

Survey of Suicide Attempts in Sari

Susan Afghah, MD¹
 Morteza Aghahasani, MD²
 Morteza Noori-Khajavi, MD³
 Emytis Tavakoli, MD⁴

1 University of Social Welfare and Rehabilitation Sciences, Tehran. Iran

2 Infectious and Tropical Disease specialist, NPH, hygienic deputy of Medical Sciences University of Ghom Iran

3 University of Social Welfare and Rehabilitation Sciences, Tehran. Iran.

4 University of Social Welfare and Rehabilitation Sciences, Tehran. Iran

Corresponding author:

Emytis Tavakoli, MD
 Razi Hospital, Amin Abad, Shahr-e Rey, Tehran, Iran.
 Tel: +98-9123218285
 e-mail: tavakoli79@yahoo.com

Objective: Studying suicide can be of assistance to prepare the ground for the adoption of effective preventative measures. In the present study, our aim was an in-depth review of suicide epidemiology in the city of Sari, in the northern part of Iran. Our focus was on geo-demographic and other risk factors affecting the frequency of suicide in order to demonstrate populations with greater risk of suicide for future preventive and protective measures.

Method: In a prospective study, during a one year period, a descriptive semi-structured questionnaire was used to conduct interviews with subjects who attempted suicide and referred to one of the four major trauma and emergency centers in the city of Sari, or with the relatives of those who completed their attempt. Convenience sampling method was used. Statistical analysis was performed using SPSS-20 software. Multivariate tests were based on χ^2 values. Logistic regression was performed estimating the effect of risk -factors.

Results: In this study, 228 suicide attempters were enrolled; of whom, 78.5% were female; 28.5% of all the attempts resulted in death. The odds of suicide completion were significantly increased in the following cases: married status (OR: 3.49; 95% CI 2.82,4.53), illiteracy (OR:2.71;95%CI 2.10,3.64), presence of comorbid physical illness (OR:2.22;95%CI 1.64,3.21), history of previous suicide attempt (OR:2.03; 95%CI 1.56,2.81), and age over 50 (OR: 2.01, 95% CI 1.14,3.05). Suicide outcome estimated worst in the married illiterate attempters. The leading method of use was suicide by burn (SBB).

Conclusion: The variety observed in the regional distribution of suicide risk factors calls for more non-discriminatory attention and adoption of precautionary, preventative and protective measures for each section of the society accordingly.

Keywords: *Suicide attempts, completed suicide, Iran, city of Sari*

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Suicide is a conscious act of self-harm that may result in death (1). The word 'suicide' is derived from the Latin words of "sui" meaning 'self' and "cader" meaning 'killing' and was first introduced in 1642 (2).

Suicide is a public health problem that in some societies ranks eighth amongst the causes of adult death, i.e. 30,000 cases of completed suicide were reported in the USA (average 80 people per day) in 2000, and the number of suicide attempts was at least ten times of this figure (3) & (4).

In the USA, the cases of completed suicide among men has been reported as three times that of women, while the number of women attempting suicide has been three times more than men (4). Similar results were obtained in Japan and the West.(5,6,7,8 &9).

The prevalence of attempting suicide in different parts of the world is widely different. For instance, the rate is very low in South Europe but high in West Europe and Scandinavia (10). Suicide had an increasing trend in East Asia and reported to be low in Islamic Countries (11).

The Existing world statistics (12), advanced countries included (13), show that single individuals are more likely to commit suicide compared to the married. Moreover, the frequency of suicide among single individuals, widows and divorcees increases respectively.

A study by Mohammadi et al. (2005) on 25180 suicide attempters in Iran revealed that the lifetime prevalence of suicide was 1.4% (0.9% males and 2% females). The majority of the attempters were 26–55 years of age, married, highly educated, female, retired and lived in the urban areas. Many of the attempters (45.3%) reported at least one psychiatric disorder during their lifetime, major depressive disorder being the most prevalent (22%). This study concluded that many of the demographic correlates of suicidal behavior in Iran are very similar to those seen in the Western cultures; however, the socio-demographic factors such as few working women and very low levels of divorce is quite different to that of the Western populations (14).

