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ORIGINAL ARTICLE

Epidemiological study of self-immolated patients referring to Velayat burn and reconstructive surgery center of Rasht

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Abstract

Introduction: Self-immolation is a deadly and painful issue that incurs high costs socially and individually. People who self-immolatearehardly cured and they will undergo serious mental and physical complications. This study aimed to determine the epidemiological distribution of self-immolated patients referring to Velayat Burn and Reconstructive Surgery Center in Rasht, Iran.

Methods: This study was conducted based on a descriptive and cross-sectional design in Velayat Hospital in Rasht, Guilan province. The sample included all cases of self-immolation referring to Velayat Hospital from the beginning of April 2009 to the end of March 2017.The total number of self-immolated patients referred to hospital and registered was 96 individuals. Data were extracted from patients' records using a researcher-made checklist. Descriptive statistics, such as mean, standard deviation, and analytical tests such as Poisson and multivariate logistic regression have been used for data analysis. Data were completely analyzed using STATA-SE software (version 13.1).

Results: According to the results, 51% of the patients were female, and 67% of the cases were married; moreover, 43% of the females were housewives, and 42 % of the patients had a history of mental illness. It is worth mentioning that91% of the cases had no history of self-immolation. The most common reasons for self-immolation has been mental disorders (38.5%) and family problems (37.5%). The frequency of the rate of self-immolation has been almost equal in urban and rural areas, whereas the majority of the cases were observed in Rasht, Talesh, and Lahijan. In total, 60% of the patients died. The mean±SD age, total body surface area (TBSA), and hospitalization period were 37.5±1.5 years, 61.3±2.8, and 9.3±8 days, respectively. Analysis of regressions shows that the mortality rate has a direct and significant relationship with age and TBSA. Moreover, hospitalization time has a direct relationship with gender (i.e., male), TBSA, history of mental disease, previous records of suicide, and marital status (i.e., being married). However, it has a negative relationship with age and education.

Conclusions: The level of burns is high in patients who are self-immolating, and mental disorders and familial problems have been the main reason for it. Therefore, although the frequency of self-immolation rate is lower, compared to other suicide methods, thesesmall groups of patients need special care due to the high rate of mortality.

Key words: Burns, Epidemiology, Patients, Self-injurious behavior

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Introduction

Suicide is one of the most important concerns in public health systems all over the world. According to the world health organization, suicide cases will reach from 804000 cases in 2012 to 1530000 cases in 2020 (1, 2). Prevalence, methods, and concepts of suicide vary based on geographical location, social and cultural factors, and gender (3). Self-immolation is one of the most painful and significant methods of suicide and indefinable at the same time which exerts high social effect (4). Self-immolation is not common in high-income countries, such as the USA, and accounts for 1-2 % of the total suicides (5, 6). However, it is very frequent in low-income countries, especially in the middle east and Africa (7, 8) comprising 40-70% of all self-immolations (9-11). The high prevalence of this phenomenon in Iran is considered a serious social and health concern (12). In Iran, 34% of all successful suicides are committed by the self-immolation method (13), and 80% of the self-immolation patients die due to the high severity of burns (7). Self-immolation is a common method of suicide among Iranian women (14) with various motivations, such as imitating other's symbolic behaviors, mental illnesses, political protests, religious practices, and other stressful conditions and events (15). This special group of patients is considered the main challenge as they have special conditions and put a heavy burden on physicians, nurses, and financial resources of the burn team (16). Self-immolation is very much painful for the victim who is conscious until the moment of death and his/her relatives (17) leading to social and personal irrecoverable traumas in the individual, family, and society (18). Prevention is the most important and effective way of reducing the complications and mortality incurred by self-immolation. Preventive measures across the society involve five stages, namely acknowledgment and evaluation of the problem, understanding risk factors and protective factors, selection and experiment of intervention in a limited scope, intervention in an extensive scope, and evaluation of its effects (19).

Epidemiology, reasons, and interventional strategies significantly vary across low- and high-income countries (17). As the present study aimed to investigate the reasons for this type of suicide and its risk factors, it can be useful in future planning and designing preventive measures. This study aimed to investigate the epidemiology of self-immolated patients referring to Velay at Burn and Reconstructive Surgery Center in Rasht, Iran.

