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Original Article

Epidemiological Study of Pediatric Burns at a Tertiary Care Center - A Retrospective Study

V V Kannan[1], S Meenakshi Sundari[2], Heber Anandan[3]

[1]Professor and Head, Department of Paediatric Surgery, Tirunelveli Medical College and Hospital, Tirunelveli, Tamil Nadu, India, [2]Professor, Department of Paediatric Surgery, Tirunelveli Medical College and Hospital, Tirunelveli, Tamil Nadu, India, [3]Senior Clinical Scientist, Department of Clinical Research, Dr. Agarwal's Healthcare Limited, Chennai, Tamil Nadu, India

Abstract

Introduction: Thermal injuries in children are serious and common but preventable health problem globally. Advances in fluid management, higher antibiotics, nutritional support, etc., have contributed to the significant decline in burns-related deaths and hospital stay over the past decades.

Aim: This study aims to study the epidemiological profile of the children with thermal injuries and to form effective treatment strategy.

Materials and Methods: A retrospective study was done at the Department of Pediatric Surgery, Tirunelveli Medical College, Tirunelveli, Tamil Nadu, India, from January 2014 to December 2016 on 100 children (up to 12 years of age) admitted with thermal injury. Data regarding age, sex, socioeconomic status, seasonal variation, total body surface area (TBSA) involved, type of burns, hospital stay, complications, and mortality rate were noted and analyzed.

Results: Out of 100 children with thermal injuries, 52 were male, and 48 were female. Thirteen were infants, 49 were in 1-5 years age group, and 38 were in 5-12 years age group. Forty-eight were due to scalds and 52 were due to burns. The majority of them occurred in the lower socio-economic group and in the winter season. According to TBSA burnt, 45 were in the 15-40% group, 23 were in the above 40% group, and 32 were in below 15% group. Upper limb (65%) was most commonly involved followed by trunk (58%), lower limb (48%), and face (30%). Hospital stay was <2 weeks in 74% of patients and 2-4 weeks in 18% and more than 2 weeks in 8%.

Conclusions: Public home safety education program is required to create awareness about thermal injury, especially in mass media such as television. Prognosis of burns depends on the TBSA involved. Major cause of mortality is septicemia which can be reduced by establishing proper burns unit, early wound excision and grafting in deep burns, and establishment of skin bank.

Key words: Burns, Scalds, Total body surface area

INTRODUCTION

Thermal injuries in children are serious and common but preventable health problem globally.[1] Thermal injuries are more common in children as they are always curious, playful and have exploratory behavior.[2] They are most often burnt in the kitchens as the people in the lower socio-economic group still cook with unsafe traditional stoves and also due to spillage of hot water or food items.[3] Furthermore, children wear flammable clothes.[4] Some children have associated illness like epilepsy. Western countries have higher incidence of battered babies with burns, whereas Indian children sustain burns due to neglect and negligence.

The thermal injuries in children are more serious than in adults because:

1. Children have thinner skin hence deep injuries are common. Children lose proportionately more fluid and are more prone to hypothermia as the surface area body weight ratio is more. Children mount greater systemic inflammatory response.[5]
2. As glomerulotubular system is immature in children, they are susceptible to overloading and dehydration.

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Corresponding Author: Dr. V V Kannan, Department of Paediatric Surgery, Tirunelveli Medical College and Hospital, Tirunelveli - 627 011, Tamil Nadu, India. E-mail: meenkann1@gmail.com

Thermal injuries can impose significant psychological, educational, social, and future occupational limitations to a young child.[6] Advances in fluid management, control of infection with higher antibiotics, nutritional support, and support of hypermetabolic response to injury have contributed to significant decline in burns-related deaths and hospital stay over the past decades.

Aim

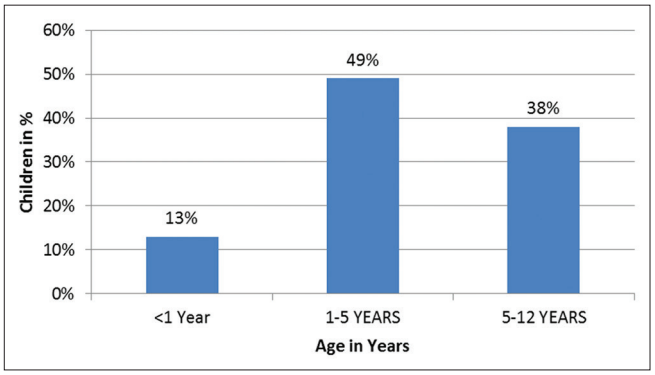
This study aims to study the epidemiological profile of the children with thermal injuries and to form effective treatment strategy.

