Epidemiological Profile of Burn Cases among autopsies Conducted in Dept. of FMT, RIMS, Ranchi

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Abstract

Introduction : Every year, it was found that burns caused by fire were responsible for about 265,000 deaths globally. More than 90% of fatal fire-related burns occur in developing or lower and middle income countries (LMICs). Out of this, South- East Asia alone accounts for more than half of these fire-related deaths. In South East Asian region, death due to Burns in girl / women is more than that of Tuberculosis, HIV/AIDS and malaria combined. In India, burn injury is found to be one of the major causes of death, especially in females. The problem of death due to burns in developing countries like India is primarily due to various socio-cultural factors prevalent in the country. Some of these factors include poor housing conditions, poor maintenance of electrical appliances, and customs of wearing dresses like sarees or dupatta, practice of dowry, illiteracy level and poverty.

Material and Method: Materials for the present study were collected from the medico legal autopsies of 296 burn cases, performed at the mortuary of Rajendra Institute of Medical Sciences (RIMS), Ranchi, during the period from January 2018 to December 2018. A detailed performa was designed with a definite set of questionnaire which formed the basis of this study.

Results: In our study, out of the 296 cases, the most common age group involved was 21-30 years with a female sex predilection (female to male ratio of 1.5:1). As far as the marital status is concerned, most cases were of married men and women (66.22%) involving mostly Housewives (43.25%). The most common time period involved was between 4 PM to 10 PM (35.47%). Most of the cases took place at home (75.34%).

Conclusion:- Our study primarily focuses on the epidemiological profile of data involving burn cases in this part of India which is relatively a backward area comprising of a majority of tribal population.

Keywords - *Burn, female, young, married, housewives*

Introduction

Fire has been known to mankind for about 400,000 years. Most of the communities believe that the whole universe is made up of five essential elements. Water (Jal), Air (Vayu), Earth (Prithvi), Sky (Aakash) and Fire (Agni). So, this way fire or burns have great importance in our life. The use of fire in various aspects has not only added to our comforts but also added to our misuses by increasing the risk of burns. Fire can be considered as man's first double-edged sword, evidenced throughout history; it has served as well as destroyed mankind[1]. Burn injuries are dry thermal injury caused due to contact with raw heat such as flame, radiant heat or some heated solid substance like metal or glass, to the body surface[2]. Mammalian tissue can survive only within a relatively within narrow range of temperature, 22-440

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C^3. Thus burning usually occurs due to contact with flame it may be caused due to contact with hot metal or any other hot solid or hot liquid. The severity of burning very extremely depending on the degree of heat, period of exposure, intensity of heat and age of the person. Burn injury of the skin is characterized by the damage to skin tissue from hot (scald, flash, flame, contact), cold, electrical, chemical, radiation, sunlight, or other sources. Burns constitute one of the most common causes of morbidity and mortality worldwide. They can result in significant disfigurement, physical impairment, work loss, psychological problems, and considerable economic burden. Prevention of burn is considered the best strategy to reduce the overall burden of burns. The impact and the management of burn injury depend on the severity of burn. Although minor burns can be treated at outpatient clinics, the management of patients with severe burns requires multidisciplinary approach in specialized burn care centers. The local treatment of burn wound should address the major concerns of wound care including anti-inflammatory treatment, wound coverage, and prevention of infection and scar formation. Although superficial burns may be managed with topical treatment, deep burns require excision and grafting. The major challenges for treating physicians are to control the infection to avoid development of septicaemia and its related complications. Burn injuries and their sequel pose a public health problem. Every year, it was found that burns caused by fire were responsible for about 265,000 deaths globally[4]. More than 90% of fatal fire-related burns occur in developing or lower and middle income countries (LMICs). Out of this, South-East Asia alone accounts for more than half of these fire-related deaths. In South East Asian region, death due to Burns in girl / women is more than that of Tuberculosis, HIV/AIDS and malaria combined[5,6]. In India, burn injury is found to be one of the major causes of death, especially in females. The problem of death due to burns in developing countries like India is primarily due to various socio-cultural factors prevalent in the country. Some of these factors include poor housing conditions, poor maintenance of electrical appliances, and customs of wearing dresses like sarees or dupatta, practice of dowry, illiteracy level and poverty. The precise numbers of burns incidence is very much difficult to arrive due to large population and lack of incident reporting. The loads of over-population, illiteracy, low socio-economic status, poor standards of safety at home and at work place, corruption etc. has caused a significant rise in burns cases.

The aims and objective of this research work is to study the epidemiology of burns, especially in married women in this region of the country and find out certain reasons and causes of burns and its related deaths.

Materials and Methodology

The present study was carried out in the Department of Forensic Medicine & Toxicology, Rajendra Institute of Medical Sciences, Ranchi for a period of one and half year from January, 2018 to December, 2018. The materials for the present study were dead body brought for medico legal autopsy from various police stations of Ranchi District (Jharkhand) at the Forensic Medicine Department of RIMS, Ranchi. During the study period total 3440 cases were autopsied, out of which only 296 cases where death were due to burns. The information regarding the age, gender, socio-demographic, manner of burns, time of incidence, place of incidence, occupation, etc were gathered from the police papers like inquest report, dead body challan etc, and through detailed interviews of the relatives, neighbours, friends, and police officials accompanying the dead bodies. In case of hospital deaths, hospital papers were also examined. A predesigned tested questionnaire (enclosed as annexure- I) was used to record the information.

