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Evaluation of suicide cases in Turkey, 2007–2012

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Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Background: The aim of this study was to determine the demographic and sociocultural characteristics of suicide attempts by using data from the Turkish Statistical Institute. It is our intent that the work data may contribute to the national suicide data and the development of suicide prevention policies.

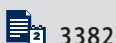
Material/Methods: We obtained our data, which cover the years 2007 to 2012, from the database accessible at the official website of the Turkish Statistical Institute, which permits the use of its data for research purposes. The data were evaluated by using the SPSS 10.0 program. The chi-square test was used for statistical analysis, and the percentage distribution and odds ratios were calculated.

Results: According to data from the Turkish Statistical Institute, the total number of suicide deaths in Turkey between 2007 and 2012 changed yearly ($\chi^2=42,035-59,209$; $P<0.001$). While suicide deaths in 2007 made up 0.00396% of the total deaths for that year, that figure increased to 0.00426% in 2013. According to the data from the Turkish Statistical Institute, over 1.9 million people died due to all causes between 2007 and 2012 in Turkey. Over 17,000 deaths (0.9%) were due to suicide.

Conclusions: Suicide is an important public health problem and is multidimensional in nature. Examining this subject from etiological, epidemiological, biological, psychological, sociological, and anthropological perspectives is important to improve the prevention of suicides.

MeSH Keywords: **Data Interpretation, Statistical • Public Health • Suicide, Attempted**

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Background

Suicide is the deliberate act of ending one's own life [1]. It occurs in a wide segment of society, from people who react to life conditions in a well-adjusted way, to people who have severe mental disorders. People who attempt suicide may truly desire to die, or this behavior may just be a response to pain, despair, and hopelessness – a cry for help [2].

The World Health Organization (WHO) divides suicides into 2 categories: suicide attempts and actual (complete) suicides. Actual suicides are those that result in death. Suicide attempts are those non-fatal attempts individuals may make to kill, harm, or poison themselves voluntarily [3].

According to the WHO, 900,000 people worldwide die as a result of suicide each year [4]. Suicides are a major public and mental health concern in developed and developing countries today. National suicide rates range from 3 to 45 out of every 100,000 people living in various countries [5]. The rates vary greatly between countries, but the most prevalent methods of suicide hold true for suicide in all parts of the world and include intentional medication overdosing, poisoning, hanging, and shooting one-self with a firearm [6,7]. Suicides are more prevalent in men after the age of 45 years and in women after age 50. Non-fatal attempts are higher in women, but fatal attempts are higher in men [8]. Self-injurious behavior is more prevalent in women and suicide occurs more in men. Self-injurious behavior is linked with suicide in men, but self-injurious behavior is linked with motivations other than suicide in women [9]. Rates of attempted suicide are higher among single individuals than among married people, and they are higher in the wealthiest and the poorest segments of society than in the middle class. Not surprisingly, suicide rates are higher among the unemployed than they are among those who have jobs [6,10–12]. The main reasons for suicide attempts are physical problems (25–75%) and mental disorders (more

than 90% of these being major psychiatric disorders), marital discord, and livelihood difficulties such as economic and social problems [8].

The aim of this study was determine the demographic and sociocultural characteristics of suicide attempts by using data from the Turkish Statistical Institute. It is our intent that the work data may contribute to the national suicide data and the development of suicide prevention policies.

Material and Methods

We obtained our data, which cover the years 2007 to 2012, from the database accessible at the official website of the Turkish Statistical Institute. This organization allows the use of its data for research purposes. The data were evaluated by using the SPSS 10.0 program. The chi-square test was used for statistical analysis, and the percentage distribution was calculated along with the odds ratios. The averages are shown, along with the standard deviations. Findings at the level of $P > 0.05$ were considered statistically meaningless. Any results at a P level below this were considered significant.

