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Original Research Article

Epidemiological study of 100 cases of burn injuries

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ABSTRACT

Background: Burn injuries are a huge public health challenge and a preventable cause of formidable morbidity, mortality, disfigurement, and disabilities. The incidence of burn injuries remains high all over India and more so in the given region. This is an epidemiological study from 100 consecutive adult burn cases admitted in Tirunelveli Medical College Hospital Burns Unit. The aim was to study the various epidemiological factors like age group, sex, socioeconomic status, causative factors, comorbid conditions, the severity of burns, psychological aspects and treatment modalities which impact the outcome.
Methods: 100 cases admitted in the burn unit of Tirunelveli Medical College Hospital were studied from October 2017 to October 2018. Data on age, sex, aetiology, percentage of body surface area (TBSA), comorbid conditions, socioeconomic factors, treatment modalities, psychological factors, bacteriological studies and treatment outcomes were studied during the period. Inclusion criteria was all burn patients more than 14 years of age.
Results: A total of 100 cases of burns were studied (male 32 and female 68). The average percentage of TBSA was 45% and the most common etiological factor was flame burns. Comorbid conditions like diabetes and COPD significantly affected the outcome. Psychological factors played an important role in the causation and outcomes. Treatment modalities were tailored according to the severity of burns. Mortality was higher for burns more than 40% TBSA.
Conclusions: This study represents the epidemiological pattern of burns in Tirunelveli district and can be used to devise improvements in treatment protocols, strategies in burns prevention and to plan a modern hi-tech burns unit.

Keywords: Burn, Epidemiology, Trauma, TBSA, PTSD

INTRODUCTION

Burn injuries constitute a serious life hazard and a severe emotional, psychological and social crisis for the affected individuals and their families. It is a huge financial challenge for the families and a formidable drain on the health care resources of the community. The incidence of burns in India is the highest in the world. It predominantly affects the low socioeconomic group who are mainly dependent on public health care facilities.[1]

Burn injury is often followed by a profound hypermetabolic response that results in the damage of local tissue and internal organs.[2,3] The extent of damage and duration of the response is related to the extent of burn injury sustained.[3] Burn patients have supra-physiological metabolic activities, multi-organ dysfunction and local and systemic oxidant changes manifested by increased free radical activity and lipid peroxidation, inflammatory cytokines and acute phase proteins.[4] Burns account for 1% of the global burden of diseases and cause more than 7.1million injuries, a loss of almost 18million disability-adjusted life years (DALYs), and more than 265,000 deaths worldwide annually.[5,6] About 7million burn incidents occur in India each year, making burn injuries the second largest group of injuries

after road accidents.[7] The burn unit in Tirunelveli Medical College Hospital caters to the needs of the poor people from Tirunelveli district. Being a tertiary care center, burn cases get referred to the surrounding PHCs and government hospitals. Burns data from 100 consecutive adult cases (age >13years) admitted in the burns ward were analyzed retrospectively to study the epidemiological patterns, psychosocial factors, bacteriological profile, and management outcomes. The aim of the study was to study the various epidemiological factors like age group, sex, socioeconomic status, causative factors, comorbid conditions, the severity of burns, psychological aspects and treatment modalities which impact the outcome.

METHODS

Retrospective analysis of 100 burn cases admitted in the Burns Ward at Tirunelveli Medical College Hospital from October 2017 to October 2018 were studied using hospital records. Patients with burn injury more than 10% TBSA were included. Patients with minor burn injuries were treated on OPD (outpatient department) basis. Patients who had taken discharge against medical advice and those declared absconded, patients not willing to enroll in the study were excluded. On admission, the detailed history and physical examination along with consent are obtained. Calculating the %TBSA of the burn was necessary for guided fluid resuscitation. Rule of nines was used for estimating %TBSA. Patients were managed according to percentage of burn. Burn wound were cleaned with soap and water, blisters and debris were removed. Patients were treated with saline wash and placement of venous access and urinary catheter. Fluid resuscitation was done according to the Parkland formula. Antibiotics, analgesics and H2 receptor antagonists are routinely given.

Application of silver sulphadiazine cream, debridement, and collagen application, surgical debridement, escharotomy, fasciotomy, excision and skin grafting are made as required. High calorie, high protein diet was provided. Physiotherapy was instituted for all cases for early mobilization. Laboratory investigations like complete blood count, serum electrolytes, urea, creatinine, random blood sugar were done. Wound swab culture and sensitivity were done whenever required. Blood transfusions were given whenever necessary.

As per the burns ward protocol, the variables entered in the admission record books were age, sex, residence, religion, type of burn, mode of burn, TBSA percentage, duration of hospitalisation, number of patients discharged and those who took discharge against medical advice (DAMA), absconded or died during the hospital stay. The data of each patient were collected in keeping with a standard pro forma, which included these variables. The data collected were entered into MS-Excel sheets and analysis was carried out. On the basis of analysis and observation, results were drawn and discussed and compared with other relevant literatures.

