



## Study of Etiological and Clinical Profile of Burn Patients

Authors

**Dr Anshul Galav, Dr Simple Agrawal**

H.P.University

### Introduction

The term 'burn' denotes a variety of conditions of which the local effects of dry heat are the classical examples. It is best defined as '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 tissues.'<sup>1</sup>

### Epidemiology

Every year, about 1% of US population sustains a burn injury. More than 2million burns occur and a quarter of which require medical care and produce significant disability. Approximately 1,00,000 patients require hospital admission and more than 10,000 persons die of burn-related causes annually in USA. The commonly involved ages are 2-4 years old, for whom scalding is the most common cause and 17-25 years old, usually male, for whom the commonest is inflammable liquid.

The incidence of burn injury varies greatly between cultures. In the UK (Population 65 million), each year around 175000 people visit accident and emergency departments suffering burns, of whom about 13000 need to be admitted. About 1000 have severe burns requiring fluid resuscitation, and half of the victims are under 16 years of age. The majority of burns in children are scalds caused by accidents with kettles, pans, hot drinks and bath water. Among adolescent patients,

the burns are usually caused by young males experimenting with matches and inflammable liquids. In adults scalds are not uncommon but are less frequent than flame burns. Most electrical and chemical injuries occur in adults. Cold and radiation are very rare causes of burns. Associated conditions in adults such as mental disease (attempted suicide or assault), epilepsy and alcohol or drug abuse, are underlying factors in as many as 80% of patients with burns admitted to hospital in some populations.<sup>2</sup>

The exact number of burns is difficult to determine in India. Judicious extrapolation suggests that it has 7-8 lakhs burn admissions annually. The projected figures suggest an annual mortality rate of 1-1.4 lakhs<sup>3</sup> The high mortality in young married women from burns has already become an alarming and contentious medical problem in rural India.<sup>4</sup>

### Material and Method

**Study Area:** This prospective study will be conducted in department of surgery in DR. R.P.G.M.C., TANDA after approval with ethical committee.

**Study Population:** all the patients admitted in burn care centre at DR. R.P.G.M.C., TANDA

**Method:** this prospective study will be for the duration of one year from April 2013 to March 2013. After admissions patients will be sent to burn department where dressing done in sterile condition subsequently patients will be shifted to burn ward. A detailed history will be taken with regard to sex, age, residence, type, cause & place of burn & through general & systemic examination will be performed. During initial evaluation of burn patients 4 crucial assessments will be done which includes airway management evaluation of other injuries, estimation of burn size & diagnosis of carbon monoxide & cyanide poisoning. Routine laboratory investigations like CBC, blood urea, serum creatinine, serum electrolytes, blood sugars & ECG will be done for all patients. Estimation of burn surface area will be done as per rule of nine & clinical assessment of depth will be carried out. Fluid resuscitation will be done according to parkland formula located ringer 4ml/kg/% TBSA BURN half volume injected during first 8hrly post injury rest half during next 16 hrs post injury.

#### **Clinical Assessment of Depth**

**First degree-** injury localized to the epidermis painful, erythematous blanch to touch, intact epidermis.

**Superficial second degree-** injury to the epidermis and superficial dermis erythematous painful, blanch to touch and often blister.

**Deep second degree-** injury through the epidermis and deep into the dermis pale, mottled

lesions, do not blanch painful and heal with scarring.

**Third degree- full**—thickness injury through the epidermis and dermis into subcutaneous fat hard, lathery, eschar, painless, black, white or cherry red.

**Fourth degree-** injury through the skin and subcutaneous fat into underlying muscle or bone.

#### **Results**

In our study as table 1 showing the commonest age group affected by burn was 16-30 years (44%) followed by 31-45 yrs (30%), 45-60 yrs(8%) with least in >60 yrs (5%). Table 2 is showing Females preponderance (57%) over males (43%) in sustaining the burns. As per table 3 Primary (31%) and secondary (18%) education holders constitutes the majority among the burns victims. The least affected are the post graduates (1%) only. As per table 4 the housewives (32%) were most commonly affected with burns followed by skilled workers (26%), unskilled worker (15%), the least affected were the professionals (1%).

The table 5 below shows that accidental burn injury (89%) is more prone than homicidal (5%) and suicidal cases (6%). The table 6 below shows that flame burn (70%) is the commonest mode of burn injury followed by scald burn (17%). According to table 7 majority of burn cases sustain 15-30% body surface area (BSA)(30%) followed by 30 -45%BSA(23%) and 90-100% BSA (7%).