Before proceeding with the dissection of the body, external examination of the whole body was carried out very carefully and minutely. The general build of the body was noted and its age, sex verified. The different regions of the body were carefully inspected, one by one and details of the injuries present on them were noted. As routine, a detailed and thorough postmortem examination was carried on every case. To make the study more systematic and error free, a Performa was designed and tested to record detailed observation of post-mortem examination including other relevant detailed information. The findings noted were carefully compiled, analyzed and tabulated. The results were presented in form of tables.

Inclusion criteria:

1. All cases of deaths due to Burns coming for post

mortem.

2. Cases considered for study will include subjects of all age group of all genders.

Exclusion criteria:

1. Highly decomposed bodies.

2. Cases of Postmortem Burns.

Results

The present study was conducted in the Department of Forensic Medicine & Toxicology, Rajendra Institute of Medical Sciences, Ranchi for a period of one year from January 2018 to December 2018. Total 3440 cases were autopsied during the period of study, out of which 296 cases were of death due to burns. This comprised 8.60% of the total post-mortem conducted in the department during the study period

The observations on various aspects were recorded and are being presented here in form of various tables.

1. Age wise distribution:

TABLE I

Age groups(in years)	No. Of Cases (N)	Percentage(%)
0 to10	24	8.01
11 to20	84	28.37
21 to 30	115	38.85
31 to 40	48	16.21
41 to 50	14	4.72
>50	11	3.71
Total	296	100

2. Distribution based on Gender:

TABLE II:

Gender	No. of cases(N)	Percentage(%)
Male	117	39.53
Female	179	60.47
Total	296	100

3. Distribution based on Marital Status:

TABLE III:

Marital Status	No. Of Cases(N)	Percentage(%)
Married	196	66.22
Unmarried	99	33.45
Widow	01	0.33
TOTAL	296	100

4. Occupation Wise Distribution of Cases:

TABLE IV:

Occupation	Number of cases(N)	Percentage(%)
Housewife	128	43.25
Labour	78	26.35
Student	66	22.29
Unemployed	16	05.40
Business/Self Employed	05	01.69
Govt. Employee	03	01.02
TOTAL	296	100

5. Distribution of cases Based on Place of Incidence:

TABLE V:

Place of Incidence	No. of Cases(N)	Percentage(%)
Inside Home	223	75.34
Outside Home	52	17.57
Working Place	21	07.09
TOTAL	296	100

6. Distribution of cases Based on Time of Incidence:

TABLE VI:

Time Range	No. of Cases(N)	Percentage(%)
04:01A.M-10:00A.M	45	15.21
10:01A.M-04:00P.M	85	28.72
04:01P.M-10:00P.M	105	35.47
10:01P.M-04:00A.M	61	20.60
TOTAL	296	100

Discussion

There is relative lack of published information about burn injuries in Jharkhand. Present study with a relatively small sample size has revealed pattern of burn injuries among reported cases from a tertiary care hospital of Ranchi, Jharkhand.

The present study was conducted in the Department of Forensic Medicine &Toxicology, Rajendra Institute of Medical Sciences, Ranchi for a period of one year from January 2018 to December 2018. Total 3440 cases were autopsied during the period of study, out of which 296 cases were of death due to burns. This comprised 8.60% of the total post-mortem conducted in the department during the study period.

Age wise distribution:

Most common affected age group in this study was 21–30 years which is consistent with findings of many other epidemiological studies on burn from different part of India like Sawney CP et al[7], Ahuja RB et al[8], Rai A et al[9], Chauhan A et al[10] and Dalbir Singh et al[11].

Gender wise Distribution:

In our study it was observed that the female to male patient ratio was 1.5:1 indicating increased vulnerability of female to burn which is comparable with other findings. A very big sample size (N= 26880) study was conducted at KGMU, Lucknow and reported that female: male ratio 1.4:1[12].

The findings of present study is also in concurrence with the other studies done in different regions of India like Kumar P et al[13], Lal P et al[14] and Bhardwaj SD et al[15]. Earlier studies done by Korah MK et al[16] and Prasad CS et al[17] on deceased burn patients from this institute had also reported higher percentage of female victims.

Substantially higher female preponderance in present study might be due to a larger population of Jharkhand resides in rural areas where females are mostly housewives engaged in household works. Unsafe cooking practices like Angithi which uses Koyla, chullas uses wooden and use of kerosene lamps are common in rural areas which expose them to flame burn and kerosene burn. These could be other reasons after intentional injuries due to burn for higher number of female patients reporting to hospital. This higher proportion of female burn admissions is consistent with that of many low- income and middle-income countries such as 53% in Egypt[18], 56% in India[19], 56% in Iran[20], 64% in Sri Lanka[21] and 67% in Turkey[22]. Studies from high-income countries report higher proportions in males[23-26].

