



UNIVERSITY KUALA LUMPUR- ROYAL COLLEGE OF MEDICINE PERAK.



RESEARCH REPORT

TITLE:

**A Review on Management of Burn Patients
Admitted To The Burn Units of Hospital
Raja Permaisuri Bainun, Ipoh (HRPB) From
1st January 2011- 31st December 2011.**

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Title: A review on management of burn patients admitted to the Burn Units of Hospital Raja Permaisuri Bainun, Ipoh (HRPBI) from 1st January 2011- 31st December 2011.

Abstract

Introduction and objectives:

This study will aim to describe a review on management of burn patients admitted to burn unit, Hospital Raja Permaisuri Bainun Ipoh from 1st January 2011 to 31st December 2011.

Methodology:

The study is a retrospective study of data of patient admitted during the period January 2011 until December 2011. Data was collected in Plastic Surgery Clinic and Record unit in Hospital Raja Permaisuri Bainun. We used a performa to transfer data. All the data were stored and analysed using SPSS version 15.0.

Result:

A total of 123 data was collected. Adults male are more prone to burn injuries. Higher number of case occurs among adults and children. Scalding due to hot liquid is the commonest causes of burn injury among the population. Majority of scalding injuries took place at home while most of burn injury due to chemical agent happened in industrial site. From overall burn cases, only 2 cases of mortality due to severe sepsis.

Conclusion:

This study showed that majority of burn injuries are male adults. Most of the cases took place in work area. This calls for better safety measures of prevention at work. Other than that, our study also showed majority of children had scald injuries which happened at home. Parental education is really needed to reduce the incidence of burn injury in children.

Keyword:

Burn, Management, Hospital Raja Pemaaisuri Bainun Ipoh

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TITLE: A review on management of burn patients admitted to the Burn Units of Hospital Raja Permaisuri Bainun, Ipoh (HRPB) from 1st January 2011- 31st December 2011.

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INTRODUCTION

Burns is a major problem in the developing countries. The injury affects both physical and psychological aspects. Proper management needs skilled holistic approach to address all the problems facing a burn patient. In Hospital Raja Permaisuri Bainun, burn management unit was established to treat burn patient in and around Perak. Although most of the hospitals in Malaysia have burn ward, there is still limited burn data available¹. In 1983 the study of the similar nature was conducted at Hospital Kuala Lumpur and in 2002 at Hospital Universiti Kebangsaan Malaysia. This study is conducted to review on management burn patients admitted to Burn Unit in Hospital Raja Permaisuri Bainun.

LITERATURE REVIEW

Definition

Burns is one of the serious injuries a person can suffer, and they require specialist treatment by a team of medical, nursing, rehabilitation personnel possessing a specific specialization in the treatment of burns. The main aim of this team is to prevent complications and death. The treatment of burns, whether serious or mild, has always constituted a problem, and great progress has only recently been achieved in treatment and full recovery. Burns is not only a superficial and localized injury affecting only the skin: it has systemic effects involving all systems of the body. This point was clearly made by Ioannovich²: a full-thickness burn in 20% total body surface area (TBSA) is as serious as a thigh-level amputation following a train accident.

Causes

Burns injury causes the destruction of skin and the underlying tissues, due to thermal, electrical, or chemical trauma. Literature survey suggested, the majority of burns are thermal injuries. They are due to high temperature (scalding, 44.5%; fire, 24.2%; sunlight, 11.7%). Chemical burns due to caustic acids (sulphuric or hydrochloric acid) or to caustic bases (potassium hydroxide or sodium hydroxide) follow with 6.2%. Electrical burns account for 3.6% of cases, while the remaining 9.9% are due to various other causes (radioactivity, etc.). The depth of the injury caused by heat depend on the duration of the heat in contact with skin and the temperature of offending source.⁹ Sudden exposure to heat is above 51 °C causes immediate destruction of tissues, while exposure to heat above 71 °C, even for less than a second, causes full-thickness burns.¹⁰

Classification of burns

Superficial burns affect only the epidermis, causing reddening of the skin, pain, and oedema. Partial thickness burns affect not only the epidermis but also some of the dermis, causing reddening of the skin, acute pain, and the formation of blisters and oedema in and around the affected area. Full thickness burns destroy the full thickness of the skin (epidermis, dermis, subcutaneous fat, muscle, and bones). The burnt area is white and dry. Owing to the destruction of the nerve endings, pain is absent.

Treatment

A superficial burn is an injury that in most cases leaves no disability, provided it is properly treated. On the contrary, if treated inadequately by not following standard rules and principles, a burn can seriously threaten not only the patient's life but also his or her rehabilitation in society and at work because of malformations and disabilities. There are two ways of treating a burn patient. First is to provide first-aid treatment on the spot, i.e. where the accident took place, and to transfer the burn patient nearest medical facilities if the burn is extensive. The second is to move the patient to a specialist burns centre for immediate and complete management.

