Original Article

Burn Injuries

Pattern and Mortality of Burns Injuries in Children

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ABSTRACT

Objectives: To see the type of burns, pattern of burn injuries, burning agent, place of injury and total body surface area involved in children.

Study Design: Descriptive study

Place and Duration of Study: This study was carried out at Burn Unit, Social Security Hospital, Islamabad from January 2006 to March 2014.

Materials and Methods: Children below 16 years of age reporting to causality department with burns were included in the study.

Results: Among 112 patients, 17.85% and 16.96% were from 5 – 6 and 3 - 4 year of age respectively. Flame injuries were commonest (41.07%), followed by hot liquids (31.25%) and electric burns (16.07%). Majority (74.11%) of burn injuries sustained at home. 39.28% and 20.54% sustained less then 10% and 11-20% of burns respectively. Only 8.04% and 5.36% sustained burns between 21-30% and 31-40% respectively. No mortality was observed in patients having less than 40% of burns and 100% mortality among patients having more than 80% burns.

Conclusion: Burn injuries from hot liquid are common in less than 6 years of age and flame burns above 10 years of age while playing with burning shopping bags and working in kitchen. As most of these injuries are avoidable, intensive educational programmes are needed to increase public awareness regarding burn dangers and to teach them how to take proper preventive and safety measures at home.

Key Words: Burns, Children, Etiology, TBSA, Mortality

INTRODUCTION

Burns injury is a major public health problem and is associated with significantly high morbidity and mortality. Children are at high risk because of unawareness and inability to protect themselves. Burns injury in children causes life long imprints on the personality as a result of its sequelae.[1] These injuries represent an extremely stressful experience for both the burns victims and their families. Flame, scald and electric burns are common as a result of domestic and occupational accidents.[2,3] By adopting the proper precautions and safety measures these accidents are preventable in majority of cases. The effectiveness of initial resuscitation, infection control and adequate surgical treatment improves short and long term outcomes.[4] Burns injuries constitute a major concern in the paediatric age group with respect to morbidity and mortality particularly among children in developing countries. To reduce the economical burden of burns injuries, it is necessary to increase current efforts in the prevention of burns injuries.[5] The purpose of the study is to see the type of burns, pattern of burn injuries, burning agent, place of injury and total body surface area involved in children.

MATERIALS AND METHODS

This descriptive study conducted at Burn Unit Social Security Hospital, Islamabad from January 2006 to March 2014. Approval from ethical committee of the hospital was taken.

Social Security Hospital Islamabad is a tertiary care hospital having all necessary facilities for the treatment of burns. All patients with burns injuries less then 16 years of age were included in the study. Informed consent was taken from the parents of the children. All patients reporting to causality were evaluated carefully regarding cause of injury, place of injury, extent of involvement of area burnt and mortality of burn victims. All findings were recorded carefully on a separate Proforma and evaluated statistically at the end of the study by using EPI-6 software.

RESULTS

A total of 112 patients less then 16 years of age were included during the study period. Majority i.e. 20 (17.85) and 19 (16.96%) among them were between age of 5-6 year and 3-4 year respectively (Table-1). Flame injuries were the commonest (41.07%), followed by hot liquid and electric injuries 31.25% and 16.07% respectively. Majority of these injuries were sustained at home (74.11%), followed by outside home or in streets while playing (11.61%). Some 9.82% patients sustained injuries while working i.e. in hotels, shops etc and only 4.46% sustained these injuries during accidents (Table-2). Majority of the patients (39.28% and 20.54%) sustained less than 10% and 11-20% of burns respectively. Only 8.04% and5.36% sustained

burns between 21-30% and 31-40% respectively. More than 90% burns are only noticed in 1.78% of patients (Table-3). No mortality was observed in patients having less than 40% of burns and 100% mortality were noted among patients having more than 80% burns (Table-4).

Table No.1: Different types of burns in different age groups. N = 112

Age Group	Hot liquid	Flame	Chemical		Electric	Others	Total (%)
			Acid	Alkali			
1-2	8	1	-	-	1	-	10 (08.93)
3-4	8	6	-	2	3	-	19 (16.96)
5-6	7	8	-	1	4	-	20 (17.85)
7-8	3	6	-	1	2	-	12 (10.72)
9-10	2	3	-	-	2	2	9 (08.04)
11-12	3	9	-	2	2	-	16 (14.28)
13-14	3	8	1	1	3	1	17 (15.18)
15-16	1	5	1	-	1	1	9 (08.04%)
Total (%)	35 (31.25)	46 (41.07)	2 (01.78)	7 (6.25)	18 (16.07)	4 (03.57)	112

Table No.2: Different types of burns and Place of accident N = 112

	Hot liquid	Flame	Chemical		Electric	Others	Total (%)	Statistics (95% Confidence Limits
			Acid	Alkali				
Domestic	33	30	-	6	13	1	83 (74.11)	69. 35 to 78.92
Street / out side	-	10	-	-	3	-	13 (11.61)	9.23 to 13.41
Occupational	2	4	2	1	2	-	11 (09.82)	7.24 to 11.52
Accidents	-	2	-	-	-	3	5 (04.46)	2.72 to 5.60
Total (%)	35 (31.25)	46 (41.07)	2 (01.78)	7 (6.25)	18 (16.07)	4 (03.57)	112	(Analyzed by Software Epi6

