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Investigating the Status of Suicide Attempt and Suicide Deaths in Population Covered by Dezful University of Medical Sciences During 2012-2018

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Abstract

Background and aims: Suicide is one of the most important complications of the industrialized world. The purpose of this study was to investigate the status of suicide attempt and suicide deaths in the population covered by Dezful University of Medical Sciences (DUMS).

Methods: In this cross-sectional study, the registered data of 3958 suicide attempts and 205 suicide deaths in Dezful from 2012 to 2018 were used. Gender, suicide method, residence, marital status, age, and education were used as the explanatory variables. The chi-square test was used to determine the relationship between qualitative variables in SPSS 22.0. A simple time series chart for suicide cases was drawn using the simple time series plot.

Results: A total of 3958 suicide attempts and 205 suicide deaths were recorded in the study population. The suicide trend during 2012-2018 years was declining. Most of the suicides cases were female (60.1%), used drugs (65.3%), lived in cities (51.8%), were in the age group of 15-24 years (49.6%), and were middle school educated (26.8%). Drug abuse was reported more frequently than other methods ($P \geq 0.001$).

Conclusion: In this study, most of the suicide cases were females, married persons, adolescents, middle school educated persons, and drug users. It is suggested that the cultural, social, and economic problems of the families, especially women, be considered important and the families and the vulnerable groups receive the appropriate training.

Keywords: Suicide attempt, suicide, Dezful University of Medical Sciences, Iran

Introduction

According to the globally accepted definition, suicide is an act in which a person ends his/her life fully conscious of its deadly consequences. In suicide attempts, the main motivation is not usually death, but the person does it for taking revenge, gaining power, coercing, as well as attracting the attention of others. However, it may lead to death.[1] Achilles Delmas considers suicide as "An action performed by a person to destroy himself, while the authority of life and death is within his power and he is not morally obliged to perform this action."[2] The phenomenon of suicide which is one of the important consequences of the current industrial world will be most affected by psychological disorders, social inequalities, and tense situations.[3] Durkheim, in his "*Work-Sharing*" book stated that the suicide appears with civilization, or at least what is observed in lower-income societies as suicide has special features.[4] Suicide is an important individual and social damage that is more common in the addicted and mentally ill persons.[5] It has already been reported about the evasive suicide writes: man tries to run from confronting the intolerable situations of life with suicide". On the other hand, it as a way to get out of the difficult and adverse situations of life.[6]

According to the World Health Organization (WHO) data, approximately 800 000 people die due to suicide every year, which is one person every 40 seconds. There are indications that for each adult who died by suicide there may have been more than 20 other suicide attempts.[7] The results of a secondary analysis showed that on average, in 2000, 35% of the people survived and 25% of the survived people committed suicide again.[8] The suicide rate is 25 per 100 000 population in Switzerland, Germany, and Japan, and it is 10 per 100 000 population in Spain, Italy, Egypt, and the Netherlands.[7,9]. Moreover, according to the latest WHO data, the highest rate of suicide in 2016 belonged

to Lithuania with 31.9 per 100 000 population and the lowest rate belonged to Antigua and Barbuda with 0.5 per 100 000 population. The suicide rate in Iran was reported to be 4.1 per 100 000 population in 2016.[10] Rostami et al reported a total number of 11 180 suicide cases during 2011-2014 in Khuzestan province, 60% (6728 cases) of whom were female and 40% (4452 cases) were male. The incidence trend of suicide from 2011 to 2014 showed a significant increase reached from 60 in 2011 to 167 per 100 000 population in 2014.[11] The suicide rate in Ilam, Kermanshah, Lorestan, Hamedan, Golestan, and Kahkiloye and Boyerahmad is much higher than the other provinces of Iran. Moreover, the suicide rate in youths is higher compared to the other age groups.[8]

Various studies show that suicide rates vary according to age, education, geographical area. In addition, the relationship between higher education status and lower suicide rates has been reported in Japanese men and women.[12] The prevalence of suicide thoughts has been reported to be higher in single and male students in Iran than in married and female students.[13]

