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Epidemiology of Self - Burning in Iranian Townships Covered by Shiraz University of Medical Sciences

Mahmood Sheikh Fathollahi,[1] Zeinab Gorgi,[2] Reza Vazirinejad,[3] and Mohsen Rezaeian[1,*]

[1]Epidemiology and Biostatistics Department, Occupational Environment Research Center, Medical School, Rafsanjan University of Medical Sciences, Rafsanjan, IR Iran
[2]Epidemiology and Biostatistics Department, Medical School, Rafsanjan University of Medical Sciences, Rafsanjan, IR Iran
[3]Department of Social Medicine, Social Determinants of Health Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, IR Iran

[*]*Corresponding author*: Mohsen Rezaeian, Epidemiology and Biostatistics Department, Occupational Environment Research Center, Medical School, Rafsanjan University of Medical Sciences, Rafsanjan, IR Iran. Tel: +98-03431315132, Fax: +98-0345226963, E-mail: moeygmr2@yahoo.co.uk

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Abstract

Background: Self - burning is known as an extremely violent means of suicide.
Objectives: This study aimed to investigate the epidemiology of self - burning in Iranian townships covered by Shiraz University of Medical Sciences during years 2009 to 2012.
Patients and Methods: This cross - sectional research was performed on 250 self - burning cases and 181 self - burning attempts. Data was collected from the Comprehensive Suicide Prevention Program Checklist. To analyze the data, the chi - square test and logistic regression model were utilized.
Results: Most self - burning cases were observed in females (70.4%), married individuals (60.4%), an age group of 15 to 24 years (38%), and rural residents (60.8%). Moreover, the highest and lowest self - burning cases had occurred during spring (31.2%) and fall (17.6%) (P = 0.736).
Conclusions: The findings are indicative of a high occurrence of self - burning among young married females. Therefore, it is vital to provide this at risk group with the necessary prevention programs.

Keywords: Self - Burning, Epidemiology, Shiraz University of Medical Sciences

1. Background

Suicide is considered a basic public health problem (1). It is the 13th cause of mortality in the world (2) and 3rd cause among the age group of 15 to 44 years (3). One person loses their life by suicide in the world every 40 seconds (4) and the majority of suicides occur in Asian countries (5). The suicide rate in Iran has reached 19 cases per 100 000 people in the recent years (6).

Self - burning is regarded as a violent, fatal, and painful type of suicide (7). Every year, about 310 000 people lose their lives through self - burning (8). The rate of deaths caused by suicide is about 11 times higher in low- and middle - income compared to high-income countries and 95% of self - burning cases occur in these countries (9). Furthermore, 34% of suicides in Iran are caused by self - burning (10, 11), which is regarded as the 3rd cause of potential years of life lost after disasters and breast cancer among Iranian females (12).

The Fars province of Iran is located to the southwest of Iran with a population of 4,596,658 (13). The results of a 9 - year investigation in this province has highlighted that most suicides occur within the age group of 20 to 29 years (43.3%). Moreover, the most important ways of suicide were found to be hanging (49.5%) and self - burning (16.4%) (14).

The above - mentioned study (14) was carried out based on data gathered by Fars Legal Medical Organization (LMO). Therefore, due to possible underestimation of LMO data, it is suggested that in Iran data gathered by University of Medical Sciences (UMSs) might show a more comprehensive picture (15) as within Iranian Health Systems, each province is covered by one or more than one UMSs.

2. Objectives

This study aimed to investigate the epidemiology of self - burning in Iranian township covered by Shiraz University of Medical Sciences.

3. Patients and Methods

This cross - sectional study was conducted on 250 cases of self - burning and 181 cases of self - burning attempt

in the townships covered by SUMS. The comprehensive suicide prevention program checklist (CSPPC), which consisted of 2 parts was used. First part included the individuals' demographic information, such as age, gender, occupation, level of education, marital status, and place of residence. The second part covered the backgrounds of suicide attempts, physical and mental illnesses, method, season, year, and the result of suicide behavior. The CSPPC is completed by all health centers of the affiliated townships on a monthly basis. However, among 27 townships of Fars Province, only Jahrom and Fasa, are not covered by SUMS and their information was therefore not included in the current study.

