

Profile and Causes of Delayed Deaths in Burn Cases at a Tertiary Care Hospital

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Abstract

Context: The death due to burns may be instantaneous i.e. on the spot, or the victims may escape the immediate death and may die after one day of survival. All these deaths occurring after one day of survival will be considered as delayed deaths. *Aims:* To study the profile of burn victims and to study the causes and manner of death among them *Settings and design:* Department of Forensic Medicine and Toxicology, Gandhi Medical College and Hospital Secunderabad, Telangana, India. *Methods and material:* One hundred deaths which had occurred due to burns after one day of infliction are selected from May 2009 to September 2009 in Gandhi Hospital Secunderabad. The entire data was analyzed and the cross sectional statistics were prepared by highlighting the causes and complications of delayed death due to burns. *Statistical analysis:* The data was analyzed using proportions and presented as charts and tables. *Results:* The male and female deaths were 36% & 64% respectively with highest number of cases among the age group 21-30 years (male and female 25.9% & 74.1% respectively). Maximum deaths were due to septicemia as the complication leading to the death i.e. 36% of total death (male and female 36.1% & 63.9% respectively). The highest death rate is between 3-7 days after the infliction of burns (Total 49%, with males & females 17%, 32% respectively), followed by 24-72 hours (29%) *Conclusion:* Septicemia is the main complication in delayed deaths and the proportion is more in females compared to that of the males. The most common causes of burns are accidents and suicides. Dowry deaths & marital issues are more common in females where as financial and ill health issues are more common in males.

Keywords: Septicemia; Delayed Deaths; Complications; Dowry; Marital Issues.

Introduction

Deaths do occur due to fire and burns. These deaths are accidental in nature but sometimes they may be suicidal or homicidal. The excess heat produces many changes in the body which may prove fatal. Heat doesn't produce uniform changes in all the people. There are several factors which influences the outcome of the burns. They are 1) The amount of surface area involved, 2) The depth of the burns, 3) Age 4) Sex 5) Previous morbidity of the victim etc. There are some deaths which occur

on the spot. Some people escape the spot death, but succumb to burns in due courses. These people who survive prolonged period and die later are included in the delayed deaths. In India, they rank second, after road traffic accidents, as a leading cause of death [1].

According to the literature these deaths are caused because of the complications produces by the burns in the victim. The occurrence of the complications is also dependent on several factors. Hospitalization & amount of medical care are the important factors. Even the highly sophisticated hospitals with the highest treatment modalities adapted, death is not preventable.

In our country, there has been a steady increase in the incidence of female victims of burns, particularly the newly married ones, over the years, clearly indicating that such deaths cannot always be attributed to accidents and that something more sinister is at play-bride burning, for want of dowry [2].

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Hence it is thought to make a study on those deaths which are occurring in the burned persons in the late period, due to some complications. The present study is made to analyze the different factors which affect both local and systemically which is influencing the fatal outcome of the burns in late period [3].

1. Local effects are

i. Interstitial edema formation due to

- a. Increased capillary filtration coefficient
- b. increased capillary hydrostatic pressure
- c. reduced interstitial fluid hydrostatic pressure
- d. reduced capillary protein permeability
- e. Increased colloid osmotic pressure of the intestinal fluid

ii. Haemolysis

iii. Changes in lymph flow

iv. Inflammatory process

v. Intra cellular edema formation etc.

2. Systemic effects are in

- i. CVS - a. Hypovolemia b. low cardiac output c. Shock & hypoxia
- ii. Metabolic effects - a. Effect of ambient temperature b. Endocrine response c. Effect of feeding
- iii. Immunological effect - a. Changes in non specific defense b. Changes in immune defense c. Causes of immune Suppression [4].

The Complications that are commonly noticed are 1. Thermal damage to the Airways 2. Intoxications and Hypoxia 3. Irritants 4. Tracheo Bronchial damage 5. Pulmonary parenchymal damage and 6. Burn wound infection and invasive sepsis [5].

The common causes of death in burns are-

1. Immediate / Instantaneous causes 1) Neurogenic shock & Trauma
2. Early Causes (within 24 hours of infliction) are a. Hypovolemic shock b. Dyselectrolytemia c. Asphyxia d. Laryngeal edema
3. Intermediate causes (1-3 days) are respiratory distress

4. Delayed causes (3days-1 week) a) Acute renal failure b) Fat embolism c) Broncho Pneumonias

5. Late causes (more than 1 week) a) Chronic renal failure b) Multiple organ failure c) Septicemia [6].

The present study was aimed to make a critical analysis of those deaths occurring due to burns after one day of survival resulting due to complications.