MATERIALS AND METHODS

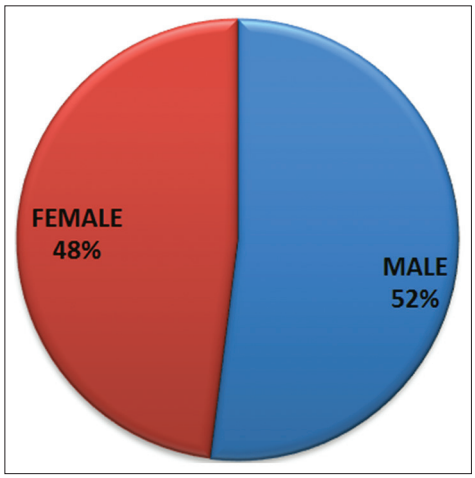
A retrospective study was done at the Department of Pediatric Surgery, Tirunelveli Medical College, Tirunelveli, Tamil Nadu, India, from January 2014 to December 2016 (up to 12 years of age) admitted with thermal injury. Data regarding age, sex, socioeconomic status, seasonal variation, total body surface area (TBSA) involved, type of burns, hospital stay, complications, and mortality rate were noted and analyzed. The children were divided into three groups – infants (<1 year), 1-5 years, and 5-12 years. Once the patient is admitted, assessment of percentage of burns done by Lund and Browder chart. Intravenous fluids given for patients with more than 10% burns. Fluid resuscitation calculated by Parkland formula (4 × % of burns × weight in kg of Ringer lactate in first 24 h and half of this on the 2nd day with maximum % taken as 40% along with normal requirement for the day). Bladder was catheterized to monitor urine output. Central venous line started in all major burns. All thermal injury wounds were washed with normal saline, blisters removed and collagen sheet applied. Empirical antibiotics, analgesics, and sedation were given. Wound swab taken for culture and sensitivity on the 3rd post-burn day and once in a week thereafter and antibiotics given accordingly. Complete blood count, renal function tests and serum proteins were done regularly and the patients were managed accordingly. Early mobilization, physiotherapy, and nutritious diet were given. Escharotomy was done when required. Patients were referred to plastic surgery department for split skin graft, contracture release, etc., when required.

RESULTS

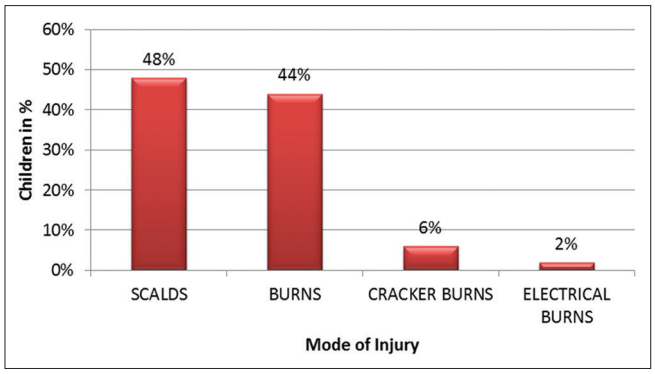
A total of 100 children with thermal were included in the study, 52 were male and 48 were female children. Thirteen were infants and 49 were in the 1-5 years age group and 38 were in 5-12 year age group (Graphs 1 and 2). Scalds were 48 and burns 52, out of which, 2 were electrical burns and 6 were firecracker Figure 1 (Graph 3). Majority of the burns occurred in the lower socio-economic group and in the winter season. Upper limb (65%) was most commonly involved followed by trunk (58%), lower limb (48%), and Figures 2-4 (Graph 4). According to the TBSA burnt, 45 were in the 15-40% group, 23 were in the above 40% group, and 32 were in below 15% group (Graph 5). Majority of thermal injuries occurred in the home accidentally. Only few occurred outside home while playing. Hospital stay was <2 weeks in 74 patients and 2-4 weeks in 18 and more than 2 weeks in 8 patients (Graph 6). In our series, complications ranged from hypovolemia, wound infection, septicemia, febrile fits, pneumonia, acute renal failure and were managed appropriately (Graph 7). Split skin grafting and contracture release (15%) were done whenever required in patients with deep burns. Late complications after discharge such as hypertrophic scar, keloid, contractures, and other disfigurements were referred to plastic surgery and managed appropriately. A total of 85 patients were discharged in good condition after complete healing of wounds and were followed-up regularly. Mortality rate was 15% in our series, out of which, 12 deaths were due to septicemia and 3 deaths due to hypovolemic shock. Ten deaths occurred due to more than 60% TBSA burnt children, 4 deaths due to 40-60% TBSA involved, and 1 death in burns <40% TBSA burnt.



