

## ORIGINAL ARTICLE

## Profile of Burn Cases brought to a Tertiary Care Hospital of Tripura

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### Abstract:

Burn injury has been a significant cause of morbidity & mortality worldwide resulting in major health crisis. The purpose of this study to provide an overview of the scenario of burn cases & their clinical parameters which will help the healthcare personnel to redirect their treatment modalities and thereby reducing their mortality and morbidity. A total of 300 cases were included in the study and the study was conducted in between 2021 to 2022. Majority of burn patients were between 21-30 years of age with female preponderance (68.70%), accidental burns were most common (52.7%) and none of the patients with 3rd degree burn survived beyond 5 days. Majority of the deaths occurred due to shock (48.6%). Result of the study shows that mortality was higher among reproductive women and majority occurred while working in kitchen. This study will provide information to raise awareness in order to prevent the victimization due to lethal burn injuries.

**Keywords:** Burn; Accidental burn; TBSA.

### Introduction:

A burn is an injury which is caused by application of heat or chemical substances to the external or internal surfaces of the body, which causes destruction of tissue.<sup>1</sup> Burn injuries pose a significant public health concern worldwide, and their impact on individuals and communities cannot be overlooked.

According to the NCRB report, the incidence of burn injuries in India has been on the rise, with approximately 1,50,000 deaths reported annually. Burn injuries continue to be a leading cause of morbidity and mortality, particularly in developing countries. According to the National Crime Records Bureau (NCRB), the number of deaths by self-immolation decreased by 64% in 2021 compared to the year 2020, with a total of 4,196 cases. Additionally, there were 8,491 fire accident cases reported in 2021, which is 9% lower than in 2020.<sup>2</sup> The states with the highest percentage of "fire in residential or dwelling building" incidents during 2021 were Mizoram (100.0%), Assam (95.7%), Himachal Pradesh (88.2%), Karnataka (86.9%) and Tripura (86.4%).<sup>3</sup>

Furthermore, the WHO highlights that burns account for a significant proportion of disability-adjusted life years (DALYs) lost globally. An estimated 180000 deaths every year are caused by burns – the vast majority occur in low- and middle-income countries. In India, over 1000000 people are moderately or severely burnt every year.<sup>4</sup> Understanding the profile and characteristics of burn cases in a specific region is crucial for developing effective prevention strategies, improving treatment outcomes and allocating healthcare resources appropriately.

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In Tripura, a state in northeastern India, burn cases present a substantial burden on healthcare facilities. AGMC & GBP Hospital, as a leading tertiary care facility in Tripura, plays a pivotal role in managing burn cases in the region. This comprehensive study aims to provide insights into the demographics, etiology, severity and outcomes of burn injuries among patients admitted to the hospital. By analyzing a substantial number of burn cases, this study aims to contribute valuable data to the existing literature, aiding policymakers, healthcare providers and researchers in addressing the challenges associated with burn injuries.

### Materials and methods:

This hospital and mortuary-based prospective study employed a descriptive design to investigate the profile of burn injury cases at Agartala Government Medical College and GBP Hospital in Tripura. A total of 300 cases were included in the study and the study was conducted in between 2021 to 2022.

**Study Population:** The study included two categories of patients: (1) Admitted and discharged burn injury cases and (2) Admitted and deceased burn injury cases.

**Exclusion Criteria:** Outpatient Department (OPD) patients with minor burns and cases brought dead to the hospital were excluded from the study.

**Data Analysis:** Descriptive statistics, such as frequencies, percentages, means and standard deviations, were used to summarize the demographic characteristics and profile of burn injury cases. The pattern of burn injuries based on severity and total body surface area involved was estimated. Epidemiological factors associated with burn injuries among the patients were analyzed.

**Ethical Considerations:** Ethical approval was obtained from the Institutional Ethics Committee of Agartala Government Medical College and GBP Hospital. Confidentiality and privacy of patient information were ensured.

