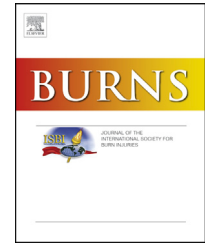


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# The epidemiology of geriatric burns in Iran: A national burn registry-based study



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## ABSTRACT

Defining the epidemiology and outcome of geriatric burn patients is critical for specialized burn centers, health-care workers, and governments. Better resource use and effective guidelines are some of the advantages of studies focusing on this aspect. The outcome of these patients serves as an objective criterion for quality control, research, and preventive programs.

We used data from the burn registry program in our country. For 2 years, >28,700 burn patients were recorded, 1721 of whom were admitted. Among them, 187 patients were  $\geq 55$  years old. Sixty-nine percent of patients were male and 31% female, with a male to female ratio of 2.22:1. The mean  $\pm$  standard deviation (SD) of age was  $63.4 \pm 8.1$ . The cause of burns was flame (58.2%) and scalds (20.3%). Most of the burns were sustained at home. The mean duration of hospital stay was 19.5 days (range 3–59 days). The mean (SD) of the total body surface area (TBSA) was 20.3% (8.4%). The median hospital stay (length of stay (LOS)) was 11 days (SD = 14). The increase in TBSA was related to a longer LOS ( $p < 0.02$ ).

Burn wound infection developed in 44.3% of patients. The presence of inhalation injury was significantly related to mortality ( $p < 0.001$ ). Among the patients, 9% recovered completely, 74.9% recovered partially (requiring further treatment), 1% underwent amputation, and 12.8% died. The lack of insurance coverage did not affect the survival of our geriatric burn patients. However, being alone or single, ignition of clothing, cause of burn, comorbid illnesses, complications following the burn, TBSA, age, and sepsis were positively correlated with mortality. The mean cost of treatment for each patient was about \$7450.

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## 1. Introduction

Burn is one of the most common forms of trauma in Iran. It is the seventh greatest cause of disease burden of injuries [1]. The number of geriatric burn patients has been increasing

every year worldwide (including our country). Thus, special measures are needed to care for such patients.

Many of these geriatric patients are alone or single, and they often need help performing minor activities. Many of them display some degree of dementia and forget how to operate their household devices.

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Some reports have described elderly patients who cannot use electrical devices and who are likely to sustain injuries via electricity or sharp objects. Burns are one of the major traumas experienced by this patient population, with several consequences. Geriatric patients usually present with comorbid diseases such as diabetes, cardiovascular disease, and neurological disorders. The presence of other comorbid diseases and/or disabilities can complicate the provision of medical care and lead to more diverse outcomes.

In the present study, we aim to identify the epidemiology and outcome of geriatric burn patients.

Iran has a population of approximately 78 million people. The average age is about 28 years; about 25.08% are in the 0–14-year age group, 65.93% in the 15–64-year age group, and 5.19% in the elderly age group (>65 years old). The elderly group is more prevalent in cities than in rural areas. The female to male ratio in our country is 1.02. The mean age of males is 26 years and that of females is 26.5 years.

In 2009, a burn registry program was established in our country with the aim of collecting complete data of burn patients [2]. These data can be used to predict the outcome of geriatric patients and to develop more effective training and preventive programs for the geriatric population.

With the aging of the global population every year, many elderly patients need support and better care [3].

## 2. Material and methods

For a 2-year period, from March 2009 to March 2011, a total of 1721 in-hospital burn patients were recorded. Of these, 187 burn patients were  $\geq 55$  years old.

As reports have shown that the outcome of injury and trauma significantly change at age 55, we included all patients at or above age 55 (as geriatric patients) in our study [4].

The epidemiologic data and outcome of these geriatric patients in this period were prospectively studied. These patients were followed up for  $3 \pm 0.5$  years.

Significant epidemiological factors include sex, inhalation injury, length of time from injury to care, accompanying traumas, previous medical history and illnesses, cause of burn, total surface area of burns, ignition of clothing, location of burn, presence or absence of guardians (unsupervised patients), third- and fourth-degree burns, anatomic distribution of burn, marital status (or being alone at home), intentional or accidental burns, previous clinical conditions or illnesses, transportation by ambulance to the hospital, prehospital care, intensive care treatment, length of hospital stay, the operative intervention, burn wound infection, culture of burn wounds, antibiotics used, laboratory tests, overall mortality rate and cause of death, educational level, and insurance coverage.

The patients were divided into four age groups: 55–64, 65–74, 75–84, and >85 years. The wound cultures were positive if >100,000 bacteria were present in each gram of tissue. Logistic regression was used to analyze the correlation between risk factors and mortality. The treatment costs were obtained from hospital and accountant files.

A special questionnaire was used to collect relevant information, and statistical analysis was performed using SPSS 19 software. A  $p$ -value <0.05% was considered significant.

## 3. Results

In a 2-year period, >28,700 burn patients were recorded, 1721 of whom were admitted, and 187 patients were in the geriatric age group (10.8%). Table 1 shows the different age groups. The most commonly occurring age group was 55–64 years (50.2%). Of the patients, 69% were male and 31% female (male to female ratio = 2.22:1). The mean  $\pm$  standard deviation (SD) of age was  $63.4 \pm 8.1$ . The median age was 64 years, with an interquartile range of 51–72 years.

Special medical care provided to these patients was found to be effective. Wound irrigation was performed in 87% of patients, resuscitation fluid therapy was administered to 42.2% before reaching the hospital, and 29% received local antibiotic ointments for their wounds. During the hospital stay, three patients required renal dialysis.

Most of our patients were retired or housewives, mostly staying at home; thus, most of the burns were sustained at home. Approximately 11% of patients did not have insurance coverage. The marital status of the patients is listed in Table 2. Table 3 presents the intentional or accidental modes of burns. The mean (SD) of the total body surface area (TBSA) was 20.3% (8.4%). Burns caused by flame were most common (58.2%) followed by scalds (20.3%).

The mortality increased significantly in patients with inhalation injury ( $p < 0.001$ ). Of the patients, 9.6% suffered complications requiring intensive care treatment. The mean  $\pm$  SD of the duration of intensive care unit (ICU) stay was  $7.5 \pm 3.5$  days. The mean hospital stay was 19.5 days (range 3–59 days). TBSA was found to increase the length of hospital stay ( $p < 0.02$ ).

Of the patients, 118 (63.1%) developed signs of infection in their burn wounds. Of these, 83 (44.3%) obtained positive tissue culture results. Bacteria such as coagulase-negative *Staphylococcus*

**Table 1 – Frequency of burn patients in geriatric age groups.**

Age group	Frequency	Percent
55–64 years	94	50.2
65–74 years	57	30.5
75–84 years	30	16.1
Above 85 years	6	3.2
Total	187	100

**Table 2 – Marital status of the geriatric burn patients.**

Marital status	Frequency	Percentage
Single	2	1
Married	164	87.7
Divorced	1	0.5
Deceased spouse	21	11.2
Total	187	100

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