

CLINICAL PROFILE AND AETIOLOGICAL FACTORS IN PATIENTS WITH OCCUPATIONAL CORNEAL FOREIGN BODY PRESENTING IN TERTIARY CARE HOSPITAL IN BASTAR DISTRICT

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Abstract

Background: A superficial corneal foreign body is the most common and preventable eye injury. Among occupational injuries, a corneal foreign body is the most common form of injuries. Patients have multiple ocular symptoms, including red eye, foreign body sensation, irritation, tearing, pain, and blurred vision etc., timely and appropriate removal of a corneal foreign body is necessary. Metallic corneal foreign body resulting from occupational accidents are often seen in construction and metal industry workers. Corneal foreign body can decrease the quality of vision by causing scars on the visual axis and secondary infections ranging from keratitis to endophthalmitis. **Materials and Methods:** From January to December 2019, a cross-sectional hospital-based study was conducted at a tertiary center in a rural area of Bastar. All participants in the study completed an informed consent form. Each patient's demographic information and complete medical history were documented. Every patient was asked about occupational hazard education and awareness, as well as about using safety precautions at the scene of the incident. Specific occupational information obtained, such as the kind of work and the activity being performed at the time of the injury. **Result:** The age range of the tested group was 15–75 years old. 60 to 75 years old had the lowest prevalence (3.12%), while 15 to 30 years old had the highest occurrence (48.43%). Of the patients, 85.09% were men and 14.06% were women. Among the 120 participants, 60.93% had a metallic foreign body, 13.28% had a wooden foreign body, 11.71% had dried mud and concrete, 7.81% had a peddy, and 6.25% had an insect shell. Metalworkers were of 61.71%, building workers 15.62%, farmers 12.50%, carpenters 6.25%, and other subjects were of 3.90%. **Conclusion:** Our findings showed that corneal foreign bodies, which can cause significant ocular morbidity, were found in most young, healthy males with work-related injuries. It is highly recommended to enforce the use of protective gear at work, modify the safety design of protective devices, and refer patients promptly to an ophthalmologist for the retrieval of corneal foreign bodies in order to combat occupational ocular morbidity.

INTRODUCTION

One of the most common causes of curable visual morbidity and blindness is ocular trauma. About 6 million people worldwide are blind as a result of eye injuries, of which 2.3 million have bilateral effects and 19 million have unilateral vision loss. Eye trauma is the most common cause of unilateral blindness. Frequent hospital visits and a high level of mental

stress are linked to ocular trauma. The distribution of ocular trauma is bimodal, peaking later in life in the elderly and with a higher incidence in young adults. Globally, the average male to female ratio is roughly 4:1, with open globe injuries being the most common.^[1]

The importance of eye trauma to public health has been recognized globally in recent decades, which has led to an increase in interest in the study of eye injuries. Globally available prevalence and incidence

data are helpful in characterizing the effects of ocular trauma. The epidemiology of ocular trauma has been extensively documented in developed nations like the United States, Europe, Australia, and New Zealand. The lifetime prevalence of ocular injuries in the United States is estimated to be between 14.4% and 19.8%. It was discovered that there were 13.2 hospitalized eye injury cases for every 100,000 people. In contrast, a Scottish study by Desai et al. found that the 1-year cumulative incidence of ocular injuries requiring hospital admission was 8.14 per 100,000 people.^[2]

Ocular trauma accounts for 8–14% of all pediatric injuries and is a major global cause of acquired monocular blindness. The type of injury, the wound's location, the severity of the laceration, posterior segment involvement, and the existence of infection all affect the prognosis of eyes with globe injuries. Unilateral visual loss is frequently caused by puncturing injuries to the eye, even though only 25% of injuries are non-penetrating.^[3]

