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EVALUATION OF ETIOLOGY AND OUTCOMES OF PAEDIATRIC BURNS UNDER THE AGE OF ONE YEAR.

Plastic Surgery

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ABSTRACT

Between March 2012 and March 2022, 138 paediatric burns patients under the age of one year were hospitalized and managed at Department of Burns and Plastic surgery at Pandit Dindayal Upadhyay Civil Hospital, Rajkot, Gujarat, India. Out of these patients, 61.59% (n=85) were males and 38.40%(n=53) were females. Aetiology of burns was mostly flame burns, scald burns from water and milk and electrical burns. TBSA (total body surface area) percentage sustained from burn trauma ranged from 1% to 95 %. Flame burns and water scald burns contributed to higher percentage of burns as compared to milk scalds and electrical burns. Total mortality was 23.91% (n=33). Flame burns resulted in 16 mortalities and scald burns lead to 14 deaths. These results show that mortality in infant is higher than other paediatric age groups. Infants represent a specific vulnerable group because they are essentially non-walkers and entirely dependent on their parents. More often than not these burns are due to negligence on the part of parents. These burns can be prevented by awareness campaigns targeting education of parents and care givers.

KEYWORDS

Paediatric Burns, Infant burns, Plastic Surgery

INTRODUCTION

Burn injury is very commonly seen in paediatric age group, and the incidence is even higher in developing countries like India.[1,2] Outcomes in paediatric burn injuries are very poor.[3-5] Management of paediatric burn is long term and the treatment and rehabilitation process places a huge economical, psychological and social burden on patients and their parents.[6] In this study, we intend to study cases of burn injury in paediatric population under the age of 1 year which constitutes mostly crawlers and non-walkers.

Since this patient population cannot walk towards the source of burn trauma themselves, burn injury to them is contributed by the negligence of their parents because of their total dependency on their caregivers.These kinds of burn injuries are mostly preventable. Awareness campaigns directed specifically towards parental education have an important role to play.

MATERIALS AND METHODS

We collected our sample by retrospective hospital case record based evaluation of data over a period of 10 years from March 2012 to March 2022. Our main aim was to collect burn injury data in paediatric population under the age of 1 year. Data regarding age, sex, aetiology, TBSA involved, history of burn injury, management and mortality was collected.

In our study, we aimed to study the aetiology of infant burns, various causative factors, treatment given and outcomes.Paediatric burns once admitted in our centre received standard care. Patients were evaluated for general condition and immediate management of any life threatening condition if any. Percentage TBSA burn involvement was calculated as per Lund and Browder charts. Patients were resuscitated as per Parkland formula.

Daily dressings were carried out with silver sulphadiazine. Debridement, escharotomy or fasciotomy was done as per requirement of individual cases. Patients developing raw areas were covered with skin grafting. Those who developed contracture were treated by appropriate surgery.

RESULTS

Our study population consisted a total of 138 patients out of which 61.59% (n=85) were male and 38.40% (n=53) were females. As seen in Figure 1, males constituted a large number of our study population. Etiological factors of burn injury in our study were flame burns (41.30%), water scald burns (30.43%), milk scald burns (19.56 %) and electrical burns (8.69 %) as depicted in Figure 2. Figure 3 depicts sex distribution as per individual aetiologies. As depicted in Figure 4, mean percentage TBSA involved was highest in flame burns (22.8%), followed by water scald burn (17.7%), milk scald burn (5.3%) and electrical burns (2.8%). Mortality was the highest in flame burns with 16 cases (30.21%). Scald burns were the second most common cause of mortality with 12 (22.15%) water scald cases and 2 (6.06%) milk scald cases. Electric burn accounted for 3 (9.09%) cases. (Figure 5)

