



Epidemiology and Characteristics of Burn Patients in Dr. Soedarso General Hospital during 2017 – 2020: Retrospective Study

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Abstract

BACKGROUND: Burns are devastating injuries, often resulting in significant morbidity, impairment of emotional well-being, and experienced quality of life. The etiological factors of burn injuries is vary considerably in different communities and regions, hence the need for detailed epidemiological studies to understand the problem status in different regions.

AIM: The aim of this study was to determine the epidemiological data and characteristics of burn patients at Dr. Soedarso General Hospital.

METHODS: A retrospective study of non-random consecutive sampling of medical records of Dr. Soedarso Regional Hospital in the period August 2017–December 2020

RESULTS: A total of 108 samples were included in this study. There were 88 (81.5%) male and 20 (18.5%) female; mostly adult (>18 years) 57 (52.8%). The etiology of burn injury was flame (35.2%), electrical (34.3%), and scald (30.6%). The most total body surface area (TBSA) of burns from 1 to 10%. The mortality rate was obtained by 8 (7.4%) respondents.

CONCLUSION: Based on the results of this study, that the major proportion of burn patients were male and in the age group of >18 years old. Flame was the most leading cause of burn. Considering the size of the burn, it was revealed that the most TBSA of burns was 1–10%.

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Introduction

Burns are a complex problem and often occur in everyday life, especially in low and middle-income countries [1], [2]. Burns are caused by various etiology, namely fire, hot water, electricity, chemistry, contact, radiation, and cold trauma [2]. According to the World Health Organization, around 180,000 people worldwide die from burns [2]. The United States in 2008 had 410,000 burn cases. Where it occurs most in men than women [2]. The incidence of burns in adults is most often caused by fire, while in children it is caused by hot water [1], [3]. In addition to affecting the patient from a physical aspect, burns can also be psychosocial and functional patients, thus affecting the quality of life of the patient [4], [5]. Management of burns must also improve the quality of life of the patient [4].

Based on research data from Cipto Mangunkusumo Hospital (RSCM) in 2011 to 2012 found 303 burn patients, most cases were found in men compared to women with a ratio of 2.26:1, with an average age of 25.7 years of patients (15–54 years), the area of burns is 20–50% in about 45.87% of cases [3]. In adults, the most etiologic cases of burns in RSCM in 2012–2016 were 53.1%; hot water 19.1%; electricity

14%; 5% contact; and chemistry 3%, while children mostly caused by hot water 52%, fire 26%, contact 15%, electricity 6%, and chemistry 1% [3].

The purpose of this study was to determine the epidemiological data and characteristics of burn patients at Dr. Soedarso General Hospital. The results of this study are expected to be additional data on the epidemiology of burns in Indonesia.

Methods

The research design used a retrospective study. The sampling method was non-random consecutive sampling. The population of this study were all burn patients at Dr. Soedarso General Hospital in the period August 2017–December 2020. Medical record data is in the form of patient demographic data in the form of gender, age, etiology of burn, burn depth, and total burn area/total body surface area (TBSA), and mortality data. Age was divided into children (≤ 18 years) and adults (> 18 years). Data analysis using the IBM SPSS Statistics 23 application.

Results

The number of burn cases in Dr. Soedarso General Hospital in the period August 2017–December 2020, there were 108 respondents. Where the most cases were found in 2019, total of 50 (46.3%) respondents, in 2020 there was a decrease in cases, there were 20 (18.5%) respondents (Figure 1).

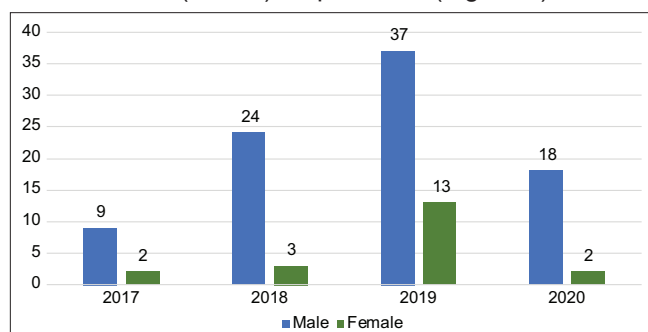


Figure 1: Burn patients during 2017–2020

The most cases of burns occurred in males 88 (81.5%) and 20 (18.5%) females, with a male-to-female ratio of 4.4: 1. Patients were children (≤ 18 years), total of 51 (47.2%) respondents and adults (>18 years) 57 (52.8%) respondents (Table 1).

