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## INTRODUCTION

Burn; is a serious health problem that occurs when the epidermis and dermis layers of the skin, sometimes subcutaneous, muscle, and bone tissue are damaged by direct or indirect contact with heat, electricity, and chemical substances (1). Burn is not a localized event by affecting the skin, it is a trauma that plays a decisive role in the prognosis of the patient with its physiopathological effects. Tissue damage caused by the factor causing the burn increases depending on the width of the burn area and the persistence of the agent (2). Post-burn treatment and rehabilitation phases are painful processes for patients. In addition, they pose a great problem due to the mortality and morbidity they cause (3). In a study conducted by the World Health Organization, it was reported that approximately 11 million burns occur annually worldwide, and 180,000 of them die (4). In order to prevent this, it is important to pay attention to complying with the occupational safety rules and taking the necessary precautions. Many studies have been conducted on patients with burns in hospital emergency departments or burn units. In our study, the burn patients who applied to the emergency

department of our hospital; We investigated burn degrees, burn percentages, burn sites, and burn etiologies demographically and epidemiologically.

## MATERIALS AND METHODS

### Study Design and Ethics Approval

In this retrospective study, patients who applied to Turgut Özal Medical Center Training and Research Hospital Emergency Service between 01.01.2014 and 31.12.2016 due to burns were discussed. Approval for our study was obtained from the Ethics Committee of İnönü University Faculty of Medicine (2017/11-1).

The data obtained were obtained from computer records, emergency service examination-observation forms, and epicrisis of the burn units they were admitted to. Data regarding the age, gender, nationality, referral status, causes of burns, anatomical burn locations, total burned body surface areas, and the services they were hospitalized for were recorded. Burn degrees of patients' 1st-degree, 2nd-degree, 3rd-degree, and 4th-degree

# Retrospective analysis of burn patients presenting to the emergency department

## Abstract

**Aim:** Patients who applied to our emergency department due to burning trauma; it was aimed to analyze demographic characteristics such as age, gender, burn causes, burn rates, and degrees.

**Materials and Methods:** Retrospectively analyzed data of patients who applied for burns within 3 years and were scanned from patient files and computer records. The age, gender, time and date of admission to the emergency department, causes of burns, anatomical burn localizations, total burned body surface areas, hospitalization, and discharge status of the cases were analyzed.

**Results:** 56.1% of the patients included in the study were male and their mean age was 21.28 years. It was found that 49.7% of our patients were between the ages of 0-17. Boiling liquids are in the first place with a rate of 43.4% as the cause of burns. The average burned body surface area was 29%, and 3rd-degree burns were the most common. The most frequently affected body areas were the upper and lower extremities. The peak application season was seen in winter with a rate of 33.9%.

**Conclusion:** It is known that burn cases always maintain their importance. Since it is a life-threatening health problem and it is frequently seen in the young-child age group, it is necessary to increase the precautions.

**Keywords:** Burn injuries, emergency services, retrospective study

were examined in four categories. The highest degree of the burn was accepted as the criterion in calculating the burn degrees of the patients (If the patient had both 1st-degree and 2nd-degree burn wounds, then the 2nd-degree burn was accepted as the burn degree.). Burn localizations of patients; were classified as head-neck, upper extremity, lower extremity, abdomen, thorax, and back. Causes of burns; They were classified into seven groups those with unknown causes, flame burn, hot liquid burn (water, milk, tea, soup, hot oil), bomb exposure (Syrian refugees), electric burn, stove burn, and chemical burn.

The outcome status of the patients; is classified as an immediate outcome and final outcome. In the emergency outcome, they were divided into 4 subgroups those discharged from the emergency department, those admitted to the adult burn unit, those admitted to the pediatric burn unit, and those who died in the emergency. In the result, the ex or discharge status of the hospitalized patients was discussed. The ages of the patients were classified as Child age, Young age, Middle age, and Geriatric age. In addition, patients' admission dates were classified according to months and seasons. The seasons were grouped as autumn (September-October-November), winter (December-January-February), spring (March-April-May), and summer (June-July-August). Entrances to the emergency room for dressing purposes due to burns between the study dates were excluded from the study.