Results

According to data from the Turkish Statistical Institute, the total number of suicide deaths in Turkey between 2007 and 2012 changed yearly ($\chi^2=42,035-59,209$; $P < 0.001$). While suicide deaths in 2007 made up 0.00396% of the total deaths for that year, that figure increased to 0.00426% in 2013. This increase was believed to have been due to a rise in the number of men committing suicide. During these same years, female suicide deaths actually decreased ($\chi^2=2667, 004$; $P < 0.001$). The incidence of suicide in this community under study was 2.294 times higher (odds ratio by gender [male/female]) in men than in women (Table 1).

Table 1. The rates of suicide cases between 2007–2012 among the total population, broken down by gender.

Year	Total			Male			Female		
	Population	Suicides	%	Population	Suicides	%	Population	Suicides	%
2007	70586256	2793	3.96E-3	35376533	1808	5.1E-3	35209723	985	2.80E-3
2008	71517100	2816	3.94E-3	35901154	1924	5.4E-3	35615946	892	2.50E-3
2009	72561312	2898	3.99E-3	36462470	2111	5.8E-3	36098842	787	2.18E-3
2010	73722988	2933	3.98E-3	37043182	2073	5.6E-3	36679806	860	2.34E-3
2011	74724269	2677	3.58E-3	37532954	1876	5.0E-3	37191315	801	2.15E-3
2012	75627384	3225	4.26E-3	37956168	2315	6.1E-3	37671216	910	2.42E-3

(3.96E-3 means 0.00396).

Table 2. The rate of suicide deaths, 2007–2012, according to the total death cases, broken down by gender.

Year	Total			Male			Female		
	Total deaths	Suicide deaths	Suicide death %	Male deaths	Male suicides	Male suicide %	Female deaths	Female suicides	Female suicide %
2007	212731	2793	1.3	118059	1808	1.5	94672	985	1.0
2008	215562	2816	1.3	119391	1924	1.6	96171	892	0.9
2009	368884	2898	0.8	203391	2111	1.0	165493	787	0.5
2010	365707	2933	0.8	200180	2073	1.0	165527	860	0.5
2011	375367	2677	0.7	206223	1876	0.9	169144	801	0.5
2012	374855	3225	0.9	206925	2315	1.1	167930	910	0.5
2007–2012	1913106	17342	0.9	1054169	12107	1.1	858937	5235	0.6

Table 3. The distribution of the suicide deaths between 2007–2012, according to gender and age groups.

Age group	Male		Female		Total	
	n	%	n	%	n	%
Aged ≤19 years	1358	11.2	1389	26.5	2747	15.8
Aged 20–39 years	4751	39.2	2109	40.3	6860	39.6
Aged 40–59 years	3766	31.1	2109	18.4	4728	27.3
Aged ≥60 years	1950	16.1	962	12.3	2594	15.0
Total	12107	100.0	5235	100.0	17342	100.0

According to the data from the Turkish Statistical Institute, over 1.9 million people died due to either natural or unnatural causes between 2007 and 2012 in Turkey. Over 17,000 deaths (0.9%) were due to suicide. The total number of suicide deaths in Turkey increased yearly between 2007 and 2012 ($\chi^2=527.5-1044.4$; $P<0.001$). Over 12,000 (69.8%) of the people who died due to suicide were male, and 5,235 (30.2%) were female. The OR value for gender was calculated as 1.895 ($\chi^2=1530.8$; $P<0.001$). There appears to have been an increase in the number of suicide deaths during 2007–2012, but the rates of suicide deaths have decreased within the same period (Table 2).

According to the data from the Turkish Statistical Institute, the number of suicide deaths between 2007 and 2012 in Turkey changed according to the ages of the victims ($\chi^2=346.9$; $P<0.001$). While most (39.6%) suicide deaths occurred between the ages of 20 and 39, the fewest deaths (15%) occurred in people aged ≥60 years. Suicide deaths for both men and women were observed most commonly in people aged 20–39 years, and it is remarkable that the rates are as close as they are. The rate of suicide deaths for those aged ≤19 years was 2.4 times greater for women than it was for men. The rate of suicide deaths in men aged 40–59 years was 1.7 times more than that for women of the same age (Table 3).

