Epidemiology of Burn Injuries in Cipto Mangunkusumo Hospital from 2009 to 2010

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Background: Burns are one of the most devastating conditions encountered in medical world. It affects people of all ages, from the very young to the elderly, and represents an assault on all aspects of the patient, from the physical to the psychological.
Method: The collection and analysis of burn patients admitted to Cipto Mangunkusumo Burn Centre between January 2009 and December 2010 were studied retrospectively in terms of admissions, age, sex, extent of burn, causes of burns, referral, length of hospital stay (LOS) and mortality.
Result: A total of 303 burn patients were admitted with the male to female ratio is 2.26 : 1 and the mean age of admission is 25.7 years (15-54 yr). Most of the patient presented with 20-50% extent of burn (mean 45.87%). The most common cause of burn injury is LPG at 30.4 % followed by flame at 25.7% and by scald at 19.1%. The overall mean LOS and mortality are 13.72 days and 34%.
Conclusion : LPG is the major cause of burn and the mortality are 42.4%. Because of level of the mortality, the prevention and management of LPG and the safety of the product of LPG should be given in terms of government regulations.
Keywords: epidemiology, burn, LPG, mortality.

Latar belakang : Luka bakar adalah salah satu kondisi berat di bidang kesehatan. Karena mempengaruhi manusia dari berbagai usia, mulai yang muda sampai geriatri dan menyerang semua aspek kehidupan pasien, mulai dari fisik sampai psikis.
Metode : Pengumpulan data pasien luka bakar di Unit Luka Bakar RSCM antara Januari 2009 sampai Desember 2010 dianalisis berdasarkan usia, jenis kelamin, luas luka bakar, sebab luka bakar, rujukan, lama rawat inap dan angka kematian.
Hasil : Dari 303 pasien yang dirawat, perbandingan antara laki-laki dan wanita adalah 2,26:1 dan usia rata-rata adalah 25,7 tahun (15-54 tahun). Sebagian besar pasien dengan luas luka bakar 20-50% adalah 45,87%. Penyebab terbanyak karena LPG sebanyak 30,4% diikuti dengan api (25,7%) dan air panas (19,1%). Rata-rata pasien dirawat selama 13,72 hari dan angka kematian sebanyak 34%.
Kesimpulan : LPG merupakan penyebab utama luka bakar dengan angka kematian sebanyak 42,4%. Karena itu, pencegahan dan manajemen dari LPG dan keamanan LPG harus diberikan sebagai regulasi Pemerintah.
Keywords: epidemiology, burn, LPG, mortality.

Burns are one of the most devastating conditions encountered in medicine. It affects people of all ages, from the very young to the elderly, and represents an assault on all aspects of the patient, from the physical to the psychological. Burns and their sequelae are responsible for significant mortality and morbidity worldwide. In developing countries, the incidence of burn injuries is even higher due to poverty, overcrowding and illiteracy.[1] Management of burns and their sequelae even in well-equipped, modern burn units of advanced affluent societies remains demanding and extremely costly.[2] Like other injury mechanisms, the prevention of burns requires adequate knowledge of the epidemiological characteristics and associated risk factors, it is hence important to define clearly, the social, cultural and economic factors, which contribute to burn causation.[2] The epidemiology of burn injuries in a geographical area is important to allow evaluation of the needs of burn injured patients. The study in a particular area allows comparison with other areas and possible improvements in treatment. It enables the planning for future needs in Burns Centers and

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the need for referral and transport of victims. It can focus on burn prevention in a given area and can enable the assessment of results such as mortality rates.[3]

METHODS

Data of hospitalized burns patients were taken from medical record over a 2-year period from January 2009 to December 2010. Patient characteristics (e.g. age, gender), causes, diagnose, referral, length of stay and outcome were examined. Statistical computations were conducted with SPSS, Version 17.0 for Windows.

RESULT

A total of 303 patients were registered during the 2-year study period. The most frequently hospitalized burned patients were adult 15-54 years (68%), followed with skin graft. The study population consisted of 210 (69.3%) male and 93 (30.7%) female, giving an overall male to female ratio of 2.26:1.

Table 1. Patients distributions according to the age and sex

Age	Female	Male
< 1 yr	0	3
1-4 yr	19	26
5-9 yr	6	16
10-14 yr	4	8
15-54 yr	57	149
55-64 yr	6	6
65-74 yr	0	2
75-84 yr	1	0

Most burn injury that hospitalized were patient with extent of burns 20-50% (45.87%). From that number (45.87%), about 60% were died.

Table 2. Distributions of extent of burns

Extent of burns	Patients
Burn < 20%	125
Burn 20-50%	139
Burn > 50%	39

LPG were the most common that cause burn (30.36%) followed by flame (25.74%) and scald (19.14%).

