

# Estimation of Financial Burden to Victims of Ocular Injuries Presenting to a Tertiary Care Hospital in Coastal Karnataka

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## Abstract

The aim of the study is to measure the financial burden incurred by patients of ocular injuries visiting a tertiary care teaching hospital. Methods: The study was a prospective questionnaire based telephonic interview with 262 patients who were treated at the Department of ophthalmology at a tertiary care teaching hospital in South India, for ocular injuries; over the past 5 years between Jan 2012 and Dec 2016. Each patient in Udupi district was interviewed in person. For patients who were based outside Udupi, a letter containing the study details, the basic information questionnaire and an informed consent form was sent via post along with a prepaid reply envelope. 163 patients were excluded and a final sample size of 99 was achieved. The results of the study showed that patients in the age group of 28-37 years formed the major group affected by ocular injuries. Males were affected more than females. The most common pattern of ocular injuries was other injuries of eye and orbit followed by ocular laceration and rupture with prolapse or loss of intraocular tissue. In the current study, the right eye was injured 44% of the time, the left eye 43% of the time and both eyes 13% of the time. A majority of the patients were not able to return to the same job due to the severity of the injuries sustained by them. Around 57% of patients of ocular injury are earning, 6% are not earning and the remaining 37% are dependent on their family.

**Keywords:** Ocular injury, Eye injury, Financial burden, Medical expenses, Open globe injury, Closed globe injury.

## Introduction

Eyes constitute only 0.1% of the total body surface area.<sup>(1)</sup> Ocular trauma, which was once a “neglected disorder,” has been highlighted recently as a cause of visual morbidity.<sup>(1)</sup> The frequency of eye injuries in the first three decades of life is remarkably high and often results in physical and psychological trauma and

associated financial burden to the injured patient for the rest of their life. It is therefore important to understand the causes of ocular trauma and their management and prevention.<sup>(2,3)</sup> Ocular trauma care in developing countries leaves much to be desired. There is a general lack of access to preventive health care at all levels.<sup>(5,6)</sup> The male to female ratio of ocular injury victims is around 4:1 worldwide with Open globe injury being the commonest form of injury. A significant number of studies on ocular injuries have been conducted in the US as well as in other developed countries but the pattern of ocular injuries in developing countries is not known due to a lack of data.<sup>(5)</sup> The annual incidence rate of

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hospitalization for eye injuries per lakh population/year is 5–16% worldwide. Blindness resulting from ocular trauma has prevalence rates of 0.6%–0.8%.<sup>(2)</sup>

A study in the urban slums in Delhi reported a 2.4% prevalence rate for ocular trauma resulting in blindness in 11% of injured eyes.<sup>(4)</sup> Andhra Pradesh and Tamil Nadu have found prevalence rates of 2% to 10% for ocular trauma.<sup>(2)</sup> Annually, over 2.5 million Americans suffer an eye injury, and globally more than half a million blinding injuries occur every year. The prevalence of ocular trauma in India was reported at 2.4%.<sup>(3)</sup> Worldwide, there are approximately 1.6 million people blind from eye injuries, 2.3 million bilaterally visually impaired and 19 million with unilateral visual loss.<sup>(1)</sup> The forty-seventh round of NSSO, 1991 noted a high prevalence of injury-related visual disability (35/1000 in rural and 32/1000 in urban areas). According to the 58th round of NSSO report, 2002, injury-related visual disability increased to 51/1000 population.<sup>(4)</sup>

Loss of vision in one or both eyes is so significant that it has been classified as 24% of whole person impairment and 85% of whole-person disability, respectively.<sup>(7)</sup> Worldwide eye injuries are responsible for about 1.6 million people being blind and a further 19 million suffering from monocular blindness.<sup>(8)</sup> Even though the socioeconomic burden of ocular injuries are overestimated, the patients affected are usually afflicted with life style changes, a lack of job opportunities and often permanent physical problems.<sup>(9)</sup>

Considering the importance of ocular trauma and its effect on eye health and public health,<sup>(10)</sup> prevention of ocular injuries must form the basis of management for which collection of data is a must. Seeing the seriousness and enormity of ocular injuries, this study is undertaken to assess the financial burden associated with ocular injuries and suggest recommendations which can help prevent ocular trauma.

