



STUDY OF INCIDENCE OF OCULAR SURFACE FOREIGN BODY AND ITS DEMOGRAPHIC PROFILE.

Ophthalmology

**Dr. Upadhyaya
Ruju K.***

Third Year Resident, GMERS Medical College, Vadodara, Gujarat, India. *Corresponding Author

Dr. Patel Happy N. First Year Resident, GMERS Medical College, Vadodara, Gujarat, India.

**Dr. Radadia Heena
C.**

Associate Professor, GMERS Medical College, Vadodara, Gujarat, India.

Dr. Sapre Ashwini Head of Department, GMERS Medical College, Vadodara, Gujarat, India.

ABSTRACT

Purpose: The aim of the study was to determine the Incidence and demographic profile of injuries caused by ocular surface foreign bodies and to identify the occupation prone to it. **Methods:** A prospective study was conducted in GMERS Hospital, Vadodara. A total 156 patients presenting to Ophthalmology department OSFBs within the period of 6 months were included in the study. **Results:** The biannual incidence of OSFB cases was 2.47%. The mean age of patients was 35.6 years. The most common mode of injury was accounted to Welding 29.5% followed by Construction 17.3%. The others included metal cutting, domestic cleaning, machine repairing, and farming. The most common type of OSFB was metal 53.2% followed by stone 18.6%. The most common site of OSFB was Cornea 83.3%. Only 63.4% patients used protective equipment. **Conclusion:** Industrial workers working with high speed machinery for welding, drilling, grinding and metal cutting are at higher risk of metallic corneal foreign bodies followed by construction workers for stone, dust and metallic foreign bodies. Though these injuries are superficial, they may cause diminution of vision due to corneal scars, loss of working hours and adverse financial effect. These could be prevented with proper use of quality eye protection wear. Comprehensive educative workshops should be conducted regularly in industries and emphasis should be made for consistent use of personal protective equipment with satisfactory quality and design.

KEYWORDS

Ocular surface foreign body, ocular trauma, ocular emergency.

INTRODUCTION

Ocular trauma is leading cause of preventable unilateral blindness.¹ The ocular surface foreign body (OSFB) is one of the most common and preventable ocular injuries.^{2,3}

OSFBs are small particles that impinge upon the conjunctiva or cornea.⁴ These type of injuries often occurs at work, while doing domestic and leisure activities like cleaning, gardening, playing sports or while walking/riding bike on windy days⁵. Even though, according to the Classification of Ocular Trauma based on the severity of the trauma, OSFBs are graded as mild,⁶ they tend to cause extreme discomfort causing redness, watering, grittiness and pain in the eyes⁷

When the foreign body strikes the cornea, due to reflex there is a sharp burning pain with a gush of tears and the lids close in blephrospasm. The patient might rub the eye violently and often succeed in impacting the foreign body securely into the corneal epithelium and stroma which if left alone, might have been safely washed down into the Conjunctival cul-de-sac.

A corneal FB can cause opacities on visual axis and also secondary infections ranging from keratitis to endophthalmitis thereby decreasing vision.⁸ The healthcare costs of such injuries also cause economic burden.⁹ Since over $\frac{3}{4}$ of the injuries are preventable by personal protection equipment,¹⁰ taking measures toward their prevention is justifiable.

The purpose of this study is to identify the settings in which such injuries occur and the level of awareness regarding eye safety among workers and general population. We believe this common cause of ocular morbidity should be prevented in this rapidly industrializing region.

AIMS AND OBJECTIVES

The aim of the study was to determine the Incidence and demographic profile of injuries caused by OSFBs and to identify the occupation prone to it.

MATERIALS AND METHOD

A hospital based prospective study was conducted in GMERS Hospital, Vadodara. All the patients presenting to Ophthalmology department with OSFBs over the period of 6 months were included in

the study after taking written consent from patients.

Approval taken from of the Institutional Human Ethics Committee, G.M.E.R.S Medical College and Hospital, Vadodara, Gujarat, India.

We recorded detailed history of patient including- Age, Gender, Occupation, Mode of Injury, use of personal protective equipment, Awareness about personal protective equipment.

Thorough slit lamp examination was done of both eyes. Location of Superficial foreign body, rust ring and any corneal opacity from previous OSFB was noted. Foreign body and rust ring was removed using cotton bud/26 gauge needle as required under topical anesthesia. Topical antibiotics were prescribed.

RESULTS

This study included total of 156 patients. The biannual incidence of OSFB cases was 2.47% (n=156) out of total biannual OPD of 6305.

The mean age was 35.6 years with range of 18 years to 60 years. The majority of patients (55.7%) were in 31-40 years age group. [TABLE1].

