

AN EPIDEMIOLOGICAL PROFILE, CLINICAL ASSESMENT AND INJURY PATTERN OF OCULAR TRAUMA IN RURAL POPULATION OF WESTERN UTTAR PRADESH- A TEACHING HOSPITAL BASED STUDY

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Abstract

Background: To determine the prevalence, clinical pattern of ocular trauma and the proportion of blindness and visual impairment due to trauma in a rural population in western Uttar Pradesh. **Materials and Methods:** It is a population-based cross-sectional observational study that surveyed 1325 people who visited the out-patient Ophthalmology department of Rajshree Medical Research Institute, Bareilly (U.P.) during the study period of 12 months from January 2020- January 2021. 200 cases of ocular trauma of all age group due to various causes were enrolled in the study after considering the inclusion and exclusion criteria. All participants underwent a standardized interview and extensive examinations of both anterior and posterior segments of the eye including visual acuity, intra-ocular pressure (wherever possible), and fundus examination. **Result:** Of the 200 participants, who were enrolled in the study, 162 were males with a mean age of (35 years) and 38 were females with a mean age of (28years). 189 patients had unilateral eye involvement while 11 patients had bilateral eye involvement. Visual outcomes were assessed and eye with visual acuity less than 6/60 on Snellen's Chart was considered blind. Men were more likely to have an eye injury than women with a p value of (<0.001). Most common is agricultural injury followed by road traffic accidents. 192 patients had blunt and adenexal injury while only 8 patients had penetrating injury which was associated with poor visual outcomes. **Conclusion:** Our study reports high proportion of occupational (agricultural) ocular trauma among rural population of Bareilly, revealing a high proportion of blindness and visual impairment. These findings suggest the need for educational strategies to increase eye health awareness in this rural population, appropriate and immediate first aid care and need for protective eye wear to reduce visual impairment.

INTRODUCTION

Ocular trauma is one of the most under-recognized causes of vision loss in the developed world and is the leading cause of monocular blindness.^[1] According to estimates of world health organization (WHO), the global annual incidence of ocular trauma is around 55 million and worldwide blindness in 1.6 million people is due to ocular trauma.

The impact of ocular trauma is a major cause for concern due to its devastating effects on the individual as well as the burden it places on the socioeconomic and health resources of any nation. The National Society for the prevention of blindness

estimates that upto 90% of all eye injuries are preventable.

Globally, eye injury is the commonest cause of visual loss. In India, over 500 lakh people suffer from blindness, and each year the count increases by 38 lakhs. It is to be noted that 1.2% of cases of blindness are caused by avoidable ocular injuries. A rural population may have a higher prevalence of blindness compared to an urban one because people living in rural areas are often uninformed about protective devices such as goggles and shields.^[2] Agricultural work and handling of animals are also major causes of eye injuries.

The mode of injury can be a direct blow to the eyeball or accidental blunt trauma.^[3] The traumatic lesions of blunt eye trauma are classified as closed

globe injury, globe rupture, and extra-ocular lesions and any anatomical eye structure may be involved. The closed globe injuries are further classified as contusion and lamellar lacerations. Open globe injuries can be laceration and globe rupture.^[4] Blunt or penetrating ocular trauma can lead to vision loss through cataract or glaucoma. In rural setup most common cause for visual deterioration is due to corneal involvement following ulceration which may be due to the pathogen or sometimes with the use of over the counter steroids. Even a trivial trauma in the visual axis may compromise vision to a large extent. The patients of road traffic accidents mostly have blunt ocular trauma with almost in all cases involvement of ocular adnexa. Epidemiological studies can pose difficulties because of remote trauma and problems in obtaining an accurate history. Furthermore, trials to better understand management can be limited by poor follow-up and lack of awareness. Strategies for prevention of ocular trauma require knowledge of the cause or mechanism of injury and proper use of protective eye wear which may enable more appropriate targeting of resources toward preventing such injuries. Both eye trauma victims and society bear a large, potentially preventable burden.

MATERIALS AND METHODS

Study Designs: This was a hospital-based cross-sectional observational study conducted at a tertiary care hospital of western Uttar Pradesh spanning a period of one year from January 2020 to January 2021. Patients with ocular injuries attending the casualty and the Ophthalmology department were selected for the study based on the inclusion and exclusion criteria.

