



## The epidemiology of burns in Indonesia's national referral burn center from 2013 to 2015



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### ABSTRACT

**Introduction:** Burn injury is one of the leading causes of disability and death, particularly in low and middle-income countries, yet the epidemiology of burn in Indonesia is rarely reported. We aim to obtain the sociodemographic characteristics of burn patients in Cipto Mangunkusumo General Hospital's Burn Center.

**Methods:** A cross sectional study design was used and the medical records of patients with burns admitted to the Burn Center of Cipto Mangunkusumo Hospital between January 2013 and December 2015 were evaluated.

**Results:** A total of 414 subjects were involved in this study. Of these, 284 (68.6%) subjects were >18 years old, while 130 (31.4%) were ≤18 years old. The highest proportion of admission was from the 1 to 4 years old age group. Since the pediatric population is not within the working-age population, most of the patients in the pediatric group (108 patients; 82.3%) did not have an occupation, making "Not Working" group as the most common occupational profile, while 82 (28.9%) of the adult population were laborers. Scald was the cause of burn in 66 (50.8%) subjects the pediatric group, whereas the burns in 201 (70.8%) adult subjects were caused by flame.

**Conclusion:** We found that children below 5 years of age are at the highest risk of acquiring burns. Scald was the major cause of burns in the pediatric population, while flame was the main etiology in the adult group.

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### 1. Introduction

Recently, burns have risen to be a major cause of morbidity and mortality in low and middle-income countries. Burns account for 1% of the global burden of diseases [1], cause more than 7.1 millions injuries, the loss of almost 18 million disability-adjusted life years (DALYs), and more than 265,000 deaths worldwide annually [2]. Moreover, burns are ranked 4th among all injuries [3]. Burns cause considerable morbidity and mortality and result in substantial physical, psychological and economic loss [4–6]. Not only fatal for patients themselves, burns also put a tremendous financial burden to the public healthcare system because of the large amount of resources needed for treatment. Low socioeconomic status, poor living conditions, illiteracy, overcrowding and floor level cooking are risk factors frequently associated with burns [7–9]. Burns are also associated with prolonged hospital stay and mortality [10].

According to the World Health Organization [2], burns were ranked 9th in the overall mortality rank for people aged 5–14 years with an estimated 41,575 deaths; 15th for people aged 15–29 years with an estimated 49,067 deaths; and 15th for people aged 0–4 years with an estimated 62,655 deaths. Moreover, being the 7th most common injury in the world, the magnitude of death from burns was estimated to be 5% of all injuries, which was nearly a quarter of deaths due to traffic accidents [11].

In Indonesia, burns caused approximately 195,000 deaths annually [11]. The Cipto Mangunkusumo General Hospital Burn Center – the national referral center for burns in Indonesia – received more than 130 patients annually from all over the country. Our burn unit takes care of referred severe burn patients, as the hospital is a tertiary healthcare provider in a tiered referral system. Latest data regarding burns in Indonesia was obtained from the Ministry of Health (published in 2014), which revealed that burns was ranked 6th in unintentional injuries in Indonesia with a total of 0.7% [12]. Despite being considered as a pressing concern in Indonesia, analyses on demographic characteristics of patients

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with burns are scant. The last analysis of burn was a mortality analysis of burn patients in Cipto Mangunkusumo General Hospital (2009–2010) and a descriptive analysis in Soetomo General Hospital (2007–2011). Both studies found that mortality caused by burns remains high, 34% (in adults) and 14.5%, in respective hospitals [13,14]. We aimed to investigate the characteristics of patients with burns in Indonesia.

## 2. Materials and methods

A cross sectional study design was used. We evaluated the medical records of patients with burns admitted to the Burn Center of Cipto Mangunkusumo Hospital between January 2013 and December 2015 to obtain demographic characteristics of the study population, which included occupational burns profile, origin of the referral, etiology of burns, total body surface area (TBSA), length of stay, and mortality. "Others" consists of readmitted patients, unless stated otherwise, and "unknown" refers to of unavailable data.

Statistical analysis was performed using IBM SPSS Statistics 23 for Mac. One-Way ANOVA was used to compare the means of more than two groups. *P* value less than 0.05 was considered as statistically significant. We attempted to perform comparative and correlative data analysis, but failed to do so on most of our data due to its abnormal distribution.

