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Original Article

Demographic features of pediatric patients with burn injuries referred to the emergency department of Sina hospital in Tabriz, Iran, in 2014

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Abstract
Introduction: The aim of this study was to evaluate the demographic status of children with burn injuries who were referred to the emergency department of the Sina hospital in Tabriz, Iran, in 2014.
Methods: Total of 220 pediatric patients with burn injuries, who referred to the emergency department of Sina hospital, were enrolled in this prospective descriptive study. Data such as age, gender, type of injury, location of injury, and severity of burns was collected, and analyzed using SPSS statistical software.
Results: Most patients were the first children of their families (61.8%). Two-year-old children had a higher incidence of burn injuries (33.2%). Most of the burns (94.5%) occurred at home. The most common cause of injury was hot liquids (74.5%). The position of the burn injuries in most patients was the upper extremities (47.3%) and second-degree burn severity was more frequent (70.5%). There were no significant statistical differences between the two genders regarding cause, severity, percentage, and anatomical area of the burn.
Conclusion: It is necessary to design effective strategies to reduce the incidence of burn injuries in pediatric patients, so that steps can be taken to reduce burn injuries and their complications.

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Introduction

Burn injuries are among the most important vulnerabilities in children that can cause severe functional, social, and psychological disabilities.[1,2] Pediatric burn injuries can be more severe than those in adults. However, children and their parents are often unaware of the results of the burn injuries. In fact, many of them are unaware of the possibility of death due to such injuries. While in some cases, a burn injury may not be life-threatening, the scars impose severe impact on an individual's physical and mental performance.[3] Most cases that occur in the first two decades of life are accidental and can be prevented.

Burns are the most common cause of death due to injury in this age group.[3,4] Studies on the epidemiology and risk factors for burns in many advanced countries like the United States play an important role in the primary and secondary prevention of burns. But the same does not apply in developing countries.[5-7] Epidemiological information on burn injuries can contribute to design effective strategies to reduce the incidence of burn injuries and to determine appropriate management methods of treatment. Programmes that lead to domestic disaster reduction can reduce deaths from

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pediatric burns.[5,7] Peleg et al. found that the hospitalization of neonates and toddlers were reduced significantly in areas where such programs have been implemented.[8]

The present research focused on the causes and location of burn damage in pediatric patients who were referred to the emergency department of Sina hospital of the Tabriz University of Medical Sciences, Tabriz, Iran, in 2014. The results can provide the appropriate strategy to prevent and reduce the incidence, morbidity, mortality, and the costs of burn injuries within the health system.

Methods

This cross-sectional study was conducted in the Sina hospital of the Tabriz University of Medical Sciences during a period of one year in 2014. The Sina Medical Center is a burn referral center[9] and about 500 patients with burn injuries are referred to the emergency ward of this hospital each year.

A sample size of 220 patients was determined using the Morgan table, a confidence level of 95%, and an α of 0.05. The inclusion criteria were children under 12 years who had burn injuries and were referred to the emergency ward of the Sina Medical Center. The exclusion criteria were those who did not consent to participate in the research and those who were older than 12 years.

The parents of patients have been assured that the patient information will remain confidential and their participation in the study will not interfere with the treatment. All conditions of the study were explained to the patients' parents and their consent was obtained. Later, after obtaining informed consent from the parents of the patient, the parents were interviewed and information was collected. The variables included age, sex, birth order, parental education, injury location and its reason, percentage, anatomical location and severity of the burn, and disposition status of patients (discharge or admission).

The collected data was entered into SPSS software (version 17, SPSS Inc., Chicago, IL, USA). The descriptive tests of mean ± standard deviation (SD) and frequency (percentage) were used to describe the data. To search for the normal distribution of data, the Kolmogorov-Smirnov test was used. An independent sample t-test was used to compare quantitative data between the groups. A chi-square test was used to compare qualitative data. A P-value < 0.05 was considered significant.

Results

In this study, 220 patients with burn injuries were studied. Among the patients, 117 were boys (53.2%) and 103 were girls (46.8%). The mean age (± SD) of patients was 1.46 ± 0.5 years (median = 1 year). Table 1 shows the demographic status of patients' family between the two genders. Table 2 shows the status of patients' burn injuries between the two genders.

Discussion

Our findings showed that of the 220 visited children with burn injuries, the male to female ratio was 1.13:1. In the previous studies, the prevalence of burn injuries in boys was more than girls.[10-12] So, it seems that boys are more susceptible to burn injuries because they are more likely to do dangerous things compared to girls.[10]

The mean age of the children was 3.5 years, and 61.8% (136 patients) of the children with burn injuries were the first child in their families. In a study conducted in Brazil on patients who were under 12 years of age, about 50% of the victims were younger than three years.[13]

Another study was conducted on children less than seven years with burn injuries in Ankara, where most children were under three years. Children in this age group are more exposed to the risk and therefore, parents should train and supervise the activities of the children. Any ignorance from parents may result in such damage.[14]

In this study, the majority of burn cases (94.5%) occurred at home. Torrati et al.

