Research article (Araştırma Makalesi)

An Analysis of Pediatric Burn Cases in Southeastern Anatolia, Turkey: A 10-Year Retrospective Study

Türkiye Güneydoğu Anadolu Bölgesinde Pediatrik Yanık Vakalarının Analizi: 10 Yıllık Retrospektif Çalışma

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Özet

Giriş: Yanıklar, özellikle gelişmekte olan ülkelerde olmak üzere tüm dünyada ciddi bir küresel halk sağlığı sorunu olmaya devam etmektedir.
Gereç ve Yöntemler: 1 Ocak 2010-1 Ocak 2020 tarihleri arasında yanık merkezimize yatırılan 1.038 hastanın yaş, cinsiyet, yaralanma nedeni ve toplam vücut yüzey alanı (TBSA), komplikasyon ve ölüm oranı, analiz edildi.
Bulgular: Erkeklerde yanık yüzey alanı kızlara göre daha fazlaydı. Tüm hastalar için ortalama yanık vücut yüzey alanı 9.2±6.35 ve ölüm oranı %1.45 idi. Çay, sıcak süt, sıcak su ve yağlı yiyecekler gibi sıcak sıvılar hastaların %84.7'sinde yanık nedeniydi. Sıcak nesneler, sıcak erimiş naylon, sıcak tandır ve közler ve sıcak asfalt yanıkların %7.7'sini oluşturuyordu. Ayrıca alev yanıkları, elektrik yanıkları ve donma ve diğer yanık nedenleri yanık yaralanmalarının sırasıyla %5.6, %1.2 ve %0.8'inden sorumluydu.
Sonuç: Pediatrik yanıklar bölgemizde daha çok üç yaş altı erkek çocuklarda ve kırsal kesimde yaşayan anne-babası eğitim düzeyi düşük olan çocuklarda görülmektedir. Yanık önleme programının bu sonuçlara göre ayarlanması gerektiğine inanıyoruz.
Anahtar Kelimeler: Acil tıp, Epidemiyoloji, Mikrobiyal profil, Pediatri, Yanık

Abstract

Objective: Burns continue to be a serious global public health problem all over the world, especially in developing countries.
Material and Methods: The age, gender, cause of injury and total body surface area (TBSA) of the burn, complications and mortality rate of 1.038 patients who were hospitalised in our burn centre between January 1, 2010 and January 1, 2020 were analysed.
Results: The burned surface area was greater in boys than in girls. The mean burned body surface area for all patients was 9.2±6.35, and the mortality rate was 1.45%. Hot liquids, such as tea, hot milk, hot water and oily food, were the causes of burns in 84.7% of the patients. Hot objects, hot melted nylon, hot tandoor and embers and hot asphalt accounted for 7.7% of the burns. Moreover, flame burns, electrical burns and frostbite and other burn causes accounted for 5.6%, 1.2 % and 0.8% of burn injuries, respectively.
Conclusions: In our region, paediatric burns occurred mostly in boys under the age of three and in children whose parents had low educational levels living in rural areas. We believe that the burn prevention program should be adjusted according to these results.
Keywords: Burns, Emergency medicine, Epidemiology, Microbial profile, Paediatrics

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INTRODUCTION

Burn injuries are among the most important causes of death in children younger than 14 years old (1). Although most paediatric burns do not cause serious clinical problems, severe burns have higher mortality rates in children than in adult patients with similar burns (1,2). Although the basic principles of burn management for paediatric patients are the same as those for adults, there are significant differences in the physiology, acute pain management and psychology of paediatric patients (2). For these reasons, it is best if children with severe burn injuries are treated in paediatric burn centres that provide multidisciplinary support (3).

The skin is the human body's first barrier and constitutes the primary defence against pathogens (1). Loss of integrity of this organ can allow microorganisms to invade the body and cause life-threatening infections (4). Especially in deep burns, the healing ability of the skin is adversely affected as a result of vascularisation and damage to resident cells (5). The incidence of infection is considerably higher in children with burns and in patients with a total body surface area (TBSA) >30% (6–8).

