

ORIGINAL ARTICLE

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Evaluation of suicidal cases: A retrospective 10 years autopsy study**^{ID}Turgay Bork¹, ^{ID}Mehmet Tokdemir², ^{ID}Abdurrahim Turkoglu¹, ^{ID}Muhammet Batbas³**¹Firat University, Faculty of Medicine, Department of Forensic Medicine, Elazig, Turkey²Katip Celebi University, Faculty of Medicine, Department of Forensic Medicine, Izmir, Turkey³The Council of Forensic Medicine, Department of Forensic Medicine, Elazig, Turkey

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**Abstract**

Suicide is a complex process that starts with suicidal thoughts and moves on to planning of suicide and finally suicidal activity. In the present study, we aimed to evaluate the sociodemographic and clinical characteristics of suicide cases and to discuss it in the light of literature. In the present study, 356 autopsied suicide cases were retrospectively reviewed. Of a total of 2686 deaths 356 (13.25%) were reported as suicide. The data were obtained from hospital records and files of judicial investigations. Of these cases, 242 (67.9%) were males, the mean age was 36±18.65 years. 132 cases (37.1%) were married. Hanging ranked first with 180 cases (50.6%) among suicide methods, the 15 to 24 years age group ranked first with 108 cases (30.3%). The most common cause of predisposing factors was depression with 107 cases (30.1%). 288 cases (80.9%) occurred in the city centers. The most suicides occurred at home with 157 cases (44.1%). When the suicide cases were evaluated by occupation, 65 (18.3%) were unemployed. Considering the fact that suicide is an important public health concern affecting particularly individuals in the 15 to 34 years age group which is defined as the productive age group, psychological support must be provided to these individuals at the workplaces and dedicated health centers to be established for this purpose.

Keywords: Forensic medicine, suicide, autopsy**Introduction**

Suicides are important public health problems worldwide [1]. Suicide affects all individuals in all ages, races and social classes and it is a more common cause of death in adults and adolescents with significant economic, cultural, public and psychological consequences [2]. The concept of suicide continues to be an unresolved problem although it is as old as humanity [3]. The World Health Organization reports that more than 800,000 individuals are lost annually due to suicide, and more than this number of individuals attempt suicide [4].

There are many risk factors for suicide attempt including psychological problems, chronic diseases, failure in emotional relations and work life, familial and financial problems, hopelessness, lack of self-confidence, socio-cultural conflicts, low education, personality traits, loneliness [5-6]. The studies report that suicide rates vary with age and there is an increase

in suicide rates during transition from childhood to adolescence and adulthood due to increased prevalence of psychopathological conditions with age and increasing independence from parents [7].

The aim of the present study was to determine sociodemographic and certain clinical characteristics of deaths by suicide, which continues to be an important public problem in the province of Elazig.

Materials and Methods

This retrospective study was approved by the Non-Interventional Trials Ethics Committee of Firat University, Faculty of Medicine (decision dated 18/01/2018; ethics committee number, 02-03). Among 2686 cases who underwent postmortem examination and autopsy in the province of Elazig between January 2005 and December 2015, 356 (13.25%) reported as suicide in judicial investigation were retrospectively reviewed with respect to sex, age, marital status, occupation, suicide method, materials used, scene, predisposing cause, and distribution to months-seasons and years. Statistical analysis was performed using the Statistical Package for Social Science (SPSS) version 23.0 software.

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Results

Of 356 suicide cases, 242 (67.9%) were males, 114 (32.1%) were females, minimum age was 7 and maximum age was 86 years, and the mean age was 36 ± 18.65 years. When the cases were evaluated according to age range, the 15 to 24 years age group ranked first with 108 cases (30.3%) (Figure 1).

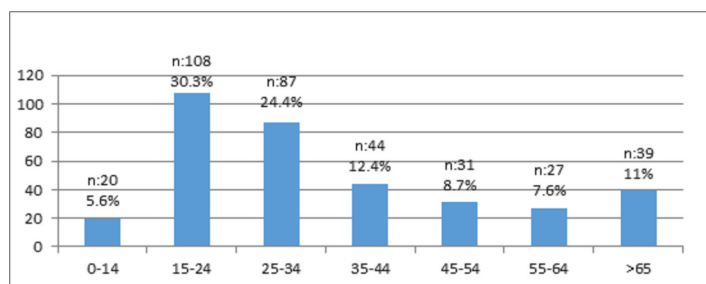


Figure 1. Suicide frequency by age (n, number of cases; %, percentage of cases)

The most common cause of predisposing factors was depression with 107 cases (30.1%). The second most common cause was family problems with 44 cases (12.4%). Eighteen cases (5.1%) had concerns related to their illnesses, 16 (4.5%) had loneliness, 16 (4.5%) had financial problems, 7 (2.0%) had work problems, 7 (2.0%) were on medication due to schizophrenia, and 87 cases (24.4%) did not have a detectable cause.