With respect to the methods of suicide attempt in different countries, availability of means is the main

determinant. However, imitating previously known victims or the suitability of a method to convey a symbolic message influences this choice. (15 & 16) Results of several studies conducted in Iran show Suicide by Burn (SBB) as the method of choice, with rates varying between 1.39% to 43%, including all the attempted suicides and Para-suicides (17,18 and 19).

In the present study, we scrutinized the cases of suicide in the city of Sari, with a view to demographic factors and rates of completed suicides. Our aim was to identify endangered individuals or groups, and suggest appropriate preventative measures.

Material and Methods

This prospective study was conducted using a cross-sectional descriptive method. Samples consisted of those who attempted suicide and were referred to the Accidents and Emergency Section of all the 4 existing centers (Boo-Ali Hospital .Shahid Zare'a Hospital, Loghman Hospital and Imam Khomeini Hospital) located in the city of Sari over a one year period. The sampling method was convenience sampling. Our sample consisted of 228 individuals. Data collection through interviews was done in a relaxed environment with those having attempted suicide or their partners and first degree relatives, using a semi structured questionnaire. Partners and families were only interviewed in the case of a completed suicide attempt, or the subjects' inability to give reliable information due to physical or psychological conditions such as reduced level of consciousness, pain, etc. Collected data were then analyzed using SPSS-20 software. The relative frequency percentage was used for the descriptive variables. Multivariate tests were based on χ^2 values and computed from coefficient variance-covariance matrices. Odds ratio was used to show the effects size of the risk factors which were compared between the 'saved attempters' and the 'completed suicide group. Logistic regression was performed demonstrating each variable's contribution to the risk of suicide completion.

Result

Of a total of 228 cases, 65 (28.55) died and the remaining 163 (71.5%) were saved. The distribution of different variables in the studied population is listed in .1Geo-demographic Distribution

The frequency of suicide attempt was 78.5% (n = 197) in women and 21.5% (n = 31) in men. Attempting suicide was 3.5 times more in women compared to men. The difference between men and women in terms of completed suicide was not significant (30.73% in women vs. 20.41% in men; = 2.009,df = 2,p = 0.156). The subjects were categorized into five different age groups (Table 1.). The frequency of suicide was greatest in the 20 -29 year age group (39%). The frequency of suicide attempt dropped abruptly in

people over 40 years of age. In terms of completed suicide, those over 50 years of age ranked first with a frequency of 66.66% compared to the rest of the attempters. ($\chi^2 = 11.476$, df = 4, p = 0.021). As seen in Table 1, the majority of suicide attempts took place amongst people who had an occupation (79.3%). However, this variable did not have a significant influence on completing the attempt ($\chi^2 = 0.15$,df = 1,p = 0.42). The frequency distributions of suicide attempt were prepared according to the degree of education (5 consecutive classes) and showed a negative pattern between the degree of education and attempting suicide (Table 1). Moreover, the degree of education demonstrated a significant impact on the completion of suicide attempt as in the illiterate group 45.2% of all the attempts resulted in victim's death, while the frequency of completed suicide was only 11.1% among people with higher education. ($\chi^2 = 11.177$,df = 4,p = 0.0008). Regarding marital status, patients were categorized as single, married, widowed and divorced. Of all the attempters, 61.7% (n = 140) were married, 35.7% (n = 82) single, 2.2% (n = 5) widowed and 0.4% (n = 1) divorced. The frequency of suicide attempt was almost twice of the single attempters in the married subjects. The frequency of completed suicide was 53.84% in the married attempters and 22.38% in the singles ($\chi^2 = 13.201$, df = 3, p = 0.0003).

Among the suicide attempters, 131 lived in the city and 79 lived in the rural areas and the data for the rest was missing. This variable did not influence suicide attempt completion significantly ($\chi^2 = 2.517$, df = 1, p = 0.1127).

