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Original Research Article

Management of Scalds in Preschool Children: A Regional Study in Tertiary Care Institution

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Abstract:

Background: Scalds account for one-third to one-half of all burns in high and middle-income countries and globally account for approximately 5% of all burn-related deaths with pre-school children experiencing a disproportionately high mortality rate compared to other age groups. While there are enormous variations in the age of patients with burn injuries due to scalds, global studies demonstrate that the 0–5-year age group had the highest incidence. Pre-school children are disproportionately affected by these burns, and therefore the study was conducted with the objectives of1) To study epidemiology of scalds in pre-school children reporting to our Hospital; 2) To access the clinical profile of Scalds in preschool children and treatment offered; 3) To notify methods of prevention of scald burns in pre-school children.

Materials and Methods: A prospective study was conducted in 50 pre-school children (0-5 years old) sustaining scalds admitted to Government Medical College and Hospital Jammu over a period of one year from 1st October 2020 to 31st September 2021.

Results: Maximum number of patients were in the age group of >1 year to 2 years and>2 years to 3 years which accounted for 30% each of all the patients. The average age of the patients was 2.4 years. The number of male patients in our study accounted for 60% of all the cases whereas females contributed to 40% of the total cases. Most of the patients were the residents of rural areas (70%) whereas 30% of the patients were from urban areas. Majority of the patients (50%) belonged to upper-lower class families whereas 30% of them belonged to lower class families. Majority (62%) of the patients were brought to the hospital by their parents/guardians within 6 hours of sustaining injury and only 38% reported later. The median time interval was 3 hours. Hot water was the most common cause of scalds among children (54%) followed by hot milk (36%), hot tea (08%) and hot dal (02). Majority (40%) of the patients had %TBSA burn between 10 to 20% with mean percentage burn of 18% whereas only 14% of the patients had %TBSA burn of greater than 30%. The most common part of the body involved was abdomen (Lower Trunk) (62%) followed by Lower Limbs (50%) in association with other parts of the body and upper limb was the most common part of the body involved separately in 16% of the patients whereas face and feet were least commonly involved (02%). Majority of the patients (70%) had second degree superficial burns whereas 15 (30%) among them had second degree deep burns. Most of the patients (90%) were managed conservatively with IV fluids, antibiotics, and antiseptic dressings, and 05 patients (10%) were surgically managed by Split-thickness skin graft. All the patients (n=50) were discharged with no mortality reported. Maximum number of patients (94%) did not develop any complication, 02 (4%) of them developed hypertrophic scarring and 01 (2%) developed minor graft rejection.

Conclusion: Hot water scalds are the most common type of burn injuries among pre-school children. Management of scalds among pre-school children can be conservative in most of the cases whereas surgical modality in terms of STSG of the burn wounds is needed in some cases. The parental education plays an important role in the prevention of scalds. All the patients in our study were discharged after treatment and none had any significant complication during monthly follow up in out-patient consultancy. At the time of discharge, parents of the children were counselled about proper care of the children, nutrition and first aid.

Keywords: Preschool Children, Scalds, Management.

Introduction

The significance of burns has been recognized since antiquity, with one of the first descriptions of their treatment in the Papyrus Ebers dating from 1550 BC. Despite considerable advances in care, burns represent one of the most severe forms of injury, accounting for 3.9 deaths per 100 000 population world-wide in children[1]. Scalds account for approximately 5% of all burn-related deaths[2] with pre-school children experiencing a disproportionately high mortality rate compared to other age groups[3]. While there are enormous variations in the age of patients with burn injuries, global studies demonstrate that the 0–5-year age group had the highest incidence. The high incidence of burn injuries in this age group is attributable to children's impulsiveness, lack of awareness, higher activity levels, natural curiosity, and total dependency on their care-givers[4,5]. Most of the scald burns are successfully managed conservatively with antiseptic dressings and nutrition whereas some deep scald burns require grafts. Scald injuries are an important public health issue since most are preventable yet cause considerable morbidity and mortality. They can be associated with significant pain and prolonged treatment with some physical and psychological effects lasting a lifetime. The identification of children at the greatest risk of scald injury is important if effective interventions are to be targeted to those in most need[6]. Pre-school children are disproportionately affected by these burns, and therefore there is a need to study the epidemiology and management patterns of such burn injuries in detail, so that a comprehensive management and prevention plan can be constructed.

