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## The characteristics of suicidal cases regarding the gender\*

**Aim:** We studied the patterns of suicide in forensic autopsies performed in Bursa province of Turkey to determine gender differences, incidence of suicide, subgroups of the population most vulnerable to such deaths, and suicide methods used.

**Materials and methods:** Nine hundred fifty-five death cases due to suicide underwent forensic autopsy between 1996 and 2005 in Bursa were included into the study. All of the cases were analyzed in terms of age, gender, and method of suicide, time of year, and alcohol use. Results were subjected to discriminant analyses using SPSS 11.0.

**Results:** There were 955 cases, with 682 males (12-95 years; mean, 41.2 years) and 273 females (10-101 years; mean, 33.1 years). For both genders, the most common method was hanging, accounted for 51.6% of the cases. Firearm injuries were more frequent in males than in females while insecticide poisoning, falling from height, and drug poisoning were more commonly used methods in females compared to males ( $P < 0.001$ ), following hanging.

**Conclusion:** In our study there was a significant difference between men and women in terms of suicide age and suicide method. More research studies are needed on gender differences in suicidal behavior to develop prevention strategies.

**Key words:** Suicide, autopsy, gender, hanging, firearm injuries

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### İntihar olgularının cinsiyete göre özellikleri

**Amaç:** Çalışmamızda Türkiye'de Bursa İli'nde otopsi yapılan intihar olgularının insidansını, cinsiyet farklılıklarını, hangi grupların intihara daha yatkın olduklarını, ve kullanılan intihar yöntemlerini ortaya koymayı amaçladık.

**Yöntem ve gereç:** Bursa İli'nde 1996-2005 yılları arasında adli otopsi yapılan 955 intihar olgusu çalışmaya dahil edildi. İntihar olguları yaş, cinsiyet, intihar metodu, mevsim ve alkol kullanımını yönünden değerlendirildi. Veriler SPSS 11 paket programı kullanılarak analiz edildi.

**Bulgular:** 955 olgunun 682'si erkek, 273'ü kadındı. Erkeklerde yaş ortalaması 41.2 (min:12-max:95), kadınlarda yaş ortalaması 33.1 (min:10-max:101) idi. Her iki cins için en fazla kullanılan intihar yöntemi (% 51,6) ası idi. Her iki cinsten en sık kullanılan yöntem olan asının ardından, ateşli silah yaralanması erkeklerde daha sık kullanılan bir yöntem iken, insektisit zehirlenmesi, yüksekten düşme ve ilaç zehirlenmesi kadınlarda daha sık kullanılan intihar yöntemleri idi ( $P < 0,001$ )

**Sonuç:** Çalışmamızda intihar yöntemi ve intihar yaşı açısından cinsiyetler arasında anlamlı bir fark bulundu. İntiharın önlenmesine yönelik stratejiler geliştirilmesi açısından intiharlarda cinsiyet farklılıklarını ele alan daha çok araştırma yapılması gerekliliği olduğu sonucuna varıldı.

**Anahtar sözcükler:** İntihar, otopsi, cinsiyet, ası, ateşli silah yaralanması

### Introduction

Suicide is an important public health problem and one of the major causes of death worldwide. Incidence of suicide and the methods used vary from country to country due to the variations in cultural, religious and social background. In

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Turkey not many studies have been performed regarding suicide epidemiology (1). Suicide rates have been rising by 60% worldwide during the last 45 years (2). Although suicide is not very common, it is the third most important reason shortens expected life-time, following coronary heart disease, and cancer among young people (3).

Various studies in epidemiology of suicide in Turkey are needed since it varies from country to country and from region to region.

We conducted this study on the patterns of suicide in forensic autopsies performed in Bursa from 1996 to 2005 to determine gender differences, incidence of suicide, subgroups of the population most vulnerable to such deaths, and suicide methods used.

**Materials and methods**

Out of 5909 deaths autopsied in Bursa, Turkey, between 1996 and 2005, 955 (15.9%) were determined as suicide by the district attorney based on the findings from crime scene investigations and all of these deaths were included in this study. All of the cases were analyzed in terms of age, gender, method of suicide, time of year, and alcohol use. Statistical analyses were performed using SPSS 11.0 for Windows. Comparison of the means was tested by one-way analysis of variance. To analyze the relationship between variables, the Pearson Chi-squared test was used.  $P < 0.05$  was considered significant.

**Results**

Nine hundred and fifty five cases received a verdict of suicide. Of these, 682 (71.4%) were male, 273

(28.6%) were female. Age range of the cases was between 10 and 101, with a mean of 38.9. For men, age range was 12-95, with a mean of 41.2, and for females 10-101 with a mean of 33.1. The mean age of females was found to be significantly lower ( $P < 0.001$ ).