2. Temporal Distribution

Temporal variables (season and time of the day) were considered for all the attempts. The frequency of suicide attempt declined as the weather turned cold and it was more frequent in the summer (n = 72; 31.6%), and spring (n = 64; 28.0%) compared to the autumn (n = 51; 22.4%) and the winter (n = 41; 18%). However, regarding the completed cases of suicide, the same pattern was not repeated as the rate of completed suicide was reported to be 29.7% (n = 19) in the spring, 29.3% (n = 12) in the winter, 29.9% (n = 21) in the summer, and 25.5% (n = 13) in the autumn with no significant seasonal pattern ($\chi^2 = 0.135$, df = 3, p = 0.713).

The highest proportion of suicide attempt took place between 7:00 a.m. to 6:00 p.m. (71.4% of the cases; n = 163). In contrast, regarding the completed cases of suicide, the frequency was greater during the night (54.7% in 6 p.m. -7a.m. vs. 34.7% in 7 a.m. -6 p.m.). However, the difference was not statistically significant ($\chi^2 = 2.109$, df = 1, p = 0.146).

3. Means of Suicide

Means of suicide regarding attempter's sex are listed in Table 2. There was a significant difference between suicide methods used by men and women. Men preferred using medical drugs, while women 's method of choice was SBB ($\chi^2 = 23.888$, df = 8, p = 0.003).

Table 1: Comparing characteristics of suicide attempters in Sari who completed their act or were saved

Group		Completed (n=65)	Saved (n=163)	Attempted (n=228)	P value	OR
Sex	Male	10	39	49	P value = 0.1563 Not significant	—
	Female	55	124	179		
Age group	15-19	14	69	83	P value = 0.021 significant	2.014
	20-29	33	56	89		
	30-39	13	24	37		
	40-49	1	8	9		
	50 and over	4	6	10		
Education	Illiterate	19	23	42	P value = 0.0008 significant	2.712
	Primary	22	40	62		
	Secondary (lower)	13	35	48		
	Secondary (high school)	10	57	67		
	Higher education	1	8	9		
Marital state	Married	53	91	140	P value = 0.0003 significant	3.495
	Single	11	67	82		
	Widowed	1	4	5		
	Divorced	0	1	1		

Group		Completed (n=65)	Saved (n=163)	Attempted (n=228)	P value	OR
Area of residence	Rural	33	64	79	P value = 0.1127 Not significant	—
	Citizen	32	99	131		
Addiction	present	14	28	42	P value = 0.4432 Not significant	—
	absent	51	135	186		
Season	Spring	19	45	64	P value = 0.7135 Not significant	—
	Summer	21	51	72		
	Autumn	13	38	51		
	Winter	12	29	41		
Time	7 Am-6 Pm	42	121	163	P value = 0.1464 Not significant	—
	6 Pm-7 Am	23	42	65		
Previous history of suicide	present	21	31	52	P value = 0.0308 significant	2.032
	absent	44	132	176		
present psychiatric illness	present	14	42	56	P value = 0.5031 Not significant	—
	absent	51	121	172		
Present physical illness	present	10	47	57	P value = 0.0342 significant	2.228
	absent	55	116	171		
Previous history of mental hospital admission	present	6	9	15	P value = 0.3078 Not significant	—
	absent	59	154	213		

Table 2: Means of suicide in Sari

Method/Means	Male		Female		total	
	No.	%	No.	%	No.	%
Self incineration (SBB)	12	24.5%	86	48.0%	98	43.0%
Medicinal Drugs	17	34.7%	54	30.2%	71	31.1%
Agricultural compounds and Pesticides, find, rodenticides	6	12.2%	24	13.4%	30	13.2%
(organo-phosphorous)						
Rice pills (a rice crops insecticide)	2	04.1%	5	02.8%	7	03.0%
Opium	4	08.2%	3	01.7%	7	03.0%
Petroleum Products	1	02.0%	3	01.7%	4	01.8%
Cutting Veins	2	04.1%	2	01.1%	4	01.8%
Cold Arms /Cutting tools	2	04.1%	2	01.1%	4	01.8%
Self Hanging	2	04.1%	—	—	2	00.9% "
Jumping Height	1	02.0%	—	—	1	00.4%
Total	49	100%	179	100%	228	100%

