

An Observational Cross-Sectional Determination of the Epidemiology and Type of Ocular Injuries that Resulted from Motorcycle Accidents

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Abstract

Aim: This study was aimed at finding out epidemiology and type of ocular injuries that resulted from motorcycle accidents.

Methodology: This is a type of cross sectional study including 240 patients. All the cases referred to the Department of Ophthalmology, NMCH, Patna, Bihar, India from November 2017 to October 2018. a result of motorcycle accidents and cases of eye injuries occurring in patients seen at the Accident and Emergency Unit of the Hospital were included. Visual acuity was measured with Snellen's chart in those who were conscious. Eye examination was done with the aid of a pen torch, slit lamp biomicroscope and direct Ophthalmoscope. The age, sex and presenting complaints were noted.

Results: Out of 240 patients, there were 197 (82.1%) male and 43 (17.9%) female cases. The commonest affected age group was 21-30 years with 74 (30.8%) cases followed by 31-40 years age group of 57 (23.7%) cases and least affected age group was less than 10 years and more than 80 years with 03 (1.3%) and 08 (33.3%) patients respectively. Most common presenting complaint was pain in 132 (55.0%) cases. Most common injured persons were the motorcycle drivers 157(65.4%). Out of 284 eyes, 156 (54.9%) eyes had visual acuity 6/6 to 6/18, 90 (31.7%) eyes had visual acuity 6/24-6/60 and 7 (2.5%) eyes had visual acuity of <3/60- PL+ / No PL (Perception of light) at presentation. Involvement of the conjunctiva either in form of traumatic conjunctivitis, sub conjunctival haemorrhage or conjunctival laceration was the commonest condition seen in 66 eyes (23.2%). This is followed by corneal lesions either in form of laceration, abrasion or ulceration, contributing 20.1% (57 eyes) and lid laceration in 54 eyes (19.1%).

Conclusion: Ocular injuries secondary to motorcycle accidents are becoming very common. Public enlightenment campaigns through electronic media and other means to educate people on the need to seek early and appropriate treatment in cases of ocular injury and road safety programs should also be embarked upon.

Keywords: Accident, lacerations, conjunctivitis, haemorrhage.

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Introduction

Road traffic accidents is one of the important causes for morbidity and mortality worldwide, accounting for over a million deaths per year [1]. Road traffic accidents are defined as a collision involving at least one vehicle in motion on a public/private road that results in at least one person being killed or injured [2]. In India, for individuals above 4 years of age, more life years are lost because of traffic crashes than due to cardiovascular diseases or neoplasms [3].

Worldwide, the estimated number of people losing their life in road traffic crashes annually is around 1.2 million, while the number of injuries could be as high as 50 million [4, 5]. Over 80,000 persons die in the traffic crashes annually in India; over 1.2 million are seriously injured and about 300,000 get disabled permanently. Most of these accidents are from two wheelers [6].

The ocular injuries are classified according to World Health Organization (WHO) and Birmingham Eye Trauma Terminology System (BETTS) [7] as extraocular and intraocular. Intraocular injuries are further classified as closed globe injury (partial thickness wound in the eyeball wall) as contusion or lamellar laceration and open globe injury (full thickness wound in the eyeball wall) as rupture involving blunt trauma, or laceration, penetrating or perforating injury or intraocular foreign body involving sharp forces. Adenexal injuries involve eyelid and/or conjunctiva.

The severity of extraocular and intraocular closed globe injury was classified into mild, moderate and severe according to the classification of Duke Elder [8]. Intraocular open globe injuries were classified into mild, moderate and severe according to classification by Vasu et al which was adapted from Organ Injury Scaling VII described by the American Association for the Surgery of Trauma [9].

The ocular trauma can cause severe and permanent visual impairment owing to delicate and complex architecture of the eye [10]. The ocular trauma are the most common cause of monocular low vision and blindness [11]. The ocular trauma is one of the leading causes of preventable blindness in the world [12, 13]. Therefore, early detection and treatment is the key for ocular trauma management to prevent complications. This study was aimed at finding out epidemiology and type of ocular injuries that resulted from motorcycle accidents.

Materials and Methods:

This is a type of cross sectional study including 240 patients All the cases referred to the Department of Ophthalmology, NMCH, Patna, Bihar, India from November 2017 to October 2018. as a result of motorcycle accidents and cases of eye injuries occurring in patients seen at the Accident and Emergency Unit of the Hospital were included. Visual acuity was measured with Snellen's chart in those who were conscious.

