

# BURNED CHILDREN PAY A COSTLY PRICE FOR CARELESSNESS AND WRONG BEHAVIOURS

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**SUMMARY.** Burns are among the most devastating injuries of all and they are responsible for higher hospitalization, morbidity, and mortality rates than other injuries in children. In addition, the management of burns and their sequelae is extremely expensive. Carelessness and wrong behaviours are the main players in burn injuries, especially in children, independently of their socioeconomic level. These burned children pay a costly price. The purpose of this study is to analyse the mechanisms of burn injuries in children in order to highlight the importance of behavioural changes for the reduction of burn injuries in children.

**Keywords:** burns, children, evaluation, prevention

## Introduction

Burns are responsible for significant mortality and morbidity worldwide and are among the most devastating of all injuries, with outcomes spanning the spectrum from physical impairments and disabilities to emotional and mental consequences.<sup>1</sup> The incidence of burns is much higher in low and middle income countries owing to several so-

cioeconomic factors such as poverty, substandard living conditions, overcrowding and illiteracy.<sup>2,3</sup> Our locality is at high risk of burn injuries because it is a low income country. Children are more at risk than adults owing to their lack of experience, impulsiveness and curiosity.<sup>4</sup> The best treatment for burn cases is prevention, which requires adequate knowledge of epidemiological characteristics and associated risk factors.<sup>4</sup> Prevention must include both active and passive components - active components are modifications in the design and safety of equipment and materials, while passive components relate to education and information.

The main objective of this study is to analyse the mechanisms of burn injuries in children, our goal being to highlight the importance of behavioural changes in their possible reduction. The pre-school group showed a higher burn accident rate than the other age groups (*Table I*).

No significant difference in TBSA was recorded between urban and rural patients (*Table II*).

**Table I** - Age, sex, and location

Group	No. cases	Sex		Locality	
		Males	Females	Urban	Rural
Infant	33	20	13	16	17
Pre-school	118	65	53	47	71
Primary school	39	21	18	15	24
Secondary school	42	28	14	13	29
Total	232	134	98	91	141

**Table II** - TBSA in urban areas, rural area and both

Group	Urban		Rural		Both	
	No. cases	Mean TBSA (%)	No. cases	Mean TBSA (%)	No. cases	Mean TBSA (%)
Infant	16	15.3	17	14.7	33	14.97
Pre-school	47	18.2	71	18.9	118	18.64
Primary school	15	18.4	24	19.5	39	19.10
Secondary school	13	17.9	29	17.55	42	17.67

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Flame thermal injury was the second most frequent cause of burn trauma (24.57%). Other causes of burn injuries were contact (11.21%), and electricity (5.6%).

Chemical burns represented the lowest percentage of cases (3%).

In the primary school group, scald and flame injuries were, relatively speaking, equally involved, while in the secondary school group, flame injuries were the most common cause of burn injury (Table III). All injuries were accidental: no case of child abuse was reported in any group.

**Table III - Aetiology**

Aetiology of burns	Infant	Pre-school	Primary school	Secondary school	Total
Scald	27	73	16	13	129
Flame	2	17	14	24	57
Contact	2	16	5	3	26
Chemical	2	3	1	1	7
Electric	-	9	3	1	13
Total	33	118	39	42	232

In the injuries group, bathing in scalding water, cooking, washing clothes (34.1%), and hot food (31.8%) were the most common causes. Hot drinks and hot oil accounted respectively for 20.9% and 13.2% of cases (Table IV).

**Table IV - Causes of contact injuries**

		Infant	Pre-school	Primary school	Secondary school	Total
Contact	Hot plate	1	4	1	1	7
	Iron	-	4	2	-	6
	Stove	-	2	3	-	5
	Oven	-	2	-	-	2
	Electric kettle	-	2	1	-	3
	Total	1	14	7	1	23

Flame injuries were mostly related to kerosene (38.6%) and gasoline cylinder (28.1%) explosions. Other causes, especially in the primary and secondary school groups, included children playing with matches, lighters, fireworks, and explosives (Table V).

**Table V - Causes of flame injuries**

		Infant	Pre-school	Primary school	Secondary school	Total
Flame	Primus stove	-	10	5	7	22
	Gasoline cylinder	2	6	3	5	16
	Matches	-	-	2	3	5
	Lighters	-	-	-	2	2
	Fireworks	-	1	4	7	12
	Total	2	17	14	24	57

Contact injuries in children were caused by contact with hot objects, such as hot plates, irons, stoves, ovens, heaters, electric kettles. The pre-school group was the most affected (57.7%), followed by the primary school group (34.6%) (Table VI).