Table3: logistic regression results of suicide in Sari

Variable in model	B	Wald	Sig.
Education	2.219	35.882	0.000
Marital status	6.296	12.011	0.001
previous history of suicide	1.533	3.746	0.053
present physical illness	-0.001	0.361	0.548
Age	0.298	1.243	0.265
Constant	-49.806	20.548	0.000
Model Summary		117.2(Sig<0.001)	
Chi-Square			
-2 Log likelihood		88.665	
Cox & Snell R Square		0.267	
Nagelkerke R Square		0.446	
Percentage Correct		93.4%	

4. Suicide Risk Factors

Of the subjects, 75% did not have a previous history of suicide attempt. For the means of suicide (except for cutting the vein), rates were greater for attempters without a previous history of suicide attempt). However, completed suicide was more frequent among attempters with a positive history of previous suicide attempt (40.38%) compared to those without one (25%) ($\chi^2=4.66$, $df = 3$, $p = 0.038$).

Investigation of motivational factors responsible for suicide attempt revealed that about 33.5% of victims attempted suicide without any specific reason (refusal to elaborate or uncertainty of the relatives), 27% of the subjects claimed marital strife and disputes to be the reason, followed by family problems in 22%, love loss in 6%, educational failure in 5%, financial loss in 3%, health problems in 2% and sorrow, grief and social discrimination in the rest. No specific motivational factor was statistically responsible for more cases of death ($\chi^2 = 15.35$, $df = 9$, $p = 0.073$).

Regarding the presence of a physical illness as a predisposing or a perpetuating factor in a suicide attempt, 24.5% ($n = 56$) of the patients had a history of physical illness and/or surgical intervention, while 75.4% ($n = 172$) did not. Positive medical history was compared between dead and alive patients and showed to have a significant impact on the completion of the suicide act ($\chi^2 = 4.48$, $df = 1$, $p = 0.034$).

Of all the attempters ($n = 15$) 6.57% had a history of previous admission to a psychiatric hospital and ($n = 213$) 93.43% did not. The frequency of completed suicide was not significantly different among those with and without a history of previous psychiatric hospitalization (10.16% Vs. 5.84%, respectively) ($\chi^2=1.04$, $df = 1$, $p = 0.307$).

Considering present psychiatric illness as a risk factor for suicide attempt, ($n = 31$) 20% of the attempters claimed to have been hearing voices either talking about them or persuading them to commit suicide (auditory hallucinations, but not necessarily a schizophrenic symptom). The most prevalent psychiatric illness was depressive disorder (45%) followed by schizophrenia (9%) and anxiety disorder (6.5%).

The frequency of completed suicide was 27.45% ($n=14$) for patients suffering from a psychiatric illness and 34.71% ($n = 42$) for those with no psychiatric disorder ($\chi^2=0.44$, $df=1$, $p=0.503$).

In 3 cases of completed suicide, attempters had lost their parents in an act of suicide (2 fathers and 1 mother), while a history of suicide act in parents was negative in those suicide attempters who were rescued. By evaluating substance abuse in suicide attempters, we found that ($n= 42$) 18.4% of the cases were addicted to a certain substance, i. e., ($n=28$) 12.3% to cigarettes, ($n=6$) 2.6% to medicinal drugs, ($n=4$) 1.8% to opiates, ($n=3$) 1.3% to alcohol and ($n=1$) 0.4% to cannabis; and the remaining ($n = 188$) 82.5% were not addicted. Our results showed no statistically significant difference between the completion of suicide in patients with and without history of substance abuse ($\chi^2 = 0.588$, $df = 5$, $p = 0.443$).

Cox and Snell's R-Square revealed that independent variables accounted for about 26.7% of variations in suicide tendency. Logistic regression revealed that married status and education were independent predictors of completed suicide (standard error < 1%). An increasing standard error measure to less than 1 and a previous history of suicide could be considered an independent predictor of completed suicide. Goodness of fit measure: Table 3 reveals that 93.4% of the predictions were correct and patients were correctly placed in the relative groups. The Nagelkerke is a reliable measure of relationship that range from 0 to 1. In our model, it was 0.446, indicating a fair relationship of 44.6% between the predictors and the prediction.

