




“Diya”-Related Burn Injuries during the Diwali Period: A 5-Year Retrospective Review from a Tertiary Care Hospital in India

Deepti Gupta¹  Nemi Chand¹ Nupoor Nanavati¹ Aakash Chauhan¹ Sujata Sarabahi¹

¹Department of Burns, Plastic and Maxillofacial Surgery, Safdarjung Hospital and VMMC, New Delhi, India

Address for correspondence Deepti Gupta, MCh Plastic Surgery, Department of Burns, Plastic and Maxillofacial Surgery, Safdarjung Hospital and VMMC, New Delhi 110029, India (e-mail: deepti2611@gmail.com).

Indian J Plast Surg

Abstract

Background Diwali is a festival that is passionately celebrated by Indians all across the globe. Fire hazards associated with this festival are well known. Our hospital is a tertiary care burn center and caters to a patient population from all over North India. Firecracker burns and diya burns constitute two major causes of burn injuries during the festival of Diwali. Since, diya-related burn injuries have been overlooked in the past, this study was primarily designed to study the demographical data of “diya burns” during Diwali.

Materials and Methods The departmental records were analyzed for 3 days around Diwali festival over a period of 5 years from 2018 to 2022.

Results The results indicated that almost a third of all Diwali-related burns were caused by diyas (32.5%). A “burning diya left on floor” was the main reason for these injuries. Females were the most affected (70.4%). Additionally, one-third of these patients required admission.

Conclusion This study emphasizes the need for raising awareness regarding the proper use of “diyās” to bring down the incidence of such preventable burn injuries.

Keywords

- ▶ thermal burns
- ▶ Diwali
- ▶ diya
- ▶ earthen lamp

Introduction

A “diya” is a small cup-shaped lamp made of mud, clay, stone, or metal with a cotton wick dipped in oil (▶ **Fig. 1**). Diyas are a symbol of goodness and purity and are lit throughout the year during prayers and ceremonies to mark the beginning of important occasions. They are lit in large numbers inside the homes of people during Diwali, a major Indian festival. In fact, the word Diwali is derived from the Sanskrit word “Deepavali,” which literally means a row (“avali”) of lights (“deep”). Diyas can result in burn injuries if appropriate precautions are not taken while lighting them.

Our burn unit is a tertiary care center and is one of the largest burn care facilities in India. We receive patients in vast numbers during the period of Diwali with burns and injuries due to fireworks and diyas. Firework injuries have gained a lot of attention in the recent years and major efforts have been made to reduce their incidence through public awareness programs and various legislations. However, burn injuries due to diyas tend to get overlooked and are relegated to the background. Through this study, we wish to describe the nature of burn injuries that can occur due to diyas and raise awareness regarding the seemingly innocuous activity of diya burning.

DOI <https://doi.org/10.1055/s-0044-1788915>.
ISSN 0970-0358.

© 2024. Association of Plastic Surgeons of India. All rights reserved. This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)
Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

Material and Methods

A retrospective study was performed with a review of our departmental records of burn injuries attended to during the period of 3 days (Diwali, the day before, and the day after) from the year 2018 to 2022. Patients with burn injuries sustained due to activities related to Diwali such as bursting of firecrackers or lighting of diyas were classified as Diwali burns, whereas burns sustained due to other reasons were grouped as non-Diwali burns.

We further studied the epidemiology of burns caused due to diyas. The study population was divided into five age groups of 0 to 12 years (children), older than 12 to 20 years (adolescents), 20 to 40 years (young adults), 40 to 60 years (middle-aged adults), and older than 60 years (elderly). The gender distribution and socioeconomic class of the patients were analyzed. The percentage of the total body surface area (TBSA) burnt and degree of burns (superficial/partial thickness/full thickness) were noted. Common causes for the burn injuries were identified. Data of admitted patients were also analyzed in terms of the presence of inhalational injury, total length of hospital stay, development of major morbidity (renal dysfunction, wound infection, sepsis, multi-organ dysfunction), and mortality.