Other study

Pande KC and Ishak KL (2012) conducted a retrospective study of epidemiology of burn in a referral hospital in Brunei Darul Salam. The average age of the patients was 19.6 ± 20.9 (median 10, range < 1–90) years. 67 (32%) patients were under two years of age. Scalding due to hot liquids was the most common cause (78.2%), followed by flame and contact burns. The majority of burns were sustained indoors either at home or at work (87.2%). The total body surface area (TBSA%) for the whole sample was $3.7\% \pm 7.9\%$ (median 2%; range 1%–90%). Patients with flame burns ($n = 19$) were older and had larger TBSA% ($p < 0.05$). Inpatients had significantly higher TBSA% compared to outpatients ($28.2\% \pm 26\%$ versus $2.5\% \pm 2.1\%$; $p < 0.005$). In this study also found that scald burns sustained indoors are the most common across all age groups. Although the TBSA is small, a large number of children are affected. There is a need for burns prevention education programme in Brunei Darussalam

Richa Gupta, VikasKumar, S.K.Tripathi (2012) conducted a study of profile the fatal burn deaths from the varasani region, India. They found that a majority of the victims (83%) were females. The maximum number of the victims (59.6%) belonged to the age group of 15 to 30 years, with the least number of victims from the age groups of ≥ 45 years and ≤ 15 years i.e. 5.6 % cases respectively. A majority of the victims (98.3%) in this present study cases were Hindus. Most of the victims (83.9%) were married. A majority of the victims (49.2%) had obtained up to primary school level education. The uneducated victims still form a major group, amounting to 15.3% of the burn victims. The maximum number (43.5%) of the burn victims died due to burns which were caused by kerosene oil. Only 0.9% cases were

observed, where petrol was used as the inflammable material. In the present study, it was observed that in 39.6 % cases, more than 90% of the body surface area was involved. Only 3.2% of the deceased were seen with burns which involved <50% of the body surface area. Septicaemia was observed as a major cause of death (50%) among the deceased.

Mohammad Hadi Rafii , Hamid Reza Saberi , Mehrdad Hosseinpour , Esmacil Fakharian and Mahdi Mohammadzadeh (2012) conducted a study on epidemiology of Paediatric Burn Injuries in Isfahan, Iran . They found that Out of 2229 burn patients, 1014 (45.5%) were under the age of 15, indicating an annual incidence of 50 in 100,000 children. Of the 1014 patients, 610 (60%) were boys and 404 (40%) were girls; the male-to-female ratio was 1.5:1. Most of the patients were in the age range of 3 to 6 years. Scald was the most common type of burn injury (51.8%). Six hundred and sixty-eight cases (65.7%) were from urban areas, while 346 (34.3%) were from rural areas. Fifty-six patients (5.5%) died. They also conclude that burn injury is a major health concern in the paediatric age group, and specific consideration and planning are required for its management.

Mohammad Aslam, Muhammad Zarar Niazi and Ghulam Mustafa (2012) conducted a study on pattern of burns at Lady Reading Hospital, Peshawar. They found that Male to female ratio was 1.5: 1. Mean age was 13.59 years (Std. deviation 14.162). Median age was 7 years. Mean Total Body Surface Area (TBSA) burn was 14.53 %. Home was the site of accident in most cases (88.1 %). There was no statistical significance in gender and percentage of burn area (p value: 0.363). Scald and flame burn were the cause of burn in 91.2 % of the cases. 519 (68.5%) of the patients were from Peshawar district. Majority of burn victims (59.2%) were below 10 year of age. They also conclude that majority of burn accidents occur at home and are preventable

OBJECTIVE

General Objectives

This study will aim to describe a review on management of burn patients admitted to burn unit, Hospital Raja Permaisuri Bainun Ipoh from 1st January 2011 to 31st December 2011.

Specific Objectives

The specific objective of this study can be stated as below:

1. To review on management of burn admission to burn unit HRPBI from 1st January 2011 to 31st December 2011.
2. To obtain socio-demographic aspect of burn patients admitted in burn unit, Hospital Raja Permaisuri Bainun.
3. To identify common causes of burn admitted to burn unit, Hospital Raja Permaisuri Bainun.
4. To correlate between causes of burn and depth of burn.
5. To identify extent of burn injury (TBSA-Total Body Surface Area) involved in majority of burn cases admitted to Hospital Raja Permaisuri Bainun.
6. To determine methods of treatment used for different cases of burns.
7. To correlate TBSA with morbidity (length of stay in hospital) and mortality rates of burn cases.

METHODOLOGY

OVERVIEW AND RESEARCH DESIGN

The study is a retrospective study of data of patient admitted during the period January 2011 until December 2011. Data was collected in Plastic Surgery Clinic and Record unit in Hospital Raja Permaisuri Bainun. We used a performa to transfer data. All the data were stored and analysed using SPSS version 15.0.

