

Longitudinal Evaluation of Hospitalized Burn Patients in Sivas City Center for Six Months and Comparison with a Previously Held Community-based Survey

Sivas İl Merkezinde Yatarak Tedavi Gören Yanık Hastalarının Altı Ay Süresi Boyunca Değerlendirilmesi ve Daha Önce Yapılmış Toplum Temelli Bir Çalışma ile Karşılaştırılması

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Abstract

Objective: This study was designed to longitudinally demonstrate the rate and epidemiology of hospitalized burn patients in Sivas city center within 6 months. The second aim was to compare the results of the current study with those of a previously held community-based survey in the same region.

Material and Methods: Patients who were hospitalized due to burn injuries in Sivas city for six months were longitudinally evaluated. Epidemiological data of these patients were analyzed.

Results: During the course of the study, 87 patients (49 males and 38 females) were hospitalized. The ratio of burn patients to the total number of hospitalized patients was 0.38%. The most common etiologic factor was scalds (70.1%). Burns generally took place in the kitchen (41.4%) and living room (31.4%), and majority of the patients received cold water as first-aid treatment at the time of injury. The vast majority of patients were discharged from the hospital without the need of surgical intervention (83.9%), and the duration of treatment was between 1 and 14 days for 73.6% of the patients. Sixty patients (68.9%) had a total burn surface area under 10%. The total cost of the hospitalization period of these patients was 137.225 Turkish Lira (83.308–92.908\$), and the average cost per patient was 1.577 Turkish Lira (957–1067\$).

Conclusion: Our study revealed a considerable inconsistency when compared with the results of the community-based survey, which had been previously conducted in the same region. We concluded that hospital-based studies are far from reflecting the actual burn trauma potential of a given district in the absence of a reliable, standard, nation-wide record system. Population-based surveys should be encouraged to make an accurate assessment of burn rates in countries lacking reliable record systems.

Keywords: Burn, hospital, evaluation, cost

Öz

Amaç: Bu çalışma, Sivas il merkezinde yatarak tedavi edilen yanık hastalarının oranı ve epidemiyolojik özelliklerini altı ay süresince longitudinal olarak göstermek amacıyla planlandı. İkinci amaç, mevcut çalışmanın sonuçlarını daha önce aynı bölgede yapılmış toplum temelli bir çalışma ile kıyaslamaktır.

Gereç ve Yöntemler: Altı ay boyunca Sivas ilinde yanık nedeniyle hastaneye yatırılan hastalar bu süre boyunca değerlendirildi. Bu hastaların epidemiyolojik verileri incelendi. Toplam yanık nedeniyle Olguların %60 gibi bir oranı yedi yaş altındaydı ve büyük çoğunluğu beş ve üzeri hane halkına sahip ailelere mensuptu.

Bulgular: Çalışma boyunca 87 hasta (49 erkek, 38 kadın) yatarak tedavi gördü. Yanıklı hastaların toplam yatan hastalara oranı %0,38'di. En sık yaralanma nedenini %70,1 ile sıcak sıvı yanıkları oluşturmaktaydı. Yanık en sık mutfak (%41,4) ve oturma odasında (%31,4) meydana gelmiş ve hastaların büyük çoğunluğuna ilk yardım olarak yaralanma anında soğuk su uygulanmıştı. Olguların büyük çoğunluğu cerrahi müdahale gerektirmeden taburcu edilmişlerdi (%83,9) ve tedavi süresi hastaların %73,6'sı için bir ile 14 gün arasındaydı. Altmış olgu (%68,9) %10 altında yanık yüzdesine sahipti. Hastanede yatış süreçlerinde uygulanan tedavi maliyeti toplam 137.225 TL (83.308-92.908 \$) olup, hasta başına ortalama 1577 TL (957-1067 \$) idi.

Sonuç: Mevcut çalışmamız bölgede daha önce yapılan toplum temelli çalışma ile kıyaslandığında ciddi bir uyumsuzluk açığa çıkmıştır. Biz hastane temelli çalışmaların güvenilir bir standart ulusal çaplı kayıt sisteminin yokluğunda, bir bölgenin gerçek yanık travma potansiyelini yansıtmaktan oldukça uzak olduğunu düşünmekteyiz. Toplum temelli çalışmalar, güvenilir kayıt sistemlerinin olmadığı ülkelerde yanık oranlarının gerçek bir değerlendirmesini yapmak için desteklenmelidir.

Anahtar Sözcükler: Yanık, hastane, değerlendirme, bedel

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INTRODUCTION

It is imperative to obtain and evaluate critical epidemiologic data for assessing preventive measures related to burn injuries. Meanwhile, the geographical and regional differences and epidemiologic data diversity cannot be overemphasized. The importance of community-based surveys has been previously stressed in the literature^{2,3}; however, community-based studies are few, and epidemiologic data derived from hospital sources and the community itself have not been adequately compared. This study was planned as a complementary study of our previous research², which was designed as a population-based survey in the same province. To our knowledge, there are no data in the literature comparing community- and hospital-based studies in the same region. Both kinds of studies have certain shortcomings in determining the exact nature of burn injuries, and combining these two studies with different designs may aid in minimizing bias emerging from them separately.