During the period 2007–2012 in Turkey, suicide deaths increased in all age groups. Suicide deaths in 2012 increased by 15.5% compared with 2007. The average annual increase was 2.6%. When evaluating each age group on its own, the highest annual increased rate in 2012 compared to 2007 was observed in the 60 years and older age group, with an increase of 7.9% (Figure 1).

In Turkey during 2007–2012, male suicides leading to death increased in all age groups. In fact, the overall rate increased by 28.0% in 2012 compared with 2007, and the average annual increase in rate was 4.7%. When evaluating each age group on its own, the highest annual increased rate from 2007 to 2012 was 8.9% in people ≤60 years (Figure 2).

During 2007–2012, the number of Turkish suicide deaths in women decreased for all age groups. This rate increased in the 40–59 age group and also in those aged 60 and older, but the rates for those who were 19 years old and younger and those who were aged 20–39 decreased. Overall, suicide deaths in women decreased by 7.6% in 2012 compared with 2007, and the average annual reduction was 1.3% (Figure 3).

In Turkey, 33.4% of suicide deaths occurred in non-urban areas and 66.6% took place in urban areas. For men, 30.8% of

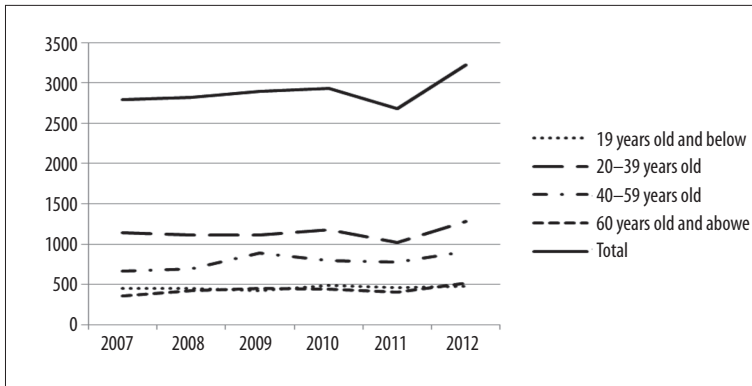


Figure 1. Suicide deaths, 2007–2012.

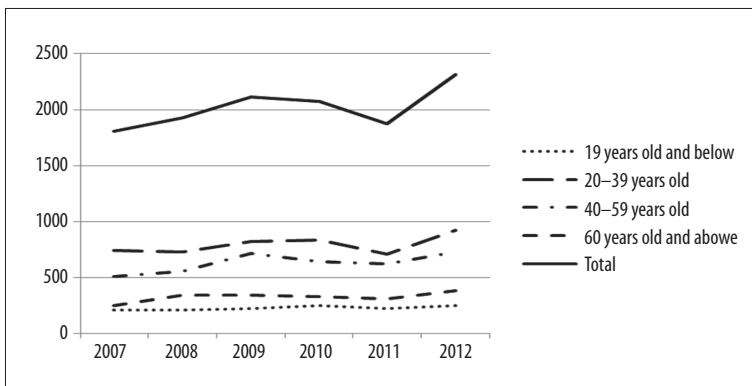


Figure 2. Suicide deaths in men, 2007–2012.

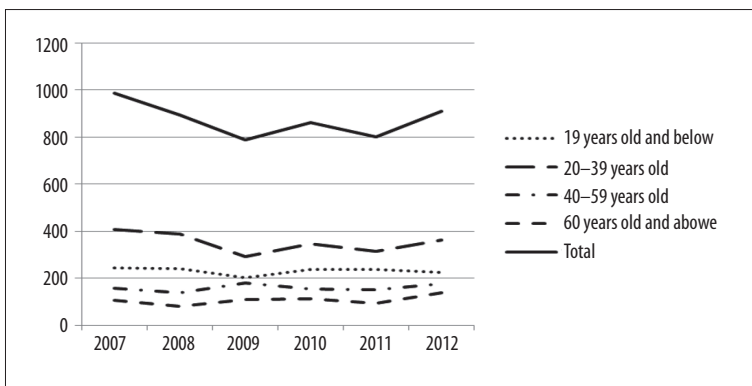


Figure 3. Suicide deaths in women, 2007–2012.

the suicide deaths occurred in non-urban areas and 39.3% of the women's suicide deaths occurred in non-urban areas. This is a staggering difference (Figure 4).

