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University of Zimbabwe

Epidemiology and mortality of burns at the Queen Elizabeth Central Hospital Blantyre, Malawi

*OO KOMOLAFE, **J JAMES, *M MAKOKA *L KALONGEOLERA

Abstract

Objectives: To determine the most common causes, population most at risk and the pattern of mortality of burn injuries at the Queen Elizabeth Central Hospital, Blantyre, Malawi.

Design: Retrospective cross sectional study.

Setting: Burns Unit, Queen Elizabeth Central Hospital (QECH), Blantyre, Malawi.

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*Department of Microbiology

**Department of Surgery

College of Medicine

P/Bag 360

Chichiri

Blantyre 3

Malawi

Correspondence to:

Dr Olumuyiwa O Komolafe

E-mail: komof@yahoo.com

Fax: + 265-1-674 700

Subjects: One thousand eight hundred and twenty five case files of burn patients admitted to the QECH, Blantyre, between January 1994 and December 1999, involving 941 male and 884 female patients among whom 145 were epileptic.

Main Outcome Measure: Aetiology of burns and the population most at risk at the QECH, Blantyre.

Results: More males (52%) than females (48%) suffered from burns during the six year study period. Children below age five (55%) were most at risk while 89% were below 30 years of age. Hot water (38%) was the most common cause of burns, but among epileptic patients, it was open fire (83%). While 71% of all inpatients had superficial burns (less than 10% TBSA) 22% had deep burns requiring grafting.

Almost all the patients (98%) had multiple antibiotic therapy combined with topical application of silver sulfadiazine. Overall mortality was 12% but among the epileptic patients it was 16%.

Conclusion: Children under five years of age were the major victims of burn injuries in this study. There is, therefore, need to mount effective awareness campaigns in order to target the root causes of burns in children.

Introduction

A severe burn is not only a life-threatening problem for the injured patient but may have serious physical, psychological and financial effects on the individual, the patient's family and society. In terms of life style the effects of a severe burn injury could perhaps be described as irreparable in all facets of the patient's life.¹

Since most burn injuries are accidental, between 80 to 90% of them are potentially preventable.² The best way to cope with the problem is prevention by public awareness and attempts to minimize the risk factors.³ An effective prevention strategy therefore, will require an exploration of the epidemiological features of the injury in a given population.

Since the establishment of the Burns Unit at the Queen Elizabeth Central Hospital, Blantyre (the largest referral hospital in Malawi) in September, 1993, a comprehensive audit/monitoring of the epidemiological features of burn injuries has not been carried out and it is for this reason that this study was undertaken.

Materials and Methods

Case files of all inpatients at the QECH, Blantyre, Malawi, from 1994 to 1999 were retrieved and studied.

Data collected included age, sex, date of burn and length of hospitalization, percentage of burn in terms of total body surface area (TBSA) aetiology, yearly and monthly cumulative admission figures and outcome of treatment. Information extracted on all 1 825 patients was processed using the EPI INFO six software package.

Results

Demographic features.

Between January 1994 and December, 1999, a total of 1 917 patients were admitted to the Burns Unit (Table I) but complete information was available on 1 825 (95%) patients which was analyzed in this study.

Of these patients 941 (52%) were males and 884 (48%) females. Age range was between four months and 73 years with a median age of seven years. A total of 145 epileptic

patients constituting 8% of burned patients were also hospitalized during the study period.

Table I: Yearly admission figures of burn patients at the QECH, Blantyre (1994 to 1999).

Year	Admission No.		Total	Percentage (%)
	Male	Female		
1994	115	106	221	12.0%
1995	152	147	299	15.0%
1996	162	146	308	16.0%
1997	164	154	318	17.0%
1998	196	187	383	20.0%
1999	198	190	388	20.0%
Total	987 (51%)	930 (49%)	1 917	100.0%

Admission figures for Sept. to Dec. 1993 not included. Complete data were available on 1 825 patients.

Distribution by Age and Outcome.