MATERIAL AND METHODS

These are the health institutions that had inpatient facilities in Sivas. The study was longitudinally planned, and all burn patients who were hospitalized in these hospitals were visited and regularly evaluated, with no inference in the treatment process. Age; sex; household information; place where the burn took place; burn etiology and percentage and depth; initial aid; treatment modality, hospital stay duration; and hospitalization period cost were recorded. The patients' rural or urban origin was noted as well.

RESULTS

During the study period, 87 patients were hospitalized in Sivas due to burn injuries. Of these, 68 were hospitalized in the University hospital and 19 were hospitalized in Sivas State Hospital. The other hospitals did not hospitalize burn patients during the study period. University hospital, with a

bed capacity of 1051, hospitalized 17540 patients, whereas State hospital, with a bed capacity of 324, hospitalized 5179 patients in total. The total inpatient capacity of these two hospitals was 22.719 and the rate of burn patients was 0.38%. The departments where the burn patients were hospitalized are shown in Table I.

The patients who were hospitalized in the pediatric surgery, neurosurgery, and ophthalmology clinics sustained electrical burns with additional traumas. The patients hospitalized in pediatric clinics were under the age of one year and had a more than 10% total burn surface area. Forty-nine patients were males and 38 were females. Majority of the patients were between 0 and 2 years. Age distribution is shown in Table II.

Residential information was also taken into consideration: 36 (41.4%) of the patients were living in villages and rural areas and 51 (58.6%) were living in cities and counties. The household number of patients is given in Table III.

In majority of the patients, the etiologic factor was boiling water in the kettle. In most age groups except the 8-29- old group, the most common etiologic factor was exposure to hot liquids (Table IV).

Burns generally took place in the kitchen in 41.4% of the patients, with the living room being the second most common place (Table V).

First-aid management that the burn patients received immediately after the burn was cold water application in 67 of the 87 patients (77.1%). In 17 patients (19.5%), no aid was given, and in only 3 (3.4%) patients, tomato paste and toothpaste were applied to the wounds. Seventy three patients (83.9%) were healed with the help of medical treatment, and in 14 patients (16.1%), surgical intervention was required. Total hospitalization duration of all burn patients was 1203 days. In 64 patients, hospitalization duration was between 1 and 14 days (73.6%); in 12 patients, it was between 15 and

Table I. Departmental distribution

Hospital	General Surgery	Plastic Surgery	Pediatrics	Pediatric Surgery	Neurosurgery	Ophthalmology
Cumhuriyet University	33	27	3	2	2	1
Sivas State Hospital		19	-	-	-	-
Total	33	46	3	2	2	1

Table II. Age distribution

Age	Number of patients	%
0-2	37	42.5
3-5	12	13.8
6-7	4	4.6
8-18	7	8.1
19-29	8	9.2
≥30	19	21.8

Table III. Household number of patients

Household number	Patient number	%
≤4	16	18.4
5-6	38	43.7
7-8	17	19.5
9-10	10	11.5
≥11	6	6.9

Table IV. Etiologic factors according to age groups

Etiologic factors	Age groups				Total	
	0-2	3-7	8-29	>30	Number of patients	%
Boiling water in kettle	22	8	3	5	38	43.7
Other boiling liquids	9	8	1	5	23	26.4
Electricity	-	-	7	2	9	10.3
Flame	1	-	2	3	6	6.9
Contact with hot objects	5	-		1	6	6.9
Hot oil	-	-	1	2	3	3.5
Lightening	-	-	1	1	2	2.3

Table V. Place where burn took place

Place where burn took place	Number of patients	%
Kitchen	36	41.4
Living room	27	31.1
Outdoors	13	14.8
Bathroom	5	5.7
Garden	3	3.5
Working place	3	3.5

Table VI. Total burn surface area of patients

Total burn surface area	Number of patients	%
<10%	60	68.9
10-20%	22	25.3
>20%	5	5.8

Table VII. Costs for patients

Costs (TL)	Costs (\$)	Total burn surface area (%)		
		<10	10-20	>20
<500	<(303-338)	19	1	3
500-1500	303-1014	32	6	1
1500-3000	909-2027	9	2	1
>3000	>(1818-2027)	-	13	-

28 days (13.8%); and in 11 patients, it was more than 28 days (12.6%). The total burn surface area of the patients is given in Table VI.

After initial treatment, 5 patients were transferred to burn units in other cities. In all of them, the total burn surface area was more than 20%. The cost of the treatment of patients is given in table VII. In Table VIII, a summary of all patients' hospitalization durations and total burn surface burn areas are given.