### **Methodology**

The study was a prospective questionnaire based telephonic interview which included 262 patients (213 men and 49 women). These were the patients who were treated at the Department of Ophthalmology, Kasturba hospital, Manipal, for ocular injuries over the past 5 years between Jan 2012 and Dec 2016. The contact details of these patients were accessed from their case files in the Medical Records Department (MRD) and

details of their medical expenditure were accessed with prior permission from the Finance Department of the hospital. Each patient in Udupi district was interviewed in person. Informed consent was taken and then questions like income before and after injury, recovery period and source of financing were asked.

For patients based outside Udupi, a letter containing the study details, basic information questionnaire (not involving questions related to their injuries), the informed consent form and a prepaid reply envelope were sent via post. Patients who replied back and patients who agreed for a telephonic interview were contacted for additional information. Out of all the cases of ocular injuries a final sample size of 99 was achieved. A total of 163 were excluded (patients who did not consent to participate in the study, patients who did not reply back)

### **Outcomes measured**

- The following outcomes were measured: -
- Incomes before and after the eye injury
- Recovery time
- Income during the recovery period
- Return to the same job or not
- Income lost per month
- Percentage change in income.
- Medical expenditure
- Treatment expenditure borne by
- Average out of pocket medical expenses

### **Data analysis and observations**

The objective was to assess the financial costs of ocular injuries to the patients presenting to the tertiary care teaching hospital.

Out of the sample of 262 patients, 99 patients were considered for this study.

- A comparison of incomes before and after the ocular injury was done using a paired t-test, in which the p value <0.001 showed that there was a significant difference in incomes before and after the ocular injury.

- The median of the income before and income after the ocular injury was calculated separately for each injury.
- The recovery time from ocular injury among patients was calculated and presented in the form of a percentage.
- Income in the recovery period was calculated i.e. how many had some income source and how many did not have any source of income in the recovery period. It is presented in the form of frequencies and percentages.
- The percentage of patients who were able to return to the same occupation post recovery and those who were not able to return to the same occupation was calculated.
- The frequency and percentage of victims who had income post recovery and those who didn't have any income post recovery was calculated.
- The percentage change in the income post recovery was calculated which was categorized as no change in income, decrease between 50% to 100%, decrease up to 50% and increase in income post recovery.
- Cross tabulation for each type of injury was done which presented the relation between pattern of ocular injuries and return to same occupation. 9 patterns of ocular injuries were identified.
- Medical expenses i.e. the total cost incurred to the patient during the course of treatment along with source of financing of the medical expenses was calculated, and represented in the form of percentages.
- Income lost per month by the victims was also calculated.

## Results

### Gender

It was observed in almost all the articles referred that males were affected more than females. This study also reported a similar pattern. Out of 99 patients, 73 males and 26 females had ocular injuries.

### Income before injury:

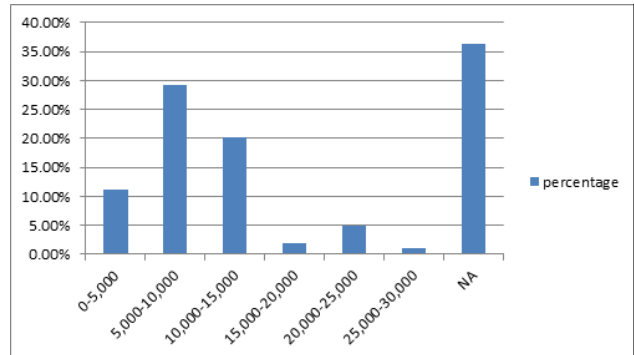


Fig 1. Income before injury

The participants had an income of about 9500 rupees before injury.