After the variables were coded, univariable analyses were performed using the SPSS software version 15.0 for windows (SPSS Inc., Chicago, IL). The qualitative data were reported in numbers (percentage) and to assess the relationship between self - burning cases with studied variables, the chi - square test was employed. A multivariable logistic regression model for factors associated with self - burning cases versus self - burning attempters was established. The associations of independent predictors in the final model were expressed as Odds Ratios (ORs) with 95% confidence intervals (CIs). Model discrimination was measured using the c statistic, which is equal to the area under the receiver operating characteristic (ROC) curve. Model calibration was estimated using the Hosmer - Lemeshow goodness - of - fit statistics. For multivariable analyses, the SAS statistical package version 9.1 for windows (SAS Institute Inc., Cary, NC, USA) was used. The significance level of the tests was set at 0.05.

To calculate the mortality percentage of self - burning, the following formula was applied:

$$\text{Mortality percentage of self - burning} = \frac{\text{Self - burning cases}}{\text{Self - burning cases plus attempts}} \times 100 \quad (1)$$

4. Results

During the study period, 250 cases from all suicides i.e. 646 (38.7%) were done by self - burning. of these, 70.4%, 60.4%, 38%, and 60.8% of the cases were female, married, within the age group of 15 to 24 years, and rural residents, respectively. Most of the self - burning cases were observed among those with secondary level education (30.8%) and housewives (55.6%) (Table 1).

Table 2 depicts the frequency distribution of the other study factors. Based on the results obtained, 7.6% of the people involved in self - burning had a history of previous attempts. Most self - burning cases were found among those with no histories of physical (88.0%) and mental illnesses (73.2%). In addition, the seasonality trend of suicides revealed that most self - burning cases had occurred in the spring (31.2%) and winter (29.2%).

As shown in Figure 1, the highest and lowest rates of self - burning cases are seen among females with 2.84 and 1.52 per 100 000 people per year during 2009 and 2010, respectively. In contrast, the rates in males were found to be 1.09 and 0.52 per 100 000 people per year in the same years, respectively.

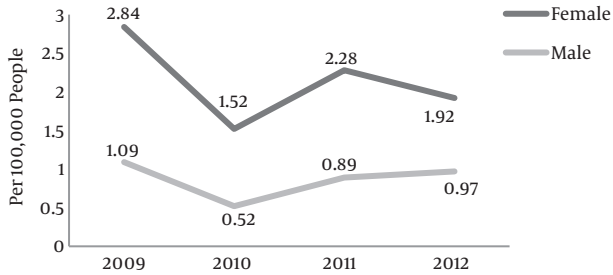

Figure 1. Shiraz University of Medical Sciences Self - Burning Rate Based on Gender During 2009 to 2012

Furthermore, 181 cases of all 16,696 cases of suicide attempt (1.1%) were self - burning. Most self - burning attempts were observed among females (71.8%), married (56.9%), and those living in rural areas (49.7%). The other demographic characteristics of the study subjects are shown in Table 1.

Table 2 displays that the majority of self - burning attempts occured in the spring (35.9%) and in those without a history of physical (89.5%) and mental (80.7%) illnesses and previous attempts (93.4%).

As shown in Figure 2, the highest and lowest rates of self - burning attempts among females occurred in 2.25 and 1.01 per 100 000 people in 2009 and 2012, respectively. In contrast, the mentioned rates were 0.71 and 0.51 among males in 2009 and 2011, respectively.

As shown in Figure 3, the highest and lowest percentages of mortality caused by self - burning that occurred among females were 65.57% and 47.69% in 2012 and 2010, respectively. Nonetheless, the percentages were 63.64% and 45.83% among males, respectively, in the same years.

Table 3 summarizes the results of the multivariable logistic regression model. Based on the results, there was no association between studied variables and self - burning cases versus self - burning attempts in either unadjusted or adjusted models.

