The Estimation of Survival and Associated Factors in Self-Immolation Attempters in Ilam Province of Iran (2011-2015)

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Abstract

BACKGROUND: Self-immolation is the most common method of suicide in Ilam province.

AIM: This study aimed to estimate the survival rate in self-immolation attempters in Ilam and identify the associated factors.

METHODS: A descriptive-analytic study was conducted based on data collected at Taleghani Hospital in Ilam, Iran. All persons passed away due to self-immolation or those hospitalised in the centre of the self-burned patients located in Ilam during 2011 to 2015 were assessed. Survival rate was calculated based on Kaplan-Meier. To compare the survival rate between groups, Univariate Log Rank and for multivariate analysis, the Cox test of STATA12 software was used.

RESULTS: During 2011 to 2015, 236 persons including 168 females and 69 males committed self-immolation. The mean and median of survival time in attempters were 32.2 ± 4.7 and 3 ± 0.33 days, respectively. In Univariate Log-Rank test, the following variables including age, sex, burn degree, Total Body Surface Area (TBSA), and burns in neck and head and lower limbs had a significantly meaningful relation with survival, while in multivariate Cox Regression test only two variables including Total Body Surface Area and age remained in the model.

CONCLUSION: The mean and median survival rate in self-attempters are very low. Quickly hospitalisation without waste of time should be considered. Providing prompt treatments and compensating dehydration in early hours especially within the first 24 hours of self-immolation are very vital. Younger persons and those with lower burn surface have more chance for longer survival and recuperation.

Introduction

Suicide is a major and one of the most important public health problems with an incidence which varies worldwide [1]. Suicide is an act where a person consciously attempts to end his/her life. The increasing rate of suicides at the beginning of the third millennium is so alarming that the World Health Organization and the International Association for Suicide Prevention have designated the tenth day of September as World Suicide Prevention Day [2]. Suicide is an indicator of a society mental health [1].

Suicides have many socio-demographic and psychopathological risk factors. Some studies showed the financial hardship, intimate relationship break-ups,

and personal history of suicide attempts was risk factors for self-immolation [3]. Palacio et al., [4] in their study showed that those who reported adverse life-events in the last six months, and those who had a family history of suicide, had a higher risk of suicide. In another study, Zhang and colleagues [5] reported that hopelessness, negative life events, and family history of suicide were risk factors of attempted suicide. Also Zhao et al. showed the work and study problems, marriage frustration, family conflict and fanaticism, somatic disease, and history of mental disorders were all significantly associated with suicide attempts [6]. Committing suicide has had an increasing rate in recent years which not only has caused tension and concern among communities to rise but also has affected the whole world [7]. The

methods of choice for suicide attempt vary across countries and sometimes regions and have a significant cultural and ethnic influence [8]. The rate of suspected death due to suicide in Iran has been reported 4.7 cases per hundred thousand people [9]. One of the violent and dramatic ways of suicide is self-immolation [10]. Self-immolation, the purposely act of self-inflicting burns, is among the most lethal means of attempting suicide [11]. It is expected that self- harm caused by self-immolation, is the most damaging method of self-destruction [12] [13]. In addition to the high probability of mortality, due to self-immolation, even if the victims survive, mutilation and cosmetic changes can lead to pain and discomfort of the person and family [14]. The high rate of mortality (70-90%) and morbidity caused by self-immolation is considerable in Middle East countries in which self-immolation is a common method for suicide [15]. Self-immolation in Iran is a common method of suicide among young adults, who were mostly women, well-educated and mentally healthy [10]. In Iran, from 1.39 to 40 per cent of the suicides are due to self-immolation [16]. Evaluation of absolute and relative frequencies of suicide cases based on sex and the method of suicide in Ilam province shows that in both sexes, self-immolation with 71% has been the most common suicide method [16] [17]. The Khankeh et al., the study showed that there were five main motives for attempting self-immolation: cultural context, mental health problems, family conflicts, self-immolation as a threat, and distinct characteristics of the suicidal method [11]. The main concern of the government is to prevent self- harm through different kinds of suicide. The next phenomenon faced by the government after prevention is treatment because when people commit suicide, saving their life is a priority. Therefore this study aimed to estimate the survival rates and the associated factors in self-immolation attempters in Ilam province during 2011 to 2015.