When the predisposing causes were examined according to age groups, 48 of 108 cases (44.4%) in the 15 to 24 years age group had depression, 8 of 31 cases (25.8%) in the 45 to 54 years age group had family problems, and 8 of 39 cases (20.5%) in the 65 years and above age group had loneliness as the most common predisposing cause.

When distribution of the cases according to the areas of settlement is evaluated, 288 cases (80.9%) occurred in the city centers and 68 cases (19.1%) occurred in rural areas.

When the cases were evaluated according to the scene of incident, most suicides occurred at home with 157 cases (44.1%), and this was followed by security center (police station, military area) with 27 cases (7.6%) (Figure 2).

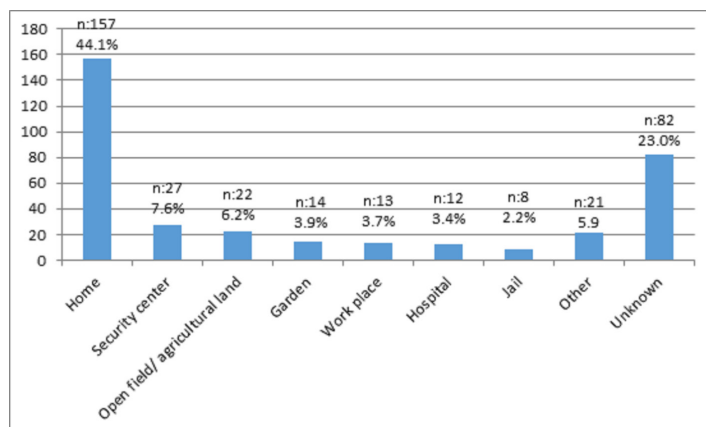


Figure 2. Frequency of suicide by the location of incident (n, number of cases; %, percentage of cases)

When the suicide cases were evaluated by occupation, 65 (18.3%) were unemployed, 49 (13.8%) were students, 39 (11.0%)

were housewives, 32 (9%) were safety officers (police, soldiers or guardians), 26 (7.3%) were workers, 23 (6.5%) were self-employed, 17 (4.8%) were farmers, 12 (3.4%) were retired, 8 (2.2%) were prisoners, and occupation was not specified in 77 (21.6%) cases.

When the method of suicide used by the cases were evaluated, hanging was the most common method used by 180 cases (50.6%), and this was followed by firearm injuries in 122 cases (34.3%), jumping from a height in 32 (9.0%) cases, and intoxication in 14 cases (3.9%). Two cases (0.6%) had used more than one method (Figure 3).

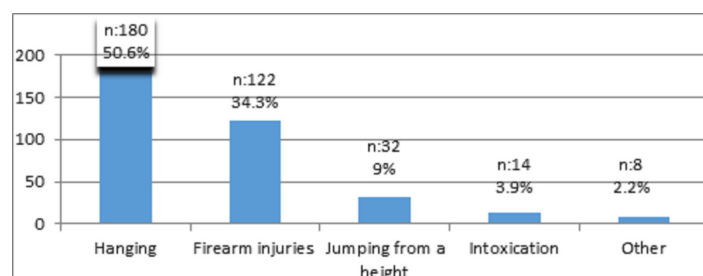


Figure 3. Suicide rates by the employed suicide method (n, number of cases; %, percentage of cases)

When suicide methods by sex are evaluated, hanging, firearm injuries, jumping from a height, and intoxication were the most commonly employed methods by both sexes. With respect to their proportions in both sexes, firearm injuries were more commonly employed by males and intoxication was employed by females (Figure 4).

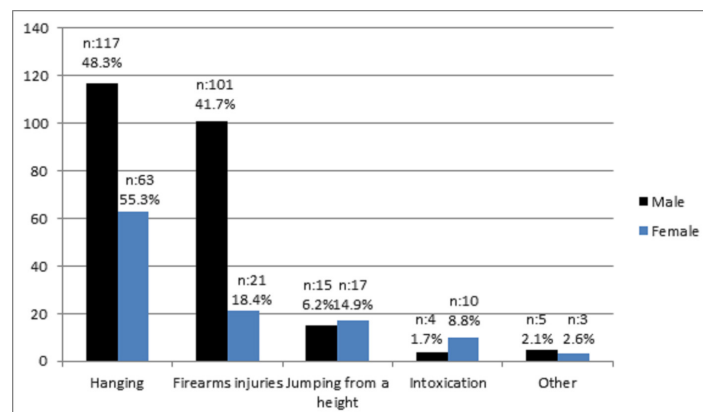


Figure 4. Suicide methods employed by sex (n, number of cases; %, percentage of cases)

The chi-square goodness-of-fit test for male and female suicide cases was as follows: χ^2 : 29.668 (SD=4), $p < 0.001$. Accordingly, comparison of female and male suiciders by the methods employed showed statistically significant differences.

