INTRODUCTION

Burns are a common cause of childhood injuries throughout the world. In developed countries, burns account for 2-6% of all childhood injuries. Burns constitute the second most common cause of accidental death in children under 5 years and the most common cause of accidental death in the home. In a Karachi based study, burns were the second most common cause of injuries among children aged ≤ 15 years. Childhood burns deserve special attention, as burn injuries often result in prolonged hospitalization and require surgical intervention. They may have long-term physical, psychosocial, and economic ramifications. Children who sustain burn injuries may also develop postransfer stress disorder.

The present study was undertaken to determine the epidemiologic pattern and outcome of childhood burns by finding the presenting features of the burn victims, causes / circumstances of burn injury, involvement of body area, need for hospitalization, duration of hospital stay and mortality.

METHODOLOGY

This study was conducted over a two and half years period at Burns Care Centre (BCC), Pakistan Institute of Medical Sciences (PIMS), Islamabad, from January 2008 to June 2010. The study included all children of either gender with burn injuries who were managed at the centre after primarily presenting to the study centre. Children over 15 years were excluded. Lund and Browder chart was used to calculate the total body surface area (TBSA) burnt. Children with extensive and critical burns, high voltage electric burns and those needing any surgical interventions were admitted for indoor management. Data were recorded on a proforma.

Results: A total of 1725 children were included in the study. Out of those, 66.84% (n=1153) were males and 33.15% (n=572) were females. The mean age was 5.04 ± 2.78 years. Majority (67.47%) of children were aged 3-6 years. Scalds were the commonest burns (70.31%). Household environment was the commonest site of acquisition of burns (91.47%). Winter was the most frequent season of sustaining burn injury (63%). The commonest anatomic regions affected were hands / upper limbs (65.68%). Overall the affected mean TBSA was 9.37±9.61 %, while for the hospitalized children it was 27.07 ± 10.84%. Two hundred and ninety seven children (17.21%) were admitted. The mean hospital stay was 15.59±5.61 days. The mortality rate was 9.09% for the hospitalized children and 1.56% for the entire study sample.

Conclusion: Male gender, age of 3-6 years and winter season were found to have an increased frequency of childhood burns. Scalds were the commonest type of injuries, and hands/ upper limbs were the most frequently affected body parts. There is a need to revisit the health care system and institute focused burn prevention strategies consistent with our local circumstances.

Key words: Childhood burn injuries. Paediatric burns. Paediatric trauma. Chinese categorization of paediatric burns.
The sociodemographic profile of the child, place of sustaining burn injury, cause and circumstance of burns, TBSA burnt, burnt depth, injury distribution by anatomic regions, managed indoor / outdoor, duration of hospitalization, and outcome in terms of survival or mortality etc. were all recorded on a proforma. Age-wise the children were stratified into three groups i.e. the infants/ toddlers (0-2 years), early childhood (3-6 years) and late childhood (7-15 years).

All the burnt children were initially managed according to ATLS protocol. Wound cleansing, application of topical antibiotics and aseptic dressings were ensured in all cases. Prophylaxis against tetanus and analgesia were instituted. For intravenous fluid resuscitation central venous line was passed. Mount Vernon formula was used for fluid resuscitation. Transfusion of fresh frozen plasma and blood was done where indicated. Early excision and skin grafting were performed in all children with full thickness skin loss. Partial thickness burns were initially managed conservatively for spontaneous healing and if burn wound progression showed full thickness skin loss, then the wounds were resurfaced with split thickness skin grafts. Children whose wounds dictated other surgical interventions such as flap coverage, escharotomy, fasciotomy, amputation, early ectropion release and grafting, were managed accordingly.

The intensity of burn injury was stratified by employing Chinese categorization of paediatric burns. Mild burns are defined as affected TBSA ranging from 0% to 5% with no area of third-degree burn. Moderate burns comprised affected TBSA ranges from 6% and 15%, or third-degree burn of < 5% TBSA.

Extensive burns were defined affected TBSA ranged from 16% to 25% or third-degree burn of 5-10%; or the burn was < 16% TBSA, with some additional complication such as shock, combined injury, poisoning, or moderate-severe inhalation injury; or the victim was an infant with facial burns exceeding 5% TBSA. Critical burns were defined where the affected TBSA was > 25%, or there were third-degree burn of > 10% TBSA.

The data were subjected to statistical analysis using Statistical Package for Social Sciences (SPSS) version 10 and various descriptive statistics were used to calculate frequencies, percentages, mean and standard deviation. The numerical data such as age, and duration of hospitalization were expressed as mean ± standard deviation values while the categorical data such as the anatomic site of burns, causes of burns were expressed as frequency and percentages.

**RESULTS**

A total of 1725 children were included in the study. Out of these, 66.84% (n=1153) were males and 33.15% (n=572) were females. The mean age was 5.04 ± 2.78 years. Table I shows the age and gender distribution of the children.

The intensity of burn injury was mild in 45.44% (n=784), moderate in 40.46% (n=698), extensive in 7.71% (n=133) and critical in 6.37% (n=110) children. Scalds were the commonest burns accounting for 70.31% (n=1213, Table II).

