A REVIEW OF BURNS IN SINGAPORE

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INTRODUCTION

This paper is a review of the incidences, causes and mortality of burns in Singapore during the four year period 1964 through 1967. The Burns Unit in Singapore was opened in 1962 and has forty beds. The Unit consists of three "open" wards, one for adult males, one for adult females and one for children with four single air-conditioned rooms. This Unit is the only one of its kind in Singapore and serves the whole island of a population of two million.

The criteria for admission to the Burns Unit are as follows:—

1. All cases of burns of the hands, face or perineum (excluding erythema and very small areas).
2. All children with more than 5% of the body surface burnt.
3. All adults with more than 10% of the body surface burnt.
4. All cases of septic burns.
5. All cases of limited contact burns—e.g. due to molten metal or electric burns. (These are suitable for immediate excision and grafting).

INCIDENCE OF BURNS

Total number of admissions over the four year period was 2,828. The number of admissions for each year are as set out in Table I.

TABLE I

ANNUAL ADMISSION TO THE UNIT

Year	No. Admitted
1964	704
1965	709
1966	730
1967	685

This shows that on an average an equal number of cases were admitted each year. We can also infer from this that in spite of the increasing population, the incidence of burns of the type admitted to the Burns Unit is decreasing—this is probably due to the fact that general changes in social habit are taking place whereby a greater number of the former kampong dwellers who used open fires for cooking are now housed in flats where more modern cooking facilities are available.

SEX DISTRIBUTION

There is a significant predominance of males over females—the total number of males admitted was 1,749 as compared with 1,079 females. A break down of these figures is given in Table II.

The greatly increased incidence in males is probably due to the increasing number of industrial burns, and males constitute the main working population.

ETHNIC DISTRIBUTION

There are three principal ethnic groups in Singapore, and the 1965 Census gives the following figures:—

	No.	% of Total Population
1. Chinese - -	1,396,500	74.9%
2. Malays - -	266,600	14.3%
3. Indians and	153,700	8.2%
4. Others - - -	48,100	2.6%

It is, therefore, within expectation that the greatest number of admissions were Chinese, followed by the Malays, the Indians and Others. The Ethnic distribution of the patients in the series is given in Table III, and the distribution approximates closely to that of the distribution in the general population.

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TABLE II

SEX DISTRIBUTION

Sex	Admissions Per Year				Total
	1964	1965	1966	1967	
Male	424	449	443	433	1,749
Female	280	260	287	252	1,079
TOTAL	704	709	730	685	2,828

TABLE III

ETHNIC DISTRIBUTION

Ethnic Group	1964	1965	1966	1967	Total	%	Percentage of Population
Chinese	557	563	566	516	2,202	77.9	74.9%
Malays	80	82	88	84	334	11.8	14.3%
Indians	64	63	71	78	276	9.8	8.2%
Others	3	1	5	7	16	0.6	2.6%
TOTAL	704	709	730	685	2,828		

TABLE IV

AGE GROUP INCIDENCE

Age Group	No. Admitted	% of Total
Infants	125	4.42
1— 5	1,120	39.60
6—10	423	14.96
11—15	249	8.80
16—20	162	5.73
21—25	148	5.23
26—30	113	4.00
31—35	109	3.85
36—40	91	3.22
41—45	71	2.51
46—50	56	1.98
51—55	52	1.84
56—60	36	1.27
61—65	33	1.17
66—70	23	0.81
71—75	10	0.35
76—80	4	0.14
81—85	2	0.07
86—90	—	—
91—95	1	0.04

A detailed analysis of these figures is given in Table VI.

AGE DISTRIBUTION

Table IV gives the incidences of burns from the age of infancy to 95 years. The highest incidence of burns was within the age group 0/5 years, after which there was a gradual decline with increasing age. Children of 10 years and below accounted for 58.98% of cases.

CAUSES OF BURNS

The causes of burns are shown in Table V. 67.64% of cases were due to scalds. Most of the scalds were the result of domestic accidents. Burns by clothes catching fire was the next commonest cause (23.76%) and was mainly due to kerosene cooker explosions. Chemical burns came next as a result mainly of acid throwing by gangsters and a few from industrial accidents. Electrical burns were surprisingly low (0.99%) inspite of the fairly wide and increasing use of electrical home appliances. There has been no change in the pattern during the four year period under survey.

MORTALITY

Out of a total number of patients admitted—i.e. 2,828 - 92 died, giving a mortality of 3.25%.

TABLE V

DISTRIBUTION BY CAUSES

Cause	1964	1965	1966	1967	Total	% of Total
Scalds	492	480	483	458	1,913	67.64
Fire	144	175	184	169	672	23.76
Chemical	25	21	24	23	93	3.29
Electrical	6	6	8	8	28	0.99
Contact	21	14	14	15	64	2.26
Unspecified	16	13	17	12	58	2.05

TABLE VI

MORTALITY RATE IN BOTH SEXES

Sex	Total No. Admitted	No. Died	% Mortality
Males	1,749	59	3.35
Females	1,079	33	3.06
TOTAL	2,828	92	3.25

MORTALITY IN DIFFERENT AGE GROUPS

Table VII shows that mortality rate tends to increase with increase in age. The mortality rate is lowest between the 0-35 age group while a surprisingly high mortality rate is shown in the 36-40 age group. This was due to a catastrophe in 1966 aboard a tanker carrying a highly volatile cargo which ignited and resulted in severe burns to those in the immediate vicinity. The majority of these people were in the 36-40 age group and eleven out of thirteen admitted to this Unit died.