When the methods employed were evaluated according to age groups, firearm injuries were the most commonly employed method in the 15 to 24 years age group while hanging is the most commonly used method in other age groups (Table 1).

When the occupation was evaluated according to the methods employed, hanging ranked first in all occupations, whereas firearm injuries ranked first in safety officers. In housewives, hanging was the most frequently employed method (53.8%) and it was followed

by jumping from a height (25.6%), intoxication (12.8%), firearm injuries (7.7%), while all prisoners employed hanging (100%).

When suicide methods were evaluated according to the location,

hanging, firearm injuries, jumping from a height, and intoxication were respectively the most commonly employed methods in the two groups.

Table 1. Suicide methods employed in the age groups

	Hanging	Firearm injuries	Jumping from a height	Intoxication	Other	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
0-14	16 (80)	4 (20)	0 (0)	0 (0)	0 (0)	20 (100)
15-24	38 (35.2)	62 (57.4)	6 (5.6)	1 (0.9)	1 (0.9)	108 (100)
25-34	46 (52.9)	28 (32.2)	6 (6.9)	4 (4.6)	3 (3.3)	87 (100)
35-44	22 (50)	14 (31.8)	4 (9.1)	4 (9.1)	0 (0)	44 (100)
45-54	18 (58.1)	5 (16.1)	4 (12.9)	1 (3.2)	3 (9.7)	31 (100)
55-64	12 (44.4)	7 (25.9)	4 (14.8)	3 (11.1)	1 (3.7)	27 (100)
>65	28 (71.8)	2 (5.1)	8 (20.5)	1 (2.6)	0 (0)	39 (100)
Total	180 (50.6)	122 (34.3)	32 (9.0)	14 (3.9)	8 (2.3)	356 (100)

Among 122 cases that committed suicide with a firearm injuries, head was the most common injury site 83 cases (71.3%), followed by chest in 25 cases (20.5%) and abdomen with 10 cases (8.2%). Right temporal area was the most common entrance site in firearm injuries to the head and this was followed by shots under the chin.

When evaluated according to marital status, 132 of 356 cases (37.1%) were married, 153 cases (43%) were single, and 8 cases (2.2%) were divorced. Marital status was not specified in 63 cases (17.7%).

When monthly distribution of deaths by suicide were evaluated, the month October ranked first with 42 cases (11.7%), and it was followed by August with 38 cases (10.7%) and May with 37 cases (10.4%). The lowest number of cases occurred in November with 18 cases (5.1%) and December with 21 cases (5.9%). When seasonal distribution was evaluated, most suicide cases occurred in summer with 100 cases (28.1%) and it was followed by spring with 93 cases (26.1%) and autumn with 87 cases (24.5%). The lowest number of cases occurred in winter with 76 cases (21.3%) (Figure 5).

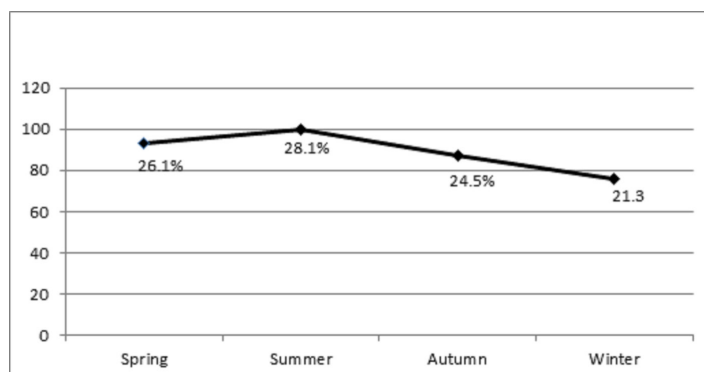


Figure 5. Number and percentage of cases by seasons (% , percentage of cases)

Discussion

Suicide is one of the leading causes of death worldwide. Suicide is among the leading ten causes of death in individuals at all ages in most countries, and it is the second leading cause of

death after accidents in youngsters aged 15 to 29 years in Europe [8]. According to the data of the World Health Organization, approximately 804,000 deaths by suicide occurred in 2012, which makes a crude suicide rate of 11.4 cases per 100,000 population [9]. Crude suicide rate per 100,000 population was reported to be 33.5 cases in Lithuania, 31 cases in South Korea, 25.4 cases in Hungary, 23.8 cases in Japan, 13.0 cases in Germany, 12 cases in the US, 11.0 cases in the Netherlands, and 9.7 cases in Australia [10, 11]. Suicide rate is 0.3 in Saudi Arabia, 1.6 in Egypt, 1.1 in Libya, 0.9 in Lebanon, 2.4 in Tunisia, and 2.6 in Malaysia [4]. When yearly distribution of the cases was evaluated, average number of suicide was 32.4 and crude suicide rate was 5.88 per 100,000. This suicide rate is below the world's average. Suicide rate is lower in most Islamic countries [12]. Religious believes protect against suicide due to prohibition of this act.