Aims and Objectives

Aim: To evaluate the Profile of Scalds in Preschool children presenting to Tertiary care hospital in Jammu.

Objectives

1. To study epidemiology of scalds in preschool children reporting to our hospital
2. To access the clinical profile of Scalds in preschool children and treatment offered
3. To notify methods of prevention of scald burns in pre-school children.

Materials and Methods

Study Design

This is a prospective study.

Study setting

This study was conducted at Government Medical College Jammu, a tertiary care teaching hospital.

Study Duration

This study was conducted over a period of one year between October 2020 to September 2021.

Patient Enrollment

A total of 50 preschool children (aged <5 years) having sustained scalds and admitted to Government Medical College and hospital Jammu were studied prospectively. The informed consent was obtained from the parents of the children to be included in the study group.

Inclusion Criteria

Preschool children aged < 5 years sustaining scalds admitted to Government Medical College and hospital Jammu were included in the study after obtaining informed written consent from the parents of the children.

Exclusion Criteria

Refusal of consent by parents/ legal guardian to be a part of study.

Data Collection

In the hospitalized patients, a detailed history including the timing, mechanism of scalds was taken from the parents of the children. General physical examination of all the patients was done.

The TBSA involved by the scalds was calculated using Lund and Browder chart, and the patients were resuscitated according to the standard burn resuscitation protocol. CBC, assessment of blood sugar, renal function (blood urea nitrogen and serum creatinine), coagulation profile, blood grouping, HIV, HCV antibodies and serum HBsAg assessment were done.

Wound swabs for culture-sensitivity were sent at regular intervals and treatment planned accordingly. A chest X- ray was also done as a part of routine investigations. All the patients were assessed for any airway compromise in cases of scalds involving head, face and neck. Surgery if needed, was performed after preparing the patient and assessment by the anesthesiologist. General anesthesia was administered in all the cases requiring any procedure. The sequential follow up was done at monthly intervals after being discharged from the hospital. Use of pressure garments and emollients after discharge from the hospital was stressed upon the parents of the children. The parents were instructed to take care of the children at home properly so that they should not suffer again from such injuries.

Statistical Analysis

Data were entered in Microsoft Excel spreadsheet Version 2013 and analyzed. Data was represented in tables represented below.

Ethical consideration

Ethical clearance was obtained from Institutional Ethics Committee of Government Medical College Jammu. Informed consent was obtained from parents? Legal guardian of patients. Privacy and confidentiality was maintained throughout the study.

Results

Table 1: Age Group

Age Group	Number of Patients	Percentage
0 – 1 Year	09	18%
>1 Year – 2 Years	15	30%
>2 Years – 3 Years	15	30%
>3 Years – 4 Years	05	10%
>4 Years – 5 Years	06	12%
Total	50	100%

Maximum number of patients were in the age group of >1 year to 2 years (30%) and >2 years to 3 years (30%). The average age of the patients was 2.4 years, the youngest patient was 3 months old whereas the oldest patient was 5 years old.Out of 50 patients; 30 (60%) were males and 20 (40%) were females making a male: female ratio of about 3:2. Maximum number of patients sustaining scalds belonged to rural areas (70%) whereas 30% of the patients belonged to urban areas.Maximum number of children; 38 (76%) belonged to nuclear families whereas 12 (24%) belonged to joint families.

Table 2: Level of Literacy of Parents of Children Sustaining Scalds

Education	Number	Percentage
Professional	Nil	0%
Graduate	01	02%
Intermediate	03	06%
High School	06	12%
Middle	10	20%
Primary	14	28%
Illiterate	16	32%
Total	50	100%

Maximum number of children; 16 (32%) had illiterate parents, 14 (28%) had parents who were primary school pass whereas 10 (20%) had middle pass, 6 (12%) had high school pass, 3 (6%) had intermediate pass and 1 (2%) had graduate parents. Based on the Modified Kuppuswamy scale which takes into account the education and occupation of the head of the family and total per capita income of the family per month, the socioeconomic status of the families of the children under study was framed and it was noted that 15 (30%) children belonged to lower class families where as 25 (50%) patients belonged to upper-lower class families and none belonged to an upper class family.

