

## A Survey of Characteristics of Self-Immolation in the East of Iran

Omid Mehrpour<sup>1,2</sup>, Seyed Alireza Javadinia<sup>1,2</sup>, Claudia Malic<sup>3</sup>, Saeed Dastgiri<sup>4,5</sup>, and Alireza Ahmadi<sup>6,7</sup>

<sup>1</sup> Medical Toxicology and Drug Abuse Research Center (MTDRC), Birjand University of Medical Sciences, Birjand, Iran

<sup>2</sup> Department of Clinical Toxicology and Forensic Medicine, Faculty of Medicine, Birjand University of Medical Sciences (BUMS), Birjand, Iran

<sup>3</sup> Department of Plastic Surgery, Frenchay Hospital, Bristol, United Kingdom

<sup>4</sup> Department of Epidemiology and Public Health, National Public Health Management Centre, Tabriz, Iran

<sup>5</sup> School of Public Health and Nutrition, Tabriz University of Medical Sciences, Tabriz, Iran

<sup>6</sup> Department of Anesthesiology, Critical Care, and Pain Management, Kermanshah University of Medical Sciences, Kermanshah, Iran

<sup>7</sup> Department of Public Health Sciences, Division of Social Medicine, Karolinska Institute, Stockholm, Sweden

Received: 1 Aug. 2011; Received in revised form: 7 Jul. 2011; Accepted: 17 Jan. 2012

**Abstract-** The aim of this study was investigating the characteristic and outcome of self-immolation cases admitted to the Burn Centre of Birjand, Iran over an eight year period. This study is a retrospective review of case notes for patients with self-immolation and admitted to our referral burn centre in the last 8 years (January 2003–January 2011). A performa was designed to collect the data such as: demographic information, length of hospital stay, extent of the burn injuries as %TBSA (Total Body Surface Area) and final outcome. Data was analyzed by SPSS software. Between 2003 and 2011, 188 self-immolation cases admitted. The mean age was  $26.97 \pm 12.6$  years. Female to male ratio was 1.7:1. Housewives represented the largest group (43.1%) and kerosene was the most frequent agent used (74.6%). There was significant difference between mortality and TBSA and low educational level ( $P=0.0001$ ). There was a significant fluctuation time trend in the incidence (per 100,000 population) of self-immolation from 2003 (4.64, CI 95%: 4.62-4.65) to 2008 (5.2, CI 95%: 5.19-5.21). Mortality rate was 64%. The survival rates at three weeks survival for patients who self-immolated was 24 percent (CI 95%: 17-31). The mean and median survival times were 6 days (CI 95%: 4.8-7.2) and 17.5 days (CI 95%: 13.3-21.6), respectively. Our study has shown a lower incidence of self-immolation (5.3%) in the South Khorasan region, when compared with other parts of Iran, as well as a relatively low mortality rate. We have also reported self-immolation in pregnant women which has rarely been reported in medical literature.

© 2012 Tehran University of Medical Sciences. All rights reserved.

*Acta Medica Iranica*, 2012; 50(5): 328-334.

**Keywords:** Self-immolation; Prognosis; Iran, South Khorasan

### Introduction

Suicide is a major and significant public health hazard with an incidence which varies worldwide (1). In 2003, the highest incidence of completed suicide in European countries was recorded in Finland, Luxembourg and Belgium, whereas the lowest incidence was in Greece (2).

World health organization (WHO) looked into the suicide incidence across 90 countries in the population group aged 15-19 year old. The countries with the highest rate were: Russia, New Zealand and Latvia, whereas Asian countries represented 60% of suicide worldwide (3). Iran was ranked as being the country

with the lowest rate of suicide in the world (6/100,000) (4). The methods of choice for suicide attempt vary across countries and sometimes regions and have a significant cultural and ethnic influence.

