

Profile of Child Burn Patients in the Plastic Surgery Department at a Tertiary Hospital in Surabaya, Indonesia

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ABSTRACT

Background: Burns are injuries to the skin that involve two main layers, namely the epidermis outside as a thin layer and the dermis inside as a thick layer. Burns can be associated with significant morbidity and mortality because burns are associated with immune reactions and inflammation, metabolic changes, and distributive shock and require a long process in the healing process. It is imperative that burns not only affect the physical health but also the mental health and quality of life of the patient. **Objective:** To determine the profile of basic data and clinical data of burn patients in children treated at Dr. Soetomo Hospital in 2020-2022. **Methods:** This study used secondary medical record data with a retrospective method and was presented descriptively. The study sample was taken by total sampling using all patients who met the inclusion criteria. **Results:** There were 44 child burn patients treated at RSUD Dr. Soetomo who met the inclusion criteria. Child burn patients were dominated by patients aged 0-5 years and males. It was found that the most common cause of burns in children was hot water, the most depth degree was degree IIB, the most location of burns on the upper extremities, the area of burns was 10-20%, the most severity degree was severe, and the majority of patients were treated for the <1 month. Patient outcome was dominated by patients discharged in a cured/improved condition.

Keywords: burns; children; burn depth; degree.

INTRODUCTION

Wounds are defined as the loss or damage of part of the body tissue. Wounds are generally categorized into two types: open wounds and closed wounds. One type of open wound is a burn injury, which ranks as the fourth most common accident worldwide, following traffic accidents, falls, and physical violence [1].

Burn injuries are injuries to the skin involving its two primary layers: the thin outer epidermis and the thick inner dermis. There are various types of burns, including chemical burns, acid burns, electrical burns, and thermal burns.

Most minor and superficial burns result in only local injuries, while more extensive and deeper burns can provoke severe systemic responses [2]. Burn injuries are associated with significant morbidity and mortality due to their effects on immune and inflammatory responses, metabolic changes, and distributive shock, often requiring prolonged recovery processes. It is crucial to note that burns impact not only the physical health of patients but also their mental health and quality of life [3]. Burn injuries affect not only adults but also children.

Burn injuries in children represent one of the primary epidemiological challenges worldwide.

Nearly a quarter of all burn injuries occur in children (under 16 years old), with the majority involving those under five years old [4]. Most child burn injuries are thermal injuries caused by kitchen appliances and other household equipment. Additionally, many cases in children result from exposure to hot water [5]. Child burn cases are a significant health issue but remain underreported compared to adult cases.

During the period of 2020–2022, the profile of child burn cases treated at the Plastic Surgery Department of Dr. Soetomo General Hospital in Surabaya has not been extensively studied or analyzed. Therefore, this study aims to conduct an in-depth investigation to contribute to the collection and presentation of burn case data as part of a strategic approach for the future management of burn care services.

METHODS

This research is a descriptive study that involves collecting retrospective data on pediatric burn patients treated in the Plastic Surgery Department at Dr. Soetomo General Hospital, Surabaya. The data were obtained from patient medical records at the hospital. The study focuses on several key variables, including the patient’s age, gender, cause of the burn, location of the burn, severity of the burn, and total burn area. The data collection process in this study involved reviewing medical records and recording the information on data collection sheets. This process was conducted during regular working days and hours.

ETHICS

The Dr. Soetomo General Academic Hospital’s Committee for Research Ethics has accepted this study (No. 2731/108/4/II/2024). To ensure confidentiality, the identities of the patients are not disclosed in this study. The authors will be the only ones to keep and utilize all of the collected data for the aim of this research.

RESULTS AND DISCUSSION

The results of this study were obtained from the medical records of child burn patients treated in the Plastic Surgery Department at Dr. Soetomo General Hospital, Surabaya, during the 2020–2022 period. A total of 44 child burn patients were admitted and treated at Dr. Soetomo General Hospital during this time.

TABLE 1: Age group distribution of burn patients in Children.

Age	Frequency (n)	Percentage (%)
0–5 Years	34	77
6–11 Years	7	16
12–17 Years	3	7
Total	44	100

Based on the findings from Dr. Soetomo General Hospital in Surabaya, it was observed that 77% of child burn patients, or 34 out of 44 cases, were

within the age range of 0–5 years. Children in this age group are at higher risk of burn injuries for several reasons. At this stage, they are typically active and highly curious but lack a full understanding of the dangers around them. Their underdeveloped motor skills increase the likelihood of accidents, such as being scalded by hot water or touching hot objects. Additionally, the skin of young children is thinner than that of adults, making it more susceptible to deeper burns and severe damage [6].

Insufficient supervision, especially in-home environments like kitchens or bathrooms, further elevates the risk of burn incidents, particularly those caused by boiling water or hot surfaces [7]. Research also indicates that most burn cases in young children require intensive care, highlighting the critical importance of parental education and supervision in preventing such incidents [8].

TABLE 2: Gender distribution of burn patients in Children.

Gender	Frequency (n)	Percentage (%)
Male	29	66
Female	15	34
Total	44	100

Based on research conducted at Dr. Soetomo General Hospital, Surabaya, the majority of burn patients among children were male, comprising 66% or 29 cases. Boys are more frequently affected by burn injuries than girls due to several factors, primarily related to behavior and environment. Generally, boys tend to be more active and engage in higher-risk activities, such as playing with sources of heat, fire, or other hazardous objects. This behavior is associated with their natural tendency to be more curious and less cautious in physical interactions, often placing them in dangerous situations [9].