Inclusion Criteria

Patients of all age group who are attending OPD or casualty or referred by private practitioners were included in the study. Even the patients who were surgically managed elsewhere in emergency but came to visit the OPD for further management were also included in the study.

Exclusion Criteria

Patients who failed to attend regular follow-ups.

Sample size: A total of 200 patients with ocular trauma who presented to the hospital during the study period were enrolled (based on a 95% confidence interval, and a desired margin of error = $4\% = 0.04$). Statistical analysis was based on age, sex, residence, marital status, occupation, per capita income, type of trauma and nature of damage, etc.

Examination: A Detailed history was taken with special emphasis to time, place and session of trauma, mode of injury, and type and nature of traumatic agent and also information about the emergency treatment taken. All patients underwent a comprehensive eye examination which included visual acuity (using the Snellen's chart), torch light, slit lamp examination, direct ophthalmoscopy and

intraocular pressure (IOP) was measured using Schiottz or Goldmann applanation tonometer (where it is possible). Imaging studies (like X Rays or CT Scans), primary and secondary surgical intervention and hospital admission was done when necessary. Then the patients were managed after obtaining informed consent. The patients were followed up at regular intervals, initially at one week and subsequently at three and six weeks. At every visit, the patients underwent a detailed ocular examination, which included a vision assessment using the Snellen chart and a slit-lamp examination. Changes, if any, were noted at each visit.

Patients presenting with corneal and conjunctival foreign body were treated with removal of foreign body under local anaesthetic on slit lamp. Traumatic black eye was treated with oral analgesics and anti-inflammatory drugs. Patients of hyphaema were treated with oral vitamin C tablets, topical steroids, cycloplegics and antiglaucoma medications.

Large conjunctival tear, corneal, scleral or corneoscleral tear were treated with suturing in operation theatre. Corneal abrasions and epithelial defects were managed with antibiotic patching for 24 hours, followed by topical antibiotics for 1 week. If the corneal injury was due to vegetative matter topical antifungals were the mainstay treatment. Globe rupture cases where the eye was non salvageable were enucleated. Patients with corneal tear and traumatic cataract underwent primary repair and secondary IOL implantation was done in secondary repair. Chemical injury cases were managed with normal saline irrigation followed by topical antibiotic, cycloplegic and steroid drops and antibiotic ointment. Treatment was continued for 7 days.

RESULTS

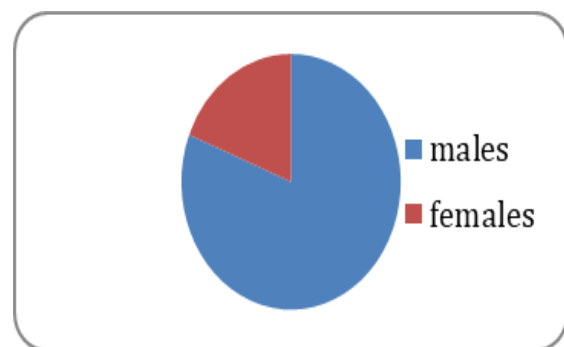


Figure 1: Pie chart showing proportion of males and females involved in ocular trauma

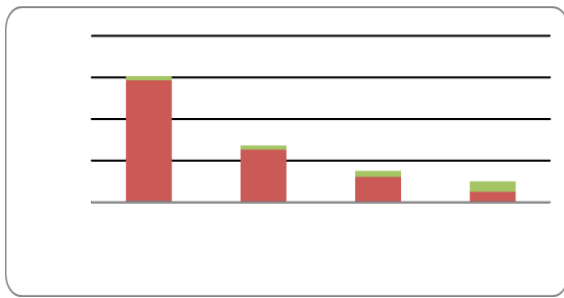


Figure 2: Bar chart showing distribution of different types of injuries

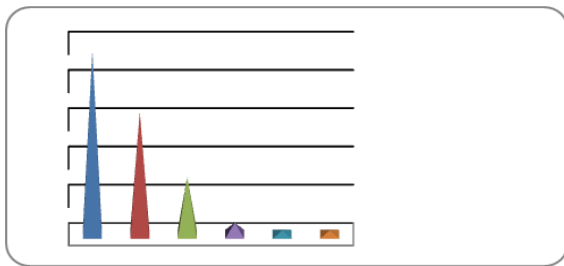


Figure 3: Bar chart showing distribution of different types of injuries

Out of 200 participants enrolled in the study 162 were male and 38 were female as males are more involved in outdoor activities. Male is to female ratio was 4.2:1 [Table 1]. Most common age group is between 2-80 years with a mean age of 35 years. Highest incidence of ocular trauma is seen in 18- 40 years age group which is considered to be the working population.

