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RISK FACTORS OF PAEDIATRIC BURNS IN BURN SURGERY UNIT OF MAYO HOSPITAL

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Abstract:
Risk factors for paediatric burns in Paediatric Burn Unit of Mayo Hospital, Lahore. ***Background:*** *Burns are the most common traumatic injury in children and can have strong implications and cause severe injuries in the child, the immediate effect of which is severe pain, cosmetic and physical disfigurement, impairment and necessity of surgical procedures.* ***Objectives:*** *To determine the risk factors for burns in the paediatric population.* ***Study Design:*** *Case-control study.*
Study setting: *Paediatric burn surgery unit, Mayo Hospital, Lahore.*
Study Duration: *3 months.* ***Materials and Methods:*** *A Case-control study was undertaken with a total of 80 subjects (40 cases, 40 controls. Sampling was done by purposive method. Data was collected with the help of a standard questionnaire containing information regarding the social and economic settings of the patient and their family relationships, after taking due informed consent. Data was analyzed by using SPSS version 20.0. Univariate frequency and percentage analysis was performed, and various tests of significance computed.*
Results: *Among children suffering from burns (n=40), majority of them were males (52.5%) and of age group 2 to 5 years (35.0%). Most of the burns occurred inside the kitchen (47.5%) and flame burns were the most common (50.0%). After describing the demographic characteristics using frequency tables, multivariate logistic regression analysis was applied.*
Conclusions: *Paediatric burns were found to be significantly associated with the age of the child below 5 years, occurrence in the kitchen, lack of knowledge about proper handling of hot liquids, easy accessibility to electrical appliances, lack of a system of earthing in the house and presence of high--tension wires near it, easy availability of strong chemicals, frequent fireworks, using wood as fuel for cooking, a joint family system, low monthly income and lack of education of parents.*
Key Words: *Burns, paediatric, electrical, flame, chemical, fireworks, abuse, sibling jealousy, socioeconomic factors, housing, working mothers, child labour.*

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INTRODUCTION:

A burn is a type of injury to flesh or skin caused by heat, electricity, chemical, friction or radiation.[1] Burns that affect only the superficial skin are known as superficial or first-degree burns. When damage penetrates into some of the underlying layers, it is a partial-thickness or second-degree burn. In a full-thickness or third-degree burn, the injury extends to all layers of the skin. A fourth-degree burn additionally involves injury to deeper tissues, such as muscle or bone. The characteristics of a burn depend upon its depth and size as well as area of body that is burned. Children with burns covering <10% of the Total Body Surface Area had a shorter mean hospitalization period of 16 days. As reported elsewhere, these minor burns resulted in low mortality.[2, 3, 4] For severe burns affecting a Total Body Surface Area ≥ 50%, the mean hospitalization period was 91 days.

Burn injuries are the 11th leading cause of death in children aged 1–9 years and are also the fifth most common cause of non-fatal childhood injuries. Approximately 90 percent of burns occur in low to middle income countries, regions that generally lack the necessary infrastructure to reduce the incidence and severity of burn injuries.[5,6] Globally, the majority of children burnt are boys with a ratio of around 2:1 to girls[30, 31, 32] and the mortality rate of males is greater than females.[32] Burns are caused by a variety of external sources classified as thermal (heat-related), chemical, electrical, and radiational.[35] In the United States, the most common causes of burns are: fire or flame (44%), scalds (33%), hot objects (9%), electricity (4%), and chemicals (3%).[8] Most burn injuries occur at home (69%) or at work (9%) and most are accidental, with 2% due to assault by another, and 1-2% resulting from a suicide attempt.

