

## A RETROSPECTIVE STUDY OF PEDIATRICS BURNS AT GENERAL HOSPITAL IN RURAL INDIA

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### ABSTRACT

**Background:** Pediatrics Burns are major preventable cause of morbidity and mortality worldwide, particularly in developing countries.

**Aims & Objectives:** The aim of this study is to perform a retrospective analysis of the epidemiology of burns observed in children below 12 years of age in rural India.

**Materials and Methods:** In this study, patients were studied retrospectively with regard to their age, sex, cause of burns, and length of hospital stay, burned body surface area and mortality. Statistical Analysis used: Chi-square test using SOFA software.

**Results:** A total of 84 patients were admitted in burn care unit, out of which, 52 were male and 32 were female. The most common causes of burns, in patients treated on an inpatient basis, were scald burns (69.04%). The mean total body surface area burnt of the patients was 20 %. TBSA >30 % was significant risk factor for mortality in children. The average hospital stay was 10-12 days. Mortality was 9.52%.

**Conclusion:** Burn injury is a major health concern in children, and special consideration to be given in prevention of burn injury.

**Key Words:** Epidemiology; Paediatric; Burn Injuries; India

### Introduction

Burns is a major cause of morbidity and mortality in all the age groups, it is fourth most common type of trauma worldwide.<sup>[1]</sup> The incidence of burns, their treatment, and rehabilitation processes have a considerably marked effect on children in both physical and psychological terms.<sup>[2]</sup> Burns in pediatric age group are generally caused by accidents. Many of these injuries occur in the home where young children spend most of their time.<sup>[3]</sup> Burns from hot drinks, food, steam, or other hot liquids are common causes of burn injuries to young children compared to flames burn injuries. In pediatrics age group lack of awareness, high level of activity and curiosity, and impulsiveness is responsible for accidental burn injuries.<sup>[4]</sup> Epidemiological studies of burn injuries have highlighted specific risk factors, and have led to the establishment of effective preventive programs.<sup>[5]</sup> The aim of this study was to perform a retrospective analysis of the causes and epidemiology of burns observed in children in rural India.

### Materials and Methods

This study was conducted in Burns Intensive Care unit, Govt. Medical College, Miraj and Padmabushan Vasantdada Patil Government Hospital (PVPGH), Sangli, during the period of 2 years. Our Burn Intensive care unit is the only government unit in our region, catering to

population from our and nearby regions. It was a retrospective Study.

Patients below 12 years of age and who were admitted in our burn unit were selected. This study was conducted for a period of 2 years. Patients treated on out patient's basis were excluded from the study. The criteria for inpatient treatment was burns over >10% of total body surface area; burns on the face, hand, foot, perineum, or major joints; circular burns on extremities; full-thickness burns over 5% of the total body surface area; and electrical/ chemical burns. Data retrieved included demographic features like age, sex, total body surface area burnt, length of hospital stay, and mortality.

The treatment protocol was established in accordance with the main international standards of treatment and included resuscitative regimens, antibiotic therapy, wound care, and surgical operation. The data was displayed in tables and graphs; statistical analysis (chi square test) was carried out with the help of SOFA statistics ver 1.4.3.

Using the "outcome of admission, that is, death" as the dependent factors, all the demographic features of the participants were involved in the analysis. A probability value (*P*-value) of less than 0.05 was considered to be statistically significant at 95% confidence interval (Table 1).