In this study, sociodemography of the patients are subdivided into age, gender, ethnicity, occupation. Patients below 12 years were classified as children, while 12- 19 years old as teenagers, 20-55 years old as adults and above 55 years old as elderly. For causes of burn, it was categorised into scalds, flames, electrical and chemical injuries.

The degree of burn was assessed clinically. First degree burn refers to superficial epithelial involvement with skin erythema, pain and no scar formation on healing. Superficial second degree burn involves the superficial layer of the dermis with blistering and blanching on pressure. Deep second degree involves the deeper dermal layer with the skin appearing white, with no blanching on pressure and subsequent scar formation. Third degree burn involves full skin thickness with minimal pain due to the destruction of nerves, and will lead to extensive scarring

Major Burns is defined as deep burn of more than 10% of Total Body Surface Area (TBSA) or minor burns of more than 25% in adult or 20% at the extremes of age. The percentage of burns was assessed clinically by using Lund and Browder chart. Burns involving face, hands, feet, perineum, and inhalation injury or patients with serious pre-existing medical disorder were considered major burns.

Method of treatments is divided into conservative or surgical. Conservative management involves fluid replacement, wound dressings and antibiotic administration while surgical management involve wound debridement, skin grafts, skin flaps, or escharotomy when indicated.

STUDY TYPE

This study is a retrospective review on management of burns patients admitted to the Burn Unit of Hospital Raja Permaisuri Bainun, Ipoh from 1st January 2011 until 31st December 2011.

ETHICAL CONSIDERATIONS

The researchers will request approval from the national ethic committee prior to implementing the study (NMRR). All the information from the questionnaire will be kept confidential.

TARGET GROUP

INCLUSION CRITERIA

All patients newly admitted to Burn Unit from HRPBI from 1st January 2011- 31st December 2011.

EXCLUSION CRITERIA

1. Patients admitted due to complication of burns such as burns contracture.
2. Patients admitted for other complaints beside burns.

RESULTS

Demography of admitted burn patient in burn unit, HRPBL.

Total burn patient admitted in burn unit, HRPB from 1st January 2011- 31st December 2011: 123 patients.

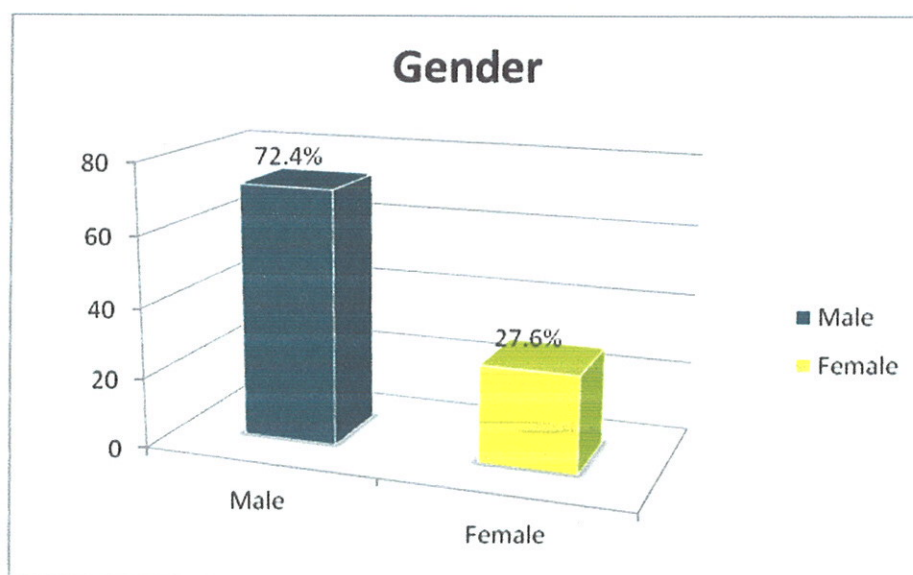


Figure 1.0: Gender Distribution

Age	Male n (%)	Female n (%)	Total n (%)
< 1	9 (81)	2(18.2)	11(100)
2-12	20(57.1)	15(42.9)	35(100)
12-19	5(100)	0(0)	5(100)
20-55	45(76.3)	14(23.7)	59(100)
>56	10(76.9)	3(23.1)	13(100)
Total	89	34	123
Children	29(63.0)	17(37.0)	46(100)
Teenagers	5(100)	0(0)	5(100)
Adult	45(76.3)	14(23.7)	59(100)
Elderly	10(76.9)	3(23.1)	13(100)

Table 1.0: Age and Sex Distribution

Based on Table 1.0, the majority of the cases (47.9%) were adults and children contributed almost to one third of the population (37.4%). From the children category, 29 were males and 17 were females with ratio 1.7: 1. The numbers of male children were almost twice the number of female children in burns. While male adults were 4 times higher than adult female admitted for burns.