Eye examination was done with the aid of a pen torch, slit lamp biomicroscope and direct Ophthalmoscope. The age, sex and presenting complaints were noted. The type of ocular trauma was documented. Any co-existing trauma in other parts of the body was also noted. We ascertained if the patient was a motorcyclist or a passenger on a motorcycle, previous involvement in motorcycle accident and whether they had a helmet on or not at the time of the accident.

Results:

Out of 240 patients, there were 197 (82.1%) male and 43 (17.9%) female cases. The commonest affected age group was 21-30 years with 74 (30.8%) cases followed by 31-40 years age group of 57 (23.7%) cases and least affected age group was less than 10 years and more than 80 years with 03

(1.3%) and 08 (33.3%) patients respectively. Most common presenting complaint was pain in 132 (55.0%) cases. Most common injured persons were the

motorcycle drivers 157(65.4%). Surprisingly out of 240 patients with ocular injury only 86 (35.8%) patients were wearing a helmet at the time of accident.

Table 1: Demographic details, presenting complaints and type of injured person

Variables	Number (n=240)	%	
Gender	Male	197	82.1
	Female	43	17.9
Age	<10	3	1.3
	11-20	49	20.4
	21-30	74	30.8
	31-40	57	23.7
	41-50	34	14.3
	51-60	15	6.2
	>60	8	3.3
Presenting complaint	Pain	132	55.0
	Redness	56	23.3
	Swelling	35	14.6
	Diplopia	17	7.1
Type of injured person	Driver	157	65.4
	Rider	83	34.6
Use of Helmet	Yes	86	35.8
	No	154	64.2

Total 284 eyes of 240 patients were traumatized. Involvement of the conjunctiva either in form of traumatic conjunctivitis, sub conjunctival haemorrhage or conjunctival laceration was the commonest condition seen in 66 eyes (23.2%). This is followed by corneal lesions either in form of laceration, abrasion or ulceration, contributing 20.1% (57 eyes) and lid laceration in 54 eyes (19.1%).

Table 2: Type of ocular injuries

Types of Ocular Trauma	Number of Eyes (n=284)	Percentage
Conjunctivitis, sub conjunctival haemorrhage laceration	66	23.2
Lid laceration	54	19.1
Corneal laceration/abrasion/ulceration	57	20.1
Conjunctival/Corneal foreign body	15	5.3
Hypopyon	12	4.2
Hyphaema	10	3.5
Iritis	21	7.4
Cataract/Lens Subluxation	7	2.5
Vitreous haemorrhage	9	3.1
Optic age atrophy	33	11.6
Total	284	100

Out of 284 eyes, 156 (54.9%) eyes had visual acuity 6/6 to 6/18, 90 (31.7%) eyes had visual acuity 6/24-6/60 and 7 (2.5%) eyes had visual acuity of <3/60- PL+ / No PL (Perception of light) at presentation.

Table 3: Visual acuity at the presentation of patients

Visual acuity	Number	%
6/6 -6/18	156	54.9
6/24-6/60	90	31.7
6/60-3/60	31	10.9
<3/60- PL+ / No PL	7	2.5
Total	284	100

Discussion:

Motorcycles have recently become a major means of transportation both in Urban and Rural parts of Nigeria and some other developing countries. This is because of its ability to meander through traffic congestion and also ply inadequately maintained earth roads more easily than cars and buses [14]. As opposed to developed countries where the rider as well as the passenger on a motorcycle are required to wear safety helmets by law, this has not been successfully enforced in Bihar region even though the legislation provides for it.

Poor enforcement of licensing regulations has also allowed room for some rider who have not had the mandatory eye test, and riding proficiency tested, to obtain licenses. As a result, many motorcycle riders are ignorant of the Highway Code. This situation has resulted in the frequent occurrence of accidents between motor vehicles and motorcyclist, motorcyclist and pedestrians as well as between motorcyclists. These accidents are sometimes fatal with severe injuries to various parts of the body.

In our study, commonest age group of ocular injury was between 21-30 years with 30.8% cases which is also known as the productive age group of the country, is similar to the reports of the studies of Ezegwei IR [15], Armstrong GW et al [16], and Arora AS et al [17]. In our study, male (82.1%) patients were more commonly

affected than females (17.9%) similar to a study by Gahlot A et al [18].

