

## Epidemiology, Causes and Outcome of Burns in Women From Southern Iran: 2009-2011

Zinat Mohebbi<sup>1</sup>; Shahla Najafi<sup>2</sup>; Zahra Molazem<sup>1</sup>; Giti Setoodeh<sup>3,\*</sup>

<sup>1</sup>Department of Medical Surgical Nursing, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, IR Iran

<sup>2</sup>Department of Medical Surgical Nursing, School of Hazrat-e-Zeinab Nursing and Midwifery, Yasouj University of Medical Sciences, Yasouj, IR Iran

<sup>3</sup>Department of Psychiatric Nursing, Community Based Mental Health Research Center, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, IR Iran

\*Corresponding author: Giti Setoodeh, Department of Psychiatric Nursing, Community Based Mental Health Research Center, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, IR Iran. Tel: +98-7116474258, Fax: +98-7116474252, E-mail: setoodeh@sums.ac.ir

Received: March 17, 2014; Revised: March 27, 2014; Accepted: April 10, 2014

**Background:** Burns are among the most prevalent mortality causes in developing countries, particularly Iran. In addition to large treatment expenses, burn victims suffer from long-term physical and psychological injuries.

**Objectives:** This study intends to recognize the epidemiologic factors, causes and outcome of burns among hospitalized women in the Burn Wards of Ghotbeddin Hospital in Shiraz, Iran.

**Patients and Methods:** This was a cross-sectional study carried out for a period of 2.5 years. The population consisted of all women hospitalized in the Burn Wards of Ghotbeddin Hospital from March 2009 until September 2011. Patients' information was entered in a checklist using old records and documents after which the collected data were analyzed by SPSS software version 15.

**Results:** A total of 619 women were hospitalized over a 2.5 year period due to burns. Their mean age was  $25.78 \pm 17$  years with a range of 3 months to 103 years. Approximately half of the burns (45.4%) occurred at home, most of which (35.0%) occurred during the spring season. Kerosene was the most prevalent cause of burns (30.0%). Of these, 210 (33.92%) women were referred due to self-immolation; familial disputes were the main cause (46.6%) for these referrals. There were 232 (37.48%) cases whose deaths were attributed to burns and its complications during this period.

**Conclusions:** Annually, many women have been admitted and treated in burn hospitals, which result in tremendous financial expenses, physical deformities, psychological disabilities and mortality. Therefore, public education of burn prevention measures seems to be necessary.

**Keywords:** Epidemiology; Burn; Women

### 1. Background

The injuries attributed to burns comprise 5%-37% of morbidities and mortality in developing countries (1). Pain that results from burns, the long treatment process and physical deformities from the burn scars on the one side and large treatment expenses (2), On the other hand cause long-term physical and psychological disabilities among patients, particularly women (3). Although the worldwide census of mortality attributed to burns has declined, a large difference is still observed in the mortality rate and resultant organ defects from burns among different countries (4). In America, the mortality rate among women with burns has declined from 7000 cases in the year 1970 to 2500 cases in 2004. No exact census of burn rate in Iran is available but it is estimated that at least 1% of women suffer from accidents caused by burns annually. Out of this rate, 3.4% (approximately 13000) must be hospitalized and, on average, at least 10% die due to the severity of their injuries and resultant complications. According to a 2000

WHO published census, the rate of burn mortalities in Iran has been reported to be 4.8 per 100000 persons the third global rank after India (8.3 per 100000) and Africa (5.5 per 100000) (5). Improvement in prevention plans (6) and pre-hospital care, management of intensive care wards and equipping burn hospitals, the rapid removal of injured tissues (7) and the use of skin grafts (8) are among factors that assist in reducing the burn mortality rate in developed countries. In Shiraz as well as many other cities in Iran, pre-hospital care is not available. Thus patients' wounds will practically remain open and exposed to various environmental infections from the time of the accident until the victim arrives at the hospital. Sometimes patients' relatives put different contaminated materials on the wound that could be potentially dangerous (9). In many cases the burned person is taken to crowded treatment centers, thus potentially increasing the risk of infection. The Ghotbeddin Hospital in Shiraz is the only

#### Implication for health policy/practice/research/medical education:

This study provides an overview of the epidemiology of burn injury in women and any contributing factors responsible for burns and outcome of care in Shiraz over the 2.5-year period March 2009 to September 2011 based on a cross-sectional study.