Methods

This study was conducted based on a descriptive and cross-sectional design. All individuals who committed self-immolation in Guilan province from the beginning of April 2009 to the end of March 2017were entered into the study. Velay at Hospital is the only burn clinic in Guilan province, and all burn cases in the province are referred to this clinic in case they need treatment. Therefore, the referral rate to this hospital is indicative of the severity and status of burns in the province. Moreover, no cases of self-immolation have been observed in other hospitals in the province. To identify self-immolation cases, patients' and caregivers 'expressions have been considered.

In other words, if the individuals expressed themselves that they committed suicide, their information had been entered and collected in a separate checklist. If the individual had not been able to answer the questions, the questions would be directly asked from the attendant. For this purpose, nurses in the Burn Department of Velay at Hospital in Rasht have been trained regarding the way data are collected. The questions in the checklist included demographic characteristics (i.e., age, marital status, employment status, resident location, the geographical location of the event), main reasons for burns, history of mental disease, suicide attempts, time of the incident, type of burning material, total body surface area (TBSA) of burns, and consequences of burns. Moreover, informed consent was obtained from the patients or attendants after completing the checklist. It should be mentioned that patients who died before reaching the hospital and individuals with incomplete data were excluded from the study. The demographic characteristics of the Statistical Centre of Iran for Guilan province in 2016 have been used in order to estimate the self-immolation rate in a population of 10000 individuals. The data were analyzed using descriptive statistics, such as mean±SD, and analytical tests, such as Poisson and multivariate logistic regression models. Furthermore, the data were completely analyzed in STATA-SE software (version 13.1).The study protocol was approved by the Ethics Committee of Guilan University of Medical Sciences, Rasht, Iran(IR.GUMS.REC. 1396.309).

Results

Out of 96 patients in this study, the majority of the patients were female 51% (n=49). Moreover, the mean±SD age of the patients was 37.5±1.5

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years. The majority of the patients were married with a diploma degree. Regarding the occupational level, 43 (87.75%) women were housewives; moreover, 28 (59.57%) and 15 (31.91%) men were self-employed or unemployed, respectively.

The most common burning materials were oil and petrol. In addition, 42.7% and 8.33% of the patients had a history of mental disease and attempted suicide before, respectively. Mental diseases (38.54%) and familial problems (37.5%) included the most common reasons for self-immolation. In terms of time, self-immolation has been more frequent from noon to 6p.m. Moreover, mean±SD of the TBSA of burn and hospitalization period were 61.3±2.8 and 9.3±0.8, respectively. In total, 62.5% of the self-immolation cases led to death.

In terms of geographical location, self-immolation incidence was more frequent in urban areas (53.12%), and its prevalence was between 3.18 and 4.85 cases per 100,000 individuals. It should be mentioned that Rasht (34.37), Talesh (10.41), and Lahijan (10.41) experienced the majority of self-immolation cases. The prevalence of self-immolation per 100,000 population is shown in table 2.

After investigating the relationship between mortality and studied variables and analysis of multiple logistic regression patterns, it was revealed that age and TBSA were significantly associated with mortality due to self-immolation. The odds ratios of these variables were1.117 and 1.209, respectively. Accordingly, with increasing age, the chance of mortality increases by 12%, and as TBSA of burns increases, the mortality rate increases by 21%. On the other hand, no significant relationship was observed among gender, history of suicide, mental disease, and mortality (P>0.05) (Table 3).

Moreover, the results of Poisson regression showed a significant relationship between the hospitalization period and predictor variables (Table 4).

Table 1: Characteristics of self-immolated patients referring to Velayat Burn Center in Rasht, Iran

Variable		Frequency	Frequency (%)
Marital status	Married	65	67.70
	Single	29	30.20
	Divorced	2	2.08
Education level	Diploma	33	34.37
	Middle school	25	26.04
	Primary school	17	17.70
	Uneducated	16	16.66
	Graduated Post-graduated	3	3.12
	Associate degree	2	2.08
Burning material	Oil	64	66.66
	Petrol	22	22.91
	Gas	5	5.2
	Hot liquids	2	2.08
	Other	3	3.12
History of mental disease	Yes	41	42.70
	No	55	57.29
History of suicide attempts	Yes	8	8.33
	No	88	91.66
Reasons for self-immolation	Mental disease	37	38.54
	Familial problem	36	37.5
	Marital dispute	11	11.45
	Financial problem	10	10.41
	Employment problem	1	1.04
	Other	1	1.04
Incidence time	0 to 6 a.m.	8	8.33
	6 a.m. to 12 p.m.	17	17.70
	12 p.m. to 6 p.m.	37	38.54
	6p.m. to midnight	34	35.41

