Pattern of Deliberate Self-Poisoning in Gorgan, North of Iran

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A B S T R A C T

Background: Suicide is a global public health problem. Deliberate Self-Poisoning (DSP) is one of the most common methods of suicide in many countries. This study was designed to identify the trends and characteristics of DSP in Gorgan.

Methods: The study was carried out retrospectively in 5 Azar Hospital. It included 549 patients who were hospitalized in the hospital due to DSP from March 2008 to March 2015. Data were obtained from medical records. Stata software and Pearson's chi-squared test were used for data analysis.

Results: Of 549 patients, 51% were females and 50.27% were aged 20–29 years. The majority of patients (76.68%) lived in urban areas. Poisoning occurred mostly in summer and the peak was observed in August. Most of the poisoning agents were pharmaceuticals (80.51%). Among the pharmaceuticals, benzodiazepines were involved most often. Overall, 21 patients (3.83%) died. The highest number of deaths was due to aluminum phosphide poisoning (76.19%). In addition, family quarrel was the main cause of DSP (43.17%). There were significant differences between the causes of DSP and demographics. Characteristics including gender, age groups, marital status, employment status and educational status.

Conclusion: Deliberate self-poisoning (DSP) with drugs has recently been a serious social problem, especially in the younger generation in Gorgan and there is an urgent need for a prevention plan.

▶*Implication for health policy/practice/research/medical education:* Deliberate Self-Poisoning

1. Introduction:

Suicide is defined as a life-threatening action that starts intentionally by someone who knows the outcome. Suicide is one of the main causes of death in the world. It is the 7th major cause of death in men and the 15th major cause of death in women. One million people throughout the world die due to suicide every year (1, 2). Also according to the World Health Organization, suicide is the third leading cause of death among people aged 15- 44 years. Moreover, Suicide has become an increasingly widespread form of morbidity in the developing world (3).

Some demographic factors that increase the risk of suicide are age, gender, race, psychosocial factors, work, education, economic and family status, social status, and availability of mental health services (4-6).Methods of suicide are diverse throughout the world (5, 6).The method used for suicide has also been cited as important to determining risk among particular subgroups of individuals. Firearms and poisoning are the most common methods for suicide in males and females, respectively (7). In Iran, Drug poisoning and self-immolation are two common methods of suicide (5, 6).

Deliberate Self-Poisoning (DSP) is one of the most common methods of suicide and is widely spread all over the world (8). DSP is the most common method in women and the second most common method in men attempting suicide (9). Moreover, DSP accounts for over 100,000 acute hospital admissions per year in the UK and poisoning is the commonest form of fatal self-harm in Asia, accounting for over 60% of all deaths (10, 11). The method of DSP is dependent upon the cultural-social factors of each region and also toxicants and available drugs (8). However, poisoning is defined as unfavorable complications caused by the use of drugs, chemical substances, and other materials. These unfavorable complications

are more severe in young and elderly people (12). Limited access to suicide means is one recommended strategy for suicide prevention (7). Therefore, attention to common suicide methodsin a geographic area may be helpful in regional suicide prevention programs. The aim of our study was to determine the trends and characteristics of deliberate self-poisoning in Gorgan.

2. Materials and Methods:

Study population: This was a descriptive and analytical cross-sectional study in which all cases of deliberate self-poisoning who are hospitalized in 5 Azar hospital in Gorgan, Golestan province, north of Iran, during 7 years from March 2008 to March 2015. Patients with incomplete information (17 people) and those who left the hospital against medical advice (8 people) were excluded. Diagnosis of DSP was based on psychiatrist's assessment reported in medical records.

Study variables: The data including demographic profile of patients, type of toxic agent used, time of exposure to poison, time interval between poisoning and hospitalization, duration of hospital stay, clinical manifestations of patients, treatments delivered to patients, outcome and circumstances of poisoning, previous suicide attempt and method and cause of DSP were obtained from medical records.

Data Analysis: Stata software (version 11) was used for data analysis and results are presented as frequency and percentage with charts and tables. Analysis of difference between two categorical variables was done using the Pearson's chi-squared test and P-values less than 0.05 were considered statistically significant.

Ethics: Ethics Confidentiality of patients' information was maintained when the data were obtained from the medical records. All guidelines of the Declaration of Helsinki were observed in all stages of the study.

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3. Results:

Demographic Findings: Between March 2008 and March 2015, from 195913 subjects who were hospitalized in 5 Azar hospital, 800 people were poisoned (0.4% of total individuals) and 549 people were due to Deliberate Self-Poisoning (68.62% of all poisoned patients).