In the developing countries, retrospective studies have shown that alcohol was rarely involved, a previous psychiatric history was not present, but verbal and physical abuse was a frequent occurrence (5). Strong emotions such as family conflict and romantic disappointments were common precipitants amongst the Iranian students who committed suicide by poisoning; depression and adjustment disorders were found also to be associated with suicide by poisoning (6). Self-immolation, self-poisoning and hanging are the most

**Corresponding Author:** Omid Mehrpour

Department of Clinical toxicology and Forensic Medicine, Faculty of Medicine, Birjand University of Medical Sciences, Ghaffari Avenue, Birjand, Iran, P.O.Box:97-175-379

Tel/Fax: +98 561 4440488, E-mail: omehrpour@bums.ac.ir, omid.mehrpour@yahoo.com.au

common types of suicide attempt in Iran. Previous studies done in Iran have shown that an easy access and availability of dangerous pesticides, such as aluminum phosphide and organophosphate, have led to an increased mortality rate mainly due to self poisoning (7-13).

Self-immolation occurs frequently in Indian continent, Middle East and less in the developed countries (14,15). Although Iran was ranked with the lowest suicide rate worldwide in the age group 15-19 year old, the rate of immolation is very high as shown by Ahmadi *et al.* (4,16). Therefore, Iran is ranked as the country with the highest rate of self-immolation in the world (4,16,17).

Self-immolation is responsible of about 25-40% of all types of suicide attempt in Iran (11,18), with a variable incidence across some parts of Iran; it is the second cause of death due to successful suicide after hanging, with mortality rate of around 70% (14-19). Previous studies done in Iran showed a link between low income and the rate of suicide by self-immolation (4,16).

Therefore, in the last decade, prevention of self-immolation became one of the most important health priorities for the Iranian government. Although in some parts of the Iran (4), epidemiological studies have shown the incidence of self-immolation, other areas, such as eastern province of "South Khorasan" do not have publishable data.

As part of the prevention process, epidemiological research played a major role in assessing and identifying the magnitude of the problem and the major risk factors.

South Khorasan, in the East of Iran, is an agricultural province with an estimated population of around 636600, with a low income representing the majority. The capital of this province is Birjand where there is a burn centre in the Imam Reza Teaching Hospital.

The authors of this paper aimed to investigate the epidemiological profile and the final outcome of suicide by self-immolation of patients admitted to the Burn Centre located in city of Birjand over an eight year period.

## Materials and Methods

Ethics approval has been obtained from The Birjand University of Medical Sciences Ethics Committee for a retrospective review of case notes for patients who sustained burn injuries by self-immolation and admitted to the Burn Centre in the last 8 years (1<sup>st</sup> of January 2003-1<sup>st</sup> of January 2011). The Burn Centre receives

referrals from the 12 counties of South Khorasan province.

Reliable self-immolation history present in the medical records, confirmed by patient's confession and/or a reliable witness to that incident was the main inclusion criteria. Patients whose suicide seemed suspicious (i.e., those who had denied suicidal intent, and for whom there was no corroborating data) were excluded from the study.

A performa was designed to collect the data such as: age, gender, marital status, occupation, educational level, length of hospital stay, extent of the burn injuries as %TBSA (Total Body Surface Area) and final outcome. Self-immolation patients were separated into two groups: first group contained the survivors after attempting suicide, and second group gathered non-survivors. Data was analyzed by SPSS software (Version 16, Chicago, IL, USA). Survival rates (with 95% confidence intervals) were calculated using Kaplan-Meier method in order to assess the prognosis of the suicide by self-immolation. *P*-values less than 0.05 were considered significant.

## Results

Between 2003 and 2010, 3541 patients attempted suicide (self-poisoning, hanging, self-immolation) out of which 260 (7.34%) died (completed suicide). Our retrospective study will focus on the self-immolation group of 188 patients. A total of 116 cases who self-immolated died, and the rest of 72 cases survived.

The mean age was  $26.97 \pm 12.6$  years (Range: 6-75 years). Majority of cases were in their second and third decade of life (Figure 1), with a female to male ratio of 1.7:1 (114 females and 67 males). Housewives represented the largest group (43.1%) and five females were pregnant at the time of the incident (6%). The attempted suicide by self-immolation was more frequent in the 21-40 year age group (53.5%). Kerosene was the most frequent agent used (74.6%) followed by petrol (Table 1). Mean Total Burn Surface Area (TBSA) was  $68.51 \pm 27.1\%$  TBSA (Range: 5-100%). Mean of staying in hospital was 9.25(12.05) days. (Range: 0-63 days). Figure 2 shows the seasonal time pattern of self-immolation. The majority of suicides by self-immolation occurred in summer season. The incidence rate of self-immolation by calendar year is presented in Figure 3. There was a significant fluctuation time trend in the incidence (per 100,000 population) of self-immolation from 2003 (4.64, CI 95%: 4.62-4.65) to 2008 (5.2, CI 95%: 5.19-5.21).