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Table 2: Prevalence of self-immolation cases referring to Velayat Burn Center in Rasht classified by geographical location from 2009 to 2016

Variable		Frequency	Frequency (%)	Frequency per 10000 population
Geographical area	Rural	45	46.87	4.85
	Urban	51	53.12	3.18
County of incidence	Rasht	33	34.37	3.44
	Talesh	10	10.41	4.98
	Lahijan	10	10.41	5.96
	Astaneh	7	7.29	6.47
	Roudsar	6	6.25	4.07
	Fouman	6	6.25	6.49
	Langaroud	6	6.25	4.26
	Roudbar	4	4.16	4.22
	Astara	4	4.16	4.38
	Siahkal	2	2.08	2.06
	Amlash	1	1.04	2.31
	Rezvanshahr	1	1.04	1.43
	Shaft	1	1.04	1.84
	Masal	1	1.04	1.84

Table 3: Odds ratio of regression for variables predicting self-immolation results based on logistic regression pattern

Variable	Odds ratio	Std. Err.	Z	P-value	Lower limit	Upper limit
Age	1.117	0.04899	2.26	0.024	1.014734	1.229573
Gender (male)	0.466	1.1088	-0.69	0.491	0.053034	4.094638
History of suicide (yes)	0.485	2.66404	-0.27	0.786	0.002619	89.82937
History of mental disease (yes)	3.081	1.21737	0.92	0.355	0.28343	33.49176
Total body surface area of burns	1.209	0.04601	4.12	0.000	1.104744	1.323094
Constant Variable	144.658	3.69218	-3.64	0.000	0.104111	200997

Table 4: Incidence rate ratio of variables predicting hospitalization period based on the Poisson model

Variable	Incidence rate Ratio	Standard error	P-value	Lower limit	Upper limit
Total body surface area of burns	1.0206	0.00448	0.000	1.011678	1.029601
Age	0.9597	0.009294	0.000	0.942376	0.977342
Gender (male)	1.7754	0.154292	0.000	1.31208	2.402328
History of suicide (yes)	1.7787	0.196878	0.003	1.209252	2.616307
History of mental disease (yes)	1.5393	0.110449	0.000	1.239673	1.911346
Education					
Elementary school	0.2806	0.308819	0.000	0.153185	0.513996
Middle school	0.5672	0.277673	0.041	0.329137	0.977454
Diploma	0.3176	0.322661	0.000	0.168743	0.597771
Married	1.7791	0.195721	0.003	1.21227	2.610967
Constant Variable	25.6667	0.451488	0.000	10.5939	62.18482

Discussion

Self- immolation is one of the most painful methods of suicide. In this study, the number of self-immolation cases was higher in females than in males. Recent reports have shown that self-immolation in women accounts for 70-96% of the cases (6, 9, 20, 21).

Rezaei an et al. indicated that self-immolation attempts are usually observed among young and married women living in west Mediterranean countries, such as Iran. Studies in other countries showed similar results (22, 23). A high prevalence of self-immolation phenomenon among Iranian women may be due to the protesting against unfair conditions, low social support, and prejudice in traditional families (21, 24, 25).

On the other hand, women are more sensitive and susceptible to mental, social, and economic pressures due to different physiological characteristics, compared to men; therefore, lack of attention to their personal and social rights in some societies has led to mental diseases and depression which in turn make them self-immolate

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as the only solution to escape the life problems. Therefore, informing women about supportive centers, proper consultation, emphasizing mental health as an important factor in primary health care in health centers, as well as training proper methods of dealing with pressure, problems, and failures can significantly reduce self-immolation cases (26).

In this study, the mean±SD age of the individuals attempting self-immolation was 37.5±1.5 years. In a study carried out by Baziyar et al(27),the mean age of the incidence has been 32 years, whereas it was 27 years in the study conducted by Saadati et al (28)Furthermore, self-immolation among married people had a high correlation with the level of education (i.e., diploma) and occupational level (housewife females, and self-employed or unemployed males). A study performed by Dahmardehei in Zahedan, Iran, showed that 74% of the patients were married, and 63% of them had elementary education; moreover, 69% of the females were housekeepers (11). A high rate of self-immolation among married, and housekeeper wives can be due to their higher contact with familial and marital stress, how their marriage is formed, problems caused by socio-economic responsibilities which married people regard them as a burden.