Copyright © 2014, Health Policy Research Center, Shiraz University of Medical Sciences This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

therapeutic center allocated for burn treatment for Fars and some of the southern neighboring provinces. In addition to the population of other provinces, for the 2000336 women in Fars Province this hospital has the capacity to admit only 25 women.

## 2. Objectives

Therefore, considering the importance of burns in women and the necessity of having an exact census of the rate and outcome of burns, we conducted this research to study the epidemiology, causes and outcome of burns among women during the years 2009-2011 at Ghotbeddin Hospital in Shiraz, IR Iran.

## 3. Patients and Methods

The present study is a retrospective, descriptive research carried out using the files of all women who suffered from burns during the period March 2009 to September 2011 who were hospitalized and treated at Ghotbeddin Hospital. The data collection tool consisted of a two-part questionnaire that included demographic characteristics (first part) and the information connected with burn patients (second part). This questionnaire was evaluated and confirmed by ten faculty members of the Nursing and Midwifery College of Shiraz and Yasouj, a city in Iran, from the view point of content validity and reliability via test re-test ( $r = 0.8$ ). Of note, in order to prepare this questionnaire we applied the help of a similar tool used by Afrasiabi et al. in their research, "Studying the Causes Connected with Burns among Patients Hospitalized at the Burn Ward of Shahid Beheshti Hospital of Yasouj City" (10). We began the data collection process after obtaining permission from the Research Assistant at Hazrat-e-Fatemeh Nursing and Midwifery College of Shiraz and presenting an introduction letter to the aforesaid hospital. After receiving approval, we extracted the necessary information from medical files of the hospitalized women in order to complete the questionnaire. After injured patients were admitted to this hospital, initially the burn percentage was determined by Wallace's rule of nine. If necessary, venous restoration was performed according to Parkland's formula. After stabilization of the patient and application of the primary dressing, the patient was transferred to the ward. Dressings were usually changed once per day and a sample obtained from the wound for culture once upon arrival to the hospital, after which sample collection was repeated weekly. Wide spectrum antibiotics (ciprofloxacin and metronidazole) were administered and, in case of observed signs of infection, patients received other medicines (amikacin and imipenem). The treatment outcome was classified as patients who were treated and discharged, died or were transferred to the provinces with better equipped centers where the patients did not need to be accompanied by an attendant. Collected data were analyzed with descriptive statistics and SPSS software version 15.

## 4. Results

During this study 619 women with various burn injuries were hospitalized. The age range of patients was between 3 months to 103 years with a mean age of  $25.78 \pm 17$  years (Table 1). Approximately 146 (23.59%) girls below 12 years of age were hospitalized primarily due to burns from boiled water or other hot liquids. Most burns (81.5%) occurred at home with cooking as the most common activity (Table 2). It was reported that kerosene (30.0%) was the most prevalent cause of burn (Table 3). There were 210 (33.92%) women hospitalized due to self-immolation, 83 of which were single and 114 were married. In these patients familial disputes were the main cause for self-immolation in 98 cases (15.83%) (Table 4). Most patients (64.7%) were housekeeper (Table 5). Most burns (35.0%) occurred during the spring season (Table 6). From the education point of view, 102 (21.56%) cases were illiterate, 255 (53.91%) had an education equal to the ninth grade level, 84 (17.76%) had a diploma and 32 (6.76%) were educated above the diploma. There were 139 (22.45%) residents of Shiraz, 19 (3.07%) were villagers, 435 (70.27%) were residents of other cities in Fars Province and 26 (4.20%) were referred from other states. Most (35.0%) were housewives.

**Table 1.** Frequency Distribution According to Age in Women With Burns <sup>a</sup>

Age, y	Burned Women
≤1	8 (1.3)
2-12	146 (23.6)
13-19	80 (12.9)
20-29	175 (28.3)
30-39	88 (14.2)
40-49	43 (6.9)
50-59	37 (6.0)
60-69	12 (1.9)
70-79	19 (3.1)
≥ 80	11 (1.8)

<sup>a</sup> Data are presented as No. (%).

