Original Research Paper

Profile of Death in Burn Cases: A Post-mortem Study

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Abstract

Deaths due to fire or burns usually result from application of dry heat to the body. In India there are several thousands of deaths occurring due to fire or burns. Unfortunately vast majority of these cases occur in the home and are due to smoking, defective electrical wiring, defective kerosene stove bursts, attempted suicides by self-immolation, homicidal burns of young women by husband or in-laws (Dowry deaths/bride burning). The present study was based on retrospective analysis of burn cases in the period from January 2013 to December 2013 from autopsies done in the Department of Forensic Medicine and Toxicology, SAIMS Medical College & PG Institute, Indore, M.P. It was observed that more than half of the victims died of burn injuries were married women. Females are mostly involved in cooking and most common cause is accidental burn. Burns having total body surface area (TBSA) more than 40% were fatal. The different aspects of burn deaths are analyzed and discussed in detail.

Key Words: Burn, Autopsy, Accidental, Homicidal Burn, Married Women

Introduction:

Burn may be defined as the traumatic effects of application of physical heat in any form to the body. Fire deaths are some of the most challenging fatalities, both from the investigative and the autopsy aspect.

One reason is the multifactorial investigative team approach to a fire death and the inevitable contamination of the scene. The first wave of investigators is the fire department personnel armed with powerful hoses, followed by the police, and then the medical examiner and his/her investigator staff.

In between, one has to deal with the news media and the curious immediate public.

Over 95% of fatal fire-related burns occur in low- and middle-income countries. South-East Asia alone accounts for just over one-half of the total number of fire-related deaths worldwide and females in this region have the highest fire-related burn mortality rates globally. Among the various age groups, children under 5 years and older people (i.e. those aged over 70 years) have the highest fire-related burn mortality rates.

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In addition to those who die, millions more are left with lifelong disabilities and disfigurements, often with resulting stigma and rejection.

Material and Method:

This study was based on retrospective analysis of 95 burn deaths from 1st January 2013 to 31st December 2013 from the post-mortems done in the Department of Forensic Medicine and Toxicology; SAIMS Medical College & Post graduate Institute, Indore, Madhya Pradesh.

The data represents all age groups. Proforma for study was prepared and various information and findings were collected from the post-mortem reports and hospital record like age, sex, religion, cause of death, duration of death, hospitalization and survival time was noted. The information was compiled, tabulated and analyzed.

Observations and Results:

During one year study period from 1st January 2013 to 31st December 2013, total 260 autopsies were conducted, out of which 95 cases (36.5%) were due to burn. (Graph 1)

There was predominance of females with 64 cases (67.4%) and 31 cases (32.6%) were male and Male: female ratio was 1: 2.06. (Table 1) Burn injuries can occur at any age but the most affected age group in this study was between 21-30 years i.e. 43 cases (45.3%), followed by 31-40 years i.e. 30 cases (31.6%). Least number of cases were from >40 yrs and <10 years. (Table 2)

Majority of victims in present study were Hindus (86.3%), with predominance of females

in both Hindu and Muslim religions. (Table 3) Majority of victims (80%) were married and among them, 56 (73.7%) were females in our study. (Table 4) Among females, 10.9% were pregnant with gravid uterus. (Table 5)

In present study out of all burn cases, five cases (5.3%) were having carbon soot particles in trachea. (Graph 2) Among all burn victims, 87 cases (91.6%) were hospitalized while eight cases (8.4%) were brought dead. (Table 6) Among hospitalized cases, 8 cases (8.4%) died within 24 hours, 13 cases (13.7%) died within 1- 2 days, 27 cases (28.4%) died within 3- 6 days, and 21 cases (22.1%) died within 7- 10 days while 18 cases (18.9%) died 10 days after hospitalization. (Table 7)

In majority of burn cases (49.5% cases), total body surface area involved was between 40- 70 %, followed by 36.8% cases with 70-100% body surface area. Only 4.2% cases died with total body surface area less than 30%. In this study, majority of victims died due to shock (40% cases), followed by septicemia (31.6%) and exhaustion in 28.4% cases (Table 9)

Discussion:

In the present study, there is a predominance of female victims than males in burn cases and a majority of them were in the reproductive age group 21-30 years, which is similar to the findings of other similar studies. [1-4] The age group 21-30 years is the young adult group and is the most common age for marriage in this area of study.

Most of the victims were working women and they do not follow the safety measures due to lack of time or knowledge resulting in such incidents. Most of the victims were female and belong to the Hindu community, which is similar to the findings of previous studies. [2-6]

The reason for the Hindu predominance is that in this part of the world Hinduism is the most commonly followed religion and so is the increase in the Hindu victims. Majority of victims were married (80%) and among them, 73.7% were females. As for the female predominance, females are mostly involved in cooking, especially after marriage. In contrast, Memchoubi et al [7] reported slight male preponderance in their study.