Discussion

Since the actual prediction of committing suicide is virtually impossible, identifying those people at risk could help to expand and modulate preventive measures. Due to previous studies carried out worldwide, suicide risk factors differ not only in different countries but also in different regions of a single country. In the present study, we focused on geo-demographic and other risk factors in suicide attempters from a northern province of Iran. We could investigate different factors leading to both committing and completing a suicide attempt .

Results of many previous studies showed that although the rate of suicide attempt is greater in women, completed suicide is more frequent in men (8, 9, 12, 20 & 21). Our present study, accordingly, shows that not only the rate of suicide attempt is three times greater in women, but also the frequency of completed suicide is also greater in this group. Our results, though not

statistically significant, are in contrast with the present belief emphasizing the lethality of suicide attempt among male gender. (22) Iranian women like some of other Asian women chose self-burn above other means of suicide, (23,24) which results in more cases of completed suicide, being a highly lethal method. Similar results were obtained in a study carried out in the city of Masjed Soleyman (southwest of Iran) (25) in which the frequency of both suicide attempt and completion was greater in women. This finding whether or not attributed to the downplayed social role and the value of women in a male dominated traditional culture, requires professional investigation and further study.

The Charlton's study (1993) (13) showed that married people were the least endangered of performing an act of suicide. While widows faced a greater risk of suicide compared to singles being divorced carried an even higher risk. In the current study, not only the frequency of suicide attempt was much greater in the married group, but also being married was the strongest predictor of death due to suicide (OR: 3.49 ;95% CI 2.82,4.53). These results are inconsistent with a study in Mazandaran by Zarghami et al. (26) and with another study titled "five year suicide pattern" conducted in Tehran by Rezaeian (27). The results of these two studies showed a double fold increase in the frequency of completed suicide in married people compared to singles and were inconsistent with the results of other studies carried out in Pakistan (28). This similarity may reflect the impact of a common cultural marriage pattern in both regions.

Factors responsible for the greater frequency of suicide attempt in Iranian females could be arranged and at times forced marriages in young teenage females, socio-economic difficulties that young couples are faced at the beginning of their new life, absence of a national social security protection, and also consideration of divorce as 'an inappropriate act or solution' in traditional Iranian societies. Dealing with mentioned sociocultural burdens, married people (mostly women) turn to suicide as the last resort to free themselves from the hardships of their lives.

We found that suicide attempt is most frequent in subjects between 20 to 29 years of age; however, the ratio of completed suicides was greater among people over the age of 50 (OR: 2.01, 95% CI 1.14,3.05). This finding is inconsistent with the results of studies conducted by Kotila L Lonquist J, 1987 (29), & Kupfer D and Blumenthal S K, 1990 (30).

Most of suicide attempters in our study had a job (housewives included) and had primary or secondary education. We found that people with higher education (college degree and above) are the least endangered group for committing suicide and the illiterate group are the most. The degree of education was the second most effective risk factor in completion of suicide (OR:2.71;95%CI 2.10,3.64). The results of a European comparative study in 2005 revealed that the greater the socio-economic disadvantage, the higher risk of

suicide. People with high level of education were at less risk of suicide (31). Opposite results were observed in other studies regarding victims' education, as Pompili et al. (32) analyzing data from Italy mortality database, concluded that suicide victims have had a higher education attainment compared to their counterparts who died from natural causes. It seems that individuals with some degree of educational achievement may be more prone to suicide risk due to facing failure, public shame and high pre-morbid functioning. On the other hand, illiteracy and poor socio-economic condition leads to a hopeless position and the victims' strong wish to die and this along with the easy availability of more lethal suicide methods such as SBB and consumption of pesticides leads to completion of suicide.

