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Relationship Between Cause, Degree, and Severity of Burns at Benyamin Guluh Kolaka Hospital, Southeast Sulawesi

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Abstract. Burn injuries present a global public health concern, causing around 180,000 deaths annually, with the majority occurring in low- and middle-income countries. This study, conducted at Benyamin Guluh Hospital in Kolaka, aimed to explore the relationship between burn causes and burn degrees and severity. Among 31 participants, scalding was the predominant cause (61.3%), and a significant relationship was found between causes and burn degrees ($p = 0.032$, $r = 0.235$). However, no significant relationship was observed between causes and burn severity ($p = 0.524$, $r = 0.143$). Understanding these connections can inform targeted interventions for burn patients, especially in the Southeast Sulawesi region.

Introduction

Burns are a global public health problem, causing approximately 180,000 deaths each year. Most occur in low and middle income countries and almost two-thirds occur in the African and Southeast Asian regions according to WHO.[1]

In many high-income countries, death rates from burns have been falling, and child death rates from burns are now more than 7 times higher in low- and middle-income countries than in high-income countries [1]. Non-fatal burns are a major cause of morbidity, including prolonged hospitalization, disfigurement and disability, often with stigma and denial. Burn injuries are one of the leading causes of loss of disability-adjusted life-years in low- and middle-income countries [1].

In 2004, nearly 11 million people worldwide suffered burns severe enough to require medical attention [1]. In Indonesia in 2018 there were 1.3% of burn sufferers with the highest prevalence in Papua province, namely 2.1%, while Southeast Sulawesi had 1% [2].

A study conducted at the RSCM Burns Unit from January 2011 – December 2012 explained that there were 275 burns patients, 203 of whom were adults. The number of deaths in adult patients was 76 patients (27.6%). Among patients who died, 78% were caused by fire, electrical burns (14%), hot water (4%), chemicals (3%), and metal (1%). Almost all burns are deep dermal (Grade 2) and full thickness (Grade 3). Causes of death were septicemia (42.1%), multiple organ failure (31.6%), systemic inflammatory response syndrome (17.6%), and acute respiratory distress syndrome (87.6%) [3].

Cedera akibat luka bakar, terutama luka bakar severe, accompanied by immune and inflammatory responses, metabolic changes, and distributive shock that are difficult to treat

and can lead to multiple organ failure. What is especially important is that injuries not only impact physical health, but also the patient's mental health and quality of life [4].

The cause of burns, percentage of burns, and cost are the main determining factors in wound care outcomes in burn patients [5], by knowing the various causes of burns and the degree of burns, it can be the basis for appropriate intervention for patients, especially in the Kolaka Regency area, Southeast Sulawesi.

Based on this, the researcher aims to determine the relationship between the cause of burns, the degree and severity of burns at Benyamin Guluh Kolaka Hospital, this research can be the basis for treating burn patients.

Method

This research is a quantitative research with a cross sectional study design [6]. This research was conducted in August 2020 at the Benyamin Guluh Kolaka Hospital with the population being patients suffering from burns and the sample in this study amounted to 31 samples with a total sampling technique in secondary sampling from 2018 to 2020. The instruments used in this research were questionnaire containing questions about the characteristics of burn patients, causes and degree of burns. The data analysis used is the lambda test to determine the relationship between the two variables.

Results and Discussion

The results of this research are as follows:

Characteristics of Burn Sufferers

Characteristics of burn sufferers based on age, gender, cause, degree and severity can be seen in table 1 below:

Table 1. Characteristics of Burn Sufferers in 2018-2020 at Benyamin Guluh Kolaka Hospital (n=31)

Characteristics	frequency (%)
Age (Year)	29,1
Min-Max	(1-78)
Gender (%)	
Male	20 (64,50)
Female	11 (35,5)
Cause (%)	
Hot water	19 (61,3)
Hot Oil	3 (9,7)
Fire	5 (16,1)
Electricity	4 (12,9)
Degrees (%)	
I	14 (45,2)
II	14 (45,2)
III	2 (6,5)
IV	1 (3,2)
Severity Level (%)	
Minor	9 (29,0)
Moderate	17 (54,8)
Mayor	5 (16,1)

Based on the table above, the average age of burn sufferers is 29 years with the lowest age being 1 year and the highest age being 78 years. Meanwhile, 64.5% were male, with the most common cause being hot water (61.3%), degree I and degree II at 45.2% each and moderate severity being the highest at 54. 8%.

