

# THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

## A Clinical Study of Aetiology and Epidemiology of Corneal Lacerations

**Srihari Atti**

Associate Professor, Department of Ophthalmology, Osmania Medical College,  
Sarojini Devi Eye Hospital and Regional Institute of Ophthalmology, Hyderabad, Telangana, India

**Srinivas Prasad Killani**

Assistant Professor, Department of Ophthalmology, Osmania Medical College,  
Sarojini Devi Eye Hospital and Regional Institute of Ophthalmology, Hyderabad, Telangana, India

**Venkataratnam Peram**

Assistant Professor, Department of Ophthalmology, Osmania Medical College,  
Sarojini Devi Eye Hospital and Regional Institute of Ophthalmology, Hyderabad, Telangana, India

**Goli Sridhar**

Assistant Professor, Department of Ophthalmology, Osmania Medical College,  
Sarojini Devi Eye Hospital and Regional Institute of Ophthalmology, Hyderabad, Telangana, India

**Valupadusu Padmavathi**

Assistant Professor, Department of Ophthalmology, Osmania Medical College,  
Sarojini Devi Eye Hospital and Regional Institute of Ophthalmology, Hyderabad, Telangana, India

**Mahendra Superna**

Assistant Professor, Department of Ophthalmology, Osmania Medical College,  
Sarojini Devi Eye Hospital and Regional Institute of Ophthalmology, Hyderabad, Telangana, India

### **Abstract:**

*Background: Corneal Lacerations due to trauma are one of the common causes of Visual impairment.*

*Objectives: To evaluate the etiological and epidemiological profile of Corneal Lacerations.*

*Materials and Methods: This was a prospective observational study in department of Cornea, Sarojini Devi Eye Hospital, Osmania Medical College, Hyderabad over a period from August 2007 to April 2012. 50 Patients of Traumatic corneal lacerations were evaluated. The details of type of causative agent with type of activity when eye injury occurred and data of age, sex, urban/ rural and occupation were collected and analysed.*

*Results: The study group was 50 patients of traumatic corneal lacerations. 31(62%) were males with 19(38%) females. Age distribution was 8(16%) in >10 -20yrs, 22 (44%) in 21 – 30yrs, 15(30%) in 31 -40yrs and 5(10.0%) in 40 - 60yrs. Laterality was 17 (34.0%) RE and 33 (66.0%) LE. 29(58.0%) were from Rural with 21(42.0%) Urban. 34(68.0%) were in agriculture and 16(32.0%) in other occupations. The type of causative agent was wood in 21(42%), Stones in 14 (28%), Iron in 9(18%), Glass in 3(6%), Human nails in 2(4%) and Ball pen in 1(2%). The injuries were at work 38(76.0%), at home 7(14.0%) and road accidents 5(10.0%).*

*Conclusions: Nearly all the causes were avoidable. The majority of the injuries occurred at the work place due to the work related agents. The prevalence was significantly higher with rural agricultural background. Adequate eye protection is often a simple step.*

**Keywords:** Agriculture, corneal lacerations, ocular trauma, visual impairment

### **1. Introduction**

Ocular trauma is a major public health issue. The impact of ocular trauma, in terms of need for medical care, loss of income and cost of rehabilitation services, clearly indicate the need to strengthen the preventive measures. Ocular trauma can occur at work, at home, during sport activities, motor vehicle crashes or interpersonal trauma, but most commonly occurs at work place and increasingly, road accidents. The true incidence of accidents involving the eyes is not known and the domestic accidents are probably under-reported<sup>1,2,3</sup>. Like any other part of the body, eyes are also not exempted from injuries, in spite of the fact that they are well protected by the lids, projected margins of the orbit, the nose and a cushion of fat from behind. Nevertheless, it can be injured in a variety of ways, mechanical, chemical, radiation; heat etc. Laceration is a full thickness mechanical injury. In all types of ocular trauma, cornea is very likely to be involved, as it is situated in the fore most part of the eyeball. A full-thickness laceration penetrates completely through the

cornea. Of particular importance in developing countries is the occurrence of corneal lacerations among agricultural work, often leading to rapidly progressing corneal ulceration and visual impairment<sup>1,2,3</sup>. So, our study was to know the etiological and epidemiological profile of corneal lacerations.