In another widely cited study from China, mortality data from 1995 to 1999 were collected and analyzed. The causes of death were examined across gender and age, as well as rural and urban settings. Data showed that suicide was the leading cause of death in those aged 15–34 years old. The suicide rate in women across all ages and settings was 25% higher compared to men. This difference was due to the high rates of suicide in rural women aged 15–34. The suicide rate was 66% higher in young rural women than in young rural men.[14]

It was found that in both India and China, the women may be faced with low social ranks, limited chances, and the family violence, which may affect their psychological health.[15] According to a study conducted in Iran, the incidence rates of suicide in the general population in males and females were 82 and 115 per 100 000 population, respectively, during 2000-2011.[16]

Most of the previous studies in our country showed that the suicide rate is higher in females than in males.[17-21] Moreover, previous studies in Iran reported a higher rate of suicide in cities compared to villages[18,21] and some of the other studies reported a higher rate of suicide in villages compared to cities.[19]

The people who commit suicide usually have some common behavioral features; they are often at lower economic levels or suffer from depression. Severe anxiety, depression, suicide thoughts, and so on are some of the important behavioral indicators of suicide.[22] Previous studies in our country have reported the effect of variables such as victimization, bullying, quarrels, stress, depression, anxiety, psychological disorders especially depression, age, residence place, education status, and monthly income on suicide thoughts.[13,23,24] It has been reported that suicide thoughts have a direct and significant relationship with neuroticism and a reverse relationship with responsibility and flexibility. On the other hand, it has been noted that there is a different relationship between the flexibility and suicide thoughts in employed and unemployed groups of youth.[25]

Many of the suicide-related indicators were previously studied in the global population and even in Iran's provinces; however, there is not any study that investigated the relationship between suicide and indicators such as gender, education, residence, and suicide method in Dezful. Additionally, the trend of suicide in this population has not been reported in any paper. Regarding the effect of regional and cultural factors on suicide and the need to have detailed information about this health problem to prevent and control it, this epidemiological study was conducted at Dezful University of Medical Sciences (DUMS) during 2012-2018 to give a clear image of suicide status and gather the required information for planning the preventive, training, and therapeutic interventions.

Materials and Methods
Subjects
The status of suicide was assessed using a cross-sectional design. A total of 4163 subjects were included in the study. Data were collected during 2012-2018. The census method was used in this study. Suicide cases that occurred in one of the cities covered by DMUS (Dezful, Shoosh, and Gotvand) and were reported to Vice-chancellor for health, DUMS, were included in the study.

Measures
A checklist was developed to assess gender, suicide method, residence place (city or village), marital status, age, and education status. The checklist was designed according to the available at DUMS.

Statistical Analysis
Descriptive statistics (e.g., frequency and percentage) were used for data analysis. The chi-square test was used to examine the relationship between qualitative variables. A simple time series chart for suicide cases was drawn using the simple time series plot. Trend analysis plot and the regression fitted line plot were used to draw the time series chart with the line indicating the time change trend (time trend analysis) over seven years. MAPE (mean absolute percentage error) was selected to determine the best data-driven model (growth curve model, S-curve trend model). MAPE is a measure of accuracy in creating a data-driven model in a time series analysis, especially in trend forecasting.[26] The model with the lowest MAPE value is selected as the best data-driven model. Descriptive-analytical procedures and time series analyses were performed using SPSS software version 22.0 and MINITAB software version 16, respectively. In all

analyses, $P < 0.05$ was considered statistically significant.

Results

The result of this survey on 4163 suicide cases in the covered population during 2012-2018 showed that 205 (4.9%) cases resulted in death and 3958 (95.1%) cases survived (Table 1). Additionally, in all the studied years, the rate of suicide deaths varied between 1.4% in 2012 and 10.2% in 2017.

To investigate the trend of suicide in the studied years, based on the MAPE=6.9 index, the best model according to data, Grade 2 model was chosen. Figure 1 showed that the suicide trend in the study population was declining over 7 years. This declining trend was statistically significant ($P \geq 0.01$ and $Yt = 1041.9 - 198.0t + 17.25t^2$).

The result of this survey showed that the suicide attempt rate was higher in females than in males, but the rate of suicide deaths was higher in males ($P \geq 0.001$; Table 2).