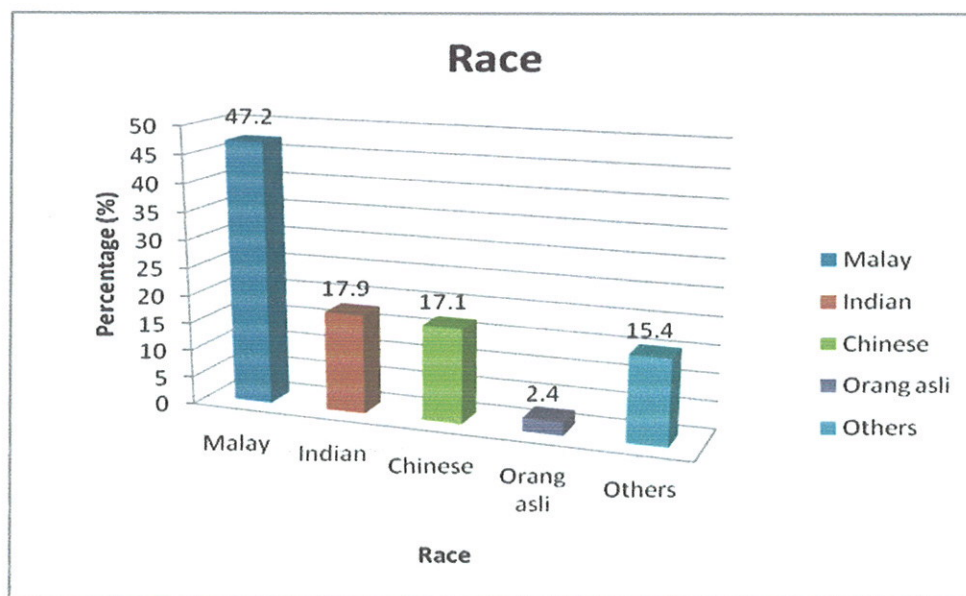


Figure 2.0: Ethnicity Distribution

According to Population and Housing Census, Malaysia 2010 (2010 CENSUS); **Malaysian** citizens consist of the ethnic groups Bumiputera (67.4%), Chinese (24.6%), Indians (7.3%) and Others (0.7%). Figure 2.0 shows that Malay ethnicity was affected most in the case of burn incidence.

Common cause and place of incidences of burn patient admitted to burn unit, Hospital Raja Permaisuri Bainun.

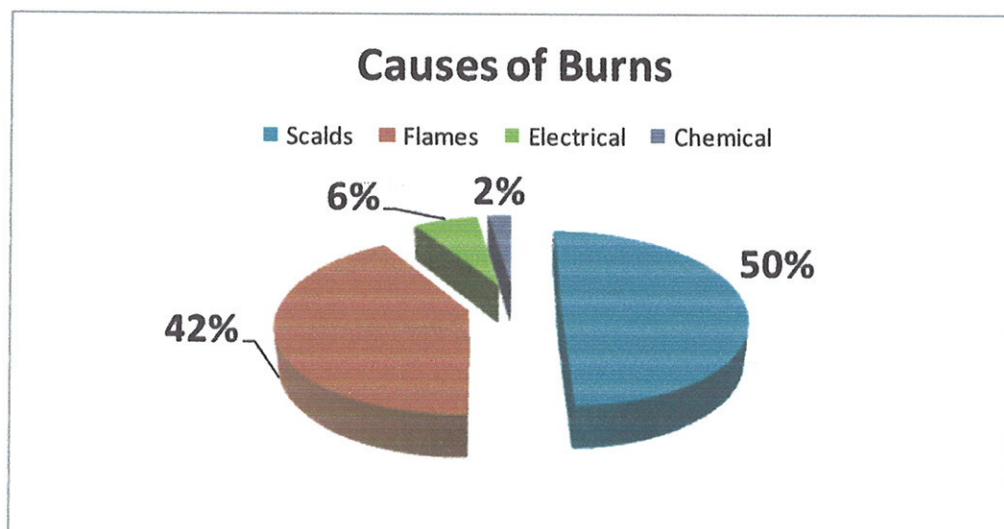


Figure 3.0: Causes of Burn

Scalding due to hot liquid is the commonest causes of burn injury among the population (49.6%). The second commonest burn injury was flames (gas explosion, petrol, kerosene and MVA) comprises about 42.0%.

CAUSE n (%)	PLACE n (%)				TOTAL
	Home	Industrial	Road	Others	
Scalds	48 (78.7)	10 (16.4)	1 (1.6)	2 (3.3)	61 (100)
Flames	32 (62.7)	12 (23.5)	5 (9.8)	2 (3.9)	51 (100)
Electrical	1 (33.3)	1 (33.3)	0 (0)	1 (33.3)	3 (100)
Chemical	1 (12.5)	4 (50)	3 (37.5)	0 (0)	8 (100)
TOTAL	82 (66.7)	27 (22)	9 (7.3)	5 (4.1)	123 (100)

Table 2.0: Place of incidence of burn

Majority of scalding injuries took place at home while most of burn injury due to chemical agent happened in industrial site.