**Table VI - Causes of contact injuries**

		Infant	Pre-school	Primary school	Secondary school	Total
Contact	Hot plate	1	4	1	1	7
	Iron	-	4	2	-	6
	Stove	-	2	3	-	5
	Oven	-	2	-	-	2

Electrical burn injuries were caused by contact with electric current when children play with electric sockets and exposed wires or insert a piece of metal into the socket, while chemical burn injuries were mainly due to the use of household cleaners (Table VII).

**Table VII - Causes of electrical and chemical injuries**

	Infant	Pre-school	Primary school	Secondary school	Total
Electric	-	9	3	1	13
Chemical	1	3	2	1	7

Most burn accidents occurred in the home (90.9%), while outdoor burn injuries were mainly associated with flame injuries (9.05%). The kitchen was identified as the commonest place (41.81%), followed by the bathroom (19.40%), dining room (14.66%), and living room (14.22%) (Table VIII).

**Table VIII - Place of burn injuries**

Place	Infant	Pre-school	Primary school	Secondary school	Total
Kitchen	13	53	13	18	97
Dining room	7	22	4	1	34
Living room	8	11	9	5	33
Bathroom	3	21	6	15	45
Bedroom	2	-	-	-	2
Outdoor	-	11	7	3	21
Total	33	118	39	42	232

Burn injuries fluctuated throughout the year, but there was a significant increase in winter (Jan., Feb.), the summer vacation period, and in periods of Islamic festivities (Ramadan, Aid Al-Fetr, and Aid Al-Adha) (Fig. 1).

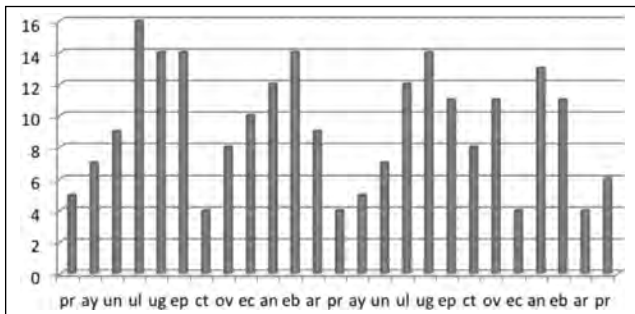


Fig. 1 - Seasonal fluctuation of burn injuries.

The majority of burned children (76%) were given improper treatments in the form of ice, toothpaste, oil, egg, etc. The remaining percentages were under water treatment (10%) and no First Aid treatment (14%) (Fig. 2).

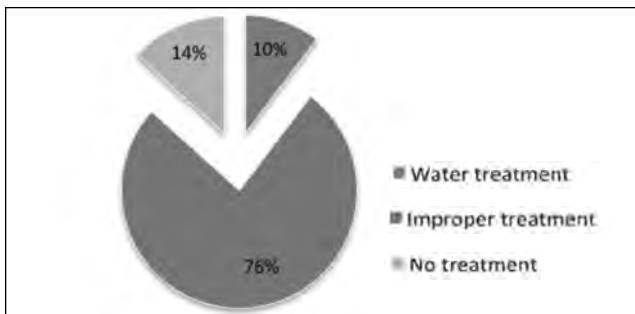


Fig. 2 - Patients receiving First Aid treatment.

### Discussion

Severe burns in children can result in prolonged suffering, disability, disfigurement, and impaired physical and mental development. Hospitalization rates of children with burns are much higher than for children with other traumas.<sup>5</sup> In recent years, several prevention programmes have been implemented,<sup>1</sup> mostly focusing on active prevention, e.g., the education of children and of their mothers.<sup>6</sup> However, although education may help raise awareness, it does not automatically lead to a change in behaviour.<sup>7</sup> Our results show that the negligence and general carelessness of parents, relatives, and children are key factors in paediatric burn injuries.

This study concludes that the pre-school group presented the highest rate of burn injuries. Children in this group were more exposed to environmental risk factors but were unaware of the dangers. The leading cause of burn injuries in this research was scalding, most commonly due to hot water. The mechanisms included children tipping over a container filled with hot water for showering or washing the clothes, and using hot water from taps with faulty valves

or not carefully checked for temperature. In one case, two children were left alone in a bathtub together, and one of them played around with the hot water tap.

Hot food and hot drinks are a very common source of burn injuries in children, especially in the pre-school group. These occur when adults are holding children while cooking or drinking a hot beverage, or when children knock over mugs, cups, or kettles containing hot liquid, or when unsupervised youngsters are allowed to help themselves to hot drinks or hot food.