RESULTS

The average age of the burns patient in this study was 32years, 30-40years age group was the most commonly affected (Figure 1).

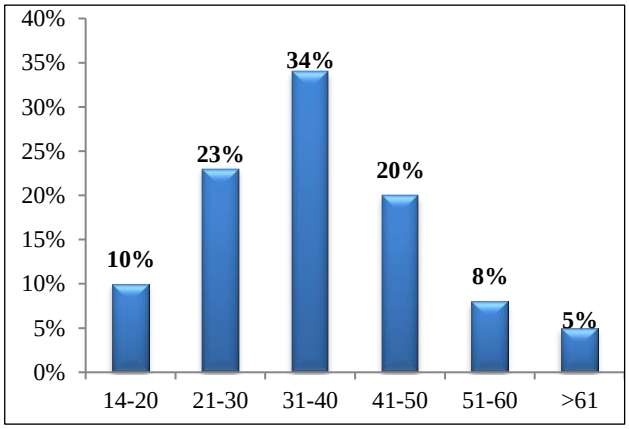

Figure 1: Distribution of Age group.

Females are more commonly affected than men. The ratio for male to female was 1:1.35. Etiologies of injuries are flame burns (60%), scalds (25%), electrical burns (10%) and chemical burns (5%) (Figure 2).

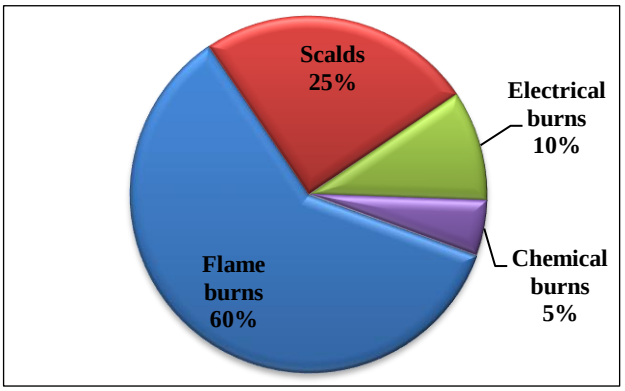

Figure 2: Distribution of etiology of burns.

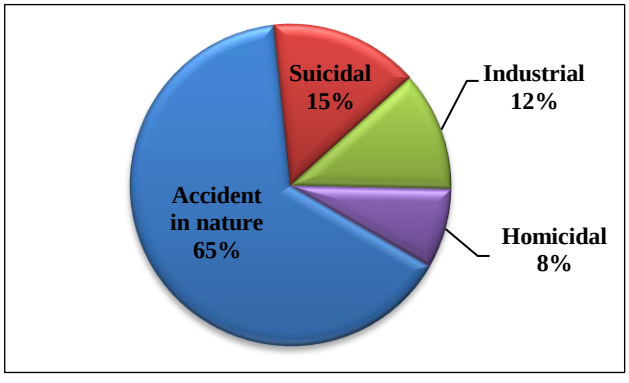

Figure 3: Distribution of nature of injury.

Most of the burn injuries are accidental (65%), followed by suicidal (15%), industrial (12%) and homicidal (8%) (Figure 3).

Less than 10% TBSA cases were usually treated as outpatients. 40-70% of TBSA formed the major bulk of admissions (63%) (Figure 4). Wound swab, Culture studies are done after 5th post-burn day for specific antibiotic therapy.

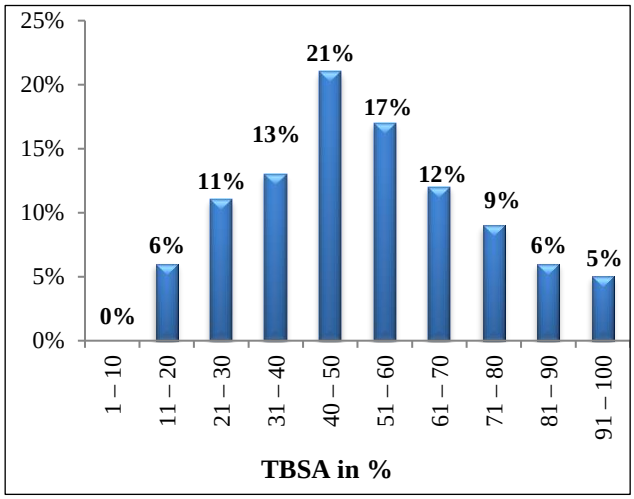

Figure 4: Severity of burn injury.

Table 1: Distribution of duration of stay at hospital.