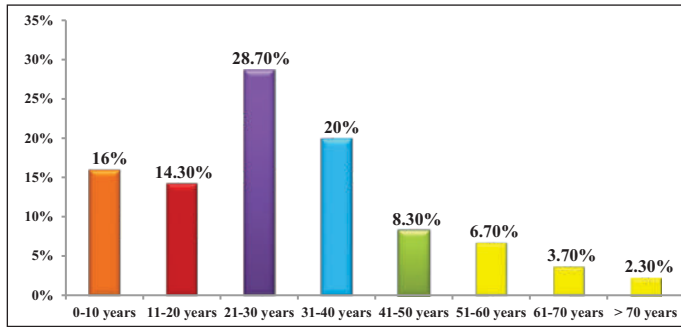


Figure 1. Distribution of burn cases by age group (N=300).

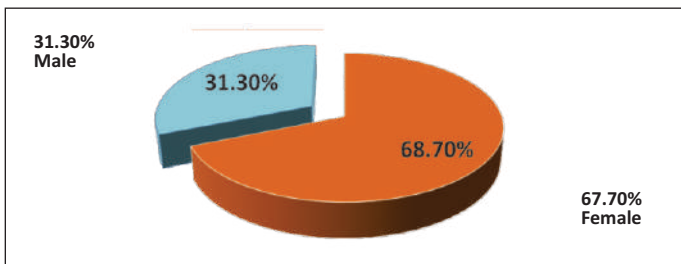


Figure 2. Distribution of the participants by Sex (N=300).

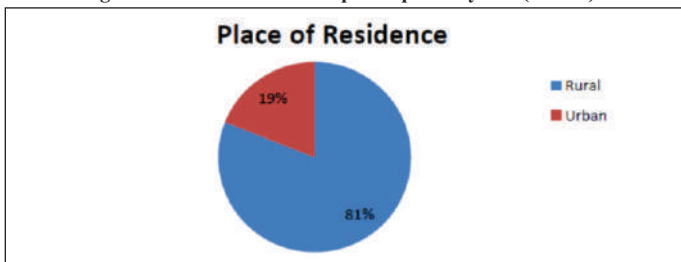


Figure 3. Distribution of the participants by place of residence (N=300).

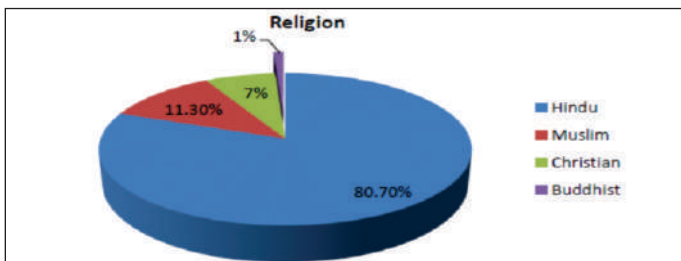


Figure 4. Distribution of the participants by their religion (N=300).

**Results & observation:**

Maximum burn patients were within the age group of 21-30 years (28.70 %). Female (68.70%) preponderance is more as compared to males (31.30%), with male: female ratio of 1:2. Most of the victims belonged to rural areas (81%) as compared to urban areas (19%). A huge percentage of cases were seen among Hindu religion (80.70%). Majority of victims were married (71.7%). Maximum percentage of victims had received education up to high school (29%). Majority of the burn incidents were seen among housewives (35%). Majority of them belonged to lower middle socio-economic status (36.7%). Maximum number of incidents occurred in the month of December (11.3%). Maximum number of incidents occurred in winter season (30.33%). Number of incidents peaked in between 05 AM To 10 AM- (29%) i.e in the morning. Majority number of burn incidents occurred indoors (84%). Most of the burn injuries were accidental burn (52.7%).