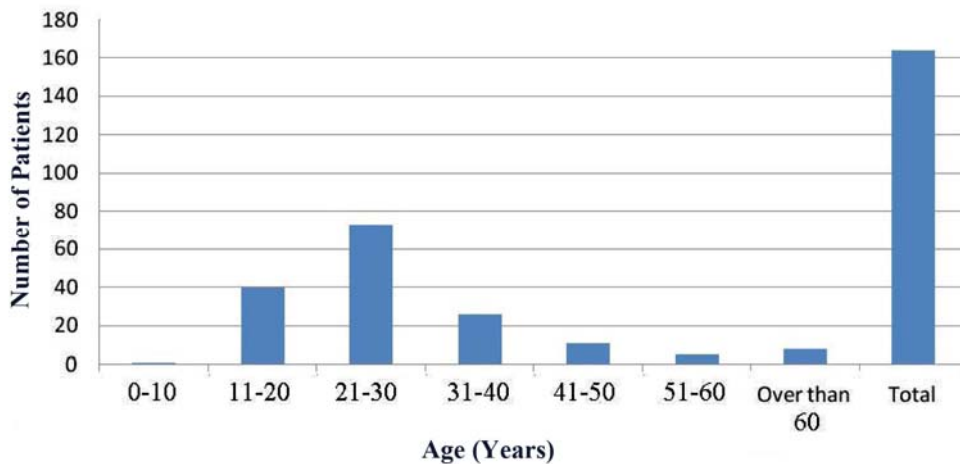


Figure1. Distribution of admitted cases according to age

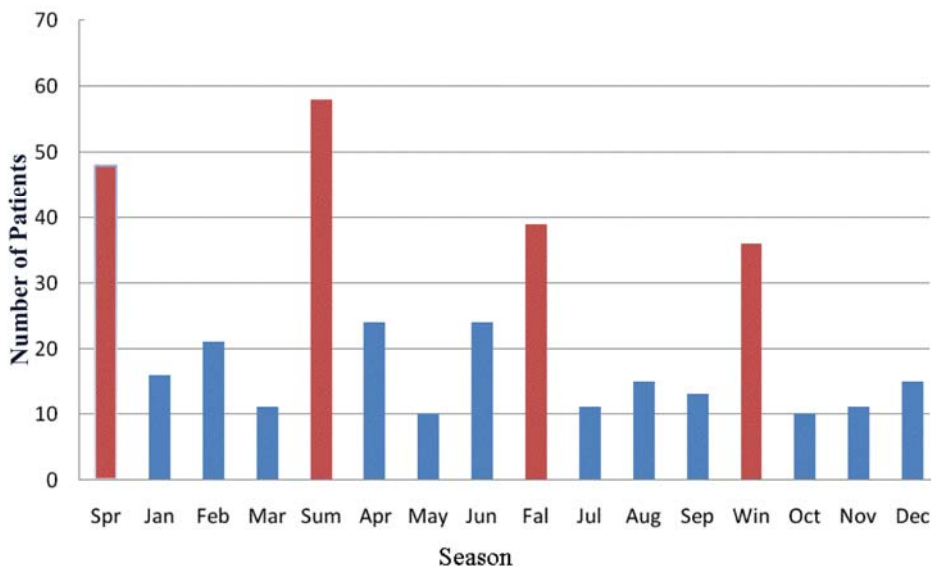


Figure 2. Distribution of self-Immolation cases according to season

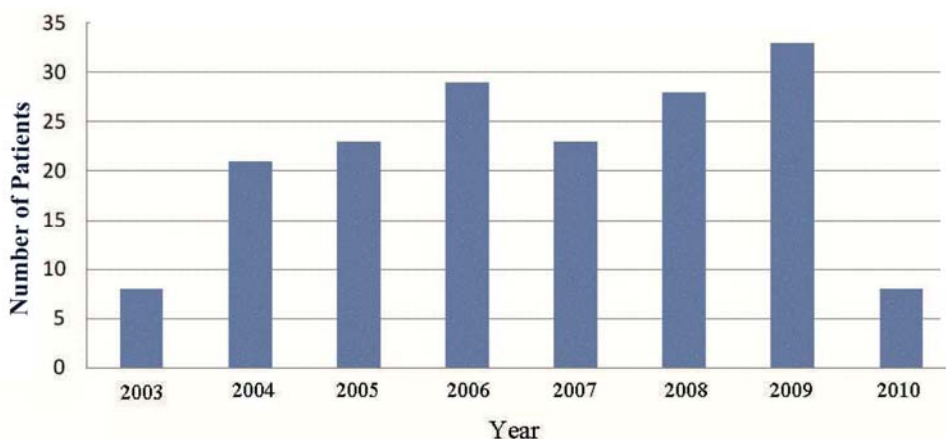
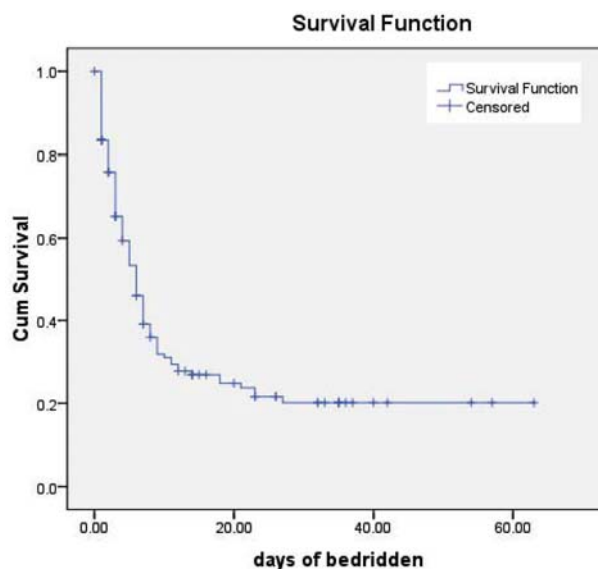


Figure 3. Distribution of Self-Immolation cases according to year of data collection.

**Table 1.** Demographic variables of self-immolation cases.

	Frequency	Percent
<b>Marital state</b>		
Single	64	35.5%
Married	83	45.8%
Married and pregnant	5	2.7%
Unknown	29	16%
<b>Education state</b>		
Illiterate	44	24.3%
Primary school	50	27.6%
Secondary school	5	2.8%
High school graduate	11	6.1%
Pre university	20	11%
University	3	1.7%
Unknown	48	26.5%
<b>Residence Status</b>		
Urban	85	47%
Rural	67	37%
Unknown	29	16%
<b>Occupation</b>		
Student	13	7.2%
Housewife	78	43.1%
Self-employee	30	16.6%
Unemployed	16	8.8%
Soldier	3	1.7%
Farmer	7	3.9%
Office worker	2	1.1%
Unknown	32	17.7%
<b>Outcome</b>		
Death	116	64%
Recovered	58	32%
Unknown(referred to other provinces)	7	4%
<b>External Cause of Suicide</b>		
Kerosene	135	74.6%
Petrol	7	3.9%
Gas	9	5%
Hot water	1	0.6%
Other	9	5%
Unknown	20	11%

There was significant differences between the mortality and TBSA ( $P=0.0001$ ), low educational level ( $P=0.025$ ). There was no significant different between mortality and age, gender, occupation, marital state, residential status and external cause of burning. Figure 4 shows the survival pattern of attempted suicides by self-immolation in the study population. The survival rates at three weeks survival for patients who self-immolated was 24 percent (CI 95%: 17-31).

**Figure 4.** Survival pattern of self-immolation in the study population.

The mean and median survival times were 6 days (CI 95%: 4.8-7.2) and 17.5 days (CI 95%: 13.3-21.6), respectively. We weren't able to track the outcome for 7 patients who were excluded, therefore, the overall case fatality rate being 64 percent.