Results

A total of 567 patients with burn injuries were attended to over a period of 3 days around Diwali over a 5-year period (2018–2022). Diwali burns accounted for 86.24% ($n = 489$) of the total burn injuries (►Fig. 2). Of the Diwali burns, around 67.4% ($n = 330$) were attributed to firecrackers, whereas as the remaining 32.5% ($n = 159$) were due to diyas. All burns due to diyas were accidental in nature. Clothes coming in contact with a burning diya kept on the floor was found to be the most common cause of such burn injuries (►Table 1). A female preponderance was noted in diya-related burn



Fig. 1 Diya/earthen lamp.

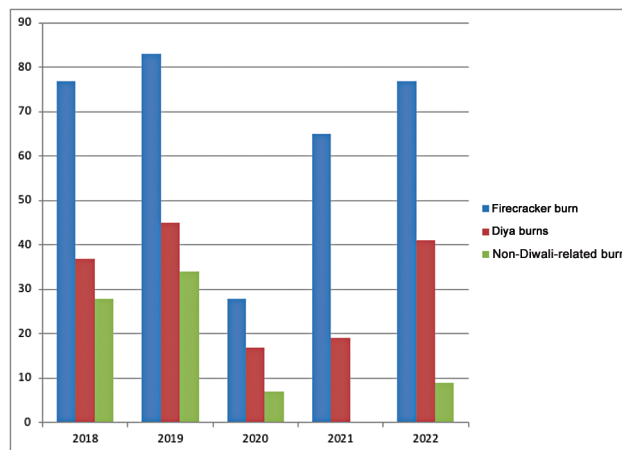


Fig. 2 Yearly distribution of number and etiology of burn injuries attended during the period of Diwali.

Table 1 Reasons for “diya”-related burn injuries

1	Burning diya kept on the floor	112
2	While lighting a diya for prayers at home	23
3	Accidental fall of a burning diya kept at a height	17
4	Lighting of diya at a temple	7

injuries ($n = 112$, 70.44%). The majority of patients affected were young adults in the age group of 20 to 40 years. According to the modified Kuppuswamy scale,¹ 82% of the patients belonged to the upper lower socioeconomic class. The TBSA burnt was less than 20% in approximately 64% of the patients and the remaining 35% incurred major burns of more than 20% TBSA (►Table 2). Of the diya-related burns, the majority were partial thickness ($n = 74$) and the rest were superficial ($n = 62$) and full thickness ($n = 23$) in nature. The lower limb was found to be most commonly involved in the burn injuries ($n = 48$), followed by the abdomen ($n = 37$), chest, upper limb ($n = 24$), and face ($n = 15$). A total of 55 patients with diya-related burn injuries needed admission during the 5-year period, and 15 of these patients had inhalational injury. Burn wound infection was the most common complication observed in admitted patients (►Fig. 3). All the patients, except eight, survived and were discharged after appropriate treatment of their burn injury.

Discussion

Lighting of lamps and candles and burning of firecrackers are an integral part of Diwali celebrations across the country, and a large number of burn injuries are sustained during this time. We activate a disaster management protocol during the 3 days around the festival of Diwali to handle the increased number of patients. The protocol requires the presence of increased number of medical and paramedical staff, arrangement of adequate number of beds, dressing materials, intravenous fluids, drugs, and blood products. A multidisciplinary

Table 2 Percentage of total body surface area (TBSA) burns in different age groups

Age (y)	<20%	20–40%	40–60%	>60%	Total
<12	11	3	2	3	19
12–20	14	1	1	–	16
20–40	49	10	6	–	65
40–60	26	5	5	–	36
>60	3	5	5	10	23
Total	103	24	19	13	159