Material and Method

This was a descriptive-analytic study based on data collected at Taleghani Hospital in Ilam, Iran. The medical records of all patients admitted to Taleghani hospital from March 2011 to February 2015 were reviewed. Taleghani hospital is the only burn centre in the province of Ilam and was unlikely due to the urgent reception of patients outside the province, according to the reports of the Emergency operation centre (EOC), it was unlikely that the transfer would be rapid and admission to other medical centres outside the province of Ilam. A total of 236 patients who had the experience of self-immolation participated in the study. Based on the purpose of the study, the required variables such as demographic variables were obtained through the medical records of the patients. The researcher introduced her and the study purpose, and then explained ethical considerations such as secrecy of data and permission to leave the study at any time they want. Oral consent was obtained for all participants. This research was reviewed and approved by the Ethics Committee of Ilam University of Medical Sciences. The patient who had data of medical records of self-immolation attempting in the hospital and forensic medicine were included to study. If the patient was not referred to the hospital and self-immolation is reported by relatives or other persons, his profile was recorded in the judiciary and forensic medicine. Therefore, to investigate all cases of self-immolation and to increase the accuracy, after removing duplicates, the data of medical records were used in forensic medicine. The patients who were readmitted to the hospital due to self-immolation side-effects such as a scar or for plastic surgery were excluded.

Three established and commonly used estimation methods for the burn surface area are Rule of Palm, Rule of Nines, and Lund-Browder Chart [18]. The estimation of patients' burn surface area was extracted out of the charts available in their records which were calculated according to Lund and Browder's method [19]. All the self- immolators were followed until death or recuperation. The ultimate fate of people sent to burn centres outside the province was also followed through those medical centres. The rate of survival was calculated using the Kaplan method. In the univariate analysis of survival of the groups, Log-Rank test was used. In the multivariate analysis of survival, the factors which were significantly less than 2.0 in the Log-Rank method were analysed within the Cox model using the "forward" method. Then the most important factors associated with survival were identified. All analyses were carried out by the help of STATA12 software by taking the significant level of $P < 0.05$ into account.

Results

From 2011 to 2015, 236 patients including 168 (71.2%) females and 68 (28.8%) males had attempted self-immolation in Ilam province. The mean age of participants was 18.84 ± 34.85, ranging from 11 to 90 years. The mean of total Total Body Surface Area was 80%, ranging from 20 to 100 per cent of burning so that the levels of burn-in women and men were 83 and 73 per cent, respectively. There was a statistically significant difference between the level of burn and gender ($P = 0.002$). More than 65 per cent of suicide attempters had burns over 80 per cent. Considering the future therapy of patients and the patients dispatched to the outside of the province, we figured out that 81.4 and 18.6 per cent of the patients were respectively died and had partial or complete

remission. A total of 43 patients (18.2%) were dispatched to burn centres outside the province.

Table 1: Rates of suicide attempters' survival regarding the forthcoming days after the self-immolation

Days after the self-immolation	Death frequency	Improvement frequency	Survival rate based on per cent
Less than a day	60	0	74.57
1	84	1	64.4
7	160	5	32.2
14	174	20	26.2
22	179	24	24.1
28	181	26	23.3
35	183	28	22.45
90	186	31	21.1

The mean and median of survival in suicide attempters in the present study were 32.2 ± 4.7 and 3 ± 33 respectively. Kaplan-Meier graph shows the survival rate (Table 1 and Figure 1).
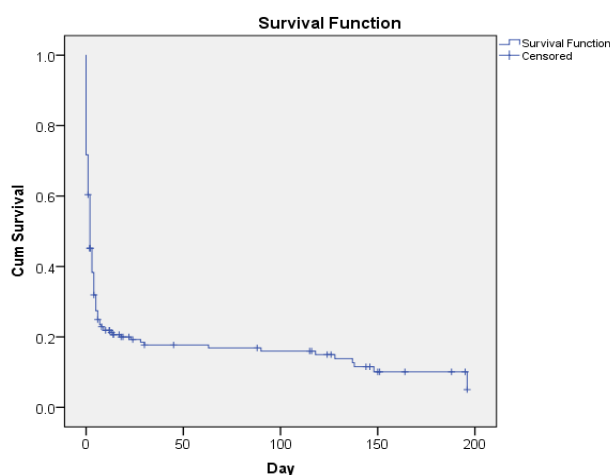

Figure 1: Overall survival rates of suicide attempters regarding the day, based on Kaplan-Meier

Based on this chart 25.43% of the victims died in the early hours after the self-immolation, having a survival of fewer than 24 hours. Only 32.2 % of the victims died 7 days after the self-immolation, that is to say, the total rate of mortality after a week amongst the self-immolators in Ilam province were equal to 67.8 %. The three-month survival rate was also 21.1 % (Table 2).

