



## Suicide Cause and Method from 2009-2017 in Turkey

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### Abstract

**Background:** This study was planned to investigate the cause, method, age group and gender of suicides between 2009 and 2017 in Turkey.

**Methods:** Data on suicide deaths between the years 2009-2017 were obtained from the death data of the Turkish Statistical Institute.

**Results:** Suicide data were evaluated according to age group, gender, reason and method. The most common suicide methods among people living in Turkey were hanging oneself, using a firearm and throwing oneself from a high place whereas common causes and unknown causes were found to be illness and economic problems. Gender showed statistical significance in the cause of suicide in all suicide methods (illness, economic problems, job failure). According to age groups the reasons were family disharmony, emotional relationship and not being able to marry the desired person, Education failure were found to be statistically significant. Less used methods to commit suicide in Turkey were determined as using firearms, using natural gas or LPG, throwing from a train or motor vehicle.

**Conclusion:** It is a very sad situation for an individual to end his/her life conspiratorially. Appropriately collected suicide information can guide the design of suicide prevention strategies. Because previous suicide attempts seem to be an important risk factor for future attempts and death by suicide.

**Keywords:** Suicide; Turkey; Gender; Method; Cause; Age group

## Introduction

Suicidal behavior is a common cause of death and disability in the world (1). Suicide is an act of aggression towards oneself, an act of destruction and the deliberate end of one's own life. In other words, suicide is the decision of the individual to end his/her life by choosing the most effective method to kill himself/herself and not allowing anyone to interfere. If the person is still alive, it is called a suicide attempt. Suicide can also be defined as a hopeless escape of the hopeless individual from the problems (2, 3).

Suicidal ideation is a strong predictor of suicide (4). Every year, close to 800,000 people die due to suicide. This means one person every 40 seconds (2, 3). Suicide is the second leading cause of death for 1.4% of all deaths worldwide and for the world population aged 15-29. In 2015, 78% of suicides occurred in low- and middle-income countries (5). Developing countries form for about 73% of global suicides and Asia at the continental level accounts for about 60% of global suicides (6, 7). Suicide may contain many



genetic, psychological, social and cultural risk factors in its etiology; these may interact with various factors from different angles (6, 8-10). That is why common suicides differ according to societies and countries with their etiology and methods. Suicide by hanging is a common method for both sexes worldwide, especially in high-income countries (11-13). The sources of information from which suicides are obtained are mainly police reports, forensic medicine reports, hospital, court and other institutional reports (6). Based on this knowledge, we aimed to investigate the causes and methods of suicide in Turkey between the years 2009 and 2017. In addition, it was planned to describe the increase or decrease in suicide deaths, the differences in male and female suicide methods and age distributions.

## **Materials & Methods**

In this study, "suicide by age group, gender and cause", "suicide by method, gender and age group" data from the web pages of the Turkish Statistical Institute (TUIK) between 2009 and 2017 were used (14). The Turkish Statistical Institute (TUIK) has been collecting data on suicide events for the country since 1962. All data are announced via the website (14).

All male and female deaths by the following age groups were taken and evaluated as "suicide by age group, gender and cause" and "suicide by method, gender and age group". Age group analyzes were divided into fifteen strata: <15, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 70- As 74, 75+ yr and unknown.

Comparisons by year, gender and age were made using chi-square, Kruskal Wallis and One Way Anova analysis. A *P* value of <0.05 was considered statistically significant. All statistical analyses were performed using SPSS software, version 20 (IBM, Somers, NY, USA).

## **Results**

There were 27 724 deaths recorded as suicides between 2009 and 2017 of which 73.30% were

men (N=20 323) and 26.70% were women (N=7 401). The male/female suicide rate was 2.7. Between 2009 and 2017, the approximate suicide rate was an average of 4.04 per 100,000 population. The approximate suicide rate was 3.61 per hundred thousand in 2011 whereas it was found to be 4.37 per hundred thousand in 2012 with the lowest and highest crude suicide rates.