## Discussion

Suicide attempt is strongly influenced by the cultural, economical and psychological factors, self-immolation being the most violent method. The rate of self-immolation in Iran varies between 1.39% and 40.3% (19, 20). Our study has shown a low rate of self-immolation over the 8 year period, but the population age was higher. In Iran most studies have shown that the mean age of victims was 18-27 years (12, 19-21) which is most similar to the finding of our present study. In our study, there was a female preponderance (62.8%) amongst patients who sustained self-immolation keeping in line with the previous studies done in Iran (14,16,19) and other developing countries like Egypt, Zimbabwe, Sri Lanka(22-24), but in contrast with some developed countries like Canada, Australia, England, and Wales (25-27).

Other studies did not show any gender differences in countries like Russia and Italy (28,29). Socio-economic factors, political protest, forced marriage and previous partners could be reasons which could explain the gender variation amongst self-immolators (14).

**Table 2.** Comparison between present study and other studies.

Article	Year published	Area studies-country/region	No pts	Period of study	Mean age	Rate female-male	Mean TBSA	Mortality rate	Married/single ratio
Epidemiology of self immolation in the north-west of Iran (14)	2005	Tabriz/ Iran	98	1998/ 2003 5 years	27.2	3.3	63	76%	1.2:1
Familial risk factors of self-immolation: A case-control study (15)	2009	Kermanshah/Iran	30	2008/9 2 years	27.5	6.5	60.2	-	1.3:1
Suicide by Self-Immolation: Comprehensive Overview, Experiences and Suggestions (16)	2007	Kermanshah/Iran	37	2004/5 2 years	24.9	4.3	-	-	1:1.17
Deliberate self-burning in Mazandaran, Iran (19)	2002	Mazandaran/Iran	318	1991/3 3 years	27	4.8	63	79%	1.7:1
Epidemiological study of self-inflicted burns in Tehran, Iran (32)	2003	Tehran/Iran	110	1997/9 3 years	26.9	-	76	77%	-
Incidence, survival pattern and prognosis of self-immolation: a case study in Iran (33)	2005	Tabriz/Iran	117	1998/ 2004 6 years	28.4	3.17	63.8	77.8%	2.1:1
Epidemiology of suicide by burns in the province of Isfahan, Iran (34)	2007	Isfahan/Iran	89	2005/6 1 years	24.0	3.7	63	56%	-
Suicidal behavior by burns among adolescents in Kurdistan, Iran: a social tragedy (35)	2006	Kurdistan/Iran	40	2000/1 1 years	16.8	4.4	70	58%	0.6:1
Correlation Between Incidences of Self-inflicted Burns and Means of Inbreeding Coefficients, an Ecologic Study (36)	2006	Boushehr & Yazd /Iran	358	1998/2004 6 years	-	2.8	-	65.5%	-
Women victims of self-inflicted burns in Tabriz, Iran (37)	2004	Tabriz/Iran	412	1998/2002 5 years	25.5	101	66	79.6%	6.2:1
Present Study	2011	South Khorasan/Iran	188	2003/2011 8 years	26.9	1.7	68.5	64%	1.37:1

One of our surprising findings was suicide by self-immolation among children in this study, we had two cases in the first decade of life, and also eleven patients were under fifteen years old. Suicidal tendencies and attempts mainly occur among children who suffer from mental illnesses, even in mild form, although these attempts are rarely fatal. Few studies have been carried out on suicide in Iran among children which concluded that the most common psychiatric disorders among students who attempt suicide with poisoning were adjustment disorder.

It is difficult to ascertain the true incidence of it, because it is still considered taboo in most societies and particularly in the Islamic society. As a result, a lot of deaths are described as accidental rather than suicides. Psychological assessments are rare and early identification of behavior leading to suicide can be problematic (30). The majority of patients in this study were married keeping in line with previous studies done in Iran (4,14,20,). Only one study has shown a majority of unmarried patients to attempt to suicide by self-immolation (16). An interesting finding in our study group was the presence of self-immolation in five pregnant women which all of them died. At present, there are very few reports in the literature which describes self-immolation in the gestation period. A possible explanation could be the hormonal and behavioral change during gestational period. Our study have shown an increased incidence of self-immolation in the age group 18-19 years old, and a reduction with higher levels of education, keeping in line with previous studies (16, 20, 31,32). Ahmadi *et al.*, reported that the literacy level had no significant effect on the incidence of self-immolation (4). The mortality rate in our study group was 64%. Cases who survived for about three weeks (20 days) had lower mortality rate (25%). Dastgiri *et al.*, found that most of deaths occurred in the early days after self immolation and the survival fell from 40% by the end of the first week, to 15% at four weeks, and to 5% at 6 weeks after the suicide attempt (33). Present study is one of the biggest studies conducted in Iran with a longest period of time (Table 2).