TABLE 1-AGE GROUP

AGE GROUP	NUMBER OF PATIENTS	PERCENTAGE (%)
10-20	8	5.1
21-30	30	19.2
31-40	87	55.7
41-50	28	17.9
51-60	3	1.9

75.6% of the patients were male (n=118), and 24.3% (n=38) were female. The male-to-female ratio was 3.1:1. Figure 1 shows that most commonly affected were industrial workers 53.2% which includes Fabrication workers 35.3% (n=55), Technicians 14.7% (n=23) and laborers 3.2% (n=5) followed by Construction workers 17.3% (n=27), and Agriculture workers 3.8% (n=6). OSFBs in domestic workers amounted to 10.3% (n=13) and other occupations 15.4% (n=10).

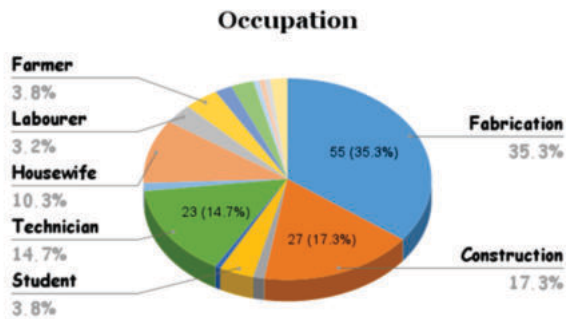


FIGURE-1-OCCUPATION

The most common mode of injury for OSFB was accounted to Welding 29.5% (n=46) followed by Construction 17.3% (n=27). The other modes of injury included Metal cutting 14.7% (n=23), domestic cleaning 13.5% (n=21), Machine repairing 6.4% (n=10), Farming 3.8% (n=6). Other activities causing OSFB included metal grinding, painting, and riding bike/taking walk on windy day as shown in FIGURE 2.



FIGURE 2- MODE OF INJURY

The most common type of Foreign body was metal 53.2% (n=83) followed by stone 18.6% (n=29). Others included dust, vegetative matter, wood, glass and insects accounting to 28.2% as shown in FIGURE 3.

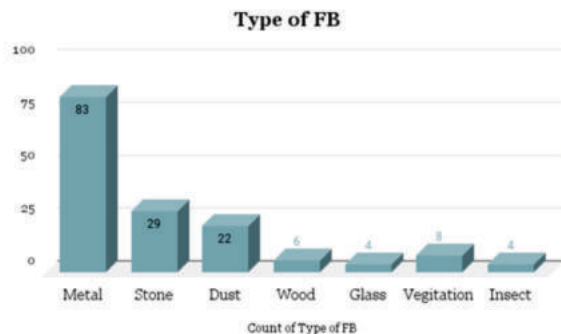


FIGURE 3- TYPE OF FOREIGN BODY

The most common site of Foreign body was Cornea 83.3% (n=130) as mentioned in TABLE 2.

TABLE 2-SITE OF FOREIGN BODY

SITE	NUMBER OF PATIENTS	PERCENTAGE (%)
Cornea(Total)	130	83.3
• Central	5	3.8
• Paracentral	106	81.5
• Peripheral	19	14.6
Conjunctiva	20	12.8
Fornices	06	3.8

Right eye was most commonly involved 59% (n=92) with Left eye involved in 33.3% (n=52) cases and both eyes were involved in 7.7% (n=12) cases. Corneal scars and opacities from previous foreign bodies were found in 35.8% cases. After removal of foreign body, 22.4% (n=35) patients had residual foreign body/rust ring which was removed in subsequent visit.

Despite of Awareness about use of protective equipment for eye was present in 92.3% (n=144) patients, only 63.4% (n=99) patients used protective equipment. Reason of not using eye-wear is as shown in TABLE 3.

TABLE 3- USE OF PPE, REASON FOR NOT USING PPE

USE OF PPE	NO. OF PATIENTS
YES	99(63.4%)
NO	57(36.5%)

REASON FOR NOT USING PPE	NO. OF PATIENTS
Uncomfortable	24 (42.1%)
Ill-fitting	11 (19.2%)
Briefly removed	9 (15.7%)
Broken	7 (12.2%)
Other	6 (10.5%)

DISCUSSION AND CONCLUSION

In our study, we found predominance of males with male-to-female ratio was 3.1:1. The male to female ratio ranged in other studies from 3:1 as per Jahangir Tehmina et al.¹⁰ to 14:1 in study of Guerra Garcia RA¹¹ et al. The male predominance might be attributed to greater exposure to risks of industrial, machine related and construction work. In our study, the mean age noted was 35.6 years. The majority of patients were in 31-40 years age group. A study by Zghal-Mokni et al.¹² demonstrated a mean age of 31 years old, for occupation related CFB. Reports of Guerra Garcia RA¹¹ et al also indicate mean ages ranging from 29 to 35 years.