Table 3. Distribution of causative agent of burns

Cause	Patients
Scald	58
Flame	78
Chemical	11
Electrical	36
LPG	92

Table 4. Distribution of referral patients

	Burn < 20%	Burn 20-50%	Burn > 50%	Total
RSCM	22	19	2	43
Referral from other	103	120	37	260

Of 303 hospitalized burn patient, 103 deaths were recorded. The overall mortality rate of hospitalized burn patients was 34%. In 2009, the mortality rate was 37.4% and in 2010 was 32.3%.

Table 5. Burn Patients Mortality

	Death	DWP	Ambulatory
Burn < 20%	9	32	84
Burn 20-50%	60	28	51
Burn > 50%	34	3	2

DWP: discharge without permission

DISCUSSION

The domestic environment, especially the modern home, is becoming more and more a source of risk, both as a result of technological progress (gas, electricity, chemical substances) and because parents are nowadays more often away from the home and have less time to look after their children.[2] In this study, the major

cause of burn in 2009-2010 was LPG. Liquefied petroleum gas (LPG) is a fuel that has been used widely for domestic purposes and also in agriculture and industry. It is a mixture of commercial butane and commercial propane gases (60:40) that is obtained from crude oil in petroleum processing plants. It is liquefied by pressurizing and by cooling. The boiling point is less than 0°C (-2°C for commercial butane and -45°C for commercial propane). Evaporating LPG cools and causes cold burns to the skin and eyes. It is also a respiratory irritant and asphyxiant.[4] LPG explosion-flame are very important because it forms the main part of flame burns and the injuries affect patients as severe as flame burn patients. So, the usage of the LPG tubes must be controlled and people must be informed of the precautions.[5]

Burns are much more common in low and middle income developing countries than in the U.S. and Europe due to poverty, substandard living condition, overcrowding, illiteracy and limited access to burn care.[2] Several risk factors can be identified in a community. As a general rule, high population density, illiteracy, and poverty are the main demographic factors associated with a high risk of burns. Based on studies conducted in both developing and industrialized countries, general conclusions about SES (socioeconomic status) and burn risk can be suggested. First, burn risk is associated with poverty, lack of education and unemployment. Second, large and single-parent families are at increased risk of burns. Third, substandard housing, including the lack of running water, and crowding increases the risk for burn.[2]

An outcome is something that follows from an action or situation—a result or consequence. In a burn care service, outcome measurement enables the health status of an individual or cohort to be determined, after burn treatment has been provided. There are several objectives to be achieved by measuring outcomes. These include setting and maintaining standards of care within a service; comparing and monitoring services nationally and internationally; aiding the commissioning of services; interpretation of research and audit findings, for quality improvement, cost containment and cost effectiveness purposes and for facilitating patient assessment and clinical management. Historically, mortality and length of stay have been the key reported outcomes within burns research; however, they are proximate indicators of clinical effectiveness rather than true outcome measures. For example, length of stay is influenced by many factors other than the effectiveness of medical treatment, such as geography or co-morbidity. The WHO have published the International Classification of Functioning (ICF). This is a tool which sets out a generic framework for assessment of function, encompassing activity levels, overall levels of participation and social roles. [6]

Prevention is a cost-effective strategy. The fact that the social cost of burns in general is high, it costs approximately U.S.$ 1000 per patient per day to provide satisfactory burn care in the Western world. This is clearly not possible for most developing country populations due to limited resources, poor knowledge of first aid treatment, and inaccessibility to timely modern medicine and to sophisticated skills and technologies.[2]

Legislation is a crucial passive prevention tool. The intention is to obtain modifications in the relevant laws by promoting prevention at national and local levels, together with the promulgation of safety standards to be observed not only in the planning and realization of particular structures and buildings, but also in the legal regulation of industrial production to protect the public through product modification especially in the field of baby and children clothing, electric household appliances and toys, etc. Keeping, storage, use, sale, handling, transportation or other disposition of highly flammable materials, including crude petroleum or any of its products, natural gas, and of explosives, including gunpowder, dynamite, fireworks and firecrackers are also strictly regulated. To provide for the public safety the transportation of liquid fuel over public highways is also restricted as well as the use of pyrotechnic devices and materials.[2]

CONCLUSION

This study is trying to provide a overview of hospitalized burn patients in Cipto Mangunkusumo Hospital, Jakarta. In order to evaluate changes in patterns of injury and whether the mortality rates have decreased or not. Recognizing these failures is the first step towards development of more effective burn care. The most common cause for burn was LPG, therefore the prevention programs for reducing the risk of burns because of LPG are controlled by the usage of LPG tubes and to inform users about the precaution.

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