Table 1. The Frequency Distribution of the Demographic Variables of Shiraz University of Medical Sciences Self - Burning Cases During Years 2009 to 2012[a]

Variable	Self - Burning	Self - Burning Attempt	Total	P Value[b]
Gender				
Female	176 (70.4)	130 (71.8)	306 (71.0)	
Male	74 (29.6)	51 (28.2)	125 (29.0)	
Age Groups				0.445
5 - 14	4 (1.6)	3 (1.7)	7 (1.6)	
15 - 24	95 (38.0)	60 (33.1)	155 (36.0)	
25 - 34	84 (33.6)	76 (42.0)	160 (37.1)	
35 - 44	39 (15.6)	27 (14.9)	66 (15.3)	
45 - 54	18 (7.2)	7 (3.9)	25 (5.8)	
55 +	10 (4.0)	8 (4.4)	18 (4.2)	
Educational Level				0.086
Illiterate	23 (9.2)	16 (8.8)	39 (9.0)	
Primary	52 (20.8)	22 (12.2)	74 (17.2)	
Secondary	77 (30.8)	51 (28.2)	128 (29.7)	
High school	70 (28.0)	59 (32.6)	129 (29.9)	
University	4 (1.6)	3 (1.7)	7 (1.6)	
Unknown	24 (9.6)	30 (16.6)	54 (12.5)	
Marital Status				0.778
Single	91 (36.4)	70 (38.7)	161 (37.4)	
Married	151 (60.4)	103 (56.9)	254 (58.9)	
Divorced	4 (1.6)	5 (2.8)	9 (2.1)	
Unknown	4 (1.6)	3 (1.7)	7 (1.6)	
Occupation				0.556
Self - employed	39 (15.6)	24 (13.3)	63 (14.6)	
Unemployed	31 (12.4)	23 (12.7)	54 (12.5)	
Housewife	139 (55.6)	93 (51.4)	232 (53.8)	
Student	14 (5.6)	20 (11.0)	34 (7.9)	
Worker	10 (4.0)	8 (4.4)	18 (4.2)	
Other	14 (5.6)	10 (5.5)	24 (5.6)	
Unknown	3 (1.2)	3 (1.7)	6 (1.4)	
Place of Residence				0.062
Village	152 (60.8)	90 (49.7)	242 (56.1)	
City	95 (38.0)	88 (48.6)	183 (42.5)	
Unknown	3 (1.2)	3 (1.7)	6 (1.4)	

[a] Data are presented as n (%).
[b] P - values are derived from chi - square test.

Table 2. The Frequency Distribution of the Other Study Factors in Shiraz University of Medical Sciences Self - Burning Cases During 2009 to 2012[a]

Variable	Self - Burning	Self - Burning Attempt	Total	P-Value[b]
Suicide Attempts History				0.700
Yes	19 (7.6)	12 (6.6)	31 (7.2)	
No	231 (92.4)	169 (93.4)	400 (92.8)	
Physical Illness History				0.628
Yes	30 (12.0)	19 (10.5)	49 (11.4)	
No	220 (88.0)	162 (89.5)	382 (88.6)	
Mental Illness History				0.072
Yes	67 (26.8)	35 (19.3)	102 (23.7)	
No	183 (73.2)	146 (80.7)	329 (76.3)	
Season				0.736
Spring	78 (31.2)	65 (35.9)	143 (33.2)	
Summer	55 (22.0)	39 (21.5)	94 (21.8)	
Fall	44 (17.6)	31 (17.1)	75 (17.4)	
Winter	73 (29.2)	46 (25.4)	119 (27.6)	
Year				0.074
2009	81 (32.4)	61 (33.7)	142 (32.9)	
2010	42 (16.8)	47 (26.0)	89 (20.6)	
2011	66 (26.4)	40 (22.1)	106 (24.6)	
2012	61 (24.4)	33 (18.2)	94 (21.8)	

[a] Data are presented as n (%).
[b] P - values are derived from chi - square test.

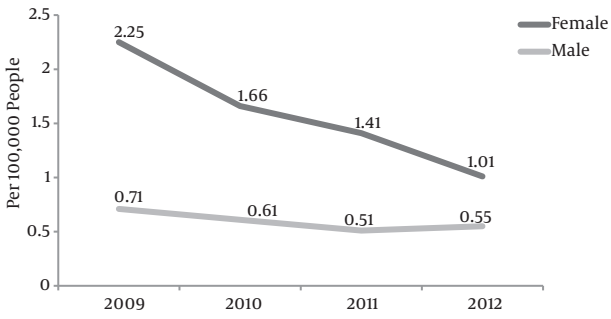

Figure 2. Shiraz University of Medical Sciences Self - Burning Attempts Rate Based on Gender during 2009 to 2012