According to the data from the Turkish Statistical Institute, the numbers of suicide deaths actually changed over the period of interest according to the place of residence ($\chi^2=699.5$, $P<0.001$).

While the rate of suicide occurring in villages and towns in 2007 was 1.5 times more than that occurring in the town center, the rate of suicide occurring in the town center in 2012 was 2.7 times more than the rate found in the villages and towns. Between 2007 and 2012, while the rate of suicide occurring in the city district centers increased, the rate of suicide

occurring in the villages and towns decreased in a noteworthy manner (Table 4).

When examining the suicide deaths according to geographic region, it became clear that the most deaths (26.3%) occurred in Marmara. This rate was 8.8% higher than in the East Anatolian region. As seen in Figure 5, there was a reduction in the number of deaths moving from west to east through Turkey.

An increase in suicide deaths occurred in all regions except the Black Sea region. While there has been an increase in suicide deaths in the Eastern Anatolia and Southeastern Anatolia region, this rate has become stable over the years. The Aegean region showed an increase of 23.0% in 2012 compared to

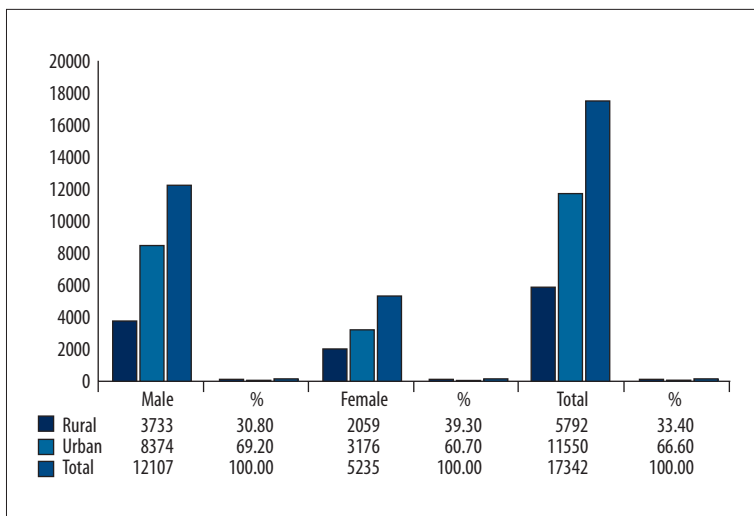


Figure 4. Distribution of suicide deaths in the villages and cities, 2007–2012.

Table 4. The rate of suicide deaths occurring in the provincial and district centres, and also in the villages and town centres, according to population.

Year	Provinces and districts population	Provinces and districts suicide deaths	Suicide death %	Town and villages population	Town and villages suicide deaths	Suicide deaths %
2007	49747859	1702	3.42E-3	20838397	1091	5.24E-3
2008	53611723	1624	3.03E-3	17905377	1192	6.66E-3
2009	54807219	1789	3.33E-3	17754093	1109	6.25E-3
2010	56222356	1913	3.40E-3	17500632	1020	5.83E-3
2011	57385706	1753	3.06E-3	17338563	924	5.33E-3
2012	58448431	2769	4.74E-3	17178953	456	2.65E-3

(3.42E-3 means 0.00342).