Flame injuries are the second commonest type of burn injury in general and the commonest type in the secondary school group. The mechanisms include playing with matches, lighters and fireworks, careless cigarette lighting and handling, and unsafe gasoline storage, leading to clothing catching fire. An additional cause is the use of the kerosene primus stoves, a widespread domestic stove, used especially in rural and suburban areas.

Contact injuries are another frequent type of burn in children observed in this study. The main cause is touching hot objects, such as hot plates, irons, stoves, etc... without due caution. In this type of burn trauma, the hand is the most common site of injury and the burned surface area is relatively small.

The mechanism of electric burn injuries is that of children playing without supervision and inserting the wires of various devices, or a piece of metal, into electric sockets. As to chemical burn injuries, they are caused mainly by leaving household cleaning products within children's reach. This type of burn trauma mostly occurs in kitchens and bathrooms, where they are typically stored, and it is more common in rural and suburban areas.

The kitchen is the most dangerous place for burn injuries to occur when children play freely and unsupervised while adults are cooking, especially when mothers hold their children in their arms whilst cooking.

The bathroom is the second commonest place for burn injuries, due to children staying with their mother or carer while she is preparing or transporting hot water for bathing or washing clothes.

A significant increase in burns is registered in winter due to the use of gas and kerosene as fuel for heating - especially in rural and suburban areas - and to the increase in hot drinks consumption. During the summer holidays children play with fireworks, or stay with their mothers when they are cooking, or try to make a hot drink and food for themselves. Islamic holidays also show a rising peak in burns due to the Arab tradition of having a very long breakfast for the feast of Ramadan with families and neighbours with increasing time spent by children playing with fireworks. The majority of burned children we observed either received improper initial treatments or no treatment at all. This resulted in higher morbidity, which is why we focus on and stress the importance of First Aid

education on burns for all school children and community members.

This study has shown that the main reason for burn injuries is the wrong behaviour by parents and their children's, e.g., leaving children free and unsupervised in dangerous areas, such as the kitchen, while someone is cooking, and the bathroom, while someone is preparing or transporting hot water; leaving dangerous chemicals within the reach of children, playing with children while holding the hot drinks, leaving children unsupervised and free to play with matches, lighters, fireworks, carelessness and lack of safety measures when changing gas cylinders and when using kerosene primus stoves. Experience is lacking as to the raising of parental awareness of their child's safety. Indeed, children's behavior is appropriate for their age and it changes very fast. The adoption of safety measures is up to adults. Children's developmental changes and their varying behaviour must be prepared for and corrected in time to prevent accidents.

Our observations suggest that changing behaviour patterns and careful supervising of children are effective methods to prevent the majority of paediatric burns.

The following are our recommendations to all parents and future parents;

1. Never cook, drink hot liquids, eat hot food or carry hot objects while holding a child.
2. Never put hot food and hot liquids on the edge of the table.
3. Never leave two unsupervised children together in the bath-tub.

4. Always test water temperature before giving your child a bath.
5. See your kitchen as an operating room: close the door when cooking and keep your children away.
6. Never light a match in a dark kitchen.
7. Keep wires of appliances and devices out of reach of your children by hanging the devices up.
8. Place plastic plugs in sockets to prevent children from inserting any object.
9. Don't leave any device connected to the socket when it is no longer in use.
10. Never leave electric wires bare or uninsulated.
11. Never let your children play with electric connections.
12. Keep your children away while preparing hot water for bathing or washing the clothes.
13. Avoid using bad quality equipment: check valves and water heaters.
14. Keep matches, lighters, fireworks and house cleaning products out of your children's reach.
15. Don't leave the iron within the reach of your children during or immediately after use.

On the basis of our results, we conclude that if we succeed in raising awareness and change the wrong behaviour of parents and children by means of education and prevention programmes, the number of accidental burns will be reduced. Moreover, the use of water treatment as a First Aid measure and an immediate examination by a specialist physician in burns will result in the reduction of burns, total morbidity, and mortality in the paediatric population.

**RÉSUMÉ.** En âge pédiatrique, les lésions provoquées par les brûlures se classifient parmi les lésions les plus dévastatrices, responsables - indépendamment des facteurs socioéconomiques - d'un taux d'hospitalisation, de morbidité et de mortalité plus élevé des autres pathologies. La gestion des brûlures et de leurs séquelles est extrêmement coûteuse. Les brûlures en âge pédiatrique se produisent principalement à cause de comportements négligents et erronés. Les enfants brûlés paient un prix trop élevé. Nous voulons analyser le mécanisme des brûlures chez les enfants dans le but de mettre en évidence l'importance de réaliser des changements de comportement afin de réduire le fléau des brûlures en âge pédiatrique.

**Mots-clés:** brûlures, enfants, évaluation, prévention

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