The risk factors include high population density, crowding of household appliances and psychological stress. Children from low income homes have 8x greater risk of sustaining burns than those from higher income homes(37). Different cooking practices also increase the risk of getting burnt. About 2 billion people worldwide cook with open flames or unsafe traditional stoves.[37] Most regions report scalds as major burn injury(34). Most burns were due to scalding by hot water, tea, coffee or soup, as has been reported elsewhere [9,10]. There was an increasing trend in scalds from electric kettles, devices which were unknown in the 1980s. In 1993, no case was recorded, but in 2000, there were 22 cases[10,11]. Home steam inhalation therapy for respiratory infections using a saucepan was hazardous, especially for infants, who were prone to scalding because of the difficulty of keeping them still. Overall, 24 scalds could have been averted by using vaporizers [12]. Other burn hazards that were not addressed are hot milk and baby-walkers. Electrical burns occur in young children exposed to electrical cords,plugs,outlets and poorly maintained electrical devices Presence of parental factors such as physical illness, substance abuse, psychiatric illness, behavioural problems and inadequate social support are also risk factors related to pediatric burns. Burns cause severe injuries in children(35). Immediate effect is severe pain, cosmetic and physical disfigurement, impairment and surgical procedures are to be done. Children <5 years old are at greatest risk(38). In Ghana, 6.1% prevalence in children 0-5 yrs. In India, children 0-5 yr account for 50% of all children burns. Incidence can vary greatly by race and ethnicity even within a region.

Males and children aged less than 5 years of age were at the highest risk of injury, with children aged 1 to 5 years at the highest risk of death. Scalds represented the major etiological factor contributing to thermal burns. Some studies have also reported a higher female mortality but in other studies, no significant difference was found Children aged 48 months and younger do not tolerate large thermal injuries as well as adults. Therefore children younger than 48 months with burns more than 30% of the body surface have a higher rate of mortality than adults with identical injuries.[19,20].

MATERIALS AND METHODS

STUDY DESIGN: Case--control study

SETTING: Burn Unit, Paediatric Surgery Ward, Lahore.

DURATION OF STUDY: April 2015 to June 2015

SAMPLE SIZE: 80 (40 cases, 40 controls)

SAMPLING TECHNIQUE: Simple random sampling.

SAMPLE SELECTION:

Inclusion Criteria:

Cases: Individuals having burns according to operational definition.

Control: Healthy individuals (Not having burns)

Exclusion Criteria: Individuals who will not give the consent.

DATA COLLECTION PROCEDURE: All the burn patients presenting to the Burn Unit of Paediatric Surgery Ward between April 2015 to June 2015 are included to be a part of the study. The degree of burn noted on the patient file is noted, and a questionnaire which includes clinical and demographic information like age, sex and address of the patient and the different variables involved is filled by one of the team members .

DATA ANALYSIS PROCEDURE: Statistical analysis is done using IBM SPSS 22.0 (Statistical Package for Social Sciences). Relation of various risk factors associated with paediatric burns is analysed and plotted as graphs and tables.

RESULTS:

Among children suffering from burns (n=40), majority of them were males (52.5%) and of age group 2 to 5 years (35.0%). They mostly occurred inside the kitchen (47.5%) and flame burns were the most common (50.0%), resulting in second-degree burns (57.5%). After describing the demographic characteristics using frequency tables, multivariate logistic regression analysis was applied.

UNIVARIATE FREQUENCY AND PERCENTAGE

ANALYSIS

VARIABLE	FREQUENCY	PERCENTAGE
Did the patient get a burn?		
No	40	50.0
Yes	40	50.0
Age of patient?		
0 to 2 years	9	11.2
2 to 5 years	25	31.2
5 to 8 years	20	25.0
8 to 10 years	9	11.2
10 to 15 years	17	21.2
Sex of patient?		
Male	44	55.0
Female	36	45.0
Degree of burn?		
No burn	40	50.0
First degree burn	8	10.0
Second degree burn	23	28.8
Third degree burn	7	8.8
Fourth degree burn	2	2.5
Address?		
Bahawalnagar	1	1.2
Bhakkar	1	1.2
Chakwal	1	1.2
Gujranwala	10	12.4
Gujrat	1	1.2
Hafizabad	2	2.5
Jhang	1	1.2
Jhelum	1	1.2
Kasur	1	1.2
Lahore	33	41.2
Mirpur	1	1.2
Multan	1	1.2

