

# Epidemiology of Hand Burn in Albania 2011-2016

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## Abstract

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**INTRODUCTION:** Hand burns occur commonly both as part of larger burn injuries as well as isolated injuries.

**AIM:** To give an overview of epidemiologic features and outcome of burn hand patients who admitted to our Service. This study was performed at University Hospital Center "Mother Teresa" Tirana which is the only tertiary hospital in Albania.

**MATERIAL AND METHODS:** This prospective study included all patients who had combustion of the hands solely or hands accompanied with burns to other areas of the body, treated and followed up at our service during the years 2011-2016.

**RESULTS:** Of the 333 included burn patients, 64% were males. The median age of patients is 25.9 years. About half of patients belong to the age group 20-60 years (49.5%) and only 10.2% belong to the age of 60 years. In most of the cases (73.6%), the burn of hands is associated with the burn of the other anatomical region, mostly forearm.

**CONCLUSION:** The surgical treatment is used for less 30% that of patients. The undesirable results of the burn of hands are presented in the 33% of the patients. The contractures were the main unfavourable outcome of the burned hand.

## Introduction

Burns is the fourth most frequent traumatic cause in the world, following accidents, crashes or violence [1]. Burns are a major cause of global damage. The World Health Organization estimates an incidence of 1% and more than 300,000 people die each year from combustion-related fires [2].

In high-income countries, there is a reduction in the incidence of burns, the severity of burns, hospitalisation and mortality rates. But the prevalence of combustion is higher in developing countries than in developed countries, and this is related to the survival rate of burning patients in developed countries closely related to providing first aid and appropriate treatment after initial assessment [3] [4].

The adults are most likely to burn at home, outdoors or at work. Burning in adult males occurs more often outdoors and at work, while women usually live at home. At home, the most common cause is cooking since it is the most common activity. Greater older people often experience burns in the bathroom and then in the kitchen, while children are more often burned in the home environment (84%), and in 80% of cases of burns, children are rich. Due to damage to the skin and other organs, burning can lead to open wounds, disabilities, deaths and major economic consequences, deeply psychological and emotional complications [3].

Therefore, burning patients require not only acute treatment but also subsequent rehabilitation, reconstruction and long-term anti-scar therapy. Although 90% of combustion is preventable, burns

remain a major public health problem [5]. To improve the effects of preventive measures, it is necessary to recognise epidemiologic features and the unwanted frequency outcome in post burning phase.

## Material and Methods

In this prospective study were included all patients who had combustion of the hands solely or hands accompanied with burns to other areas of the body, treated and followed up at the Burns and Plastic Service of the University Hospital Center "Mother Teresa", Tirana, Albania during the years 2011-2016.

For each patient were collected demographic data (age in years, sex), anatomical region, an association of burned hand with other burned areas, the treatment used (surgical or conservative) unwanted post-burning outcomes (contractures, ulcerations, etc.). This study was accepted by the ethical committee of Tirana University of Medical Sciences, Tirana, Albania. All continuous variables were presented as means $\pm$ SD, and the frequencies of categorical variables were presented as percentages. Chi-square test was used to compare the proportions of categorical variables and student *t*-test to compare the mean of continuous variables. AP value $<$ 0.05 was considered significant.

## Results

The study included 333 patients with the burning of hands (Table 1).

**Table 1: Summary statistics of age by gender**

Gender	N	Mean	SD	Age, years			
				Min	Max	Median	IQR
Female	119	27.8	23.2	1	91	21.8	4.7 – 43.9
Male	214	31.2	21.4	0	91	27.6	13.0 – 50.5
Total	333	29.9	22.1	0	91	25.9	11.5 – 49.1

Of the subjects selected, 214 (64%) are males, and 36% are females. The median age of women in years, of men, is 27.5 years, and the median age total patients' population is 25.9 years. In total, almost half of patients belong to the age group 20-60 years (49.5%) and only 10.2% belong to the age of 60 years (Table 2). There is a statistically significant difference in the distribution of patients by age group and gender, with males predominating in the age group 20-60 years (55.1%) ( $p < 0.01$ ).