This preponderance of female burns in the current study is likely to be related to the role of women in the family where they take care of cooking, baking and other functions involving heating and cooking equipment. In addition, young females are more likely to be affected by intentional self-harm burns. This interpretation becomes more convincing when we notice that 84% of burns occurred at home and 94% of intentional self harm burns were females.

Distribution based on Marital Status:

Marital status wise distribution of death due to burns revealed that the maximum number of burn victims were married (66.22%) followed by unmarried (33.44%). Least number of cases was from widows.

In the present study, the independent risk factors for intentional self-harm were among female married victims was probably because of the increasing familial stress due to day to day problems like unemployment, illiteracy and poverty, which together give rise to greater issues like marital disharmony and dowry. These results are consistent with the findings of other researchers like Adamo C et al[27], Srivastava AK[28], and Vaghela Prithwiraj Singh et al[29] and they were in contradiction to the findings of the studies from other developed countries. The unmarried victims group mostly included men of the adolescent age group and the reasons behind their deaths were rivalry, carelessness at the work place and frustration which arose due to a failure in love/ examinations.

Occupation Wise Distribution of Cases:

Occupation wise distribution of death due to burns revealed that maximum cases belong to housewives in this study. In the studies conducted by Gupta RK and Srivastava AK (1988)[30], and Dalbir Singh et al 1997)[31], similar observation was reported that burns incidence was more common in housewives.

Distribution of cases Based on Place of Incidence:

The findings of present study showed that majority of incident of burns occurred at home followed by outside of home and working place. Similar observation was reported by various different authors worldwide. Studies involving admissions for all burns and all ages indicate that the majority of injuries occur at home including 56% in Nigeria[33], 57% in Turkey[34], 58% in Israel[35], and 63% in Norway[36]. In the United States 66% of all hospitalized burns are reported to have occurred at home[37]. In the low-income and middle income countries, the kitchen is the room where burn incidents most commonly occur. Majority of incidences occurred in kitchen. This is because the housewives working in kitchen are more prone to hazards of fire. It was followed by incidences occurred in living room. Most of the suicidal victims prefer closed spaces like living room. This finding is consistent with studies done by Subrahmanyam M[38] and Attia AF et al[39].

In the studies conducted by Vaghela Prithviraj Singh C et al (2012)[29], Mostafa M.Afify et al (2012)[40] and Shinde A.B. Keoliya A.N.(2013)[41] in other part of India and revealed that burns incidence were more common at home.

Distribution of cases Based on Time of Incidence:

Time of incident wise distribution of death due to burns reveals that maximum numbers of burn cases occurred between 4P.M. to 10 P.M. followed by10 A.M. to 4P.M. in my study. In the study conducted by Akther J.M. and Nerker et al[42](2010) found that the peak incidence of burn occurred between 5A.M to 10A.M (47.4%) followed by between 11P.M to 4A.M (29.8%) which is not similar to our study. There is no universal division of periods of a day. Hence for sake of convenience, a day was divided in three hourly periods. Maximum number of cases 19 (17.43%) were reported in early evening hours during 18:00 hours to 20:59 hours. This is usual time of cooking by housewives in India. This increases chances of exposure to hazards of fire. Minimum number of cases 7 (6.42%) were reported early night hours during 00:00 hours to 02:59 hours. This finding is consistent with studies conducted by Sharma BR et al[43] and Singh D et al[44]. This is sleeping time for most of the peoples. The cases occurred during this period were due to fall of lamp over bed or body while the victims were asleep. This is not consistent with study done by Akhter JM et al[42], who observed maximum number of incidences 48.59% in early part of the day followed by 29.13% during evening. This might be due to the fact that Akhter JM et al conducted study in rural part of India which involves majority of agrarian population. They are usually exposed to fire in early morning for cooking, warmth and heating water.

In the study conducted by Mostafa M.Afify et al[40] (2012) observed that majority of the burn incidence occur at night time (53.8%) which is not similar to my study. In the study conducted by Shinde A.B. Keoliya A.N[41] (2013) found that the peak incidence of occurrence between 10P.M to 06P.M (46.8%) followed by between 06A.M to 2P.M (26.6%) and between 2P.M to 10P.M (26.6%) which is not similar to my study.

Conclusion

- Out of the total 3440 cases autopsied during the period of study, 296 cases involved death due to burns.
- Most common age group affected in this study was 21–30 years closely followed by the age group 11-20 years.
- There was higher preponderance of female cases in this study with a female to male ratio of 1.5:1.
- Maximum number of burn victims were married (66.22%) followed by unmarried (33.45%).
- Burn incidence was seen more commonly in housewives (43.25%) followed by labourers (26.35%) and students (22.29%).
- Majority of incidence of burns occurred at home (75.34%) followed by outside home (17.57%) and working place (7.09%).
- Maximum numbers of burn cases occurred between 4P.M. to 10 P.M. (35.47%) followed by10 A.M. to 4P.M. (28.72%).

Conflicts of Interest: None

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Ethical Clearance: Taken from Institutional Ethics Committee, RIMS, Ranchi

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