DISCUSSION

Epidemiologic data concerning burn trauma are less in Turkey. Most existing data were retrospectively obtained from hospital

Table VIII. Hospitalization days and total burn surface areas of all patients

Burn %	Stay in hospital				Number of patients
	1-7 days	8-15 days	16-30 days	>30 days	
1	-	-	-	-	-
2	2	2			4
3	5	3			8
4	1	3	1		5
5	4	3			7
6	7	1			8
7	4	5	1	1	11
8	4	4	3	1	12
9	1	3		1	5
10	1	2		1	4
11	1				1
12		1	2	1	4
13			2		2
14			1	1	2
15	1		1	1	3
16			1		1
17			1	1	2
18				1	1
19					-
20				2	2
21-25	3				3
26-30	1				1
31-40					-
41-45	1				1

records. Developed countries heavily rely on hospital records due to their regular and complete recording systems. In underdeveloped and undeveloped countries, lack of adequate recording systems make the statistical data relatively inefficient. Population-based surveys are also not widespread among

these countries.^{3,4} In the study by Mekele, which was conducted in Ethiopia, a survey was performed on 7309 individuals who were randomly selected, representing a population of 96.938. This study revealed an annual burn incidence of 1.2%. In a similar study, which was conducted in Bangladesh, where a survey was conducted 171.366 people, the annual incidence was found to be 0.29%. This study included only children under 18 years old, and the result is unexpectedly low in this age group. A unique population-based study conducted in Holland on 24.000 individuals revealed an annual burn incidence 0.3%.

In Turkey, till date, now there are only two published population based studies. The first one was held in Denizli province.⁵ This study included 1068 individuals who were selected to represent the central city of Denizli province. The authors obtained the burn history of the selected individuals over the last 10 years, and they reported a total incidence of 10 years being 12.6%. The second population-based survey is the Sivas study.² In this study, 8107 patients were randomly selected to represent the entire Sivas province, including urban and rural areas. The annual burn incidence was found to be 0.37%.

The inadequacy of hospital records in Turkey, similar to other underdeveloped countries, is generally accepted, but the actual correlation of data between hospital records and population-based surveys needs to be established. In fact, this was the main motivation behind the current study. To our knowledge, there is no study in the literature comparing these two methodological techniques. We think that it is valuable to compare the population-based survey and hospital-based study (current study) in the same region. While comparing these two studies, we are fully aware of the fact that these two studies have some differences concerning the methodologies and the difficulty in interpreting the results of the two studies.

In the population-based survey, the annual burn incidence was calculated to be 3.7/1000, and among these patients, 315 were expected to be hospitalized, so we expect 157-158 patients to be hospitalized in 6 months. In the current study, 87 patients were hospitalized in 6 months in the city center. We should consider that there are hospitals in counties and that some burn patients in the outer regions of Sivas province are closer to the neighborhood provinces, so they may prefer to go to those hospitals. Then, it is reasonable to roughly assess that 45% of the patients might be hospitalized either in county hospitals or other province hospitals. When we compare the details concerning the patient's burn total burn surface area, the discordance between the population-based survey and hospital-based study increases. In the population-based survey, there was 1 patient with a 25% total burn surface area, 1 with a 20% total burn surface area, and 1 with a 15% total burn surface area. Therefore, we expect 34-35 patients in six months for each of the burn percentages. However, in the current study, we had 7 patients with 15-19% total burn surface areas, 5 with 20-24% total burn surface areas, and 2 with $\leq 25\%$ total burn surface areas. It is not reasonable to think that patients with 15% or more total burn surface areas were hospitalized in county hospitals because of the limited capabilities of these hospitals. Majority of the patients with these

percentages of total burn surface areas should be transported to neighborhood provinces or to bigger provinces that have sophisticated and fully-equipped burn centers. On the other hand, the same mechanism makes the medical records of developed burn centers less reliable because of their complex patient spectrum epidemiologically. This epidemiological pattern, which we widely observe in Turkey, makes hospital-based epidemiological data unreliable for demonstrating the regional characteristics of burn injuries in the absence of a definitive national record system. In turn, the lack of accurate information for determining regional requirements makes the burn care planning problematic.

CONCLUSION

We think that investigating hospital records as a method of an epidemiological survey for a given region are far from reflecting the actual burn trauma potential, particularly in developing countries. In these countries, population-based surveys are crucial to elucidate the burn profile.

Ethics Committee Approval: This study was planned as a graduation thesis in plastic surgery residency in 2009; and at that time ethics committee approval has not been required for these theses. Moreover, this study did not include any treatments, interventions, or patient follow up, it is merely an epidemiologic survey.

Informed Consent: This study was an epidemiologic survey which did not include any treatment, intervention or patient follow up. For this reason informed consents are not available for this study.

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Hasta Onamı: Bu çalışma yalnızca bir epidemiyolojik çalışma olup, hastalara yapılmış bir tedavi, cerrahi girişimi içermemektedir. Hasta takibi de yapılmamıştır. Bu hastalardan onam alınmamıştır.

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