The most common burns in paediatric patients are thermal burns caused by scalding or contact with hot food (9). Contact with hot food occurs if relatives do not take enough preventive precautions to prevent the reach of the children (9). Non-food-related thermal burns include chemical burns, which can be caused by many general cleaning products through topical or mucosal contact, including various acidic or alkaline products (1,9,10). Although electrical burns are mostly seen in adulthood, exposure may also occur in the paediatric age group. These burns cause little visible damage because most of the damage occurs in deeper tissues. Electrical burns can also cause nerve and muscle damage and arrhythmias (1).

Paediatric burns are evaluated in different settings, ranging from outpatient paediatric clinics to regional burn centres. This study aims to discuss the clinical characteristics of paediatric patients who were hospitalised in the only paediatric burn centre in Turkey's southeast Anatolia region in light of the literature.

Clinical implications

We revealed the causes of burns that frequently occurred in our region.

We drew attention to public education policies that could be developed to prevent the causes of burns.

We determined the differences in the causes of burn cases between urban and rural areas.

We revealed the causes of burns according to seasonal differences.

We analysed selected epidemiological and microbial variables associated with the outcomes.

MATERIALS AND METHODS

The records of paediatric patients (0–17 years old) who were hospitalised at the Diyarbakır Gazi Yasargil Training and Research Hospital Burn Centre between January 1, 2010 and January 1, 2020 were analysed. The study was conducted in accordance with the principles of the 2008 revision of the Declaration of Helsinki, and approval was obtained prior to the study from the local ethics committee for retrospective research (Gazi Yasargil Training and Research Hospital Ethics Committee/29.01.2021/E-655). Medical records, which included demographic information (age, gender and place of residence), causes of injury and related factors, pre-hospital and hospital treatment, date of admission and discharge, injury-related data (burn status, cause of burn injuries, TBSA and burn degree), major complications and treatment outcomes (recovery, discontinuation or death) were obtained from the hospital's Electronic Medical Record System. Patients without acute burn injuries (scarring, cosmetic problems, or chronic wounds) were excluded.

Statistical Analysis

Fisher's least significant difference test was used to analyse the variance between different groups and the significant difference between the t-tests. The mean±standard deviation or median (interquartile range) was used to express the distribution of variables among the statistical data. Categorical variables were evaluated by chi-square tests. Multivariate logistic regression analysis was used to screen for risk factors in burn patients. The t-test was used for pair and multiple group comparisons. A P value <0.05 was considered statistically significant result.

RESULTS

Of the 1.038 patients, 593 (57.1%) were male, and 445 (42.9%) were female. All patients were aged between 0 and 17 years. Patients below four years old constituted the largest proportion at 73.4%, and patients below two years old accounted for the highest number of patients at 48.3% (**Table 1**).

Table1. General information of patients		
Sex	Girl	445 (%42.9)
	Boy	593 (%57.1)
Age range	0–12 months	154 (14.8)
	1–4 ages	600 (%57.8)
	5–9 ages	176 (%17)
	10–14 ages	71 (%6.8)
	14–17 ages	37 (%3.6)
Place of residence	Urban	550 (%53)
	Rural	448 (%47)
Season	Spring	279 (%26.9)
	Summer	239 (%23)
	Autumn	273 (%26.3)
	Winter	247 (%23.8)
Burn percentage	Range %1to %50	
Burn degree	Range 1 to 4 degree	
Length of stay	Range 1 to 66 days	
Treatment result	Exitus	15 (%1.45)
	Discharged	1023(%98.55)

According to place of residence, 47.0% of the patients were from rural areas, and 53.0% were from the city centre. Burn cases occurred more frequently in the spring (26.9%), increasing gradually in January and peaking in March (**Figure 1**).