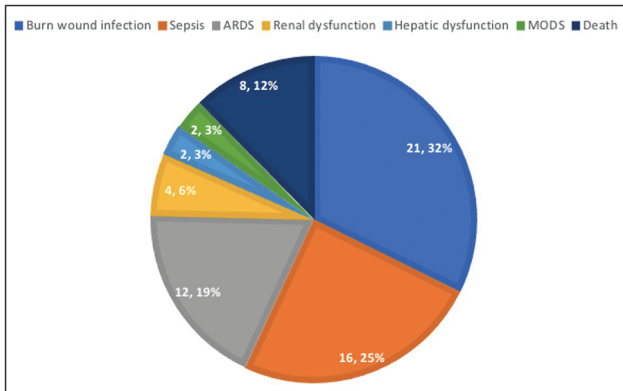


Fig. 3 Complications seen in admitted diya-related burn patients. ARDS, acute respiratory distress syndrome; MODS, multi-organ dysfunction syndrome.

team is present under one roof to provide immediate care to the burn/blast victims. In total, 489 Diwali-related burn injuries were managed at our institute during the 3 days around Diwali festival from 2018 to 2022.

Diwali-related burns have been synonymous with firework injuries and a few studies that have observed the epidemiology and pattern of Diwali-related burns are limited to burn injuries caused by firecrackers.^{2–5} An earlier study from our center showed that 1,373 patients with firecracker injuries were treated from 2002 to 2010 around this festival.² We managed 330 patients with firecracker injuries over the last 5 years, which is significantly lesser than the earlier reported numbers. This decline is attributable to numerous awareness programs on firecracker safety and guidelines laid down by the government. A decrease in the number of firecracker injuries was also observed by Puri et al who treated 157 patients during a 10-year period from 1997 to 2006.³

However, not all burn injuries during Diwali are related to firecrackers and a significant number of burns are caused by lighting of “diyas.” One study from West Bengal accorded 5% of the reported burn injuries to diyas and other oil lamps.⁶ Ours is the first study to highlight the burden of disease imposed by “diya”-related burn injuries during Diwali. We observed that around one-third of Diwali-related burn injuries were caused by “diya,” which is not insignificant by any means.

Diyas kept on the floor were found to be the most common cause for diya-related burn injuries. Burning diyas on the floor or along the staircase for decorating homes can easily come in contact with clothes when people are moving about,

leading to burn injuries. Other causes included the accidental fall of a diya that was kept at a height or while lighting a diya at home or in a temple. Most of the diya burns were more commonly seen in the female population (70.4%). Ethnic apparels, commonly worn by girls and ladies on the occasion of Diwali, are loose fitting and flowing, making them an easy target for diyas kept on the floor. Moreover, the loose-fitting nature of the apparels allows more air circulation, resulting in higher flammability. The material of the clothes also plays a role. Polyester blends are more flammable, whereas synthetic material such as polyester, nylon, or acrylic melt when ignited and cause deeper burns.^{7,8}

Young adults (20–40 years) were the most common age group affected by diya-related burn injuries. This is likely because this age group is largely responsible for decorating the home for the occasion and is most active around the house. Older people mostly sustain burn injuries while igniting diyas during prayers either at home or in the temple. The majority of the patients (64.7%) had less than 20% of TBSA burns; however, this was reversed in the elderly (>60 years) with most of them sustaining a higher percentage of burns. The elderly population has decreased reflexes and reduced mobility, making it difficult for them to effectively respond to fire injuries, resulting in larger and deeper burn injuries. The lower limb was most commonly involved in burn injuries as the majority of burns were due to clothes getting ignited from below by diyas kept on the floor. Our findings were similar to a study conducted on burn injuries sustained during religious activities.⁹

Over the 5 years, a significant number ($n = 55$, 35%) of patients needed admission and inpatient care due to either percentage or thickness of their burn injuries. On analysis of the inpatient stay, burn wound infection was found to be the most common complication, followed by sepsis and acute respiratory syndrome. Burn injuries are characterized by a break in skin barrier and suppression of immune response, making the patient susceptible to infectious complications.^{9,10} Inhalational injury and infection have been found to be a major contributing factor to the morbidity and mortality resulting from burn injuries.^{11,12}

