

## Assessment of risk factors of Cooking-related burn injury among children

Dr. Riyaben Chauhan<sup>1</sup>, Dr. C D Aundhakar<sup>2</sup>, Dr. Chandana Patil<sup>3</sup>

<sup>1</sup>Resident, Department of Pediatrics, Krishna Institute of Medical Sciences, Karad, Maharashtra, India.

<sup>2</sup>Professor, Department of Pediatrics, Krishna Institute of Medical Sciences, Karad, Maharashtra, India. (**Corresponding author**)

<sup>3</sup>Resident, Department of Pediatrics, Krishna Institute of Medical Sciences, Karad, Maharashtra, India.

### Abstract:

**Background:** To assess the risk predictors of cooking related burn injuries in children. **Materials & methods:** A sample size of 100 was decided. Incidence of burn injuries among these patients was evaluated. The children in the age group between 0-5 years were included. The complete data was collected. Risk factors of cooking related burn injuries was assessed. **Results:** A total of 100 subjects were enrolled. Children between 2 and 5 years were 3 times more likely to suffer burns in comparison with those below 1 year. Absence of separate kitchen in the house and lack of children supervision were also found to be risk factors associated with cooking burn injuries. **Conclusion:** The prevalence of burns among children under 5 years was high. Absence of separate kitchen in the house and lack of children supervision were also found to be risk factors associated with cooking burn injuries.

**Keywords:** Burns, children, Cooking

### Introduction:

Burns are a global public health problem, accounting for an estimated 180 000 deaths annually. The majority of these occur in low- and middle-income countries and almost two thirds occur in the WHO African and South-East Asia regions. <sup>1</sup> Over 1 million burns occur in the African Region (SSA) each year leading to significant morbidity and mortality. <sup>2</sup> Children who are below 4 years have disproportionately higher mortality compared to the other age groups. <sup>3,4</sup> Statistics on burns among under-fives in slums remain scanty, undocumented or unpublished. Without precise data on prevalence and associated factors, the design of home-based burn prevention interventions is greatly hampered. Although rarely fatal, 85% of burn injuries are due to scalds, and 95% of them occur within the home environment specifically the kitchen. <sup>5-7</sup> These burns leave long term consequences such as pain, disfigurement, emotional trauma, disability and in extreme cases death. In African region, burns account for a high proportion of injury deaths although its magnitude is hardly documented. <sup>8</sup>

Globally, burn injuries remain among the most prominent and preventable injuries in children. Childhood burns can have devastating physical, psychological and socioeconomic consequences. <sup>9</sup>

Cooking-related burns have emerged as a particularly damaging subset of childhood burns, representing up to an estimated 85% of childhood scalds, and these types of burns carry a greater patient injury burden and long-term morbidity than burns of other etiologies. <sup>10,11</sup> Young children and girls are more likely to experience paediatric burns. <sup>9,13</sup> Low socioeconomic status and its associated circumstances, such as lack of water supply and volatile cooking materials, are also reported to be key risk factors for childhood cooking burns. <sup>14,15</sup> Research on paediatric cooking burns has been largely restricted to local or national studies, limiting generalizability of conclusions, especially to global systemic factors underlying disparities in burn injuries. <sup>16</sup> Wide variability in research methods has made meaningful comparisons of clinical outcomes and risk factors between high- and low-income countries difficult. While rapid declines in mortality from childhood burns have been reported in high-income countries over the past decades, the same trend has not been documented in low- and middle-income countries. <sup>14</sup> Hence, this study was conducted to assess the risk predictors of cooking related burn injuries in children.

### Materials & methods:

The present study was conducted in the pediatric department with the aim of assessing the risk factors

associated with cooking related burn injuries in pediatric subjects. Ethical approval was obtained from institutional ethical committee. After adjusting the odd ratios and based on incidence of burn injuries among pediatric subjects, a sample size of 100 was decided. Incidence of burn injuries among these patients was evaluated. The children in the age group between 0-5 years were included. Risk factors were evaluated as complete history was taken under consideration. The complete data was collected. A Performa was made and detailed medical history along with personal history of all the patients was analyzed. The results were analyzed using SPSS software. P –value less than .05 was considered significant.

## Results:

A total of 100 subjects were enrolled. Children between 2 and 5 years were 3 times more likely to suffer burns in comparison with those below 1 year. Those from less poor wealth quintile had lower risk of experiencing burn injuries. In households where flammables were safely stored, the likelihood of under-five burns was lower by forty two percent. Absence of separate kitchen in the house and lack of children supervision were also found to be risk factors associated with cooking burn injuries.