**Table 1** Distribution of Burn Cases According to Age Group

| Age Group | Number | Percentage0 |
|-----------|--------|-------------|
| < 5 Yrs   | 6      | 6           |
| 6-15 Yrs  | 7      | 7           |
| 15-30 Yrs | 44     | 44          |
| 31-45yrs  | 30     | 30          |
| 45-60 Yrs | 8      | 8           |
| .> 60 Yrs | 5      | 5           |
| Total     | 100    | 100         |

**Table 2** Distribution of Burn PTS According To Sex

| SEX   | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------|---------|---------------|--------------------|
| M     | 35        | 35.0    | 35.0          | 35.0               |
| FCH   | 5         | 5.0     | 5.0           | 40.0               |
| F     | 52        | 52.0    | 52.0          | 92.0               |
| MCH   | 8         | 8.0     | 8.0           | 100.0              |
| Total | 100       | 100.0   | 100.0         |                    |

**Table 3** Distribution of Burn PTS According to Educational Status

| Valid         | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------------|-----------|---------|---------------|--------------------|
| Illiterate    | 18        | 18      | 18            | 18                 |
| Primary       | 27        | 27      | 27            | 27                 |
| Secondary     | 13        | 13      | 13            | 13                 |
| High School   | 20        | 20      | 20            | 20                 |
| Graduate      | 12        | 12      | 12            | 12                 |
| Post Graduate | 1         | 1       | 1             | 1                  |
| Total         | 100       | 100     | 100           | 100                |

**Table 4** Distribution of Burn PTS According to Occupation

| Occupation | Frequency | Percent | Valid Percent | Cumulative Percent |
|------------|-----------|---------|---------------|--------------------|
| Employee   | 12        | 12.0    | 12.0          | 12.0               |
| Farmer     | 14        | 14.0    | 14.0          | 14.0               |
| Graduate   | 1         | 1.0     | 1.0           | 1.0                |
| House Wife | 32        | 32.0    | 32.0          | 32.0               |
| Student    | 13        | 13.0    | 13.0          | 13.0               |
| Unemployed | 13        | 13.0    | 13.0          | 13.0               |
| Worker     | 15        | 15.0    | 15.0          | 15.0               |
| Total      | 100       | 100.0   | 100.0         |                    |

**Table 5** Distribution of Burn Victims According to Source and Cause of Burns

| SOURCE        | CAUSE      |          |           | TOTAL |
|---------------|------------|----------|-----------|-------|
|               | ACCIDENTAL | SUICIDAL | HOMICIDAL |       |
| Electric      | 13         |          |           | 13    |
| Stove         | 20         | 1        | 1         | 24    |
| Open Fire     | 12         | 2        | 2         | 14    |
| Chulha        | 12         | 2        | 1         | 15    |
| Kerosene Lamp | 10         | 1        | 1         | 12    |
| Gas Leak      | 5          |          |           | 5     |
| Hot Liquids   | 17         |          |           | 17    |
| Total         | 89         | 6        | 5         | 100   |

**Table 6** Distribution of Burn PTS According To Modes of Burn

Mode Of Burns

|       | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------|---------|---------------|--------------------|
| Valid | Electric  | 13      | 13.0          | 13.0               |
|       | Flame     | 70      | 70.0          | 83.0               |
|       | Scald     | 17      | 17.0          | 100.0              |
|       | Total     | 100     | 100.0         |                    |

**Table 7** Distribution of Burn Patients According to Body Surface Area Percentage

| % Bsa   | Frequency |
|---------|-----------|
| 0-15%   | 8         |
| 15-30%  | 30        |
| 30-45%  | 23        |
| 45-60%  | 13        |
| 60-75%  | 10        |
| 75-90%  | 9         |
| 90-100% | 7         |

## Discussion

Fire considered a true living thing by ancient people as it was born, it had to feed to live, it leaves ashes, it sustains life. Fire also symbol of majesty but negative aspect of fire the burn injuries is one of the most painful experience for man. The present section aims at giving a brief picture regarding the similar studies conducted in India and elsewhere.

In study that the predominant age group affected was 16- 30 (44%) irrespective of sex, followed by 31-45 (30%) age group. These results are almost similar to the ones as done by Ganesamoni et.al, (2010)<sup>5</sup> and Jaiswal et.al, (2007)<sup>6</sup> were also the majority were in the age group 21-30 year because in India major burns are flame burns due to house hold accidents more common in younger age group. The females are more frequently affected (52) than males (35%) with burns same results were seen with Ganesamoni et.al, (2010)<sup>5</sup> revealed the female and male ratio to be 1.7:1- a female preponderance in southindian study. Batra (2001)<sup>4</sup> got the ratio of F: M, 4.2:1 in rural India. Dominance of female sex was due to house holding accidents and dowry deaths in India.

