

Observational Descriptive Study on Medico-Legal Aspects of Burn Cases Reported at JLN Medical College, Ajmer

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Abstract— This study investigates the medicolegal aspects of burn-related deaths through autopsy cases across various age groups and burn types, including flame, electric, chemical, and scald burns, analyzed from July 2022 to December 2023. Out of 46 cases, males (78%) were notably more affected than females (22%), with the 0-10 age group having the highest incidence, especially in urban areas. Flame burns were the leading cause (52%), followed by electric burns (35%), with shock as the primary cause of death, particularly within the first two days. Accidental burns accounted for the majority of cases (80%), though suicidal and homicidal burns were also observed. The findings reflect regional differences in burn patterns and highlight critical risk factors, underscoring the importance of targeted safety protocols and preventive measures. Comparisons with prior studies reveal similar trends in burn severity and cause but suggest regional variations influenced by socio-cultural and occupational factors.



Keywords— *Medicolegal aspects, burn-related deaths, gender distribution, burn sources, preventive measures.*

I. INTRODUCTION

Flame is symbol of purity. This also considered as womb of light simultaneously it also link with agitation & aggressiveness. Among many communities especially Hindus & Parsis "fire" is a source of worship, all the good work is being done before the "fire" Flame is goddess till it is under the frame of vigilance, as this frame loss its integrity:^[1-3] it leads to disaster for mankind. Several episodes are in the history of mankind where major calamities are caused by a tiny brisk of flame.

In India, deaths due to burns stemming from crimes such as dowry deaths and acid attacks represent severe forms of gender-based violence. Dowry deaths, often misreported as

accidents, are a significant concern, with thousands reported annually, reflecting societal issues around dowry harassment and violence against women¹. Acid attacks, another grim reality, inflict devastating physical and psychological trauma on victims, although exact mortality statistics are less frequently documented compared to cases of severe disfigurement and disability. These crimes underscore ongoing challenges in India's legal framework and societal attitudes towards gender violence, prompting efforts from both governmental and non-governmental sectors to address prevention, victim support, and legal re-form^[4-6].

II. AIMS AND OBJECTIVES

1. This study is aimed to find out various medicolegal aspects in autopsy cases of death due to burn.
2. To study on the pattern of burn over the body among different sources of burn associated with death.
3. To analyze the socio etiological factors involved and suggest preventive measures.
4. To know the distribution of burn injuries according to their severity and total body surface area affecting these persons and period of survival.
5. To analyze the causes of death in burn cases according to their survival period.
6. To study salient and gross PM findings in the present study.

III. MATERIAL AND METHOD

This study was based on autopsy cases of burn (Flame burn, Electric burn, Chemical burn, Scald burn) in all age groups. with few cases are included in which autopsy not conducted but external feature and related findings noted in case sheet, Inquest papers and relevant police documents, Case history papers and other relevant hospital documents of the victims Age, sex, marital status, surface area involved, their survival period before death, etc. studied. Postmortem report of the above said cases & Photographic equipment's are used for recording burnt areas of the body.

Observation

This study was carried out on the cases of death related with burn (Flame Burn, Electric Burn, Chemical Burn, Scald Burn) in the Medical Jurist Department from JULY 2022 to DEC 2023.

Table 1: Distribution of cases according to age group, gender and demographic profile.

Age group	Male		Female		Total
	Urban	Rural	Urban	Rural	
0-10 yrs	3	4	2	3	12
11-20 yrs	5	2	2	0	9
21-30 yrs	2	3	1	0	6
31-40 yrs	3	5	1	1	10
41-50 yrs	2	1	0	0	3
51-60 yrs	2	2	0	0	4
61-70 yrs	0	0	0	0	0
70 yrs above	1	1	0	0	2
Total	18	18	6	4	46
Total cases	36		10		46

The table shows the distribution of cases by age group, gender, and whether they live in urban or rural areas. In total, there are 46 cases, with 36 males and 10 females. The cases are spread across different age groups, with most cases occurring in children aged 0-10 years (12 cases) and young adults aged 11-

20 years (9 cases). The majority of cases are from urban areas. The distribution shows that males are more affected than females, particularly in rural areas, and the number of cases decreases as age increases, with very few cases in those aged 61 years and above.