The association of all variables with survival was specified using the Log-Rank test. There was a significant relationship between genders, age, per cent of burn, burn degree and survival rate, accordingly. People who had suffered burn in the head, neck, limbs and reproductive organs had a lower rate of survival.

Table 2: Univariate analysis of factors affecting the survival rate of self-immolation attempters in Ilam province during 2011 to 2015

Variable	Subgroup	Frequency	Death (per cent)	Improvement (per cent)	Log-rank test
Gender	Male	68	(67.4)46	(32.4)22	0.024*
	Female	168	(86.9)146	(13.1)22	
Age	10- 30 years old	141	(79.1)113	(19.9)28	0.000*
	31- 60 years old	67	(79.6)52	(22.4)15	
	Over 61 years	28	(96.4)27	(3.6)1	

Variable	Sub-group	Frequency	Death (per cent)	Improvement (per cent)	Log-rank test
	old				
Education	Illiterate	61	(83.6)51	(16.4)10	0.64
	Primary school	46	(82.6)38	(17.4)8	
	Secondary school	41	(78)32	(22)9	
	High school	29	(82.8)24	(17.2)5	
	Diploma	46	(76.1)35	(23.9)11	
	University	13	(92.3)12	(7.7)1	
Employment	Employee and retired	5	(80)4	(20)1	0.833
	Student	27	(85.2)23	(14.8)4	
	Worker	7	(85.7)6	(14.3)1	
	Householder, unemployed	175	(81.7)143	(18.3)32	
	Self- employed	22	(72.7)16	(27.3)6	
Marital status	Married	130	(81.5)106	(18.5)24	0.070
	Single	98	(79.6)78	(20.4)20	
	Other (widowed, divorced)	8	(100)8	(0)0	
Residency status	City	161	(79.5)128	(20.5)33	0.677
	Rural area	75	(85.3)64	(14.7)11	
Per cent of burn	Less than 30%	11	(10)1	(90) 10	0.000*
	31- 70 %	55	(40)22	(60) 33	
	Over 71%	169	(99.4)168	(.6)1	
Ignition material Used	Oil	228	(81.6)186	(18.4)42	0.922
	Benzene	6	(66.7)4	(33.3)2	
	Gasoline	2	(100)2	(0)0	
Burn degree	First- degree	0	(0)0	(0)0	*0.000
	Second-degree	8	(2.5)1	(87.5)7	
	Third- degree	1	(100)1	(0)0	
	First and second degree	12	(0)0	(100)12	
	Second and third degree	144	(93.7)135	(6.3)9	
	First, second and third degree	71	(77.5)55	(22.5)16	
Season	Spring	67	(77.7)52	(22.3)15	0.472
	Summer	60	(78)49	(22)11	
	Fall	50	(78)39	(22)11	
	Winter	59	(79.7)46	(20.3)12	
Head, neck burn	With	198	(94.4)187	(5.6)11	*0.000
	Without	38	(13.2)5	(86.8)33	
Body burn	With	227	(81.9)186	(18.1)41	0.288
	Without	9	(66.7)6	(33.3)3	
Upper parts burn	With	183	(80.3)147	(19.7)36	0.066
	Without	53	(84.9)45	(15.1)8	
Lower parts (reproductive organs) burn	With	195	(95.9)187	(4.1)8	*0.000
	Without	41	(2.2)5	(87.8)36	
Addiction	With	15	(73.3) 11	(26.7)4	0.666
	Without	221	(81.9)181	(18.1)40	

There was not a significant correlation between education level, employment status, marital status, ignition material used, residency status, time of the year and addiction with survival (Table 3).

Table 3: Multivariate analysis of factors affecting the survival of self-immolation attempters in Ilam province during 2011 to 2015

Variable	Sub- group		CI95%HR
Burn percentage	Below 30%		----
	31- 70%	3.94	0.531-29.32
	Over 71%	26.21	3.661-187.699
Age	10- 30 years	1	----
	31- 6- years	1.3	0.934-3.368
	Over 61 years	2.2	1.435-3.367

*Hazard Rate.