There was no significant difference between male cases and female cases in regard to the distribution of the cases by years ( $P = 0.174$ ). The distribution by age was as follows: The age group was 10-19 in 121 cases (12.7%), 20-29 in 245 cases (25.7%), 30-39 in 176 cases (18.4%), 40-49 in 164 cases (17.2%), 50-59 in 106 cases (11.1%), 60-69 in 76 cases (8%), 70-79 in 50 cases (5.2%) while 17 (1.8%) cases were 80 years or older (Table 1).

A significant difference was also found between genders in terms of age. The rate of suicide was 23.1% in females aged 10-19 while this rate was 8.5% in males in the same age group. In 60-69 age groups, the rate of suicide was 9.2% in males and 4.8% in females ( $P < 0.001$ ) (Table 1).

The incidence of suicides by years was significantly different. It was obvious that the incidence of suicide has been increasing (Figure 1).

In our study, seasonal variation in suicides was also examined. Two hundred and four cases (21.4%) occurred in winter, 254 cases (26.6%) in spring, 265 cases (27.7%) in summer, and 232 (24.3%) in autumn. There was no significant seasonal difference between genders. No difference between age groups was observed in terms of seasonal effect. Table 2 illustrates the distribution of cases by gender and season. ( $\chi^2 = 2.55, P = 0.466$ ) (Table 2).

When we examined the frequency of suicide methods, hanging was the leading method with 51.6%

Table 1. Age and gender distribution of cases.

Gender	Age groups								Total
	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-	
Male	58 (8.5%)	157 (23.0%)	129 (18.9%)	141 (20.7%)	81 (11.9%)	63 (9.2%)	39 (5.7%)	14 (2.1%)	682 (100%)
Female	63 (23.1%)	88 (32.2%)	47 (17.2%)	23 (8.4%)	25 (9.2%)	13 (4.8%)	11 (4.0%)	3 (1.1%)	273 (100%)
Total	121 (12.7%)	245 (25.7%)	176 (18.4%)	164 (17.2%)	106 (11.1%)	76 (8.0%)	50 (5.2%)	17 (1.8%)	955 (100%)

( $\chi^2=64.73, P < 0.001$ )

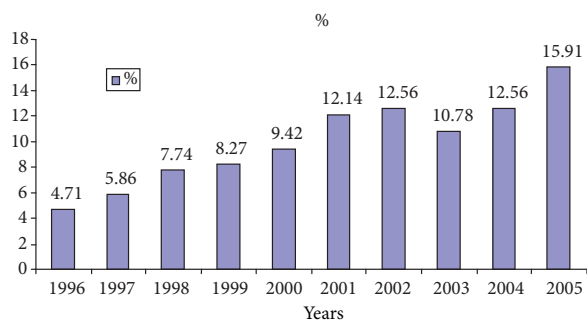


Figure 1. Distribution of cases by years.

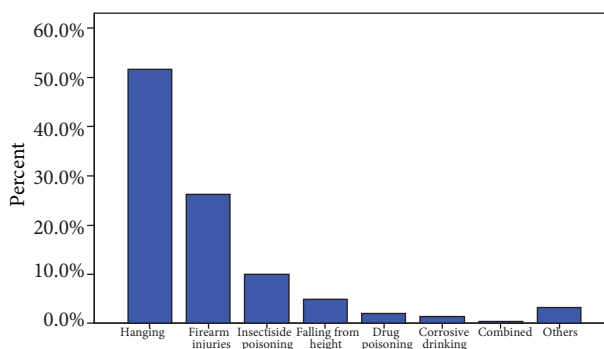


Figure 2. Distribution of cases by the method of suicide.

followed by firearm injuries (26.3%) and insecticide poisoning (10.1%). Proportion of falling from height was 4.8%, drug poisoning was 2.1%, and corrosive drinking was 1.5%. In 0.4% of cases, more than one method was chosen. Stabbing, cutting, burning, electric shock, and drowning, which have been categorized as “others”, were the methods of suicides in 3.2% of the cases (Figure 2).

There were significant differences between females and males with respect to the suicide method ( $P < 0.001$ ). Firearm injuries were more frequent methods in males than in females while insecticide poisoning, falling from height, and drug poisoning were more

commonly used methods in females in comparison with males ( $P < 0.001$ ), which follow hanging, the most common method used in both gender groups.

In males, hanging is the most common suicide method with 355 cases (52.1%), followed by firearm injuries with 194 cases (28.4%), and insecticide poisoning with 62 cases (9.1%). In females, the most commonly used method was also hanging with 138 cases (50.5%), followed by 57 (20.9%) firearm injuries, and 34 (12.5%) insecticide poisoning cases (Table 3).