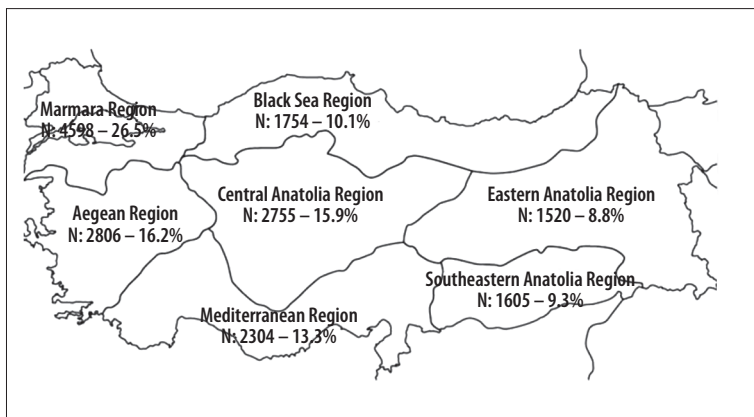


Figure 5. The distribution of suicide deaths, 2007–2012, according to geographic region.

2007 and this increase was the highest increase among the regions (Figure 6).

As shown in the figure above, suicide deaths increase in the spring, reaching their highest level in the summer, and then

drop to their lowest levels in the autumn. While suicide deaths most often occur in the month of July (N: 1689), November has the least suicides (N: 1218). In fact, the suicide deaths in July occur at a rate 38.7% higher than the rate of suicides in November. In men, the lowest number of suicide deaths occur

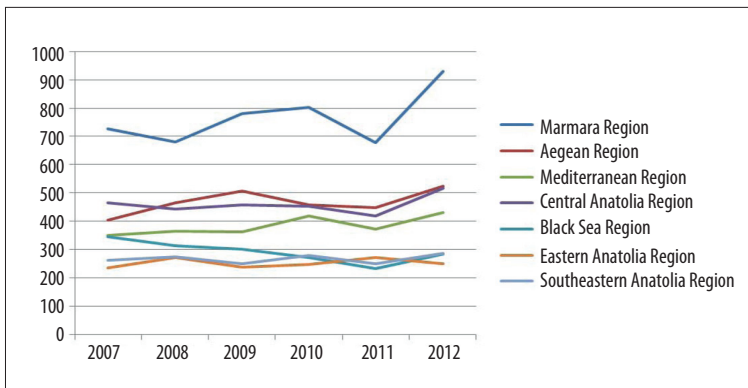


Figure 6. A graph showing the changes regarding suicide deaths according to region, 2007–2012.

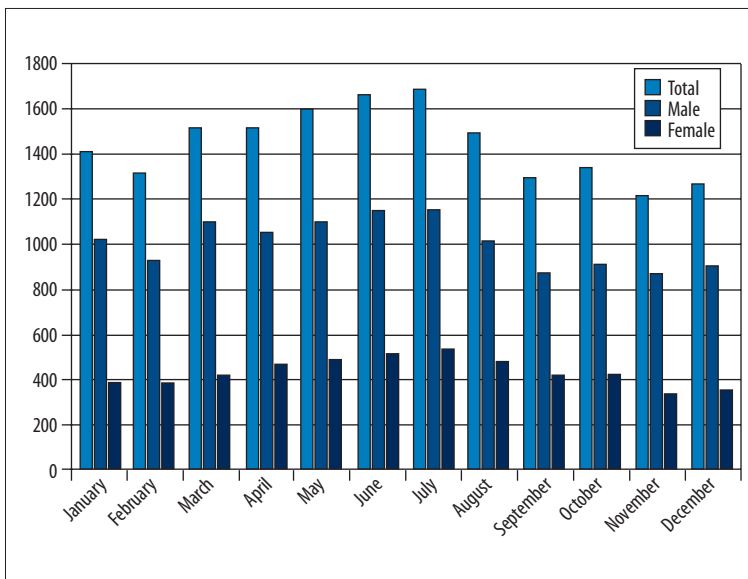


Figure 7. Distribution of suicide deaths by month, 2007–2012.