A total of 549 cases of Deliberate Self-Poisoning (DSP), 269 subjects (49%) and 280 subjects (51%) were male and female. The mean was 25.25 (SD=8.80) in which the youngest and oldest were 12 and 67 years, respectively.

Regarding the gender of patients, mean age for males and females was 25.25 (SD=8.80) years and 25.21 (SD=8.81) years, respectively. So the majority of patients were women and female to male ratio was 1.04:1. According to the present study, there were no significant gender differences in the number of DSP cases (P=0.63). Furthermore, the most patients were in the age group of 20 to 29 years old (50.27%), followed by the patients in the 10 to 19 years old age group (26.59%) and the patients in the age group above 60 years were the lowest in number (0.55%). This indicates most patients are between adult ages (p<0.001). Also, 52.46% of the cases were single which shows that single persons are more susceptible to DSP (p<0.001).

Regarding the place of residence, 76.68% of the cases lived in urban areas (p<0.001) which indicates the greater availability of drugs or substances, differences in life style and etc. in cities that affect the rate of DSP. Moreover, most patients (51.55%) had high school education levels. This indicates the highest incidence of DSP occurred in moderate educated levels persons (p<0.001). Regarding occupation, most patients (26.96%) were unemployed (p<0.001) followed by housewife (22.40%) and businessman (21.31%) (Table 1). Demographic characteristics of DSP cases, is shown in Table1.

Agents of poisoning: The most common agents of DSP (p<0.001) included: drugs (80.51%), aluminum phosphide (9.65%), organophosphates (4.01%), opium (1.64%), zinc phosphide (1.46%), cleaning agents
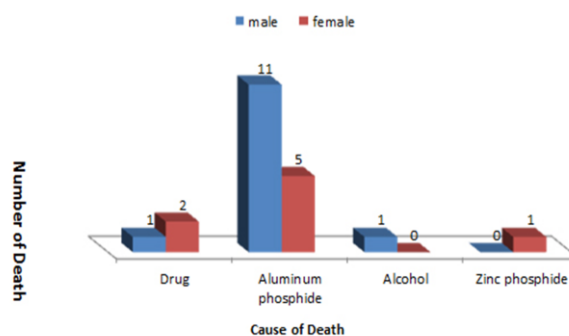

Fig. 1. Death distribution of Deliberate Self Poisoning during march 2008-march 2015, Gorgan, Iran.

(1.28%) and others (1.46%). Among these cases, one-drug poisoning accounted for 39.53% of all DSP cases (p<0.001), 34.43% of cases involved two or more drugs, and the remaining 6.56% of cases had no known drugs (Table 2 and 3).

Our findings also reveal that the most common drug involved in DSP was benzodiazepines (35.34%) and antidepressant14.03%, respectively (Table 3). We also found that in the majority of cases, the route of exposure to poison was oral (99.27%) followed by injection (0.73%) (Table 2).

Time and Trend: Admit mostly occurred between 18:00 to 24:00 in 34.43% of patients, followed by 12:00 to 18:00 in 34.24% of patients (p<0.001). In addition, most of the patients (41.71%) were hospitalized within 1-3 hours after the toxic exposure. Also, hospitalization time was between 24-72 hours in 43.36% of patients (p<0.01). Moreover, the seasonal distribution in DSP suggested a peak in summer (28.42%) and autumn (26.23%) and lower numbers in spring (24.95%) and winter (20.40%). Most cases of DSP occurred on Sunday (17.12%), followed by Wednesday (16.21%) and Tuesday (16.03%) (p=0.049). Maximum number of DSP cases was observed during the months of August (11.48%) and September (9.84%) (Table 4). Also, no significant difference was seen in the trend of DSP by season and month.