Table 1: Distribution of sex and age

Sex	≤ 18 years n (%)	>18 years n (%)	Total n (%)
Male	37 (34.2)	51 (47.2)	88 (81.5)
Female	14 (13)	6 (5.6)	20 (18.5)
Total	51 (47.2)	57 (52.8)	108 (100)

Judging from the etiology of burns, the most cases were caused by fire, total 38 (35.2%) respondents. The most cases of burns in male with etiology were caused by electricity, 37 (34.3%) cases, while in female were caused by scald 12 (11.1%). In addition, adults (>18 years) were most affected by burns, total of 57 (52.8%) respondents with the most etiology of electricity 29 (26.9%) respondents (Table 2).

Table 2: Distribution of burns etiology by sex and age

Parameter Etiology	Male n (%)	Perempuan n (%)	≤ 18 years n (%)	>18 years n (%)	Total n (%)
Flame	30 (27.8)	8 (7.4)	20 (18.5)	18 (16.7)	38 (35.2)
Electric	37 (34.3)	0 (0)	8 (7.4)	29 (26.9)	37 (34.3)
Scald	21 (19.4)	12 (11.1)	23 (21.3)	10 (9.3)	33 (30.6)
Chemical	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Contact	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	88 (81.5)	20 (18.5)	51 (47.2)	57 (52.8)	108 (100)

Judging from the depth of burns, the most cases were 2nd-° burns with a total of 77 (71.3%) respondents. Adults (>18 years) experienced more cases of burns, 57 (52.8%) respondents with IIAB degree burns 36 (33.3%) respondents (Table 3).

Table 3: Distribution of depth of burns for sex and age

Parameter Depth of Burns	Male n (%)	Female n (%)	≤ 18 years n (%)	>18 years n (%)	Total n (%)
IIAB	58 (53.7)	19 (17.6)	41 (38)	36 (33.3)	77 (71.3)
III	30 (27.8)	1 (0.9)	10 (9.3)	21 (19.4)	31 (28.7)
Total	88 (81.5)	20 (18.5)	51 (47.2)	57 (52.8)	108 (100)

The TBSA was 1–10% in 43 (39.8%) respondents. Most of them occurred in male gender,

total of 88 (81.5%) respondents and in adult (>18 years) 57 (52.8%) respondents (Table 4).

Table 4: Distribution of TBSA by sex and age

Parameter TBSA (%)	Male n (%)	Female n (%)	≤ 18 years n (%)	>18 years n (%)	Total n (%)
1–10	35 (32.4)	8 (7.4)	21 (19.4)	22 (20.4)	43 (39.8)
11–20	24 (22.2)	4 (3.7)	9 (8.3)	19 (17.6)	28 (25.9)
21–30	14 (13.7)	5 (4.6)	13 (12)	6 (5.6)	19 (17.6)
31–40	7 (6.5)	1 (0.9)	3 (2.8)	5 (4.6)	8 (7.4)
41–50	3 (2.8)	0 (0)	3 (2.8)	0 (0)	3 (2.8)
51–60	4 (3.7)	0 (0)	1 (0.9)	3 (2.8)	4 (3.7)
61–70	0 (0)	1 (0.9)	1 (0.9)	0 (0)	1 (0.9)
71–100	1 (0.9)	1 (0.9)	0 (0)	2 (1.9)	2 (1.9)
Total	88 (81.5)	20 (18.5)	51 (47.2)	57 (52.8)	108 (100)

The hospital length of stay we found that median was 10.00 (1.00–96.00) days. The length of stay mean was 16.15 days. The study found that 57 (52.8%) patients were treated for 1–10 days (Table 5).

Table 5: Distribution of hospital length of stay on burn patients

Parameter	Day n (%)	Mean \pm SD	Median (Min; Max)
Length of stay		16.15 \pm 17.145	10.00 (1; 96)
1–10	57 (52.8)		
11–20	24 (22.2)		
21–30	11 (10.2)		
31–40	9 (8.3)		
41–100	7 (6.5)		
Total	108 (100)		

Cases of mortality rate in male were 6 (5.6%) respondents and 2 (1.9%) women respondents. Then, in children (≤ 18 years) cases, total of 3 (2.8%) respondents and adults (>18 years) 5 (4.6%) respondents. The etiology of the cause of death was mostly caused by flame for 3 (2.8%) respondents and scald for 3 (2.8%) respondents (Table 6).