Patients with foreign bodies and corneal abrasions frequently visit emergency rooms, urgent care facilities, primary care physicians, and eye care specialists. The body's most densely innervated tissue is the cornea. A variety of ocular symptoms, such as pain, photophobia, reduced vision, profuse tears, discharge, blepharospasm, and conjunctival hyperaemia, can be reported by patients with corneal foreign bodies. The event usually begins with a sharp, noticeable commencement. Foreign bodies in the cornea are frequently obtained covertly and are only suspected when minor eye complaints continue. Patients often say that the foreign body became lodged in their eye while they were working in the yard or doing home maintenance projects, or that it happened by chance.^[4]

Wearing safety eyewear, such as goggles, can help reduce eye injuries related to work. Although industry advocates and everyone knows that safety eyewear is important, worker adherence to safety regulations is lacking. The causes include either a lack of safety eyewear in workplaces or an improper design of the same or behavioural (indifference and lack of understanding of working dangers and safety). In India, agricultural labourers wear safety glasses less often than workers in other occupations—nearly never at all. The majority of studies assessing the use of safety glasses in agriculture are from the West, but their conclusions cannot be easily applied to the Indian context because to the disparities in farming methods and sociocultural norms.^[5]

An Indian study found that 20.1% of all ocular damage was caused by accidents related to the workplace. The most frequent type of injury sustained at work is a corneal fracture. Workers in the construction and metal industries, such as welders,

frequently get these kinds of injuries. A corneal FB can result in secondary infections ranging from keratitis to endophthalmitis, which can impair vision, as well as scars on the visual axis. These injuries also result in financial hardship due to the cost of medical care. It is reasonable to take steps to prevent injuries as personal protective equipment can prevent more than half of them. There are no other studies that we are aware of that evaluate corneal FB in the workplace in India. The aim of this research is to evaluate the environments in which these types of accidents transpire as well as the degree of knowledge about eye protection.^[6]

MATERIALS AND METHODS

A cross sectional hospital based study was done at the tertiary centre in rural area of Bastar. Informed consent form is taken from all the participants included in this study. All the patients with the corneal foreign body were evaluated and asked some questions by the concerned doctor in their respective suitable language during the period of January to December 2019. These questions were orally asked to all the patients after taking verbal consent. We recorded the detail history and demographic data of each patient. All the patients were enquired about the education and awareness regarding occupational hazard and also inquired about using of safety measures at the time of injury. Detail occupational detail taken, including type of occupation, type of activity at the time of injury and the use of protective devices. We also evaluated the time between injury and reporting to the ophthalmologist and also noted self attempt for foreign body removal and what method used for that. Focal and diffuse light examination was done.

RESULTS

The age group that was examined ranged from 15 to 75 years old. The age group that had the highest occurrence was 15 to 30 years old (48.43%), while the age group that had the lowest incidence was 60 to 75 years old (3.12%).

Out of the patients, 14.06% were females and 85.09% were males. [Table 2]

Out of 120 subjects, 76.56% subjects belong to urban area and 23.43% subjects belong to rural areas. [Table 3]

Out of 120 subjects in this study, 79.60% were literate and 20.31% were illiterate. [Table 4]

Out of 120 subjects, 60.93% - metallic foreign body, 13.28% - wooden foreign body, 11.71% with mud and concrete, 7.81% with peddy and 6.25% with insect shell. [Table 5]

Table 1: Age distribution of study subjects

Age (in years)	Percentage
15-30 years	48.43%

31- 45 years	38.28%
46-60 years	10.15%
60-75 years	3.12%

Table 2: Gender distribution of study subjects

Gender	Percentage
Male	85.09%
Female	14.06%

Table 3: place distribution of study subject

Place	Percentage
Rural	23.43%
Urban	76.56%

Table 4: literacy distribution of study subject

Literate	79.60%
Illiterate	20.31%

Table 5: Type of foreign body

Foreign body	Percentage
Metallic	60.93%
Wooden	13.28%
Mud and concrete	11.71%
Peddy	7.81%
Insect shell	6.25%

Table 6: type of occupation

Occupation	Percentage
Metal worker	61.71%
Construction area	15.62%
Farmer	12.50%
Carpenter	6.25%
Others	3.90%

Table 7: use of protective measures at the time of activity

Use of protective measures	Percentage
Patient with protective measures at the time of injury	82%
Patients without protective measures at the time of injury	18%