The average age of the patients was 4.058±4.034 (range 0–17) years. The mean age of the boys was 4.02 (min–max, 0–17) years, and the mean age of the girls was 4.09 (min–max, 0–17) years. There was no difference in the mean age between genders (p=0.39, Mann-Whitney U test). According to age in months, 18.0% were in the 1–12 months age group, 55.4% were in the 13–48 months age group and 26.6% were in the >48 months age group (p=0.36, Mann-Whitney U test). The result was not statistically significant (**Figure 2**).

Scalding, flames and hot solids were the main causes of burns, followed by electricity and others. Categorical variables were evaluated using chi-square tests (**Table 2**). Hot liquids, such as tea, hot milk, hot water and oily

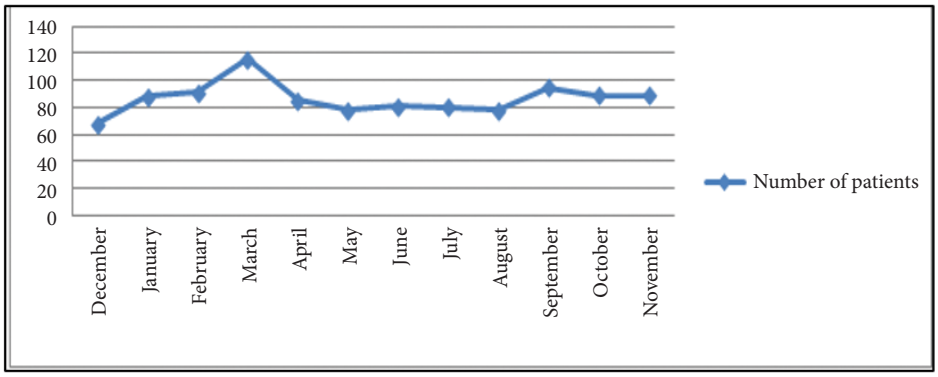

Figure 1. Seasonal distribution of pediatric burn

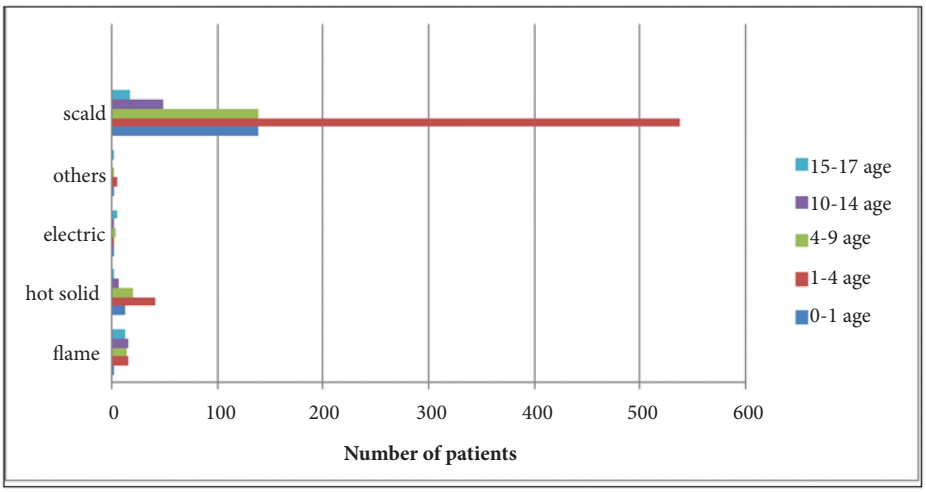

Figure 2. Distribution of age and burn etiology

food, were the causes of burns in 84.7% of the patients. Hot objects, such as melted nylon, tandoor and embers and asphalt, accounted for 7.7% of the burns. Flame burns, electrical burns and frostbite and other causes accounted for 5.6%, 1.2% and 0.8% of the burns, respectively.

Multiple sites of the body were affected in the majority of patients. According to anatomic location, the most burned body site was the right lower extremity (44.2%), followed by the left lower extremity (42.0%) (**Table 3**).