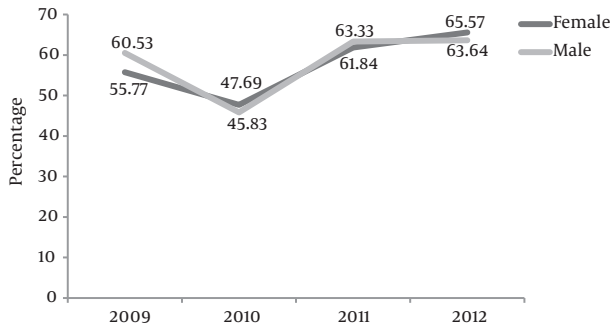

Figure 3. Shiraz University of Medical Sciences Percentage of Mortality Caused by Self - Burning Based on Gender 2009 to 2012

5. Discussion

Overall, 38.7% of suicides had taken place through self - burning. This figure is rather similar to 34%, which depicts the average percentage of suicides in Iran by self - burning (10, 11). However, it highlights a rather lower percentage when compared with other parts of Iran, including 69% in Ahvaz (16), 78.6% in Masjed Soleiman (17), and 79% in Mazandaran (18).

Moreover, as in the previous research performed inside and outside of the country, especially in countries with rather similar social, economical, and cultural norms (16, 19-21), females were found to constitute the majority of self - burning cases and the female/male ratio (2.38) was significantly high in this respect. Nevertheless, this result was somewhat different from results reported from western countries. For example, the results of some studies conducted in America (22-24) or Bulgaria (25) demonstrated that self - burning rate in males was significantly higher than in females.

Table 3. Factors Associated with Shiraz University of Medical Sciences Self - Burning Cases Versus Self - Burning Attempts in Logistic Regression Model During 2009 to 2012[a, b]

	Unadjusted			Adjusted		
Variable	**OR**	**95% CI**	**P-Value**	**OR**	**95% CI**	**P-Value**
Gender			0.748			0.415
Female	1.000			1.000		
Male	1.072	0.702 - 1.635		1.344	0.660 - 2.741	
Age Groups			0.455			0.109
5 - 14	1.842	0.182 - 12.895		2.674	0.470 - 15.201	
15 - 24	1.000			1.000		
25 - 34	0.698	0.446 - 1.093		0.519	0.304 - 0.886	
35 - 44	0.912	0.507 - 1.642		0.618	0.311 - 1.225	
45 - 54	1.624	0.640 - 4.120		1.194	0.422 - 3.383	
55 +	0.789	0.295 - 2.113		0.520	0.173 - 1.567	
Educational Level			0.093			0.113
Illiterate	1.000			1.000		
Primary	1.644	0.732 - 3.695		1.931	0.789 - 4.725	
Secondary	0.928	0.182 - 4.721		1.013	0.430 - 2.387	
High school	1.050	0.506 - 2.179		0.894	0.359 - 2.228	
University	0.825	0.399 - 1.706		1.205	0.202 - 7.199	
Unknown	0.557	0.242 - 1.281		0.564	0.207 - 1.536	
Marital Status			0.795			0.662
Single	0.887	0.595 - 1.323		0.940	0.542 - 1.629	
Married	1.000			1.000		
Divorced	0.546	0.143 - 2.081		0.454	0.102 - 2.018	
Unknown	0.909	0.199 - 4.149		1.856	0.292 - 11.777	
Occupation			0.576			0.401
Self - employed	1.000			1.000		
Unemployed	0.829	0.395 - 1.741		0.855	0.359 - 2.037	
Housewife	0.920	0.519 - 1.630		1.118	0.479 - 2.607	
Student	0.431	0.184 - 1.009		0.332	0.112 - 0.991	
Worker	0.769	0.267 - 2.220		0.739	0.246 - 2.220	
Other	0.862	0.331 - 2.245		0.863	0.294 - 2.539	
Unknown	0.615	0.115 - 3.299		0.640	0.070 - 5.853	
Place of Residence			0.074			0.065
Village	1.000			1.000		
City	0.639	0.433 - 0.944		0.610	0.401 - 0.927	
Unknown	0.592	0.117 - 2.996		0.563	0.079 - 4.023	
Suicide Attempts History			0.701			0.871
Yes	1.158	0.547 - 2.451		1.070	0.475 - 2.409	
No	1.000			1.000		
Physical Illness History			0.628			0.864
Yes	1.163	0.632 - 2.139		1.059	0.549 - 2.042	
No	1.000			1.000		
Mental Illness History			0.073			0.155
Yes	1.527	0.961 - 2.427		1.464	0.865 - 2.478	
No	1.000			1.000		
Season			0.737			0.792
Spring	1.000			1.000		
Summer	1.175	0.694 - 1.989		1.100	0.618 - 1.960	
Fall	1.183	0.672 - 2.082		1.160	0.598 - 2.249	
Winter	1.322	0.807 - 2.168		1.329	0.767 - 2.303	
Year			0.076			0.083
2009	1.000			1.000		
2010	0.673	0.395 - 1.146		0.698	0.378 - 1.289	
2011	1.243	0.743 - 2.078		1.434	0.799 - 2.574	
2012	1.392	0.813 - 2.385		1.399	0.766 - 2.553	