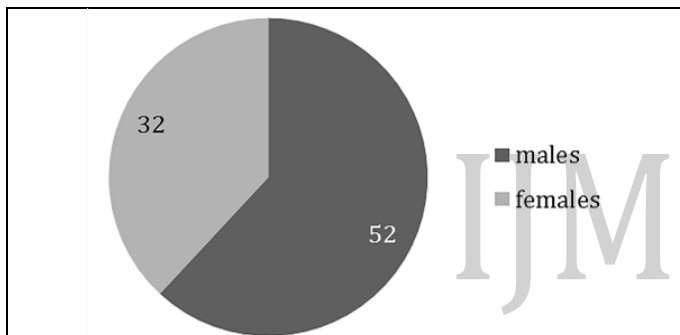
## Results

The total no of patients, less than 12 years, admitted and included in this study, was 84. Out of this, males were 61.91% (sex ratio 1.6:1, Figure 1). Majority of the patients were below 4 years of age (Figure 2). The more common modes of burns in our study were scalds, flame, electric – least was by chemical burns (Figure 3). The most common cause of scalds burns being hot / boiled water; other causes of scald burns in decreasing order were hot milk, hot oil and hot curry (Figure 4).

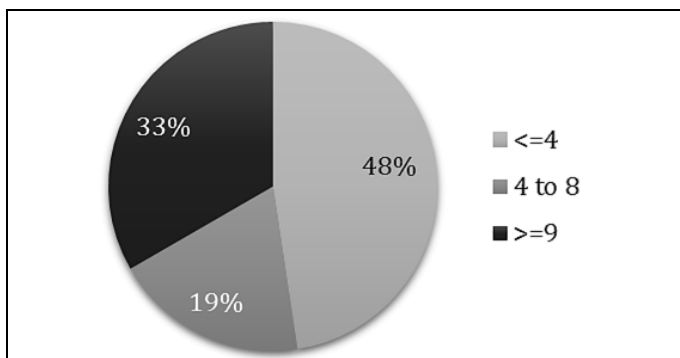
**Table-1: Statistical analysis**

|             | df | Pearson Chi-square | p value |
|-------------|----|--------------------|---------|
| Age         | 22 | 41.43              | 0.007*  |
| Sex         | 2  | 0.534              | 0.766   |
| TBSAB > 30% | 24 | 40.57              | 0.019*  |
| LOS         | 10 | 14.6               | 0.147   |

\* denotes significant value ( $P < 0.05$ ), TBSAB- total body surface area burnt; LOS- length of hospital stay; df- degree of freedom; TBSAB = total body surface area of burn (in percent)



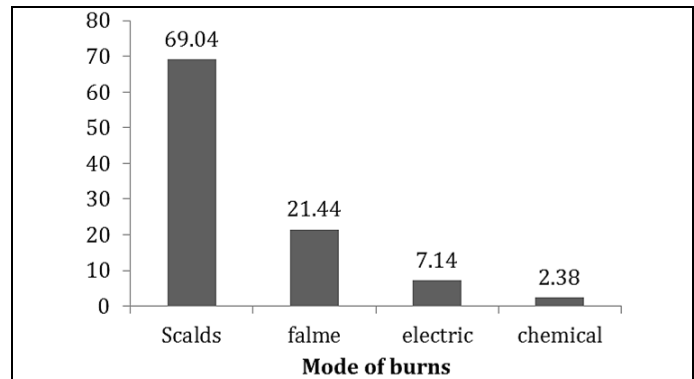
**Figure-1: Sex distribution**



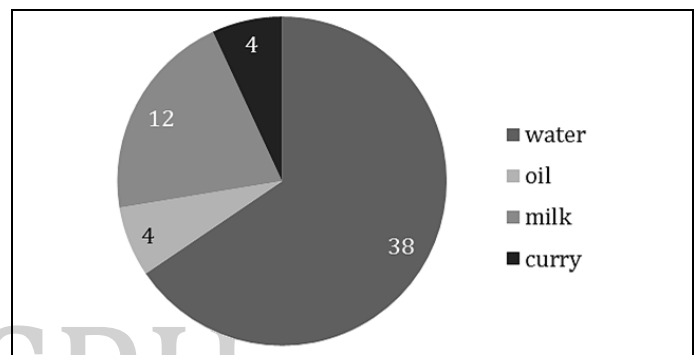
**Figure-2: Age distribution**

In our study, average total body surface area burnt in case of scald burns was 20% and that of flame burns was 85%. The average length of hospital stay for our patients was 10-12 days. 8 out of 84 patients died, with equal distribution in sex, 6 patients died of flame burn injuries and 2 died of scald burn injuries. In the current study, correlation of paediatric burns mortality risk with age and TBSAB greater than 30% was statistically significant ( $p$  value < 0.05). Thus age, TBSAB and hot water were

identified as risk factors of scalds in children aged <12 years.



