

Epidemiology of Pediatric Burn in a Tertiary Care Hospital of in a Northeastern State of India

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Abstract

Background: Burn injury is one of the biggest public health issue in terms of mortality, mor-bidity, and permanent incapacity. Pediatric burns have a long-run social impact. This impact is more distinguished within the north-eastern population of India, where their incidence and morbidity are high. The aim of this retrospective hospital based study was to produce a recent prospective to epidemiologic information on Pediatric burns in this region and to recommend future preventive methods. **Methods:** Children up to eighteen years age attending a State Medical facility at Dibrugarh between January 2018 and December 2020 were included in the study. Information relating to age, sex, etiology, total body area (TBSA), circumstances of injury, and clinical assessment were taken into thought and analyzed to confirm the predictors of outcome of the extent of Burns.

Results: There have been three hundred children included in the study. Age, variety of burns, mode of injury, presence or absence of inhalation injury, gender, and time of year for admission were found to have an effect on the outcome of the Burn concerned. Fidgeting with flammable substances and unattended fireworks was conjointly found to be major explanation for burns in Children. Electrical burns conjointly fashioned a vital range of presenting burn patients, chiefly involving teenagers. Contrary to different earlier analysis that steered by a high incidence of suicidal burns our study failed to find any incidence of suicidal burns in Children.

Conclusions: This study conjointly highlights many problems like overcrowding, lack of awareness, dangerous cookery practices, and improper use of fuel oil. Concerned authorities ought to acknowledge the issues, formulate methods, unfold awareness, and ban or replace unsafe substances answerable for most burn accidents.

Key words: Pediatric burns; North-east India; During COVID-19 pandemic.

Introduction

India is the second most thickly settled country with a population of over 1.35 billion. North-East India, comprising the seven states, includes a population of over 45 million, which is about 3.76% of India's population. The general density of population is 159 persons per sq. km. Assam, the principal state of the region, has a population density of 397 persons per sq. km. In distinction, the state of Arunachal Pradesh, occupying the foothills of the mountain chain, has a median density of 17 persons to a sq. km. The distribution of population is extremely irregular that reflects the sequent of occupancy, the agricultural potential of a state and therefore the ruggedness and accessibility of the parcel of land.

India has a calculated annual burn incidence of 6-7 million and therefore a calculated annual burn incidence 225000 is anticipated in north-east

India, of that no real knowledge is accessible. The aim of this retrospective hospital based study was to supply recent prospective epidemiological knowledge on Pediatric burns in north-east India and to recommend future preventive ways.

Supported by Data from the foremost hospitals in India, computed to the entire country, Burns remain the second largest cluster of injuries after Road Accidents within the pediatric age bracket.¹ The worldwide incidence of burn injuries (all ages) is 1.1 per 100,000, and it varies with geographic location, socio-economic standing, grouping, age and sex. Most burn injuries are minor and does not necessitate hospital admission.²

In developing countries, pediatric burns is reported to be the third most typical reason for death in youngsters aged between five and eighteen years. However, the worldwide incidence of hospitalized Pediatric burn patients is unknown. Although a little proportion of burn injuries is serious and meets the standards for admission to a burn unit, the care of those critically injured children needs a coordinated effort and experience to treat those patients with success and save and rehabilitate them.³

Epidemiological studies of burn injuries have highlighted risk factors that have led the institutions to device effective preventive programs. However, in pediatric burns, most of the injuries occur in accidental domestic circumstances that are grossly preventable. Therefore, it is vital to coach folks, create awareness to be responsive to the potential danger within the home ambiance and the way to stop common burn accidents.

Methods

Children up to eighteen years old attending a State Medical facility at Dibrugarh, Assam, India, between January 2018 and December 2020 were included in this retrospective hospital based study. American Burn Association criteria were followed for admission of patients. Extent of burns was assessed on admission with Laud and Browder chart. The kids were sorted according to age into 4 cluster viz. cluster one (0–4 years), cluster two (5–8 years) cluster three (9–12 years) and cluster four (13–18 years). The Data contained in patient hospital records, photographic records and discharge summaries like age, gender, etiology, mechanism of injury, extent of burns and outcomes

together with mortality was reviewed. Applied mathematics analysis of the collected data was done using Libre Office Calc.