Muzaffargarh	1	1.2
Nankana Sahib	5	6.2
Narowal	3	3.8
Nasirpur	1	1.2
Okara	2	2.5
Sahiwal	5	6.2
Sargodha	1	1.2
Sheikhupura	4	5.0
Sialkot	4	5.0
Nature of burn?		
Not applicable	40	50.0
Accidental	40	50.0
Non-accidental	0	0.0
Where did the burn occur?		
Not applicable	40	50.0
In the kitchen	19	23.8
Outside the kitchen	12	15.0
Outside the house	9	11.2
Etiology?		
Not applicable	40	50.0
Scalds	16	20.0
Electrical	4	5.0
Flame	20	25.0
Chemical	0	0.0
Scalds were caused by?		
Not applicable	63	78.8
Hot milk	7	8.8
Hot water	2	2.5
Soup	1	1.2
Oil	7	8.8
Does the child have knowledge about the hazards of		
careless handling of hot liquids?		
No	30	37.5
Yes	50	62.5
Does the child have accessibility to electrical appliances?		
No	51	63.8
Yes	29	36.2

No	47	58.8
Yes	33	41.2
What is the height of switchboards at home?		
Low	30	37.5
High	50	62.5
Are they any high-tension wires passing near the house?		
No	46	57.5
Yes	34	42.5
Does the child have exposure to strong acid/base?		
No	65	81.2
Yes	15	18.8
Is strong acid/base easily available from nearby?		
No	45	56.2
Yes	35	43.8
Are there frequent fireworks around the house?		
No	48	60.0
Yes	32	40.0
Do you use wood as fuel for cooking at home?		
No	62	77.5
Yes	18	22.5
Are there any smokers in the house?		
No	52	65.0
Yes	28	35.0
What is the birth number of the child?		
Eldest	31	38.8
Middle	25	31.2
Youngest	24	30.0
Is there any history of abuse (physical, mental or sexual) to the child?		
No	71	88.8
Yes	9	11.2
Is there any evidence of jealousy among siblings?		
No	67	83.8

Yes	13	16.2
Is there any history of psychological disease in the family?		
No	78	97.5
Yes	2	2.5
Number of family members?		
less than 5	14	17.5
5 to 10	49	61.2
10 to 12	6	7.5
more than 12	11	13.8
Family system?		
Joint	50	62.5
Nuclear	30	37.5
Monthly family income?		
less than Rs. 5,000	8	10.0
Rs. 5,000 to Rs. 10,000	22	27.5
Rs. 10,000 to Rs. 15,000	25	31.2
more than Rs. 15,000	25	31.2
Is the father educated?		
No	32	40.0
Primary	5	6.2
Middle	7	8.8
High	29	36.2
Undergraduate	2	2.5
Graduate	5	6.2
What is the education of the mother?		
No	31	38.8
Primary	8	10.0
Middle	12	15.0
High	21	26.2
Undergraduate	8	10.0
Graduate	0	0.0

Does the family face any problem in moving around the		
house?		
No	53	66.2
Yes	27	33.8
What is the type of dwelling?		
Brick and concrete	72	90.0
Traditional mud	7	8.8
Wood	1	1.2
Is the house equipped with basic facilities (electricity, gas, sanitation)?		
No	20	25.0
Yes	60	75.0
Is there a separate kitchen for the family?		
No	32	40.0
Yes	48	60.0
Is the mother a working woman?		
No	55	68.8
Yes	25	31.2
How is the child's behaviour compared to other children?		
Active	44	55.0
Shy	36	45.0
Is the child employed?		
No	80	100.0
Yes	0	0.0
Does the child have a twin sibling?		
No	78	97.5
Yes	2	2.5
Does the child have a caretaker (hired or otherwise)?		
No	68	85.0
Yes	12	15.0