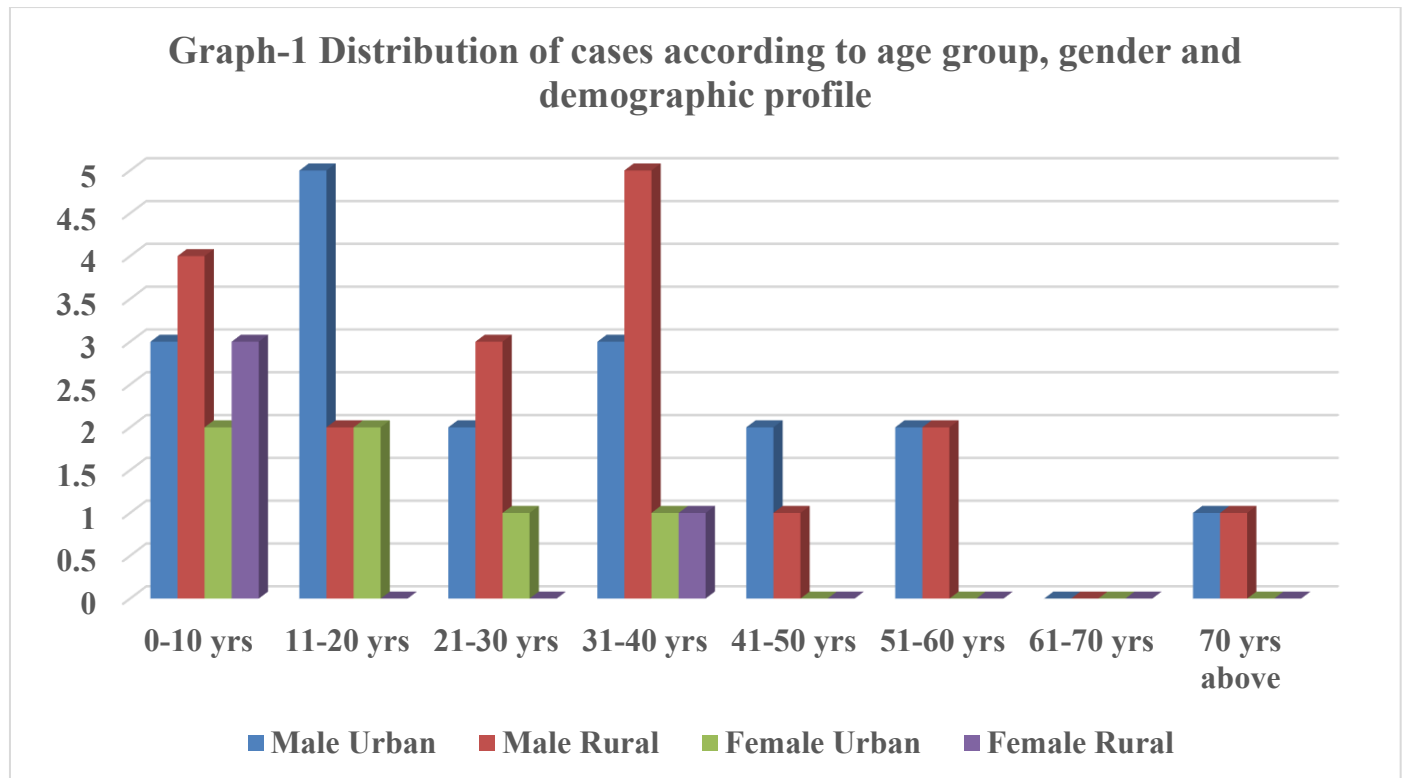


Table 2: Distribution of cases according to age group, gender and Mean body surface area involved in burn.

