of safety measures.<sup>11</sup> The injuries represent the most common preventable cause of monocular blindness.<sup>12</sup>

Identification of the type of foreign bodies and their location of impaction in eye will help in creating awareness and use of appropriate eye protective devices.<sup>13</sup>

The objective was to study the incidence and demographic patterns of ocular surface foreign bodies (OSFB) and their correlation with location in eye and preventive measures taken to avoid them.

## METHODS

It was a hospital based retrospective cross-sectional study done at Ophthalmology department, District Headquarters Hospital, Gujranwala for one year from 1<sup>st</sup> January 2020 to 31<sup>st</sup> December 2020. Approval from hospital ethical review board was taken. Verbal consent from all the patients was also taken. All the patients presented in Ophthalmology emergency were enrolled in the study. Demographic data like age, gender, nature of trauma, occupation and the activity at time of injury were recorded. All patients were examined on slit lamp in detail. Patients were instilled topical anesthetic drops 0.5 % proparacaine hydrochloride. Foreign bodies were removed using 27-gauge needle. Topical antibiotics drops were advised for 5 days. Type of foreign body and the site was noted. Laterality was also checked. All eyes were stained with fluorescein strip to confirm the site and associated epithelial defects. Patients were asked about their occupation and availability as well as the usage of protective eye wear (PEW) was also investigated. Patients were counselled about the importance of PEW. Statistical analysis was done using statistical program for social sciences (SPSS) version 25.

## RESULTS

A total of 329 patients were included in this study, out of which 294 (89.3%) were males and 35 (10.7%) were females. (Table 1) OSFB were found to be present in

right eyes of 149 (45.3%), in left eyes of 170 (51.6%) and bilateral in 10 (3.1%) patients. (Table 2)

Table 1: Frequency Distribution of Gender of Patients with OSFB

Gender	Number (n)	Percentage (%)
Male	294	89.3
Female	35	10.7
Total	329	100.0

Single OSFB was present in 241 (73.2%) patients while 88 (26.8%) patients had multiple OSFB. It was also noted that 203 (61.7%) patients presented in hot weather (April to October) while only 120 (38.3%) patients presented in cold months (November to March).

Table 2: Frequency Distribution of Laterality of OSFB

Laterality	Number (n)	Percentage (%)
Left	170	51.6
Right	149	45.3
Bilateral	10	3.1
Total	329	100.0

Location of OSFB also differed vastly with calculated corneal foreign bodies being most common in 220 (66.9%) patients, followed by upper tarsal foreign bodies in 64 (19.4%). Calculated scleral, lower forniceal, medial canthal and lower lid foreign bodies (collectively labeled as “miscellaneous”) were present in 24 (7.4%) patients. (Table 3)

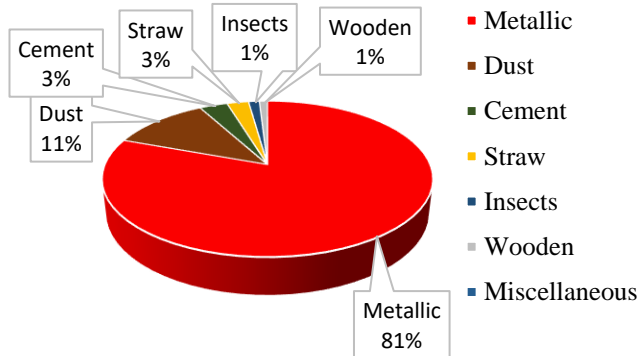
Table 3: Sites of Calculated OSFB

Site of FB	Number (n)	Percentage (%)
Corneal	220	66.4
Upper Tarsus	64	19.4
Limbus	12	3.6
Conjunctiva	9	2.7
Miscellaneous	24	7.4
Total	329	100.0

Different types of OSFB ranged from most common variety such as metallic in 252 (76.6%) to dust particles in 36 (10.9%) and “miscellaneous” (stones, paint particles, glass pieces and lashes) in 16 (4.9%) individuals. (Figure 1) Only 48 (14.5%) patients used any kind of protective equipment like glasses, shields etc. while rest of 281 (85.5%) did not use any kind of protective eye wear.

