

BURN INJURIES IN PEDIATRIC POPULATION

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ABSTRACT

Burn injuries constitute a major concern in the pediatric age group with respect to morbidity and mortality particularly in children in developing countries. Burn injuries represent an extremely stressful experience for both the burn victims as well as their families.

Burn injuries are least explored areas among other injuries in Nepal. We do not have any data on childhood burn injuries and this study is done to know the incidence, age, sexwise distribution and nature of childhood burn injuries at Patan Hospital.

Hospital based prospective study done at Emergency and surgical department during one year period. Twenty children that had fulfilled hospital criteria for admission included in this study.

All injuries were of accident in nature. Scald injuries were more than dry burn injuries. Children less than 5 years were more prone to injury than older children. Twenty one patients survived after treatment and one patient died due to sepsis. Mortality in this series is about four percent.

Burn injury is a leading cause of unintentional injuries mainly seen in children less than 5 years of age with physical as well as psychological consequences.

Key Words: *Degree of burn, Scald, Mortality, Total body surface area (TBSA), sepsis.*

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INTRODUCTION

Burns in Nepal cause an estimated 1700 deaths per year and much suffering.¹ Burn injuries constitute a major concern in the pediatric age group with respect to morbidity and mortality particularly among children in developing countries.¹

It not only causes severe pain during initial stage but also severe emotional and physical scarring, which may last life long. Pediatric burns impose enormous burdens on families and on the society as a whole. Children with 5% TBSA third degree burn or more than 10% total body surface area (TBSA) burn injuries, 2nd and 3rd degree burns needs to be hospitalized for proper resuscitation and specific burn wound management. Children with burn injuries involving the face, hands or genital areas also require hospitalization.²

Recently published data reveal that almost one third of all burn centre admissions involve children less than 10 years in developed nation.² The peak incidence for thermal injury in children is in the 2nd year of life. In most series burn injuries are commonest among boys. Seventy eight percent of infants and toddlers sustain thermal injury as a result of their own actions. Twenty percent are innocent bystanders, and two percent are victims of child abuse. Scald burns predominate in most series, constituting seventy percent of all thermal injuries in infants, toddlers and preschool children.² Scald commonly occurs at home and mainly affects the upper part of the body. Toddlers become increasingly mobile and are at increasing risk from spilled hot foods and drinks, household electric equipment and stove. Flame burns predominate among elder children and are the commonest form of thermal injury between the ages of five and thirteen.

MATERIALS AND METHODS

Pediatric Burn injuries are least explored areas among other injuries in our country. We do not have definite national data on this injury. Hence, this study was done to know incidence, age, sex distribution, nature of injury, and outcome of hospitalized burn patients.

This is a prospective study done at Patan Hospital emergency and surgical department during 1 year period (2061 BS). This study was started after getting verbal permission from surgical department and emergency department. Permission was also taken from guardian of patient too.

In our hospital, there are no special beds for pediatric burn patients. Thus, children with burn injuries, who fulfil criteria, are admitted in surgical pediatric ward. Before admission Emergency department started a standard protocol for each burn patient and were completed and analyzed weekly during their stay in ward.

Inclusion criteria for study

- Children less than 14 years of age.
- Children admitted only from Emergency department.
- Fulfilled all of the following criteria for admission
 - Burn injuries seen in Emergency department
 - 3rd degree burn
 - Burn injuries 1st or 2nd degree greater than 5% up to 1 year, greater than 8% up to 4 years, and greater than 10% after 4 years of age.³
 - Burn injuries in special organs e.g. face, hand and perineum or feet
 - Deep circumferential burns
 - Referral burn patients

Exclusion criteria

- Chemical burn injuries
- Electrical injuries
- Chronic burn injuries

Data on age, sex, location and nature of injury were noted and analyzed. Degree of burn was also noted according to pediatric burn injury protocol.

RESULT

The results of the study are given below in Table I and Fig.1-4.

DISCUSSION

Table I: Age of children

0-5 (59%)		5-10 (31.81%)		11-15 (9.04%)	
Male	Female	Male	Female	Male	Female
4	9	4	3	2	0

Table I shows most of the patient belongs to age group less than 5 years (13 i.e. 59%).