### Income after injury:

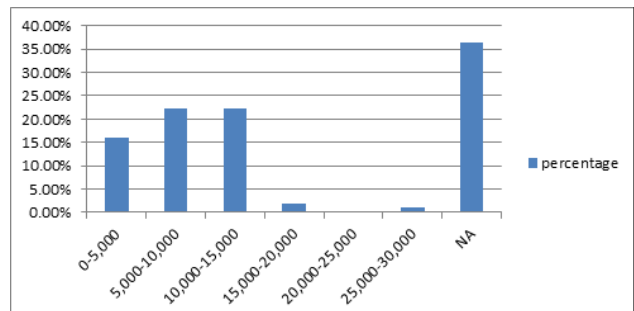


Fig 2. Income after injury

The participants had an income of about 8000 rupees after injury.

### Recovery time (days)

About 28% of victims healed between 11- 20 days of the injury, 25% of victims took 21-30 days to heal, 19% of victims healed within 10 days, 12% took more than 60 days to recover, 8% took 31-40 days and 7% took 41-50 days.

### Income in the recovery period

Some of the victims of ocular injury had some sort of a source of income in the recovery period: mostly paid by the employer or their own business or rental income. Many of them did not have any source of income during the recovery period. During the recovery period, 18 patients had an income while 45 patients had no income. 36 were not considered as they were students, housewives, or patients who were dependent on their family.

Return to the same occupation

Even though a majority of patients were able to continue with the same occupation, there were a considerable number of patients who had to either change their occupation or who had a significant fall in their income or were not working at all. Out of 99 patients, 52(48%) were able to return to the same occupation. 10(18%) were not able to return to the same occupation. 36(36%) were not considered as they were students, housewives, or patients who were dependent on their family.

Income post recovery

About 56(57%) of victims had an income post recovery. 6(6%) did not have a source of income post recovery. 36(36%) were not considered as they were students, housewives, or patients who were dependent on their family.

Percentage change in income post recovery

Among 99 victims of ocular injury, 49(50%) of victims had no change in their income post recovery. 12

victims out of 99 (12%) saw a fall in income. 2 victims out of 99(2%) had an increase in income. 36(36%) were not considered as they were students, housewives or patients who were dependent on their family.

**Table 1. Showing patients with percentage change in income post recovery**

Percentage change in income post recovery	Frequency	Percentage
No change	49	49.50%
Decrease in income	12	12.12%
Increase in income	2	2.02%
NA	36	36.36%
Total	99	100%

Pattern of ocular injuries vs return to the same job

Following is the cross tabulation of ocular injuries and return to the same job

**Table 2. Relation between pattern of ocular injuries and return to the same job.**

Code	Pattern	Return to same job			Total
		NA%	No%	Yes%	%
S05.0	Injury of conjunctiva and corneal abrasion with mention of foreign body	2.2(1)	0(0)	7.7(4)	51.(5)
S05.1	Contusion of eye ball and orbital tissues	27(10)	40(4)	9.6(5)	19.2(19)
S05.2	Ocular laceration and rupture with prolapse or loss of intraocular tissue	21.6(8)	20(2)	23(12)	22.2(22)
S05.3	Ocular laceration without prolapse or loss of intraocular tissue	13.5(5)	0(0)	9.6(5)	10.1(10)
S05.4	Penetrating wound of orbit with or without foreign body	2.7(1)	0(0)	3.8(2)	3(3)
S05.5	Penetrating wound of eye ball with foreign body	0(0)	0(0)	9.6(5)	5.1(5)
S05.6	Penetrating wound of eye ball without foreign body	0(0)	10(1)	3.8(2)	3(3)
S05.8	Other injuries of eye and orbit	32.4(12)	20(2)	21.2(11)	25.3(25)
S05.9	Injury of eye and orbit , part unspecified	0(0)	10(1)	11.5(6)	7.1(7)
	Total	100(37)	100(10)	100(52)	100(99)

Medical expenses

It was seen that medical expenditure for machine-cut ocular injuries ranged from 1065 rupees to 3,13,336 rupees. The majority of the patients spent between 10,000- 20,000 rupees on the treatment(41%). For 33% of patients, the expenditure on the treatment was less than 10,000 rupees. For 9% of patients, the expenses lay between 20,000-30,000 rupees. About 9% of victims had to spend between 30,000-40,000 rupees on the treatment. About 4% of the victims spent more than 50,000 rupees on treatment. 3% of victims spent between 40,000-50,000 rupees on treatment