**Table 1. Distribution of burn cases as per Marital Status (N=300).**

Marital status	Frequency	Percentage (%)
Married	215	71.7
Unmarried	85	28.3
Total	300	100

**Table 2. Distribution of burn cases as per educational qualification (N=300).**

Educational Qualification	Frequency	Percentage (%)
High school	87	29.0
Primary	47	15.7
Higher secondary	46	15.4
Illiterate	43	14.3
Middle	34	11.3
Graduate	28	9.3
Pre-school	15	5.0
Total	300	100.00

**Table 3. Distribution of burn cases according to their Occupation.**

Occupation	Frequency	Percentage (%)
Housewife	105	35.0
Business	44	14.7
Student	43	14.3
Others	39	13.0
Employed	37	12.3
Labourer	32	10.7
Total	300	100.00

**Table 4. Season wise distribution of burn cases (N=300).**

Seasons	Frequency	Percentage (%)
Winter	91	30.33
Spring	36	12
Summer	61	20.33
Monsoon	83	28.66
Autumn	26	8.66
Total	300	100.00

**Table 5. Distribution of the participants by manner of incident of burn (N=300).**

Manner of Incident	Frequency	Percentage (%)
Accident	158	52.7
Suicide	118	39.3
Homicide	22	7.3
Not Commendable	2	0.7
Total	300	100.00

The leading cause of suicidal burn incident is dowry harassment which accounts for about 24 (20.4%) numbers of suicidal burn cases. Maximum of the victims had 21 % to 40 % of their total body surface area involved in burn (35.7%). Most of the burns were 2<sup>nd</sup> degree burn (58.40%). Out of 300 cases, 189 (63%) patients got successfully treated & discharged and 111 (37%) patients succumbed to death. The agent responsible for burn injury among 38.4 % study subjects was kerosene. The mean number of hospital stayed days among who survived & discharged was 4 days and 2.5 days among expired. Majority of the deaths occurred due to shock (48.6%). Females (46.1%) had more mortality than males (17%). Total body surface area involved in burn was 21 to 40% among 35.66% cases. Mortality starts rising when 41% to 60% of body surface area is involved in burn and the mortality is almost 100 % when the body surface area involved in burn is beyond 61% to 80%. The percentage of survivorship for more than 5 days in 2<sup>nd</sup> degree burn is more as compared to 3<sup>rd</sup> degree burn (17.1% > 0.0%) and there was no mortality among 1<sup>st</sup> degree as the degree of burn gets higher, the

**Table 6. Distribution of the participants by burn percent (N=300).**

Burn Percentage (TBSA)	Frequency	Percentage (%)
21 to 40	107	35.7
81 to 100	61	20.3
41 to 60	47	15.7
61 to 80	45	15.0
0 to 20	40	13.3
Total	300	100.00

**Table 7. Distribution of burn cases as per cause of death (N=111).**

Cause of death	Frequency	Percentage (%)
Shock	54	48.6
Septicemia	47	42.4
Toxemia	4	3.6
Pneumonia	3	2.7
Septicemia with covid positivè		2.7
Total	111	100.00

duration of hospital stay increases subsequently.

### Discussion:

Age wise distribution of burns cases reveals that maximum number of cases belong to the age group of 21- 30 years (28.70%) and the incidence decrease in the age group of 31- 40 years (20%) followed by 0-10 years (16%) and 11-20 years (14.30%). In old age i.e after 70 years, incidence came down to 2.3%. Meera T et al.,<sup>5</sup> Halder A et al.,<sup>6</sup> Bandyopadhyay S et al.,<sup>7</sup> Debbarma S<sup>8</sup> and Shubhendu K et al.<sup>9</sup> revealed that burn incident is more common in the age group of 21-30 years, which is similar to my study. But Koller J et al.<sup>10</sup> in their study revealed that the age group with the highest number of burn patient was in children 0-3 years (21.1%), which is different from my study.

Among the burn victims, 68.70% are females and 31.30% are males. The male to female ratio is 1:2. Females outnumbered the males. Similar findings were observed in the studies conducted by Meera T et al.,<sup>5</sup> Halder A et al.,<sup>6</sup> Debbarma S<sup>8</sup> and Shubhendu K et al.<sup>9</sup> But Koller J et al.<sup>10</sup> in their study revealed male predominance (2.1:1) over female, which is different from my study.

In the studies conducted by Tripathi CB et al.,<sup>11</sup> Kumar A<sup>12</sup> and Nath A et al.<sup>13</sup> (2015) revealed that burns incidents were more common in the rural areas, which is similar to my study. In the studies conducted by Dasgupta SM, Tripathi Cb<sup>14</sup> (1984), Kumar A,<sup>12</sup> Nath A et al.<sup>13</sup> (2015) and Bandyopadhyay S et al.<sup>15</sup> (2019) revealed that burns incidents were more common among Hindus, which is similar to my study.