## 3. Results

### 3.1. Admissions and monthly admissions

The average number of admissions was  $11.0 \pm 4.13$  patients per month and 138 patients per year; number of visits per year is presented in Fig. 1. Statistical analysis showed  $p = 0.01$  for average monthly admission. The lowest average of monthly admission in 2013–2015 period was in February (8.67) and the highest average was in July and December (13.33).

### 3.2. Age and gender prevalence

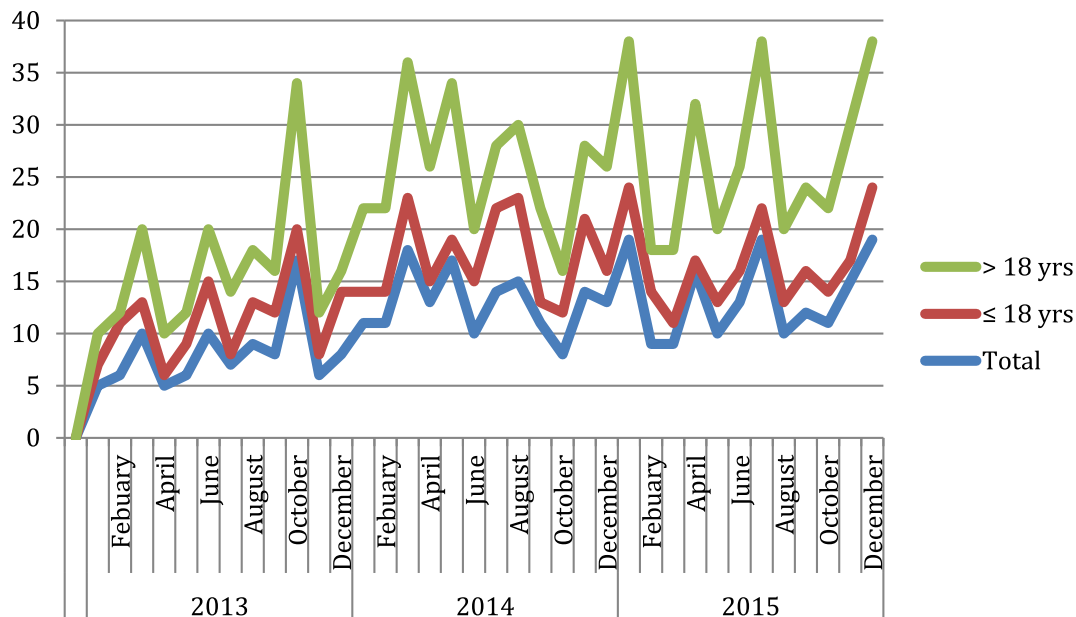
In this study, a total of 414 subjects were recruited. Of these, 284 (68.6%) subjects were >18 years old, while 130 (31.4%) were ≤18 years old. Those in the age group of 1–4 years old comprised the highest proportion of admission (Table 1), which includes 60 patients or 14.49% from the total number of admissions. The majority of the subjects were males (Fig. 2), with a ratio of 1.22:1 between males and females.

### 3.3. Occupational profile

In this study, 107 (82.3%) of the pediatric population did not have occupation whereas 82 (28.9%) of the adult population were laborers. Distribution of the occupations is presented in Table 2.

**Table 1**  
Distribution of admission by age group.

Age group	2013	2014	2015	Total
0–1	7	3	4	14
1–4	14	25	31	60
5–9	7	7	7	21
10–14	7	11	2	20
15–19	5	7	7	19
20–24	4	18	31	53
25–29	9	15	12	36
30–34	8	11	13	32
35–39	7	22	12	41
40–44	10	10	15	35
45–49	3	8	16	27
50–54	6	4	7	17
55–59	4	4	7	15
60–64	2	3	4	9
65–69	1	4	3	8
70–74	2	2	0	4
75–79	0	1	1	2
80–84	0	0	0	0
85+	1	0	0	1
Median	27.07 (0.41–89)	27.23 (0.08–75)	29.31 (0.67–76)	



**Fig. 1.** Monthly admission divided by age groups (pediatric and adult).

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