Correlation between causes of burn and burn depth

Burn Depth		Causes Of Burns N (%)			
Type	Total cases N (%)	Scald	Flame	Electrical	Chemical
Superficial	32 (26)	20(62.5)	9(28.1)	1(3.1)	2(6.2)
Partial	11(8.9)	6(54.5)	4(36.4)	0(0)	1(1.91)
Full	8 (6.5)	1(12.5)	4(50.0)	1(12.5)	2(25.0)
Mixed	72 (58.5)	34(47.2)	34(47.2)	1(1.4)	3(4.2)

Table 3.0: Correlation between causes of burn and burn depth.

Pearson correlation is +0.46 with P value= 0.617 which is not a significant association.

Clinical Assessment of the burn wound.

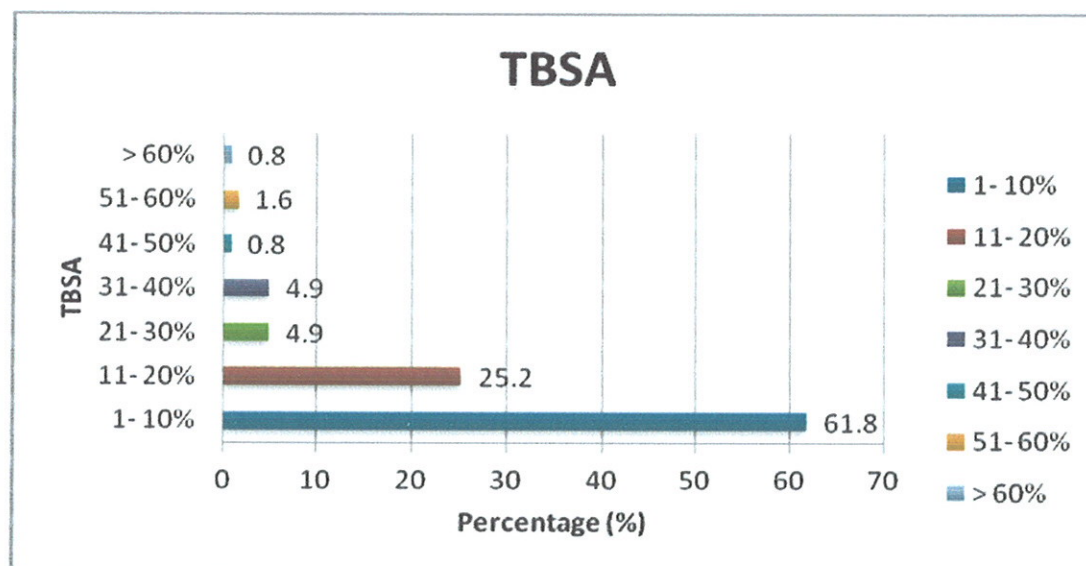


Figure 4.0: TBSA involve among patients admitted to Burn Unit at HRPBI

More than 85% of patient admitted to Burn Unit, HRPB sustained below 20% of TBSA.

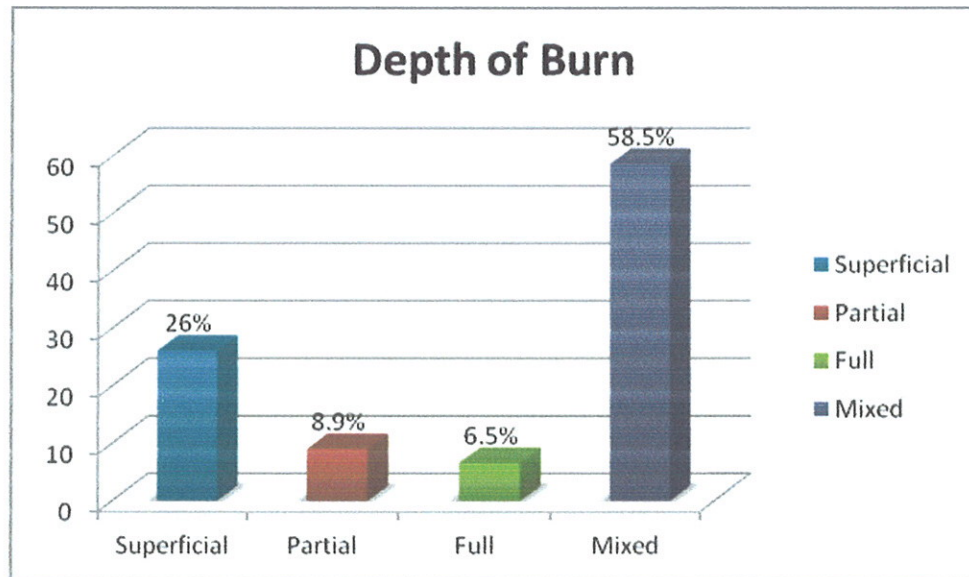


Figure 5.0: Depth of burn among patient admitted to Burn unit HRPBI.

