

Impact of Awareness and Ecofriendly Diwali on Firecrackers Related Ocular Injuries: At Aimer Rajasthan: A Tertiary Eye Hospital-Based Study

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Abstract

Purpose:

Nature of firecracker-related ocular injuries at a tertiary eye hospital and level of awareness about ecofriendly Diwali, Aimer Rajasthan: A tertiary eye hospital-based study

Methods:

A three-consecutive year, retrospective study involving the patients presenting with firecracker-related ocular injuries in Diwali years 2017, 2018 and 2019.

Results:

In 2017 year; total 53 patients of which 39 (73.58%) were superficial injury, 5 (9.43%) were closed globe injury and 9 (16.98%) were open globe injury seen. In 2018 year; total 42 patients of which 31 (73.8%) were superficial injury, 4 (9.52%) were closed globe injury and 7 (16.66%) were open globe injury seen. In 2019 year; total 32 patients of which 25 (78.13%) were superficial injury, 3 (9.37%) were closed globe injury and 4 (12.5%) were open globe injury seen. All year's majority of patients were below 20 years of age.

Conclusion:

Following the rising awareness among society with media, the number of firecracker-related ocular injuries reported from previous years reduced in numbers and morbidity.

Keywords: Awareness, firecracker ban, ocular injuries

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I. Introduction

Firecracker injuries can cause serious and irreparable damage to vision. In India, firecracker injuries are common during the festival of 'Deepavali' where traditionally, firecrackers form an essential part of the celebrations. [1]

Though fireworks-related eye injuries have been decreasing over the years, there is still a need to increase awareness about the dangers of fireworks. These injuries constitute an important cause of preventable blindness worldwide, and in India, such injuries are very common among children. [2,3]

In 2017 year in October, the honorable Supreme Court of India prohibited the sale of firecrackers in the national capital (Delhi-NCR region) due to severe air pollution and later in 2018 Rajasthan high court also prohibited illegal sales and time bound of firecrackers in Jaipur, Rajasthan. So, effects of these notifications of courts can also influence the firecrackers related ocular injuries. [4]

Harm to nature by firecrackers and public awareness about safety measures by print, electronic media, NGOs, social workers, films actors can decrease firecrackers uses and its related ocular injuries significantly.

Purpose of this study is to know the impact and nature of firecracker-related ocular injuries in last three years; and level of awareness about ecofriendly Diwali.

II. Material And Methods

Retrospective study of three consecutive years; involving the patients presenting with firecracker-related ocular injuries in Diwali years 2017, 2018 and 2019, in department of ophthalmology JLN Medical College, Ajmer, Rajasthan.

Detailed ocular examination, i.e., initial visual acuity, anterior segment examination by slitlamp biomicroscopy, intraocular pressure (IOP) measurement, gonioscopy and fundus examination. USG scan was carried out to assess posterior segment status, particularly, retinal detachment, vitreous haemorrhage and to rule

out retained intraocular foreign body (IOFB) in patients with hazy media. X-ray of the orbit was done to rule out retained IOFB in all patients.

III. Results

Injuries were classified according to Birmingham eye trauma terminology system (BETTS).

A) Superficial ocular injuries: include conjunctival tear and burn, corneal epithelial defect, superficial foreign body.

B) Closed globe/ blunt ocular injuries: corneal abrasion/laceration, iridodialysis, phacodonosis, lens subluxation / dislocation, vitreous hemorrhage, berlin's edema / macular edema, retinal detachment, etc.

C) Open globe injuries: penetrating, perforating, ruptured globe, intraocular foreign body (IOFB).