Our findings showed that in 83.3% cases cornea was involved, rest 16.7% showed involvement of conjunctiva, fornices etc. The study of Yigit Ozlem et al¹³ showed comparable results with involvement of cornea to be 72.6%. They also found that the majority of FBs were metal fragments followed by dust particle. Our study showed similar results with metallic FB 53.2% followed by stone 18.6%.

Industrial workers were most commonly affected in our study 53.2%. Woo and Sundar¹ reported in 2005 that 56.4% (n = 75) of all eye injuries in Singapore were work-related. In our study, industrial OSFBs were accounted to Welding 29.5%, Construction 17.3%, metal cutting 14.7%, and machine repairing 6.4% .In a Canadian study 21% eye injury occurred during welding. Overall Industrial accident frequency rates have stagnated over the last ten years despite various workplace safety measures being put in place.¹⁸

Despite the work practice policy and legislation of strict guidelines on mandatory wear, only 63.4% cases used protective equipment. This finding is similar to previous reports by Woo and Sundar¹, who found that 38.7% had not used protective gear at the time of injury.

Most common reason of not using eye-gear was found to be uncomfortable eye-gear 42.1%. This data is consistent with findings by Connel et al¹⁴, that reasons given by Irish construction workers for not wearing eye protection included poorly-fitted eyewear, habit, fogging of eyewear or non-availability of eyewear.

There is a great social impact of ocular injuries including superficial foreign bodies related to loss of productivity by young men, health care costs in addition to the impact on individual including risk to vision.

To increase abidance, there is a need to improve the design of protective equipment to improve comfort, clarity, longevity and convenience. Standards in workplace should be improved for better protective capacity of PEW. Most of the cases were aware of use of protective wear but did not have proper understanding of impact of OSFBs on vision. Regular and comprehensive educative workshops should be conducted in industries and emphasis should be made for consistent use of PPE. Assurance of satisfactory quality and design of personal protective equipment should also be made by all business and construction sectors.

REFERENCES

1. Woo JH, Sundar G. Eye injuries in Singapore-Don't risk it. Do more. A prospective study. Ann Acad Med Singapore. 2006;35(10):706-18.
2. Perspective from the emergency service of a large tertiary hospital. Clinical Study Eye 2001;15:75-81
3. Injuries to the eye. Sihota and Tandon, editors. Parsons' diseases of the eye. 20 edition. New Delhi: Elsevier;2007.p.362-4
4. Netdoctor(homepage on the internet), Foreign body in the eye reviewed by MacEwan C.
5. Netdoctor.co.uk / health_advice/facts/foreignbodyintheeye.htm Clinical Career in

- Ophthalmology and Optometry (homepage on the internet), classification of ocular trauma.
6. Pandey AN (2017) Ocular Foreign Bodies: A Review. *J Clin Exp Ophthalmol* 8: 645.
 7. DeBroff BM, Donahue SP, Caputo BJ, Azar MJ, Kowalski RP, Karenchak LM. Clinical characteristics of corneal foreign bodies and their associated culture results. *CLAO J* 1994;20:128-130.
 8. Ramakrishnan T, Constantinou M, Jhanji V, Vajpayee RB. Corneal metallic foreign body injuries due to suboptimal ocular protection. *Arch Environ Occup Health* 2012;67:48-50.
 9. Wong TY, Tielsch JM. A population-based study on the incidence of severe ocular trauma in Singapore. *Am J Ophthalmol* 1999;128:345-51.
 10. Tehmina Jahangir, Nadeem Hafeez Butt, Uzma Hamza, Haroon Tayyab, Samina Jahangir. Pattern of Presentation and Factors Leading to Ocular. *Trauma Pak J Ophthalmol* 2011; 27(2):96-102
 11. Guerra García RA, García D, Martínez FE, Columbié Garbey YE, Martínez RR. The Cuban Ocular Trauma Registry. *J Clin Exp Ophthalmol* 2013; 4(2):276
 12. Zghal-Mokni I, Nacef L, Kaoueche M, et al. Epidemiology of work-related eye injuries. *La Tunisie Medicale*. 2007 Jul;85(7):576-579.
 13. 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):75-9
 14. Connell PP, Saddak T, Harrison I, et al. Construction-related eye injuries in Irish nationals and non-nationals: attitudes and strategies for prevention. *Ir J Med Sci* 2007; 176:11-4.