Results

Out of a total of 1527 patients with burn injuries, there have been 300 patients included in the study who were children up to eighteen years of age attending the State Medical facility at Dibrugarh, between months of January 2018 and December 2020. 19.65 % of Burn patients were children below 18 years of age and is showing a gradual increasing trend with 15.25% in 2018, 23.73% in 2019, and 21.64% in 2020.

Gender Distribution of Admissions

Out of 300 Children involved in burn injuries, 129 (43%) were male and 179 (67%) were female. Female children had a little higher number of involvement in burn injuries.

Table 1 and Figure 1 depicts the distribution and gender percentage of the cases.

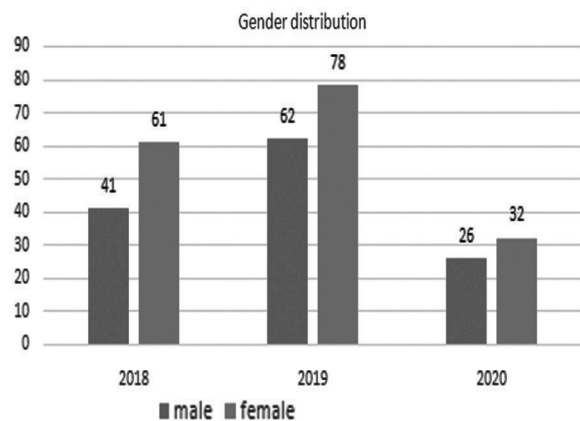


Fig. 1 Number and Gender distribution of cases over the years.

Table 1: Gender Distribution of Cases.

Year	Male	Female	Total
2018	41	61	102
2019	62	78	140
2020	26	32	58
Total	129 (43%)	171 (57%)	300

Monthly distribution of admissions

Studies on seasonal pattern showed that the highest admission was observed during winter season, and the patients admitted in between October to January were highest. The lowest average monthly

admission was observed in between May to July. Table 2 shows the month wise distribution of the cases Figure 2 depicts the trend.

Table 2: Month wise distribution of cases.

	2018	2019	2020	
January	10	19	9	38
February	6	9	7	22
March	12	6	6	24
April	7	12	3	22
May	6	5	3	14
June	7	6	4	17
July	14	10	2	26
August	9	12	4	25
September	6	12	2	20
October	8	22	4	34
November	5	13	5	23
December	12	14	9	35

Mortality

A Total 40 out of the 300 children admitted for burn injuries died making a mortality rate of 13.33%. Children had the least mortality for Burns of 1-10% TBSA and a 100% mortality for Burn injuries above 80% TBSA.

Children less than 4 years of age had the lowest mortality (3.42%) while children between 5 and 9 years had 4.41%, 10 to 15 years had 20.40%, and 16 to 18 years had 30.30% mortality in our series.

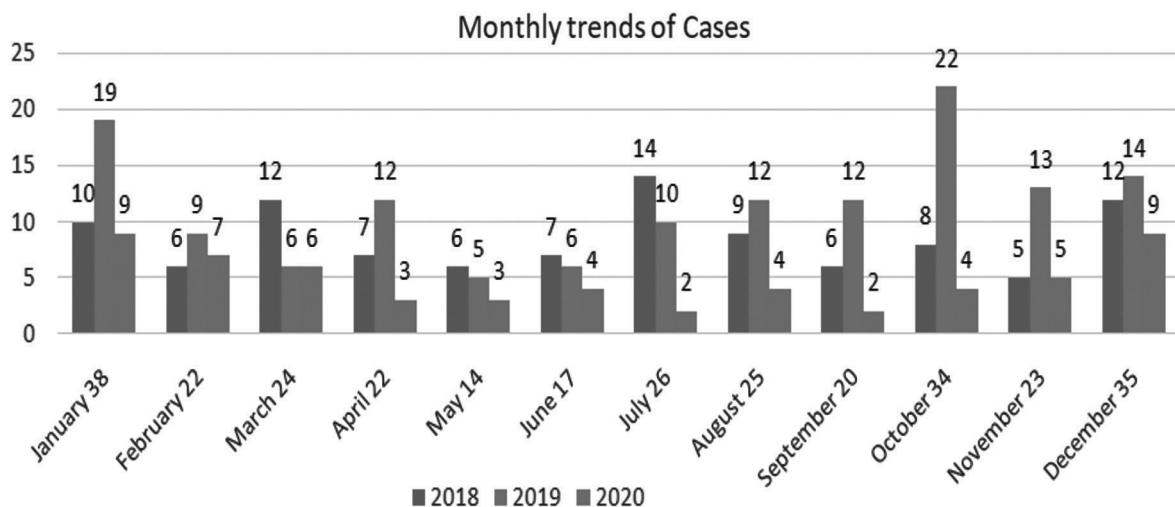


Fig. 2 Trends in monthly distribution of cases.