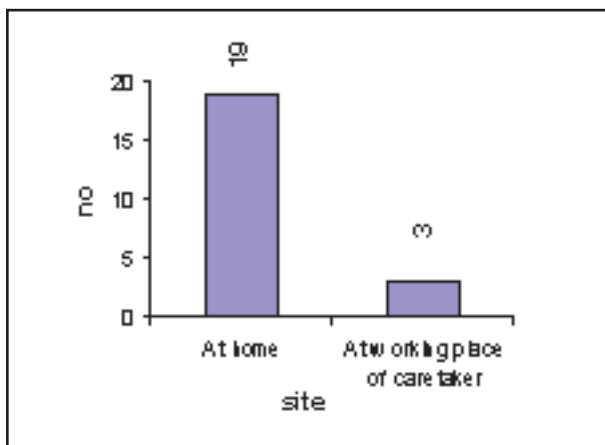


Fig. 1: Injury Site.

Figure 1 shows most of the injury occurred at home. Nineteen out of twenty two children sustained injury at home.

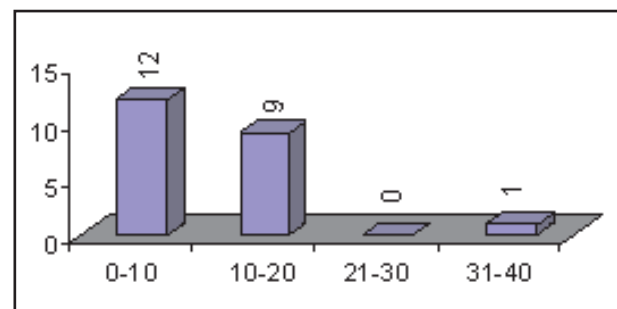


Fig. 3: Burn Surface area in percentage.

Majority of patients (96%) have burn injuries less than 20% of total body surface. One patient had burn injury more than 30 percent of body surface.

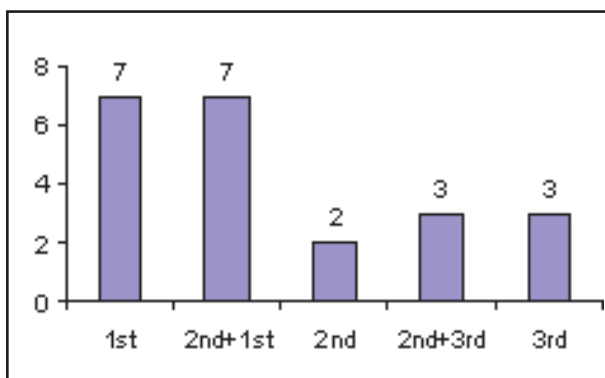


Fig. 2: Degree of Burn.

Most of the injury belongs to 1st and 2nd degree burn (63.62%). Fourteen children out of twenty two had sustained 1st and 2nd degree burn injuries.

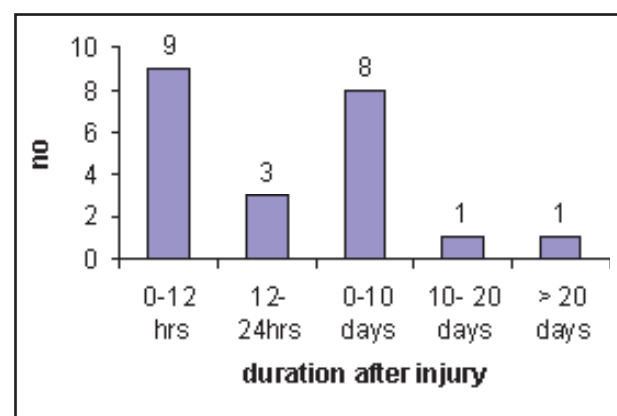


Fig. 4: Patient's arrival at hospital after injury.

Most of the patient (54%) came to emergency department within 24 hrs of injury.

