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Forensic Medicine

FATAL BURN INJURIES- A TWO YEAR AUTOPSY BASED RETROSPECTIVE STUDY

Dr. Dharmendra Kumar	Assistant, Professor & HOD, Department of Forensic Medicine & Toxicology (FMT), Vardhman Institute of Medical Sciences (VIMS), Pawapuri, Bihar.
Dr. Ritu	Assistant Professor, Department of Forensic Medicine & Toxicology (FMT), Patna Medical College & Hospital (PMCH), Patna, Bihar.
Dr. Pankaj Kumar	Associate Professor, Department of Forensic Medicine & Toxicology (FMT), Patna Medical College & Hospital (PMCH), Patna, Bihar.
Dr. Jainendra Kumar	JR III (Acad.), Department of Forensic Medicine & Toxicology (FMT), Patna Medical College & Hospital (PMCH), Patna, Bihar.
Dr. Ranvir Ranjan*	Senior resident, Department of Forensic Medicine & Toxicology (FMT), AIIMS, Patna Bihar. *Corresponding Author

ABSTRACT **Introduction:** Burn deaths are an important public health problem in a developing country like India. AIM: The purpose of this study was to record and evaluate the causes and magnitude of the fatal burn injuries retrospectively. **Material And Method:** An analysis of the autopsy records revealed 862 (17.33%) cases of the burn injuries among the total 4973 autopsies done over the period of two years from June2016 to May2018 in the mortuary of Department of Forensic Medicine & Toxicology (FMT) of Patna Medical College & Hospital (PMCH), Patna, Bihar. **Result:** The majority of deaths occurred between the age group of 21-40 years (536 or 62.18%) with the preponderance of females (69.72%). The flame burn was seen in 713 (82.71 %) cases. The majority of the burn cases were accidental in nature 743 (86.19%) followed by suicidal 93 (10.78%) and homicidal 26 (3.01%) deaths. The percentages of burn (TBSA) over 50% were observed in most of the cases (60.78%). Clear sign of vitality were found in 68.67% (n=592) of the victims. The majority of deaths occurred in weeks (54.17%) and most of the victim died from septicaemia and neurogenic shock (93.38%) followed by and pneumonia (2.32%).Regarding accident location, our study showed that the home ranked first (n=634; 73.54%), followed by outdoor locations (n=164; 19.02%), then workplace (n=64; 7.42%). Most of the cases appeared in winter season and the study also showed diurnal variation with maximum number of cases occurring during night. The victims were mainly belonging to low socioeconomic status and were inhabitant of rural areas. **Prevention:** The result of the study provides necessary information to develop proper burn prevention programs thereby reducing the frequency of burns and burn related deaths.

KEYWORDS : Burn deaths, Septicaemia, Neurogenic shock, TBSA

INTRODUCTION:

Burns have always been considered as one of the most destructive injuries, causing not only deaths but also major economic and psychological impacts and long term somatic sequel. A burn is an injury to the skin or other organic tissue primarily caused by heat or due to radiation, radioactivity, electricity, friction or contact with chemicals. In India, over 1 000 000 people are moderately or severely burnt every year.[6]Burns are a global public health problem, accounting for an estimated 180 000 deaths annually.[3] In 2015, nearly 11 million people worldwide were burned severely enough to require medical attention[5] Moreover, burns are also among the most expensive traumatic injuries, because of long hospitalization and rehabilitation, and costly wound and scar treatment.

Patna, the capital of Bihar, is one of the most crowded cities in India. Patna city is governed by Municipal Corporation. The population of Patna City in 2011, as per provisional reports of census India is 1,684,222 of which male and female are 893,399 and790,823 respectively.[7] A number of studies on various aspects of burns have been reported from various parts of Patna, but there is lack of information especially on fatal victims from the Patna City. The Present study is based on a 2 years retrospective study (June2016–May2018) of fatal burn cases at autopsy from the Department of Forensic Medicine &Toxicology of Patna Medical College, Patna.

MATERIAL AND METHODS:

This retrospective study was done on burn deaths from Patna which were autopsied between June 2016 to May 2018 on police request at the mortuary of Department of Forensic Medicine & Toxicology (FMT) of Patna Medical College & Hospital (PMCH), Patna, Bihar. Of the 4973 autopsies performed on all types of unnatural deaths, 862 (17.33%) were the cases of burns. These 862 fatal burn cases form the material of this study. Retrospective data were collected from the autopsy reports of the department, case sheets from the hospital, the general prosecutor's investigations report and the inquest reports from police.

