

EPIDEMIOLOGY OF PAEDIATRIC BURNS: A RETROSPECTIVE STUDYJangpreet Singh Multani¹, Baljit Singh Bajwa², P. S. Aneja³**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: Burn injuries are a major cause of morbidity and mortality in children. These are the third most common injury causing death in children, following motor vehicle accidents and drowning accidents. **AIM:** To study the Epidemiological parameters for assessment of morbidity & mortality rate in pediatric burns and to form effective preventive strategy. **MATERIAL AND METHODS:** The study was done at the Department of Surgery, PIMS, Jalandhar. Total 50 patients (n=50) up to age of 12 years, were included in the study retrospectively. Data regarding age, sex, demographic distribution, seasonal variation, Total body surface area (TBSA) involved, type and place of burn injury, parent's occupation, family size and mortality rate were noted and analysed. **RESULTS:** Total 50 patients (n=50) of which 32 were males and 18 females were included in the study. Mean age of burn injuries was 3.6 years. Scalds burns were the most common cause of burns followed by thermal burns. It involved mostly upper limbs (67%), anterior trunk (56%), lower limbs (53%), face (4%), and posterior trunk including buttocks (16%). The time lapse from injury to presentation to hospital ranged from 1 hour to 3 weeks. Total body surface area burnt was ranged from 2-60%. Mean hospital duration was 12.4 days. Complications ranged from wound sepsis in 11 patients (22%), contractures of fingers in 3 patients (6%) and hypertrophic scarring in 8 patients (16%). After healing of wounds, patients were advised pressure garments and oil massage and night splint age regularly for six months. **CONCLUSION:** Children constitute a vulnerable group of burns. Most injuries occur in the home setting where effective control measures can be adopted. Advances have also made in resuscitation, intensive care, antimicrobials, vascular access, nutritional support, and skin banking. Splintage, physiotherapy, massage and pressure garments also help in reducing the morbidity and overall long term burden over the society at large.

KEYWORDS: Burns, Scald burns, Thermal burns, Septicemia, Contractures.

INTRODUCTION: Burn injuries are the third most common injury causing death in children, following motor vehicle crash and drowning accidents. Burn injuries are common in children and many are catastrophic due to the delicate physiological homeostasis they possess. In India, children 0-5 years accounts for 50% of all child burns. Incidence can vary greatly with race and ethnicity. Children are always curious and as the proverb goes "curiosity kills the cat". The children most often accidentally burnt in kitchens as two billions people worldwide cook with open flames unsafe traditional stoves. Also, children put flammable cloths. Some children have associated co-morbid conditions like epilepsy. Burns account for 10% of all cases of child abuse. Children are mostly less than two years of age. Scalding is the most common cause. Western countries have higher incidence of battered babies with burns whereas the Indian children population suffer from burns due to neglect and negligence. The burns in children are more serious than adults because:

- Skin of children is thin due to scant dermal appendages, hence deep injuries more commonly occurs.

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- Temperature regulatory mechanism is labile as the surface area body weight ratio is greatly increased.
- Glomerulo tubular system is immature.
- Children are more susceptible to overloading and dehydration.

Burns cause various types of complications like disfigurement, contractures, emotional damage, delay in reaching developmental milestones and educational development and lastly death. Great improvement has been made in the reduction of mortality related to thermal injuries over the past few decades. Advances in fluid resuscitation, early surgical excision and grafting of the burn wound, infection control, treatment of inhalational injury, nutritional support, and support of hyper metabolic response to injury have contributed to significant decline in burn related deaths and hospital stay in children.

AIM: To study the Epidemiological parameters for assessment of morbidity & mortality rate in pediatric burns and to form effective preventive strategy.

MATERIAL AND METHODS: The study was done at the Department of Surgery, PIMS, Jalandhar. Total 50 patients (n=50) up to age of 12 years, were included in the study retrospectively. Data regarding age, sex, demographic distribution, seasonal variation, Total body surface area (TBSA) involved, type and place of burn injury, parent's occupation, family size and mortality rate were noted and analyzed.

Once patient presented in the hospital, after admission, assessment of the percentage of burns done by Lund and Browder chart as Rule of nine, useful in adults, does not accurately reflect the surface area of children under 15 years of age. Weight of the patient was noted and TBSA was calculated by Jacobson formula:

$$\text{TBSA (m}^2\text{)} = [\text{ht (cm)} + \text{wt (kg)} - 60] / 100.$$

Intravenous fluid was given to patients more than 10% TBSA involved. A nasogastric tube and indwelling urinary catheter were put in patients with burns more than 15% TBSA. Ringer lactate solution was given in children. Fluid requirement was calculated by Parkland formula for children i. e. $2\text{ml} \times \text{wt of the patient} \times \text{percentage of burns}$. Fluid is key for restoring adequate intravascular volume to prevent hypotension and shock, correcting electrolyte abnormalities and minimizes renal insufficiency. Fluid requirement was titrated to keep urine output 1-2 ml/kg BW/ hr. Empirical antibiotics were started for gram positive and gram negative coverage as wounds are initially sterile but quickly colonizes with endogenous and exogenous microbes. Wound discoloration, fever, increased leukocyte count are the signs for infection. Patients were encouraged with enteral feeding (oral or through Ryle's tube) once paralytic ileus subsides, usually on 2nd day. Patients were encouraged to take high calorie –high protein diet in the form of non-vegetarian diet, eggs and milk etc. as burns leads to increased metabolic demands and energy requirement. Goal of the nutrition is weight loss less than 10% of pre injury weight.

