

## Original Article

# Characteristics of Burn Injury in Paediatric Age Group

Satish D Gadade<sup>1</sup>, Narendra N Hombalkar<sup>2</sup>, Priya D Dhandore<sup>3</sup>, Monali D Sonawane<sup>4</sup>

**Authors' affiliations:** <sup>1</sup>Medical Superintendent, SDH, Kavathemahankal, Sangli, Maharashtra; <sup>2</sup>Associate Professor; <sup>3</sup>Assistant Professor, Dept. of General Surgery, Sangli, Maharashtra; <sup>4</sup>Professor & Head, Dept. of Anatomy, Pacific Institute of Medical Sciences, Udaipur, Rajasthan

**Correspondence:** Dr. Monali Dilip Sonawane, Email: drmonalisonwane25@gmail.com, Mob. No.: 9702181045

## ABSTRACT

**Introduction:** Burn injury in paediatric age group up to 15 years of age are generally caused by accidents and constitute a major health problem and are leading cause at childhood morbidity and mortality worldwide. This study aimed to describe the characteristics of the burn injury in paediatric age group that help to explore priority areas to target preventive programs.

**Aim and Objective:** The study designed to find out the common causes & site of burn injury and to find out the common presentation and associated complications of burn injury in paediatric age group. The study analyses the Total Body Surface Area (TBSA) percentage wise cases of burn injury in paediatric age group.

**Method:** In this study, patients were studied retrospectively with regard to their age, sex, cause of burns, type of burns, site of burns, burned body surface area, medical history, site of injury.

**Results:** 40 female and 43 male subjects were examined. Majority of subjects were in the age group less than or equal to 2 years with 11-20 percent total body surface area involvement. Patient less than 2 year has superficial burns. Most common site of burns was anterior trunk. Majority burns are accidental, most injuries occurring at home

**Conclusion:** Preschool stages and male children were at risk for burn injury. The scald burn injury is most common. It reflects lack of awareness of dangerous substances in this age group and lack of domestic safety with poor supervision in families. Raising awareness among patients or parents about the fire safety is important for prevention of such injuries.

**Key words:** Burn injury, Paediatric, Total Body Surface Area (TBSA)

## INTRODUCTION

Burn injury in paediatric age group up to 15 years of age are generally caused by accidents and constitute a major health problem and are leading cause at childhood morbidity and mortality worldwide.<sup>1</sup> Burn-related injuries are one of the leading cause of morbidity and mortality in children. Burn injuries are one of the common injury-related deaths in children aged 1 to 9 years.<sup>2</sup> In India, paediatric burns account for 17-25% of total burn admissions.<sup>3,4</sup> Burn injuries are a major problem in the low-income and middle-income countries. Paediatric burns may not only cause life-long disability, but also affect the mental health and quality of life of their families, imposing a socioeconomic burden.<sup>5</sup> This study aimed to describe the characteristics of the burn injury in paediatric age group that help to explore priority areas to target preventive programs.

## METHODS

The Data was collected from 83 paediatric patients less than 15 years getting admitted in our tertiary health care centre (GMC, Miraj, Maharashtra) during the period from September 2014 to September 2016. After obtaining clearance from Institutional ethical committee and duly explained consent from parents or guardians the burn patients from paediatric age group were enrolled for study. A

detailed history of each patient is taken with history of present illness, past history personal history, family history and socio economic status was enquired. A special emphasis was given to mode of burn. A detailed general examination and systemic examination was done to know any associated disease to rule out any predisposing factor to aggravate complication in later stage. A local examination was done to calculate the percentage of total body surface area that is affected by burn injury. The nature of burn injury was seen with either the burn injury was superficial or deep. If the burn was old then presence of slough was looked for. A detailed proforma was filled explaining the different affected body parts. The % TBSA was assessed by using a Lund Browder Chart. The burn depth was assessed clinically by observation of the burn wound. Patients more than 15 years of age were excluded. Patients admitted for post burn reconstructive surgery were also excluded.

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Displaying of data was done by charts and tables. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. p value of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

**RESULTS**

40 female and 43 male subjects were examined. Majority of subjects were in the age group less than or equal to 2 years (41%), 26.5% were in the age group between 2 to 5 years, 15.7% were in the age group between 5 to 10 years and 16.9% were in the age group more than 10 years. Majority of subjects had 11 to 20% burns as per TBSA (Total Body Surface Area), 21.7% had <10% burns, 19.3% had

21 to 30% burns, 10.8% of them had 41 to 60% burns and 9.6% had 31 to 40% and >60% burns respectively.

When compared age group with TBSA burn, In <5 years age group majority of them had 11-20% burns and among age group >10 years, majority of them had >60% burns. 59% of subjects had superficial burns and 41% had mixed burns. In the study 97.6% of them had accidental burns, 1.2% had homicidal burns and 1.2% had suicidal burns.