Table 6: Distribution based on life and death rates

Parameter	Lived cases n (%)	Died cases n (%)	Total n (%)
Gender			
Male	82 (75.9)	6 (5.6)	88 (81.5)
Female	18 (16.7)	2 (1.9)	20 (18.5)
Age			
≤ 18 years	48 (44.4)	3 (2.8)	51 (47.2)
>18 years	52 (48.1)	5 (4.6)	57 (52.8)
Etiology			
Flame	35 (32.4)	3 (2.8)	37 (35.2)
Electric	35 (32.4)	2 (1.9)	36 (34.2)
Scald	30 (27.8)	3 (2.8)	33 (30.6)
Chemical	0 (0)	0 (0)	0 (0)
Contact	0 (0)	0 (0)	0 (0)
TBSA (%)			
1–10	43 (39.8)	0 (0)	43 (39.8)
11–20	28 (25.9)	0 (0)	28 (25.9)
21–30	19 (17.6)	0 (0)	19 (17.6)
31–40	6 (5.6)	2 (1.9)	8 (7.4)
41–50	2 (1.9)	1 (0.9)	3 (2.8)
51–60	2 (1.9)	2 (1.9)	4 (3.7)
61–70	0 (0)	1 (0.9)	1 (0.9)
71–100	0 (0)	2 (1.9)	2 (1.9)
Total	100 (92.6)	8 (7.4)	108 (100)

Discussion

This study is an epidemiological study and the characteristics of burns at Dr. Soedarso General Hospital. The data in this study came from patient medical records; This hospital is a health service provider in the tiered referral system in Indonesia. Burn cases were also referred to this hospital. All burn cases were examined and managed by a plastic surgeon.

This research study found the total cases of burns in Dr. Soedarso General Hospital, namely 108

respondents in the 2017–2020 period. Research conducted by Wardhana *et al.* at Cipto Mangunkusumo Hospital in Burns Unit in 2013–2015 found 414 respondents [6]. In 2020, the COVID-19 pandemic resulted in a decrease in burn cases. This also happened in the UK in a study conducted by Azzam Farroha which had a 33% reduction in cases [7].

Burns were more common in males than females with a ratio of 4.4:1. These results are consistent with research conducted by Frans *et al.* [8], Wardhana *et al.* [6], and Pande *et al.* [9]. Males are more often exposed to burns due to the surrounding environment and work risks [6]. From our observations, it was found that the most frequent burn cases were in adults (>18 years), total 57 (52.8%) respondents. This study was supported by Zheng *et al.* it also found that more burn cases occurred in adults (52.5%) [10]. In this study, flame (35.2%) and electric (34.3%) were found to be the most common causes. The results of KC Pande's research which found that the etiology of burns was mostly caused by scald (78.2%) due to boiling water, especially when it occurred at home [9]. Research on electrical burns conducted by D. Kym in South Korea In 2005–2011, 625 patients were found, most of whom were workmen or electricians, it was said that electric burns resulted in a high rate of morbidity and mortality as well as serious tissue damage [11]. The mortality rate obtained was 0–21.7% [11]. Most of the 2nd-^o burns (68.9%). This result is in accordance with the research conducted by Fiera Avriilia Ferdianty and Santi Devina, namely, 2nd-^o burns of 81.3%, mostly in adults 50.7% [12].

Children (≤18 years) were most often exposed to scald (21.3%). Research conducted by Grivna *et al.* [13], Palmieri *et al.* [14] and Frans *et al.* [8] stated that hot water, hot soup, and hot oil are the most common causes of burns in the house.

The median length of stay in the previous study by Wardhana *et al.* [6] was 11.00 days, Yao *et al.* [15] study found 11.00 days. The study conducted by Louise *et al.* [16] found several causes that caused patients to be treated for a long time in the hospital, namely burn depth, burn location, infection or sepsis, and the need for surgical intervention or dressing change.

The mortality rate found in this study was 7.4%, in a previous study conducted by Nungki Ratna Martina and Aditya Wardhana it was 26.7% [17]. The cause of death in burn cases was caused by septicemia (42.1%), multiple failures. organs (31.6%), SIRS (Systemic Inflammatory Response Syndrome) (17.6%), and acute respiratory failure (8.7%) [17].

In this study, additional data were limited, such as the socio-economic status of the patient, the comorbid illnesses suffered, and the location of the burns that were incomplete, thus limiting the analysis of patient characteristics data. For future researchers, it is advisable to look for patient mortality rates, cure rates, complications, and prognosis of burn patients.

Conclusion

This study describes the epidemiology and characteristics of burn patients at Dr. Soedarso General Hospital in the period August 2017 to December 2020, cases of burns in children (≤18 years) were more often caused by scald, while in adults (>18 years) by electric and flame.

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