Statistical Analysis

Data was stratified by gender,age group, socio-economic status, time (from 2016 to 2018), season, diurnal variation, accident location, type of burn, TBSA(estimated according to Lund–Browder chart), duration of survive along with manner and cause of death. Statistical analysis was done by chi-squared, Student's t-test and Kaplan-Meier for survival where applicable. Data were presented as numbers and percentages by using SPSS version 25. Pearson correlation coefficient was done and P value is considered significant at <0.05. Descriptive statistics was performed using frequency and percentages which was presented in the form of tables and charts.

OBSERVATION &RESULTS:

Thermal (heat) burns occur when some or all of the cells in the skin or other tissues are destroyed by: hot liquids (scalds), hot solids (contact burns), or flames (flame burns) corrosive poisons(corrosive burns) Electric spark, discharges, flashes and lightening(electric burns). Well burn injury is a common type of traumatic injury, causing considerable morbidity and mortality. Mortality for all acute burn autopsies during this 2year period was 862 of a total of 4973 cases, equal to 17.33% . Of total autopsies conducted, 71% had sepsis diagnosed clinically and autopsy findings (Table 2). From June 2016 to May 2018, the majority of burn cases was female, had suffered a flame burn injury and had 60.78% cases with TBSA> 50%. The average (standard deviation) TBSA was 69% ± 14%. Sepsis and shock was present in 93.38% of all admitted burns.

Respiratory failure due to pneumonia accounts for 2.32% of all deaths. On average, patients lived 8 ± 3 days before death. Brain injury (Anoxic brain injury and cerebral edema with herniation) accounted for 0.81% (n=7)of all deaths. Shock (hypovolemic or neurogenic) accounted for 8% of all deaths. Shock in some cases lead to cardiovascular failure and multi-organ failure. Multi-organ failure was present in 2.08% (n=18) and suffocation in1.39% (n=12) of all deaths after burn injury. Regarding accident location, our study showed that the home ranked first (n=634; 73.54%), followed by outdoor locations

(n=164; 19.02%), then workplace (n=64; 7.42%). In the present study, about 62.18% (n=536) of the victims were in the age group of 21–40 years, which are similar to the observation of Singh et al.8 from Chandigarh who reported two thirds of fatal burn cases in the young age group (21–40 years).

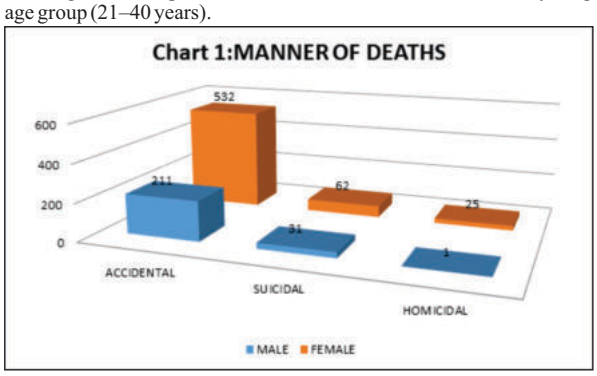
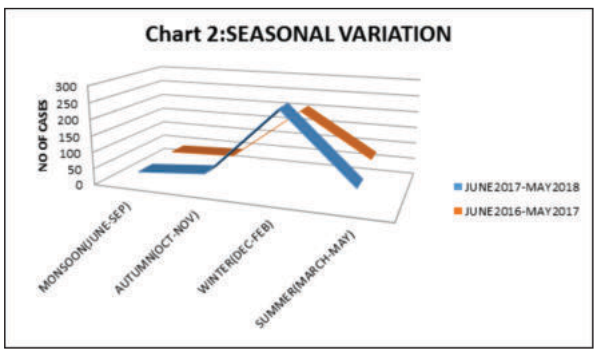


Table 1: Distribution Of Burn Cases According To Nature Of Burn

NATURE OF BURN	NO. OF CASES (PERCENTAGE)
FLAME	713 (82.71%)
ELECTROCUTION	143 (16.58%)
CHEMICAL BURN	4 (0.4%)
SCALD	2 (0.2%)

Table 2: Distribution Of Burn Cases According To Cause Of Death

CAUSE OF DEATH	NO. OF CASES (PERCENTAGE)
SEPSIS & SHOCK	805 (93.38%)
LUNG INFECTION (PNEUMONIA)	20(2.32%)
MULTI-ORGAN FAILURE	18(2.08%)
SUFFOCATION	12(1.39%)
HEAD INJURY	07(0.81%)



DISCUSSION:

A medico-legal autopsy is mandatory in Patna for all unnatural deaths including those due to burns irrespective of the burns being accidental, suicidal or homicidal. Burn constitutes 17.33% (n=862) of the total deaths coming for autopsy at mortuary. Burn is the only unnatural cause in which female not only outnumbered the males, but the sex ratio being almost two times higher in female in India. Seasonal variations in our study showed that burn deaths occurred mostly in winter followed by monsoon. This might be due to the fact that, in winter, there is more need for hot water for bathing. There are important regional differences in burn rates. People living in low- and middle-income countries are at higher risk for burns than people living in high-income countries.