**Table 2.** Frequency Distribution of the Location of Burn Accidents <sup>a</sup>

Place of Burn	Burned Women
Home	506 (81.5)
Work	71 (11.4)
School	5 (0.7)
Car accident	19 (3.6)
While playing	18 (2.8)
Total	619 (100)

<sup>a</sup> Data are presented as No. (%).

**Table 3.** Frequency Distribution of the Cause of Burn Incidence <sup>a</sup>

Cause of Burn	Results
Kerosene	209 (33.8)
Gas	125 (20.2)
Hot instruments	97 (15.7)
Gasoline	105 (16.9)
Electricity	24 (3.9)
Firewood	8 (1.3)
Inflammable substances	2 (0.3)
Chemical substances	2 (0.3)
Steam	1 (0.2)
Others	21 (3.4)
Not recorded	25 (4.0)
<b>Total</b>	<b>619 (100.0)</b>

<sup>a</sup> Data are presented as No. (%).

**Table 4.** Absolute and Relative Frequency Distribution of the Cause of Self-Immolation <sup>a</sup>

Cause	Results
Familial dispute	98 (46.6)
Marital problems	3 (1.4)
Economic problems	6 (2.9)
Consumption of narcotics	13 (6.2)
Psychological problems	49 (23.3)
Other cases	16 (7.6)
Unknown	25 (12.0)

<sup>a</sup> Data are presented as No. (%).

**Table 5.** Absolute and Relative Frequency Distribution of Occupational Status of Women With Burns <sup>a</sup>

Occupation	Results
Housekeeper	401 (64.7)
Self-employment	56 (9.4)
Worker	43 (7.0)
Student	42 (6.7)
Unemployed	38 (6.0)
Farmer	39 (6.2)
<b>Total</b>	<b>619 (100.0)</b>

<sup>a</sup> Data are presented as No. (%).

**Table 6.** Frequency Distribution of Burns in Various Seasons of the Year <sup>a</sup>

Season	Results
Spring	208 (33.5)
Summer	88 (14.1)
Autumn	195 (31.4)
Winter	128 (21)
<b>Total</b>	<b>619 (100)</b>

<sup>a</sup> Data are presented as No. (%).

Regarding the burn severity, 109 (17.61%) had second degree burns, 73 (11.79%) had third degree burns and 437 (70.59%) cases had burns with different degrees. In connection with the burn extent, 213 (34.41%) had burns of less than 25%, 296 (47.82%) had burns of 25.0%-50.0% and 110 (17.77%) had burns of more than 50.0%. From the view point of burn outcome, 232 (37.48%) cases died from burn injuries and the resultant complications. Of these, 11.0% of the total mortality belonged to girls below 12 years of age. There were 6 (0.97%) cases transferred to other states and the treatment results for 29 (4.68%) cases were not recorded.

### 5. Discussion

In the present research, 619 burned women were hospitalized and treated in Ghotbeddin Hospital, Shiraz over a 2.5-year period. This figure approximated the reported census from similar studies in Iran but was higher compared to the global census. Roozbahani et al. in an epidemiologic study in Esfahan reported that 446 women with burns were hospitalized at Imam MousaKazem Burn Hospital during a period of one year in 2003 (11). According to reports by Kabirzadeh et al. 612 women with burns referred to the Zare Education- Treatment Center in Sari during 2002-2004. This study included hospitalized as well as out-patients (12). Also, Aghakhani et al. reported the number of hospitalized women in 2005 at Imam Khomeini Hospital in Oroumieh to be 310 (13). The above studies showed a lower census of the numbers of burned women. Mashreky et al. has reported the burn census in Bangladesh during the year 2003 to be 723 women (14). Burn injuries are among the most important causes for hospital admission; age and sex are also among the important epidemiologic criteria for burn injuries. In the present research, young women between 20-29 years of age comprised the highest numbers of burned women. The results of a study by Afrasiabifar et al. on burn causes among hospitalized patients of both genders at Yasouj Hospital showed that most burned patients (60.6%) consisted of women between 10-19 years of age (10). Mean-time, the results showed that, 23.59% of burns and 11.0% of mortalities were seen in girls below the age of 12 years. In this respect, the result of a research in Nigeria has also shown that the incidence of burn (23.6%) occurred in girls less than 10 years old (15). According to Afrasiabifar et al. 24.0% of burn cases were girls less than 13 years old (10). Therefore, it could be said that the results of the present study from the view point of burn prevalence among young children was similar to the results of other studies. In connection with the burn season, the results indicated that most (35.0%) burns happened during the Spring season which contradicted the results of other studies in Iran (11, 16). The reason might be attributed to completion of sampling in September 2011, so the rate for burns in the Fall and Winter were not calculated, which could have impacted the results. Furthermore, the first month of spring(Farvardin) is the month of bon firing and acci-