Table 5. Distribution of suicide deaths by educational level, 2007–2012.

Education	Male		Female		Total	
	n	%	n	%	n	%
Illiterate	244	2.0	392	7.5	636	3.7
Not completed primary schooling	945	7.8	726	13.9	1671	9.6
Primary school – junior high school (secondary)	7298	60.3	3088	58.9	10.386	59.9
High school	2262	18.7	615	11.7	2877	16.6
Tertiary education and university	834	6.9	237	4.5	1071	61.8
Total	12107	100.0	5235	100.0	17342	100.0

in the months of September (N: 874) and November (N: 876), and the most occur in June (N: 1151) and July (N: 1152). Male suicides in July occur at a rate 31.8% higher than the rate of male suicides in September. Female suicides most often occur in July (N: 537) and least often occur in November (N: 342), so that the rate of suicides among women in July is 57.0% higher than the rate in November (Figure 7).

According to the data from the Turkish Statistical Institute, the number of suicide deaths varies according to educational level ($\chi^2=575.3$; $P<0.001$). More than half of the suicide victims had no more than a primary or secondary education. Illiteracy is 3.75 times more common in female victims than it is in the males. The incomplete primary school rate was 1.8 times higher for females than for males. A high school education or the

Table 6. Distribution of suicide deaths by suicide methods, 2007–2012.

Method	Male		Female		Total	
	n	%	n	%	n	%
Hanging	6203	51.2	2625	50.1	8828	50.9
Using firearms	3553	29.3	834	15.9	4387	25.3
Throwing him/herself from a high place	886	7.3	701	13.4	1587	9.2
Chemical overdose	659	5.4	705	13.5	1364	7.9
Other methods	806	6.7	370	7.1	1176	6.8
Total	12107	100.0	5235	100.0	17342	100.0

Table 7. Distribution of suicide deaths by reason, 2007–2012.

Reason	Male		Female		Total	
	n	%	n	%	n	%
Due to illness	2281	18.8	1179	22.5	3460	20.0
Family problems	1106	9.1	750	14.3	1856	10.7
Livelihood challenges	1495	12.3	109	2.1	1604	9.2
Unrequited love	601	5.0	267	5.1	868	5.0
Commercial failure	449	3.7	9	0.2	458	2.6
Learning failure	80	0.7	52	1.0	132	0.8
Unknown	5355	44.2	2578	49.2	7933	45.7
Others	740	6.1	291	5.6	1031	5.9
Total	12107	100.0	5235	100.0	17342	100.0

equivalent was 1.6 times more likely to be seen in male victims than in female victims (Table 5).

The number of suicide deaths varies according to the method of suicide ($\chi^2=708.2$; $P<0.001$). The most common method of suicide was hanging, as approximately half of the reported deaths were due to hanging. The second most common method is using a firearm (Table 6). This method is 1.8 times more likely to be used by men than by women. Suicide by use of chemicals was 2.5 times more likely in women than in men. Suicide by jumping from a high place was 1.8 times more likely to be used by women than men.

The number of suicide deaths varies according to the reason for the suicide ($\chi^2=733.8$; $P<0.001$). Approximately half of the suicide deaths have an unknown cause. Approximately one-fifth of all suicides are committed because of illness, making this the most common cause. Suicide due to livelihood challenges is approximately 6 times more common in men than it is in women. Suicide due to commercial failure is 18.5 times more likely in men than in women. Suicide due to unrequited love is 2 times more likely in men than in women (Table 7).

Discussion

According to the WHO, 0.00016% of the world's population is reported to have died due to suicide [13]. Suicide deaths in Turkey in 2012 were around 4% all deaths in the total population, and the suicide rate in Turkey is 4 times lower than that of the overall world rate. Although our country is among those with a relatively low suicide rate, our rates are increasing, according to these statistics. It must be pointed out, however, that suicide statistics are not very reliable, given that the subject of suicide is still taboo.