Is anyone in the family addicted to drugs?		
No	73	91.2
Yes	7	8.8
Is there any family member suffering from a chronic illness?		
No	56	70.0
Yes	24	30.0

DISCUSSION:

Paediatric burns are a common occurrence in our society and have multiple determinants associated with them, which vary from age to age and from place to place. Burn injuries are the 11th leading cause of death in children aged 1–9 years and the fifth most common cause of non-fatal childhood injuries.[5] This study analyses the effects of apparent risk factors on the presentation of burns in children upto 15 years. 38 variables were studied, which were previously established to be associated with burns in children in studies. The results indicate that flame burns are the most common etiological factor, making up 50.0% of the cases. This was supported by the data from the National Burn Repository of the United States of America which shows flame burns to have an incidence of 40.0%.[8] Au contraire, the results obtained by McLoughlin and McGuire found scalds to have the majority representation.[34] Similar results were found in a study in Australia.[23]

35.0% of the cases belonged to the age group of 2 to 5 years, which was a significant association, in accordance with a study conducted in India, which showed 50.0% of the children to be aged below 5 years.[38] Second degree burns were found to be the most common consequence (57.5%), an effect which was not previously researched. 100.0% of the case in the study were accidental in nature. This low incidence was supported by a study conducted in America, where most of the burns were accidental, with 2% as a result of assault by another.[7]

A significant number of the burns occurred in the kitchen (47.5%). A similar result was obtained in a survey by the University of California in San Francisco, which concluded that different cooking practices increase the risk of getting burnt; about 2 billion people worldwide cook on open flames or unsafe traditional stoves, a dangerous practice.[37] According to Den Hertogg and Blankendaal, most burns are due to scalding hot water, milk or soup[9]] Ytterstaad, Smith and Coggan reported a relationship between the increased incidence of scalds and an increased use of electric kettles[10] and Ebrahim, Bang and Lari declared that home steam inhalation therapy for respiratory infections through a pot of boiling water was hazardous, especially for infants, who were prone to scalding due to difficulty in sitting still, and a generous amount of scalds could have been prevented by using nebulisers.[12] Other burn hazards that were not previously addressed were included in this study such as hot milk (17.5%) and cooking oil (17.5%). Knowledge of hazards of careless handling of hot liquids was an important predisposing factor with 67.5% of the children in control group having sound understanding. 45% of the children suffering from burns had easy accessibility to electrical appliances as compared to only 27.5% of the controls. 57.5% did not have a proper earthing system at home and 52.5% had high-tension electrical wires passing near their house. These are important predisposing factors according to Hernon D, who describes the most common cause of electrical burns in children to be electrical cords (60.0%) followed by power outlets (16%).[23]

45.0% of the children lived in areas where strong acids and bases were easily available and as described by Hunter and Hardwicke, such chemicals cause 2-11% of all burns and are responsible for as many as 30% of all burn-related deaths.[24] In the control group, 37.5% of the children lived in households where fireworks were a frequent occurrence, as against 42.5% children from the case group. Wood was used as fuel for cooking in 15.0% of the control group households; on the other hand, twice the number (30.0%) of children suffering from burns had the same, which is an established risk factor.[37]

In 22.5% of the cases, a smoker was present in the household. 40.0% of the burns occurred in the eldest child, the incidence decreasing down the birth number with 37.5% and 22.5% of the burns in the middle and

youngest child, respectively. The research by Peck MD suggests that 3-10% burns are caused by assault, whose reasons may include physical, mental and sexual abuse.[28] However, in our study 95.0% of the burn patients did not have any such history. A similar result was found for a feeling of jealousy among siblings, with 85.0% of the cases answering in negative. The incidence of paediatric burns varies with geographic location, socioeconomic status and ethnicity. 90% of all burns usually occur in low and middle income countries, according to McKay and Rastegar, with the highest frequency in South-east Asia and Africa (more than 96,000 hospitalisations/year).[36] In rural Nepal, they account for 3% of all childhood disabilities. The risk factors include high population density, and children from low income homes have an eight times greater risk of experiencing burns than those from higher-income households.[37] Most of the burns (70.0%) occurred in houses where 5 to 10 members lived, and a joint family system had a much greater predisposition (65.0%) than nuclear (35.0%). They were more common in households with a monthly income between Rs. 5,000 to Rs. 10,000 (35.0%).