Additionally, further studies suggest that boys are often more inclined to experiment with new things without fully considering the risks involved, whereas girls may tend to be more cautious in similar situations [10]. This is supported by prior research conducted by Toma, A., et al. (2024) [9], which noted that male patients are more commonly observed because boys generally exhibit higher levels of physical activity and impulsiveness compared to girls, leading to a greater likelihood of accidents and injuries.

TABLE 3: Cause Distribution of Burn Patients in Children.

Cause of Burn	Frequency (n)	Percentage (%)
Fire	13	30
Hot Oil	3	7
Hot Water	27	61
Chemical	1	2
Total	44	100

According to the study, burn injuries in children treated at Dr. Soetomo General Hospital, Surabaya were predominantly caused by hot water, accounting for 27 cases or 61%. Burns caused by hot water often occur due to children's frequent interactions with household environments, such as kitchens, and bathrooms, or during the consumption of hot beverages. This aligns with research indicating that the majority of burn cases in children, particularly those under five years old, result from exposure to hot water or hot liquids such as milk and tea, which are commonly consumed in households [11].

The findings of this study are consistent with research conducted by Nationwide Children's Hospital [12], which revealed that hot water from bathtubs is the leading cause of over half of burn cases in young children. Early childhood skin is thinner and more susceptible to deep burns, even at lower temperatures compared to adults. Additionally, children in this age group are increasingly active and curious about their surroundings, which heightens the risk of hot water spills.

TABLE 4: Burn location distribution of burn patients in Children.

Burn Location	Frequency (n)
Face	25
Neck	4
Chest	25
Abdomen	17
Back	20
Upper Extremities	29
Lower Extremities	25
Genitalia	5

Note: one patient can have more than 1 burn site.

The study found that the most common burn location in children treated at Dr. Soetomo General Hospital, Surabaya, was the upper extremities, with 29 cases. Young children, in particular, have underdeveloped self-protective reflexes, making them slower to withdraw their hands from sources of danger. The upper extremities are also frequently exposed because they are often positioned closer to hazards, such as cups containing hot water or other hot objects within a child's reach.

These findings align with other studies, such as Van Niekerk et al. (2010) [13], which reported that the upper extremities are the most common burn locations in children, especially in younger age groups. The primary contributing factor is the involvement of the hands and arms as children actively interact with their surroundings, such as reaching for hot objects or accidentally touching hot water or other heat sources.

TABLE 5: Distribution of burn severity in Children.

Burn severity	Frequency (n)	Percentage (%)
Mild	4	9,1
Moderate	7	15,9
Severe	32	72,7
No data	1	2,3
Total	44	100

Burn classifications according to the American Burn Association (ABA) are divided into three categories based on severity Mild burns include first- or second-degree burns involving less than 10% of the total body surface area (TBSA) in adults or less than 5% TBSA in children and the elderly, without affecting critical areas such as the face, hands, feet, or perineum. Moderate burns involve 10–20% TBSA in adults or 5–10% TBSA in children and the elderly. These burns may include injuries to higher-risk areas but are not accompanied by systemic complications or inhalation injuries. Severe burns involve more than 20% TBSA in adults, more than 10% TBSA in children and the elderly, or burns affecting the face, hands, feet, perineum, or third-degree burns covering more than 5% TBSA. These burns are often associated with inhalation injuries or other trauma [14].

The study results revealed that the majority of child burn patients at Dr. Soetomo General Hospital, Surabaya, during the 2020–2022 period had severe burns, accounting for 72.7% or 32 patients.

This finding aligns with the study conducted by Jeschke et al. (2020) [15], which showed that children are more susceptible to severe burns due to their thinner skin and underdeveloped anatomical structures, making them more prone to deep burns when exposed to heat sources or chemicals.

TABLE 6: Distribution of burn area in Children.

Burn area	Frequency (n)	Percentage (%)
0-10%	8	18
10–20%	17	39
20–30%	10	23
>30%	9	20
Total	44	100

The study conducted at Dr. Soetomo General Hospital, Surabaya, found that the most common total burn area in children was between 10–20%, representing 39% or 17 patients. This indicates that most burn injuries in children are moderate in size significant enough to cause complications and require hospitalization, but not so extensive as to demand intensive care. Such burns often need close monitoring and appropriate medical treatment to prevent long-term effects, such as scarring or functional disabilities.

This finding is consistent with a study by Mok, Adams, and Holland in Australia [16], which reported that the majority of burn cases in children occur at home. These burns typically involve 10–20% of the total body surface area (TBSA) and are frequently caused by domestic accidents, such as spills of hot liquids like boiling water, tea, or coffee. Such incidents commonly happen in kitchens or dining areas, where children are exposed to potential hazards due to their natural curiosity and tendency to explore their surroundings.

The high occurrence of burns within this TBSA range highlights the need for improved parental supervision and greater awareness of safety measures at home. Prevention efforts, such as keeping hot liquids and dangerous objects out of children's reach and providing basic education on first aid for burn injuries, are crucial. Public health campaigns focused on burn prevention could significantly reduce the number and severity of these incidents, emphasizing the importance of creating a safer home environment for children.

CONCLUSIONS

The total number of child burn patients treated at the Plastic Surgery Department of Dr. Soetomo General Hospital, Surabaya, during the 2020–2022 period was 44 patients. Among them, there were 29 male patients and 15 female patients, with males accounting for the majority at 66% of cases. The age range of child burn patients during this period was between 0 and 17 years, with the highest incidence occurring in the 0–5 years age group, comprising 77% of the cases.

The most common cause of burns in children was scalding from hot water, which accounted for 61% of the cases. The most frequently affected body area was the upper extremities. Regarding the severity of burns, the majority of patients were classified as having severe burns, comprising 72.7% of cases. And lastly, the most common total burn surface area (TBSA) was 10–20%, observed in 39% of the patients.

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