Figure 1: Types of Calculated OSFB

Types of Foreign Bodies



## DISCUSSION

Ocular foreign bodies are the most common cause of ocular discomfort and subsequent presentation to seek medical advice.<sup>14</sup> They can be either superficial or deep (intra-ocular) with the latter being more dangerous as intraocular foreign bodies (IOFB) can cause immediate (e.g., infection, cataract, retinal detachment) as well as late (chalcosis, siderosis, sympathetic ophthalmia) complications.<sup>15</sup> Ocular surface foreign bodies, although more common, have less risk of long term complications as compared to IOFB if properly and promptly managed.<sup>16</sup>

Our study showed the total annual presentation of 329 patients with OSFB. There was a male predominance with male to female ratio being almost 9:1. Fei Sun et al. also gave similar higher incidence in males.<sup>13</sup> Increased male incidence is due to exposure of men to outdoor activities like sports, traffic accidents, heavy work, alteration and alcohol intake.<sup>17</sup> Fei Sun et al. also reported the higher incidence of OSFB in summer season (July-August). Our study supported this speculation as 61.7% of our study population presented in hot weather (April to October) reason being increased outdoor exposure with long working hours and climatic changes with tendency for strong winds.

Our study showed a unique prospective about laterality of OSFB. Left sided foreign bodies were present in 51.6%, right sided in 45.3% and bilateral in 3.1%. Bahoo et al. reported a very similar pattern as left sided in 50%, right in 48% and bilateral in 2%.<sup>18</sup>

Corneal foreign bodies made the bulk of OSFB in our study in 220 (66.4%) patients. Most of authors documented this. Bahoo et al. in his another publication wrote incidence of corneal foreign bodies as high as 40.2 % in his study.<sup>19</sup> He also reported upper tarsal foreign bodies at 27.9 % as second most common location same as in our study.

Metallic OSFB were most common type of foreign body in our study in 76.6% patients followed by dust particles

in 10.9% patients. Bahoo et al also wrote metallic particles as most common type of OSFB in 27.1% patients.<sup>19</sup> Dass et al. also documented metallic foreign bodies in 34.8% of his study population as leading causes of OSFB.<sup>6</sup>

Only 14.5% individuals used protective eye wear in our study exactly same as Fei Sun et al. (14.7%).<sup>13</sup> Bahoo et al. reported use of protective eye wear in 9.3% while Jahangir T el al. documented that a large number of such injuries could be well prevented by use of such protective measures including glasses, helmets and eye shields etc.<sup>20</sup> The main limitation of this study is single center study with a small sample size. We recommend a multicentric study with larger sample size. We did not consider the profession and circumstances of injuries and also it is not population-based study and hence does not truly represent the incidence and prevalence of OSFB in our population.

## CONCLUSION

Ocular surface foreign bodies are more common in male population especially in working group and most commonly involve superficial cornea. Most of the times, they are metallic particles in origin and people hardly use any protective equipment. Owing to the nature and types of these foreign bodies, their incidence can be reduced significantly with proper awareness strategies particularly emphasizing on use of protective measures like helmets while driving, protective goggles at workplace and strong supervision of children while playing especially outdoor.

## CONFLICT OF INTERESTS

Authors declared no conflict of interests.

## FUNDING

No funding was acquired for this study.

## ETHICAL REVIEW BOARD APPROVAL

The study was approved by the Institutional Review Board/ Ethical Review Committee of Gujranwala Medical College/ DHQ Teaching Hospital, Gujranwala.

## REFERENCES

1. Subba Reddy P, Nirmala K, Radhika S, Ravi S, Paul C. Incidence of ocular surface foreign body and its correlation with specific occupation and preventive measures. *Global journal for research analyses.* 2016;5(12):56-58.
2. 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 journal of ophthalmology.* 2020 Jan;68(1):54.