CI, Confidence Interval; OR, Odds Ratio.
[a] Adjusted Hosmer - Lemeshow goodness - of - fit test; P = 0.2037.
[b] Adjusted area under the ROC curve; c = 0.6345.

Therefore, it seems that being a female could be considered as an important risk factor in self - burning in Fars and other parts of Iran (7, 14, 16). This could partially be explained by the existence of some individual and social differences between males and females in the Iranian society, including female's higher illiteracies or having low education levels and the lack of an independent financial income (16).

In this study, most self - burning cases were found to be within the age group of 15 to 24 years. Similarly, the results of another research performed in the southwest of the country was indicative of the occurrence of most cases of self - burning within the same age group (26). Likewise, in another investigation carried out in Ahvaz city of Iran, most self - burning cases were reported to have occurred within the age group of 20 to 30 years (16). However, the results of a study carried out in Athens revealed that the average age of occurrence was 53.5 years (27).

In this research, most cases of self - burning were found to have happened among married individuals. Similarly, Zarghami et al. (18), Ahmadi et al. (10), and Ghalambor et al. (16), reported the highest bulk self - burning among married couples. Moreover, the results of an investigation carried out in Afghanistan (28), showed that most self - burning cases had occurred among married females.

In terms of educational levels and in line with a number of domestic studies, the highest self - burning rate was observed among those with secondary education (10, 16, 29). In many studies, self - burning cases were shown to have an inverse relationship with educational level, so that by increasing the level of education, self - burning occurrence was decreased (10, 16). As a result, illiteracy or low level of education along with low socio-economic situation could be considered as risk factors for self - burning (16).

Living in rural areas could also be considered as another effective factor, as in this research most cases of self - burning were found among villagers. Furthermore, in accordance with a number of previous studies (16, 18, 30, 31), most self - burning cases were found to have occurred among housewives.

In the present study, only 7.6% of the individuals that had performed self - burning were found to have had a history of suicide attempts. Nevertheless, the results of an investigation conducted in Ahvaz city of Iran demonstrated that 25% of these individuals had a history of suicide attempts (16).

In the present study, 26.8% of the self - burning subjects were found with a history of psychiatric disorders. Other studies have shown that a history of mental illness, especially depression, is one of the most important risk factor for suicidal behaviors (32, 33).

The results of the current study also highlighted that spring and winter were seasons, during which the highest bulk of self - burning had occurred, respectively. The increasing bulk of self - burning in cold seasons could be explained by the availability of and easy access to fuels, such as kerosene.

Although by using CSPPC this study presents a more reliable picture of self - burning within the Fars province of Iran, the authors emphasize that CSPPC has its limitations. For example, it does not include the cause and/or motivation for self - burning, type of fuel used, burn degree, burning location, and individual's socio - economic status. Therefore, the authors strongly suggest that CSPPC should be revised to include such important information.

5.1. Conclusion

The findings of the current study are indicative of a high occurrence of self - burning among young married female. Therefore, it is vital to provide this at - risk group with the necessary prevention programs. Moreover, as it is suggested by a number of other studies (34, 35), a comprehensive social campaign is needed to prevent self - immolation among young married females.

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