Suicide deaths in Turkey in 2012 were around 0.0061% of the total male population and 0.00242% of the total female population, and this rate shows similarities with other countries such as Brazil (0.0077% in men; 0.0020% in women in 2008), Albania (0.0047% in men; 0.0033% in women in 2003), Guatemala (0.0056% in men; 0.0017% in women in 2008), Greece (0.006% in men; 0.001% in women in 2009), and Israel (0.007% in men; 0.0015% in women in 2007) [13]. While the rate of suicide deaths in the United Kingdom in 2010 was 0.00111% of all deaths in the total population, in 2011 this rate

increased to 0.00118%. In the same year, this rate decreased to 0.0036% from 0.004% in Turkey [14]. The rate of suicide deaths in the United States in 2010 was 0.00124% of all deaths in the total population; in that same year, the rate of suicide deaths relative to the total population in Turkey was about one-third of that figure [15]. In 2010, suicide deaths in Japan and South Korea were 0.00231% and 0.00324%, respectively, 6 and 8 times higher than the observed rates in Turkey [16].

In India in 2010, 0.00263% of all deaths among men aged >15 years and 0.00175% of women died due to reported suicide. In the same year, 0.0056% of men and 0.0023% of women died due to suicide in Turkey; an extremely low rate compared to India [17]. These rates vary from country to country and from culture to culture because religious beliefs and societal traditions may have a preventive effect on suicide. Therefore, the perception of suicide varies according to religion, culture, and social system [18]. According to Islam, suicide is a great sin. With the effects of these thoughts and beliefs, suicide in our country has been considered to be especially shameful over the years [19].

Less than 1% of all the deaths around the world occurred because of suicide [20]. In Turkey, as with the rest of the world, 0.9% of the deaths between 2007 and 2012 were due to suicide. Suicide accounted for 1.6% of the deaths in America in 2010 [15], and 3% of all deaths in India were because of suicide [17]. In the same year, 0.8% of the deaths in Turkey were because of suicide.

While the suicide deaths were 0.004% in 2007, this rate increased to 0.0043% in 2013, and this increase was caused mostly by an increase in male suicides. During these same years, the numbers of female suicide deaths decreased. Males are more prone to increased suicidal thoughts, aggression, and a tendency toward violence [9].

Between 2007 and 2012, the number of suicide attempts has increased, but the numbers of suicide deaths decreased. Despite the low rate of suicide death in our country, the increase in suicide rates shows that the subject is a significant social problem [21].

Suicide deaths between the ages of 20 and 39 years are 39.6% higher than the all-ages rate, while suicides in those aged ≥ 60 years are the lowest by 15.0%. Suicide death rates in men and women between the ages of 20 and 39 years are highest, and it is noteworthy that the rates of the 2 genders are close together. The rate of suicide deaths in women aged ≤ 19 years is 2.4 times more than the rate of suicide deaths in men of the same age. The rate of suicide deaths in men aged 40–59 years is 1.7 times more than the rate of suicide deaths in women of the same age.

Between 2007 and 2012, the number of suicides in men increased in Turkey. Male suicide deaths in 2012, compared to

2007, showed an increase of 28.0% and an annual average increase of 4.7%. From 2007 to 2012, the highest annual increase rate was 8.9% for the ≥ 60 age group. This can be connected to the increase in the elderly population.

Between 2007 and 2012, the number of suicides in women decreased in Turkey in all age groups except the 40 to 59 group and the ≥ 60 age group. Female suicide deaths in 2012, compared to 2007, decreased by 7.6%, with an annual average increase of 1.3%.

According to the Turkish Statistical Institute, the number of suicide deaths varies according to the place where people live ($\chi^2=699.5$; $P<0.001$). The rate of suicide increases in the district centers but showed a decrease in villages and towns.