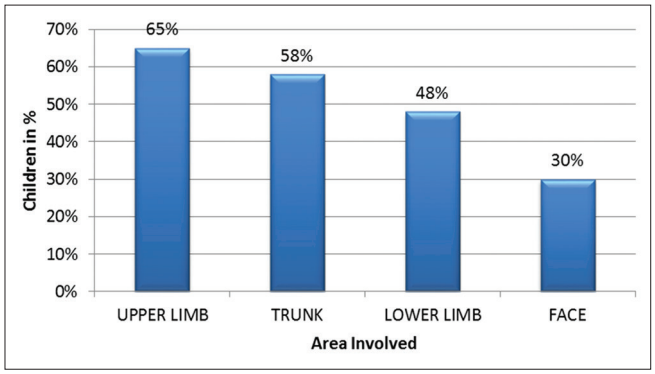
Graph 1: Distribution of children in age group



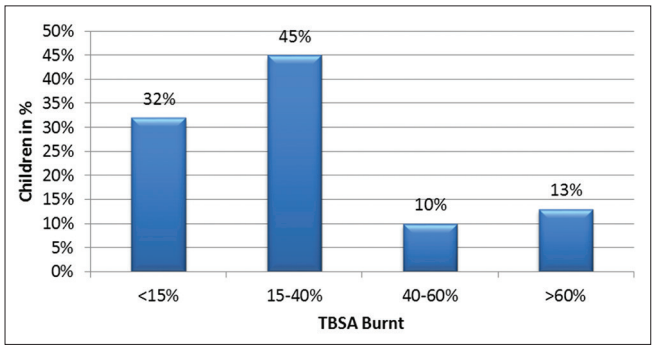
Graph 2: Distribution of gender



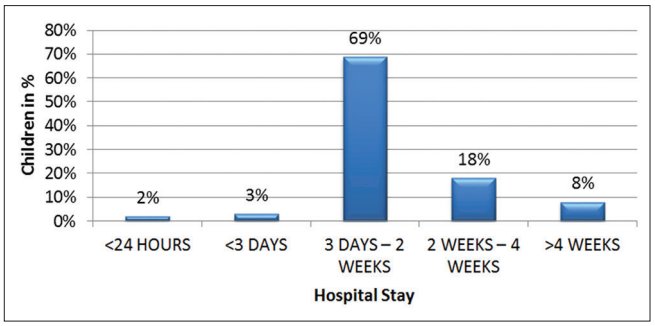
Graph 3: Distribution of mode of injury



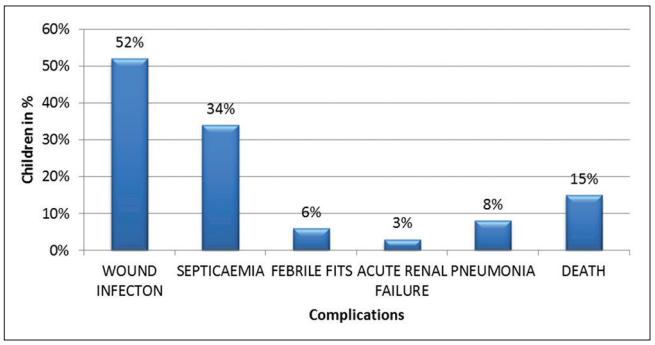
Graph 4: Distribution of area involved



Graph 5: Distribution of total body surface area burnt



Graph 6: Distribution of hospital stay



Graph 7: Distribution of complications

DISCUSSION

Thermal injuries are common in children and are preventable. This study was carried out to describe the epidemiological profile of the children with thermal injury. A total of 100 children were included in the study. In our study, 62% of the children were below 5 years.[7] After 3 years, children begin independent mobility and manifest exploratory behavior.[8] In our study, both male and female children were equally affected whereas other studies show male preponderance.[8,9] In our study, overall prevalence of both burns and scalds injuries were almost equal (52:48), but scalds injury is more common in children under 5 years of age.[10] Majority of the burns occurred in the lower socio-economic group.[3] In our study, more number of thermal injuries occurred in winter season.[11,12] In our study, more children (45%) had involvement of 15-40% TBSA.[13] Upper limbs were more commonly involved (65%) followed by trunk (58%), lower limb (48%), and face (30%).[10] In our study, hospital stay was <2 weeks in 74% cases and more than 2 weeks in 26% cases.[14] In our series, most common complication was wound infection (52%) followed by septicemia (34%).[9] Mortality rate was 15% in our study,[12] out of which, 93% were major burns of more than 40% TBSA burnt. Cause of death in 80% of cases was septicemia, which could be reduced by establishment of proper burns unit with controlled environment and skilled personnel, early wound excision and early grafting in major burns, and by establishment of skin bank since donor area is very limited in major burns.[4]

CONCLUSION

Children are vulnerable to thermal injuries majority of which occur in the home and are preventable. Public home safety education program is required to create awareness about thermal injury, especially in mass media such as television. Prognosis of burns depends on the TBSA involved. More than 40% TBSA burnt are at increased risk of morbidity and mortality. Although advances made in resuscitation, wound care, antimicrobials, vascular access, nutritional support, and physiotherapy, major cause of mortality is septicemia in major burns. This can be

