

# Ocular Surface Foreign Bodies and their Association with Profession

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## ABSTRACT

**Aim:** To study the association between the aetiology of ocular surface foreign bodies and profession.

**Methods:** This descriptive cross sectional study was conducted at Ophthalmology department of Shahida Islam Medical College Lodhran from August 2016 to December 2017. There were 1035 patients in this descriptive cross sectional study. Age, gender, laterality and work engagement at the time of foreign body fall were recorded for all patients. Detailed slit lamp examination was performed. Location of the foreign body was by specially designed proforma. Foreign bodies were removed with the help of forceps or 27/26gauge needle.

**Results:** Mean age was 36.77±13.31 years. Males were 888 (85.8%) and females were 147 (14.2%). The most common location of foreign body in the eye was cornea. Metallic particles constitute the most common type of foreign body. In the present study ocular surface foreign bodies fell in 938 (90.6%) patients who did not use protective eye wear while ocular surface foreign bodies fell in 96 (9.3%) patients who used eye protective devices. Pearson Chi Square test was used to calculate association between aetiology of foreign body and profession of patients. Pearson Chi Square value was 3137.31 at significance level of 0.000. These values show strong association between aetiology of foreign bodies and profession of patients.

**Conclusion:** Persons in professions related to farming and working with metals were most commonly found to be hurt by ocular surface foreign bodies. Person's education and use of eye protective devices should be practiced in order to avoid this professional hazard.

**Keywords:** Corneal injuries, Eye foreign body, Eye protective devices, Occupations.

## INTRODUCTION

Ocular surface foreign bodies generally produce minor ocular trauma. Usually they get lodged into the surface epithelium. At times they get impacted into the stroma especially when these foreign bodies are flying at a considerable speed. Ocular surface foreign bodies are one of the most common causes of ophthalmologist visit<sup>1</sup>. Ocular surface foreign body is an important reason for eye morbidity and results in cost of working times<sup>2</sup>. These foreign bodies cause considerable discomfort<sup>3</sup>. If these are not properly managed these can lead to inflammation, tissue necrosis and infection.

Foreign bodies can get into the eyes in domestic and house hold setting, during occupation, playing, as a result of assaults and accidents<sup>4</sup>. Majority of ocular surface foreign bodies are found in the eyes as a result of work related activities<sup>5,6</sup>.

Most commonly ocular surface foreign bodies are found on cornea. Metallic foreign bodies are the most commonly encountered foreign bodies and young men get them the most **Error! Bookmark not defined.**

In recent years the world has recognized the women's participation in the development of society<sup>7,8</sup>. Women constitute about half of the population of Pakistan. Without their participation desired growth in society cannot be achieved<sup>9</sup>.

Pakistani women did significant contribution in the economic development especially in rural and semi urban regions. Female take part in agriculture, farming, cottage

industry, factories and house hold working. As a result work related ocular surface foreign bodies are seen in a significant proportion of female patients **Error! Bookmark not defined. Error! Bookmark not defined.**

Awareness of targeted population and adoption of preventive measures should be practiced to avoid this potentially discomforting and disabling damage **Error! Bookmark not defined.** Aetiology of ocular surface foreign bodies is related to occupation. People related to specific professions are prone to get hurt from certain sort of ocular surface foreign bodies **Error! Bookmark not defined.** Most of the ocular injuries occur during occupational and work related setting. Objective of this study is to study the association between the aetiology of ocular surface foreign bodies and profession.