On the other hand, a high frequency of self-immolation among self-employed or unemployed males indicates that these conditions are strong backgrounds for stress in life that generatevarious socio-economic issues leading to mental diseases. The rate of suicide is increased when the crisis and economic downturn happen along with an increase in the rate of unemployment (23).

Therefore, the rate of self-immolation can be significantly reduced by paying more attention to housewives as an effective group in society's mental health, improving couples' relationship, reducing social, cultural, and economic problems, and providing proper background for enhancing education level, public awareness, and problem-solving skills (11).

The present study indicated that mental and familial problems were the most important reasons for suicide. Similar results are observed in most studies. According to a study conducted by Poeschla et al. the main reasons were mental disorders and drug addiction in high-income countries, as well as family disputes and marital issues in low-income countries (21). Shahana et al. expressed that 43-91% of the self-immolation cases occur due to mental problems (29). In a systematic review and meta-analysis carried out by Saadati et al., mental and family problems, as well as difficulty in making a relationship with a spouse were the most common reasons for self-immolation (28). Moreover, other findings showed that the majority of self-immolated people had no related history, and they suddenly committed suicide. This result is inconsistent with the findings of a study carried out by Makhlouf since most people attempted suicide with a previous history of suicide (18). History of mental diseases, such as depression, tension, and previous attempts for suicide is considered the risk factors of such suicidal behaviors (11). People with mental diseases are not able to solve problems and cannot find any solution other than suicide due to limited intellectual streams (30). Therefore, it is important to identify all factors or even ideas which play a significant role in motivating suicidal attempts; moreover, effective attempts, such as social services and proper mental health care measures, should be taken into account to eliminate the stressful condition. Oil and petrol accounted for the most widely used burning materials for self-immolation which was consistent with the results of other studies (6, 10) that can be attributed to their easy availability.

In the present study, the majority of the self-immolation cases occurred from12 to 6p.m. In most studies, these time points are considered as the proper time of suicide incidence (5, 18).A high prevalence of self-immolation in these time points can be due to the fact that such individuals intend to self-immolate in presence of a large number of people.

Death is among the most significant consequences of burns and is observed in more than half of the patients. Moreover, in other studies, death is introduced as an important consequence (21, 31) which can be due to a high percentage of the mean TBSA of burning. Concerning the urban and rural population in the studied area, the prevalence of suicide was higher in villages, which was consistent with the results of other studies (19, 32). A comparison between the results of the present study with those of other studies showed that although self-immolation rate was higher in the rural population in Guilan, the difference was insignificant which can be attributed to the short distance between city and villages, as well as reduced social, cultural, and economic differences

Therefore, any interventional measure taken to prevent self-immolation should include all people in rural and urban areas. Our study indicated that the rate of mortality correlated significantly with age and TBSA, and increasing age and TBSA led to an increase in mortality. These two variables are

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considered as the main risk factors of mortality in various studies (27, 33). As age increases, major changes occur in human skin, such as the reduction of subcutaneous fat and atrophy of skin-dependent structures, all of which reduce the immune system's ability to fight against secondary infections (27).

Therefore, urgent remedies in the first 24 h after burns along with compensation of body fluids and electrolytes can significantly increase the survival rate. On the other hand, the data analysis shows that hospitalization period is directly associated with TBSA, male gender, marital status (i.e., married), and history of mental disease and suicide attempt; therefore, hospitalization period increases by an increase in burn percentage, being male and married, and having a history of suicide attempts and mental disease. Self-immolation has a negative relationship with age and education. As the body area of burns increases, the hospitalization period increases as well (15, 31, 34). On the other hand, there is a negative relationship between hospitalization period and age in patients who survived. Moreover, hospitalization period is longer in young patients, compared to older patients which can be due to the preparation of younger patients for reconstructive surgery, compared to older patients.

Conclusions

The results of the present study indicate the high rate of self-immolation in women, young people, married people, and individuals who have diploma education. The majority of people attempting self-immolation had mental diseases or familial problems. Therefore, a self-immolation attempt should be noticed as an important issue in society's mental health care. Taking interventional measures, such as education, consultation, and socio-economical support across the society, especially high-risk groups are necessary to reduce the incidence of such cases. With this background in mind, the identification of the high-risk groups is an effective way to practice these preventive measures.

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Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this article.

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