Parental unawareness is an important risk factor, as 40.0% and 35.0% of all burns occurred in homes where the father and mother were uneducated, respectively. 95% of the cases did not have a caretaker to look after them, which significantly increased the incidence of accidental burns. Other factors like experiencing the type of dwelling and experiencing problems with it, the presence of basic facilities of electricity, gas and sanitation and a separate kitchen, increased activity and shyness of the subject as compared to other children, and having a twin sibling and a working mother, did not show significant association with burns in children.

CONCLUSION:

Paediatric burns were found to be significantly associated with the age of the child below 5 years, occurrence in the kitchen, lack of knowledge about proper handling of hot liquids, easy accessibility to electrical appliances, lack of a system of earthing in the house and presence of high-tension wires near it, easy availability of strong chemicals, frequent fireworks, using wood as fuel for cooking, a joint family system, low monthly income and lack of education of parents.

REFERENCES:

1. Herndon D. Chapter 4: Prevention of Burn Injuries. Total burn care, 4th ed. Edinburgh: Saunders; pp. 46.
2. Ryan CA, Shankowsky HA, Tredget EE. Profile of paediatric patient in a Canadian burn centre. Burns 1992; 18: 267-72.
3. Adamo C, Esposito G, Lissia M, Vonella M, Zagaria N, Scuderi N. Epidemiological data on burn injuries in Angola: a retrospective study of 7230 patients. Burns 1995; 21: 536-8.
4. Ho WS, Ying SY. An epidemiological study of 1063 hospitalized burn patients in a tertiary burns centre in Hong Kong. Burns 2001; 27: 119-23.
5. Granger J. An evidence-based approach to pediatric burns. Pediatric Emergency Medicine Practice 2009; 6(1).
6. Herndon D. Chapter 10: Evaluation of the burn wound: management decisions. (ed). Total burn care, 4th ed. Edinburgh: Saunders; pp. 127.
7. Rosdahl CB, Kowalski MT. Textbook of basic nursing, 9th ed. Philadelphia: Lippincott Williams & Wilkins; 2008; p.1109.
8. National Burn Repository; p. i
9. Den Hertog PC, Blankendaal FA, Ten Hag SM. Burn injuries in the Netherlands. Accid Anal Prev 2000; 32: 355-64
10. Ytterstad B, Smith GS, Coggan CA. Harstad injury prevention study: prevention of burns in young children by community based intervention. Inj Prev 1998; 4: 176-80.
11. Sheller JLP, Thuesen B. Scalds in children caused by water from electrical kettles: effect of prevention through information. Burns 1998; 24: 420-4.
12. Ebrahim MKH, Bang RL, Lari ARA. Scalds accidents during water aerosol inhalation in infants. Burns 1990; 16: 291-3.
13. Anlatici R, Ozerdem OR, Dalay C, Kesiktas E, Acarturk S, Seydaoglu G. A retrospective analysis of 1083 Turkish patients with serious burns, Part 2: burn care, survival and mortality. Burns 2002; 28: 239-243.
14. Barisoni D, Peci S, Governa M, Sanna A, Furlan S. Mortality rate and prognostic indices in 2615 burned patients. Burns 1990; 16: 373-376.
15. Germann G, Barthold U, Lefering R, Raff T, Hartmann B. The impact of risk factors and pre-existing conditions on the mortality of burn patients and the precision of predictive admission- scoring systems. Burns 1997; 23: 195-203.
16. Akerlund E, Fredrik RM, Huss R, Sjöberg F. Burns in Sweden: an analysis of 24,538 cases during the period 1987-2004. Burns 2007; 33: 31-36.
17. Babik J, Sopko K, Orsag J, Koller J. Epidemiology and therapeutic aspects of burn injuries in Slovakia (1993-2003). Acta Chir Plast 2006; 48: 39-42.
18. Benito-Ruiz J, Navarro-Monzonis A, Baena-Montilla P, Mirabet-Ippolito V. An analysis of burn