TBSA in %	Length of stay (in days)
1-10%	0
11-20%	10
21-30%	22
31-40%	24
40-50%	18
51-60%	13
61-70%	8
71-80%	6
81-90%	3
91-100%	2

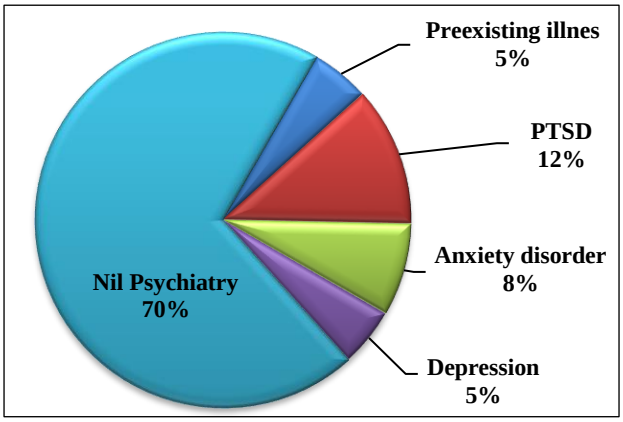

Figure 5: Distribution of psychological factors.

Klebsiella pneumonial was is the most commonly isolated organism followed by *Pseudomonas* and methicillin resistant *staphylococcus aureus*. The incidences of diabetes, COPD, ischemic heart disease, seizure disorders were studied. The mean length of stay of all the patients was 10.6days. The length of stay for each 10 %TBSA group was also studied (Table 1).

Patients with psychiatric manifestations requiring psychiatric management were studied. Patients with pre-existing psychiatric illness already under medication were 5%. Patients who developed psychiatric manifestations during the burns treatment was 25%. 12% of patients suffered from PTSD (Post Traumatic Stress Disorder), anxiety disorder 8%, depression 5% (Figure 5). Overall mortality was high (49%). Mortality up to 30% TBSA was low 0%. Mortality of TBSA from 30-60% was 41.1%. Mortality for TBSA above 60% was high (87.5%). The commonest cause of death was septicemia (80%) followed by burns shock 15% (Table 2).

Table 2: Distribution of mortality.

TBSA in %	Percentage of death
1-10%	0%
11-20%	0%
21-30%	0%
31-40%	23%
41-50%	38%
51-60%	59%
61-70%	75%
71-80%	89%
81-90%	100%
91-100%	100%

DISCUSSION

This study was undertaken as a trial study on the burn injury cases admitted in Burns ward, TVMCH. The commonly affected age group was 20-40years and females are involved more in burn injuries. This correlates well with other studies conducted in this country (Goswamy P et al) but differs from the studies from the west (Othman N et al) where male case more commonly involved.[8,9] This is mainly due to the socioeconomic situation in this country where women cook using kerosene stoves and chulhas and wearing long flowing dresses like sarees and long skirts. Flame burns were the common cause 60% followed by scalds 25% and electrical burns 10% and chemical burns 5%.[10,11]

Nature of burns 65% has accidental burns, 15% suicidal burns, 12% industrial burns, 8% homicidal burns. The high incidence of accidental burns correlates well with other studies.[12,13]

TBSA is an important risk factor, and various treatment modalities are adjusted accordingly. 40%-60 % TBSA of burns formed the major bulk of cases admitted. Overall

mortalities up to 30% TBSA was low. Mortality for TBSA above 60% was high at 87.5%.[8]

Klebsiella was the most common organism isolated from the culture studies followed by *Pseudomonas* and methicillin resistant *staphylococcus aureus*.[12]

The average hospital stay in this series is 10.6days as compared to other studies. 30-50% TBSA had the longest stay averaging 21days. For TBSA less than 30% the average stay was 8.5days. For TBSA more than 60% average stay was 4.75days.[8,14]

Diabetes, IHD, and COPD constitute significant comorbid conditions leading to higher morbidity and mortality rates. 3 cases of uncontrolled seizure disorders leading to accidental burn injuries were treated. These comorbid conditions result in increased morbidity and mortality and prolonged hospital stay.[15]

Psychological factors: 5% of these cases suffered from pre-existing psychiatric illness taking treatment. During the admission, 25% of cases developed clinical depression, anxiety disorders, and PTSD and were treated by psychiatrists.[16] The leading cause of death was septicemia and MOF and cardiorespiratory arrest. Other causes were burn shock in cases having more than 90% TBSA.

CONCLUSION

The morbidity and mortality associated with burn injuries can be significantly reduced by using modern technologies in burns unit like-central air conditioning/ laminar air flow, isolated cubicles with barrier nursing, dedicated burns operation theatre, burns intensive care unit and skin banking facilities. Cost-effective measures and improving public awareness by burns prevention programs, use of fire safety measures in workplace and homes. Burns first aid management training for rural health care workers will significantly reduce the incidence of burn injuries.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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