In the current study, the most frequent suicide method was SBB followed by use of medicines and pesticides (incl. rodenticides / organ-phosphorous compounds). Regarding SBB, our results were similar to previous studies conducted in Cairo by Mabrouk et al, 1999 (33) and Peck (34). Sheth H et. al. (35) (1994) believes that tensions arising from cultural differences, interpersonal conflicts and agonies, (especially marital problems) contribute a great deal to the high frequency of SBB in Asian women. Similar pattern is closely repeated in provinces of Ilam and Kermanshah in the western regions of Iran and Khuzestan in the southern part of Iran. These results are in contrast with some studies showing SBB being more common in men (Garcia Sanchez, 1994) (36) and (Chan RC et al in Hong Kong) (37) and Peck MD in Europe, or studies showing no difference in the SBB ratio between two sexes (Davidson & Brown, 1985 (38), Hadjiiski et. al., 1996 (39)). A study by Moradi and Khademi in 2002 (40) shows that the leading suicide method was self-hanging (56.5%) in Iranian men and the one chosen by women was SBB (62.29%). This pattern is common among Indian women (12) as well. Quoting from this study: "Both Iranian men and women use more violent methods of attempting suicide", whereas, in a Japanese studies in Japan and England (41, 42) it was concluded that compared to women, men use more violent suicide methods. Considering these findings, it is suggested that in order to reduce the rate of suicide (particularly for women and married people), enforcing preventative and protective measures, providing counseling services and casework schemes designed to accommodate particularities of each society coupled with thorough considerations of cultural traditions is of critical importance.

Addiction is considered a major risk factor for suicide attempt, and the related death rates are greater among addicts, Volk Wasserman D, 1987 (43). In our study, the majority of subjects (82.3%) had no addiction, a point not consistent with any other previous study. This incoherency could be due to the limitations of our study. Because acquiring a complete and correct past substance abuse history was impossible in the deceased

patients, the frequency of addiction might have been underdiagnosed in the cases of completed suicide .

In the current study, many patients were suffering from a psychiatric disorder. The most frequent psychiatric comorbidity was depression (45%) followed by schizophrenia and anxiety disorders. this finding is incongruent with previous studies. A Swedish cohort study assessed the impact of coexistent psychiatric morbidity on the risk of completed suicide and pointed out schizophrenia, bipolar and unipolar mood disorders to be the strongest predictors of death (44). We, on the other hand, could not find a significant relation between psychiatric comorbidity and completion of suicide.

Recognition of periods of high suicide risk on the grounds of previous non-fatal suicide attempt is likely to be important for suicide prevention, especially in women who report first suicide attempt less than men (62% Vs. 38%, respectively)(45). A history of previous suicide attempt was present in 22.8% of our patients and increased the risk of death due to suicide about two folds (OR:2.03; 95%CI 1.56,2.81)

The presence of comorbid physical illness was significant on the outcome of suicide and resulted into more cases of death (OR:2.22;95%CI 1.64,3.21). There are numerous records highlighting the role of physical illnesses such as end stage renal disease (ESRD), congestive heart failure (CHF), cancer, etc. in committing suicide. This incidence is explained by health related declines in patient's quality of life and secondary physical disabilities and restrains (46, 47, 48) in daily routine and leisure activities leading to an undesirable lifestyle and the patients' wish of death as the only way left.

Conclusion

This study revealed that among suicide attempters referred to one of the four trauma and emergency centers in the city of Sari, completed suicide was more common among illiterate married women. The most common means of suicide was suicide by burn. This demographic pattern and method of choice is similarly repeated in the provinces of Ilam, Kermanshah and Khuzestan in Iran. Regarding the differences observed between this pattern and those belonging to studies held in other regions of Iran or other parts of the world, it is noticeable that regional variables belonging to high risk populations should be considered carefully when conducting suicide prevention programs. The diversity of suicide risk factors in different parts of a country calls for more detailed regional geo-demographic explorations and adjustment of preventive and protective measures according to the local needs.

Limitations

In this study, we only evaluated those suicide attempters who referred to the emergency wards of the four general hospitals in the city of Sari. Therefore, it is likely that some of the attempters were not referred to these centers either because they went to other hospitals in the nearby cities or they were treated using

palliative measures at home or they might have even been dead before anyone could reach them.

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