### Statistical Analysis

SPSS 22.0 statistical program was used for the analysis of the obtained data. The numerical data obtained by the measurement are the mean and standard deviation; Categorical data obtained by counting were expressed as numbers (n) and percentages (%). Pearson Chi-Square test was used for statistical analysis of categorical variables.  $P < 0.05$  was considered significant in all tests.

## RESULTS

The data of a total of 627 patients to be considered in the study were collected; however, 35 patients were excluded from the study. A total of 592 patients who applied to the emergency department and met the working conditions were included in the study. Of the cases, 332 (56.1%) were male and 260 (43.9%) were female. The mean age was found to be  $21.28 \pm 18.492$  years. When the ages of the patients were examined according to the groups; the highest number of patients was found to be in the child age group with 294 (49.7%). The demographic characteristics of the patients are shown in Table 1 hot liquid burn was among the causes of burns in 257 (43.4%) patients, followed by flame burns in 230 (38.9%) patients. The least common type of burn is seen in 6 (1%) patients with electrical burns. The average percentage of burned body surface areas of the patients ranged from  $29\% \pm 28\%$ . In terms of burn degrees, (41.2%) 3rd-degree burns are seen, followed by 2nd-degree burns (39.7%) (Table 2) 403 (68.1%) patients were recorded as forensic cases in terms of admission to the emergency department. In all burn types, most patients applied during the winter (December-January-February)

season. Flame burns were most common in winter with 101 patients. Although hot water burns show a balanced distribution according to the seasons, they were most common in the summer months (June-July-August) with 70 patients. The average length of stay of hospitalized patients is Med: 5 (min:0-max:202). While 214 (36.1%) patients were hospitalized in the pediatric burn unit, 128 (21.6%) patients were hospitalized in the adult burn unit. While 245 (41.4%) patients were discharged from the emergency department, 5 (0.8%) patients died in the emergency department. 94 of 327 Syrian patients died (Table 3). There was no significant difference in terms of gender and death and discharge ( $p=0.42$ ).  $P < 0.05$  was found in terms of death and discharge rates due to burns and a significant difference was found.  $p < 0.05$  was found in terms of birthplace, death, and discharge of burn cases and it can be said that there is a significant difference. There is a significant difference in terms of the causes of burns with the seasons since  $p < 0.05$ .

**Table 1. Demographic characteristics of burn patients**

| Gender            | n   | %    |
|-------------------|-----|------|
| Male              | 332 | 56.1 |
| Female            | 260 | 43.9 |
| <b>Age ranges</b> |     |      |
| Child age         | 294 | 49.7 |
| Young age         | 129 | 21.8 |
| Middle age        | 116 | 19.6 |
| Geriatric age     | 53  | 8.9  |

**Table 2. Burn etiology, grades and localizations**

| Causes of burn            | n   | %    |
|---------------------------|-----|------|
| Unknown                   | 9   | 1.5  |
| Flame                     | 230 | 38.9 |
| Hot liquid                | 257 | 43.4 |
| Bomb                      | 59  | 10   |
| Electric                  | 6   | 1    |
| Stove                     | 21  | 3.5  |
| Chemical                  | 10  | 1.7  |
| <b>Burn degree</b>        |     |      |
| Unknown                   | 3   | 0.5  |
| 1st-degree                | 106 | 17.9 |
| 2nd-degree                | 235 | 39.7 |
| 3rd-degree                | 244 | 41.2 |
| 4th degree                | 4   | 0.7  |
| <b>Burn localizations</b> |     |      |
| Head neck                 | 287 | 48.5 |
| Upper extremity           | 423 | 71.5 |
| Lower extremity           | 382 | 64.5 |
| Abdomen                   | 224 | 37.8 |
| Torax                     | 239 | 40.4 |
| Back                      | 131 | 22.1 |

