International Journal of Research in Health and Allied Sciences
Journal home page: www.ijrhas.com

Official Publication of "Society for Scientific Research and Studies" [Regd.]

ISSN: 2455-7803

Original Research

Evaluation of corneal foreign bodies in known population- A clinical study

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***ABSTRACT*:**
Background: Corneal foreign bodies are a common workplace occurrence. The present study was conducted to evaluate corneal foreign bodies in known population. **Materials & Methods:** 70 patients who reported to eye department with complaint of corneal foreign bodies were taken. A slit lamp evaluation of each patient was done. **Results:** Out of 70 patients, males were 45 and female were 25. 33 were electricians, 20 were carpenter and 7 were doing metal work. Activity at time of injury was metal grinding in 10, welding in 45 and wood cutting in 15 cases. Presenting vision was 6/6-6/9p in 30 and 6/12-6/18p in 40 cases. The difference was significant (P< 0.05). **Conclusion:** Corneal foreign bodies were seen in electricians, carpenter and welder. Injury occurred during metal grinding, welding and wood cutting.
Key words: Corneal foreign bodies, welding, wood cutting

Received: 12 September, 2020 Accepted: 16 November, 2020

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This article may be cited as: Krishan S. Evaluation of corneal foreign bodies in known population- A clinical study. Int J Res Health Allied Sci 2021; 7(1):25-27

INTRODUCTION

Corneal foreign bodies are a common workplace occurrence. The consequences can range from employee discomfort to impaired visual acuity and blindness.[1] A corneal FB can cause scars on visual axis and also secondary infections ranging from keratitis to endophthalmitis thereby decreasing vision. The healthcare costs of such injuries also cause economic burden. Since over ¾ of the injuries are preventable by personal protection equipment, taking measures toward their prevention is justifiable.[2] Corneal foreign bodies remain a constant concern. This is despite mandated use of a variety of sophisticated protective eyewear provided by the company and combined with safety and engineering controls. Occupational health nurses frequently have little formal training in assessing and treating eye injuries and are left to acquire skills with time and experience.[3]

Conjunctiva, cornea, anterior chamber and pupils can be examined with a bright-focused light, such as a pen torch, ophthalmoscope or loupes. An ophthalmoscope provides a magnified view of these structures when dialed to +10D and held at 10 cm. The location, size and depth of the corneal foreign body should be noted, particularly if it is in the central pupillary zone. Surrounding corneal opacity may indicate a rust ring, burn, infection, oedema or scar tissue. Irregularities in pupil shape may indicate a penetrating foreign body causing iris incarceration.[4] The present study was conducted to evaluate corneal foreign bodies in known population.

MATERIALS & METHODS

The present study comprised of 70 patients who reported to eye department with complaint of corneal foreign bodies of both genders. All were informed regarding the study and their consent was obtained.

Data such as name, age, gender etc. was recorded. A thorough eye assessment was performed by eye surgeon. A slit lamp evaluation of each patient was done. The site and depth of foreign body were noted. The presence of a rust ring, any evidence of superadded infection and any corneal scar due to previous FB injury were noted. Results were analysed statistically. P value less than 0.05 was considered significant.

RESULTS

Table I, graph I shows that out of 70 patients, males were 45 and female were 25. Table II, graph I shows that 33 were electricians, 20 were carpenter and 7 were doing metal work. Activity at time of injury was metal grinding in 10, welding in 45 and wood cutting in 15 cases. Presenting vision was 6/6-6/9p in 30 and 6/12-6/18p in 40 cases. The difference was significant (P< 0.05).