When the wound culture results were examined, Staphylococcus aureus was present in 6% of the patients, Staphylococcus epidermidis in 5.5% and Pseudomonas aeruginosa in 1.7%. Other bacterial species were present to a lesser degree. No causative microorganism was isolated in the wound culture in 72.2% of the patients. The wound culture results were positive in 41.9% of the rural patients and 14.7% of urban patients. The average length of hospital stay was six days for those with a positive wound culture and five days for those with a negative wound culture (**Table 4**).

Table 2. Etiology of burn

Avarage age	Sex	Electric	Flame	Others	Scalds	Solid	Total
0–12 months	boy	0	1	1	79	8	89
	girl	1	1	0	59	4	65
1–4 ages	boy	1	7	3	310	29	350
	girl	1	8	2	228	11	250
5–9 ages	boy	2	9	0	66	12	89
	girl	1	5	1	72	8	87
12–14 ages	boy	1	14	0	20	4	39
	girl	1	1	0	28	2	32
>14 ages	boy	4	11	1	10	0	26
	girl	0	1	1	7	2	11
Total	boy	8	42	5	485	53	593
	% of total	%0.8	%4.0	%0.5	%46.7	%5.1	%57.1
	girl	4	16	4	394	27	445
	% of total	% 0.4	%1.5	%0.4	%38.0	%2.6	%42.9
		12	58	9	879	80	1038
	% of total	%1.2	%5.6	%0.9	%84.7	%7.7	%100

Table 3. Burn areas, number and percentage of patients

Burned body parts	Number&percents
Head-neck	204 patients (%19.7)
Right Upper extremity	304 patients (%29.3)
Left Upper extremity	318 patients (%30.6)
Front chest+abdomen	298 patients (%28.7)
Back Chest+back abdomen	85 patients (%8.2)
Perineum	57 patients (%5.5)
Right lower extremity	459 patients (%44.2)
Left lower extremity	426 patients (%40)

Table4. Culture results			
Pathogen	**Subgroup**	**Number of patients**	**Percentage**
Acinetobacter		4	0.4
Aeromonas		1	0.1
Burchodelica		1	0.1
Candida		2	0.2
Enterobacter	E.Coli	33	3.3
Enterococcus		16	1.6
Klebsiella	Klebsiella Pneumoniae	6	0.6
Kocuria	Kocuria Krıstinae	4	0.4
Lactococcus	Lactococcus Garvieae	1	0.1
Pantoea	Pantoea Spp	2	0.2
Proteus	Proteus Mirabilis	5	0.5
Pseudomonas	Pseudomonas Aerogenas	20	2.0
Serratia	Serratia Marcescens	1	0.1
Sphingomonas	Sphingomonas Paucimobilis	1	0.1
Staphylococcus	Staphylococcus Aureus	63	6.0
	Staphylococcus Capitis	2	0.2
	Staphylococcus Epidermidis	57	5.5
	Staphylococcus Haemolyticus	20	1.9
	Staphylococcus Hominis	29	2.8
	Staphylococcus Pseudintermedius	1	0.1
	Staphylococcus Saprophyticus	2	0.2
	Staphylococcus Simulans	1	0.1
	Staphylococcus Warneri	2	0.2
	Staphylococcus Xylosus	4	0.4
Streptococcus		9	0.9
Negative culture		749	72.2
Total		1038	100

Superficial second-degree, deep second-degree, third-degree and fourth-degree burns accounted for 19.7%, 60.2%, 19.6% and 0.5 % of the cases, respectively. Escharectomy was performed in the operating room with burn treatment dressings in 78.4% of the patients, and 21.6% of the patients were grafted.

The mean hospitalisation time was 5.04±4.17 (min–max, 1–66) days. A positive correlation was found in the Pearson correlation analysis between the duration of hospitalisation and the percentage of burned TBSA ($r=0.478$, $p<0.001$).

Eighteen patients had poor general clinical conditions and thus were referred to more experienced burn centres. Nine patients were referred to the paediatric burn centre of Malatya Turgut Ozal University, seven patients were referred to the paediatric burn unit of Dicle University, one patient was referred to the Erzurum burn centre, and one was referred to the Adana burn centre.