The result of this analysis is presented in Table II which reveals that children below age five where the major victims representing 55% of all cases with an overall mortality of 11%. Even within this age group, children under two years of age suffered more from burn injuries than those in the two to five years age bracket, although mortality was higher in the latter. Surprisingly, 89% of all inpatients were below age 30. The incidence of burn injuries steadily declined with age, but mortality which was 100% among patients above age 70 did not follow any clear-cut pattern and so also was the mean total body surface area (TBSA). Of the 1 825 patients hospitalized, 1 602 (88%) were treated and discharged while the remaining 223 (12%) died (Table II).

Causes of Burns.

The most common causes of burns in the study population were hot water, open fire, hot food, flammable liquids and cooking oil, in that order (Table III). For the two sub-groups of children, that is: those under two years and those between two and five years of age, the pattern remained the same except that the latter had a higher incidence of burn injuries from hot food, flammable liquids and cooking oil (Table III). By contrast open fire (83%) was the most common cause among epileptic patients.

Table II: Distribution of burn inpatients by age and outcome.

Age Group (Years)	Total no. of Patients	Overall % total	Outcome		% Mortality	Mean TBSA (%)
			Discharged	Mortality		
0-2	570	31.0	509	61	11.0	6.0
2-5	431	24.0	377	54	13.0	5.0
6-10	250	13.0	235	15	6.0	5.0
11-20	206	11.0	188	18	9.0	8.0
21-30	160	9.0	136	24	15.0	12.0
31-40	103	6.0	85	18	17.0	16.0
41-50	67	4.0	55	12	18.0	15.0
51-60	27	2.0	13	14	52.0	43.0
61-70	8	0.5	4	4	50.0	36.0
>70	3	0.2	0	3	100.0	77.0
Total	1 825	100%	1 602 (88%)	223 (12.0%)		

Table III: Causes of burns at the QECH, Blantyre.

Cause	Overall Population		Children 0-2 years		Children 2-5 years		Epileptics	
	Freq.	%Total	Freq.	%Total	Freq.	%Total	Freq.	%Total
Hot water	685	38.0	279	28.0	252	25.0	9	6.0
Open fire	511	28.0	104	10.0	75	8.0	122	83.0
Hot food	234	13.0	78	8.0	92	9.0	1	1.0
Flammable liquids	214	12.0	26	3.0	45	4.0	5	4.0
Cooking oil	35	2.0	8	1.0	16	2.0	—	—
Burning house	31	2.0	2	0.2	1	0.1	1	1.0
Electricity	22	1.2	—	—	—	—	—	—
Ash	20	1.1	7	0.7	4	0.4	1	1.0
Others	73	4.0	5	0.5	7	0.7	6	4.0
Total	1 825	100	509	51.4	492	49.2	145	100

Extent of Burn and Mortality.

The distribution of burn injuries in relation to the total body surface area (TBSA) or extent of burn is presented in Table IV. Most inpatients (1 296/71%) had minor burn injuries of less than 10% TBSA and a mortality of 3% while 22% had deep burns requiring surgery. Almost all inpatients (98%) had multiple antibiotic therapy combined with topical application of silver sulfadiazine to reduce the possibility of infections during the prolonged healing period. Extent of burns ranged from 0.5 to 96% with a mean of 12%. The number of burned patients steadily decreased with age while percentage mortality sharply increased. The result showed that the chances of survival of burn patients with 21 to 30% TBSA was even, beyond which mortality steadily increased and reached 100% at 51 to 60% TBSA and above. In fact, patients with more than 50% TBSA in this study all died.

Epileptics and Burn Injuries.

The distribution by age and outcome of burn injuries among the 145 epileptic patients hospitalized during the study period is presented in Table V. The highest frequency was among the 11 to 20 years age group followed by 21 to 30 and zero to 10 years age groups in that order. Overall,

71% and 92% were below ages 30 and 50 respectively. Although the mortality pattern varied, the chances of an epileptic dying from burns was higher with age (Table V). Mortality among epileptic patients was 16.0% compared to 12.0% observed among the study population.

Table IV: Extent of burn in relation to mortality among inpatients at the QECH, Blantyre.