If we compare the methods used for suicide in terms of age groups, it is clear that hanging was the

Table 2. Distribution of cases according to gender and season.

Gender	Season				Total
	Winter	Spring	Summer	Autumn	
Male	139 (20.4%)	181(26.5%)	198(29.0%)	164(24.0%)	682(100%)
Female	65(23.8%)	73(26.7%)	67(24.5%)	68(24.9%)	273(100%)
Total	204(21.4%)	254(26.6%)	265(27.7%)	232(24.3%)	955(100%)

Table 3. Methods of suicide by genders.

Gender	Hanging	Firearm injuries	Insecticide poisoning	Falling from height	Drug poisoning	Corrosive drinking	Combine	Others*	Total
Male	355 (52.1%)	194 (28.4%)	62 (9.1%)	26 (3.8%)	7 (1.0%)	7 (1.0%)	4 (0.6%)	27 (4.0%)	682 (100%)
Female	138 (50.5%)	57 (20.9%)	34 (12.5%)	20 (7.3%)	13 (4.8%)	7 (2.6%)	0 (0%)	4 (1.5%)	273 (100%)
Total	493 (51.6%)	251 (26.3%)	96 (10.1%)	46 (4.8%)	20 (2.1%)	14 (1.5%)	4 (0.4%)	31 (3.2%)	955 (100%)

\*Stabbing, cutting, burning, electric shock, and drowning. ( $\chi^2=32.9, P < 0.001$ )

most common method in all age groups. None of the victims older than 80 years old preferred falling from height, while it was a method used by all age groups in various proportions. Following hanging, insecticide poisoning was the second most common method in 60-69 age group (Table 4).

In 9.7% of cases, alcohol in various concentrations was detected in blood samples.

**Discussion**

It was observed in the studies performed in Turkey that from 4.6% to 24.3% of deaths are due to suicide. The significant difference between the proportions is explained by the statuses of the cities in terms of performed autopsies; autopsies were performed in all of the suicidal cases in cities with higher proportion while the death certificates were issued by only carrying out conventional external examinations in the other cities with lower proportion (4). The proportion of the deaths caused by suicide is 15.9% in Bursa.

In our study 682 (71.4%) of suicide victims were males and 273 (28.6%) were females; the male/female ratio was 2.49. This finding is consistent with the nationwide study performed by Oner et al. (5). In their study, 61.1% of the suicidal cases were among

males, 38.9% among females. It was found in studies carried out in such provinces of Turkey as Kahraman Maraş, Malatya, Adana, Konya, Eskişehir, and Edirne that the rates of death from suicide were higher among males (4, 6, 7, 8, 9, and 10). However the study of Katkıcı et al. showed a 1:1 ratio between males and females (11). Mohanty et al. reported that the ratio of suicide was 49% in females and 51% in males in Egypt and these rates were also nearly equal (1).

Burns et al. documented that the ratio of suicide was 83.3% in males and 34% of the males was between the ages 21 and 30 years (12).

Hawton claims that social changes especially in roles, feeling hopeless about unemployment or broken relationships, differences in the way of coping with problems, and lack of help-seeking behaviours are the reasons in the increase in suicide rates in young males (13).

In the age group of 10-19, the number of female cases were higher than male cases and the number of male cases were higher than female cases in all age groups older than 20. It was observed in the studies examining the suicides among children and adolescents in Turkey that female suicide rates have been higher in females than in males. In Diyarbakır, 71% of 56 suicide victims were female in the study carried out to investigate the suicidal cases in 11-19

Table 4. Methods of suicide by age groups\*.

Age groups	Hanging	Firearm injuries	Insecticide poisoning	Falling from height	Drug poisoning	Corrosive drinking	Combine	Others*	Total
10-19	59 (48.8%)	46 (38.0%)	10 (8.3%)	2 (1.7%)	3 (2.5%)	0 (0%)	0 (0%)	1 (8%)	121 (100%)
20-29	115 (46.9%)	90 (36.7%)	20 (8.2%)	12 (4.9%)	5 (2.0%)	0 (0%)	0 (0%)	3 (1.2%)	245 (100%)
30-39	81 (46.0%)	47 (26.7%)	14 (8.0%)	11 (6.3%)	8 (4.5%)	4 (2.3%)	3 (1.7%)	8 (4.5%)	176 (100%)
40-49	92 (56.1%)	36 (22.0%)	17 (10.4%)	7 (4.3%)	0 (0%)	4 (2.4%)	1 (0.6%)	7 (4.3%)	164 (100%)
50-59	65 (61.3%)	13 (12.3%)	11 (10.4%)	4 (3.8%)	1 (0.9%)	4 (3.8%)	0 (0%)	8 (7.5%)	106 (100%)
60-69	42 (55.3%)	10 (13.2%)	12 (15.8%)	7 (9.2%)	3 (3.9%)	1 (1.3%)	0 (0%)	1 (1.3%)	76 (100%)
70-79	27 (54.0%)	7 (14.0%)	10 (20.0%)	3 (6.0%)	0 (0%)	1 (2.0%)	0 (0%)	2 (4.0%)	50 (100%)
80-	12 (70.6%)	2 (11.8%)	2 (11.8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5.9%)	17 (100%)
Total	493 (51.6%)	251 (26.3%)	96 (10.1%)	46 (4.8%)	20 (2.1%)	14 (1.5%)	4 (0.4%)	31 (3.2%)	955 (100%)