Table 3: Time Interval between Injury and Reporting to the Hospital after Injury

Time	Number of Patients	Percentage
<6 Hours	31	62%
>6 Hours	19	38%
Total	50	100%

Majority of the patients (62%) were brought by their parents/guardians within 6 hours of sustaining injury and only 38% reported later. The median time interval was 3 hours. 02 patients were brought to emergency by their parents after 1 week of sustaining injury and had allegedly sought treatment from quacks.

Table 4: Cause of Scalds

Cause Of Scalds	Number of Patients	Percentage
Hot Water	27	54%
Hot Milk	18	36%
Hot Tea	04	08%
Hot Dal	01	02%
Total	50	100%

Hot water was the most common cause of scalds constituting 54% of the patients followed by hot milk in 36% of the patients.

Table 5: Percentage of Scalds (%TBSA)

Percentage of Scalds (%Tbsa)	Number Of Patients	Percentage
<10%	14	28%
10% - 20%	20	40%
21% - 30%	09	18%
>30%	07	14%
Total	50	100%

The %TBSA burn was calculated by using Lund and Browder chat. 40% of the patients had %TBSA burn between 10 to 20% whereas 28% of them had %TBSA burn of less than 10% and only 14% of the patients had %TBSA burn of greater than 30%. The mean %TBSA burn was 18%.

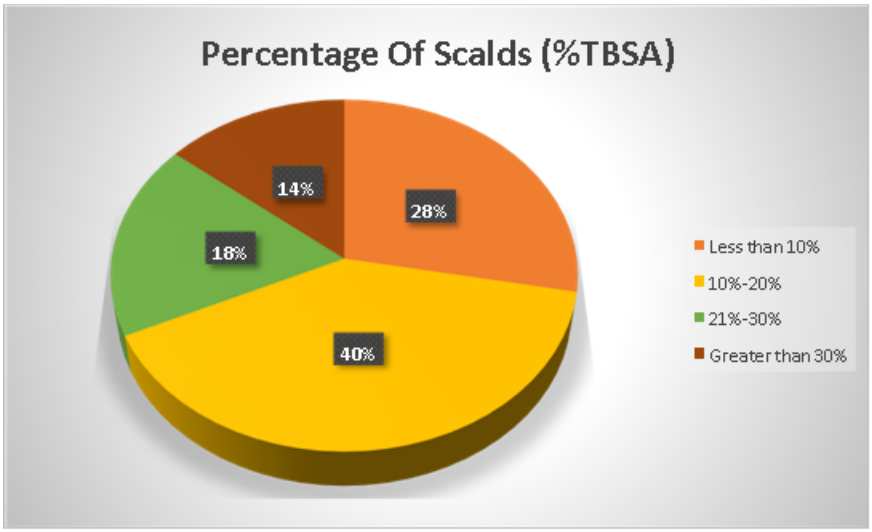

Figure 1: Pie Chart Showing Percentage of Scalds (%Tbsa) Among Patients

Table 6: Anatomic Sites of Burn in Combination

Site	Number Of Patients	Percentage
Unilateral Upper Limb	8	16%
Abdomen, Perineum, B/L Lower Limbs	6	12%
Abdomen, Chest, B/L Lower Limbs	7	14%
Abdomen, Chest	4	8%
Abdomen, B/L Lower Limbs	3	6%
Abdomen, Perineum, Chest	2	4%
Perineum, B/L Lower Limbs	2	4%
Abdomen, Chest, Unilateral Upper Limb	2	4%
Abdomen, Chest, Neck	2	4%
Unilateral Hand	2	4%
Abdomen, Chest, B/L Lower Limbs, Neck	1	2%
Abdomen, Chest, B/L Upper Limbs	1	2%
Abdomen, Chest, Unilateral Lower Limb	1	2%
Abdomen, Perineum, Back	1	2%
B/L Lower Limbs, Back	1	2%
B/L Lower Limbs, Neck	1	2%
Chest, Unilateral Upper Limb	1	2%
Chest, Neck	1	2%
Head (Face), Chest	1	2%
Unilateral Lower Limb	1	2%
Unilateral Foot	1	2%
Abdomen, B/L Lower Limbs, Unilateral Upper Limb	1	2%
Total	50	100%

In majority of the patients, more than one site was involved and the most common site of involvement was abdomen (lower trunk) (62%) followed by lower limbs in 48% of the patients in association with other parts of the body whereas upper limb was the most common part of the body involved separately (16% of the patients) and the least common areas of burn were face and foot (02%).