Household environment constituted the commonest site of acquisition of burns 91.47% (n=1578), followed by street 7.71% (n=133), and school / market 0.80% (n=14). Winter was the most frequent season of sustaining burn injury 62.95% (n=1086).

The commonest anatomic regions affected were hands/ upper limbs 65.68% (n=1133), followed by abdomen/ chest 46.55% (n=803), lower limbs 36.69% (n=633), back 18.20% (n=314), buttocks 6.72% (n=116), face 6.20% (n=107), and genitals 1.56% (n=27).

Overall the affected mean TBSA was 9.37 ± 9.61%, while for the hospitalized subset of children it was 27.07 ± 10.84%. Most of the burns 88.89% (n=1535) were partial thickness. Inhalation injury was found in 6 patients (0.34%). Two hundred and ninety seven children (17.21%) were admitted, while, the remainder 1428 (82.78%) were managed on outdoor basis. Among the hospitalized patients, the mean hospital stay was 15.59 ± 5.61 days.

There were 27 deaths among the hospitalized children (n=297) constituting 9.09% mortality rate for the hospitalized subset of children, while an overall mortality rate of 1.56% when projected to the entire study sample (n=1725).

**DISCUSSION**

The study is the largest series on paediatric burn injuries in our country and it shows the gravity of this common childhood health issue. Globally, childhood injuries constitute a growing public health issue with injury and violence responsible for approximately 950,000 paediatric deaths annually.10 The five leading causes...
of paediatric mortality are road traffic accidents, burns, drowning, poisoning and falls.\textsuperscript{11}

In this study predominant involvement of male children was noticed. This observation conforms with several published studies.\textsuperscript{12} Male children are probably more active than females and the same may account for their more frequent involvement in burn injuries.

There was a predominant involvement of children in the age group 2-6 years. Al-Shehri found that majority of childhood burns occur in the 0-5 year age group, which comprised upto 78% of all childhood burns.\textsuperscript{13} Kai-Yang \textit{et al}. observed that children aged < 3 years were more prone to burn injury than children aged > 3 years.\textsuperscript{14} The gravity of burn injury is even more among younger children as children under 6 years of age have thinner skin than do older children and adults and, therefore, are at higher risk for burn-related injuries even when exposure time is short (especially for thermal and scald burns).\textsuperscript{14,15}

In this study, scalding was the most common form of burn injury. Kai-Yang \textit{et al}. in a systematic review from China reported scalding as the most predominant cause of burns, accounting for 59-92% of all burns, followed by flame (6-33%), electricity (0-10%), other (0-23%), and chemical burns (0-7%).\textsuperscript{14} In most of the published research, scalds are reported as the most common cause of burn injury, however, Oludiran \textit{et al}. from Nigeria have reported flame burns from kerosene explosions (52%) as the leading cause of paediatric burns.\textsuperscript{16} This is due to ignition of kerosene lamps used for lighting and or kerosene stoves cooking.

In this study, the share of electric burn injury was disconcertingly high. Contrary to this observation, Oludiran \textit{et al}. reported only one case of electrical burn in their series.\textsuperscript{16}

In this study, the anatomic areas most commonly affected by burns were hands and upper limbs. Different studies have reported variable frequency of involvement of different anatomic sites. Chen \textit{et al}. have reported upper limb as the most frequently burnt part.\textsuperscript{17} Lu \textit{et al}. reported lower limb as the most frequently affected body part.\textsuperscript{18} Li \textit{et al}. reported head and neck while Xie \textit{et al}. reported trunk as the most frequently burnt part.\textsuperscript{19,20} Hands and fingers have also been reported to be frequently injured by burns.\textsuperscript{21}

In this study, home constituted the commonest place of occurrence of burn injury. In home, kitchen was the most frequent site of these accidents, where hot water, boiling milk and soup were the common sources of scalds among children. Different published studies have also reported home and kitchen as the frequent sites of burn injury acquired by children.\textsuperscript{14,21,22}

In this study, winter was the most frequent season for burn injury. Winter being cold season, households are likely to use gas and electric heaters and kerosene devices for space and water heating and making hot drinks. Household members especially children also spend greater proportion of their time indoors in cold weather, and hence have greater proneness to burn injuries. This findings conforms to several published studies, however, D’Souza \textit{et al}. reported no seasonal variation in burn injury frequency.\textsuperscript{22}

In this study, the in-hospital mortality was 9.09\%. In China different studies have reported mortality rate ranging from 0.49\% to 9.08\%.\textsuperscript{14} The reported mortality from Turkey, India and Iran is 10.1\%, 10.4\%, and 16\% respectively.\textsuperscript{23-25} A local study may be designed to identify child abuse and parental negligence in the context of burn injuries. This will help to evolve an evidence base to prompt legislative reforms for child protection and safeguarding.

\textbf{CONCLUSION}

Burn injuries constitute an important cause of childhood morbidity and mortality in our set up. Male gender, age of 3-6 years and winter season were found to have increased frequency of childhood burns. Scalds were the commonest type of these injuries, and hands/ upper limbs were the most frequently affected body parts. Childhood burns stem largely from preventable causes. There is need to revisit the health care system and institute focused burn prevention strategies consistent with the local circumstances.

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