Suicide attempts are more likely to occur in June and August. Suicide deaths increased in the spring, reached their highest levels in the summer, and dropped to their lowest levels in the autumn. Suicide deaths were most likely to occur in July (N: 1689) and least likely to occur in November (N: 1218), and the deaths in July occurred at a rate about 38.7% higher than the November deaths. Suicide deaths in men occur least in September (N: 874) and November (N: 876), but they occur most in June (N: 1151) and July (N: 1152). July suicides for men are 31.8% more likely to occur than male suicides in September. Suicide deaths in women occur approximately 57.0% more in July (N: 537) than they do in November (N: 342). Spring and summer months are especially critical, as the suicides occurring around this time of year are most often associated with failure in school [24].

Regarding educational level, more than half of the individuals committing suicide in Turkey have no more than a primary or secondary education. Illiteracy is 3.75 times more common in women than in men. Not receiving any education is 1.8 times more common in women than in men. Having a high school or equivalent education is 1.6 times more likely in men than in women. Several studies conducted in Turkey have shown that suicide attempts in patients with low levels of education are much more likely [25,26] because the lack of education can cause difficulties in expressing him/herself and can negatively affect the individual's economic situation, which may also lead to suicide.

Suicide methods of men differ from those of women. Men especially prefer hanging and jumping off buildings, whereas women prefer overdosing on medications, intoxication with poison, and cutting wrists [27]. In the deaths between 2007 and 2012, the most commonly used method was hanging. This method is also commonly used in Brazil, Argentina, Thailand, Austria, and Germany [28].

According to the Turkish Statistical Institute, about half of the suicide deaths both in men and women were committed by the method of hanging. About half the male suicide deaths in

Brazil, Argentina, Thailand, Austria, Germany, France, Portugal, Spain, England, and Georgia, and the female suicide deaths in Slovakia, Slovenia, Georgia, Croatia, and Mexico have occurred with a similar method of hanging as in our country [28].

The second most prevalent method for both men and women is using a firearm. This method is 1.8 times more likely in men (29.3%) than in women (15.9%). In the US in 2007, suicide deaths occurred most often by using a firearm. Men prefer this method 1.9 times more than women, and this is similar to what has been observed in our country [29]. This finding is consistent with the information that men prefer more severe methods than women [30]. Suicide by using chemicals is 2.5 times more likely in females (13.5%) than in males (5.4%). In many countries, such as Canada, America, Austria, Hungary, Denmark, the Netherlands, and Norway, suicide by using chemicals is usually preferred by women, as is often the case in our country [28].

Suicide by jumping from a high place was 1.8 times more likely to occur in females (13.4%) than in males (7.3%). This method is also most common in Singapore (72.4%, 2000–2004) and in Hong Kong (46%, 2003). This method is second most common in Saudi Arabia (12%, 1086–1995) and in Japan (10.4%, 1994). It is the third most common method in Taiwan (9.4%, 1995–2004) and in South Korea (15%, 2003). This method is preferred in areas where there are many high buildings [31].

It is difficult to determine the causes of suicide. Some contributing factors are depression, alcohol and drug dependence,

personality disorders, schizophrenia, chronic diseases, and unfavorable family conditions, economic and social problems, migration, and urban life [32].

In approximately half of suicide deaths, the cause is unknown. This kind of death is seen especially in females. The most common cause of suicide is illness for both males and females. Suicide due to economic difficulties occurs 6 times more often in males than in females. Suicide because of commercial failure is 18.5 times more likely in males.

In Turkey, the rate of employment in males was 71.5%, while this same rate was only 24.9% for females. This data can be evaluated as an indicator as to why suicide is higher in men than in women by reason of subsistence difficulties and commercial failure [33]. The rate of suicide due to unrequited love was seen equally in both males and females. Knowing the cause of the suicide is extremely important in terms of approaching and orienting patients. In addition, assessing the risk of recurrence of suicide is also important.

Conclusions

Suicide is an important public health problem and is multidimensional in nature. Examining this subject from etiological, epidemiological, biological, psychological, sociological, and anthropological perspectives is important in order to improve the prevention of suicides.

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