## SUBJECTS AND METHODS

This was descriptive cross sectional study. Duration of the study was from August 2016 to December 2017. The study was approved by the ethical committee of the institution. Consent was obtained from all patients who were included in the study. All patients aged 19 years and above coming in eye outpatient department with foreign body fall in eye were included in the study. Ocular injuries extending from involvement of ocular surface were excluded from the study. Sample size was calculated by using sample size calculator by survey system. Sample size was calculated to be 377 at confidence level of 95% and confidence interval of 5. Age, gender, laterality and work engagement at the time of foreign body fall were recorded by specially designed proforma for all patients. Number of episode of foreign body fall was also noted. Detailed slit lamp examination was performed. Location and aetiology of the foreign body was noted. Fluorescein dye was instilled in the

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eye to outline the location of foreign body. Topical anaesthesia was given by instilling proparacaine 0.5%. Superficial foreign bodies were removed with the help of forceps. In case of impaction in the ocular surface foreign bodies were removed with the help of sterile 27/26 gauge needle. Topical antibiotic drop was instilled into the eye after removal of foreign body. Topical antibiotic eye drops were prescribed for seven days. Statistical analyses were performed using SPSS version 21. Age was presented as mean and standard deviation. Gender, laterality, number of episode, aetiology of foreign body, location of foreign body and occupation were presented as percentage. Pearson Chi-square test was used to calculate association between aetiology of foreign body and occupation.

## RESULTS

There were 1035 patients in this study. Mean age was  $36.77 \pm 13.31$  years. Age range was 19 to 68 years. Males were 888 (85.8%) and females were 147 (14.2%). There were 496 (48%) right eyes and 518 (50%) left eyes. Bilateral cases were 21 (2%). In 782 (75.6%) cases this was first incidence of foreign body fall. While 263 (24.4%) cases reported repeated history of fall of foreign bodies into the eyes. The most common location of foreign body in the eye was cornea. Table number 1 shows the distribution of foreign bodies according to their location in the eyes. Metallic particles constitute the most common type of foreign body. Table number 2 shows the distribution of foreign bodies according to aetiology. Most of the patients got ocular surface foreign body injury when they were busy in farming related activities. Table number 3 shows the distribution of cases according to work engagement at the time of foreign body fall. Pearson Chi Square test was used to calculate association between aetiology of foreign body and profession of patients. Pearson Chi Square value was 3137.309 at significance level 0.000. Phi value was 1.741 and Cramer's V value was 0.658 at significance of 0.000. These values show strong association between aetiology of foreign bodies and profession of patients.

## DISCUSSION

Total of 1035 patients with ocular surface foreign bodies were included in the study. Each day on an average 2 patients of ocular surface foreign bodies came in outpatient department. Ocular injury with ocular surface foreign bodies was more common in males than females. Male to female ratio was 6.04:1. Similar results were presented by P. Subba Reddy and co-authors **Error! Bookmark not defined.** . Males are at greater risk to trauma due to their exposure in occupation, travelling and assaults<sup>11</sup>. Nonetheless It is noteworthy that 14.2% of foreign body patients are female. When we stratify our data it is evident that 34.6% straw particle are found in females. This is quite high than the overall female percentage of 14.2%. It can be explained on the basis of agricultural background of the local economy and female participation in it **Error! Bookmark not defined.** . Twenty five percent glass particles are found in female patients. 17.7% thread/cotton foreign bodies are found in females. These might explain female participation in glass and cotton and linen industry.

Mean age in our study was  $36.77 \pm 13.31$  years. Jahangir T and co-authors reported mean age of  $28.6 \pm 17.6$  years. In another study mean age was reported to be 35 year.

About 25% patients have more than one episodes of foreign body fall. This may be due to lack of preventive measures adopted by the population at risk **Error! Bookmark not defined.**

In 47.8% cases cornea was involved. While in 10.7% cases palpebral conjunctive, in 12.5% cases upper lid sub tarsal conjunctiva, in 13.3% cases inferior fornix, in 1.8% cases superior fornix and in 13.8% cases caruncle was involved. This is in distinction to work done by P. Subba Reddy and co-authors where cornea was involved in 71.9% cases and in 28.03% cases conjunctiva and fornices were involved<sup>13</sup>. In another research performed by Yigit Ozlem et al cornea was involved in 72.6% cases<sup>14</sup>. This difference may be due to occupational differences<sup>15</sup>.