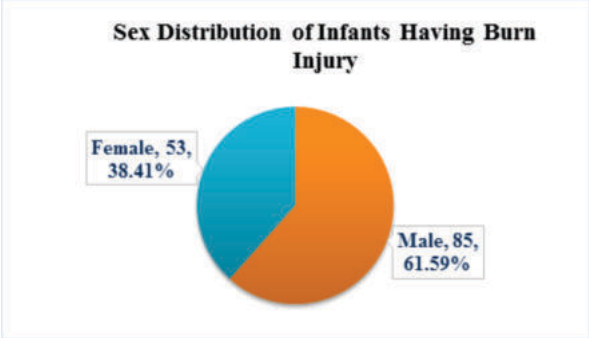

Figure 1: Sex Distribution of Infants Having Burn Injury

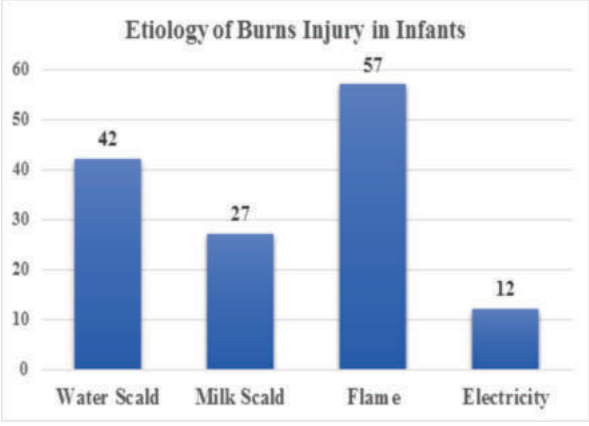

Figure 2: Aetiology of Burn Injury In Infants

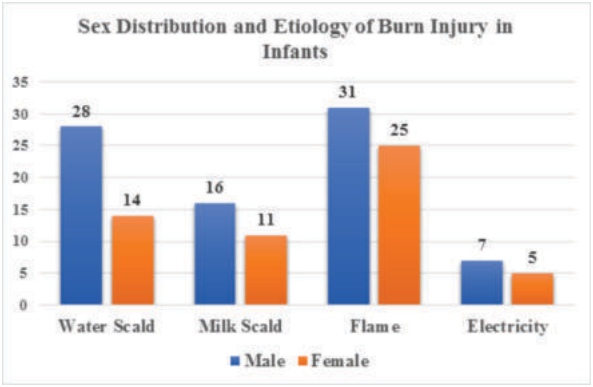

Figure 3: Sex Distribution of Burn Injury

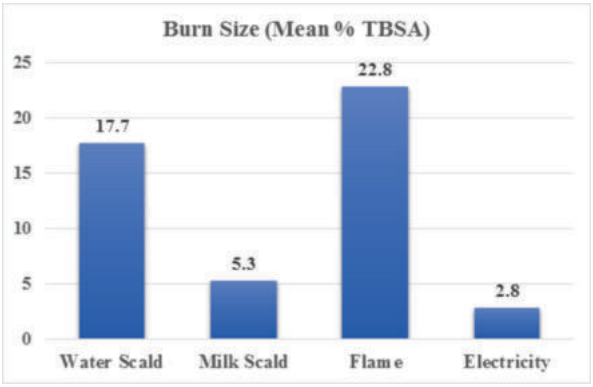

Figure 4: Mean Percentage of TBSA involved

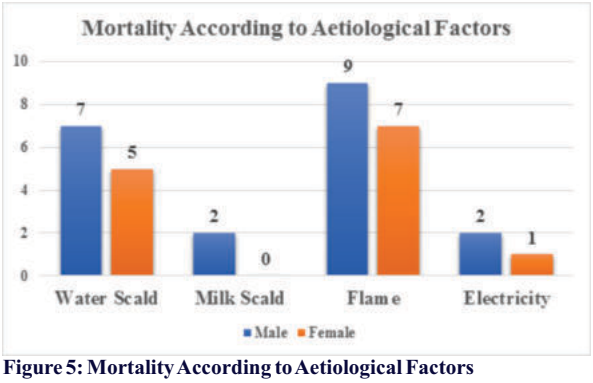

Figure 5: Mortality According to Aetiological Factors

DISCUSSION

Our study was designed mainly to collect epidemiological data on paediatric patients under the age of 1 year. Since this study population consisted primarily of non-walkers, our focus was on studying the mechanism of injury and environmental factors that contributed to burn trauma.