In the studies conducted by Meera T et al.<sup>5</sup> and Shubhendu K et al.<sup>9</sup> revealed that burn incident is more frequent among married people as compared to unmarried, which is similar to my study. Bandyopadhyay S et al.<sup>15</sup> revealed that maximum victims (61.47%) were educated up to 10<sup>th</sup> standard, which is similar to my study. In the study conducted by Dasgupta SM, Tripathi CB<sup>14</sup> (1984) reported that 59% of burnt wives were illiterate, 23% received only primary education and 16% were educated up to secondary standard and only 2% victims were graduate, which is not similar to my study.

In the studies conducted by Singh D<sup>16</sup> (1997) and Shubhendu K et al.<sup>9</sup> revealed that burns incidents were more common among

housewives, which is similar to my study.

In the study conducted by Tejerina C et al.<sup>17</sup> revealed that burns incidents were more common during winter season, which is similar to my study. However the study conducted by Pandey SK, Chaurasia N<sup>18</sup> found that the peak incidence of burns occurred during summer season (43.6%) followed by winter (29.5%) and rainy (26.9%), which is different from my study.

In the study conducted by Mangal HM et al.<sup>19</sup> (2007) and Meera T et al.<sup>5</sup> found that the majority of burn cases were accidental followed by suicidal and homicidal, which is similar to my study findings.

In the study conducted by Nath A et al.<sup>13</sup> (2015) revealed that total body surface involved was greater than 80% category, which is not similar to my study. The study conducted by Mangal HM et al.<sup>19</sup> found that the total body surface area involved was more in 40-60% category.

Distribution of burn cases according to degree of burn reveals that, 58.40% patients had 2<sup>nd</sup> degree burn, 27.30% had 1<sup>st</sup> degree burn and 14.30% had 3<sup>rd</sup> degree burn. Shankar G et al.<sup>20</sup> (2014) found that the overall mortality was 37.50%, which is similar to my study.

In the study conducted by Tejerina C et al.<sup>17</sup> (1992), Mangal HM et al.<sup>19</sup> (2007), Nath A et al.<sup>13</sup> (2015) and Meera T et al.<sup>5</sup> found that most of the victims died from shock, which is similar to my study. In the study conducted by Singh D<sup>16</sup> (1997) and Tripathi CB et al.<sup>11</sup> observed that majority of the burn victims died due to septicemia, which is not similar to my study.

### Conclusion:

This study on burn patients identified several important factors and epidemiological aspects related to burns. The majority of cases occurred in young adults aged 21-30 years, likely due to their higher exposure to hazardous situations. Housewives were the most commonly affected group, while unemployment, depression, and stressful situations were associated with burns among men. Women, on the other hand, faced burn risks related to young age at marriage, inability to cope with marital stress, harassment, and inadequate cooking precautions. Most burn incidents were accidental, with flame burns being most common due to various factors such as kerosene and open fires.

The study also highlighted that homes were the primary site of accidents. The involvement of a significant body surface area in burns, combined with delays in seeking medical help and higher mortality rates, indicated the severity of the cases and the need for improved resources and timely intervention. Shock was identified as the leading cause of mortality in nearly half of the cases.

Overall, understanding these risk factors and epidemiological aspects is crucial for designing effective preventive programs tailored to specific countries and regions.

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**Conflict of Interest :** The authors declare that there is no conflict of interest.