Burns are always associated with some or other complications. People succumb directly to the burns on the spot or sometimes they become vulnerable to the complications

Methods

Study design: Hospital based record analysis study

Study period: May 2009 to September 2009.

Settings: Present study was carried out at Mortuary of Gandhi Medical College and Hospital, Secunderabad attached to the Department of Forensic Medicine and Toxicology.

Sample size: A total no. of 100 cases of burn deaths brought to mortuary for post-mortem examination who died 24 hours after infliction of the burns were selected studied for the present study.

Inclusion Criteria

Deaths occurred after one day survival after infliction of burns are selected.

Cases which are admitted and had medical aid are selected.

Cases from both sexes, inquests done by both Tahalsildar and Police are taken.

Exclusion Criteria

Deaths occurred at the scene (spot deaths) are excluded.

Deaths occurring within one day of the infliction of burns are excluded.

Unidentified dead bodies are excluded.

Dead bodies in advanced state of putrefaction are also excluded as the post mortem examination findings are not clear.

Methodology

Present study was planned to study delayed deaths in burns (deaths due to burns occurring

only 24 hours after the infliction) brought to the mortuary of Gandhi Medical College and Hospital, Secunderabad attached to the Department of Forensic Medicine and Toxicology.

During the study period a total no. of 100 cases were subjected to postmortem examination in the mortuary of Gandhi Hospital. A detailed pre designed, pre tested, semi structured study questionnaire was approved for the present study.

Inquests, First information report, Statements made by the relatives, Panchanama of scene of offence are collected from Police. The Post-mortem examination reports are taken from the Department of Forensic Medicine, Gandhi Medical College, and Secunderabad to collect the data for analysis purpose.

Some information is also collected from the relatives who attended the Mortuary at the time of Post-mortem examination by personal enquiry, regarding previous illness which might have interfered with the work. Visit to the scene of offence is also made in some cases.

Photographs of the victims, at the scene of offence and also at the time of conducting the Post-mortem examination are taken. Some photographs of the scene of offence are collected from the Police.

After collecting the above information, a data sheet is prepared and filled in, to analyze them. The data is processed, to get various brakes up of the information. All the information is tabulated.

The tables are studied under the prescribed Aims and Objectives. The observations are made out. These observations are compared with the standard information available in the literature from India and west. Subsequently, the conclusions are derived. In the last a summary is prepared about everything.

Statistical Analysis

The data was analyzed using proportions and presented as charts and tables.

Results

Total No. of Sex distribution

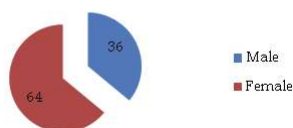


Fig. 1: Distribution of study subjects as per sex

Figure 1 shows sex distribution of study subjects. Females were found to be more than males i.e. 64% females vs. 36% males. Thus showing that the incidence of burns deaths more common among females than males. This may be due to close intimacy of females in kitchen.

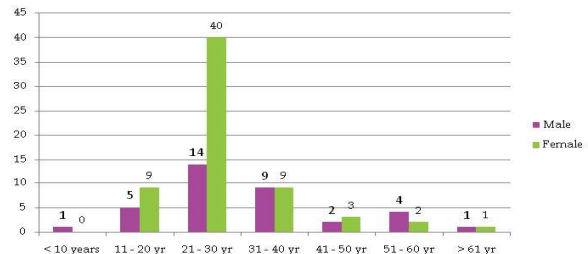


Fig. 2: Age and sex wise distribution of study subjects

Figure 2 shows age and sex wise distribution of study subjects. Majority of the study subjects were in the age group of 21-30 years in both the sexes followed by 31-40 years. Very few cases were reported in children and old age.

Percentage of Burns

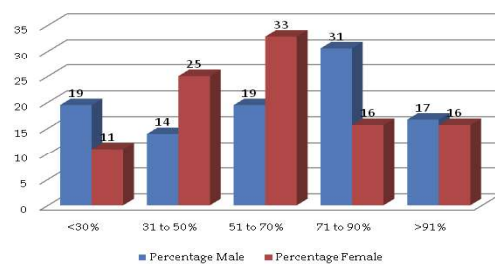


Fig 3: Distributio of study subjects as per the percentage of burns

Figure 3 shows distribution of study subjects as per the percentage of burns. When the percentage of burns less than 30% and when it is between 71-90% the death proportional is more in males. For burns of more than 91% the difference between male and female was minimum. But for the categories of burns 31-50% and 51-70% it was the females among whom the proportion was more than males.