Causes and Circumstances of DSP: Nearly half (43.17%) of the DSP cases were resulted from family quarrel, in 19.85% DSP cases were due to mental disorders. In

Table 1: Demographic characteristics of Deliberate self-poisoning duringmarch2008- march 2015, Gorgan, Iran

Variable		Number of cases (n)	Percentage (%)	p value
Gender	Male	269	49	0.63
	Female	280	51	
Age group	0-9	0	0	< 0.001
	10-19	146	26.59	
	20-29	276	50.27	
	30-39	82	14.94	
	40-49	32	5.83	
	50-59	10	1.82	
	60 and above	3	0.55	
Marital status	Single	288	52.46	< 0.001
	Married	213	38.80	
	Divorced/Widowed	7	1.27	
	Unknown	41	7.47	
Employment status	Student	80	14.57	< 0.001
	Housewife	123	22.40	
	Businessman	117	21.31	
	Unemployment	148	26.96	
	Others	42	7.65	
	Unknown	39	7.10	
Educational status	Illiterate	9	1.64	< 0.001
	Primary school	35	6.38	
	Secondary school	115	20.95	
	High school	283	51.55	
	Collegiate	27	4.92	
	Unknown	80	14.57	
Residence	Urban	421	76.68	< 0.001
	Rural	128	23.32	

Table 2: Toxicological findigs , clinical manifestations and service characteristics of Deliberate self-poisoning during march2008- march 2015, Gorgan, Iran

Variable	Total 549 (%)	Females (280)	Males (269)	p value
Agents of poisoning				
Drug	442 (80.51)	244 (87.14)	198 (73.61)	
Aluminum phosphide	53 (9.65)	16 (5.71)	37 (13.75)	
Organophosphates	22 (4.01)	7 (2.5)	15 (5.58)	< 0.001
Opium	9 (1.64)	6 (2.14)	3 (1.12)	
Zinc phosphide	8 (1.46)	2 (0.71)	6 (2.23)	
Cleaning agents	7 (1.28)	5 (1.79)	2 (0.74)	
Others	8 (1.46)	0 (0)	8 (2.97)	
Site of poisoning				
Home	415 (75.59)	269 (96.07)	146 (54.28)	
Outside home	38 (6.92)	4 (1.43)	34 (12.64)	< 0.001
Unknown	96 (17.49)	7 (2.5)	89 (33.09)	
Route of exposure to poison				
Oral	545 (99.27)	279 (99.64)	266 (98.88)	< 0.001
Injection	4 (0.73)	1 (0.36)	3 (1.12)	
Time of admit to hospital				
Morning (6 am-12 pm)	67 (12.20)	25 (8.93)	42 (15.61)	
Afternoon (12 pm-6 pm)	188 (34.24)	92 (32.86)	96 (35.69)	< 0.001
Evening (6 pm-12 am)	189 (34.43)	99 (35.36)	90 (33.46)	
Night (12 am-6 am)	105 (19.13)	64 (22.86)	41 (15.24)	
History of addiction				
Yes	72 (13.11)	8 (2.86)	64 (23.80)	< 0.001
No	477 (86.89)	272 (97.14)	205 (76.20)	
Admitted to ICU				
Yes	244 (44.44)	119 (42.5)	125 (46.47)	<0.05
No	305 (55.56)	161 (57.5)	144 (53.53)	

cause of DSP			
Family quarrel	237 (43.17)	152 (54.29)	85 (31.60)	
Mental disorder	109 (19.85)	45 (16.07)	64 (23.80)	
Love and emotional problems	57 (10.38)	32 (11.43)	25 (9.30)	
Substance/drug abuse	20 (3.64)	3 (1.07)	17 (6.32)	0.000
Poverty and unemployment	18 (3.28)	1 (0.36)	17 (6.32)	
Other	30 (5.46)	16 (5.71)	14 (5.20)	
Unknown	78 (14.21)	31 (11.07)	47 (17.48)	
Level of consciousness (GCS score)				
Glasgow Coma Scale				< 0.001
GCS≤8	60 (10.93)	25 (8.93)	35 (13.01)	
GCS>8	489 (89.07)	255 (91.07)	234 (86.99)	
previous suicide attempt				
Yes	55 (10.02)	25 (8.93)	30 (11.15)	< 0.001
No	494 (89.99)	255 (91.07)	239 (88.85)	
duration of hospitalization				
< 24 h	122 (22.22)	65 (23.21)	57 (21.19)	
24-72 h	238 (43.36)	135 (48.21)	103 (38.29)	<0.01
>72 h	189 (34.43)	80 (28.58)	109 (40.52)	
Outcome				
Survival	412 (75.05)	215 (76.79)	197 (73.23)	
Self – Satisfaction	116 (21.13)	57 (20.36)	59 (21.93)	< 0.001
Death	21 (3.83)	8 (2.86)	13 (4.83)	

14.21% cases the circumstances were unknown. 22.27% DSP were due to some other causes like love and emotional problems, substance or drug abuse, poverty and unemployment and others (p<0.001) (Table 2). 75.59% of all poisonings occurred at home (p<0.001). Furthermore, of 549 individuals, 55 reported a history of a previous suicide attempt, which is a prevalence rate of 10.02% in this study.