Age group	Male		Female	
	No of cases	Mean % of Burn Area	No of cases	Mean % of Burn Area
0-10 yrs	7	44.92	5	52.80
11-20 yrs	7	17.42	2	28.50
21-30 yrs	5	28.10	1	0
31-40 yrs	8	62.87	2	48.50
41-50 yrs	3	59.16	0	0
51-60 yrs	4	42.0	0	0
61-70 yrs	0	0	0	0
70 yrs above	2	67.50	0	0
Total	36		10	

The table provides a breakdown of burn cases according to age group, gender, and the average percentage of body surface area affected by the burns. There are a total of 46 cases, with 36 males and 10 females. The highest average burn area is seen in males aged 70 years and above (67.5%), while females aged 0-10 years have the highest average burn area at

52.8%. Younger children (0-10 years) have a significant number of cases with high burn percentages in both genders. In contrast, females aged 21-30 years and older females (above 40 years) have no reported cases. The data indicates that the severity of burns varies widely across different age groups and between genders.

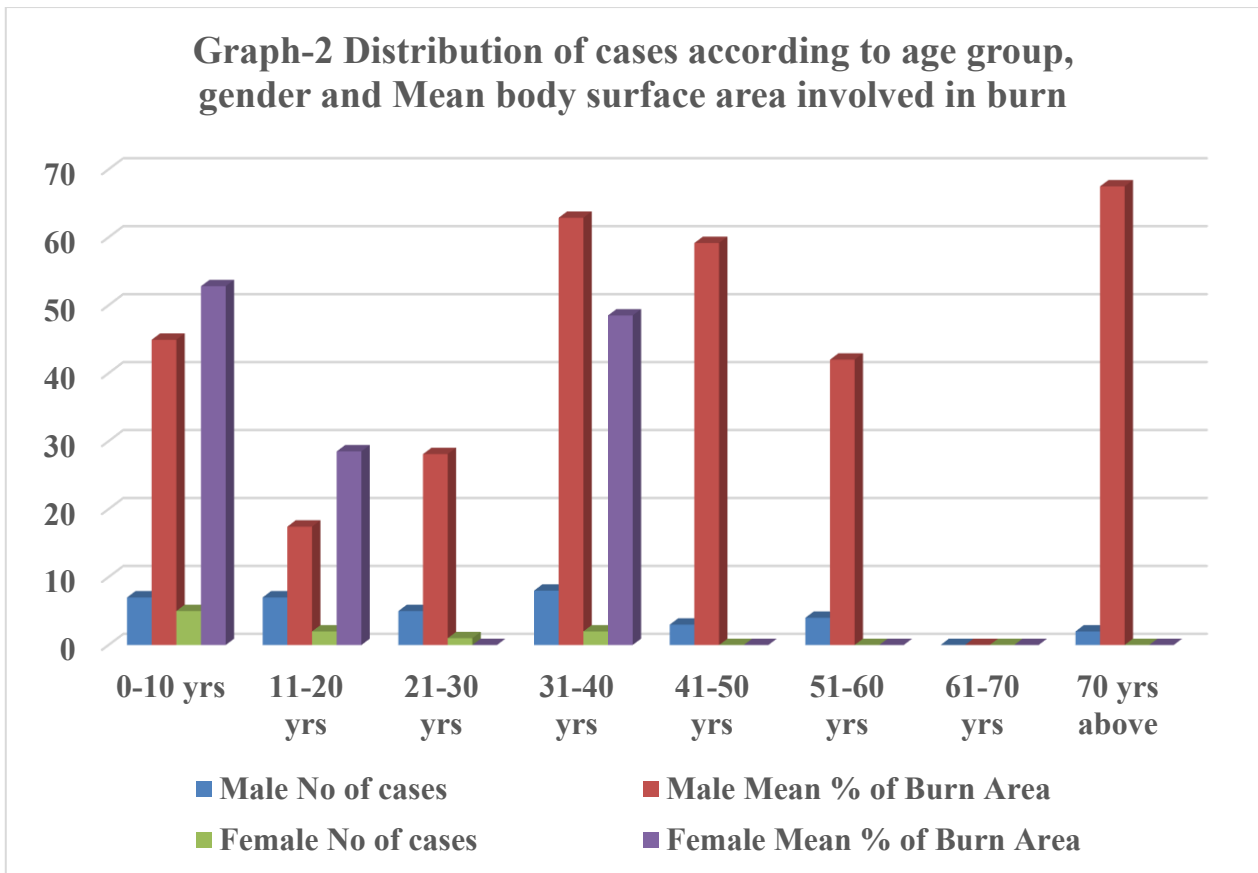


Table 3: Distribution of cases according to survival period and cause of death in burn.