Table 7: Degree of Burns

Degree Of Burns	Number Of Patients	Percentage
First Degree Superficial	0	0%
Second Degree Superficial	35	70%
Second Degree Deep	15	30%
Third Degree	Nil	0%
Total	50	100%

Majority of the patients had second degree superficial burns (70%) and 30% had second degree deep burns.

Table 8: Treatment Modalities

Treatment Modality	Number Of Patients	Percentage
Conservative	45	90%
Surgical (Stsg)	05	10%
Total	50	100%

Most of the patients (90%) were successfully managed conservatively with IV fluid, antibiotics and dressings whereas only 05 patients (10%) required surgical treatment in the form of STSG of the burn wounds.

Table 9: Average Duration of Stay in the Hospital in Relation to the Degree of Burns and %TBSA Burn

Length Of Stay	Degree of Burns	%TBSA	Number Of Patients	%Age
3 Weeks	Second Degree Superficial	<10% 10-20% 21-30% >30%	14 15 05 01	70%
Total			35	
6 Weeks	Second Degree Deep	<10% 10-20% 21-30% >30%	0 05 04 01	20%
Stotal			10	
2 Months	Second Degree Deep	<10% 10-20% 21-30% >30%	0 0 0 05	10%
Total			05	
Grand Total			50	100%

Maximum number of patients (70%) with second degree superficial scald burns had an average length of stay in the hospital for about 3 weeks whereas 20% of the patients who sustained second degree deep burns had an average length of stay in the hospital for about 6 weeks and only 10% of them required hospitalization for the average duration of 02 months.

Table 10: Outcome of Management

Outcome	Number Of Patients	Percentage
Discharged	50	100%
Expired	Nil	0%
Total	50	100%

All the patients (n=50) were discharged after management and no mortality was reported.

Out of 50 patients, maximum number of patients (94%) did not develop any complication, 02 (4%) of them developed hypertrophic scarring and 01 (2%) developed minor graft rejection.

Figure 1: Second Degree Superficial Involving Abdomen Scald Burn in a 7 Month Old Child

Figure 2: Second Degree Superficial Scald Burn Of Foot In A 4 Year Old Child

Figure 3: Second Degree Superficial Scald Burn of Foot in a 4 Year Old Child

Figure 4: Second Degree Scald Burn of A Hand in a 1.5 Year Old Child

Figure 5:

Figure 6: Second Degree Deep Scald Burn Involving Chest in a 2 Year Old Child

Figure 7: Second Degree Deep Scald Burn in a 4.5 Years Old Child, Involving Perineum

Figure 8: Second Degree Deep Scald Burn Involving B/L Lower Limbs in a 3 Years Old Child

Figure 9: STSG of Raw Area Over Lower Limb Done in a 3 Years Old Child, Post-Scald Burn

Discussion

Scalds are the most common cause of burns in children as they are not aware of potential dangers of hot liquids and foods. Young children have thinner skin that burns more quickly than the adults. Most incidents of scald burns occur at home and are preventable.

Child safety measures and parental education are important measures for reducing mortality and morbidity due to scald. In our study, 50 cases of children sustaining scalds in pre-school age group were included. Maximum number of patients were in the age group of >1 year to 2 years and >2 years to 3 years which accounted for 30% each of all the patients. The average age of the patients was 2.4 years. Shah M et al., in their study observed that the risk for scald injuries was highest at 13 to 24 months of age as compared to older children[6]. Thompson R et al., in their study on burn prevention program concluded that 60% of Scalds occurred in children younger than 5 years of age[7]. In our study, the number of male patients accounted for 60% of all the cases, whereas females contributed to about 40% of all the cases. The male to female ratio was about 3:2. Male preponderance was observed in studies on Pediatric scalds conducted by Guzel A et al.,[8] and Bang RL et al.,[9].