dental burns. So, this could be interfere with total results. Kerosene was the most prevalent (30.0%) cause of burns. Kerosene is still used by many people in most parts of the country, particularly in Fars Province as a cheap material to produce heat which in turn increases the risk of fire and subsequent burns. The majority of self-immolation cases were related to young married women (55.34%), low literacy (83.71%), village residents (79.33%) and kerosene (73.40%). In this regard, the results of a study by Mashreky et al. "The Rate of Burn Resultant Mortality in Bangladesh", reported the maximum number of self-immolation cases belonged to villager women with low literacy (14). Meantime, familial disputes (46.6%) and the existence of psychological disorders (23.3%) have been mentioned as the main causes for attempted self-immolation. A study by Mohanty et al. conducted from 1993-2003 in connection with the rate of self-immolation that resulted in mortality in India showed that 79.5% of self-immolation cases belonged to young women who were 21-30 years of age. Injuries sustained from their husbands and financial poverty were among the main causes for self-immolation (17). Ahmadi et al. reported that over 70.0% of attempted self-immolation cases in Iran suffered from a type of psychiatric disorder (18). Obtaining such results might be an indication of requiring more attention to the matter of consultation, the necessary education regarding life skills and patient screening so that it might be effective in reducing the rate of attempted self-immolation. These results were in line with the results of the current study. In this study, there were 232 (37.48%) mortalities attributed to burns. Towfighi et al. Reported that 52.4% of hospitalized women in the Burn Ward of Shahid Motahari Hospital in Tehran died due to injuries sustained from burns (19). According to Mashreky et al. (14). The number of mortalities was reported to be 18 out of 1381 (23.8%) cases of hospitalized patients. Anyway, in different studies inside Iran, the women mortality rate related to burn was almost similar but this rate increases when compared to global census. Hence, it can be said that burns are one of the most disastrous events followed by increased mortality, creation of severe complications such as deformities, loss of normal functioning, and increase in the incidence of psychiatric problems. Fortunately these tragic events are largely controllable by the use of proper education of medical personnel in the treatment of burn victims, correct application of oil-burner instruments, and observation of safety points in addition to the establishment of equipped, adequate therapeutic centers. Therefore, educating the public about burn prevention measures is necessary. There were some study limitations. First, the reliability of administration data was typically constrained by the fact that the data was collected at various time points with a potential for time lag and accurate reporting of the exact hospital admissions. Second, this study was a cross-sectional research. Therefore data on women who did not seek medical attention or who attended a health-care facility were not available for our analysis. Al-

though perceived to be relatively small number of burn injury cases, this numerical gap might have caused us to under-estimate the true incidence of burn victims in Shiraz. Our findings show no significant changes in burn hospital admissions or deaths over a 2.5 year period. We believe this could be attributed to variations in the success made by the government and health care agencies in burn injury prevention and control programs as well as variations in efficient treatment and clinical practices amongst primary care providers. Therefore, educational efforts for prevention should be the keystone to minimize the incidence of burn injuries.

### Acknowledgements

We express our appreciation to the personnel at Ghotbeddin Hospital especially to Mrs. Seddigh, Mrs. Rezaei and Ms. Pishahang for their sincere cooperation in performing this research.

### Authors' Contribution

Conception and design: Zinat Mohebbi, Shahla Najafi, Zahra Molazem, Giti Setoodeh; analysis and interpretation: Giti Setoodeh, Zinat Mohebbi; data collection: Giti Setoodeh, Zinat Mohebbi; writing the article: Giti Setoodeh, Zinat Mohebbi; critical revision of the article: Najafi Shahla, Zinat Mohebbi, Giti Setoodeh, Zahra Molazem; final approval of the article: Zinat Mohebbi, Shahla Najafi, Zahra Molazem, Giti Setoodeh; statistical analysis: Giti Setoodeh, Zinat Mohebbi; discussion and final approval: Zinat Mohebbi, Shahla Najafi, Zahra Molazem, Giti Setoodeh.