**Table 3. Admission types, seasons, hospitalization-discharge status and nationalities of the patients**

| Type of arrival to the emergency room | n   | %    |
|---------------------------------------|-----|------|
| Normal                                | 187 | 31.6 |
| Judicial event                        | 403 | 68.1 |
| Work accident                         | 2   | 0.3  |
| <b>Seasons</b>                        |     |      |
| Autumn                                | 122 | 20.6 |
| Winter                                | 201 | 33.9 |
| Spring                                | 149 | 25.2 |
| Summer                                | 120 | 20.3 |
| <b>Immediate result</b>               |     |      |
| Discharge                             | 245 | 41.4 |
| Adult burn unit                       | 128 | 21.6 |
| Child burn unit                       | 214 | 36.1 |
| Emergency ex                          | 5   | 0.8  |
| <b>Final result</b>                   |     |      |
| Discharge                             | 495 | 83.6 |
| Ex                                    | 97  | 16.4 |
| <b>Nationality</b>                    |     |      |
| Republic of Türkiye                   | 259 | 43.7 |
| Syria                                 | 327 | 55.2 |
| Other                                 | 6   | 1.1  |

## DISCUSSION

The medical and financial problems that develop as a result of burn cases around the world reveal how important this trauma is with the mortality and morbidity rates they create (3). It also creates serious problems in terms of the psychological and sociological effects it has created. It should not be forgotten that burn injuries that are significant in every aspect are actually preventable (5).

Saritas et al. (6) in their study, male patients were in the majority with a rate of 65.3%, and the mean age was found to be 20.0±20.7 years. Considering the results of our study; most cases are seen in the 0-17 age group and men. Again, in accordance with the literature data, male cases were in the majority and the mean age was 21.28±18.49 years. The fact that the cases are seen more frequently in children and young ages is due to their inability to distinguish dangerous situations and their carelessness. Burns due to liquids are generally the first among burn causes (6-8). Al et al. (7), 76.2% of the burns were scalded and 23.6% were flame-related burns. Aytac et al. (8) in their study, the causes of burns were respectively; scalding is 68.8%, flame burns are 21.5%, burns due to contact with a hot object are 3.8% and chemical burns are 1.1%. In our study, while hot water burns were 43.4%, flame burns ranked second with 38.9%.

Gunay et al. (9) stated the average burn surface area as 19%, while Aytac et al. (8) found this rate to be 23%. In the study of Saritaş et al. (6), it was 8%. In this study, the average burn surface area was found to be 29%. In terms of burn sites, upper extremity, and lower extremity burns were significantly more affected than other body parts. In addition, in terms of burn degrees, 2nd and 3rd-degree burns were observed in the majority. According to the burn degrees, 2nd and 3rd-degree burns were found to be more common than other burn degrees, and the total rate of the two was around 81%.

In the study of Erkuran et al. (10), the total rate of 2nd and 3rd-degree burns was found to be 89.3%. In terms of burn sites, the rates of affecting the upper and lower extremities were found to be the highest. Consistent with the literature, these rates give similar results to other publications (6,8,10). Aldemir et al. (11) 6.3%, Deveci et al. (12) 16%, Ringo et al. (13) 26.8%, and Khan et al. (13) found a mortality rate of 29.7%. In our study, the total mortality rate was found to be 16.4%. Studies have found that burn patients are frequently seen in the spring season according to months and seasons (15,16). In our case, on the other hand, in terms of seasonal distribution, burn cases were mostly encountered in winter months. We think that the reason why it is seen more frequently in the winter is due to the widespread use of stoves in the rural areas of our region and the fires lit to bake bread. Finally, the only limitation of our study is that it was single-centered.

## CONCLUSION

Although the negative effects of burn injury on a social scale are known, unfortunately, it is still not prevented. The fact that a significant majority of burn cases are still life-threatening health problems reveals the necessity of increasing the precautions that should be taken in children and young ages and providing necessary information to families.

### Conflict of Interests

*The authors declare that there is no conflict of interest in the study.*

### Financial Disclosure

*The authors declare that they have received no financial support for the study.*

### Ethical Approval

*Approval for our study was obtained from the Ethics Committee of İnönü University Faculty of Medicine (2017/11-1).*

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