In the current study, 13.11% patients had a positive history of addiction and 44.44% of patients were admitted to the ICU ward.

Furthermore, GCS score (level of consciousness) ≤8 were seen in the 10.93% of patients.

There were significant differences between causes of DSP and demographics characteristics including gender (p=0.000), age groups (p=0.000), marital status (p=0.000), employment status (p=0.000), educational status (p=0.099). The details of the relationship between demographic characteristics and causes of DSP are shown in Table 5.

Table 3: Characteristics of drugs used in Deliberate self-poisoning during march 2008- march 2015, Gorgan, Iran

Variable	Total	Females	Males	p value
	442 (100)	(244)	(198)	
Number of drug				
one drug	217 (49.1)	127 (52.05)	90 (45.45)	
Two or more drugs	189 (42.76)	99 (40.57)	90 (45.45)	< 0.001
Unknown	36 (8.14)	18 (7.38)	18 (9.09)	
Categories of pharmaceutical (One or more drug per case)				
Benzodiazepine	194 (35.34)	104 (37.14)	90 (33.46)	
Antidepressant	77 (14.03)	43 (15.36)	34 (12.64)	
Tramadol	72 (13.11)	22 (7.86)	50 (18.59)	
NSAIDs	48 (8.74)	31 (11.07)	17 (6.32)	< 0.001
Narcotics	45 (8.20)	20 (7.14)	25 (9.29)	
Cardiovascular	41 (7.47)	29 (10.36)	12 (4.46)	
Anti-seizure	35 (6.38)	18 (16.79)	17 (6.32)	
Antipsychotic	29 (5.28)	13 (4.64)	16 (5.95)	
Antibiotics	27 (4.92)	19 (6.79)	8 (2.97)	
Others	128 (23.32)	79 (28.21)	49 (18.22)	
Unknown	36 (6.56)	17 (6.07)	19 (7.06)	

Clinical findings and outcome: The most frequent clinical symptoms of poisoning involved neurological (80.87%) and gastrointestinal (30.05%) complications. According to the present study most patients survived (75.05%) and 21 (3.83%) patients died (p<0.001) (Table2). On the other hand, altogether 21 patients (3.83% of all DSP cases) died at the hospital due to DSP. So, the overall case fatality rate (CFR) was 3.83%. Of those who died, 61.90% were males (p<0.001) and the majority of patients (38.1%) were in the 20-29 year age-group (p<0.001). Moreover, death of DSP were significantly higher in married patients (5.16%) in comparison with non-married (2.43%) (p=0.029). Also, nearly half (47.61%) of the death cases occurred among patients who lived in rural areas (p=0.009). Moreover, the most common agent for death cases was aluminum phosphide (p=0.001), responsible for 76.19% of deaths, followed by drug (14.29%), zinc phosphide and alcohol (each one 4.76%) (Fig.1).

Table 4: Distribution of Deliberate self-poisoning by season, month and day of week during march 2008- march 2015, Gorgan, Iran

Variable	Number of cases (N)	Percentage (%)	p value
Season			
Spring	137	24.95	
Summer	156	28.42	0.057
Autumn	144	26.23	
Winter	112	20.40	
Month			
Jan	49	8.93	
Feb	47	8.56	
Mar	34	6.19	
Apr	38	6.92	
May	40	7.29	
Jun	53	9.66	0.073
Jul	39	7.10	
Aug	63	11.48	
Sep	54	9.84	
Oct	41	7.47	
Nov	38	6.92	
Dec	53	9.66	
Day of the week			
Saturday	77	14.03	
Sunday	94	17.12	
Monday	61	11.11	
Tuesday	88	16.03	0.049
Wednesday	89	16.21	
Thursday	63	11.48	
Friday	77	14.03	

Table 5: Relationship between demographic characteristics andcauses of Deliberate self-poisoning during march 2008- march 2015, Gorgan, Iran