The results of this study show that men suffer more burns than women, in accordance with studies conducted in China that men are more at risk of getting burns because the patient's work area is at risk of getting burns [7], as in the research results This means that men have higher degrees of burns than women and the causes of electrical burns are all suffered by men.

The causes of burns from the results of this research are caused by hot water, hot oil, fire and electricity. Meanwhile, the severity levels are minor, moderate and major. The main cause of burns is hot water, according to the 2013-2015 study at RSU Cipto Mangunkusumo that the most common cause of burns is caused by hot water and the second is caused by fire [8], as well as research in Iran that hot liquids are the biggest cause of burns [9], research at a burn center also showed that boiling water burns were the most common cause of hospitalization in burn patients [5]. Most skin burns occur at home and the most common cause is hot water, especially on the hands [10].

According to research in India, the percentage of burns caused by electricity is lower than those caused by fire and hot water [11], This is directly proportional to this research, which states that electrical burns have a percentage of 12.9%.

Relationship between causes and degrees of burns

The relationship between causes and degree of burns can be seen in table 2 below:

Table 2 Relationship between causes and degrees of burns at Benyamin Guluh Kolaka Hospital

Variable		Degrees I	II	III	IV	Total	*r*	*p*
Cause	**Hot Water**	9	8	2	0	19		
	Hot Oil	2	1	0	0	3		
	Fire	3	1	0	1	5	0,235	0,032
	Electricity	0	4	0	0	4		
	Total	14	14	2	1	31		

Based on table 2 above, there is a relationship between the causes and the degree of burns with p = 0.032 (p<0.05) with a value of r = 0.235, which means there is a small correlation. The results of this study show that there is a relationship between the cause and the degree of burn injury with p = 0.032 (p<0.05) with a value of r = 0.235, which means there is a small correlation. Burns caused by hot water have degrees I, II and III. Burns caused by hot oil have degrees I and II, burns caused by fire have degrees I, II and IV while burns caused by electricity have degree II.

In a study, it was revealed that burns exposed to hot water/liquids and fire were the most common burns and the study also revealed that most burns were second degree in line with this research, this can be explained by the mechanism of injury: when a person comes into contact with hot or boiling water, hot tea, chemicals, electricity, and radiation, patients may present with different symptoms. burns of anatomical areas, where the extremities are common due to manipulation of different objects [12].

Relationship between causes and severity of burns

The relationship between causes and severity of burns can be seen in table 3 below:

Table 3 Relationship between causes and severity of burns at Benyamin Guluh Kolaka Hospital

Variable		Severity Level Minor	Moderate	Mayor	Total	*r*	*p*
Cause	**Hot Water**	4	13	2	19		
	Hot Oil	2	1	0	3		
	Fire	2	2	1	5	0,143	0,524
	Electricity	1	1	2	4		
	Total	9	17	5	31		

Based on the statistical test results in table 3 above, it states that there is no relationship between the cause and severity of burns with a value of p=0.524 (p>0.05) and a value of r=0.143. The results of this study show that there is no relationship between the cause and severity of burns with a p value = 0.524 (p> 0.05) and an r value = 0.143. Burns caused by hot water are mostly at the moderate level, followed by minor and major levels. Burns caused by hot oil have minor and moderate levels of exposure, burns caused by fire can cause minor, moderate and major damage. while burns caused by electricity mostly cause major, minor and moderate damage.

This research is in line with other research which states that burns caused by hot water and fire have moderate and major severity. This can be explained by the common cause of burns in this study being burns that affect the outer layer of the skin (epidermis) and part of the second layer of skin (dermis) exposing the body to infection. [12]. The relationship between the cause of the burn, the percentage of burns, and the cost is a major determining factor in treatment outcomes [5]

Conclusion

The conclusion of this study is that there is a relationship between the cause and the degree of burn injury, but there is no relationship between the cause and the severity of the burn injury.

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