Table 1: Time of infliction and sex among the cases

Time of infliction	Total percentage	
	Male	Female
Early morning	5.6	4.7
Morning	16.7	15.6
Mid day	19.4	14.1
Evening	25	34.4
Night	33.3	31.3

Table 1 shows time of infliction and sex among the cases. The most common time of infliction in both males and females was evening and night.

Table 2: Marital status of victims in delayed deaths

Marital status	Male		Female		Total	
	Number	%	Number	%	Number	%
Married	24	66.7	48	75	72	72
Unmarried	11	32.4	8	12.5	19	19
Widowed	1	2.9	8	12.5	9	9
Total	36	36	64	64	100	100

Table 2 shows the marital status of victims in delayed deaths. Majority were married in both the males (24%) and females (48%). Proportion of unmarried and widowed was lesser.

Percentage Of Manner of infliction

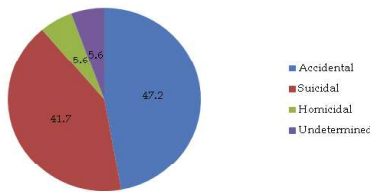


Fig. 4: Manner of infliction among study subjects

Figure 4 shows the Percentage of Manner of infliction. Majority of the burn cases were accidental (47.2%) followed by suicidal (41.7%), and homicidal (5.6%). But in 5.6% of the cases the manner of infliction could not be decided and hence classified as undetermined.

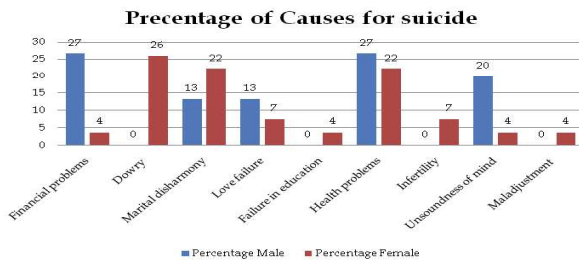


Fig. 5: Percentage of Causes for suicide

Figure 5 shows percentage of causes for suicide. Financial problems (26.6%) and ill health (26.6%) are major causes in Males where as in Females, Dowry deaths (25.9%), marital disharmony (22%) and ill health (22%) are the major causes.

Percentage of Period of Survival in delayed deaths

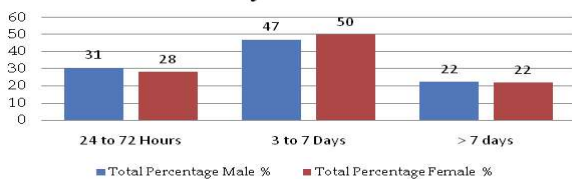


Fig. 6: Percentage of Period of Survival

Figure 6 shows percentage of period of survival. The Maximum deaths occurred in the period of 3-7days without much specific difference between male and females i.e. 47% and 50% and followed by 24-72 hours i.e. below 3 days (31% & 28% respectively)

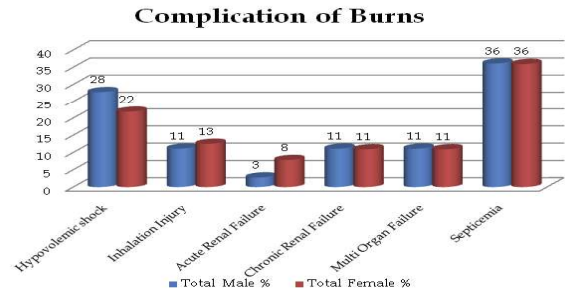


Fig. 7: Percentage of Complications due to burns

Figure 7 shows percentage of Complications due to burns. In most of our cases Septicemia is the highest cause of death (36%) with a difference among Males (36.1%) and Females (63.9%) followed by Hypovolemic shock (28% & 22% respectively)

Discussion

The present study was carried out on the delayed deaths due to burns at mortuary of Gandhi hospital. We included the deaths occurring after one day of infliction of burns. In fact deaths in the delayed period include those which occur after 3 days of infliction. But in our observation complications had started after one day of infliction only. Hence an attempt was made to analyse the complications that are arising after one day of infliction of burns and, which were admitted in Gandhi General Hospital, Secunderabad.