Our study was conducted in a rural and semi urban area where most of the population is involved in agriculture and fields works. Corneal injuries most commonly occur due to metallic foreign bodies<sup>16</sup>. This sort of injury is commonly seen in occupations associated with engineering and industry<sup>17,18</sup>. Ocular surface foreign bodies are found in all parts of the ocular surface. More exposed parts like cornea and palpebral conjunctiva are more likely to attain such type of injuries. Sub tarsal space acquires foreign bodies owing to its anatomical conformation<sup>19,20</sup>. Foreign bodies get lodged into different parts of ocular surface. In cases of history of foreign bodies fall thorough eye examination is mandatory to remove obscured foreign body particles.

In the present study metallic particle was seen in 25.6% cases. This is fewer than the damage by metallic particles in former studies **Error! Bookmark not defined.** . In other research work comparable percentage of metallic particle injuries is stated<sup>21</sup>. In 24.8% cases insect was removed from the eye. It may be due to driving patterns of folks. Most of the persons riding a bike and cycle do not practise helmets and eye wear to guard them from falling foreign bodies. In 20.1% cases straw particles were removed from the eye. This is due to agronomic contextual of the region **Error! Bookmark not defined.**

In our study left eye was more frequently hurt in difference to the study prepared by P. Subba Reddy **Error! Bookmark not defined.** where right eye was more usually involved.

In the present study most of the patients were affiliated with farming. This is in contrast with the study conducted by Peate<sup>23</sup>. Where over half of all work related injuries in United States of America occurred in the sectors of industry. This difference may be due to the differences in economic and social backgrounds. In developing countries like Pakistan agriculture and farm related activities is the most commonly practiced profession<sup>24</sup>. Our results are different from the results of Jahangir T and co-authors<sup>25</sup>. They reported the most common injury was penetrating trauma and most frequent setting for this sort of injury was domestic. The difference in the affected population may be due to selection criteria of cases. Jahangir T and co-

authors included all sorts of ocular trauma. While in our study only cases with ocular surface foreign bodies were studied. In our study metallic foreign bodies were most commonly found in workers handling metals. Insects were most often found in farmers followed by drivers. Straw particles were most commonly recovered from the eyes of farmers and drivers in the decreasing frequency. Plastic particles were frequently encountered in the eyes of tyre repair workers. Particles of thread and cloth were commonly seen in the eyes of workers related to cotton and linen industry. Dust particles were commonly seen in the eyes of farmers followed by drivers. Contact lens lodged into the superior fornix were recovered from the eyes of domiciliary females. Glass particle foreign bodies were found in the eyes of workers linked with glass industry. Our results are in accord with the results of Dass and Gohel whereby metallic foreign bodies were most common in the eyes of industrial workers and vegetative matter was found in the eyes of farmers **Error! Bookmark not defined..**

In the present study ocular surface foreign bodies fell in 938 (90.6%) patients who did not use eye protective devices while ocular surface foreign bodies fell in 96 (9.3%) patients who used eye protective devices. Our results are similar to those presented by Dass and Gohel **Error! Bookmark not defined.** and Jahangir T and co-authors **Error! Bookmark not defined..** Most of the injuries could be prevented by the use of protective eye wear **Error! Bookmark not defined..**

We used Pearson Chi Square test to find association between aetiology of foreign body and occupation. Pearson Chi square is 3137.309 at significance level of 0.000. This means there is strong association of type of foreign body with occupation. Phi and Cramer's are strength of association. Phi is 1.741 and Cramer's is 0.658. So there is strong association between type of foreign body and occupation.

This study was based on rural and semi urban areas. Its results may not be applicable to other setting. This is limitation of our study.

## CONCLUSION

Persons in professions related to farming and working with metals were most commonly found to be hurt by ocular surface foreign bodies. Person's education and use of eye protective devices should be practiced in order to avoid this professional hazard.

**Disclaimer:** None to declare.

**Conflict of interest:** One person who signed ethical review statement is also a co-author of the same manuscript.

**Funding Sources:** None to declare.

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