Method of treatment used for different cases of burns.

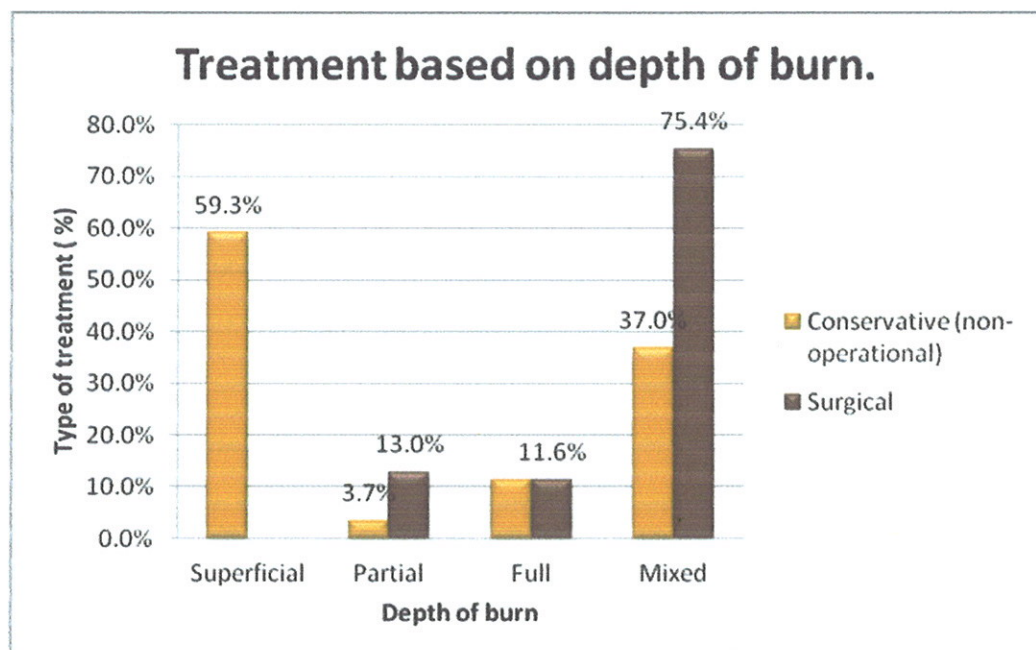


Figure 6.0: Treatment given to patients admitted to Burn Unit at HRPB

Mortality rates of burn cases in Hospital Raja Permaisuri Bainun, Ipoh

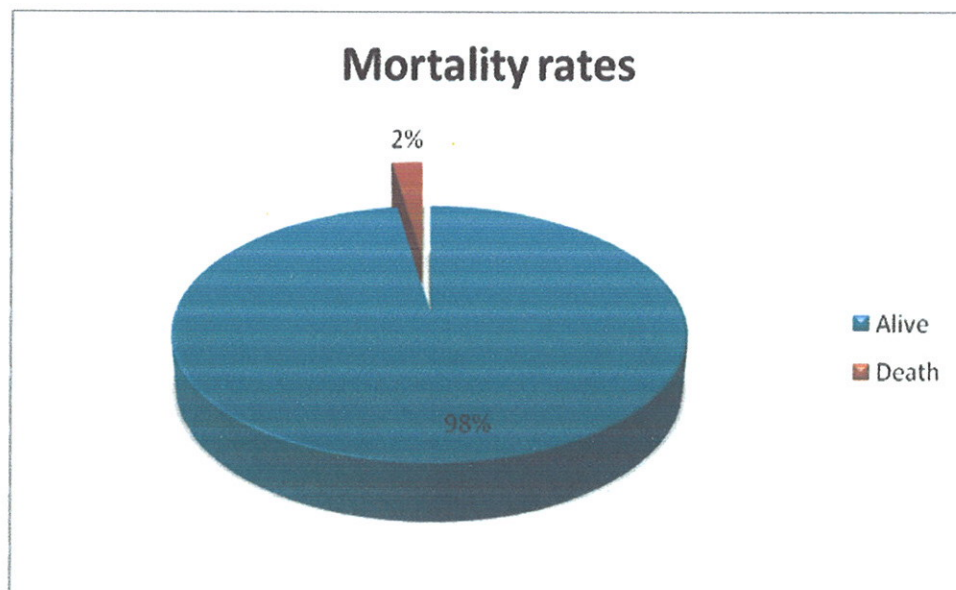


Figure 7.0: Mortality rates of burn cases in Hospital Raja Permaisuri Bainun, Ipoh

Upon all the burn admission cases in 2011, about 2% of the patients died due to; 55% TSBA mixed thickness burn complicated with severe nosocomial infection and 64% of TSBA burn complicated with severe sepsis.

