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

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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 ±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 different 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.

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
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 lead 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 (1st of January 2003-1st 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.

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).
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Figure 1. 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.

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

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).

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).
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<table>
<thead>
<tr>
<th>Article</th>
<th>Year published</th>
<th>Area studies-country/region</th>
<th>No pts</th>
<th>Period of study</th>
<th>Mean age</th>
<th>Rate female-male</th>
<th>Mean TBSA</th>
<th>Mortality rate</th>
<th>Married/single ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemiology of self immolation in the north-west of Iran (14)</td>
<td>2005</td>
<td>Tabriz/Iran</td>
<td>98</td>
<td>1998/ 2003 5 years</td>
<td>27.2</td>
<td>3.3</td>
<td>63</td>
<td>76%</td>
<td>1.2:1</td>
</tr>
<tr>
<td>Familial risk factors of self-immolation: A case–control study (15)</td>
<td>2009</td>
<td>Kermanshah/Iran</td>
<td>30</td>
<td>2008/9 2 years</td>
<td>27.5</td>
<td>6.5</td>
<td>60.2</td>
<td>-</td>
<td>1.3:1</td>
</tr>
<tr>
<td>Suicide by Self-Immolation: Comprehensive Overview, Experiences and Suggestion (16)</td>
<td>2007</td>
<td>Kermanshah/Iran</td>
<td>37</td>
<td>2004/5 2 years</td>
<td>24.9</td>
<td>4.3</td>
<td>-</td>
<td>-</td>
<td>1.1:17</td>
</tr>
<tr>
<td>Deliberate self-burning in Mazandaran, Iran (19)</td>
<td>2002</td>
<td>Mazandaran/Iran</td>
<td>318</td>
<td>1991/3 3 years</td>
<td>27</td>
<td>4.8</td>
<td>63</td>
<td>79%</td>
<td>1.7:1</td>
</tr>
<tr>
<td>Epidemiological study of self-inflicted burns in Tehran, Iran (32)</td>
<td>2003</td>
<td>Tehran/Iran</td>
<td>110</td>
<td>1997/9 3 years</td>
<td>26.9</td>
<td>-</td>
<td>76</td>
<td>77%</td>
<td>-</td>
</tr>
<tr>
<td>Incidence, survival pattern and prognosis of self-immolation: a case study in Iran (33)</td>
<td>2005</td>
<td>Tabriz/Iran</td>
<td>117</td>
<td>1998/ 2004 6 years</td>
<td>28.4</td>
<td>3.17</td>
<td>63.8</td>
<td>77.8%</td>
<td>2.1:1</td>
</tr>
<tr>
<td>Epidemiology of suicide by burns in the province of Isfahan, Iran (34)</td>
<td>2007</td>
<td>Isfahan/Iran</td>
<td>89</td>
<td>2005/6 1 years</td>
<td>24.0</td>
<td>3.7</td>
<td>63</td>
<td>56%</td>
<td>-</td>
</tr>
<tr>
<td>Suicidal behavior by burns among adolescents in Kurdistan, Iran: a social tragedy (35)</td>
<td>2006</td>
<td>Kurdistan/Iran</td>
<td>40</td>
<td>2000/1 1 years</td>
<td>16.8</td>
<td>4.4</td>
<td>70</td>
<td>58%</td>
<td>0.6:1</td>
</tr>
<tr>
<td>Correlation Between Incidences of Self-inflicted Burns and Means of Inbreeding Coefficients, an Ecologic Study (36)</td>
<td>2006</td>
<td>Boushehr &amp; Yazd/Iran</td>
<td>358</td>
<td>1998/2004 6 years</td>
<td>-</td>
<td>2.8</td>
<td>-</td>
<td>65.5%</td>
<td>-</td>
</tr>
<tr>
<td>Women victims of self-inflicted burns in Tabriz, Iran (37)</td>
<td>2004</td>
<td>Tabriz/Iran</td>
<td>412</td>
<td>1998/2002 5 years</td>
<td>25.5</td>
<td>101</td>
<td>66</td>
<td>79.6%</td>
<td>6.2:1</td>
</tr>
<tr>
<td>Present Study</td>
<td>2011</td>
<td>South Khorasan/Iran</td>
<td>188</td>
<td>2003/2011 8 years</td>
<td>26.9</td>
<td>1.7</td>
<td>68.5</td>
<td>64%</td>
<td>1.37:1</td>
</tr>
</tbody>
</table>
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 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

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