This 0.76 increase explains 82% of the increase. Approximate suicide rates increased 2.4% from 2011 to 2012 and 1.2% from 2015 to 2016. There was a significant decrease of 3.2% from 2016 to 2017. Total deaths in 2017 were 3069 (Male: 2368; Female: 701); The total number of deaths in 2016 is 3193 (Male: 2426; Female: 767). The total number of deaths is also disclosed in Table 1 for each year. In this context, a significant difference was found between the genders in terms of causes and methods (*P*=0.001).

By using Bonferroni correction according to suicide years, the statistical result was at 0.05 significance level; "Other causes (*P*=0.001) and other methods (*P*=0.001) and job failure (*P*=0.029) account for significantly higher suicide deaths over the years. The most commonly used suicide methods among those living in Turkey were hanging, using firearms, throwing oneself from height and taking chemicals (Table 1). The most common reason for suicide among people living in Turkey were found as unknown methods, illness, economic problems and family conflicts (Table 2). Gender differences were observed among all suicide methods and causes. Illness and economic problems are the most common causes of suicide in men whereas illness and family incompatibility constituted the causes of suicide in women (Table 2). In this context firearm suicides and suicide by hanging are most common in men whereas suicide by hanging and jumping from a high place was most common in women. The least observed cause of suicide was educational failure and its method was seen as using and burning natural gas or liquefied petroleum gas (Table 1).

Table 1: Suicides by method and gender 2009-2017

Year	Gender	Total	By hanging $\chi^2(8, N=13722)=33.6, P=0.0001$ **	Taking chemicals $\chi^2(8, N=1587)=20.1, P=0.0101$ *	Throwing from a high place $\chi^2(8, N=2014)=12.5, P=0.1271$	By drowning $\chi^2(8, N=513)=7.6, P=0.469$	Using firearms $\chi^2(8, N=7371)=31.2, P=0.0001$ **	By burning $\chi^2(8, N=107)=2.2, P=0.972$	Using a sharp instrument $\chi^2(8, N=107)=2.2, P=0.972$	Using natural gas or lpg. etc. $\chi^2(8, N=107)=2.2, P=0.972$	Throwing off a train or other motorized vehicle $\chi^2(8, N=107)=2.2, P=0.972$	Other $\chi^2(8, N=923)=24.9, P=0.002$ *
2017	Total	3 069	1 459	145	310	33	954	9	45	5	10	99
	Male	2 368	1 109	82	187	20	840	7	38	5	9	71
	Female	701	350	63	123	13	114	2	7	-	1	28
2016	Total	3 193	1 495	174	380	57	880	20	39	20	17	111
	Male	2 426	1 126	90	234	37	774	15	34	19	13	84
	Female	767	369	84	146	20	106	5	5	1	4	27
2015	Total	3 246	1 528	208	413	64	873	11	56	14	14	65
	Male	2 358	1 099	118	232	49	729	8	51	11	11	50
	Female	888	429	90	181	15	144	3	5	3	3	15
2014	Total	3 169	1 491	189	352	64	816	13	70	5	13	156
	Male	2 352	1 098	122	191	45	689	11	66	5	11	114
	Female	817	393	67	161	19	127	2	4	-	2	42
2013	Total	3 252	1 632	194	304	71	858	19	28	14	11	121
	Male	2 382	1 206	116	157	47	719	14	23	12	9	79
	Female	870	426	78	147	24	139	5	5	2	2	42
2012	Total	3 287	1 641	164	332	60	838	14	42	11	8	177
	Male	2 377	1 199	82	175	44	701	12	36	10	6	112
	Female	910	442	82	157	16	137	2	6	1	2	65
2011	Total	2 677	1 391	142	270	44	698	6	26	14	12	74
	Male	1 876	948	87	151	32	561	5	24	13	10	45
	Female	801	443	55	119	12	137	1	2	1	2	29
2010	Total	2 933	1 528	204	300	67	693	9	35	13	13	67
	Male	2 073	1 080	103	177	51	574	6	25	11	11	33
	Female	860	448	101	123	16	119	3	10	2	2	34
2009	Total	2 898	1 557	167	253	53	760	7	30	6	12	53
	Male	2 111	1 121	110	136	42	627	6	25	6	8	30
	Female	787	436	57	117	11	133	1	5	-	4	23

