

# Frequency of Different Types of Ocular Trauma

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## ABSTRACT

**Objective:** To determine the frequency of different causes of ocular injuries in patients presenting at Liaquat National Hospital, Karachi.

**Study Design:** Cross sectional study

**Place and Duration of Study:** This study was conducted at the Department of Ophthalmology, Liaquat National Hospital, Karachi from November 2016 to March 2018.

**Materials and Methods:** Total 684 patients of acute ocular trauma were included. History of ocular trauma was taken. The refractive errors if existing before and usage glasses were inquired. Descriptive statistics were calculated. Stratification was done and post stratification, chi square test was applied, taken P value  $\leq 0.05$  as significant.

**Results:** There were 489 male and 198 female patients. Mean duration was  $146.92 \pm 738.24$  hour. Mostly cases had either right or left eye trauma. 86.2% patients had mechanical trauma, 9.3% had chemical trauma, 1.9% had photic trauma, and 2.06% had thermal trauma. Mechanical trauma was significantly associated with age groups, eye involved, and socio economic status. Results showed significant association of chemical trauma with age group and eye involved. There was also significant association of photic trauma with gender, age groups, and education. Study found significant association of thermal trauma with eye involved and socio economic status.

**Conclusion:** Majority of the trauma was of mechanical type presenting in young adult males in unilateral eyes.

**Key Words:** Ocular Trauma, Mechanical, Chemical, Photic, Thermal

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## INTRODUCTION

In Pakistan, 6.78% of all hospital admissions comprise of ocular emergencies.<sup>(1)</sup> that makes them the third most common ophthalmic indication for hospitalization.<sup>(2)</sup> approximately 1.6 million people go blind from eye injuries, 2.3 million with bilateral visual impairment and 19 million with unilateral visual loss worldwide, making ocular trauma the commonest cause of unilateral blindness.<sup>(3)</sup> male gender is an important risk factor in ocular trauma.<sup>(4,5)</sup> majority of these injuries are preventable by patient education and use of protective wear alone.<sup>(6)</sup>

Ocular trauma can have mechanical (83.5%), chemical (7.6%), photic (2.3%) and thermal (2.2%) causes. (5) Ocular trauma can be caused by various agents. Due to lifestyle modifications, these trends shifted overtime. Road traffic accidents have been a major cause during early 80's. Sports and leisure activities related injuries replaced them later in the decade.

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However, with the start of this millennium, terror attacks and counter terrorism war, presented unique challenges. Largest number of attacks occurred in South Asia and the near east, which also has the highest number of causalities.<sup>7</sup>

Blast injuries have resulted in significant 9% cases of ocular trauma.<sup>8</sup> Pakistan is in itself in the middle of various military operations. Aim of this study was to find out frequency of different causes of ocular injuries in our population. As literature search shows very limited data available locally in this regard. Result of this study will help us estimate the correct magnitude of different causes of ocular trauma in current scenario, which will in turn be helpful in modification of management of ocular emergencies in a better way.

## MATERIALS AND METHODS

This study was conducted at the Department of Ophthalmology, Liaquat National Hospital, Karachi from 1st November 2016 to 22nd March 2018

Sample size: 684 patients were included in the study. WHO software was used for sample size calculation considering  $p=2.2\%$ ,  $d=1.1\%$  and 95% confidence level.

Sampling Technique: Non-probability, Consecutive sampling

Study Design: Descriptive Cross Sectional study

**Inclusion criteria:** Patients of age group (pediatric age group 2-12 years and adult age group 12-50 years) and

gender of acute ocular trauma presenting to eye emergency or OPD.

**Exclusion criteria:** All those patients who have injuries involving lids and surrounding orbital structures or those who have received treatment (medical or surgical) for their trauma somewhere else. Or those who have a co-existing ocular disease potentially affecting visual acuity.

**Data Collection Procedure:** After taken approval from hospital ethical committee, 684 patients fulfilled the selection criteria were included from OPD of Department of Ophthalmology, Liaquat National Hospital, Karachi. Informed consent was taken from each patient or parents of underage children. Demographic information (name, age, sex, contact, education and socioeconomic status) was obtained. A detailed history of ocular trauma was taken regarding settings, agent, type and time of injury. The refractive errors if existing before and usage glasses were inquired. All the information was noted on Performa.

**Data Analysis Procedure:** All data hence collected was entered and analyzed by SPSS software version 20. Mean and standard deviations were calculated for age, duration of trauma, frequency and percentages were calculated for gender, education level, socioeconomic status and cause of ocular trauma. effect modifiers like eye involved, age, gender, education level and socioeconomic status was controlled through stratification, post stratification, chi square test will be applied by taking  $p \leq 0.05$  as significant.