Table 3: Age wise distribution of cases, cases and mortality percentage for age.

Age	2018 (n=102)		2019 (n=140)		2020 (n=58)				
	cases	death	cases	death	cases	death	cases	death	percentage
1 day to 4 yrs	34	5	57	1	26	2	117	8	3.42%
5 yrs to 9 yrs	18	1	35	1	15	1	68	3	4.41%
10 yrs to 14 yrs	15	6	24	2	10	2	49	10	20.40%
15 yrs to 18 yrs	35	11	24	8	7	1	66	20	30.30%
n =	102	23	140	12	58	6	300	41	13.67%

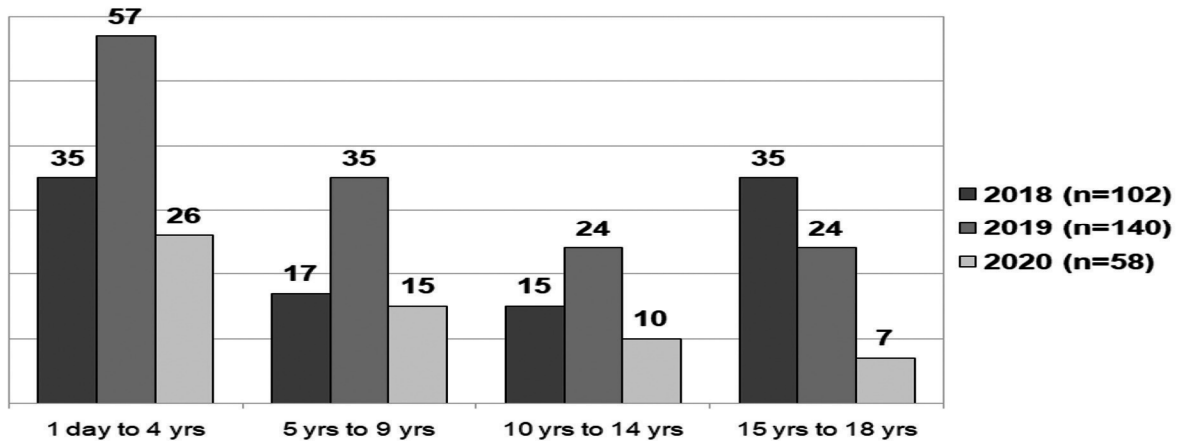


Fig 3. Age wise distribution of cases.

Table 4 shows Distribution of patients according to percentage of Total Body Surface Area involved with burns and the mortality percentage associated with it.

Table 4: Distribution of patients according to percentage of Total Body Surface Area involved with burns and the mortality percentage associated with it.

TBSA	2018 (n=102)		2019 (n=140)		2020 (n=58)		All cases		
	Death	Death	Death	Death	Death	Death	Death	(%)	
1 to 10 %	24	2	62	0	16	0	102	2	1.96%
11 to 20 %	19	1	32	0	17	0	68	1	1.47%
21 to 30 %	15	1	17	0	9	0	41	1	2.44%
31 to 40 %	15	3	10	1	8	1	33	5	15.15%
41 to 50 %	6	2	7	2	2	1	15	5	33.33%
51 to 60 %	8	4	6	4	2	1	16	9	56.25%
61 to 70 %	6	3	2	1	1	0	9	4	44.44%
71 to 80 %	2	0	0	0	0	0	2	0	0.00%
81 to 90 %	6	6	4	4	2	2	12	12	100%
91 to 100 %	1	1	0	0	1	1	2	2	100%
Total	102	23	140	12	58	6	300	41	13.67%