Table: 1 Presenting ocular injuries

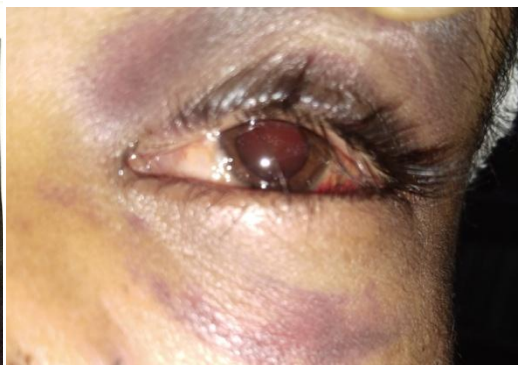
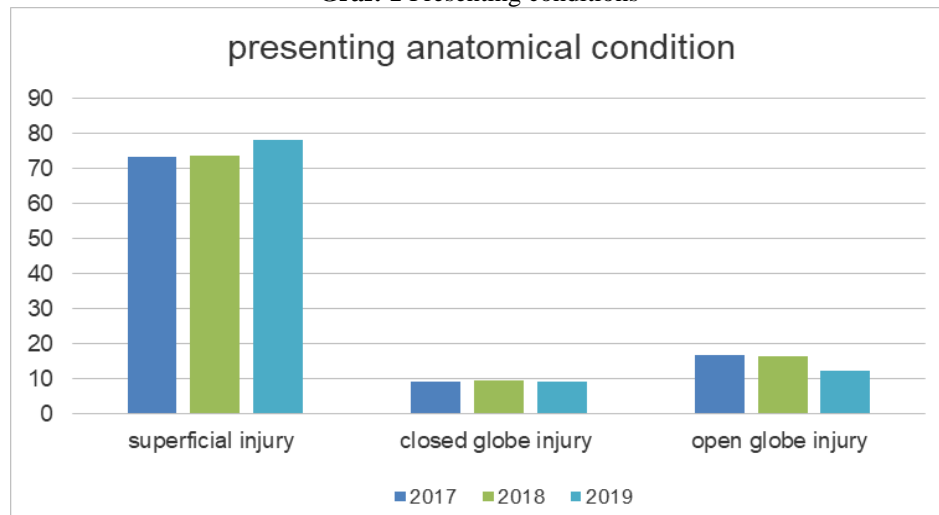
Years	Superficial	Closed globe injury	Open globe injury	Total patients
2017	39 (73.58%)	5 (9.43%)	9 (16.98%)	53
2018	31 (73.8%)	4 (9.52%)	7 (16.66%)	42
2019	25 (78.13%)	3 (9.37%)	4 (12.5%)	32

In 2017 year; total 53 patients, of which 39 were superficial injury, 5 were closed globe injury and 9 were open globe injury seen. Bilateral ocular injuries were seen in 11 patients. There were 38 (71.70%) males and 15 (28.30%) females, the mean age was 16.5 years. A majority were between 6 and 20 years of age.

In 2018 year; total 42 patients, of which 31 were superficial injury, 4 were closed globe injury and 7 were open globe injury seen. Bilateral ocular injuries were seen in 8 patients. There were 32 (76.20%) males and 10 (23.80%) females, the mean age was 14.8 years. A majority were also between 7 and 18 years of age.

In 2019 year; total 32 patients, of which 25 were superficial injury, 3 were closed globe injury and 4 were open globe injury seen. Bilateral ocular injuries were seen in 4 patients. There were 25 (78.12%) males and 7 (21.18%) females, the mean age was 16.1 years. A majority were also between 8 and 16 years of age.

Graf: 1 Presenting conditions



Picture:1 Closed globe injury and **Picture: 2** of same patients B Scan showing Retinal detachment, choroidal detachment and vitreous hemorrhage.



Picture: 3 Open globe injury



Picture: 4 conjunctival (superficial) injury

Table: 2 Presenting visual acuity

Visual Acuity	2017	2018	2019
>20/40	20 (37.74%)	17 (40.47%)	16 (50.0%)
20/40-20/200	12 (22.64%)	11 (26.19%)	10 (31.25%)
20/200-CF	11 (20.75%)	6 (14.28%)	2 (6.26%)
HM	7 (13.20%)	6 (14.28%)	3 (9.37%)
NO PL	3 (5.66%)	2 (4.76%)	1 (3.12%)
Total patients	53	42	32

Graf: 2 showing presenting visual acuity.