## RESULTS

Data was entered and analyzed by Statistical Package for the Social Sciences Software (SPSS, version 20). Mean and standard deviation were calculated for quantitative data. Frequency and percentages were presented for qualitative data. Stratification was done and post stratification chi square test was applied to control effect modifiers.  $P$ -value  $\leq 0.05$  is considered as significant.

A total of 687 patients presented to the Liaquat National Hospital, Department of Ophthalmology with the trauma injury over a period of 6 months were evaluated. Out of all study subjects, 489 were male and 198 were female.

The overall mean age of all the study subjects was  $23.93 \pm 14.33$  years. The age was further stratified in two groups such as pediatrics and adults. 29% (200 patients) were in pediatrics group and 71% (487 patients) were adults.

The overall mean duration was  $146.92 \pm 738.24$  hour.

Among total study subjects, mostly cases had either right 43.5% (299 patients) or left eye 41% (282 patients) trauma. Only 15.4% (106 patients) presented with bilateral ocular trauma. According to the education status of trauma patients, 43.5% (299 patients) majority were illiterate while only 4.5% (31 patients) were post

graduate. 41% (282 patients) had primary qualification, 15.4% (106 patients) were matric and 18.2% were intermediate whereas 30.6% (210 patients) were graduate.

Patients who enrolled in our study had different socio economic status. There were 42.5% patients (292 patients) belong to the low socio economic status ( $< 20,000$ Rs/Month). 29% earned 20,000-40,000Rs/Month and 28.5% (196 patients) belonged to  $> 40,000$ Rs/Month class of monthly income.

There are different trauma injuries among total study subjects, 86.2% had mechanical trauma, 9.3% had chemical trauma, 1.9% had photic trauma, and 2.06% had thermal trauma.

Stratification with respect to age, gender, eye involved, education status and socio economic status was done to observe effect of these modifiers on eye trauma injuries.  $P$ -value  $\leq 0.05$  was considered as significant.

The results showed that there was significant association of mechanical trauma with age groups ( $p=0.019$ ), eye involved ( $p<0.001$ ) and socio economic status ( $p=0.007$ ) while no significant association was found with gender ( $p=0.693$ ), and education ( $p=0.067$ ). Out of 592 patients of mechanical trauma, 71.5% (423 patients) were males and 28.5% (169 patients) females. Similarly, 69.26% (410 patients) were adults while 30.74% (182 patients) belonged to pediatric group. Only 9.2% ( $n=55$ ) eyes had bilateral mechanical trauma whereas 46.28% ( $n=274$ ) of the eyes were right and 44.43% ( $n=263$ ) were left. With regards to education status, 30.40% ( $n=180$ ) were graduates and in majority while 3.71% ( $n=22$ ) were postgraduate. 14.7% ( $n=87$ ) were illiterate, 15.37% ( $n=91$ ) primary, 16.89% ( $n=100$ ) were matric and 18.91% ( $n=112$ ) were intermediate. According to socioeconomic groups, 42.23% (250 patients) earned  $< 20,000$ Rs/Month, 30.91% (183 patients) earned 20,000-40,000Rs/Month and 26.86% (159 patients) had  $> 40,000$ Rs/Month income.

We found significant association of chemical trauma with age group ( $p=0.027$ ) and eye involved ( $p<0.001$ ) while insignificant association was found with gender ( $p=0.187$ ), education ( $p=0.415$ ) and socio economic status ( $p=0.231$ ). Out of 64 patients of chemical trauma, 64.06% (41 patients) were males and 35.94% (23 patients) females. Similarly, 82.81% (53 patients) were adults while 17.19% (11 patients) belonged to pediatric group. 50% ( $n=32$ ) eyes had bilateral chemical trauma whereas 31.25% ( $n=20$ ) of the eyes were right and 18.75% ( $n=12$ ) were left. With regards to education status, 32.81% ( $n=21$ ) were graduates and in majority while both postgraduate and primary were 7.8% ( $n=5$ ). 17.19% ( $n=11$ ) were illiterate, 14.06% ( $n=9$ ) were matric and 20.31% ( $n=13$ ) were intermediate. According to socioeconomic groups, 39.06% (25 patients) earned  $< 20,000$ Rs/Month, 23.44% (15

patients) earned 20,000-40,000Rs/Month and 37.5% (24 patients) had > 40,000Rs/Month income.

There was significant association of photic trauma with gender ( $p=0.014$ ), age groups ( $p=0.014$ ), and education ( $p=0.028$ ) while no significant association was found with eye involved ( $p=0.115$ ) and socio economic status ( $p=0.408$ ). All 14 patients of photic trauma were adult males. Bilateral and right eye both presented with 35.71% ( $n=5$ ) and 28.56% ( $n=4$ ) were left. With regards to education status, 42.86% ( $n=6$ ) were illiterate and in majority while 14.29% ( $n=2$ ) were primary, graduate or postgraduate. 7.14% ( $n=1$ ) were matric and intermediate. According to socioeconomic groups, 57.14% (8 patients) earned <20,000Rs/Month, 14.29% (2 patients) earned 20,000-40,000Rs/Month and 28.57% (4 patients) had > 40,000Rs/Month income.