Dressing was done daily after bathing, with silver sulphadiazine over body and Ointment Neosporin over face. Goals of the therapy are fast healing and prevention of infection. Splintage was given in functional position in upper limb and lower limb burns. Early mobilisation, chest physiotherapy were encouraged.

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Wound swabs were sent for culture and sensitivity. Biweekly blood tests like haemogram, renal function test, total serum proteins, serum albumin, A/G ratio, serum electrolytes were monitored. Blood transfusion was given in patients with major burns.

RESULTS: Total 50 patients were included in the study. Of these, 32 patients were males and 18 were females. The age group was ranged from 8 months to 10 years. Mean age was 3.6 years. In our study, 60% of patients were below 5 years of age, of which 80% were <3 years of age. Scalds burns were the most common cause of burns followed by thermal burns. 3 cases had fire cracker burns. Scalds burns occurred mostly at home and was mostly in winter season. It involved mostly upper limbs (67%), anterior trunk (56%), lower limbs (53%), face (34%), and posterior trunk including buttocks (16%). The time lapse from injury to presentation to hospital ranged from 1 hour to 3 weeks. Total body surface area burnt was ranged from 2–60%.

Six patients were having respiratory burns. Escharotomy was done in four patients having circumferentially upper limb burns. Splintage in functional position were given in patients with upper and lower limb burns. Duration of hospitalisation in our series ranged from one day to forty two days. Mean hospital duration was 12.4 days. In our series, complications ranged from wound sepsis in 11 patients (22%), contractures of fingers in 3 patients (6%) and hypertrophic scarring in 8 patients (16%). Two deaths and one leave against medical advice (LAMA) were noted in our study due to septicaemia and multiple organ dysfunction syndromes. After healing of wounds, patients were advised pressure garments and oil massage and night splintage regularly for six months.

DISCUSSION: Burns are important preventable cause of injury in children. This study was carried out to describe the epidemiological and clinical profile of children with burn injuries. Total 50 patients were included in the study. In our study, male outnumbered females. This is in accordance with the studies conducted by Chang JC⁽¹⁾ and Gali BM et al.⁽²⁾ This is because that male child are more playful than female children. 60% of the children were below 5 years of age. Mean age was 3.6 years. Younger children (<2 years of age) are mostly under the care of parents or some guardian. At 3 years of age, children begin independent mobility, manifest exploratory and hand to mouth behavior.⁽³⁾

In our study, scald burns were the most common cause of burns followed by thermal burns. Prevalence of the scald burns can be explained that children are left unattended at home and they are too small to understand the danger of being in the vicinity of injurious agents. Sharma et al,⁽⁴⁾ Oludiran OO⁽⁵⁾ and Zeitlin R et al⁽⁶⁾ also concluded that scalds burns are the most common cause of burns. Majority of the scald burns occurred at home as children are more playful at home.⁽¹⁾ Ryan CA⁽⁷⁾ et al also had similar findings in their study. In our study, winter season had more number of admissions than summer seasons which is in accordance with the studies conducted by Ying S Y et al⁽⁸⁾ and Gupta M et al.⁽⁹⁾

In our study, upper limbs including hands were most commonly involved (67%) followed by anterior trunk i. e. chest and abdomen (56%) and lower limbs (53%). Facial burns were noticed in 34% of the cases. Total body surface area burnt was ranged from 2 -60%. Average total body surface area burnt was 14.34% which was in accordance with the work done by Morrow SE et al.⁽¹⁰⁾ Escharotomy was done in four patients having circumferentially burns of upper limbs in aseptic conditions in operation theatre followed by fluffy dressing and limb elevation. Vascularity by pin prick and oxygen saturation improved after escharotomy. Splintage in functional position were given

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in patients with upper and lower limb burns. Physiotherapy with night splintage was encouraged once swelling subsided. Average hospital stay in our series was 12.4 days. Burn wound sepsis was the most common complication (22%) followed by hypertrophic scarring (16%) and contracture of fingers (6%).

Late presentation to the hospital, absence of proper burn ward and perhaps failure to follow proper infection control protocol may be the reasons for burn wound sepsis. It is hoped that with the controlled environmental and skilled personnel in the proper burn unit, this can be reduced. Provision of early skin cover for deep burns also helps to control septic complications as well as reduce hospital stay. Much has been said about early wound excision and grafting in the management of deep burns. However, this still remains a challenge in most of the developing countries. Lack of manpower, inadequate operating space and instrumentation, weak blood banking support, absent skin substitutes are among the numerous constraints. The best management of hypertrophic scarring and contractures involves prevention, splintage, active and passive physiotherapy, oil massage, pressure garments and appropriately timed surgery.⁽¹¹⁾

CONCLUSION: Children constitute a vulnerable group of burns. Most injuries occur in the home setting where effective control measures can be adopted. Children should be left all by themselves only in controlled play rooms. With the exception of infants, the prognosis for survival in children is quite good. The most important factor that has led to improvement in prognosis is the prompt identification, excision, and effective wound closure. Advances have also made in resuscitation, intensive care, antimicrobials, vascular access, nutritional support, and skin banking. Splintage, physiotherapy, massage and pressure garments also help in reducing the morbidity and overall long term burden over the society at large.

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