Scald burn injury with blisters



Flame burn injury domestically treated with ink

**Fig-1: Types of burn injury**

**Table 1: Association between age and depth of burn**

| Age             | Depth     |                 |
|-----------------|-----------|-----------------|
|                 | Mixed (%) | Superficial (%) |
| <2 years        | 9 (26.5)  | 25 (51.0)       |
| 2 to 5 years    | 9 (26.5)  | 13 (26.5)       |
| > 5 to 10 years | 5 (14.7)  | 8 (16.3)        |
| > 10 years      | 11 (32.4) | 3 (6.1)         |

$\chi^2 = 11.17$ ,  $df = 3$ ,  $p \text{ value} = 0.011^*$  ( $\chi^2 = \text{chi-square test}$ ,  $df = \text{degree of freedom}$ )

**Table 2: Association between age and type of burns**

| Age             | Type      |           |
|-----------------|-----------|-----------|
|                 | Flame (%) | Scald (%) |
| <2 years        | 5 (22.7)  | 29 (47.5) |
| 2 to 5 years    | 3 (13.6)  | 19 (31.1) |
| > 5 to 10 years | 5 (22.7)  | 8 (13.1)  |
| > 10 years      | 9 (40.9)  | 5 (8.2)   |

$\chi^2 = 15.5$ ,  $df = 3$ ,  $p \text{ value} = 0.001^*$  ( $\chi^2 = \text{chi-square test}$ ,  $df = \text{degree of freedom}$ )

**Table 3: Sites of burn injuries among subjects**

|             | Present (%) | Absent (%) |
|-------------|-------------|------------|
| HNF         | 34 (41.0)   | 49 (59.0)  |
| Ant. Trunk  | 57 (68.7)   | 26 (31.3)  |
| Post. Trunk | 37 (44.6)   | 46 (55.4)  |
| UL          | 54 (65.1)   | 29 (34.9)  |
| LL          | 50 (60.2)   | 33 (39.8)  |
| Genitalia   | 12 (14.5)   | 71 (85.5)  |

In the study 73.5% had burns due to scald and 26.5% had burns due to flame. In the study most common type of burn is scald. (Fig-1)

In this study, among subjects with mixed burns majority of them were in the age group >10 years and among subjects with superficial burns majority of them were in the age group <2 years. Among subjects with mixed burns majority of them were females (55.9%) and among subjects with superficial burns, majority 57.1% were in males. This difference was not statistically significant. (Table 1)

In the study among subjects with flame burns, 40.9% were in >10 years subjects and in subjects with scald burns, majority were <2 years of age. (Table no.2)

In this study, most common site of burns was anterior trunk, 65.1% had Upper limb burns, 60.2% had Lower limb burns, 44.6% had posterior trunk burns and 14.5% had genitalia burns. (Table no.3)

**DISCUSSION**

In our study, majority of burn affected children were < 2 years i.e. 41%, 26.5% were in the age group of 2 to 5 years where as in study done by Chalya PL et al and Zhai et al the majority of cases are below 2 years of age.<sup>6,7</sup> This finding is nearly consistent to the previous studies which are done in Iraq<sup>8</sup> and in Brazil<sup>9</sup>. High incidence of burn injuries in children <2 years of age reflects lack of unaware-

ness of dangerous substances in this age group and lack of domestic safety with poor supervision in families.

In the current study males were more affected to burn injury than females. The high percent of male burn injured in our study could be due to more risk-taking behaviour than females. It is nearly consistent with many studies in low-income and middle-income countries such as 60% in Iran<sup>10</sup>, 53.2% in Turkey<sup>11</sup>.

In study done by Chalya PL et al and Zhai et al Majority of subjects in the study had 11 to 20% burns and when compared age group with TBSA burn, In <5 years age group majority of them had 11-20% burns which comparable with our results. This finding is consistent with a study conducted in Israel.<sup>12</sup>

Majority of subjects in current study had superficial burn i.e., 59% which is comparable to Chalya PL et al study having majority of superficial burns 48%

In the current study 97.6% of subject had accidental burns, 12% had homicidal i.e., child abuse and 1.2% had suicidal burns which is comparable to Chalya PL et al 2011 study having 97.1% accidental burns subjects and 2.9% intentional i.e. child abuse burn subject.

In current study majority subjects had 73.5% scald burn and 26.5% had burns due to flame. While in Chalya PL et al 2011 study 56.1% had scald, 40.4% had flame burn, 1.5% had chemical burns, 1.2% contact burn and 0.9% had electric burns which is comparable to current study. All studies showing scald burn is most common burn in paediatric subjects. In the study among subjects with flame burns, 40.9% were in >10 years subjects and in subjects with scald burns, majority were <2 years of age. This difference in age distribution with respect to age and type of burn was statistically significant. Comparable to Chalya PL et al with 33.3% scald in < 2 years and 18.4% flame in < 10 years.

In current study most common site of burns was ant trunk 68.7%, 65.1% had upper limb burns, 60.2% had lower limb burns, 44.6% had posterior trunk burns, 41% had head and neck and four involved and 14.37% had genitalia and perineal burns.

These current study findings are comparable to Chalya PL et al 2011 study with trunk was most commonly involved body region 57.3% followed by upper limb 41.5%, 29.2% had lower limb burn, 21.9% had head, neck and face burns and 15.2% genitalia and perineal region involved.

## CONCLUSION

Burns are serious health problems and are most frequent injury among paediatric patients. This study showed that, children aged two years and below is commonly affected. Majority of these 97.6% burns are accidental, most injuries occurring at home. Preschool stages and males children were at risk for burn injury. It reflects lack of unawareness of dangerous substances in this age group and lack of domestic safety with poor supervision in families. The scald burn injury is most common. Children at least 5 years suffered more serious injuries with significantly higher TBSA involvement. Raising awareness among patients or parents about the fire safety is important for prevention of such injuries.

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