Variable	Cause of Deliberate self-poisoning							Statistical test*
	Family quarrel	Mental disorder	Love and emotional problems	Substance or drug abuse	Poverty and unemployment	Other	Unknown	
Gender								χ2 =
Male	85(35.9)	64(58.7)	25(43.9)	17(85)	17(94.4)	14(46.7)	47(60.3)	48.47
Female	152(64.1)	45(41.3)	32(56.1)	3(15)	1(5.6)	16(53.3)	31(39.7)	P =
Total	237(100)	109(100)	57(100)	20(100)	18(100)	30(100)	78(100)	0.000
Age group								
0-9	0	0	0	0	0	0	0	
10-19	61(25.7)	16(14.7)	32(56.1)	5(25)	4(22.2)	10(33.3)	18(23.1)	χ2 =
20-29	119(50.2)	61(56)	22(38.6)	11(55)	8(44.4)	11(36.7)	44(56.4)	40.43
30-39	37(15.6)	19(17.4)	2(3.5)	4(20)	4(22.2)	6(20)	10(12.8)	
40-49	14(5.9)	11(10.1)	1(1.8)	0	1(5.6)	2(6.7)	3(3.8)	p =
50-59	5(2.1)	1(0.92)	0	0	0	1(3.3)	3(3.8)	0.000
60 and above	1(0.42)	1(0.92)	0	0	1(5.6)	0	0	
Total	237(100)	109(100)	57(100)	20(100)	18(100)	30(100)	78(100)	
Marital status								
Single	107(45.2)	54(49.5)	48(84.2)	11(55)	6(33.3)	17(56.7)	45(57.7)	
Married	115(48.6)	43(39.4)	3(5.3)	7(35)	12(66.7)	11(36.7)	22(28.2)	χ2 =
Divorced/Wid	2(0.84)	2(1.8)	0	0	0	2(6.7)	1(1.3)	48.90
ow	13(5.5)	10(9.2)	6(10.5)	2(10)	0	0	10(12.8)	P =
Unknown	237(100)	109(100)	57(100)	20(100)	18(100)	30(100)	78(100)	0.000
Total								
Employment status								χ2 = 67.90
Student	37(15.6)	8(7.3)	19(33.3)	1(5)	0	5(16.7)	10(12.8)	P =
Housewife	78(32.9)	22(20.2)	2(3.5)	1(5)	1(5.6)	6(20)	13(16.7)	0.000
Businessman	44(18.6)	26(23.9)	5(8.8)	9(45)	4(22.2)	6(20)	23(29.5)	

Unemployme	48(20.30)	35(32.1)	20(35.1)	7(35)	9(50)	9(30)	20(25.6)	
nt	17(7.2)	12(11)	5(8.8)	0	2(11.1)	3(10)	3(3.8)	
Others	13(5.5)	6(5.5)	6(10.5)	2(10)	2(11.1)	1(3.3)	9(11.5)	
Unknown	237(100)	109(100)	57(100)	20(100)	18(100)	30(100)	78(100)	
Total								
Educational status								
Illiterate	5(2.1)	1(0.92)	0	0	2(11.1)	0	1(1.3)	
Primary	14(5.9)	12(11)	0	0	1(5.6)	4(13.3)	4(5.1)	
school	54(22.8)	24(22)	14(24.6)	2(10)	2(11.1)	4(13.3)	15(19.2)	χ^2 = 22.33
Secondary	122(51.5)	50(45.9)	36(63.2)	14(70)	11(61.1)	18(60)	32(41)	P = 0.099
school	14(5.9)	6(5.5)	3(5.3)	0	0	1(3.3)	3(3.8)	
High school	28(11.8)	16(14.7)	4(7)	4(20)	2(11.1)	3(10)	23(29.5)	
Collegiate	237(100)	109(100)	57(100)	20(100)	18(100)	30(100)	78(100)	
Unknown								
Total								

4. Discussion:

In this study, DSP among women were higher than men in common with studies conducted in Mashhad (13), west of Iran (8), India (14), Malaysia (15), Turkey (16), and Norway (17), and that can be attributed to the fact that women are more vulnerable to attempt suicide and self-harm than males.

The majority of patients in this study were aged 20–29 years, similar to studies from west of Iran (8). During the study period, no poisoning mortalities were recorded below 17 years of age. This shows that young adults are more vulnerable to this health problem which might be due to emotional and social disharmony.

Also, the age of DSP in Gorgan is lower than other places like Sir Lanka (18), India (14) and Norway (17). Similarly, maximum number of victims were in their 2rd decade (20-29 years old) of life.