Out of 120 subjects, 61.71% of subjects were of metal workers, 15.62% are of construction area, 12.50% were of farmers and 6.25% are of carpenters and 3.90% are of others. [Table 6]

When the injuries occurred, 82% of the patients had on the protective glasses, whereas 18% of the patients did not have any protective glasses. [Table 7]

DISCUSSION

Individuals arrive with symptoms such as foreign bodily aches, redness, tear production, and hazy vision. The triggering event's is nearly always there. (Fraenkel and others, 2017) Scarring along the visual axis and subsequent infections ranging from keratitis to endophthalmitis impair visual acuity. Usually, rust from metal foreign bodies leaves scars in the cornea. (Macedo et al., 2005; DeBroff et al., 2017). When a rust ring starts to form, it means that the cornea has been embedded for longer than 24 hours. (1990, Casser et al.) One of the common occupational health dangers that cause ocular morbidity is corneal foreign bodies. (Fond, 1995; Bernad et al., 1960).+[7]

In the context of small workplace mishaps. Our findings are consistent with literature data, which show that younger guys are more susceptible to

superficial corneal foreign bodies. Despite their insignificance, aside from their irritating effects, it is crucial to consider them as possible vectors of contamination, as evidenced by our study's discovery of 19.8% foreign entities with positive culture in the cornea. There was no information in the literature regarding the isolation and identification of bacteria from superficial corneal foreign bodies. The microorganisms isolated from the foreign body cultures included: Streptococcus, alphahemolytic, Staphylococcus aureus, Staphylococcus, coagulase-negative, Corynebacterium xerosis, unidentified Grampositive bacillus, Moraxella sp, Serratia sp, and Acynetobacter sp.^[8]

Even though the most of these occupational injuries were minor, they nevertheless required a sizable amount of time away from work to attend to the casualty division and for future reference. The majority of patients did not have eye protection on when they were injured, even though it was typically available. The following excuses were offered for not wearing it: pain, inability to view the task at hand, forgetfulness, or lack of belief in its true necessity. It's interesting to note that many people who worked in dusty areas beneath moving cars believed that protection wasn't necessary, and some workers are

still ignorant of the risks associated with hammering without eye protection. Although 15–4% of people were wearing eye protection, it was ineffective. Mostly, the ineffectiveness of eye protection.^[9]

Study showed male preponderance with male to female ratio of 6.5:1. The male to female ratio ranged in other studies from 3:1 as per Jahangir Tehmina et al. to 14:1 in study of Guerra Garcia RA et al. The male predominance might be due to the greater exposure of men to risks such as industrial and construction work, sports, traffic accidents and alcohol intake. The age commonly affected by CFBs injury in our study, ranged from between 10 to 60 years in which there was predominance of this injury during 31 – 40 years. The mean age was found to be 36.7+/- 10.8 years. Reports of Guerra Garcia RA et al and also indicate mean ages ranging from 30 to 35 years. In most reports, injuries occurred in men under 50 with higher incidences in the 3rd and 4th decades of life which is consistent to our findings. The study of Yiğit Ozlem et al and Radha I Dass et al showed majority of FB to be metal fragments. Most of them were metallic iron foreign bodies. Our study revealed similar results where 53.33% patients had metallic CFB injury.^[10]

CONCLUSION

Our research revealed that the majority of young, healthy males with work-related injuries were discovered to have corneal foreign bodies, which can result in serious ocular morbidity. However, by raising knowledge of the visual consequences of occupational ocular injuries and using improved protective equipment to lower the frequency of occupational ocular morbidities, the majority of workplace accidents can be avoided and prevented. To combat occupational ocular morbidity, it is strongly advised to enforce the use of protective gear at work, improvise the safety design of protective

devices, and refer patients promptly to an ophthalmologist for the retrieval of corneal foreign bodies. The construction and metalworking industries are the most common industries to experience corneal foreign bodies, thus it could be wise for these sectors to offer thorough occupational eye.

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