189 patients had unioocular involvement where the right eye was involved in 90 patients and left eye was involved in 99 patients, while 11 patients had bilateral ocular involvement [Table 2].

Among all the patients most common type of injury was blunt injury, followed by penetrating, perforating and chemical injury which is shown in [Table 3].

In the study we observed that most of the patients were literate which shows that work related injuries are more common. It also indirectly shows improvement in the educational facilities even in the rural areas as well [Table 4].

On the basis of occupational classification majority of the patients are farmers and labourers working in the fields. In the patients injury by vegetative matter was most common. Artisans like carpenters, welders etc. most common agent causing injury was wooden

stick or iron particle. In home makers most common mode of injury was either due to fall or assault [Table 5].

Majority of the patients with blunt superficial injury and mild chemical injury presented with good visual acuity like patients with minor abrasion or corneal foreign body away from the pupillary axis while patients with penetrating and perforating injuries had poor visual acuity at presentation and improved over a period of time with proper treatment and follow ups. [Table 6]

Most patients resolved to 6/6 – 6/12 group and 6/18-6/36 group after proper treatment and follow up.

Most common type of injury observed was closed globe injury seen in nearly 82% patients while only 18% patients had closed globe injury [Table 7].

Agriculture related trauma (48%) was the most common mode of injury in the rural population followed by accidental injuries (47%). Assault and chemical injuries contributed to a very small proportion. [Table 8]

Patients with agricultural related trauma corneal foreign body, corneal abrasion and corneal ulcerations (most commonly fungal corneal ulceration) are most common. Traumatic black eye is seen in almost all cases of accidental traumas and assault. Lid abrasions, lid tears, sub-conjunctival hemorrhage, sclera tears, corneal tears are common after road traffic accidents. Open globe injury patients irrespective of the cause may have lens damage, uveal prolapsed, intra ocular foreign body, vitreous hemorrhage, retinal detachment etc. [Table 9]

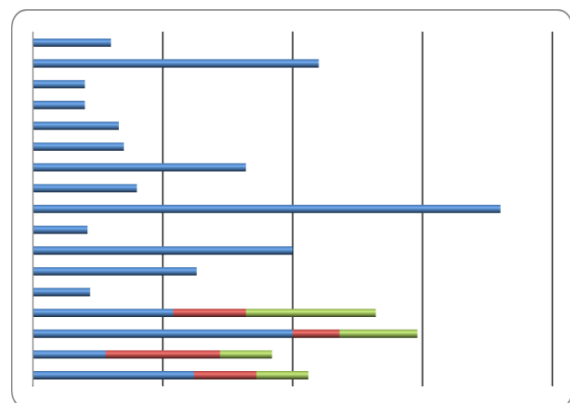


Figure 4: Bar chart showing distribution of different types of injuries

Table 1: Distribution of ocular trauma on the basis of gender

	Number	Percentage
Male	162	81%
Female	38	19%
Total	200	

Table 2: Distribution on the basis of ocular involvement

Right eye	Left eye	Bilateral eye
90 patients	99 patients	11 patients

Table 3: Distribution on the basis of type of injury

	Type of injury	Percentage
1.	Blunt injury	58%
2.	Penetrating injury	25%
3.	Perforating injury	12%
4.	Chemical injury	5%

Table 4: Educational status of patients

Illiterate	24%
literate	76%

Table 5: Distribution on the basis of occupational classification

	Occupation	Percentage
1.	Farmers	32%
2.	labourers	30%
3.	Artisans	8%
4.	Businessman	10%
5.	Factory workers	6%
6.	Home makers	2%
7.	unemployed	2%

Table 6: Visual acuity at the time of presentation

	Visual acuity	No. of patients	Percentage
1.	6/6- 6/12	76	38%
2.	6/18- 6/36	20	10%
3.	6/60- 2/60	16	8%
4.	3/60- PL+	102	51%
5.	No PL	06	3%