### References

- Othman N, Kendrick D. Epidemiology of burn injuries in the East Mediterranean Region: a systematic review. *BMC Public Health*. 2010;**10**:83.
- Wibbenmeyer LA, Amelon MA, Loret de Mola RM, Lewis R, 2nd, Kealey GP. Trash and brush burning: an underappreciated mechanism of thermal injury in a rural community. *J Burn Care Rehabil*. 2003;**24**(2):85-9.
- Perry S, Difede J, Musngi G, Frances AJ, Jacobsberg L. Predictors of posttraumatic stress disorder after burn injury. *Am J Psychiatry*. 1992;**149**(7):931-5.
- Brigham PA, McLoughlin E. Burn incidence and medical care use in the United States: estimates, trends, and data sources. *J Burn Care Rehabil*. 1996;**17**(2):95-107.
- World Health Organization.. *Department of injuries and violence prevention The injury chart book*. 2002.
- Thompson RM, Corrogher GB. Burn Prevention. In: Corrogher GB, editor. *Burn care and therapy*. New York: Mosby; 1998.
- Xiao-Wu W, Herndon DN, Spies M, Sanford AP, Wolf SE. Effects of delayed wound excision and grafting in severely burned children. *Arch Surg*. 2002;**137**(9):1049-54.
- Chester DL, Papini RPG. Skin and skin substitutes in burn management. *Trauma*. 2004;**6**(2):87-99.
- Olaitan PB, Iyidobi EC, Olaitan JO, Ogbonnaya IS. Burns and scalds: First-aid home treatment and implications at Enugu, Nigeria. *Ann Burns Fire Disasters*. 2004;**17**(2):61-3.
- Afrasiabifar A, Karimi Z. Studying the causes related to burn among hospitalized patients at burn ward of Shahid Beheshti Hospital of Yasuj city in 1380. *J Armagh-e Danesh Q yasuj univ med Sci*. 2003;**7**(27):39-44.

11. Roozbahani R, Zamani AR, Omranifard M, Roozbahani A, Farajzadegan Z, Rezai F. Epidemiology study of burn patients hospitalized at EmamMosa Kazem-Esfahan in 1383. *J Shahrecord Univ Med Sci.* 2003;7(1):80-9.
12. Kabirzadeh A, Zamani KA, Bagherian FE, Mohseni SB, Kabirzadeh A, Tawasoli AA. Mortality rate resulted from burn among the years 1381-83. *Sci J Gorgan Univ Med Sci.* 2006;9(1):79-82.
13. Aghakhani N, Rahbar N, Feizi A, Karimi H, Vafashoar N. Epidemiology of admitted patients at burn ward of EmamKhomeini Hospital of Oromieh city in 1384. *Behbood Sci Res Q.* 2007;12(2):140-50.
14. Mashreky SR, Rahman A, Svanstrom L, Khan TF, Rahman F. Burn mortality in Bangladesh: findings of national health and injury survey. *Injury.* 2011;42(5):507-10.
15. Dongo AE, Irekpita EE, Oseghale LO, Ogbabor CE, Iyamu CE, Onuminya JE. A five-year review of burn injuries in Irrua. *BMC Health Serv Res.* 2007;7:171.
16. Ghaderi R, Attaran A. Epidemiology of burn and determining LASO among patients with burn hospitalized at EmamReza Hospital of Birjand. *J Birjand Univ Med Sci.* 2004;10(15):15-9.
17. Mohanty MK, Arun M, Monteiro FN, Palimar V. Self-inflicted burns fatalities in Manipal, India. *Med Sci Law.* 2005;45(1):27-30.
18. Ahmadi A, Mohammadi R, Schwebel DC, Yeganeh N, Hassanzadeh M, Bazargan-Hejazi S. Psychiatric disorders (Axis I and Axis II) and self-immolation: a case-control study from Iran. *J Forensic Sci.* 2010;55(2):447-50.
19. Towfighi H, Aghakhani K, Joghtai H, Chehrei A. Epidemiologic study of death resultant burn referred to legal medical organization of Tehran in 1998. *Q J leg med.* 2005;5(17):3-15.