The rate of DSP in high school students were more than other grades. This finding is consistent with study conducted in the west of Iran (8). This can be due to factors such as conflict with other family members or

friends and emotional problems of this age group (19). Therefore, preventive interventions must be initiated from younger ages, especially since school. These interventions should include training in life skills (problem-solving ability, decision making ability, the ability to cope with stress and excitement, and so forth), so that the person would be prepared to face daily life problems. Other preventive measures can be training in the management of peer group relationships which is even more effective than the education of the parents. Parents also have a prominent role in choosing the right and approved friends and teaching appropriate behavior (5, 10, 20, 21).

In this study, most cases were single. This finding is consistent with previous studies done in Iran (8) and another countries (22, 23), the reason of which is unknown but it appears to be the unemployment, quarrel with parents and emotional problems.

DSP attempts in urban areas in present study were higher than in rural areas, which may be due to the greater stress imposed by urban lifestyles and treatment facilities. Moreover,

rural areas are far from hospitals. So, it is expected lowest intoxication numbers for rural areas. As for occupation, the highest rate of DSP was among unemployed persons. Of course, unemployment is linked to other social factors such as low literacy and financial problems. In New Zealand, unemployed men are 2 or 3 times at greater risk of attempting suicide than employed men (24). Our results also highlighted that 8.2% of cases, all men, had committed DSP as a result of unemployment plus addiction. Clearly, more studies are needed to explore the complex interaction between suicide and unemployment. Moreover, since addiction should have an interaction with both unemployment and suicide, further studies should also explore the complex interaction of co-occurring between suicide, unemployment and addiction (25).

In our study, the majority of DSP cases were admitted during summer, but in another studies such as in the west of Iran (8), India (14) and Turkey (26) most of DSP were attempted in spring. Moreover, a study in Finland found a strong seasonal effect on suicide occurrence, with the risk of suicide being greatest in spring (27).

In contrast, some studies in Iran showed that the highest suicide rate in the Islamic Republic of Iran was in summer (28). Furthermore, Our finding is consistent with the Durkheim hypothesis, He discovered that a disproportionate number of suicides occurred in summer, leading him to hypothesis that temperature might have something to do with suicide (21). Basic pattern and trend of poisoning shows a regional variation. The use of certain poisons to commit suicide depends on the availability and accessibility of the agent to an individual (14). So, the substances involved in most of the poisonings in our study were pharmaceutical agents, which is in agreement with reports from other regions in the west of Iran (8), South-East Melbourne (23) and UK (18, 22), whereas in the studies reported from some Asian countries (29) organophosphates were the most common cause of poisoning. This difference in the type of substances can be due to availability of substances and cultural differences (6).

Among drug-related poisonings, in some reports, analgesics were found to be the most frequently ingested agents (30-32) whereas in other reports psychotropic drugs were declared as the most common poisoning agents (33-35).

In our study, benzodiazepines were the most common cause of drug poisoning, which may be due to the ease of use and accessibility of drugs.

Our findings have shown that chemical poisoning exposures were associated with increased mortality, while drug overdoses were associated with increased morbidity.

Aluminum phosphide was found to be responsible for maximum mortalities in males and females.Mortality due to poisoning depends on various factors including age, toxicity of the poison, amount consumed,health status of the patient, early hospitalization and proper management (36). Our results highlighted that 237 (43.17%) cases, had committed DSP as a result of family quarrel. A family quarrel is a common term which might encompass several scenarios including quarrel with the spouse, quarrel with parents and quarrel with another members in the family. This study indicates that there is a higher rate of DSP attempts among patients with family quarrel. Mental disorder is the second most common risk factor for DSP. Some studies have placed emphasis on background disorders, particularly psychological disease, as an important risk factor for self-harm and DSP; a finding that appears to be more significant in successful suicides (9, 37).

According to WHO, instigating mental health services after a person has attempted suicide is effective in reducing the risk of further attempts (38). Also, in previous studies half of all people who die by suicide may have major depressive disorder (20, 36, 39, 40).

In this study, data were not directly collected by the researchers and were collected retrospectively with questionnaires, which may cause bias in data collection.

5. Conclusion:

Based on our results, at risk patients are summarized as those suffering from family quarrel, mental and emotional disorders, previous suicidal attempts and addiction. Moreover, present study show that DSP is more in adult women, single people, medium educational level, unemployed persons and urban dwellers. Given the high rate of DSP, it is necessary to identify the risk factors, to prevent to the extent possible. In general, it appears that the preventive measures should include life skills training, readily available psychiatric services, and training programs for general practitioners who are at the forefront of detection and treatment of mental disorders, restricting the ways of suicide in high-risk groupsand providing readily available counseling services.

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7. References:

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