Survival period/ Mean duration of	Cause of death			
	Shock	Septicemia	Toxemia	Renal failure
0-2 days	26	1	0	1
2-5 days	3	3	4	0
5-7 days	3	1	0	1
7 days and more	1	1	0	1
Total Cases	33	6	4	3

The distribution of burn cases according to the survival period and cause of death shows that shock was the most common cause, particularly in the first 0-2 days, accounting for 26 out of 33 cases. Septicemia contributed to deaths across all survival periods, though in smaller numbers, with a total of 6 cases. Toxemia was responsible for 4 deaths, primarily

occurring between 2-5 days. Renal failure was a less frequent cause of death, with 3 cases, spread across different survival periods. Most deaths due to shock occurred within the first two days, while septicemia, toxemia, and renal failure were more associated with longer survival periods.

Graph-3 Distribution of cases according to survival period and cause of death in burn

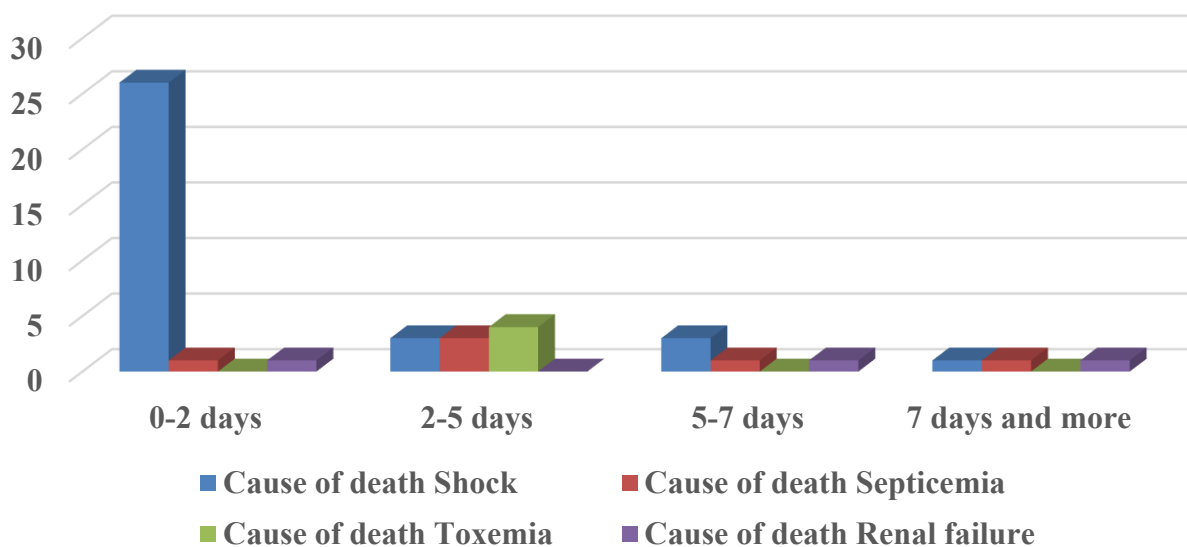


Table 4: Distribution of burn cases as per Manner of death

Manner of death	No of cases
Accidental	37
Suicidal	5
Homicidal	4
Total	46

The table presents the distribution of burn cases based on the manner of death. Out of a total of 46 cases, the majority (37 cases) were accidental. There were 5 cases classified as suicidal and 4 cases classified as

homicidal. This indicates that most burn incidents were unintentional, with a smaller number resulting from deliberate actions, either self-inflicted or inflicted by others.