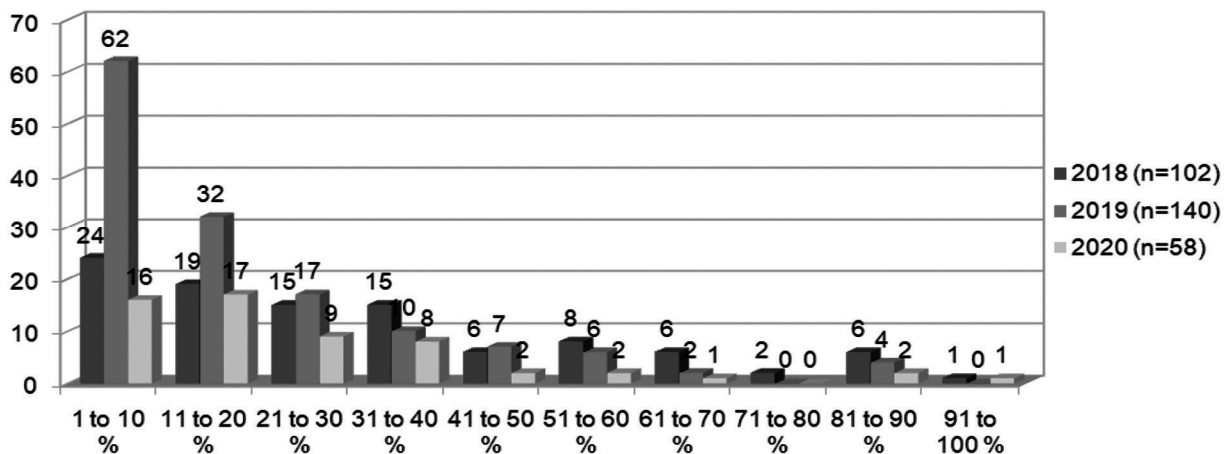


Fig. 4 Number of patients according to percentage of Total Body Surface Area involved with burns.

Table 5: Distribution of Cause of Burn.

	2018	%	2019	%	2020	%	Total	%
Flame Burn	64	39.65	124	88.57	23	62.75	211	70.33
Scald Burn	30	51.72	13	9.28	30	29.41	73	24.33
Electric Burn	5	6.89	2	1.42	4	4.9	11	3.67
Cracker Burn	3	2.08	1	0.71	1	2.94	5	1.67
	102		140		58		300	

Discussions

This study reports one of the largest pediatric burns scenario in North-east India, managed in a tertiary care hospital which caters to a large remote area of about 200sq km. In India, pediatric burns is estimated to be about 17–25% of total burn admissions.¹ Our study had an overall 19.65% of all burn admission showing a gradual increasing trend with 15.25% in 2018, 23.73% in 2019, and 21.64% in 2020.

Management of paediatric burn is a multidisciplinary approach involving General Surgeons, Plastic Surgeons, Pediatricians, Nutritionist, Physiotherapist, and a dedicated nursing staff. TBSA of children is three time of that of adult, resulting in increased fluid loss and hypothermia requiring relatively greater fluid resuscitation compared to adult. The thin skin in a child often poses difficulty in assessment of the depth of the burn in the initial stage.⁴

In our study, Flame Burn (n=211) was commonest burn injury overall accounting for 70.33% of cases followed by Scald burn (n=73, 24.33%), secondary to pulling of container containing hot liquid in itself, accidental immersion in hot water tub/container, accidental spillage of hot beverages and splash of hot oil in kitchen. Thermal burns are common in older age group children as young children are assigned household work involving cooking, boiling water using fossil fuels, etc. Reports of loose clothing catching fire while lighting lamp were also noted.

Injuries in children involved playful activities involving fire, crackers or fall in replace, adventurous activities with fire, more so when the child escapes the supervision of an adult in these activities. This is highlighted by the decrease in

such cases during COVID-19 lockdown period where the parents and elders of the family were available at home to mind the children. Majority of these scald and thermal burn injuries were second degree superficial to deep dermal burns, requiring conservative management with collagen sheets and other wound management regimen.

Electrical injuries were noted due to accidental contact with live wires, contact with electrical sockets, putting loose wires into mouth by toddlers, contact with electrical appliances. Electrical burn patient required surgical intervention in form of fasciotomy, debridement and amputation.

Mortality increased with the increase in percentage of burns and reached 100% above 80% TBSA. Suicidal burns as noted in older children especially among female patients in VinayakChavan, Ravi Kumar Chittoria, Abhinav Aggarwal, et al; 4 was not seen in our study; depicting a different socio-cultural scenario and mentality of the population.

Conclusion

This study conjointly highlights many problems like overcrowding, lack of awareness, dangerous cookery practices, and improper use of fuel oil. Concerned authorities ought to acknowledge the issues, formulate methods, unfold awareness, and ban or replace unsafe substances answerable for most burn accidents.

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