We found significant association of thermal trauma with eye involved ( $p<0.001$ ) and socio economic status ( $p=0.029$ ) while no significant association was found with gender ( $p=0.788$ ), age group ( $p=0.452$ ), and education ( $p=0.423$ ). There were 19 patients of thermal trauma, out of which 68.42% (13 patients) were males and 31.58% (6 patients) were females. Similarly, 63.15% (12 patients) were adults while 36.84% (7 patients) belonged to pediatric group. 73.68% ( $n=14$ ) eyes had bilateral thermal trauma whereas 10.58% ( $n=2$ ) of involved eyes were right and 15.79% ( $n=3$ ) were left. With regards to education status, 36.84% ( $n=7$ ) were graduates and in majority while 5.26% ( $n=1$ ) were intermediate. Both illiterate and postgraduate were 10.53% ( $n=2$ ). 15.79% ( $n=3$ ) were primary and 21.05% ( $n=4$ ) were matric. According to socioeconomic groups, 47.39% (9 patients) belonged to each <20,000Rs/Month and classes > 40,000Rs/Month income. 5.26% (1 patient) earned 20,000-40,000Rs/Month.

## DISCUSSION

In Pakistan, 6.78% of all hospital admissions comprise of ocular emergencies. <sup>(1)</sup> that makes them the third most common ophthalmic indication for hospitalization. <sup>(2)</sup> approximately 1.6 million people go blind from eye injuries, 2.3 million with bilateral visual impairment and 19 million with unilateral visual loss worldwide, making ocular trauma the commonest cause of unilateral blindness. <sup>(3)</sup> Majority of these injuries are preventable by patient education and use of protective wear alone. <sup>(6)</sup>

There were no recent studies on ocular trauma in our region i.e. Pakistan. Last study was published in 2007 where Khan et al. reported 1.9% patients suffering from trauma to both eyes. Almost 80% patients were male and 69% patients were below 30 years of age. Delayed presentation was more common and 63.61% patients presented after one week. <sup>(1)</sup> Although, our study shows similar trends like less incidence (15.4%) in bilateral eyes, more common in males (71.7%). Time of

presentation was also around 146.92hours (around 6 days). difference in percentages over the years may be due to more privileged settings (Karachi vs peshawar) and increased education and awareness. Studies from around the world, have also reported increased association of ocular trauma with male gender <sup>(4, 5, 9, 10, 11)</sup> Liggett et al conducted a study of 510 patients, of which 427 (83.7%) were male and 462 (90.6%) were literate. Adults, children and elderly comprised 403 (79%), 90 (17.6%) and 17 (3.3%) of the study population. <sup>12</sup>

According to Liggett <sup>12</sup> and Glynn <sup>13</sup>, less educated and less wealthy persons are prone to partake in risk taking activities and thus to be injured. In a door to door survey in rural Nepal, Khattry reported 50.9% literate males and 31.2% of literate females, among all ocular injury patients. <sup>14</sup> In their study from a south India community, Nirmalan et al reported lower odds ratios for literates for eye trauma. <sup>(15)</sup> However, studies from an urban slum population in Delhi, India did not corroborate the reported decreased risk of ocular trauma in literates. <sup>(16)</sup> This is in consistency with our findings of increase incidence of ocular trauma in lower socioeconomic population group. Also most people seeking treatment had higher education level i.e. graduate level.

Most of the above mentioned studies didn't take into account the causative agents. Ocular trauma was classified into mechanical (83.5%), chemical (7.6%), photic (2.3%) and thermal (2.2%) causes by Jafari et al. (5) Our population showed nearly similar patterns of mechanical (86.2%), chemical (9.3%), photic (1.9%) and thermal (2.06%).

Weak points of this study were that we did not use any international classification system. Also visual assessment at the time of presentation and visual prognosis were not recorded.

Aim of this study was to find out patterns of different causes of ocular injuries in our population. As literature search shows very limited data available locally in this regard. Result of this study will help us estimate the correct magnitude of different causes of ocular trauma in current scenario, which will in turn be helpful in modification of management of ocular emergencies in a better way.

## CONCLUSION

We have compared the patterns of various types of ocular trauma, presenting to our setting. Majority of the trauma was of mechanical type presenting in young adult males in unilateral eyes. Trauma was more prevalent in lower socioeconomic status. However, educated people came for treatment more frequently. Regardless of the type of trauma, age group and involvement of laterality of eye is significant.

**Author's Contribution:**

Concept & Design of Study: Maria Khan  
 Drafting: Abdul Hameed Siddiqui  
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 Revisiting Critically: Maria Khan, Abdul Hameed Siddiqui  
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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