Soot particles are found in trachea in 5.55% of cases, which is different from the finding of Dr. K.C. Das [2], who found soot particles in trachea in 18.05% cases and D. Nath [3] who found in 34.07% cases and A. Mazumdar [4], who found soot particles in trachea in 19% cases.

Most of the victims died in the hospital after receiving treatment, which include intravenous fluid and also some oral medication. This might be the cause of absence of soot particles in the trachea in most of the victims.

In the present series, the overwhelming majority (86.3%) of the victims had more than 40% of total body surface area (TBSA) burn indicating the incompatibility with life even at a tertiary care center.

Studies from Angola [8] revealed 100% mortality over 40% TBSA, and similarly 80% mortality rate in burn over 40–50% TBSA has been reported from Jaipur. [9] Shock is found to be the most common cause of death in most of the victims (40% cases), which is similar to other studies. [2-4]

Shock (neurogenic, hypovolemic) is more common in 1-2 day period after burn injury. Most of the cases (59 %) succumbed to death within week. Concurrent to this study, 60.8 % of cases and 58 % of cases died within a week in studies done by Kumar V [10] and Ragheb et al [11] respectively indicating that burns are rapidly fatal. Most of the injuries were epidermal to dermo-epidermal in nature, which were most painful resulting in neurogenic shock.

Any kind of injury including burn injury was the common source of infection, which resulted in septicemia and septicaemic death in 30 cases (31.6%). Harish D [12] reported in their study that 84 % of cases died due to septicemia as a result of burns.

Conclusion:

The epidemiological factors for burn injuries vary in different countries. In this study, more than half of the victims died of burn injuries were married women. Females are mostly involved in cooking and most common cause is accidental burn. Mass education and following safety instructions will definitely reduce the incidence of burn injuries.

Prevention is better than cure and effective prevention requires a good understanding of major risk factors. Government, NGO'S and other organizations need to intensify their efforts in raising the awareness of public at large.

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Table1: Gender-wise Distribution of Burn Cases

Sex	Burn Cases	Percentage
Male	31	32.6
Female	64	67.4
Total	**95**	**100**

Table 2: Age wise Distribution of Burn Cases

Age Grps (Yrs)	Cases	Percentage (%)
0-10	3	3.2
11-20	10	9.5
21-30	43	45.3
31-40	30	31.6
41-50	4	4.2
51-60	2	2.1
61-70	1	1.05
71-80	2	2.1
Total	**95**	**100**

Table 3: Religion-wise Distribution of Burn Cases

Religion	Male	Female	Total (Percentage)
Hindu	26	56	82 (86.3%)
Muslim	5	8	13 (13.7%)
Total	**31**	**64**	**95 (100%)**

Table 4: Marital Status

Gender	Married	Unmarried	Percentage
Male	20	11	31 (32.6%)
Female	56	8	64 (67.4%)
Total	**76 (80%)**	**19 (20%)**	**95 (100%)**

Table 5: Female Burn Victims with Gravid Uterus

Religion	Cases	Gravid uterus	Percentage
Hindu Female	56	6	10.7
Muslim Female	8	1	12.5
Total	**64**	**7**	**10.9**

Table 6: Brought Dead or Died in Hospital

Hospitalized/Brought dead	Cases	Percentage
Hospitalized	87	91.6
Brought dead	8	8.4
Total	**95**	**100**

Table 7: Survival Period

Period of Survival	Cases	Percentage
Brought dead	8	8.4
<12 hrs	3	3.2
12- 24hrs	5	5.3
1- 2 days	13	13.7
3- 4 days	9	9.5
5- 6 days	18	18.9
7- 8 days	9	9.5
9- 10 days	12	12.6
>10 days	18	18.9
Total	**95**	**100%**

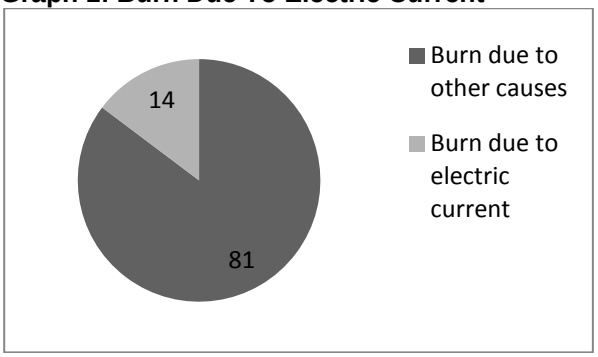
Table 8: Body Surface Area Involved

Total Body surface area involved (%)	cases	Percentage
10- 20%	0	0
20- 30%	4	4.2
30- 40%	9	9.5
40- 50%	11	11.6
50- 60%	21	22.1
60- 70%	15	15.8
70- 80%	12	12.6
80- 90%	11	11.6
90- 100%	12	12.6
Total	**95**	**100**

Table 9: Cause of Death

Cause of Death	Cases	Percentage (%)
Septicemia	30	31.6
Exhaustion	27	28.4
Shock	38	40
Total	**95**	**100**

Graph 1: Burn Due To Electric Current



Graph 2: Soot Particles in Trachea