Table No.3: Total body surface area involved in different age groups N = 112

	< 10	11-20	21 - 30	31 - 40	41 - 50	51 - 60	61 - 70	71 - 80	81 – 90	> 90	TOTAL (%)
1-2	6	3	1	-	-	-	-	-	-	-	10 (8.92)
3-4	9	6	2	1	1		-	-	-		19 (16.96)
5-6	8	3	2	1	1	2	1	1	1		20 (17.86)
7-8	5	4	1	-		1	-	1			12 (10.71)
9-10	4	2		1		1	1				9 (8.05)
11-12	4	2	1	1	2	1	1	2	1	1	16 (14.28)
13-14	5	1	1	1	1	2	1	2	2	1	17 (15.18)
15-16	3	2	1	1	1		-	-	1		9 (8.04)
Total (%)	44 (39.28)	23 (20.54)	9 (8.04)	6 (5.36)	6 (5.36)	7 (6.25)	4 (3.57)	6 (5.36)	5 (4.46)	2 (1.78)	112

Table No.4: Total body surface area and Mortality of burns in different age groups N = 112

Body Surface Area	Mortality (%)
0-40 (n = 82)	0 (0)
41-50 (n = 6)	1 (5.55)
51-60 (n = 7)	3 (16.67)
61-70 (n = 4)	2 (11.11)
71-80 (n = 6)	5 (27.78)
81-90 (n = 5)	5 (27.78)
91-100 (n =2)	2 (11.11)

DISCUSSION

Burns injuries are common among children.[1,2] Majority of children's burns injuries are accidental and domestic.[2,6] Incidence varies in different age groups. Incidence is comparatively higher between 1 to 5 years of age because children are more susceptible at this age due to unawareness, curious and active personality.[7] Al-Shehri from Saudi Arabia[3] observed that 54 % of burns victims are between 1 to 5 years of age. Similarly highest incidence below age of 5 years reported from Nigeria,[1] China[8] and Pakistan[9] in different studies. Study done at Singapore General Hospital,[10] Khyber teaching Hospital, Peshawar[11] and JPMC Karachi[12] reported highest incidence below 10 years of age. Similarly in our study highest (34.82%) is noticed in children from 3 to 6 year of age and then again increased frequency (29.46%) is noticed between 11 to 14 years of age. This is probably due to the fact the male children above 10 year of age are more involved in out door activities and female children work in kitchen.

Burns injuries are predominantly domestic in nature.[13] Domestic burns are commonest (86.5%) followed by outside while playing in public as reported by Xin et al.[8] Saleem and his colleagues reported that 89.89% of accidents occurred in home environment, kitchen is the most common place.[9] Similarly in our study domestic burns are common (74.11%), followed by street/ out door (11.61%) and occupational (09.82%). frequency of occupational burns is not reported in developed countries or among those where child labour is prohibited.

Scalds or hot liquids is the commonest cause of burn (51% to 67%) as reported in different international studies.[14,15,16,17] Similarly in Pakistan scalds/ hot liquid is the commonest cause of burns as reported from Karachi[9,12] and Peshawar.[11] In our study, overall flame burns are commonest (41.07%) followed by scalds or hot liquids burns [31.25%]. Majority of our patients with flame burns met this accident in streets commonly with burning shopping bags or at home while busy in cooking in kitchen. In our study prevalence of scalds is more common below 10 years of age which is also observed in other studies.[3,14,18] Whereas above 10 years of age flame burns are more common because majority of our girls help their mothers in kitchen during cooking or involved in independent cooking at home. Incidence of flame burns varies i.e. 26.8% from Nigeria, 27.6% from Saudi Arabia,[3] 28.4% from Israel[14] and 35.2% from Singapore.[10]

Electric burns are third most common cause (16.07%) in our patients. Electric burns are usually from domestic set up while handling the electronic equipment and playing with power plugs. Other causes of electric burns are accidental contact with non insulated wires on electric poles while playing at roof top and during kite flying. In literature, 5 % cases due to electrical burns reported by Al-Shehri[3] and 3% by Uba and his colleagues.[18] In our setup frequency is comparatively high probably due to non insulated wires on electric poles in our streets and lack of awareness and preventive education of children.

Chemical burns are uncommon as observed in our study. Among chemical burns alkali is more common cause of burns (6.25%) as compared to acid. Alkali burns are more commonly reported in literature as compared to acid burns. [2,3,19] Reason for this is probably due to the fact that alkalis are commonly used in domestic set up e.g. washing clothes and cleaning of different items. These products are usually found in home and children sustain burns while handling them in mistake for other liquids. In contrary from China, chemical burns are second commonest cause after scalding as reported by Xin et al.[8]

Burns due to explosives are uncommon as observed in our study and in literature. The most common cause of explosive burns is handling of marriage bombs and different explosives usually used during different religious and local festivals.

In our study majority of patients (59.81%) sustained less than 20% burns and only 1.78% children sustained more than 90% burns. Burns in children are usually less severe because they are commonly inflicted in domestic setup and in restricted environments.[20] In Israel 94% children develop less than 20% burns.[14] Where as another study from National Institute of Child Health, Karachi Pakistan shows that 62% of cases Total Body Surface Area burnt was less than 30%.[9] Same observation was made by Xin et al[8] and Al- Shehri.[3]

Overall 16.70% mortality is noticed in our study and majority among them having more than 70% of burns. Mortality is almost 100% among patients having more than 80% burns. Commonest cause of mortality is sepsis in our patients. Mortality among our patients is quite high as compared to international literature. Studies shows 0.7% mortality from Israel,[14] 1.15% from China[4] and 4.61% from Singapore.[10] This high mortality is due to inadequate health resources especially lack of specialized burns units and staff even at tertiary level hospitals in our setup.

CONCLUSION

It is concluded that burns injuries from hot liquids are

common in less than 6 year of age. In children above 10 year of age flame burns are common while playing outdoor especially with burning shopping bags and while working in kitchen. As most of these injuries are avoidable so intensive educational programmes are needed to increase public awareness regarding nature and danger of burns. It is also important to teach the children and parents how to take proper preventive and safety measures at home and while playing outdoor..

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