## 2. Objectives

This study was to evaluate the etiological and epidemiological profile of corneal Lacerations, one of the common causes of Visual Impairment.

## 3. Methods

This was a prospective observational study in the department of Cornea, Sarojini Devi Eye Hospital and Regional Institute of Ophthalmology, Osmania Medical College, Hyderabad over a period from August 2007 to April 2012. The study group was 50 patients of traumatic corneal lacerations. The children below 10yrs were excluded. The study was approved by the institute ethical committee. The informed consent was taken from all the patients of the study group.

## 4. Methodology

A detailed clinical history was obtained with a complete ophthalmic examination for all the patients. Inclusion criteria the patients with laceration wounds of the cornea and the age group above 10yrs. Exclusion criteria were the patients with Lacerations extending to sclera, Lens involvement, uveal and vitreous incarceration, Posterior segment involvement and associated injuries of the orbit and lids. History of Chemical injuries and alcohol consumption at the time of trauma was elicited and excluded. Epidemiological data of patient's age, sex, occupation and urban/rural status with the presenting complaint were recorded. History of corneal trauma with type of the agents and the type of activity of the patient when eye injury occurred was noted. Each patient underwent Snellen's visual acuity testing, Slit Lamp clinical examination and fundus examination.

- Results: The study group was 50 patients of Traumatic Corneal Lacerations.

S. no.	Sex	No. of patients	%
1	Males	31	62.0
2	Females	19	38.0

*Table 1: Sex distribution  
Sex distribution was 31(62%) males and 19(38%) females*

S. no	Age group	Males	Females	No of patients	%
1	>10– 20	5	3	8	16.0
2	21 – 30	13	9	22	44.0
3	31 – 40	9	6	15	30.0
4	41 – 60	4	1	5	10.0
Total		31	19	50	

*Table 2: Age distribution  
Age distribution was 8(16%) in >10 -20yrs, 22 (44%) in 21 – 30yrs, 15(30%) in 31 -40yrs and 5(10.0%) in 40 - 60yrs.*

S. no.	Eye	No. of patients	%
1	RE	17	34.0
2	LE	33	66.0

*Table 3: Laterality of the Eye  
Laterality of the eye was 17 (34.0%) RE and 33 (66.0%) LE*

S. no.	Status	No. of patients	%
1	Rural	29	58.0
2	Urban	21	42.0

*Table 4: Rural / Urban Status  
Rural / Urban status was 29(58.0%) Rural and 21(42.0%) Urban*

S. no.	Occupation	No. of patients	%
1	Agriculture	34	68.0
2	Other occupations	16	32.0
	Housewives	6	12.0
	Students	6	12.0
	Electricians	2	4.0
	Industrial workers	2	4.0

Table 5: Occupation Status

Occupation status was 4 (68.0%) in agriculture and 16(32.0%) in other occupations which includes 6(12.0%) house wives, 6(12.0%) students, 2(4%) electricians and 2(4.0%) industrial workers.

S. no.	Agent	No. of patients	%
1	Wood	21	42.0
2	Stones	14	28.0
3	Iron	9	18.0
4	Glass	3	6.0
5	Nails	2	4.0
6	Ball pens	1	2.0

Table 6: Type of traumatic agent

Type of Traumatic Agent was wood in 21(42%), Stones in 14 (28%), Iron in 9(18%), Glass in 3(6%), Human nails in 2(4%) and Ball pen in 1(2%).

S. no.	Activity	No. of patients	%
1	At Work	38	76.0
2	At Home	7	14.0
3	Accidents	5	10.0

Table 7: Type of Activity of the patient when eye injury occurred

Type of Activity of the patient when eye injury occurred was 38(76.0%) at work, 7(14.0%) at home and 5(10.0%) with road accidents

## 5. Discussion

The fact that there are 180 million people in the world today severely visually disabled is a tragic, pathetic situation in both social and economic terms. Blindness and visual impairment have far-reaching implications for society, the more so when it is realized that 80% of visual disability is avoidable<sup>4,5,6</sup>. Corneal blindness is a major health problem worldwide. Of particular importance in developing countries is the occurrence of corneal trauma in agricultural work. Corneal lacerations or subsequent secondary infection (endophthalmitis or panophthalmitis) can result in complete or partial loss of vision, loss of the eye. A better understanding of the risk factors associated with it can help to design targeted campaigns to reduce the incidence of ocular trauma in community and develop effective plans for disseminating eye injury prevention material to the public.