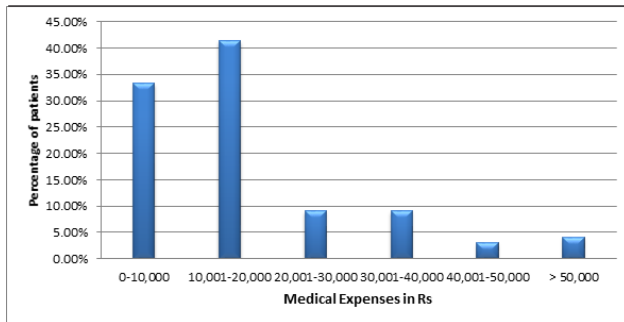


Fig 3. Expenditure on treatment of ocular injuries

Types of expenditure

Almost half (65%) of the patients paid the expenses out of their pocket ( self, family, self + family). This was about 11,480 rupees.

Expenses of 21% of the victims were covered under insurance.

For 28% of the victims, their families paid the medical expenses.

For 33% of the victims, medical expenses were paid by a combination of self, family, insurance and employer.

**Table 3. Frequencies of type of expenditure**

Type of expenditure	Frequency	Percentage
Self	18	18.18%
Family	28	28.28%
Insurance	21	21.22%
More than 1 option	32	32.32%
Total	99	100%

**Discussion**

The present study showed that patients in the age group of 28-37 years formed the major group affected by ocular injuries and males were affected more than females. The most common pattern of ocular injuries was other injuries of eye and orbit followed by Ocular laceration and rupture with prolapse or loss of intraocular tissue. In the current study, the right eye was injured 44% of the time, the left eye 43% of the time and both eyes 13% of the time.

In the present study, the majority of ocular injury patients got healed between 11 to 20 days followed by patients who got healed between 21 to 30 days. About 48% of ocular injury patients were able to return to the same occupation; 18% were unable to return to the same occupation. This study has calculated the medical or in-hospitalization expenses only for ocular injuries. The majority of patients spent between 10,000 and 20,000 rupees on the treatment. The majority of the medical expenses were paid out of pocket.

In the present study, the median of income before ocular injury was calculated to be 9,500 rupees and the median of income after ocular injury was calculated to be 8,000 rupees. There was a significant fall in the income of patients. 49% of patients were earning the same income post recovery that they were earning before the occurrence of the ocular injury; about 12% of patients had a fall in income. It is clear that ocular injury is a burden on society. That the majority of patients were not able to return to the same job shows that the severity of those injuries had restricted them from continuing in the same job.

**Conclusion**

We conducted the study to estimate the average financial burden of ocular injuries on the affected individuals. However, the study results reflected a particular pattern of age and gender distribution of ocular injuries among the affected individuals also. The study reported that the young male adults constituted the larger group of people who were affected by ocular injuries. The frequency analysis revealed that there is no such significant difference in proportion of left and right eye injuries where as proportion of both eye injuries was lesser than that of the single eye injuries. Minimum healing time from ocular injuries was reported to be 11 days and average out of pocket expenditure for ocular

injuries as reported by study participants was around 11,500 Rs. Wage loss during this minimum duration of healing time which is around two weeks creates an additional financial burden over and above the out of pocket expenditure. Also, among the study participants there was a down fall of income reported after the ocular injuries get healed. All these factors together indicate that ocular injuries can be cause of considerable financial burden among the affected individuals.

However, financial protection mechanisms in terms of health insurance were insufficient as it was only availed by one fifth of the study participants. Eyes are indispensable to human activity. Policies to use personal protective equipment to prevent ocular injuries should be made and implemented in all areas of human work, primarily among blue collar workers and in the informal and unorganized sector. Financial protection mechanisms may be leveraged for protecting people from the financial burden from ocular injuries. This study results warrant for a larger study among the people especially among people working in the occupations which involves risk of ocular injuries as an occupational hazard.

**Ethical Clearance-** Taken from Institutional ethics committee

**Source of Funding-** Self

**Conflict of Interest -** Nil

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