Our study has shown a lower incidence of self-immolation (5.3%) in the South Khorasan region over 8 year period, when compared with other parts of Iran, as well as a relatively low mortality rate (64%). The mean age of the study group was 26.97; females being preponderant In Iran, suicide attempt in pediatric population are still a taboo, often being under-reported

and discouraged by the cultural trend and Islamic religion. Our study has shown an incidence of self-immolation in pediatric population of 40 cases (22%). It is also one of the unique reports in the literature with regards self-immolation in pregnant women with 100% mortality rate in this group. Also our study showed that if the patients survive for 3 weeks, the mortality rate significantly reduced.

## References

1. Kanchan T, Menon A, Menezes RG. Methods of choice in completed suicides: gender differences and review of literature. *J Forensic Sci* 2009;54(4):938-42.
2. Chishti P, Stone DH, Corcoran P, Williamson E, Petridou E; EUROSAVE Working Group. Suicide mortality in the European Union. *Eur J Public Health* 2003;13(2):108-14.
3. Wei KC, Chua HC. Suicide in Asia. *Int Rev Psychiatry* 2008;20(5):434-40.
4. Ahmadi A, Mohammadi R, Stavrinou D, Almasi A, Schwebel DC. Self-immolation in Iran. *J Burn Care Res* 2008;29(3):451-60.
5. Sheikholeslami H, Kani C, Ziaee A. Attempted suicide among Iranian population. *Suicide Life Threat Behav* 2008;38(4):456-66.
6. Farzaneh E, Mehrpour O, Alfred S, Moghaddam HH, Behnoush B, Seghatoleslam T. Self-poisoning suicide attempts among students in Tehran, Iran. *Psychiatr Danub* 2010;22(1):34-8.
7. Mehrpour O, Singh S. Rice tablet poisoning: a major concern in Iranian population. *Hum Exp Toxicol* 2010;29(8):701-2.
8. Shadnia S, Mehrpour O, Soltaninejad K. A simplified acute physiology score in the prediction of acute aluminum phosphide poisoning outcome. *Indian J Med Sci* 2010;64(12):532-9.
9. Shadnia S, Mehrpour O, Abdollahi M. Unintentional poisoning by phosphine released from aluminum phosphide. *Hum Exp Toxicol* 2008;27(1):87-9.
10. Mehrpour O, Alfred S, Shadnia S, Keyler DE, Soltaninejad K, Chalaki N, Sedaghat M. Hyperglycemia in acute aluminum phosphide poisoning as a potential prognostic factor. *Hum Exp Toxicol* 2008;27(7):591-5.
11. Mehrpour O, Keyler D, Shadnia S. Comment on Aluminum and zinc phosphide poisoning. *Clin Toxicol (Phila)* 2009;47(8):838-9; author reply 839.
12. Islambulchilar M, Islambulchilar Z, Kargar-Maher MH. Acute adult poisoning cases admitted to a university hospital in Tabriz, Iran. *Hum Exp Toxicol* 2009;28(4):185-90.