Graph- 4 Distribution of burn cases as per Manner of death

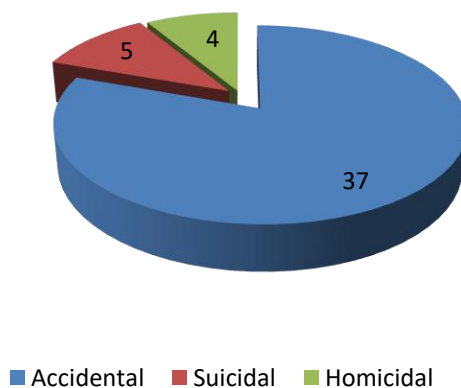
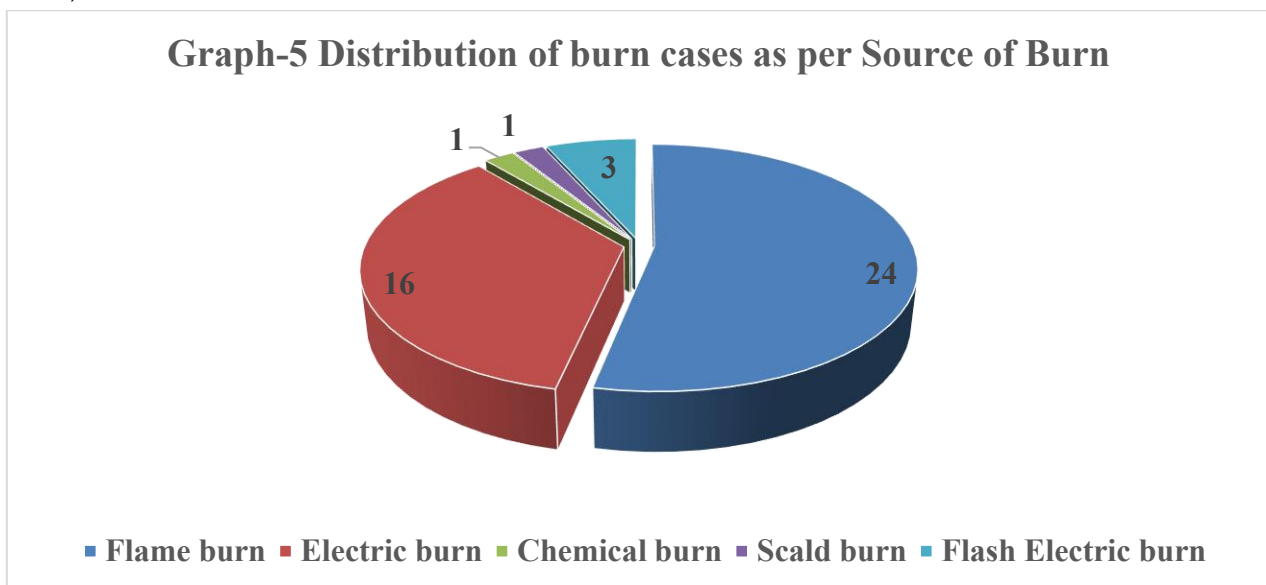


Table 5: Distribution of burn cases as per Source of Burn

Source of burn	No of cases
Flame burn	24
Electric burn	16
Chemical burn	1
Scald burn	1
Flash Electric burn	3
Total no cases	46

The table shows the distribution of burn cases according to the source of the burn. Out of 46 total cases, flame burns are the most common, accounting for 24 cases. Electric burns are the second most common, with 16 cases. There is 1 case each for

chemical burns and scald burns, while flash electric burns account for 3 cases. This indicates that flame and electric burns are the predominant sources of injury in this group.



IV. DISCUSSION

Age Group, Gender, and Demographic Profile

The study found that males (78%) were significantly more affected than females (22%), with the most affected age groups being 0-10 years (26%) and 11-20 years (20%). The majority of cases were from urban areas, with urban males representing a substantial proportion. Kumar et al. This study reported a higher incidence among females (60%) compared to males (40%), with the most affected age group being 21-40 years. This suggests that in North India, women, particularly young adults, are at a higher risk, possibly due to domestic roles and related hazards like cooking. Gupta et al. This study observed a more balanced gender distribution (55% males, 45%

females) with significant cases among children (0-10 years) and young adults (20-30 years), similar to Our study findings regarding young children but showing a more rural impact.

The findings from JLN Medical College highlight a higher risk among males and young children, particularly in urban areas. This contrasts with Kumar et al., where females, especially in the age group of 21-40 years, were more affected. The differences suggest that socio-cultural factors, like domestic responsibilities in North India, might lead to more female burn cases in that region. Meanwhile, the higher male incidence in Ajmer could be linked to occupational hazards in urban settings. The Gupta et al. study's rural focus and balanced gender distribution also point to regional variations in

exposure risks, emphasizing the need for location-specific prevention strategies.