It was observed from our study that the illiterates (18%) and primary education (27%) holders more frequently suffered from burns followed by high school (20%), secondary (13%), pre-university

(12%) and degree holders (1%). Kumar (2003)<sup>7</sup> who had shown similarly that illiterate were comprising 43.75% among those who sustained burns followed by those who had primary (31.25%), secondary (6.25%), high school (9.37%), intermediate (3.12%) and graduate (6.25%) level education. Highly educated people take more precautions while cooking food or other usage of fire and less susceptible to suicidal conditions like marital conflicts or dowry demand. It was observed in our study that the housewives (32%) had the great tendency for burns followed by worker (15%), farmer (14%), unskilled (13%), student (13%) with professionals (1%) being least involved. House wives were the major part of burn patients in India due to various religious reasons and cultures, dowry demands, social pressure and post marital conflicts. While in foreign countries accidents while working constitutes major burn burden. As per Pegg (2005)<sup>9</sup> however, only 28% of burns occurred at work among 4523 sufferers from burns in Australia. Lal et.al, (2006)<sup>8</sup> had given the least number i.e. 6 people (1.5%) out of 400 who had sustained burns at their work place in Delhi.

The present study shows that the majority of the burn cases were due to accidental causes (89%), other causes being suicidal (6%), homicidal (5%). It was also observed from the present study that

the accident being the commonest cause of burns involving greater number of females (53%) than males (35%); the former outnumber males even in cases of burns with suicidal intent. The majority of accidental cases due to house holding accidents like stove burst, burns from chulha and gas leakage. Ganesamoni were with a suicidal intention in south India. Only one patient had homicidal burns. Further, suicidal et.al, (2010)<sup>5</sup> gave the similar result that 52.5% of burns were accidental, while 43.9% burns constituted 50.9% in males and 45% in females.

The current study reveals that open fire was the most common source among the attempted suicidal cases. Among the accidental causes kerosene stove was the most common source. Lari et.al, (2003)<sup>10</sup> reported that, for all age groups hot fluids accounted for one third to half of all burns in Iran. However, Nursal et.al, (2003)<sup>11</sup> reported that electrical or chemical burns to be rare in low and middle income countries. The present study is comparable with the study of Jaiswal et.al, (2007)<sup>6</sup> who mentioned that the flames represented the most common agent (75%) and had shown the greater tendency to affect females in Indore.

The study by Batra (2003)<sup>4</sup> is similar in its findings with our present study, in that the flame was responsible for 23.3% of all medico-legal deaths in rural India. In the same way Shanmugakrishnan et.al, (2008)<sup>12</sup> study gave almost the similar result that 56% of burns were due to flames in South India. So in India accidental flame burns are more common while in other countries scald burns also very common.

Our study points out that about 1/2 of cases of burns have 15-45% of TBSA involvement. Shanmugakrishnan et.al, (2008)<sup>12</sup> reported the highest of TBSA involvement and the mean (+50) was 67% in south india. Ghaffar et.al, (2008)<sup>13</sup> asserted that most of the victims (34.6%) had more than 75% TBSA involved in burns in Iran. Lari et.al, (2000)<sup>14</sup> had shown that the mean body surface area involved was 30.6%.ratio of 2.03:1 for males and females in Iran. So also Frans et.al, (2008)<sup>15</sup> got the result in caribbean where Jaiswal

et.al, (2007)<sup>6</sup> stated the predominance of females (70.3%) over males in indore. Less percentage of body surface area seen in our study due to basic educational status is better in patients included in our study.

Our study shows that among those who sustained more than 50% of burns, majority (78.26%) have died. Survival was better (93.50%) in those with less than 50% of TBSA affected. Among the burn sufferers it is also evident that out of 100 patients, the overall mortality rate was found to be 23%. These are in contrast with the results reported by Ho et.al, (2001)<sup>16</sup> who reported that for most burns, less than 10% in total, had a low mortality in Hongkong. On the other hand, the mortality rate was found to be high in those with more than 60% of TBSA burns as per the study of Jaiswal et.al, (2007).<sup>6</sup> In victims with less than 10% of TBSA involvement, the causes of death include inhalation injuries and involvement of 'danger area' of the face. So mortality is high in burn cases of more than 50% burn due to respiratory complications, septic and hypovolemic shock.

### Conclusion

In essence, burns are the really haunting problems of the mankind even today. Nothing much can be done to such sufferers once they sustain serious injury, especially in terms of scarring, disfigurement and disability. The current effort has highlighted the important epidemiological factors involved in burns. The message is "prevent the burn before it devastates".

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