## A survey of characteristics of self-immolation

13. Mehrpour O, Jafarzadeh M, Abdollahi M. A systematic review of aluminium phosphide poisoning. *Arh Hig Rada Toksikol.* 2012 Mar;63(1):61-73.
14. Dastgiri S, Kalankesh LR, Pourafkary N. Epidemiology of Self-Immolation in the North-West of Iran. *Eur J Gen Med* 2005;2(1):14-9.
15. Ahmadi A, Mohammadi R, Schwebel DC, Yeganeh N, Soroush A, Bazargan-Hejazi S. Familial risk factors for self-immolation: a case-control study. *J Womens Health (Larchmt)* 2009;18(7):1025-31.
16. Ahmadi A. Suicide by self-immolation: comprehensive overview, experiences and suggestions. *J Burn Care Res* 2007;28(1):30-41.
17. Rezaeian M, Sharifi G. Self-immolation is the most important way for suicide in Eilam province (a survey from 1996 to 2003). *J Andishe va Rafter* 2004;21:289.
18. Razaieian M, Mohammadi M, Akbari M, Maleki M. The most common method of suicide in Tehran 2000-2004: implications for prevention. *Crisis* 2008;29(3):164-6.
19. Zarghami M, Khalilian A. Deliberate self-burning in Mazandaran, Iran. *Burns* 2002;28(2):115-9.
20. Dibaei A, Gharebagi R. A study of self-immolation cases led to death in Legal Medicine Center of Ahvaz. *Sci J Legal Med* 2000;19:5-10. [Persian]
21. Groohi B, Alaghebandan R, Lari AR. Analysis of 1089 burn patients in province of Kurdistan, Iran. *Burns* 2002;28(6):569-74.
22. Mabrouk AR, Mahmood Omar AN, Massoud K, Magdy Sherif M, El Sayed N. Suicide by burns: a tragic end. *Burns* 1999;25(4):337-9.
23. Mzezewa S, Jonsson K, Aberg M, Salemark L. A prospective study of suicidal burns admitted to the Harare burns unit. *Burns* 2000;26(5):460-4.
24. Laloë V, Ganesan M. Self-immolation a common suicidal behaviour in eastern Sri Lanka. *Burns* 2002;28(5):475-80.
25. Shkrum MJ, Johnston KA. Fire and suicide: a three-year study of self-immolation deaths. *J Forensic Sci* 1992;37(1):208-21.
26. Cameron DR, Pegg SP, Muller M. Self-inflicted burns. *Burns* 1997;23(6):519-21.
27. Prosser D. Suicides by burning in England and Wales. *Br J Psychiatry* 1996;168(2):175-82.
28. Anoshchenko IuD, Smirnov SV. The medicosocial status of the victims of burns as a consequence of a suicide attempt (cases of self-immolation). *Zh Nevrol Psikhiatr Im S S Korsakova* 1995;95(4):72-4.
29. Castellani G, Beghini D, Barisoni D, Marigo M. Suicide attempted by burning: a 10-year study of self-immolation deaths. *Burns* 1995;21(8):607-9.
30. Caley M, Fowler T. Suicide prevention: is more demographic information the answer? *J Public Health (Oxf)* 2009;31(1):95-7.
31. Ahmadi A. Frequency of self-immolation in attempted suicide patients in West. Islam Abad city (1997-2003). *J Behbood* 2005;9(1):26-37. [Persian]
32. Rastegar Lari A, Alaghebandan R. Epidemiological study of self-inflicted burns in Tehran, Iran. *J Burn Care Rehabil* 2003;24(1):15-20.
33. Dastgiri S, Kalankesh LR, Pourafkary N, Vahidi RG, Mahmoodzadeh F. Incidence, survival pattern and prognosis of self-immolation: a case study in Iran. *J Public Health* 2006;14:2-6.
34. Lari AR, Joghataei MT, Adli YR, Zadeh YA, Alaghebandan R. Epidemiology of suicide by burns in the province of Isfahan, Iran. *J Burn Care Res* 2007;28(2):307-11.
35. Groohi B, Rossignol AM, Barrero SP, Alaghebandan R. Suicidal behavior by burns among adolescents in Kurdistan, Iran: a social tragedy. *Crisis* 2006;27(1):16-21.
36. Saadat M, Zendeh-Boodi Z. Correlation between incidences of self-inflicted burns and means of inbreeding coefficients, an ecologic study. *Ann Epidemiol* 2006;16(9):708-11.
37. Maghsoudi H, Garadagi A, Jafary GA, Azarmir G, Aali N, Karimian B, Tabrizi M. Women victims of self-inflicted burns in Tabriz, Iran. *Burns* 2004;30(3):217-20.