We received information that 12 of them had died.

Three patients died in our burn centre. Two patients died due to insufficient fluid delivery during transport to the hospital, and one died due to sepsis in the paediatric intensive care unit. The recovery rate was 98.55% (n=1023), and the mortality rate was 1.45% (n=15) (**Table 1**).

DISCUSSION

Scalding burns are the most common cause of paediatric burns (11). In this study, 84.6% of the patients had scalding burns. The most common other causes of burns were hot objects, flame and electricity. Our results were

similar to those of Wesson et al. (12). Traditionally, in our region, boiling, frying, or steaming food and serving it hot were the causes of scalding burns (4).

The burn cases in our study were found to occur most frequently while cooking or eating in the kitchen. The incidence of paediatric burns increased gradually in winter and peaked in spring. Owing to the extremely hot summer months in our region, there was a decrease in food-related burns due to the preference for warm foods, vegetables and fruits instead of hot meals during these months. Programs aimed at educating parents about the risk of burns and burn treatment in children are more beneficial in spring when children are most at risk.

The reaction of avoiding danger is insufficient in toddlers aged 2–3 because their motor skills and reflexes are not yet well developed. For this reason, the percentage and degree of burns were found to be higher in children in this age group (13). In our patient group, similar to the study of Xin and Wesson (14,15), 57.8% of the patients were under the age of four, and 48.3% were under the age of two.

Beginning at birth, the ratio of the head and extremities to the thorax surface area is high in paediatric patients (13). In our study, the head and extremities were the most affected parts of the body, consistent with Öztorun et al. (10,14).

We found that burns were more common in children whose parents had low educational levels and in children living in rural areas. This indicates that some accidents could be prevented or minimised through the education of parents with low education levels and those living in rural areas.

When children are excited about playing games and if they have insufficient control of their strength and balance or are not paying attention, all kinds of accidents can occur. This type of trauma is more common in boys than in girls because their games are more active and based on physical strength. In our study, 57.1% of the cases were boys, consistent with previous studies. Rafii et al. and Lipovy et al. found that 60.0% and 56.5% of their patients were boys, respectively (16,17).

Although most of the cases in this study came from the city centre, the rural burn rate was found to be higher than the urban burn rate due to the low population density in rural areas. As life in single-story houses in the countryside allows children to spend time freely outside, it makes it difficult to protect them against fire and hot food in tandoor ovens and cooking places outside the home (9,14).

Burn wound infection is one of the most undesirable complications in burn patients. In addition to increasing mortality, infection delays wound healing and increases the length of hospital stay. Therefore, obtaining wound cultures is vital in burn care to allow for the proper management of infected burns. The rate of wound culture positivity was high at 47.5% in Chen et al.'s study (18) and 42.9% in Karimi et al.'s study (19). There were fewer positive wound cultures in the current study. Only 27.8% of our cases had positive wound cultures, and staphylococcal species were the microorganisms identified most often.

Most burns in this study were superficial second-degree and deep second-degree burns, contradicting the research of Kazanasmaz et al. in Sanliurfa. Third-degree burns occurred at a rate of 19.6%, which was lower than that reported by Kazanasmaz et al. The number of patients in our study was higher than that of theirs (20).

Following a burn injury, only 46.0% of paediatric patients received appropriate first aid treatment. Burn patients who present late and receive incomplete, wrong, or no treatment are at greater risk of infection and have a poorer prognosis (3). This finding indicates that there is a serious lack of knowledge among parents about burn treatment. In 2009, Cuttle et al. reported that, following a burn injury, an initial intervention of tap water for more than 20 min could significantly reduce the length of hospital stay (21). Therefore, improving the first aid education of parents and guardians can significantly improve burn prognosis in this population. We admitted most of the paediatric patients to our centre because the hospitals in our region did not have departments specialising in paediatric burns. As these patients are primarily evaluated by this physician group, physicians working in the emergency department and paediatricians also need further training in appropriate burn management. Therefore, first interventions performed by experts can reduce the risk of complications. The disadvantages of this lack of education have been discussed in the literature (22,23).