The causes and methods of suicide also differ according to age groups. <24 year old suicides were the most common. In particular, 2013 was the most common year for suicides aged <24 years ( $\chi^2(120, N=15351)=1162.8, P=0.001$ ). When examining the causes and methods of suicide cases according to age groups, family disharmony ( $P=0.002$ ), emotional relationships ( $P=0.021$ ), education failure ( $P=0.001$ ), using of firearms ( $P=0.019$ ), using of natural gas or LPG ( $P=0.009$ ) and jumping in front of a motor vehicle ( $P=0.024$ ) were found to be statistically

significant. The most common reason for suicide among women aged 15-19 was family discord. The suicide method in women aged 15-19 yr differs from men of the same age and suicide in women by taking chemical substances, jumping from height and other causes were more frequent and statistically significant compared to men ( $P=0.001$ ) (Table 3). Between 2009 and 2017, disease and unknown methods were common in men ( $P<0.01$ ).

**Table 2:** Suicides by gender and cause, 2009-2017

<i>Year</i>	<i>Gender</i>	<i>Total</i>	<i>Illness</i>	<i>Family income</i>	<i>Economic problem</i>	<i>Business failure</i>	<i>Emotional relation</i>	<i>Educational failure</i>	<i>Other</i>	<i>Unknown</i>
2017	Total	3 069	653	128	233	6	86	3	712	1 248
	Male	2 368	482	95	224	6	67	2	523	969
	Female	701	171	33	9	-	19	1	189	279
2016	Total	3 193	680	126	274	7	84	12	39	1 971
	Male	2 426	473	86	257	7	74	6	32	1 491
	Female	767	207	40	17	-	10	6	7	480
2015	Total	3 246	955	257	298	8	72	6	66	1 584
	Male	2 358	649	169	283	8	54	3	45	1 147
	Female	888	306	88	15	-	18	3	21	437
2014	Total	3 169	549	275	256	40	96	8	220	1 725
	Male	2 352	376	198	244	39	74	4	148	1 269
	Female	817	173	77	12	1	22	4	72	456
2013	Total	3 252	522	302	221	62	109	16	261	1 759
	Male	2 382	380	205	205	59	81	9	179	1 264
	Female	870	142	97	16	3	28	7	82	495
2012	Total	3 287	560	259	250	67	136	19	242	1 754
	Male	2 377	370	176	235	66	99	12	175	1 244
	Female	910	190	83	15	1	37	7	67	510
2011	Total	2 677	519	252	215	60	146	15	222	1 248
	Male	1 876	350	156	196	58	98	10	171	837
	Female	801	169	96	19	2	48	5	51	411
2010	Total	2 933	595	296	273	62	136	22	195	1 354
	Male	2 073	384	195	254	61	97	14	145	923
	Female	860	211	101	19	1	39	8	50	431
2009	Total	2 898	559	266	318	90	123	15	176	1 351
	Male	2 111	386	174	305	89	89	11	131	926
	Female	787	173	92	13	1	34	4	45	425
$\chi^2$			$\chi^2(8, N=559) = 19.5, P = 0.012$ *	$\chi^2(8, N=161) = 10.0, P = 0.265$	$\chi^2(8, N=233) = 9.8, P = 0.274$	$\chi^2(8, N=402) = 3.5, P = 0.896$	$\chi^2(8, N=988) = 4.4, P = 0.70$	$\chi^2(8, N=1) = 2.7, P = 0.947$	$\chi^2(8, N=21) = 33, P = 0.718$	$\chi^2(8, N=13994) = 68.8, P = 0.000$ **