MORTALITY RATE FOR CAUSES OF BURNS

The mortality rate was highest at 7.13 per cent with those caused by fire compared to 2.19 per cent caused by scalding. This was generally because burns due to fire were deeper and more extensive than those of scalds. Table VIII shows an analysis of the numbers and causes of burns covered in this four year period.

TABLE VII

MORTALITY RATE IN THE DIFFERENT AGE GROUPS

Age Group	No. Admitted	No. Died	% Mortality
Infants	125	2	1.6
1— 5	1,120	35	3.1
6—10	423	7	1.7
11—15	249	3	1.2
16—20	162	3	1.9
21—25	148	5	3.4
26—30	113	6	5.3
31—35	109	5	4.6
36—40	91	10	11.0
41—45	71	5	7.0
46—50	56	3	5.4
51—55	52	2	3.8
56—60	36	2	5.6
61—65	33	3	9.1
66—70	23	1	4.3

No deaths among patients above the age of 70 years.

TABLE VIII

MORTALITY RATE FOR THE DIFFERENT CAUSES OF BURNS

Cause of Burn	No. Admitted	No. Died	% Mortality
Scalds	1,913	42	2.19
Fire	673	48	7.13
Chemical	93	—	—
Electrical	27	—	—
Contact	64	—	—
Unspecified	58	2	3.45
TOTAL	2,828	92	3.25

MORTALITY RATES OF THE DIFFERENT ETHNIC GROUPS

The Table below (Table IX) sets out the mortality rates for the Ethnic groups in Singapore.

TABLE IX

MORTALITY RATES OF THE DIFFERENT ETHNIC GROUPS

Ethnic Group	No. Admitted	No. Died	% Mortality
Chinese	2,202	61	2.77
Malays	334	11	3.29
Indians	276	18	6.52
Others	16	2	12.5
TOTAL	2,828	92	3.25

The highest percentage of mortality was encountered among Indian patients (6.52%). Most of these patients had extensive burns. A high percentage of the patients were females whose saree caught fire and thus a large area of the body surface was burnt. This shows that the nature of clothing plays an important part regarding the severity of burns. There is also a significant difference in the mortality of Malay patients (3.29%) compared to the Chinese patients (2.77%). The reason for this is that the majority of the Malay patients came from the lower income group living in Kampongs and used open fires for cooking and thus sustained more severe burns. Their nutritional state prior to their burns was also poor.

PERCENTAGE OF BODY SURFACE BURNS IN RELATION TO PERCENTAGE OF TOTAL NO. OF ADMISSIONS

About fifteen per cent of our total admissions for the four year period were of a severe nature, the rest were not considered severe. Table X.

Table XI shows the mean body surface area of burn for the different age groups. It shows that the mean area of burn tends to increase with age up to the 36-40 group after which it decreases.

TABLE X

PERCENTAGE OF BODY SURFACE BURNS IN RELATION TO PERCENTAGE OF TOTAL NO. OF ADMISSIONS

Body Surface Area of Burn in %	% of Total No. of Cases
1— 5	41.5
6—10	34.2
11—15	11.3
16—20	5.8
21—25	2.2
26—30	1.7
31—40	1.4
41—60	1.0
61—95	0.9

TABLE XI

MEAN SURFACE AREA OF BURN IN THE DIFFERENT AGE GROUPS

Age Group (Years)	Mean Surface Area of Burn (%)
Infants	6.9
1— 5	8.5
6—10	8.4
11—15	7.2
16—20	9.3
21—25	10.7
26—30	10.6
31—35	13.2
36—40	18.2
41—45	12.8
46—50	11.4
51—55	9.2
56—60	7.3
61—65	10.1
66—70	7.7
71—75	6.6
76—80	7.0
81—85	3.0
86—90	No Cases
91—95	8.0

DISCUSSION

The decreasing incidence of burns admitted to the Burns Unit despite an increasing population, which is growing at the rate of 2.5% per year, does not necessarily imply an absolute fall in overall incidence. Rather, it suggests that the incidence of extensive burns which requires admission is decreasing. This would

perhaps be more evident with domestic burns over the next few years as more people are re-housed in modern accommodation where the fire-risk is much less. The recent Government legislation banning the sale of certain types of dangerous fireworks which in the past has often led to burns of the hand and face, would also bring about a decrease in admissions to the Unit.

On the other hand, while we have not seen as many industrial burns as domestic burns, we can predict that with the rapid increase of industrialisation in the island, there will be an increase of industrial accidents resulting in thermal and electrical injuries. Electrical burns would also probably show an increase as electricity becomes available to more homes and more people are then able to use electrical appliances.

SUMMARY

1. The total number of admissions during the four year period 1964-67 to the Burns Unit of the Outram Road General Hospital is 2,828.
2. The Chinese being the predominant race had the highest number of admissions.
3. The age group 0-5 years accounts for the highest number of burns admitted.
4. Scalding claimed the most victims of all causes of burns with a total of 1,913 cases, but mortality is low.
5. About 15% of the total number of admissions during the four year period were of a severe nature.
6. The mortality rate increases with age.
7. The highest percentage of deaths were as a result of fire rather than of scalding.
8. The overall mortality rate was 3.25%, which compares favourably with other centres. ARTURSON and PONTEN (1962) 5.7%, BARNES (1957) 11.0%, BIRKE ET AL. (1957) 9.0%, PERDRUP (1950) 2.59%.

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