In our study population, patients mainly came from rural settings or lower socio-economic conditions with overcrowded living situations. Similar environmental factors were seen contributing to burn trauma in studies done on this topic.[1,2,7]

In villages there is a common area that is used for cooking and sleeping. There is a traditional system of floor kitchens and cooking is done over chulhas (earthen or brick stove). The chulha is lit by burning wooden logs or dried cow dung cakes. Cooking over chulha is potentially hazardous since it's a source of flame burn. Because it is open from one side and since it is at floor level, spillage of food item from containers can also lead to scald burn injury. In villages sterilization of milk is done by boiling in large containers.[8,9]

The mother is primary care giver to the children. She manages all the household work as well as looks after children. The fathers are mostly out for earning their livelihood or they work in fields. There are large families and on an average have 3 to 4 children. In this situation, sometimes the children are left unsupervised in the kitchen area.[10]

In this setting, the mother becomes overwhelmed looking after so many children. They leave the children nearby or towards the source of fire while cooking or doing other household chores.

In winter months, water is heated in large containers which is used for bathing and other activities. Such containers are mostly kept open. This is a potential source of burn trauma. Instances of infants getting burnt accidentally is quite common.

Scald burns from hot water or milk was the most common reason found in our study, contributing half of the total burns cases. Out of total 138 cases of burns, 42 cases (30.43%) of water scald burn and 27 cases (19.57%) were milk scald burns. Similar studies done in this topic also had an increased preponderance around winter months.[11–14]

Sometimes the infants are in mothers lap while they do activities like cooking. Dal or sabzi which contain hot liquids are cooked over chulhas on the floor. Instances of hot liquid spilling from these containers while transferring food is quite common. Accidental spillage of hot tea while the child is in the lap of parents also contributed to a number of scald burn cases.

In winter months, bonfires are lit to keep warm against the cold weather that leads to accidental flame burns. Flame burns are also sustained from chulhas. Flame burns are also caused in India by fire crackers in festival of Diwali festival.[15,16]

Electrical burn injuries from household sources are low voltage injuries resulting from sources less than 1000V (220 to 250 V). Injuries included oral injuries from biting of electric cords, inserting fingers into wall sockets or contacting live wires or from indoor appliances.

Sometimes children are put in baby walkers and they can move towards potential source of burn trauma sustaining different types of burn injury.[17]

Paediatric patients of less than one year have thin skin and less insulating layer of subcutaneous fat. As a result, they are more prone to loss of water and heat. Thin skin also leads to fallacious assessment of burn wound thickness.In comparison to adults, children aged less than 12 months do not tolerate large thermal injuries well because of their physiology.[18,19] Therefore infants with burns more than 30% of the body surface have a higher rate of mortality than adults with identical injuries.[19]

Mortality in our study was 33 (23.68 %) which is relatively high and is comparable to other studies done in paediatric populations. In our study, there were 20 (60.60%) male mortalities and 13 (13.39%) female mortalities. Higher incidence of male mortality in our study correlates with similar studies done in this regard.[13,20]

Flame burns contributed to highest mortality. In our study, highest number of mortality was from flame burn with mean % TBSA affected being 22.8%. Flame burns preponderance is noted in other studies.[1,3,20–22]Followed by flame burn, scald burns contributed to mortality with water scald burn and milk scald burn contributing to 12 and 2 deaths respectively. Higher incidence of scald burn is also noted other studies.[11–14]

Environment conditions and conditions in which the burn victims live should be studied so that effective treatment strategies can be planned accordingly. Kitchen and bathroom are common areas where proper precautionary measures can be taken and parental education plays a key role maintaining a safe kitchen and safe home environment.

While it is difficult to abolish the traditional system of floor kitchen and Chulhas, infants can be kept away in their cradles or they should be sleeping when the mother is cooking. Crawling children should be kept away from source of burn trauma and should not be left unattended in any case.

Negligence of parents and caregivers is to blamed when non walking and crawling children sustain burn injuries since they themselves can not walk towards the source of burn trauma.Steps should be taken for prevention of child neglect. There should be a proper supervision of infants at all times. Care givers should keep children away from source of burn injury especially during cooking.Awareness campaigns for burn prevention directed specifically towards parental education have

a very important role to play and can drastically decrease the morbidity and mortality in infant population

CONCLUSION

Our study identified potential risk factors for paediatric burns under one years of age. Rural residence, and low parental education levels, low socio-economic status and overcrowded living conditions came out to be the main reasons, occurred most often cooking, and scalding was the leading cause. Winter was the high-risk season.. Burns occurred most frequently in children left unsupervised by parents and care givers.

Although further studies and analysis are needed to establish risk factors for infant burns, our findings suggest that educating parents or caregivers can reduce incidence and improve outcomes.

Conflicts Of Interest: There are no conflicts of interest.

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