Correlation of TBSA with morbidity (Length of stay in hospital -Days).

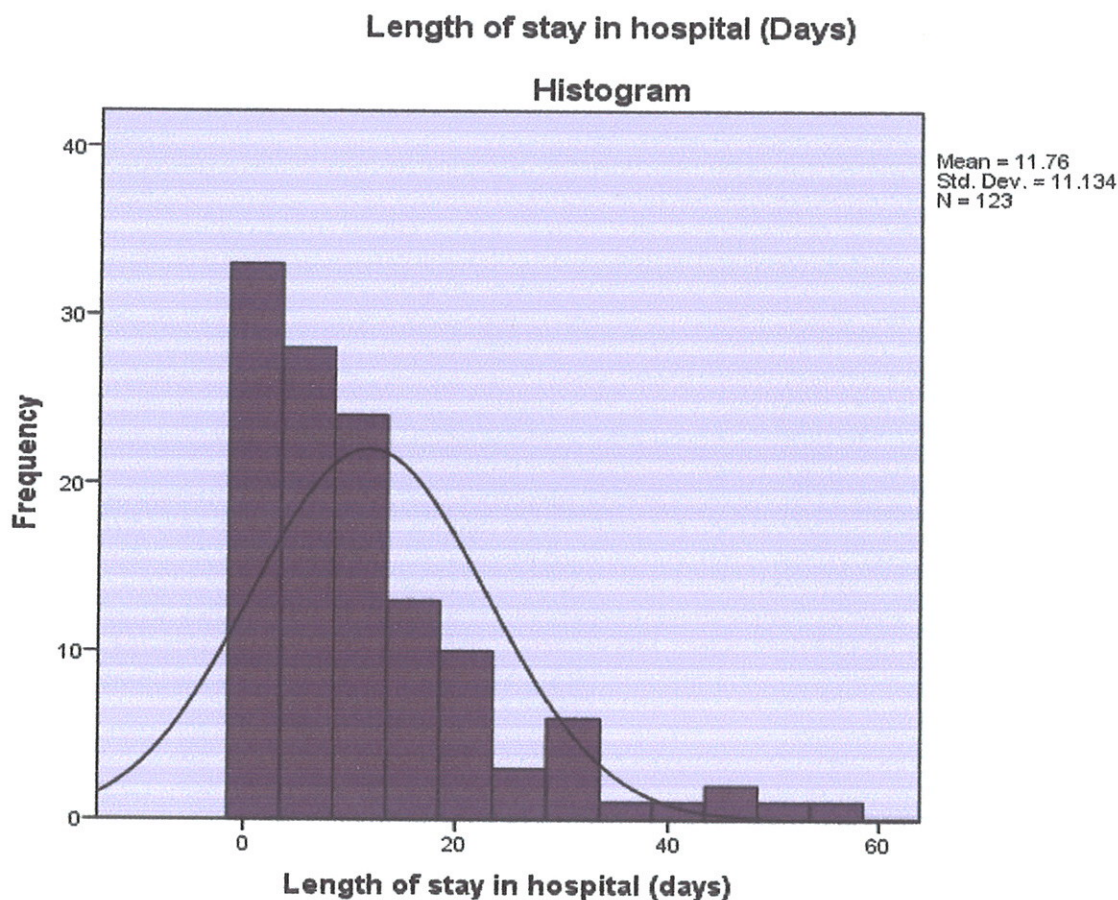


Figure 8.0: Correlation of TBSA with morbidity (Length of stay in hospital -Days).

Burn Depth (P: 0.000)	Length of Stay (N)											Total
	1- 5 days	6- 10 days	11- 15 days	16- 20 days	21- 25 days	26- 30 days	31- 35 days	36- 40 days	41- 45 days	46- 50 days	> 51 days	
Superficial	7	5	0	0	0	0	0	0	0	0	0	32
Partial	2	4	4	0	0	0	0	0	0	1	0	11
Full	1	1	3	1	1	1	0	0	0	0	0	8
Mixed	16	13	15	10	6	3	4	2	2	0	1	72
Total	6 (37.39)	23 (18.6 9%)	22 (17.86 %)	11 (8.94 %)	7 (5.69%)	4 (3.25%)	4 (3.25%)	2 (1.63 %)	2 (1.63 %)	1 (0.81 %)	1 (0.81%)	123

Table 4.0: Correlation of Burn Depth with morbidity (Length of stay in hospital -Days).