Antifirecracker campaigns directed at students and resident welfare associations are routinely conducted by the government of Delhi through various social media platforms.¹³ However, people also need to be made aware of the dangers associated with burning of diyas and there is a need to educate them regarding the proper precautions to be taken while lighting diyas such as avoiding their placement in narrow

passages or staircases. Diyas should preferably be kept on a noncombustible surface away from curtains, wood, and paper. It is preferable to avoid loose clothing and clothes made of synthetic material. A bucket of water along with a first-aid kit should be kept readily available. Awareness campaigns incorporating this information can be performed in schools, colleges, hospitals, and offices. Media platforms such as billboards, radio, television, and phones can be used for dissemination of knowledge in the form of audio and visual messages.

Conclusion

Although firecrackers remain the major cause of burn injuries during Diwali, diya burns cannot be ignored. Diya-related burn injuries are a significant health problem and can have devastating sequelae, as seen in our study. These injuries are largely preventable, and efforts should be made to reduce the burden of this condition through awareness campaigns and targeted interventions.

Funding

None.

Conflict of Interest

None declared.

References

- 1 Wani RT. Socioeconomic status scales-modified Kuppuswamy and Udai Pareekh's scale updated for 2019. *J Family Med Prim Care* 2019;8(06):1846–1849
- 2 Tandon R, Agrawal K, Narayan RP, et al. Firecracker injuries during Diwali festival: the epidemiology and impact of legislation in Delhi. *Indian J Plast Surg* 2012;45(01):97–101
- 3 Puri V, Mahendru S, Rana R, Deshpande M. Firework injuries: a ten-year study. *J Plast Reconstr Aesthet Surg* 2009;62(09):1103–1111
- 4 Sarma BP. Epidemiology, treatment and preventive strategy in Diwali-related burns. *Indian J Burns* 2012;20:42–45
- 5 Kalita K, Gurindagunta SV. Fire-cracker burn injuries during Diwali, a seasonal and preventable epidemic. *Indian J Burns* 2021;29:70–75
- 6 Kuiri SS, Ghosh BC, Mandal N, Nandi MM, Saradar TK, Ghosh G. Epidemiological study of burn injury with special reference to its prevention: a nine-year retrospective study from a tertiary care hospital of West Bengal, India. *Asian J Med Sci* 2015;7:70–75
- 7 Fantus RJ, Rivera EA. A hot mess: clothing-related burn injuries. *Bulletin of the American College of Surgeons*. 2015. Accessed August 3, 2023 at: <https://bulletin.facs.org/2015/08/a-hot-mess-clothing-related-burn-injuries/>
- 8 Muguregowda HT. An observational study on clothing characteristics involved as major contributors in sustaining domestic burns injuries. *World J Plast Surg* 2019;8(03):293–297
- 9 Pereira CB, Ellur S, Dharmarajan R. Puja burns: burns related to use of fire in religious practices. *Eur J Plast Surg* 2022;45:787–792
- 10 Greenhalgh DG. Sepsis in the burn patient: a different problem than sepsis in the general population. *Burns Trauma* 2017;5:23
- 11 Olaitan PB, Jiburum BC. Analysis of burn mortality in a burns centre. *Ann Burns Fire Disasters* 2006;19(02):59–62
- 12 El-Helbawy RH, Ghareeb FM. Inhalation injury as a prognostic factor for mortality in burn patients. *Ann Burns Fire Disasters* 2011;24(02):82–88
- 13 Department of Environment, Government of NCT of Delhi. Anti Fire-Crackers. 2024. Accessed June 15, 2024 at: <https://environment.delhi.gov.in/environment/anti-fire-crackers>