Table 1. Demographic status of patients' family according to patient's gender

Variable	Male	Female
Birth order [n (%)]		
1	69 (59.0)	67 (65.0)
2	37 (31.6)	22 (21.4)
3	10 (8.5)	9 (8.7)
4	1 (0.9)	5 (4.9)
Place of living [n (%)]		
Urban	99 (84.6)	89 (86.4)
Rural	18 (15.4)	14 (13.6)
Education of father [n (%)]		
Elementary school	7 (6.0)	6 (5.8)
Middle and high school	51 (43.6)	41 (39.8)
Diploma	34 (29.1)	32 (31.1)
High diploma and BSc	9 (7.7)	7 (6.8)
MSc and higher	16 (13.7)	17 (16.5)
Educational of mother [n (%)]		
Elementary school	9 (7.7)	11 (10.7)
Middle and high school	53 (45.3)	29 (28.2)
Diploma	43 (36.8)	46 (44.7)
High diploma and BSc	1 (0.9)	6 (5.87)
MSc and higher	11 (9.4)	11 (10.7)
Occupation of father [n (%)]		
Self-employed	93 (79.5)	89 (86.4)
Employee	21 (17.9)	11 (10.7)
Unemployed	3 (2.6)	3 (2.9)
Occupation of mother [n (%)]		
Self-employed	4 (3.4)	8 (7.8)
Employee	3 (2.6)	5 (4.9)
Housewife	110 (94.0)	90 (87.4)
Parental death [n (%)]		
Yes	0 (0)	0 (0)
No	117 (100%)	103 (100)
Parental divorce [n (%)]		
Yes	1 (0.9)	0 (0)
No	116 (99.1)	103 (100)

conducted a study on children under 12 years of age in Brazil, where 86.0% of injuries took place at home,[13] which is consistent with the finding of our study. Most burn injuries were caused by hot liquids in this study (74.5%). In Ankara, more than 605 cases of burn injuries in children were due to boiling water.[14]

Isaac et al. also concluded that boiling water was the main cause of burns in children in South Africa.[15] Also, in the study by Arslan et al.,[16] boiling water was the most important cause of burn injuries. Most deaths were due to burns from fire. They suggested that changes in the living habits of parents have reduced this injury.[16] Shams et al. have concluded that in a population under 20 years, burn injuries in the lower limbs and due to boiling water were more common at home.[17]

In this study, 90.9% (200 patients) of mothers of patients were housewives and 40.4% had a diploma (their education level). This can be a sign of their low knowledge about protecting children from hazardous factors at home. Thus, proper training is important for mothers to prevent burns.

The majority of fathers of children with burns were self-employed (82.7%), and most of them (41.8%) hold a diploma. In the study conducted by Samimi et al., mothers and fathers who had diplomas were 92% and 96%, respectively. The majority of fathers (42.0%) were self-employed.[10]

In this study, most cases of burns (47.2%) were in the upper limbs. Research findings

Table 2. Status of patients' burn in terms of gender

Variable	Male	Female	P
Age (year) (mean ± SD)	3.57 ± 2.86	3.43 ± 2.68	0.718
Injury percent (mean ± SD)	8 ± 11 (Median = 4)	7 ± 9 (Median = 4)	0.446
Place of injury [n (%)]			
Inside home	109 (93.2)	99 (96.1)	0.255
Outside home	8 (6.8)	4 (3.9)	
Cause of injury			
Hot fluids	89 (76.1)	75 (72.8)	0.124
Hot foods	5 (4.3)	10 (9.7)	
Fire	2 (1.7)	3 (2.9)	
Acid/alkali	13 (11.1)	13 (12.6)	
Electricity	8 (6.8)	1 (1.0)	
Hot metal	0 (0)	1 (1.0)	
Severity of burning			
1	9 (7.7)	6 (5.8)	0.226
2 superficial	84 (71.8)	71 (68.9)	
2 deep	21 (17.9)	26 (25.2)	
3	3 (2.6)	0 (0)	
Injury area			
Upper extremities	52 (44.4)	52 (50.5)	0.201
Lower extremities	39 (33.3)	34 (33.0)	
Perineum	1 (0.9)	0 (0)	
Trunk	15 (12.8)	4 (3.9)	
Head/neck	8 (6.8)	10 (9.7)	
Multiple area	2 (1.7)	3 (2.9)	
Disposition			
Admission	32 (27.4)	26 (25.2)	0.421
Discharge	85 (72.6)	77 (74.8)	

SD: Standard deviation

suggested that the upper limbs were more susceptible to burn injuries due to children's curiosity;[3,18,19] therefore, it is recommended to train parents on how to ensure safety at home.

In this study, the highest frequency (22.7%) of the burn size was 2.0% and about 91.9% of children had second-degree burns. According to a study by Mercier and blond, the majority of children with burn injuries had blisters.[20] Of all children with burns, 162 (73.6%) were discharged and others were admitted in the pediatric burn unit. One of the limitations of our study was sample collection in a limited time per day (8 am-4 pm). Another limitation of our study is that we did not follow up on the admitted patients.

Conclusion

This research will be useful for implementing prevention programs of burn injuries and reducing their effects. The development and implementation of appropriate strategies will be beneficial to train parents on how to use heating devices such as samovars, heaters, stoves, etc., and observe safety rules at home. They can be trained to identify risk factors at home and at the workplace as it will reduce the physical, mental, and economic effects of burns in pediatric patients.

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Authors' Contribution

All authors have read and approved the manuscript. FR and AZ performed the data collection, writing, critical revision and

drafting of the manuscript. FA undertook the major parts of the study design and performed the statistical analysis, data analysis and data interpretation.

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Conflict of Interest
Authors have no conflict of interest.

Ethic Approval
This study has been approved by Islamic Azad University, Tabriz Branch and has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

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