The study group was 50 patients of corneal trauma with Lacerations. Our study Sex distribution was 62% males and 38% females with M:F ratio of 1.6:1. The studies of Sannapaneni Krishnaiah et al.<sup>7</sup>, Nirmalan PK et al.<sup>8</sup>, Dandona Let al.<sup>9</sup> and Li WernVoon et al.<sup>10</sup> showed higher incidence among males. In the study of Zigelbaum BM et al.<sup>11</sup> 70% were males and 30% were females. M:F ratio was 2:1 in Renu Dhasmana et al.<sup>12</sup> and 10:1 in Govind Singh Titiyal et al.<sup>13</sup>.

Our study Age distribution was 74% in 21 to 40yrs(44% in the age group 21-30yrs and 30% in the age group 31 – 40yrs) with 16% in >10 -20yrs, and 10.0% in 40 - 60yrs. In the study of Dandona L et al.<sup>9</sup> the majority of the trauma occurred during childhood and young adulthood. In the study of Li Wern Voon et al.<sup>10</sup> most were younger than 40 years of age. In the study of Zigelbaum BM et al.<sup>11</sup> the average age was 30.5yrs. In the study of Renu Dhasmana et al.<sup>12</sup> the predominant age group was 21-40 years with 55.29 %. In the study of Govind Singh Titiyal et al.<sup>13</sup> 56.4% were below 30 years of age. Our study Rural/Urban status showed 58.0% Rural and 42.0% Urban with Laterality of the eye as 34.0% RE and 66.0% LE.

Our study Occupation status showed 68.0% in agriculture and 32.0% in other occupations, which includes 12.0% house wives, 12.0% students, 4% electricians and 4.0% industrial workers. In the study of Nirmalan PK et al.<sup>8</sup> agricultural trauma was in 46.9%. In the studies of Sannapaneni Krishnaiah et al.<sup>7</sup> and Dandona L et al.<sup>9</sup> the incidence was more in agriculture than in other occupations. In our study the agent of trauma was wood in 42%, Stones in 28%, Iron in 18%, Glass in 6%, Human nails in 4% and Ball pen in 2%. In the study of Sannapaneni Krishnaiah et al.<sup>7</sup> injury with vegetable matter such as a thorn, branch of a tree etc. was the cause in 45.3%.

Our study showed 76.0% injuries at work, 14.0% at home and 10.0% road accidents. In the study of Sannapaneni Krishnaiah et al.<sup>7</sup> 55.9% were at the work followed by home 21.7%. In the study of Li WernVoon et al.<sup>10</sup> 71.4% were at work. In the study of Zigelbaum BM et al.<sup>11</sup> 37% were the road accidents, 31% at home, and 13% at the work. In the study of Renu Dhasmana et al.<sup>12</sup> the road accident were 37.86% and occupational 23.86%. In the study of Govind Singh Titiyal et al.<sup>13</sup> the causes were road accidents, sports and occupational in 32.7%, 25.5% and 20% respectively.

Adjusting for age and sex, higher frequency of injuries was seen with agricultural work in our study population. In all the studies, the incidence of injuries in males were much higher than females, may be related to occupational exposure, as they are more exposed to outdoor activities, take more active part in sports and games, and indulge more in violence and rash driving and more employed in industries and factories. Work related agents were found to be the major contributory risk factors for ocular injuries. There was a correlation between activity when injured and male gender. A significant difference of frequency of injuries of RE /LE and Rural/Urban was noted.

## 6. Conclusions

Nearly all the causes were avoidable. Most ocular injuries occurred in the rural population with agriculture background at the workplace. As the trauma is often preventable, Eye care programs targeting high-risk ocular trauma groups may need to consider ocular trauma as a priority. Strict Traffic Rules implementation and simple measures such as education regarding the use of protective eyewear could possibly significantly decrease this preventable cause of visual disability.