Figure 1: Cracker burns

Figure 3: Facial burns

Figure 2: 80% burns in a infant

Figure 4: Infant burns

reduced by establishing proper burns unit (with controlled environment and skilled personnel) and skin bank.

REFERENCES

1. Zhai H, Liu S, Jiang L, Sun B, Xin S. Characteristics of 985 pediatric burn patients in the south of Liaoning province of China. Burns Trauma 2014;2:136-40.
2. Olaitan PB, Diaro MD, Uduezue AO, Ogbonnaya IS. Paediatric burns: Mortality in burn unit. Afr J Paediatr Surg 2007;4:82-5.
3. Mehta MA, Bhatia VY, Sharma BP. A study of burns in pediatric age group. Indian J Burns 2013;21:55-7.
4. Multani J, Bajwa B, Aneja PS. Epidemiology of paediatric burns: A retrospective study. J Evol Med Dent Sci 2015;4:4798-802.
5. Fenlon S, Nene S. Burns in children. Contin Educ Anaesth Crit Care Pain 2007;7:76-80.
6. Weedon M, Potterton J. Socio-economic and clinical factors predictive of paediatric quality of life post burn. Burns 2011;37:572-9.
7. Bayat A, Ramaiah R, Bhananker SM. Analgesia and sedation for children undergoing burn wound care. Expert Rev Neurother 2010;10:1747-59.
8. Gali BM, Madziga AG, Naaya HU. Epidemiology of childhood burns in Maiduguri North-Eastern Nigeria. Niger J Med 2004;13:144-7.
9. Cheng JC, Leung KS, Lam ZC, Leung PC. An analysis of 1704 burn injuries in Hong Kong children. Burns 1990;16:182-4.
10. Barrow RE, Spies M, Barrow LN, Herndon DN. Influence of demographics and inhalation injury on burn mortality in children. Burns 2004;30:72-7.
11. Ying SY, Ho WS. An analysis of 550 hospitalized pediatric burn patients in Hong Kong. J Burn Care Rehabil 2001;22:228-31.
12. Gupta M, Gupta OK, Goil P. Paediatric burns in Jaipur, India: An epidemiological study. Burn 1992;18:63-7.
13. Peddi M, Segu SS, Ramesha KT. The persistent paradigm of pediatric burns in India: An epidemiological review. Indian J Burns 2014;22:93-7.
14. Ibrahim SB, Omar MB, Gan EC, Rauf A, Johari NB, Yusof HB. Childhood burns at the Paediatric Institute Kuala Lumpur. Med J Malaysia 1995;50:221-5.

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