**Figure-3: Mode of burns**



**Figure-4: Causes of scald burn**

## Discussion

The overall incidence of paediatric burn patients (<12 years) admitted in our burn care unit was 18% of totally admitted burn patients. Some Indian studies have shown incidence to be 16.6%<sup>[6]</sup>, and up to 33%<sup>[7]</sup>. Among the paediatrics burn patients, 48% children were below 4 years of age. The higher incidence in this age group is due to the curious nature of infants and toddlers and the urge to mostly pull and push things around. They end up getting injured when containers, pots, or pans containing hot fluids overturn and pour on them. In our study, boys were more affected than girls, the difference is statistically not significant though.

In our study, scalds were the main cause of burn in the majority of patients, similar to other studies.<sup>[8]</sup> Flame burn is the second most common cause of paediatric burn injury. Flame burns are generally caused by open fires or bursting of fire crackers. Electric burn and chemical burn were also seen. The rate of electric and chemical burn were lower when compared to other studies in literature.<sup>[9,10]</sup> All burns were accidental. Hot water was the most common cause of scald burns in our study, other causes of scald burns were hot milk, hot oil and curry.

The average total body surface area burnt in case of scald burns was 20% and that of flame burns was 85%. So in flame burns involvement of multiple parts and total body surface area is more compared to scald burn injuries, resulting in more mortality and morbidity. The results were comparable to other studies in literature.<sup>[11]</sup> The total body surface area burnt was statistically significant as mortality risk factor. The average length of hospital stay for our patients was 12 days, which was similar to other studies.<sup>[6]</sup> As the total body surface area burnt increased, the length of hospital stay also increased.

In our study, the mortality was less when compared to other studies from literature, 13.88%<sup>[6]</sup> and 19.7%<sup>[12]</sup>. Although it appears that the incidence of burns is largely unchanged over time, the mortality rates seem to have dropped. The drop in mortality rates may be attributable to better diagnosis, management, and referral to specialized centres.

In spite of the differences in age classification in different studies, in most of the studies, children under the age of 4, form the most vulnerable group. Application of fluid resuscitation formula has markedly reduced the prevalence of death due to resuscitation failure.<sup>[13]</sup> The need to educate people about fire-safety in the home environment, living condition and social welfare has been suggested.

There are some limitations of study. For example, the reported incidence is only of hospitalized patients; and hence, the actual incidence of the general population may be different. The data collected was only from single institute, private sector was not considered. The number of patients is small; a longer duration of study is required.

Burns in general, irrespective of the aetiology poses socioeconomic burdens on the patient and family members resulting in morbidity and non-productivity.<sup>[14]</sup> In general, infants and toddlers depend solely on their mothers and caregivers for care and support they need, implying that caregivers have to invest time which could otherwise be used to work to take care of their kids hence causing economic burden. This current study shows scald injuries as high as 69.04% and so burns preventive measures, especially towards scald prevention at homes, should be paramount, since the home serves as the highest place of childhood scalds occurrence.<sup>[15]</sup>

## Conclusion

Age less than 4 years; scald, especially hot water and TBSA greater than 30% were identified as paediatric burns mortality risk factors. These identified factors will serve as a guideline for burn surgeons and other health professionals in the management of paediatric burn cases. Avoiding burn injuries is as important as treating patients with any type of burns to reduce morbidity. Public education on safety and burns prevention should be encouraged at all levels. Mothers and caregivers should ensure that children are not allowed unattended to get in the kitchen areas or places where they could be exposed to danger. In situations where burns occur, caregivers should take the necessary first aid treatment and then taking the child burn care centre.

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