Within all countries however, burn risk correlates with socioeconomic status. There are a number of other risk factors for burns, including: occupations that increase exposure to fire; poverty, overcrowding and lack of proper safety measures; placement of young girls in household roles such as cooking and care of small children; underlying medical conditions like epilepsy, peripheral neuropathy, and physical and cognitive disabilities; alcohol abuse and smoking; easy access to chemicals used for assault (such as in acid violence attacks); use of kerosene (paraffin) as a fuel source for non-electric domestic appliances; inadequate safety measures for liquefied petroleum gas (LPG) and electricity. Burns occur mainly in the home and workplace. Men are most likely to be burned in the workplace due to fire, scalds, chemical and electrical burns. Our study revealed that signs of vitality (soot in airways and/or digestive tract) were found at autopsy in large majority (68.67%) of victims who died from burns.

CONCLUSION:

In conclusion, the present autopsy-based study has highlighted some important features pertaining to burn deaths in Patna. The highest incidence rates of burn deaths were in adolescent and young age groups. Majority of the burn victims are females, but men and children age were reported to be at a higher risk for electric burn. Flame was the major cause of burns. Accident is the commonest manner of death. A higher occurrence of fatal burns is in the night. Furthermore, the accumulation of burn fatalities in winter suggests that there is a relation between people's habits and fatal burns. Signs of vitality were found at autopsy in a large majority of victims who died from burns. Neurogenic shock& Septicemia was the major cause of burn death, followed by pneumonia.

PREVENTION:

The approach to burn prevention, should be based on a sound knowledge of etiological patterns, geographical variations and socioeconomic differences. As in other low income countries, burns in India are considered as major health problems that are associated with high mortality and morbidity. Encourage further development of burn-care systems, including the training of health-care providers in the appropriate triage and management of people with burns. Support the development and distribution of fire-retardant aprons to be used while cooking around an open flame or kerosene stove. [4] The national programme for prevention, management and rehabilitation of burn injuries (NPPMRBI) is an initiative by the directorate general of health services, Ministry of Health and Family Welfare, Government of India to strengthen the preventive, curative and rehabilitative services for burn victims[6].

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

Ethical Clearance: Taken from Institutional Ethical Committee

REFERENCES:

1. Bernard GR, Artigas A, Brigham KL, Carlet J, Falke K, Hudson L, Lamy M, Legall JR, Morris A, Spragg R. The American-European Consensus Conference on ARDS. Definitions, mechanisms, relevant outcomes, and clinical trial coordination. Am J Respir Crit Care Med. 1994;149:818–824. [PubMed] [Google Scholar]
2. Modi NJ, Injuries from burns, scalds, lightening and electricity. Asphyxiants. Modi's Text Book of Medical Jurisprudence and Toxicology. 20th Ed. Bombay: NM Tripathi; 1983: p. 182, 762.
3. World Health Organization. Injury: A leading cause of the global burden of disease, 2000. World Health Organization: Geneva; 2002.
4. Mostafa M. Afify a, *, Naglaa F. Mahmoud b , Ghada M. Abd El Azzim c , Nevein A. El Desouky bFatal burn injuries: A five year retrospective autopsy study in Cairo city, Egypt Egyptian Journal of Forensic Sciences Volume 2, Issue 4, December 2012, Pages 117-122.
5. www.who.int/violence_injury_prevention.
6. Nrhm.gov.in/pdf/NPPMBI/operational_ guidelines.
7. www.census2011.co.in.
8. D. Singh, A. Singh, A.K. Sharma, L. SodhiBurn mortality in Chandigarh zone: 25 years autopsy experience from a tertiary care hospital of IndiaBurns, 24 (1998), pp. 150-156.
9. K. Virendra, K.M. Manoj, K. Sarita Fatal burns in Manipal area: a 10 year study J Forensic Leg Med, 14 (2007), pp. 3-6.