Men had a higher rate of survival in comparison with women, and this correlation was statistically significant (P = 0.024). The variables having P < 0.2 in univariate analysis using the Log-Rank was analysed using multivariate Cox analysis method. Multivariate analysis showed that only two variables, namely, Total Body Surface Area and age could remain in the Cox Regression model and the rest of the other variables were excluded from the model. Total Body Surface Area was introduced as the strongest factor associated with survival.

Discussion

The mean and median of suicide attempters in the present study were, respectively, 32.2 ± 4.7 and 3 ± 33. In the study conducted by Najafi et al., the mean and median of the suicide attempters was respectively, 11 ± 2 and 33 ± 2.6 in Kermanshah [20]. There was a significant difference in survival rate of both genders. It was in contrast with them. Moradinazar et al., study which reported that no significant difference in survival rate of both genders was found [21]. In our study 25.43% of the victims died in the early hours after self- immolation having survival rate lower than 24 hours, which was consistent with the results of the of Moradinazar et al., study which showed that the highest mortality rate of self-immolation was in the first 24 hours after accident [21]. Only 32.2 % of the victims died after 7 days after self-immolation, while in Najafi's study 11% and nearly 70% of the victims have respectively, the survival rates of lower than 1 and 7 days [20]. It can be said that 24 and 7 days survival of the self-immolation attempters in Kermanshah province was rather two times more than our study's.

In the present study, through using univariate analysis by the help of the Log Rank, it was revealed that there is a significant relationship between, age, sex, burn degree, Total Body Surface Area, head, neck, limbs and genitals' burn with survival rate. In Najafi's study, in univariate analysis, factors such as age, mental disorder, drug addiction and burn percentage were significant [20]. In our study, in contrast with Najafi's, gender was significant, while drug addiction was not so. In Dastgiri's study as far as univariate analysis is taken into consideration, gender and age were not significant [22]. In our study, the victims suffering head, neck and limb's burn had a lower rate of survival which is inconsistent with the study done by Dastgiri et al., [22].

In the present study, only Total Body Surface Area and age variables could remain in the multivariate analysis and other variables were excluded out of the model. The findings of the study were well correlated with Najafi's in Kermanshah [20]. In this study, like Najafi's study, the percentage of the burn was the most powerful detected factor in the survival. Also in Moradinazar et al. study the strongest risk factor affecting the survival of self-immolation attempters was Total Body Surface Area [21]. In the present study, the risk factor in those participants with more than 71% of the burn was 26.2 times more than those with less than 30% of burn. These results are consists with Moradinazar that demonstrated the risk of those with burns percentage higher than 70% was 17 times more than those with burns percentage lower than 30%. Also, this rate was 17.3% in Najafi's study [20].

In the analysis of age as the second associated factor in survival, it was found that the risk factor for people ranging from 31 to 60 years was 1.3 times and in people over 61 years, 2.2 times more than those under the age of 30, and in Najafi's study,

these rates were, 1 and 3.08, respectively [20]. Also, the results of Moradinazar et al. study showed the ratio of fatal self-immolations up to the age of 45 was constant. But, after the age of 45, the ratio of fatal suicides increases [21]. It is believed that with ageing, the human skin, major changes such as perforation of dermal vessels, reducing subcutaneous fat and atrophy of the skin-dependent structures, which means that the immune system's ability to fight secondary infections is will be reduced.

In conclusion, the mean and median of self-immolation attempters' survival rate is very low, and the mortality rate is by contrast high. Although preventive measures to avoid the phenomenon of suicide is much more important than medical intervention, self-immolation attempters with a lower degree of burn and age have more chances to survive and even improve. It seems that even in case of severe burns, the younger victims have a chance of survival. So, quickly hospitalisation without waste of time should be considered. Urgent medical treatments in the first hours, especially in the early 24 hours after self- immolation, as well as compensation for body's fluid and electrolytes, can be very determinative in survival rate. Activating the emergency medical system and doing medical treatments at the place of self- immolation towards the first burning centre can help revival and keep body fluid.

Our results regarding the survival of people committing self-immolation, due to the limitations of the studies in this field, were compared with a few other studies. It is recommended to conduct further studies with sufficient sample size. Such factors as the risk of nosocomial infection and the rate of inhaled damages will certainly have an impact on survival. In the present study, due to lack of access to this information, we were unable to estimate the impact of these factors. Considering the impact of these issues in future researches is also suggested. Many patients due to lack equipped burn centre in the province are being sent to distant provinces. Perhaps, establishing Burn Centers in Ilam or the west of the country, having the high incidence of suicide, can be helpful.

Acknowledgements

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