Table 3: Suicide cause age group and gender in 2009-2017

Age group	Gender	Illness	Family in-compatibility	Economic problems	Business failure	Emotional relationship and not marrying	Educational failure	Other	Unknown
<15	Male	22	31	0	0	8	12	35	298
	Female	34	52	4	0	9	8	31	303
15-19	Male	180	129	44	2	167	29	164	1053
	Female	133	166	10	0	85	25	111	917
20-24	Male	352	137	103	14	186	19	194	1268
	Female	127	124	14	1	62	6	83	531
25-29	Male	431	174	191	24	144	7	177	1056
	Female	142	115	19	1	38	4	66	340
30-34	Male	415	184	254	48	66	2	167	921
	Female	168	78	17	1	21	2	59	325
35-39	Male	317	175	264	58	45	1	138	803
	Female	172	44	15	0	10	0	42	244
40-44	Male	299	176	314	61	32		127	786
	Female	168	34	14	2	11		38	198
45-49	Male	268	140	301	54	23		104	786
	Female	141	29	8	1	3		35	190
50-54	Male	300	102	257	50	13	1	118	743
	Female	145	14	8	1	6	0	22	153
55-59	Male	312	61	220	44	13		79	596
	Female	115	16	9	0	5		20	137
60-64	Male	253	47	119	15	10		65	432
	Female	106	12	8	1	0		13	119
65-69	Male	191	26	74	12	6		53	329
	Female	102	6	2	0	0		14	101
70-74	Male	144	25	25	1	4		46	280
	Female	61	5	3	0	1		11	103
75+	Male	357	40	30	5	10		76	618
	Female	120	9	4	0	2		36	248
Unknown	Male	9	7	7	5	6		6	101
	Female	8	3	0	1	2		3	15
$\chi^2$		( $\chi^2(14, N=5592)=85.9, P=0.000$ )**	( $\chi^2(14, N=2161)=44.7, P=0.000$ )**	( $\chi^2(14, N=2338)=11.6, P=0.000$ )**	( $\chi^2(13, N=402)=1.6, P=0.553$ )	( $\chi^2(14, N=988)=5.1, P=0.013$ )	( $\chi^2(6, N=116)=5.1, P=0.531$ )	( $\chi^2(14, N=2133)=61.9, P=0.000$ )**	( $\chi^2(14, N=13994)=89.4, P=0.000$ )**

Suicide due to family incompatibility ( $P=0.001$ ), emotional relationship and not marrying the desired person one wants ( $P=0.012$ ), educational

failure and unknown reasons ( $P=0.001$ ) was mostly seen in the 15-19 yr age group.

**Table 4:** Suicide method age group and gender in 2009-2017

Age group	Gen	By hanging	Taking ...	Throwing	By drowning	Using fire-arm	By burning	Using a ...	Using nat-	Throwing	Other
<15	M	251	4	22	3	113	1	3	3	1	5
	F	217	27	51	5	124	0	1	0	0	16
15-19	M	824	63	129	40	621	7	10	11	8	55
	F	538	169	220	14	444	1	3	0	3	55
20-24	M	962	96	182	42	804	13	64	10	11	89
	F	403	93	184	18	212	0	1	0	1	36
25-29	M	996	79	191	38	760	8	24	14	17	77
	F	366	68	127	12	114	3	3	2	1	29
30-34	M	967	71	201	53	635	8	35	13	7	67
	F	318	69	127	12	100	4	6	2	3	30
35-39	M	842	106	135	36	571	9	20	11	7	62
	F	276	53	93	15	51	1	7	1	4	28
40-44	M	896	74	117	31	565	9	28	12	10	53
	F	259	31	84	17	45	2	0	0	6	21
45-49	M	871	97	120	31	483	3	21	3	4	43
	F	236	34	72	9	31	1	6	2	4	12
50-54	M	824	74	93	15	487	7	31	8	8	37
	F	216	33	53	12	12	1	2	1	2	17
55-59	M	727	71	94	17	351	7	17	2	4	35
	F	193	24	56	8	8	1	5	1	2	4
60-64	M	483	52	93	16	245	5	19	1	4	23
	F	163	14	46	7	3	2	5	1	0	18
65-69	M	354	36	61	13	189	1	15	1	3	18
	F	144	18	41	4	3	3	2	0	0	10
70-74	M	268	26	59	12	133	0	10	0	1	16
	F	116	12	32	7	3	2	3	0	0	9
75+	M	639	56	132	16	226	4	25	2	2	34
	F	275	24	86	5	4	3	4	0	0	18
Unknown	M	82	0	11	4	31	2	0	1	1	4
	F	16	0	2	1	2	0	1	0	0	2
$\chi^2$		( $\chi^2(14, N=1372)$ )=287.8, $P=0.000$ **	( $\chi^2(14, N=1587)$ )=187.2, $P=0.000$ **	( $\chi^2(14, N=291)$ )=110.1, $P=0.00$ **	( $\chi^2(14, N=513)$ )=15.1, $P=0.36$ 6)	( $\chi^2(14, N=7370)$ )=1145.9, $P=0.000$ **	( $\chi^2(14, N=108)$ )=23.2, $P=0.05$ 7)	( $\chi^2(14, N=371)$ )=31.6, $P=0.05$ *)	( $\chi^2(13, N=102)$ )=15.4, $P=0.28$ 2)	( $\chi^2(14, N=114)$ )=15.3, $P=0.35$ 6)	( $\chi^2(14, N=923)$ )=50.3, $P=0.00$ 0)**