The conjunctiva, eyelids and cornea were the eye structures mostly affected. This is expected because of the anterior location of the structures [19, 20]. Involvement of the conjunctiva either in form of traumatic conjunctivitis, sub conjunctival haemorrhage or conjunctival laceration was the most common condition seen. Corneal laceration, abrasion or ulceration and lid laceration were the next commonest type of ocular injury recorded. This again is not surprising because most motorcycle riders and passengers do not wear protective goggles.

Conclusion:

Ocular injuries secondary to motorcycle accidents are becoming very common. In order to achieve a significant improvement in road safety, thrust should be given with multiple strategies to minimize road accidents about awareness about road safety, safe road infrastructure and enforcement of safety laws. The government should therefore, through the law enforcement agents begin to enforce the legislation on the use of protective helmet by motorcycle riders as well as the passengers. Public enlightenment campaigns through electronic media and other means to educate people on the need to seek early and appropriate treatment in cases of ocular injury should also be embarked upon.

References:

1. World Health Organisation Collaborating Centers for Neurotrauma. World Health Organisation; Geneva: 1995. Prevention, critical care and rehabilitation of neurotrauma—perspectives and future strategies.
2. WHO. World Health Organisation; Geneva: World Report on Road Traffic Injury Prevention: Summary; 2004:1–52.
3. Mohan, D. and Varghese, M. Injuries in SouthEast Asia Region: Priorities for policy and action. Delhi: SEARO, World Health Organization; 2002:1-19.
4. Murray, C. and Lopez, A. The global burden of disease. vol.1 Cambridge M.A. Harvard University Press. 1996.
5. Bangdiwala, S.I. Methodological consideration in the analysis of injury data. In: Mohan, D., Tiwari, G. (eds). Injuries prevention and control. New York: Taylor & Francis publishers; 2000:27-34.
6. Mohan, D. Road traffic deaths and injuries in India: Time for action. Nat Med J India. 2004; 17:63-66.
7. Kuhn F. Epidemiology of ocular trauma In: Kuhn F, Morris R, Mester V, Witherspoon D. Ocular Traumatology. Springer-Verlag Berlin Heidelberg.2005:47-77.
8. Duke Elder S, MacPaul PA. Injuries; Part I Mechanical Injuries. System of Ophthalmology 1972;14.
9. Vasu U, Vasnaik A, Battu R. Occupational Open Globe Injuries. Ind J Ophthalmol 2001;49:43-47.
10. Enock ME, Dawodu OA, Osahan AI. Motorcycle related ocular injuries in Irrua specialist teaching hospital, Irrua, Edo state, Nigeria. JMBR 2008; 7:24-9.
11. Karlson T, Klein B. Incidence of acute hospital treated eye injuries. Arch Ophthalmol 1986; 104:1473-76.
12. Parver LM. Eye Trauma: The neglected disorder. Arch Ophthalmol 1986; 104: 1452-53.
13. Pizzarello LD. Ocular trauma; time of action. Ophthalmic Epidemiol 1998; 5:115-16.
14. Osime OC, Ohanaka. EC. Road traffic accidents in a Semi Urban Community in Edo State of Nigeria JMBR 2003; 2(1): 18-24.
15. Enock ME, Dawodu OA, Osahan AI. Motorcycle related ocular injuries in Irrua specialist teaching hospital, Irrua, Edo state, Nigeria. JMBR 2008; 7:24-9.
16. Armstrong GW, Chen AJ, Linakis JG, Mello MJ, Greenberg PB. Motor Vehicle Crash-Associated Eye Injuries Presenting to U.S. Emergency Departments. Western Journal of Emergency Medicine. 2014; 15:693-700.
17. Arora AS, Bhargava G, Chauhan A, Singh P. Ocular trauma in road traffic accidents: Experience at Mathura Das Hospital, Jodhpur (Rajasthan). Rajasthan journal of ophthalmology. 2011; 3:1-3.
18. Gahlot A, Magdum R, Singh M, Kumari P. A study of a ocular trauma profile and its visual outcome in road traffic accidents. NJMR2015;5;211-15.
19. Omoti AE. Ocular trauma in Benin City. Journal of Trauma 2004; 2:67-71.
20. Ajaiyeoba AI. Ocular injuries in Ibadan. Nigerian Journal of Ophthalmology. 1995; 3(2): 18-20.