Burn injuries remain a leading cause of injuries in children. This form of trauma is one of the commonest causes of hospitalization due to accidents among pediatric patients.³ Burn injuries are second only to motor vehicle accidents as the leading cause of death in children aged 1-4 years and the third most frequent cause of injury and death among all children from birth up to age of 19 years.²

The etiology of burn injuries varies as the child progresses through the stages of normal development. Scald burn predominates in most series and constitute seventy percent of all thermal injuries in infants, toddlers, and pre school children. Scalds mostly occur at home and mostly affect upper part of body. Incidence of spill is always more than immersions.²

Care for the burned child continues to demand close attention of a multidisciplinary team. The treatment of burn children differs substantially from that of adults not only because of the large body surface areas and the different anatomical structures but also more importantly - because of the metabolic process involved, homeostasis factors, hormonal responses, the immunological profile, the degree of psychological maturation, and healing process.

Adequate management of a pediatric burn injury requires initial accurate estimation of the percentage (TBSA) burned. It is common knowledge that both pre-hospital personnel and burn members may significantly misjudge the extent of pediatric burns when compared with actual measurements.

The emergency care of pediatric burns also includes a rapid assessment of the circumstances of the injury with regard to abuse and neglect, as in some instances protection of the child may become as important as medical care for the burn injury.

The primary determinant of survival in patients with burn injury has historically been the size and depth of the burn wound, followed by patient under 4 years. Young children do not tolerate thermal injury as well as adults. Many reports have suggested that children under 4 year have a diminished

probability of surviving as compared with the expected survival of young adults with equivalent injuries.

This study shows predominance of female patients (54%) in comparison to male patients. Hemanda M. et al and Kumar P. et al also found similar data in their study.^{4,5} However, studies done by other authors have found predominance of male patients in comparison to female patients.^{6,7,8,9,10,11} Study done by Allen SR and Kagan RJ also found male predominance in this type of Injury among small children.¹² The main cause of predominance of male child may be due to more mobility of male sex.

Our study shows fifty nine percent of patients were below 5 years of age. Other studies also showed predominance of children less than 5 years of age.^{13,14,15} The other age groups according to our study, more vulnerable for this injury after this age group were 5-10 yrs of (32%) age group.

Among 22 patients 19 patients got injured at home (86.36%) and 3 patients (13.6%) at working place of care-taker. In other studies, majority of burn injuries occurred at home.^{4,7,14,16,17}

This study shows scald injuries in 55% cases and flame burn injuries in 45% cases. Similar results were seen a study done by Chien WC et al.¹⁴ Lari AR found scalds in 46.2% cases and flame injury in 42.9 cases.⁷ Studies done by other authors showed predominance of scald injuries over flame injuries.^{18,19,20,21}

Among 22 patients 71% patients had 1st and 2nd degree burn. 3rd degree burn was noticed in only 13% cases. A study from Turkey showed half of the patients suffered second-degree burns and the others all had deeper burn injuries.²²

Ninety one percent patients admitted in ward had TBSA 0-20%. Kumar P et al found 63.9% child received burn injuries in the range of 0-20%.⁵ This data is much less than that found in our study. Lari AR et al in their study found 77.4% of the children had body surface area burns less than forty percent.

This study showed 5% mortality rate and cause of death

was due to sepsis. Chen XL et al in their study showed mortality rate in 13% cases, which is much higher than of us and they also found sepsis as major cause of death, followed by multiple organ failure.⁸ A study from Iran also showed similar report of mortality.²⁴

Forty percent of patient came to our hospital soon after injury i.e. within 12 hours. One patient came after 20 days of injury as referred from outside.

Our study shows most of the patients (63%) stayed in hospital up to 20 days. Report from Turkey showed average hospital stay was 13 days.²⁵ Maghsoudi H et al also got similar data of admission as study from Turkey²⁴ Lari AR found average admission day of 16.7 days in his study.⁷

CONCLUSIONS

Burn injury is a leading cause of unintentional injuries in children. Our study has shown the prevalence of this injury under 5 years of age and female children were mostly affected. Scald injuries were more common than flame injuries and most injuries happened at home. Sepsis was the major cause of mortality in this study.

RECOMMENDATIONS

Safety measures must be taken while dealing with flame and hot liquids, especially in presence of children at home. Knowledge about burn injuries must be given to children. It is necessary to avoid applying dirty things on wound and wound should be cleansed with lot of clean water. After injury, medical advice should be taken as soon as possible to prevent its complications.

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