In this study, the majority of parents and guardians had no literacy or primary school certificates, and most were farmers or migrant workers. When the burns occurred, most children were cared for by their mothers, sisters and/or grandparents. However, most parents had limited or no burn prevention knowledge. Therefore,

public education about the prevention of burns should target populations with low education levels and aim to improve the knowledge of caregivers (mothers, sisters and/or grandparents). For example, education about burn injuries should be provided to parents and caregivers, preferably before the child is born. This should include information about burn hazards, emergency treatments, first aid protocols, the need to reach a burn treatment centre as soon as possible and the importance of keeping children away from heat sources, especially during cooking. Public authorities should promote education in general to reduce burn severity.

As our study included only 1.038 patients over a 10-year period, more studies are needed to determine whether these findings about the characteristics of burn patients and their parents and guardians are valid for a larger population. The effects of targeted training strategies require careful monitoring to examine the concrete effects on burn injuries in target populations.

After May 2016, when modern burn treatment materials, such as silver burn cover and skin equivalents, started to be used in our hospital, a significant decrease in hospital stay, morbidity, and mortality was detected. Recently, the importance of the hospitalisation period for burn patients has been increasingly emphasised with the renewal of treatment modalities and the improvement of the management of burn patients. These new treatment modalities and patient management have contributed to shorter hospital stays and lower mortality compared with the time before 2016.

Our institution is the only burn centre in our region. Burn units are also available at the Dicle University Medical Faculty and at the Sanlıurfa Mehmet Akif Inan Training and Research Hospital. Injured children are transferred to our burn centre by local health centres after primary health care services. As children with minor burns were excluded from our analysis, the follow-up of patients without major burns at Dicle University and in the burn units of the Mehmet Akif Inan Training and Research Hospital is a limitation of our study. Another limitation is the lack of strict follow-up due to the retrospective nature of the study.

CONCLUSION

In our region, childhood burns are more common in boys, children under the age of three, those who live in rural areas and those whose parents had low education levels. Burns occur most often during meal preparation, and scalding is the most common cause. Spring and autumn are high-risk seasons. The most frequently affected anatomical parts are the head and neck as well as the upper and lower extremities.

Although determining the risk factors requires further analysis, our findings need to raise the awareness of parents and guardians and to make space arrangements, such as taking care with tandoor cooking, so that children are not easily exposed. Further, training physicians and paediatricians working in the emergency department on appropriate burn treatments can reduce complicated paediatric burn cases.

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Ethics Committee Approval: The study was conducted in accordance with the principles of the 2008 revision of the Declaration of Helsinki, and approval was obtained prior to the study from the local ethics committee for retrospective research (Gazi Yasargil Training and Research Hospital Ethics Committee/29.01.2021/E-655).

Research Contribution Rate Statement Summary: The authors declare that, they have contributed equally to the manuscript.

REFERENCES

1. Shah AR, Liao LF. Pediatric Burn Care: Unique Considerations in Management. Clin Plast Surg. 2017;44(3):603-610.
2. Gülhan B, Kanık Yüksek S, Hayran M, Özkaya Parlakay A, Güney D, Akın Kağızmanlı G et al. Infections in pediatric burn patients: An analysis of one hundred eighty-one patients. Surgical infections. 2020;21:357-362.
3. Sönmezer M, Tezer H, Şenel E, Parlakay A, Yüksek S, Gülhan B et al. Bir pediatrik yanık ünitesinde gelişen hastane enfeksiyonları, izole edilen mikroorganizmalar ve antibiyotik dirençleri. Türkiye Çocuk Hast Derg. 2014;8(4):171-175.
4. Asena M, Aydin Ozturk P, Ozturk U. Sociodemographic and culture results of paediatric burns. International wound journal. 2020;17:132-136.
5. Abdel-Sayed P, Hirt-Burri N, de Buys Roessingh A, Raffoul W, App-legate LA. Evolution of biological bandages as first cover for burn patients. Adv Wound Care (New Rochelle). 2019;8(11):555-564.
6. Greenhalgh DG. Sepsis in the burn patient: A different problem than sepsis in the general population. Burns Trauma. 2017;5:23.
7. Ramirez-Blanco CE, Ramirez-Rivero CE, Diaz-Martinez LA, Sosa-Avila LM. Infection in burn patients in a referral center in Colombia. Burns. 2017;43(3):642-653.
8. Grudziak J, Snock C, Mjuweni S, Gallaher J, Cairns B, Charles A. The effect of pre-existing malnutrition on pediatric burn mortality in a sub-Saharan African burn unit. Burns. 2017;43(7):1486-1492.
9. Sözen İ, Güldoğan CE, Yastı AÇ. Etiology of childhood burns and parental awareness in Turkey. Ulus Cerrahi Derg. 2015:1;32(3):168-172.