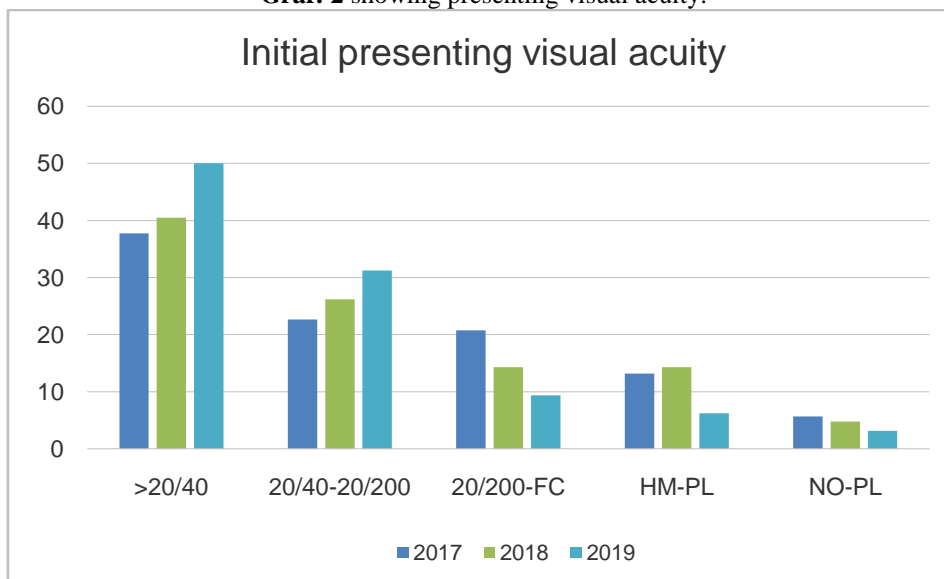


Table 1 & 2 and also Graf 1 & 2 showed firecrackers injuries reduced in numbers and morbidities as compare to previous years.

IV. Discussion

This study was a hospital-based, single-center, retrospective case series of firecracker injuries. The injuries reported ranged from conjunctival or corneal burns to globe rupture. Most of the patients were below the age of 20 years. [1]

Most injuries of children due to manipulated or misused fireworks, absence of parental supervision, and failure to maintain safe distance from firecrackers. These injuries constitute an important cause of preventable blindness, such injuries are very common among children. [2,3]

Firecracker-related ocular injuries are of great concern globally. There are few reported case series in literature analyzing the nature of firecracker-related injuries in India [1,5,6] as well as globally. [7-10]

Following the rising awareness among societies with media (i.e. Television, Radio, newspapers, WhatsApp, messages etc.), the number of firecracker-related ocular injuries reported from previous years reduced in numbers, also reduced in morbidity and had positive impact. However, firecracker-related ocular injuries are still a cause of significant visual loss, especially in children. Thus, firecracker-related celebrations should be monitored with a stringent protocol.

V. Conclusion

Public awareness by print and electronic media can decrease firecrackers related ocular injuries significantly, and also have a positive impact.

References

- [1]. Ravi Kumar, Manohar Puttanna, K S Sriprakash, B L Sujatha Rathod, and Venkatesh C Prabhakaran. Firecracker eye injuries during Deepavali festival: A case series. *Indian J Ophthalmol*. 2010 Mar-Apr; 58(2): 157–159.
- [2]. Mohan K, Dhir SP, Munjal VP, Jain IS. Ocular fireworks injuries in children. *Afro-Asian J Ophthalmol* 1984;2:162-65.
- [3]. Dhir SP, Shishko MN, Krewi A, Mabruka S. Ocular fireworks in children. *J Paediat Ophthalmol Strabismus* 1991;28:1-2.
- [4]. Amar Pujari, Atul Kumar, Rohan Chawla, Sudarshan Khokhar, Divya Agarwal, Meghal Gagrani, Namrata Sharma, and Pradeep Sharma. Impact on the pattern of ocular injuries and awareness following a ban on firecrackers in New Delhi: A tertiary eye hospital-based study. *Indian J Ophthalmol*. 2018 Jun; 66(6): 837–840.
- [5]. Arya SK, Malhotra S, Dhir SP, Sood S. Ocular fireworks injuries. Clinical features and visual outcome. *Indian J Ophthalmol*. 2001;49:189–90. [PubMed] [Google Scholar]
- [6]. Puri V, Mahendru S, Rana R, Deshpande M. Firework injuries: A ten-year study. *J Plast Reconstr Aesthet Surg*. 2009;62:1103–11. [PubMed] [Google Scholar]
- [7]. Chang IT, Prendes MA, Tarbet KJ, Amadi AJ, Chang SH, Shaftel SS, et al. Ocular injuries from fireworks: The 11-year experience of a US level I trauma center. *Eye (Lond)* 2016;30:1324–30. [PMC free article] [PubMed] [Google Scholar]
- [8]. Jing Y, Yi-Qiao X, Yan-Ning Y, Ming A, An-Huaai Y, Lian-Hong Z, et al. Clinical analysis of firework-related ocular injuries during spring festival 2009. *Graefes Arch Clin Exp Ophthalmol*. 2010;248:333–8. [PubMed] [Google Scholar]
- [9]. Witsaman RJ, Comstock RD, Smith GA. Pediatric fireworks-related injuries in the United States: 1990-2003. *Pediatrics*. 2006;118:296–303. [PubMed] [
- [10]. Vassilia K, Eleni P, Dimitrios T. Firework-related childhood injuries in Greece: A national problem. *Burns*. 2004;30:151–3.

Dr. Brijesh Sanwaliya. “Impact of Awareness and Ecofriendlydiwali on Firecrackers Related Ocular Injuries: At Aimer Rajasthan: A Tertiary Eye Hospital-Based Study.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 11, 2019, pp 01-04.