**Table 2: Distribution of patients by age group and gender**

Anatomical region	N	%
Hand and forearm	113	34.0
Hand and face	81	24.3
Hand only	88	26.4
Hand and different regions	51	15.3
Total	333	100.0

Based on the anatomical region, it is noted that the hand solely is affected in almost 26.4% of cases, the hand and forearm in 34% of cases, hand and face and 24.3% of cases. In 15.3% of cases, the patients had burns of the body, the gluteal region and the lower extremities (Table 3).

**Table 3: Distribution of cases according to an anatomical region**

Anatomical region	N	%
Hand and forearm	113	34.0
Hand and face	81	24.3
Hand only	88	26.4
Hand and different regions	51	15.3
Total	333	100.0

Of the 333 patients with burned hands, only 98 (29%) of them underwent surgical treatment of the wounds (95% CI 24.4–34.1).

In total, after treating 333 patients with hand burn, 102 patients or one in three patients showed undesirable results such as contractures of various levels, ulcerations, syndactyly or keloid (Table 4).

**Table 4: Distribution of unwanted effects**

Unwanted outcome	N	%
Dorsal web-space contracture	28	28.1
Volar contracture	16	6.6
Fingers' contracture	22	22.9
Ulceration/wounds	27	27.1
Syndactyly	7	7.4
Keloid	2	2.1

In most cases, undesirable outcomes are dorsal web-space contracture (28%, and ulceration/wounds (27.1%) ( $p < 0.01$ ). Syndactyly and Keloid are rarely found.

## Discussion

Investigating combustion epidemiology and unwanted outcomes are important for assessing the effects of preventive and treatment measures on burning. The findings of our study represent the epidemiological situation in Albania, considering that the plastic and burns department at the university hospital centre is the only tertiary service specialised in the treatment of combustion. Burns occur at all ages, including pediatric and advanced age, defining burning an unintended injury with a

very broad age range. Burning is a disability that is often encountered in working age. This study's data show that the average age is approximately 30 years and that the age group most affected is 20-60 years old. The age of over 60 is less affected by the fact that in this age group the individual is less active and less exposed to the risk factors for combustion. Men have a higher percentage of burns in all age groups and this is explained by the fact that they are more exposed to different etiologic factors of burning such as fire, electricity etc. while women are more exposed to cooking facilities with a low likelihood of burning [3] [6] [7] [8] [9]. Thus, adult males are more likely to have burns of hands according to the experience at our clinic. Among women, burning is most common in the age group <20 years. This finding is supported by the fact that the average age of women who have had burns is lower. According to the World Health Organization, this is explained by the fact that young girls are often involved in housework and caring for younger children by placing them in the kitchen facilities and increasing the risk of burns due to carelessness [3].

In most cases, hand burning is accompanied by burns in the forearm, and only one in four people have solely hand burns. Cases, when burns of the hand are associated with burns to other anatomic regions, are rarer. Often, the left hand is most affected than right one, and rarely both hands. Surgical treatment was applied in 29% of patients, and the undesired outcome was evidenced in nearly one-third of the cases involved in the study, which is consistent with studies reported in the literature [10] [11]. The most common unwanted post-burn outcomes were contractures and ulcerations/wounds. In 50% of cases were reported most commonly dorsal and finger contractures and less are keloids or syndactyly. The findings of the study are similar to *Salisbury's et al.*, study [12] on post burning deformities in upper extremities with hand and finger contractures being more frequent, as well as the study conducted in Kosovo in which the contractures also rank high as the most common unwanted outcome of burned hand [13].

In conclusion, burns are injuries commonly encountered in adults. According to gender, males are more likely to have burns while among women burn occurs more frequently under the age of 20 years. Combustion of the hands is usually associated with burning injuries to other anatomic areas of the body, especially the forearm. Most hand burns do not require surgical treatment, but almost one in three patients who have suffered from hand burns

experience unwanted results in the post-burning stage. According to our study, the most common unwanted outcome is hand or finger contractions in almost half of the cases.

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