In many areas of the world, suicide rates in males are higher than females in all age groups. Although suicide attempts are more common in females than in males, rate of completed suicide is higher in males than in females [13]. The examination of deaths by suicide in an 11-year period in our province showed that male-to-female ratio was 2.12. In contrast to alcohol or illicit drug use and aggressive behavior in males, despite females being more prone to psychiatric disorders such as depression, somatization or conversion disorder, females' struggle to cope with these disorders, being less affected by economic problems than males, attaching more importance to relationship and responsibilities than males, easily seeking help and support from counselors which males feel as a weakness, and taking into account more parameters while making decisions are factors protecting females from suicide [14].

Although hanging is the most commonly used method in suicide cases that resulted in death, the method preferred varies depending on sex, country, marital status, ethnic and socio-economic status, and cultural characteristics of the community [15]. Firearm injuries was the most commonly employed method by males, (55.8%) whereas intoxication was the most commonly employed method in females (40.3%) in the United States [10]. Although hanging and intoxication were the most commonly employed methods in India, self-immolation (18.3%) and suicide on the railway (17%) are also

commonly used methods [3]. According to the data of Turkstat in 2011, hanging (52%), firearm injuries (26%), jumping from a height (10%) and intoxication (5.3%) were the most common methods employed by males and females in respective order [16]. Elazig province is similar to TURKSTAT data in terms of preferred methods. Males employed methods involving more violence such as hanging, firearm injuries and jumping from a height, whereas females tend to choose less violent methods as intoxication [17]. Significant difference between suicide methods employed by males and females in the present study was thought to be caused by higher rate of intoxication as a suicide method in females.

The rate of suicide in the US was 9.9 per 100,000 population in the 15 to 24 years age group and 15.6 cases in >65 years age group [18]. The rate of suicide in Europe was 14 per 100,000 population in the 15 to 24 years age group and 23.25 cases in >85 years age group [19]. The finding that young and adult age group comprised the majority of suiciders in the present study is consistent with other data reported in Turkey. We consider that religious believes, social customs, strong family, and social relations and socio-cultural structure may have favorable effect on the elderly, thereby, resulting in lower suicide rates among elderly as in our country. However, according to the data of Turkstat in 2015, the rate of deaths by suicide in the 15 to 24 years age group was 23.29% among all age groups, and this rate was 11.7% in >65 years age group [16]. We think increased rate of suicide among elderly in our country is caused by gradual weakening in social relations, individualization, changes in the life style, and isolation of elderly from other family members and from the society.

With respect to predisposing causes, financial problems followed by mismatched marriage were reported as the most common causes in India, whereas chronic diseases and economic problems were reported as the most common causes in the US and Japan [4]. Depression was the most common predisposing factor (30.1%) in the present study and it was followed by family problems as the most common second cause (12.4%). These results are owed to our taking care to do psychological autopsy and detailed history taking from the family members during postmortem examination and judicial investigation.

Several studies have suggested a relationship between seasonal variation and the risk of suicide [20]. A study conducted in the US reported highest suicide rates in summer (26%) and the lowest rates in autumn (23.8%) [21]. In the present study, highest suicide rate was observed in summer (28.1%) and the lowest suicide was observed in winter (21.3%).

All deaths, regardless of the cause of death, requiring judicial review should undergo complete and duly performed autopsy particularly seemingly suicide cases that could be possibly confused with accidents and murder. Therefore, specialist physicians in forensic medicine must participate in the autopsy of suicide cases, and autopsy must be performed in detail in light of scene investigation.

Considering high risk of individuals in the 15 to 34 years age group, psychological support must be provided and social support programs must be organized for these high-risk individuals at the workplaces and dedicated health centers must be established for this purpose to prevent suicides attempts.

In conclusion, it must be taken into account that individuals with previous history of failed suicide attempt have higher risk of attempting suicide, and those with a risk of suicide should be placed on psychiatric followed-up and therapy. Based on our study results, we believe that individuals carrying risk factors of suicide must be provided public support to reduce suicide attempts and positive relations must be established across all family members by strengthening social infrastructure at the family level.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval

This retrospective study was approved by the Non-Interventional Trials Ethics Committee of Firat University, Faculty of Medicine (decision dated 18/01/2018; ethics committee number; 02-03).

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