TBSA (P: 0.000)	Length of Stay (N)											Total
	1- 5 days	6- 10 days	11- 15 days	16- 20 days	21- 25 days	26- 30 days	31- 35 days	36- 40 days	41- 45 days	46- 50 days	> 51 days	
1- 10%	40	18	11	2	3	0	0	0	1	1	0	76 (61.8%)
11- 20%	5	4	10	5	3	1	1	1	0	0	1	31 (25.2%)
21- 30%	1	0	0	2	1	1	0	0	1	0	0	6 (4.9%)
31- 40%	0	0	0	2	0	1	3	0	0	0	0	6 (4.9%)
41- 50%	0	0	1	0	0	0	0	0	0	0	0	1 (0.8%)
51- 60%	0	0	0	0	0	1	0	1	0	0	0	2 (1.6%)
> 60%	0	1	0	0	0	0	0	0	0	0	0	1 (0.8%)
Total	46 (37.4 %)	23 (18.7%)	22 (17.9 %)	11 (8.9%)	7 (5.7%)	4 (3.3%)	4 (3.3%)	2 (1.6%)	2 (1.6%)	1 (0.8%)	1 (0.8 %)	123 (100%)

Table 5.0: Correlation of TBSA with morbidity (Length of stay in hospital -Days).

Based on Figure 8.0, average length of stay in the hospital is about 11 days (Mean: 11.76, Median: 9). Based on our review on relation of TBSA and duration of patients stay in ward, Table 3.0 and 4.0 shows that; patient who sustained greater TBSA and deeper depth of burn will stay longer in the ward. Pearson correlation is +0.460 with P value=0.000, which is significant.

DISCUSSION:

Age and gender are vital epidemiological determinants for injury including burn. In our study we found that more male sustained burn with male to female ratio was 2.6: 1. A similar finding was observed in study in HUKM and also in other centres. However their ratio were higher compared to our study due to bigger sample size. Majority of cases occurring in male took place at outdoor activities site. Our finding was similar to HUKM findings that activities such as repairing electrical equipment or car radiators, rubbish burning and work that requires exposure to chemical agent were some the causes. However in female, majority of the cases took place in the kitchen involving cooking activities.

In this study, 1/3 of the population composed of children. The majority of the cases were domestic injuries³. Precaution and preventive measure must be implemented to reduce the incidence. We also found that male children were prone to burn injury compared to female children. This is not a surprising finding because in children, lack of awareness of dangerous substance and lack of coordination are important aspect that leads to burn injury. This similar finding was observed also in KY Chan and Ashraff⁷.

Reviewing the causes of burn, our finding reveal the commonest causes is scalding (49.6%), followed by flame (41.5%). 55.7% from the total scalding injury are involving children. Study in France and Iceland also found that scalding is the common type of burn injury particularly in children. This similar study was found also by KY Chan and Pade KC. Flame injury usually occurred in workers who are exposed to easily inflammable material like petrol, kerosene and gas. However electrical and chemical causes in Hospital Raja Permaisuri Bainun were little maybe due to less of industrial workers that expose to high voltage and chemical substance. In contrast, the Munnoch report suggested of higher incidence of chemical burn among industrial workers in Welsh region⁸.

A review of burn cases in HRPBI on 2011 (Table 4.0 and Table 5.0) shows that, most of the patient admitted to the hospital due to burn cases were below 10% of TBSA (61.8%). This is followed by 11-20% TBSA (25.2%), 21-30% and 31- 40% TBSA (4.9% respectively) and 51- 60% TBSA (1.6%). Burn cases involving more than 40% TBSA were minimal (0.8% respectively).

In addition, based on the depth of burn, most of the patients admitted were due to; Mixed thickness burn (58.5%). This is followed by superficial thickness burn (26%), Partial thickness burn (8.9%) and lastly Full thickness burn (6.5%). There was a significant correlation between the causative agent and depth and severity of the burn wounds (Table 3.0). Flame burns usually cause mixed thickness burn (47.2%) while scald burn usually cause Partial thickness burn (54.5%). This is similar to the epidemiological and sociocultural study of burn patient in Alexandria, Egypt in 1997.⁷

As for the treatment, we divide the treatment into surgical management and conservative management. Surgical management comprises of; wound debridement, split skin graft, and escharotomy when indicated. Reviewing the treatment based on the burn depth showed, all of the patient who sustained superficial thickness burn will be treated conservatively (59.3%) and Full thickness burn were all managed surgically (11.6%). Besides that, most of the patients with mixed thickness burn were treated by surgical management (75.4%) compared to conservative management (37%). As for Partial thickness burn, patient managed surgically were 13% and conservative management were 3.7%. This management follows exactly based on the American Burn Association White Paper on Surgical Management of the Burn Wound and Use of Skin Substitutes (2009).⁹

The duration of stay in hospital depended on the severity of burns or complication that might arise. Based on our review (Table 3.0 and Table 4.0), average number of days patients stayed in the hospital is about 11 days (Mean: 11.76, Median: 9). Median number of days of stays in hospital were 8, 8, 9 and 16 days were reported by Ying¹⁰, Munnoch⁸, Ho⁵ and Mahaluxmivala¹¹ respectively. Only 0.8% patient stayed in the hospital for more than 51 days.

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SSM Project Supervisor.

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