Table 7: Distribution on the basis of type of injury

	Type of injury	Number of patients	Percentage
1.	Closed globe injury	164	81.7%
2.	Open globe injury	36	18.3%

Table 8: Distribution on the basis of mode of injury

	Mode of injury	Percentage
1.	Agriculture related trauma	48%
2.	Road traffic accident	32%
3.	Accidental	15%
4.	Trauma	3%
5.	Assault	1%
6.	chemical	1%

Table 9: Distribution on the basis of diagnosis

	Anatomical part involved	Percentage
1.	Traumatic black eye	6.2%
2.	Lid abrasion	2.8%
3.	Lid tears	10%
4.	Sub-conjunctival hemorrhage	5.4%
5.	Sclera tears	2.2%
6.	Corneal foreign body	6.3%
7.	Corneal ulceration	10%
8.	Corneoscleral tears	2.1%
9.	Corneal tears or rupture	18%
10.	hyphaema	4%
11.	Lens damage	8.2%
12.	Uveal prolapse	3.5%
13.	Retinal detachment	3.3%
14.	Vitreous hemorrhage	2%
15.	Intra ocular foreign body	2%
16.	Corneal abrasion	11%
17.	corneal burn	3%

DISCUSSION

We conducted study in 200 patients presenting to the Ophthalmology department with ocular trauma. The patients were managed with prompt treatment

and care and thus we observed that 81% of them achieved a final visual acuity of 6/18 or better, fulfilling the WHO criteria for no or mild visual impairment.^[5]

In our study, males constituted 81% of the patient population while females comprised 19 %, resulting in a male-to-female ratio of 4.2:1. This is well supported by a study conducted by Gothwal,^[6] in Hyderabad where males were involved in 86% of cases of ocular trauma

A study done by Agrawal et al,^[7] had a cohort with males comprising 84.8% of the total and females making up 15.2%. A study by Karve et al,^[8] found that males were affected 3.7 times more than females. It correlates well with the fact that males are involved in more outdoor activities as compared to females.

In our study most common age group involved in trauma was 18-40 years of age group because this group constitutes the major portion of the working population. This correlates well with the study conducted by Poy Raiturcar et al,^[9] in 500 patients where the prevalence of ocular injuries was highest in the age group of 21-40 years (45%). Kumar and Vishwas,^[10] and Singh et al,^[11] also reported the same in their study.

In this study we found out that most common type of injury was blunt injury closed globe injuries followed by penetrating and perforating injury. In a study by Shukla et al,^[12] 66.7% had closed globe injuries, whereas 26.7% had open globe injuries. Poy Raiturcar et al's,^[9] study showed that closed globe injuries were seen in 450 (90%) patients, while 26 (5.2%) had open globe injuries. This was also similar to study by Karve et al,^[8] where most ocular traumas occurred due to blunt objects (25.75% of cases) and study by Nirmalan et al,^[13] which reported that blunt objects were the most common cause of injury in their study (54.9%).

Agriculture related trauma among farmers and laborers was most common than accidental traumas in the rural population. Such patients mostly presented with lid injuries or corneal injuries. In a study by Laishram et al,^[14] 46.15% of cases had adnexal injuries, followed by 31.92% with contusion injuries, and a globe rupture was the least common type. This is similar to what was found in study of Mohammed D Adamu et al.^[15] This may be due to their being the most exposed part of the eye Lens damage was seen in 11.19% of patients.

At presentation the visual acuity was between 3/60 to PL+ in majority of the patients which improved to 6/12 to 6/18 group in majority of the patients which was similar to other studies as well.^[16]

CONCLUSION

This study highlights epidemiology of ocular trauma in the rural population of western Uttar Pradesh. Agriculture is the major occupation in rural areas in central India, and men in the age group of 20-40 years were found to be predominantly affected in our study as most of the males in this age group are

engaged in manual labor to earn a living, which makes them vulnerable to injuries of all sorts. Mass health education and awareness about risk of ocular trauma, morbidity caused by delayed presentation, and need to adopt safety or preventive strategies should be focused, especially during travel, playground, and at workplace. And in this area, males are the most common earning members in families. It is necessary to educate the working class about exercising caution while working as well as gaining awareness about traffic rules to reduce the incidences of road traffic accidents. It is also important to raise awareness about getting treatment immediately following injuries.

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