This study showed that the most common way of suicide is using drugs (2719 cases, 65.3%) and poison (752 cases, 18.1%). Moreover, electrocution was the least frequently used method (7 cases, 0.2%) (Table 2).
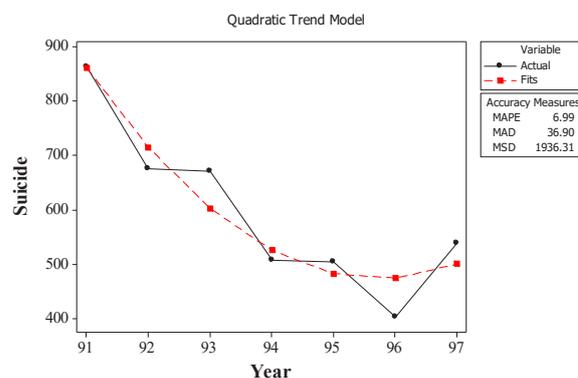
This survey showed that there is a statistically significant relationship between drug abuse and the suicides that resulted in death. The rate of suicide that resulted in death is higher in drug abuse rather than other methods ($P \geq 0.001$; Table 2).

Based on the data related to residence, the suicide rate was higher in cities (2158 cases, 51.8%) than in villages (1874 cases, 45.0%) (Table 2). There was not a statistically significant trend, in some years the suicide rate in villages was higher than cities and in others, the opposite was true. On other hand, the results showed that the rate of suicide attempts and suicide deaths was higher in cities ($P \geq 0.001$; Table 2).

The results of this survey showed that in all the years, except for 2016, the suicide rate was higher in married people than in single people. Totally, 2161 (51.9%) of cases were married (Table 2). There was no statistically significant relationship between marital status and suicide.

In all the studied years, 2063 cases (49.6%) were reported to be in the 15-24 age group, indicating that the suicide rate in the 15-24 age group was significantly higher compared to the other age groups ($P \geq 0.0001$; Table 2).

In this study, the suicide rate was higher in people with middle school education than the others (1114 cases,

Table 1. Frequency of Suicide Attempts and Suicide Deaths in the Studied Population from 2012 to 2018

	No. (%)
Suicide status	
Suicide attempts	3958 (95.1%)
Suicides deaths	205 (4.9%)
Total	4163

Figure 1. The Trend of Suicide in the Studied Population from 2012 to 2018.

26.8%), and the illiterate cases had the lowest suicide rate (317 cases, 7.6%). The suicide rate in cases with middle school education was significantly higher compared to others ($P \geq 0.001$; Table 2).

Discussion

The present study is the first study conducted to assess the suicide status in Dezful. The high incidence rate of youth suicide is of major concern in many countries and it is the focus of major public health initiatives.[27]

Today, due to the increasing importance of attention to suicide, 10th of September has been announced as World Suicide Prevention Day by the WHO to focus attention and call for global action.[20] Considering the higher incidence of suicide, it is important for all health services to be vigilant about suicidal behaviours in people.

The results of the current study showed that during 2012-2018, a total of 4163 cases of suicide have been registered at DUMS. The study of suicide trend showed that the suicide rate has been declining in the covered population during 2012-2018. This finding is in agreement with a study by Daliri et al, which shows that the suicide rate had a declining trend from 2001 to 2014 in Iran.[28] However, it is in contrast with a study by Rostami et al, which showed the suicide rate had an increasing trend in Khuzestan during 2011-2014.[11]

The suicide deaths and suicide attempt have severe psychological and spiritual consequences for the friends and families, they cause a lot of anxiety and worry related to the lost lives in them, and because suicide is a preventable problem, it is very important to study the current status of suicide and different factors related to it.[20]

In the present study, of 4163 cases of suicide, 205 cases (9.4%) resulted in death. In previous studies, it was reported that in the United States, 10% of 2000 suicide cases resulted in death in 2000.[29] This result shows that in addition to trying to harm oneself as a suicide target, there are other goals such as attracting attention and advancing desire that could also be considered as the suicide targets. Moreover, as people with a suicide history are always

Table 2. Frequency of Suicide Attempts and Suicide Deaths in the Studied Population from 2012 to 2018