## 7. References

- i. Thylefors B<sup>1</sup>. Epidemiological patterns of ocular trauma. *Aust N Z J Ophthalmol.* 1992 May;20(2):95-8.
- ii. B.Shukla, S.Natarajan. New classification systems for ocular trauma, Appraisal of new classification of Ocular Trauma, Corneal injuries. In: B.Shukla, S.Natarajan.editor. *Management of Ocular Trauma*, 1<sup>st</sup>ed. New Delhi: CBS Publishers & Distributors Pvt.Ltd.; 2005. P. 8- 9, 12-13, 89 – 94.
- iii. Jack J Kanski, Brad Bowling. Trauma. In: Jack J Kanski, Brad Bowling, editor. *Clinical Ophthalmology – A Systematic Approach*, 7<sup>th</sup> ed. China. Elsevier Saunders; 2011. P. 885
- iv. K. Park. Epidemiology of Chronic Non-Communicable Diseases and conditions- Blindness. In: K Park, editor. *Park's Textbook of Preventive and Social Medicine*, 21<sup>st</sup> ed. Jabalpur (MP): M/s BanarsidasBhanot; 2011. P. 370-72.
- v. RamanjitSihota, RadhikaTandon. The causes of and Prevention of Blindness. In: RamanjitSihota, RadhikaTandon, editor. *Parsons' Diseases of the Eye*, 20<sup>th</sup>ed. New Delhi: Elsevier, A Division of Reed Elsevier India private Limited; 2007. P. 523-24, 529
- vi. A K Khurana, Aruj K Khurana, BhawnaKhurana. Community Ophthalmology. In: AK Khurana, editor. *Comprehensive Ophthalmology*, 5<sup>th</sup>ed. New Delhi: New Age International (P) Ltd; 2012. P. 474-78, 482-84.
- vii. Krishnaiah S<sup>1</sup>, Nirmalan PK, Shamanna BR, Srinivas M, Rao GN, Thomas R. Ocular trauma in a rural population of southern India: the Andhra Pradesh Eye Disease Study. *ophthalmology* 2006 Jul;113(7):1159-64. *ophthalmology* July 2006 volume 113, issue 7, pages 1159-64.
- viii. Nirmalan PK<sup>1</sup>, Katz J, Tielsch JM, Robin AL, Thulasiraj RD, Krishnadas R, Ramakrishnan R; Aravind Comprehensive Eye Survey. Ocular trauma in a rural south Indian population: the Aravind Comprehensive Eye Survey. *Ophthalmology*. 2004 Sep;111(9):1778-81.
- ix. Dandona L<sup>1</sup>, Dandona R, Srinivas M, John RK, McCarty CA, Rao GN. Ocular trauma in an urban population in southern India: the Andhra Pradesh Eye Disease Study. *Clin Experiment Ophthalmol.* 2000 Oct;28(5):350-6.
- x. Li Wern Voon<sup>1,2</sup>, Jovina See<sup>1</sup> and Tien Yin Wong<sup>1,3,4</sup> The epidemiology of ocular trauma in Singapore: Perspective from the emergency service of a large tertiary hospital. *Eye* (2001) 15, 75–81.
- xi. Zigelbaum BM<sup>1</sup>, Tostanoski JR, Kerner DJ, Hersh PS. Urban eye trauma. A one-year prospective study. *Ophthalmology*. 1993 Jun;100(6):851-6.
- xii. RenuDhasmana, Harsh Bahadur, Kunal Jain. Profile of ocular trauma in uttarakhand, a hospital based study. *Indian journal of community health*. Vol 24, No 4 (2012).
- xiii. Govind Singh Titiyal, Chandra Prakash, Swati Gupta, Vijay Joshi Pattern of Ocular Trauma in Tertiary Care Hospital of Kumaon Region, Uttarakhand. *J Indian Acad Forensic Med.* April-June 2013, Vol. 35
- xiv. Klopfer J<sup>1</sup>, Tielsch JM, Vitale S, See LC, Canner JK. Ocular trauma in the United States. Eye injuries resulting in hospitalization, 1984 through 1987. *Arch ophthalmol.* 1992 Jun;110(6):838-42.