In our study, 70% of the pre-school children sustaining scalds belonged to rural areas whereas 30% of them belonged to urban areas. Marashi SM et al., in their study noticed that among children admitted with scald injuries, the children from rural areas were hospitalized 1.4 times more often than urban children[10]. Rezapur-Shahkolai et al., in their study on burns among children under 5 years noted that the children living in rural areas were more susceptible to burns as compared to those living in urban areas[11].In our study, majority (32%) of the patients had illiterate parents. Our observation goes well with studies of Cox SG et al.,[12] and Aghaei A et al.,[13] who concluded that low educational status of parents was found among pediatric burn patients.

In our study, 62% of the patients were received in emergency within first 6 hours of sustaining injury and 38% of them reported after 6 hours. The median time interval was 3 hours. Sahu et al., in their study on scalds in preschool children observed that median interval between scald and reporting to casualty was 3 hours 30 minutes[14]. Mohammad M et al., reported that 51.3% of pediatric burn patients reported to the hospital after 24 hours whereas the rest reported between 6 to 24 hours of sustaining burns[15]. In our study, hot water was the most common cause of scalds among children (54%) followed by hot milk (36%), hot tea (08%) and hot dal (02%). Hot water was the commonest causative agent in studies undertaken by Kemp AM et al.,[16] and McGuire F et al.,[17].In our study, the %TBSA burn was calculated by using Lund and Browder chart. Majority of the patients (40%) had %TBSA burn between 10 to 20% with mean percentage burn area of 18% whereas only 14% of the patients had %TBSA burn of greater than 30%. Cronin KJ et al., found that mean body surface area involved among 336 pediatric patients of scalds was 16.36%[18]. Sinha S et al., found that the children sustaining scald burns had a mean Body surface area involvement of 14%[19]. In our study, most of the patients had an involvement of more than one body part at the same time and the most common part of the body involved was abdomen (Lower Trunk) (62%) followed by Lower Limbs (48%) in association with other parts of the body. Upper limb was the most common part of the body involved separately in 16% of the patients whereas face and feet were least commonly involved (02). Park JM et al., in their study on pediatric burns observed that upper limbs (43.7%) were most involved in scalds followed by

lower limbs (16.8%) [20]. Reig A et al., in epidemiological study of scalding in children noticed that upper limbs were most commonly injured (51.8%) followed by head and neck[21].

In our study, out of 50 patients, 35 (70%) had second degree superficial burns whereas 15 (30%) among them had second degree deep burns. Zhai H et al., in study on scalds in children concluded that the majority of children had second degree burns (88.54%)[22]. Rashid KJ et al., too noticed that majority of children(72.6%) had sustained second degree burns in their study[23].

In our study, out of 50 patients, 45 (90%) were managed conservatively with IV fluids, antibiotics, and antiseptic dressings, and 05 patients (10%) were surgically managed by Split-thickness skingraft of burn wounds. Bhatti DS et al., in their study on 52 pediatric burns patients concluded that majority of patients healed with conservative management and only 3 patients underwent split thickness skin grafting[24].

In our study, 50 out of 50 patients were discharged and no mortality was reported. Aghbenorku P in his retrospective study on pediatric burns found that scald was the commonest cause of burn injury among children and out of 197 patients in study, 42 patients (21.3%) expired[25].In our study, 47 (94%) out of 50 patients did not develop any complication whereas 2 (4%) patients developed hypertrophic scarring and 1 (2%) patient developed minor graft rejection.

Conclusion

Hot water scalds are the most common type of burn injuries among pre-school children. Management of scalds among pre-school children can be conservative in most of the cases whereas surgical modality in terms of STSG of the burn wounds is needed in some cases. The parental education plays an important role in the prevention of scalds. All the patients in our study were discharged after treatment and none had any significant complication during monthly follow up in out-patient consultancy. At the time of discharge, parents of the children were counseled about proper care of the children, nutrition and first aid.

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