Indicators		Suicide Status			P Value[a]
		Suicide Attempts	Suicide Deaths	Total	
Gender	Male	1547 (37.2%)	113 (2.7%)	1660 (39.9%)	
	Female	2411 (57.9%)	92 (2.2%)	2503 (60.1%)	≤0.001
	Total	3958 (95.1%)	205 (4.9%)	4163 (100%)	
Suicide method	Drug	2653 (62.71%)	66 (1.59%)	2719 (65.3%)	
	Toxin	718 (17.28%)	34 (0.82%)	752 (18.1%)	
	Hanging	75 (1.78%)	47 (1.12%)	122 (2.9%)	
	Electrocution	6 (0.17%)	1 (0.03%)	7 (0.2%)	
	Self-immolation	46 (1.09%)	17 (0.41%)	63 (1.5%)	-
	Jumping from height	71 (1.7%)	0 (0.0%)	71 (1.7%)	
	Firearm	32 (0.73%)	20 (0.47%)	52 (1.2%)	
	Others	357 (8.61%)	20 (0.49%)	377 (9.1%)	
	Total	3958 (95.1%)	205 (4.9%)	4163 (100%)	
Residence	City	2044 (49.07%)	114 (2.73%)	2158 (51.8%)	
	Village	1787 (42.91%)	87 (2.09%)	1874 (45.0%)	
	Non-reported	127 (3.01%)	4 (0.09%)	131 (3.1%)	≤0.001
	Total	3958 (95.1%)	305 (4.9%)	4163 (100%)	
Marital status	Single	1774 (42.65%)	77 (1.85%)	1851 (44.5%)	
	Married	2065 (49.6%)	96 (2.3%)	2161 (51.9%)	
	Divorced or widow	50 (1.21%)	29 (0.69%)	79 (1.9%)	-
	Non-reported	69 (1.63%)	3 (0.07%)	72 (1.7%)	
	Total	3958 (95.1%)	205 (4.9%)	4163 (100%)	
Age	5-14	80 (1.93%)	24 (0.57%)	104 (2.5%)	
	15-24	1983 (47.68%)	80 (1.92%)	2063 (49.6%)	
	25-34	1308 (31.43%)	49 (1.17%)	1357 (32.6%)	
	35-44	426 (10.26%)	31 (0.74%)	457 (11%)	
	45-54	122 (2.94%)	11 (0.26%)	133 (3.2%)	≤0.001
	55-64	37 (0.93%)	7 (0.17%)	44 (1.1%)	
	64 and higher	2 (0.04%)	3 (0.06%)	5 (0.1%)	
	Total	3958 (95.1%)	205 (4.9%)	4163 (100%)	
Education status	Illiterate	271 (6.5%)	46 (1.1%)	317 (7.6%)	
	Primary school	446 (10.75%)	48 (1.15%)	494 (11.9%)	
	Middle school	1084 (26.08%)	30 (0.72%)	1114 (26.8%)	
	High school	876 (21.03%)	24 (0.57%)	900 (21.6%)	≤0.001
	Diploma and higher	1013 (24.36%)	27 (0.64%)	1040 (25%)	
	Unknown	268 (6.48%)	30 (0.72%)	298 (7.2%)	
	Total	3958 (95.1%)	205 (4.9%)	4163 (100%)	

[a] χ^2 test.

considered as a high-risk group, this result can be used for planning preventive interventions for this group.

The results of this study show that the suicide rate is higher in females than in males which is in line with studies done by Rostami et al (females 60%, males 40%),[11] Bazyar et al (females 71.2%, males 28.8%), Khajeh et al (females 63.3%, males 36.7%), Moradi et al (females 53.3%, males 46.7%), Teimouri et al (females 55.7%, males 44.3%), and Mivehyan.[17-21] There may be different reasons for the higher suicide rate in females such as more social and economic limitations for them in the study population. However, in a study by Daliri et al, the suicide rate during 2001-2014 has been reported to be higher in males than in females, which is one of the few studies that report conflicting results.[28]

In this study, we found that the most common method

of suicide is drug abuse. This result is in line with the results of studies conducted by Khajeh et al (77.7%),[19] Moradi et al (50.5%),[21] Teimouri et al (88.1%),[20] Daliri et al (59.52%),[30] Esmaeilnia et al (87.5%),[31] and Memari et al (82.8%).[24] Moreover, in this study, it was found that drug abuse was more prevalent than the other ways. In Poland, it was reported that drug poisoning is the most common way of suicide.[32] It shows that people who want to commit suicide use the simplest available tool.[21] Therefore, restricted or controlled access to drugs could help prevent suicide.