\*No statistical test was used. Because there were 33 cells (51.6%) have expected count less than 5.

age group in Diyarbakir (14). It was found in another study performed to examine the childhood suicides in Adana that 62.9% of the victims were females (15). In a nationwide study reported by Oner et al. (5), the suicides occurred most often in the age group of 15-24; our study showed that 25.7% was in the age group of 20-29. TUIK (Turkish Statistical Institute) also reports that approximately 1/3 of the suicides occurred in Turkey in 1997-2006 period were in 15-24 age group (16). Mohanty et al. reported that the largest age group of the victims was in between 21 and 30 years (41.4%) (1).

The youngest victim was 10 years old while the oldest was 101 in our study. It was seen regarding the distribution of suicidal cases by age groups that 121 victims (12.7%) were in 10-19 age group, 245 victims (25.7%) in 20-29, 176 victims (18.4%) in 30-39, 164 victims (17.2%) in 40-49, 106 victims (11.1%) in 50-59, 76 victims (8%) in 60-69, 50 victims (5.2%) in 70-79, and 17 victims (1.8%) were older than 80 years.

In Celbiş et al.'s study performed in Malatya, 38.6% of suicides were in 17-24 age group; in Kar et al.'s study performed in Adana, 23.6% of suicides were in 15-19 age group. In Katkıcı et al.'s study performed in Sivas, 33.9% of suicides were in 20-29 age group. In Demirci et al.'s study performed in Konya, 24.5% of suicides were in 20-29 age group. In Azmak's study performed in Edirne 27% of suicides were in 21-30 age group. In Balci et al.'s study performed in Eskişehir 42.6% of suicides in 15-34 age group (6,7,8,10,11,17). All of these findings are concordant with our results.

The fact that the suicides are more common among young population is explained by incomplete spiritual development, failure dealing with the problems in daily life, being daunted by problems easily, perceiving issues more important than they actually are, and priority of emotionality in outlook on life. To build up strategies for preventing suicide among young people is important (8).

Suicide by hanging is the most frequent suicide method in Turkey (5). Suicide by hanging, as an easy and certain lethal method, is also the most common suicide method in many other countries (1,12, 18,19,20,21,22). In an epidemiologic study performed by Varnick et al. (23), in 15 European countries

studies reported that suicide victims between 15-24 years preferred hanging as the most frequently used suicide method for both genders.

We observed in our study that the use of firearms was the second leading suicide method after hanging. It was found in the studies performed in Malatya, Konya, and Edirne (6,8,10) that hanging was the most common suicide method while the other studies carried out in Adana and Afyon showed that the use of firearms was the leading method (7,24). The finding that suicides by use of firearms were more common than poisoning can be explained by the easy access to firearms. This also determines the cause of most common occurrence of suicides using firearms in certain regions.

It is well recognized that males tend to use violent means of both suicide and deliberate self harm more often than females do. Greater suicidal intent, aggression, knowledge regarding violent means and less concern about bodily disfigurement are all likely explanations for the excess of violent suicide in males (25).

Concerning the suicide methods that are chosen by females, it is revealed that they prefer less violent methods than males (26). Denning et al. (27) reported that while males prefer more violent methods in committing suicide, such as guns and hanging, females prefer self poison by drugs or carbon monoxide gas.

There was no significant seasonal difference between genders and between age groups. According to Durak et al.'s findings (28) in their study evaluating the suicidal cases between 1996 and 2002 in Bursa, it was significant that males commit suicide more in summer than in winter or in fall.

In our study, it was revealed that there was a significant difference between men and women in terms of suicide age and suicide method.

The etiology of suicide has to be understood in order to prevent it. A national database on suicide has to be set up in order to clarify the reasons underlying and to observe the efficacy of prevention strategies. More studies are needed on gender differences in suicidal behavior to develop prevention strategies.

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