3. Prakash Kumar D, Kumar S, Joshi NK. An Investigation to Assess the Prevalence of Ocular Trauma in the Rural Population of Bihar Rohtas District. *European Journal of Molecular & Clinical Medicine (EJMCM)*.;8(04):2021.
4. Guerra Garcia RA, Garcia DP, Martinez FE, Columbie Garbey YE, Martinez PR. The Cuban ocular trauma registry. *J Clin Exp Ophthalmol* 2013; 4 (2): 276
5. Milanez M, Saraiva PGC, Barcellos NN, Saraiva FP. Epidemiological and occupational profile of eye trauma at a referral centre in Espírito Santo, Brazil. *Rev Bras Oftalmol*. 2017; 76 (1): 7-10.
6. Dass RI, Gohel DJ. Ocular surface foreign body: Its incidence and correlation with specific occupations. *GCSMC J Med Sci*. 2012; 2:42-45.
7. Camodeca AJ, Anderson EP. Corneal foreign body. *StatPearls* [Internet]. 2021 Apr 26.
8. MD Guidelines (homepage on the internet) Reed Group, Medical Disability Advisors.
  1. c1991-2013
9. Rosli AH, Abdurrahman MY, Kamal KM. Deeply Embedded Corneal Foreign Bodies with Fungal Keratitis Secondary to Rambutan Fruit Fall. *Cureus*. 2022 Feb 20;14(2).
10. Wilson MM, Mathan JJ. Corneal foreign body and rust ring removal in a remote setting: further tips and tricks when support is afar. *Emergency and Critical Care Medicine*. 2022 Jan 28.
11. Özlem, Yürüktümen, Savaş ARSLAN. Foreign body traumas of the eye managed in an emergency department of a single-institution. *Turkish Journal of Trauma & Emergency Surgery* 2012;18 (1):75-79
12. El-Mekawey HE, Abu El Eimen KG, Abdelmaboud M, Khafagy K, Eltahlawy EM. Epidemiology of ocular emergencies in the Egyptian population: a five-year retrospective study. *Clin Ophthalmol* 2011;5:955–960
13. Sun F, Zhou Y, Dong L, Qin H. Relationship between the use and type of eye protection and work-related corneal and conjunctival foreign body injuries. *Injury prevention*. 2021;27(6):521-526.
14. Ayyildiz T, Ozturk Y. Investigating The Factors That Affect The Frequency Of Visits Due To Corneal Foreign Bodies. *Sanamed*. 2020 Jul 29;15(2):107-110.
15. Maloba V, Nday F, Mwamba B, Tambwe H, Senda F, Ktanga L, et al. Ocular foreign bodies: Epidemiological, clinical and therapeutic aspects in Lubumbashi: About 98 cases. *Journal Francais D'ophtalmologie*. 2020 Jul 4.
16. Ahmed F, House RJ, Feldman BH. Corneal abrasions and corneal foreign bodies. *Primary Care: Clinics in Office Practice*. 2015;42(3):363-375.
17. Chang T, Zhang Y, Liu L, Zhang K, Zhang X, Wang M, et al. Epidemiology, clinical characteristics, and visual outcomes of patients with intraocular foreign bodies in Southwest China: A 10-year review. *Ophthalmic Research*. 2021;64(3):494-502.
18. Bahoo ML, Jamil AZ, Khalid MS. Ocular surface foreign bodies and their association with profession. *Pak J Med Health Sci*. 2018 Apr 1;12(2):495-498.
19. Bahoo ML, Jamil AZ. Types of ocular surface foreign bodies and their correlation with location in the eye. *Pak J Ophthalmol*. 2018;34(1):25-9.
20. Jahangir T, Butt NH, Hamza U, Tayyab H, Jahangir S. Pattern of presentation and factors leading to ocular trauma. *Pakistan Journal of Ophthalmology*. 2011 30;27(2).

#### **AUTHOR'S CONTRIBUTIONS**

**RI:** Manuscript writing, Data collection  
**AA:** Manuscript review, Correspondence  
**ZH:** Manuscript writing, Statistical analysis  
**IQM:** Supervision, Manuscript review