As it has been noted in the other studies, the chance of committing suicide is lower in people living in villages than in people living in cities.[32,33] In this research, the suicide rate was reported to be significantly higher in cities than in villages which is in agreement with studies done by Bazyar et al (68.2% in cities, 31.8% in villages) and Moradi et al (59.8% in cities, 40.2% in villages).[18,21] On other hand, Khajeh et al reported that the suicide rate in villages is higher compared to cities (56% vs 44%).

They explained that the differences in the results is due to more accurate reporting of suicide cases by health workers in villages and also the registration of a number of cases in private hospitals in the cities that have not been included in the study.[19] The high rate of suicide in cities can be attributed to social problems, lack of sincere social relations, economic problems of urban life, and stress in the cities.[21]

In the current study, in all the years except 2016, the suicide rate was higher in married people than in single ones. Moreover, in all the studied years, the rate of suicide that resulted in death was higher in married people. The results of a study conducted by Bazyar et al was in line with the current study (55.1% married, 41.5% single).[18] However, the results of studies conducted by Esmaeilnia et al (single and married almost equal),[31] Moradi et al (single 52.3%, married 47.7%),[21] Mivehyan (single 59.4%, married 38.7%),[17] and Khajeh et al (single 57%, married 41.9%)[17] were in contrast with this study. This contrast can be attributed to differences between study populations. The high rate of suicide in married people can be due to various economic, social, and behavioral problems in the society.

In this study, the suicide rate was significantly higher in the 15-24 age group than other age groups. This result is in the same direction with the studies conducted by Teimouri et al (53.3% in 15-24 age group),[20] Morady et al (56.1% in 16-25 age group),[21] and Mivehyan (3381 cases in 15-24 age group).[17] Most of the studies and reports have indicated a higher rate of suicide in adolescents and youths.[19] As Khani citing from Schaeffer and Pffer the rate of suicide increases with age, and they added that this rate reaches its peak around 20 years of age.[29] The high number of suicides in ages under 20 is due to the fact that they do not have the necessary skills to solve the problem in acute crises.[31] Simbar et al in a review study classified the suicide risk factors into 3 categories of demographic information including age, gender, sexual orientation, race and ethnicity; environmental factors including lack of social and family support, and imprisonment, poor life skills, suicide history in the family, the Internet, and mass media; and psychological factors including diagnosed psychological disorders, adverse life events, history of childhood abuse, academic stress, using narcotics and alcohol, and cyberbullying.[34]

Limitations
In this study, we collected data from Health vice-chancellor of DUMS and all factors that have been reported were included in the study, but it seems there can be other influential factors that are important and it will be useful to analyze them in future studies.

Conclusion
In this study, most of the suicide cases were females, married persons, adolescents, middle school educated individuals, and drug abusers. It is suggested that the cultural, social, and economic problems of the families, especially the women, be considered important and the families and the vulnerable groups receive the appropriate training. The training including decision-making in critical situations, life skills such as self-consciousness, and coping with stress and problem-solving should be provided. In addition, the establishment of consulting centers for high-risk groups and ages must be considered seriously. Additionally, considering that restriction of access to suicide means (e.g., pesticides, firearms, and so on) and use of selective serotonin reuptake inhibitors reduced suicide rates in some countries, these restrictions and interventions could be helpful in the studied population.

Conflict of Interest Disclosures
None.

Ethical Approval
This study was approved by the Research Committee of Dezful University of Medical Sciences (IR.DUMS.REC.1397.048).

Authors' Contributions
FR, designed the study, drafted the manuscript. MMB, collected the data, drafted the manuscript. FS, collected the data, drafted the manuscript. MD, analyzed the data, designed the chart and table.

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