TBSA (%)	Total No. of Patients	Outcome		% Mortality
		Discharged	Mortality	
0-10	1 296	1 252	44	3.0
11-20	354	281	73	21.0
21-30	97	48	49	51.0
31-40	38	14	24	63.0
41-50	22	7	15	68.0
51-60	5	0	5	100
61-70	7	0	7	100
71-80	4	0	4	100
81-90	—	0	—	—
>90	2	0	2	100
Total	1 825	1 602 (88%)	223 (12.0%)	

Table V: Distribution by age and outcome of burns among epileptics.

Age Group	Outcome		Total Hospitalized	% Total	% Mortality	Mean TBSA (%)
	Discharged	Mortality				
0-10	26	2	28	19.0	7.0	8.0
11-20	38	2	40	28.0	5.0	8.0
21-30	31	4	35	24.0	11.0	11.0
31-40	17	0	17	12.0	0.0	12.0
41-50	9	5	14	10.0	38.0	44.0
51-60	2	7	9	6.0	78.0	57.0
61-70	0	0	0	0.0	0.0	0.0
>70	0	2	2	1.0	100	81.0
Total	123 (84.0%)	22 (16.0%)	145	100		

Seasonal Variation and Burns.

Cumulative monthly admission figures from 1994 to 1999 did not show any clear cut prevalent pattern although burn injuries seemed more common between the months of June and November.

Discussion

It is only by continuously reviewing the epidemiology of burn injury that we can effect a reduction in burn incidence and for this reason, the causes and outcome in terms of mortality were investigated in a six year (1994 to 1999) retrospective study of 1 825 burn-injured patients at the QECH, the largest referral hospital in Malawi.

Although the preponderance of female over male patients has been reported by some authors^{4,5} our series (Table I) shows that males have a slightly higher risk than females which agrees with studies carried out in India, Kuwait, Romania, Ireland, Iran and Angola.^{1,6-10} The results of this study (Table II) also conform with others carried out in

developed and developing countries¹⁰⁻¹⁴ where children constitute a disproportionate number of burn patients. This observation is indicative of the fact that children and young adults below 25 years of age which constitute 85% of all burn patients in this study are more exposed to burn accidents than other age groups and for any campaign strategy, to be effective, it should target this group.

Children under five years of age (55%) particularly those below two years (31%) were evidently the most prone to burn accidents in this study (Table II). This observation is not surprising since it is during this period children crawl, walk or out of ignorance attempt to do certain things by themselves in the home and in the process get burned. Parental vigilance should, therefore, be at its peak during this period in order to reduce paediatric burn accidents.

Analysis of the cause of burns in this study (Table IV) showed hot water, open fire, hot food, flammable liquids and cooking oil to be the most frequent as previously reported.^{10,11} These causes taken together are indicative of the fact that most burn accidents occur in the home and with more care, are preventable.

In this study the overall mortality rate (12%) was much lower than reported in several other studies¹³⁻¹⁸ which we could not easily explain except perhaps that the injuries were probably of low to moderate grade. For example 1 296 (71%) had a TBSA of less than 10% and 1 650 (90%) less than 20% TBSA (Table IV). Mean TBSA was 12% in this study. Furthermore, while 65% stayed in hospital for less than 20 days, 84% stayed for less than 40 days, with 88% of them treated and discharged.

The length of hospitalization in this study could not be directly correlated with mortality but all inpatients with more than 50% TBSA, died. This observation has also been validated by other studies.^{11,13,19}

The distribution by age and outcome of burns among epileptics in this study (Table V) confirms that burns are a common complication of epilepsy^{20,21} and that open fire is the major cause in Malawi.²⁰

A clear relationship between seasonal variation and the incidence of burns could not be established in this study although cases of burns seemed to be more prevalent between June and November. Why this is so is not entirely clear but in Malawi the weather is usually very cold between May and July followed by a heat period up to October/November. People's desire for warmth by making fire during the cold period and excessive heat exacerbating open fire during the dry period may indirectly influence the incidence of burns during these periods in Malawi.

In conclusion this study has revealed the major risk groups (children, young adults and epileptics) of burns and the predisposing causes in Malawi. The epidemiological profile of childhood burns should be used as the basis for an intensive campaign in the mass media for regulation and improvement to safety in the home since most burns seem to occur in the home, probably as a result of parental negligence. It should also be possible to prepare an educational programme for parents in order to prevent

burn injuries in the general population and among young children in particular.

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