**Table 1: Factors associated with burns among children.**

Variable		Cooking burn injury				p- value
		Yes		No		
		n	%	n	%	
Age (months)	0-20	3	10	40	57.2	0.002*
	21-40	15	50	22	31.4	
	41-60	12	40	8	11.4	
Gender of Caregivers	Male	2	6.6	16	22.8	0.03*
	Female	28	93.4	54	77.2	
Socio-economic status	Middle class	10	33.3	40	57.2	0.04*
	Lower middle class	10	33.3	20	21.5	
	Lower class	10	33.3	20	21.5	
Flammables safely stored	Yes	12	40	18	24	0.003*
	No	18	60	52	76	

\*: Significant

**Table 2: Other associated risk factors**

Variable		Cooking burn injury				p- value
		Yes		No		
		n	%	n	%	
Separate kitchen in house	Yes	21	70	26	37.14	0.001*
	No	9	30	44	62.86	

Lack of children supervision	Yes	18	60	31	44.29	0.012*
	No	12	40	39	55.71	

\*: Significant

## Discussion:

Homes are among the leading injury locations, with children living in informal settlements being at higher risk of burns. Infants are exposed to hazards which are often difficult to eliminate especially in informal settlements and are characterised by congestion and overcrowding.<sup>6,17</sup> Given the adventurous and inquisitive nature of children, the lack of designated safe play spaces further predisposes them to burn injuries. Hence, this study was conducted to assess the risk predictors of cooking related burn injuries in children.

In the present study, a total of 100 subjects were enrolled. Children between 2 and 5 years were 3 times more likely to suffer burns in comparison with those below 1 year. A study by Tusiime M et al, the prevalence of burns among under-fives was 32%, highest among those aged 24 to 35 months (39%), and least in those below 12 months (10%). Children with single parents (adj PR = 1.56 95% CI 1.07–2.29) and those from households in the middle and least poor wealth quintile (adj.PR = 1.72; 95% CI 1.02–2.89 and adj.PR = 1.77; 95% CI 1.02–3.05, respectively) were more likely to get burns compared to their counterparts in other quintiles. In households where flammables were safely stored, children were less likely to suffer from burn injuries (adj.PR = 0.61; 95% CI 0.44–0.83). Congestion, negligence of caregivers, and use of charcoal stoves/open cooking were the commonest determinants of burns. Although many caregivers offered first aid to burn patients, inadequate knowledge of proper care was noted. Crawling children were perceived as being at highest risk of burns.<sup>18</sup>

In the present study, those from less poor wealth quintile had lower risk of experiencing burn injuries. In households where flammables were safely stored, the likelihood of under-five burns was lower by 40%. A study by Dissanaike S et al, a total of 541 pediatric burn patients were admitted, of whom 123 had cooking-related injuries. Common substances involved included soup (27%), grease (26%), coffee (18%), beans (9%), and menudo (2.3%), a traditional Mexican soup based on tripe, hominy, and chile.

Children with cooking injuries were significantly younger than other groups, with a mean age of 2.7 years. The most common mechanism was the child pulling the substance down from a height, accounting for nearly half of all injuries. This resulted in a characteristic scald pattern involving a wide area across chest and shoulders narrowing to a point near the pelvis. The average burn area was 7%, associated with a hospital stay of 4 days and mortality below 1%.<sup>19</sup> Another study by Puthumana JS et al, of the 2957 paediatric patients with burn injuries, 974 involved cooking (32.9%). More burns occurred in boys (532 patients; 54.6%) than in girls, and in children 2 years and younger (489 patients; 50.2%). Accidental contact and liquefied petroleum caused most burn injuries (729 patients; 74.8% and 293 patients; 30.1%, respectively). Burn contact by explosions (odds ratio, OR: 2.8; 95% confidence interval, CI: 1.4–5.7) or fires in the cooking area (OR: 3.0; 95% CI: 1.3–6.8), as well as the cooking fuels wood (OR: 2.2; 95% CI: 1.3–3.4), kerosene (OR: 1.9; 95% CI: 1.0–3.6) or natural gas (OR: 1.5; 95% CI: 1.0–2.2) were associated with larger body surface area affected. Mortality was associated with explosions (OR: 7.5; 95% CI: 2.2–25.9) and fires in the cooking area (OR: 6.9; 95% CI: 1.9–25.7), charcoal (OR: 4.6; 95% CI: 2.0–10.5), kerosene (OR: 3.9; 95% CI: 1.4–10.8), natural gas (OR: 3.0; 95% CI: 1.5–6.1) or wood (OR: 2.8; 95% CI: 1.1–7.1).<sup>20</sup>

Absence of separate kitchen in the house and lack of children supervision were also found to be risk factors associated with cooking burn injuries. Adane MM et al, showed that the prevalence of cooking-related child burn injury was 6.2% (95% CI: 5.5–6.8). This burden was linked with risk factors such as lower literacy of caretaker, family size, using traditional cook stove, long cooking time, and presence of extra indoor burning events as well as lack of separate kitchen, child supervision, and injury prevention awareness.<sup>21</sup> Management of burns given the strong belief in the efficacy of traditional remedies among the key informants. Many acknowledged wide use of home remedies by slum dwellers with the belief that these can reduce burn severity, alleviate pain and prevent infection. Some studies have discussed the pros and cons of using traditional remedies in burn treatment but these

belief still exist worldwide.<sup>22,23</sup> These beliefs and myths may need to be demystified through community burn management education. Preventive measures specific to this context could include: community sensitization drives for burn injury prevention targeting single mothers, stay home mothers, house helpers and covering issues such as child supervision, safe storage practices for consumables, proper first aid and burn treatment, demystify myths and belief on burn management.

## Conclusion:

The prevalence of burns among children under 5 years was high, with several household hazards identified.

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