10. Öztorun Cİ, Demir S, Azılı MN, Şenaylı A, Livanelioğlu Z, Şenel E. The outcomes of becoming a pediatric burn center in Turkey. Ulus Travma Acil Cerrahi Derg. 2016;22(1):349.
11. Tung KY, Chen ML, Wang HJ, Chen GS, Peck M, Yang J et al. A seven-year epidemiology study of 12381 admitted burn patients in Taiwan-using the Internet registration system of the Childhood Burn Foundation. Burns 2005;31;1:12–17.
12. Wesson HK, Bachani AM, Mtambeka P, Schulman D, Mavengere C, Stevens KA et al. Pediatric burn injuries in South Africa: A 15-year analysis of hospital data. Injury. 2013;44:1477–1482.
13. Einspieler C, Marschik PB, Prechtl HFR. Human motor behavior: prenatal origin and early postnatal development. J Psychol. 2008;216:148–154.
14. Yılmaz M. Türkiye'de kırsal nüfusun değişimi ve ilere göre dağılımı (1980-2012).Doğu coğrafya dergisi 2015;20:161-188.
15. Xin W, Yin Z, Qin Z, Jian L, Tanuseputro P, Gomez M et al. Characteristics of 1494 pediatric burn patients in Shanghai. Burns. 2006;32:613–618.
16. Rafii MH, Saberi HR, Hosseinpour M, Fakharian E, Mohammadzadeh M. Epidemiology of pediatric burn injuries in Isfahan, Iran. Arch Trauma Res. 2012;1:27–30.
17. Lipovy B, Brychta P, Gregorova N, Jelinkova Z, Rihova H, Suchanek I et al. The epidemiology of pediatric burns undergoing intensive care in Burn Centre Brno, Czech Republic, 1997-2009. Burns. 2012;38:776–782.
18. Shah A, Suresh S, Thomas R, Smith S. Epidemiology and profile of pediatric burns in a large referral center. Clin Pediatr (Phila). 2011;50:391–395.
19. Karimi H, Montevalian A, Motabar A, Safari R, Parvas M, Vasigh M. Epidemiology of pediatric burns in Iran. Annals of burns and fire disasters 2012;25:115.
20. Kazanasmaz Ö, Dinç N. Yanık Ünitesinde Takip Edilen Pediatrik Yaş Grubu Olguların Klinik Değerlendirmesi. Harran Üniversitesi Tıp Fakültesi Dergisi, 2019:16(3):535-539.
21. Cuttle L, Kravchuk O, Wallis B, Kimble RM. An audit of first-aid treatment of pediatric burns patients and their clinical outcome. J Burn Care Res. 2009;30(6):1028-1034.
22. Davies M, Maguire S, Okolie C, Watkins W, Kemp AM. How much do parents know about first aid for burns? Burns. 2013;39:1083 1090.
23. Zhu L, Zhang H, Shi F, Yi D, Zhu G. Epidemiology and outcome analysis of scalds in children caused by "guo lian kang": An 11-year review in a burn center in China. Burns. 2015;41:289–296.