Table I Distribution of patients

Total-70

Gender	Males	Females
Number	45	25

Graph I Distribution of patients

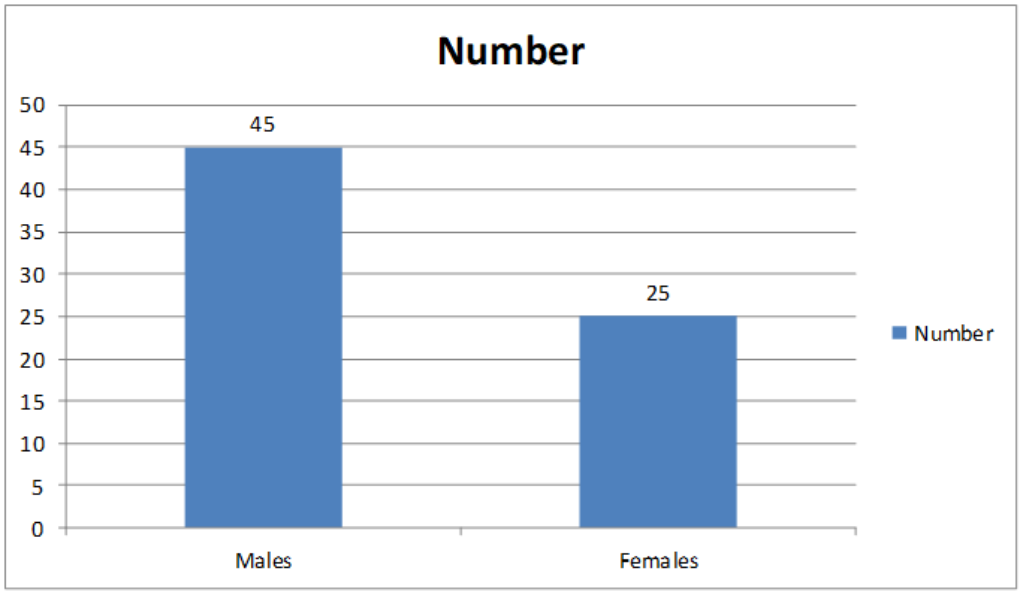
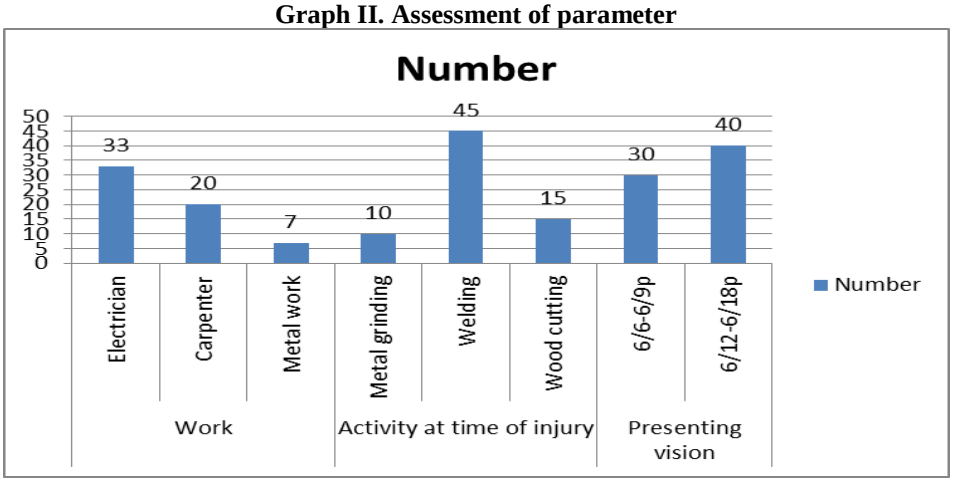


Table II Assessment of parameter

Parameters	Variables	Number	P value
Work	Electrician	33	0.02
	Carpenter	20	
	Metal work	7	
Activity at time of injury	Metal grinding	10	0.04
	Welding	45	
	Wood cutting	15	
Presenting vision	6/6-6/9p	30	0.14
	6/12-6/18p	40	

Graph II. Assessment of parameter



DISCUSSION

Protective structures of the eye include the eyebrows, eyelids, and eyelashes; conjunctiva; lacrimal glands; and the orbit.[5] The eyebrows, eyelids, and lashes serve to screen out dust, dirt, and perspiration. The conjunctiva covers the sclera and maintains the smooth, moist surface of the cornea. The lacrimal glands produce tears to dilute and wash out foreign bodies and irritating substances.[6] Protection from mechanical injury comes from the orbit's bony rim. The eye has three tissue layers. An outer, protective coating, the sclera is continuous with the cornea at the front of the eyeball. The choroid is the middle, vascular layer.[7] The ciliary muscle surrounds the spherical lens. The pigmented iris, which is in front of the lens and behind the cornea, encircles the pupil, which contracts and relaxes to control the entry of light. The choroid supports the retina, the inner light sensitive layer. Superficial corneal foreign bodies and chemical splash injuries primarily affect the cornea.[8] The cornea has a clear, avascular surface, which refracts light rays. The cornea has five layers. The epithelium is a nonkeratinized, smooth layer composed of five to six cells. The epithelium has its own basement membrane that can regenerate without scarring. The second layer (i.e., Bowman's layer) is a nonregenerative acellular membrane that scars with healing, as do the layers beneath it.[9] Ninety percent of the corneal thickness consists of the stroma, the third layer, composed of loose bundles of collagen fibrils. An elastic membrane on the inner surface of the stroma is the fourth layer, Descemet's membrane.[10] The present study was conducted to evaluate corneal foreign bodies in known population.

In present study, out of 70 patients, males were 45 and female were 25. Ramakrishnan et al[11] conducted a prospective hospital-based study. Patients presenting with CFB were asked a set of questions relating to their occupation, level of education, understanding of the potential complications of CFB, and demographics. A total of 83 patients were included in the study. CFB were attributed only to males. 66% of patients were in the age group of 14--29 years. 30% of patients were in the age group 30--44 years and 4% of patients were between 45 and 60 years old. The metal work industry was responsible for 47% of presentations. The construction industry was responsible for 27% of presentations. Electricians and carpenters combined were responsible for 10% of presentations and 17% of presentations occurred in other sectors. CFB occur across a number of occupations in the construction industry, not just metallic workers. Among a population that is generally poorly educated and has nominal understanding of the impact that CFB can have on vision, occupational hazard education is necessary to address this problem.

We found that 33 were electricians, 20 were carpenter and 7 were doing metal work. Activity at time of injury was metal grinding in 10, welding in 45 and wood cutting in 15 cases. Presenting vision was 6/6-6/9p in 30 and 6/12-6/18p in 40 cases. Kumar et al[12] calculated 86.6% of patients to have an education of 10th standard or below. This may suggest a link between higher education and reduced incidence of CFB related to occupational exposure.

CONCLUSION

Authors found that corneal foreign bodies were seen in electricians, carpenter and welder. Injury occurred during metal grinding, welding and wood cutting.

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