In the delayed deaths due to burns the number of females is more than males and this may be because of easy availability of the kerosene in the houses. The number of homicides is also significant due to various causes which include domestic violence & dowry deaths.

In the 21 - 30 years of age group, especially the married female are more prone for these deaths, as they have specific problems.

Out of 100 cases of burns victim 36 cases were developed septicemia. In which 13 were males and 23 were females.

The result of the study indicates that young and productive population (21-30 years of age group) is the main victims. Similar findings have also been reported by Harish et al. [3], Sharma et al. [4-

6], Singh et al. [7] and Taneja et al. [8] The hotter months from March to August recorded 41 burns cases with 49% incidence of septicemia, whereas the colder months from September to February had 48 burns cases that had 69% incidence of septicemia. Ideally it is expected that infection rates should be lower in colder conditions so a lower septicemia incidence is expected, but a higher TBSA involved in burn injury was seen in these cooler months so the resultant increased risk of septicemia was recorded. Similar findings of burns involving higher TBSA in colder months has been reported by Harish et al [3], Sharma et al. [4-6 & 9] and Alireza et al. [10] The overall incidence of septicemia was recorded at 72% for rural population, 70% for slum and 45% for the urban population. Moreover gender analysis showed that incidence risk of septicemia is more in rural females (81%) than in rural males (54%). The low socioeconomic status, unhygienic living conditions and poor access to burn care health facilities contribute to expose these post burn patients to multiple infection sources producing a higher septicemic incidence in this group. [1-8,11,12] TBSA burnt is the most important risk factor for development of septicemia as well as post burn mortality and this risk is even higher in females

It is a known fact that literacy makes a man more analytical and understanding. As the educational standards increases, the ability to take precautions increases and thoughts of suicidal tendencies decreases. The present study is also proving the same analysis (i.e. illiterates are 63%)

It is obvious that people from low socio-economic groups have variety of problems for which they think that the death is the only solution. It is proven once again in the present study (i.e. 50% of victims are from low socio-economic status).

There is not much difference seen in the number of deaths occurring in the night and evening time. However the deaths in the late hours of the day may be because of the precipitated factors for committing suicide or homicide. However accidents, because of stoves are once again possible in the evening and night.

People with 100% of burns, most of the times succumb within 24 hours of infliction. However, people having less than 30% burns escape the death. Hence complications leading to the death are seen only in the burns which are more than 30%. In the present study also more people died in the range of 31 to 90% burns in varying proportions.

Dowry is once again the enemy of the woman in the early days of married life which is similar to that of Sharma BR et al. study [2]. It is proved in the present study also, (7 suicides and 2 homicide). However married woman committing suicide is also seen due to marital disharmony, infertility and domestic violence.

In males financial problems and ill health are the main causes for the suicides. Unsoundness of mind and marital disharmony are other factors which resulted in suicides in the present study. The magnitude of the other problems is less in comparison with the financial burdens.

In the present study accidental infliction is seen more common than suicidal and then homicidal similar to that of Sharma et al. [4] study.

Complications are more common in females, and half of them died between 3-7 days of infliction. Ultimately septicaemia is taken as the major precipitating factor for causing the death.

Conclusion

Septicemia is the major complication which is leading to the death in burn cases. The percentage of deaths is more in females compared to that of male. The common causes for burns are accidents and suicides. In females the common causes are dowry deaths & maternal issues, where as financial problems and health issues are common in males. Time of infliction are common at late hours of the day, may be because of the precipitated causes for committing suicide or homicide. However accidents, are because of stoves are once again possible in the evening and night.

Key messages: Delayed deaths occur due to complications developing in burn cases.

Suggestions

1. Fire safety should be installed in all buildings including schools shopping malls Hospitals, Public gatherings etc.
2. The availability of kerosene and gas should be restricted to the trained persons
3. Cross ventilation should be advocated in the houses
4. Those who are having suicidal tendencies are to be treated by the psychiatrist promptly
5. Domestic violence cases should be counseled promptly to avoid Dowry deaths

6. Depressions due to any ill health or financial problem or any other issues need to be identified and proper counseling need to be given by the experts
7. Separate sophisticated and well equipped burns wards & ICU's need to be provided in the Hospitals to overcome the complications of the burns

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