mortality: a report from a Spanish regional burn centre. Burns 1991; 17: 201-204.
19. Morrow SE, Smith DL, Cairns BA, Howell PD, Nakayama DK, Peterson HD. Etiology and outcome of pediatric burns. J Pediatr Surg 1996; 31: 329-333.
20. Sheridan RL. The seriously burned child: resuscitation through reintegration, 1.
Curr Probl Pediatr 1998; 28: 105-127.
21. Eisen S, Murphy C. Training in paediatrics : the essential curriculum. Oxford: Oxford University Press; 2009; p. 36
22. Tintinalli JE. Emergency Medicine: A Comprehensive Study Guide. New York: McGraw-Hill Companies; 2010; p. 1374-1386
23. Herndon D. Chapter 3: Epidemiological, demographic, and outcome characteristics of burn injury. Herndon D (ed). Total burn care, 4th ed. Edinburgh: Saunders; pp. 23.
24. Hardwicke J, Hunter T, Staruch R, Moiemen N. Chemical burns-an historical comparison and review of the literature. Burns May 2012; 38(3): 383-7.
25. Peden, M. World report on child injury prevention. WHO 2008; p. 86.
26. Peck, MD. Epidemiology of burns throughout the World. Part II: intentional burns in adults. Burns August 2012; 38 (5): p. 630–7.
27. Maguire S, Moynihan S, Mann M, Potokar T, Kemp AM. A systematic review of the features that indicate intentional scalds in children. Burns December 2008; 34 (8): p. 1072–81.29.
28. Garmel GM. An introduction to clinical emergency medicine , 2nd ed. Cambridge: Cambridge University Press; 2012.
29. Albertyn R, Bickler SW, Rode H. Pediatric burn injuries in Sub-Saharan Africa: A review. Burns 2006; 32: 605-612.
30. Dissanaike S, Rahimi M. Epidemiology of burn injuries: Highlighting cultural and socio-demographic aspects. Int Rev Psychiatry 2009; 21: 505-511.
31. Gokdemir MT, Aldemir M, Sogut O, Guloglu C, Sayhan MB, Orak M et al. Clinical outcome of patients with severe burns presenting to the Emergency Department. J Curr Surg 2012; 2: 17-23.
32. Health Insite. Scalds.
http://www.cyh.com/HealthTopics/HealthTopicDetails.aspx?p=114&np=305&id=1 501 (accessed 17 August 2010).
33. McLoughlin E, McGuire A: The causes, cost, and prevention of childhood burn injuries.
34. Steele BF, Pollock CB. A psychiatric study of parents who abuse infants and small children. Helfer RE, Kempe CH (eds). The Battered Child. Chicago: University of Chicago Press; 1968.
35. Alaghehbandan R, MacKay Rossignol A, Rastegar Lari A. Pediatric burn injuries in Tehran, Iran. Burns 2001; 27(2): p. 115-8.
36. Burd A, Yuen C: Global study of paediatric burn patients. Burns 2005, 31: p. 432-438.
37. Katrine L, Diana F, Christopher C, Stewart, MD. Pediatric burn injuries in the developing world. University of California, San Francisco Division of Pediatric Surgery and Department of Pediatrics: 2012; 11; pp 6-7.
38. Peck MD. Epidemiology of burns throughout the World. Burns 2012; 38: p. 630.
39. Gray, A. Definitions of crowding and the effect of crowding on health.