**References:**

1. Reddy KSN, Murty OP. The Essentials of Forensic Medicine & Toxicology, 35th ed. New Delhi: The Health Sciences Publishers; 2022.
2. NCRB. [Last accessed on 2023 July 7th]; Accidents in India [Internet] 2022 Available from [https://ncrb.gov.in/sites/default/files/ADSI-2021/ads2021\\_Chapter-1 Accidents. pdf](https://ncrb.gov.in/sites/default/files/ADSI-2021/ads2021_Chapter-1 Accidents. pdf)
3. NCRB. [Last accessed on 2023 July 7th]; Suicides in India [Internet] 2022 Available from [https://ncrb.gov.in/sites/default/files/ADSI-2021/ads2021\\_Chapter-2-Suicides.pdf](https://ncrb.gov.in/sites/default/files/ADSI-2021/ads2021_Chapter-2-Suicides.pdf)
4. WHO. [Last accessed on 2023 July 7th]; Burns [Internet] 2021 Available from <https://www.who.int/news-room/fact-sheets/detail/burns>.
5. Meera T, Nandeibam P, Slong D, Nabachandra H. Burn deaths: A study on female victims in Manipur. *J Indian Acad Forensic Med.* 2015;37(4):358-60.
6. Halder A, Mandal T, Sinha T, Samanta AK. An Autopsy Based Study of Burn Deaths with Histopathology of Kidneys in West Bengal. *J Med Sci Clin Res.* 2017 Feb;5(2): 18070-7.
7. Bandyopadhyay S, Kundu A, Bhattacharjee A, Lahiri A, Adhya S. Socio-Demographic Profile and Reported Circumstances of Death among Female Burn-Victims: Experience from a Tertiary Care Hospital, Kolkata. *IOSR J Dent Med Sci.* 2019 Feb;18(2): 56-9.
8. Debbarma S. Pattern of flame burn injury in Dibrugarh district of Assam: An autopsy based Analysis. *Indian J of Forensic Community Med* 2020;7(4):170–5.
9. Shubhendu K, Chaure L, Kumar S, Mahto T, Chaudhary AK. Epidemiological Profile of Burn Cases among autopsies Conducted in Dept. of FMT, RIMS, Ranchi. *Indian J Forensic Med Toxicol.* 2021 Jan-Mar; 15(1): 139-46.
10. Koller J, Orság M, Ondriasová E, Gräffinger I, Bukovcan P. Analysis of 1119 burn injuries treated at the Bratislava Burn Department during a five-year period. *Acta Chir Plast.* 1994;36(3):67-70.
11. Tripathi CB, Kumar V, Kanth S. Burnt Wives: A Study of Autopsy Findings. *J Indian Acad Forensic Med.* 2000;22(2):33-9.
12. Kumar A. Study Unnatural death due to fatal burn in females in Varanasi, India. *Int J Sci Res.* 2015 Mar;4(3):1921-4.
13. Nath A, Das P, Chakraborty PN. Burnt Wives of Agartala: A Retrospective Study From Medico Legal Autopsies of A Tertiary Hospital of Tripura, Northeast India. *Int J Emerg Trends Sci Technol.* 2015 Jul;2(7): 2842-6.
14. Das Gupta SM, Tripathi CB. Burnt wife syndrome. *Ann Acad Med Singap.* 1984 Jan 1; 13(1): 37- 42.
15. Bandyopadhyay S, Kundu A, Bhattacharjee A, Lahiri A, Adhya S. Socio-Demographic Profile and Reported Circumstances of Death among Female Burn-Victims: Experience from a Tertiary Care Hospital, Kolkata. *IOSR J Dent Med Sci.* 2019 Feb;18(2): 56-9.
16. Singh D. Recent trends in mortality in North-west India and its preventive aspects. *J Acad Forensic Med.* 1997; 19(4).
17. Tejerina C, Reig A, Codina J, Safont J, Mirabet V. Burns in patients over 60 years old: epidemiology and mortality. *Burns.* 1992; 18(2): 149-52.
18. Pandey SK, Chaurasia N. Thermal burn: an epidemiological Retrospective study. *J Punjab Acad Forensic Med Toxicol.* 2014; 14(1):15-8.
19. Mangal HM, Pathak A and Rathod JS. The fire is both a blessing and scourge to the mankind. *J Indian Acad Forensic Med.* 2007;29(4): 75-7.
20. Shankar G, Naik VA, Powar R. Epidemiological study of burn patients admitted in a District Hospital of North Karnataka, India. *Indian J Burns.* 2014 Jan 1;22(1): 83-7.