Age Group, Gender, and Mean Body Surface Area Involved in Burn

The study showed that males aged 70 years and above had the highest mean body surface area (BSA) affected (67.5%), while females aged 0-10 years had the highest mean BSA among females (52.8%). This indicates severe burns in vulnerable age groups. **Kumar et al** This study did not specifically report on the mean BSA but highlighted that the severity of burns, particularly among women aged 21-40 years, often led to high mortality. The lack of specific BSA data makes a direct comparison challenging. **Gupta et al.** Similar to the JLN study, Gupta et al. found that children (0-10 years) and elderly individuals (above 60 years) were more likely

to suffer severe burns with a larger BSA affected, which significantly impacted survival rates.

Our study finding of high BSA burns among the elderly and young children aligns with the vulnerability of these groups as noted in the Gupta et al. study. The higher BSA in these groups likely contributes to the increased mortality risk, as managing extensive burns requires intensive care, which might not be as accessible in certain regions. The lack of detailed BSA data in Kumar et al. limits a full comparison, but the overall trend of higher severity in vulnerable populations is consistent across studies. These findings underscore the need for targeted interventions in these age groups, such as enhanced safety measures for the elderly and better supervision and protection for children.

V. COMPARISON OF STUDY RESULTS

Category	JLN Medical College Study	Kumar et al. (2009)	Gupta et al. (2020)
Total Cases	46	100	150
Gender Distribution	78% males (36), 22% females (10)	40% males (40), 60% females (60)	55% males (83), 45% females (67)
Most Affected Age Group	0-10 years (26%)	21-40 years	0-10 years, 20-30 years
Urban vs. Rural Distribution	More urban cases (urban males: 18)	More urban cases (no specific number given)	More rural cases (no specific number given)
Flame Burns	52% (24 cases)	70% (70 cases)	61% (92 cases)
Electric Burns	35% (16 cases)	5% (5 cases)	20% (30 cases)
Chemical Burns	2% (1 case)	Not specified	2% (3 cases)
Scald Burns	2% (1 case)	20% (20 cases)	17% (25 cases)
Flash Electric Burns	7% (3 cases)	Not specified	Not specified
Most Common Cause of Death	Shock (33 cases, 72%)	Septicemia	Septicemia
Survival Period - Most Deaths	0-2 days (28 cases, 61%)	Not specified	0-5 days
Manner of Death - Accidental	80% (37 cases)	Majority (exact % not given)	Majority (exact % not given)
Manner of Death - Suicidal	11% (5 cases)	Higher in females	Present but less frequent
Manner of Death - Homicidal	9% (4 cases)	Present but less frequent	Present but less frequent

VI. SUMMARY AND CONCLUSION

Demographics and Gender Distribution:

The study observed a higher incidence of burn cases among males (78%) compared to females (22%), with the most affected age groups being 0-10 years and 11-20 years. Urban areas, particularly among males, reported a higher number of cases.

Severity of Burns: The highest mean body surface area (BSA) affected was found in males aged 70 years and above (67.5%), and in females aged 0-10 years (52.8%), indicating severe burns in these vulnerable groups.

Survival Period and Causes of Death: The majority of deaths occurred within the first 2 days, primarily due to shock. As survival time increased, septicemia and toxemia became more prominent causes of death. All the burn victims who were involved with more than 60% body surface area burn were succumb to death within 5 days.

Toximea and renal failure were cause of death in lower age group and higher age group burn victims involving 30%-60% body surface area burn (bimodal occurrence).

Manner of Death: Accidental burns were the most common (80%), with a smaller proportion of cases being suicidal (11%) or homicidal (9%).

Source of Burns: Flame burns were the predominant cause of injury (52%), followed by electric burns (35%).

These findings were compared with those from two other studies (Kumar et al., 2009, and Gupta et al., 2020), revealing both consistent trends, such as the predominance of flame burns, and significant regional variations in gender distribution, the manner of death, and the sources of burns.

Ethical clearance: Taken from institutional ethical committee.

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