Other causes were most common in the 20-24 age group ( $P=0.001$ ). Suicide due to illness was observed between the ages of 30-34 ( $P=0.000$ ). Between the ages of 40-44 yr, economic problems ( $P=0.001$ ) and suicides due to job failure were seen. Among the causes of suicide with the Anova method, disease ( $P = 0.10$ ); job failure ( $P = 0.41$ ) and other causes ( $P = 0.001$ ) differed statistically.

As the most common method of suicide; hanging oneself, using a firearm, throwing oneself from a high place and using chemicals were found to be statistically significant. Suicide methods by hanging and using firearms were the most frequently used methods ( $P<0.001$ ). The use of these two methods varied according to age group and gender. (Table 3 or 4).

## Discussion

Unfortunately, suicides occur all over the world. According to the statistics of the WHO in 2015, suicide death rates per hundred thousand. It was detected in Sao Tome and Principe as (2.0), in Antigua and Barbuda as (0.0), in Azerbaijan as (3.3), in Pakistan as (2.1) and in Turkey as (8.7). This speed is lower than Europe and other low-income countries (15). Although the WHO reported the approximate death rate as 8.7 in Turkey, the average 10-year approximate death rate in Turkey was 4.04 and in 2015 the approximate death rate was 4.15. In 2017 it was 3.82 (14, 5).

Suicide rates also differ in Turkey according to gender and age, for example, in Klonsky's study, suicides are three times more common in men than in women. On the other hand, these suicide rates were 1.7 (1). Only in China and Bangladesh, women had higher suicide rates than men (16). In a Hungarian study, the rate of completed suicide was three to four times higher in men than in women, and in England and Wales the suicide rate in young men had doubled in the last two decades and was the most common cause of death in young men under 35 (17, 18).

In this study, suicide rates were found to be high in people under the age of 30 yr regardless of gender and our male- female suicide rate was 2.7 in other age groups. The compatibility of the result with the world literature has led to the fact that it can be seen as a result of suicide due to multifactorial causes. The prevalence of suicide in men almost all over the world may be the cause of suicide which may be related to the nature of men and the male gender model in society. Culture, personal sensitivity, personal tolerance and the influence of the environment can be quite effective in the inner world of men. Because in Turkey causes of suicide such as illness, economic problems, family adjustments are active factors that create responsibility in the dominant role of the male gender. Socio-cultural responsibility attitudes in Turkey are predominantly directed towards male characters. Age patterns also often differ between countries. Suicide is the second leading cause of death among young women aged 15 to 29 yr, and in some countries among young women aged 15 to 19 yr (1). Our country data also support these findings. In this context, the age, causes and consequences of suicide are still discussed in the world, because suicidal behaviors are the result of situations that can cause a series of long-term negative consequences in adults, such as psychological distress, low academic performance, mental and physical health problems, unemployment, loneliness, and low life satisfaction (19). In adolescents, multifactorial factors such as personal, interpersonal and environmental variables, may be associated with adolescent suicidal ideation and attempts (20). People between the ages of 10 and 24 yr make up about 38.3% of the population. The transition from childhood to adolescence is the process in which there are important developmental changes accompanied by physical and psychological difficulties and risky behaviors are the most common form of behavior in which difficulties increase vulnerabilities in this change process (4).

In our study, the causes of suicides in the adolescent age group are seen as family

disharmony, emotional relationship problems, forced marriage or not being able to marry the desired people, unsuccessful education and unknown reasons. This situation appears to be demanding of adolescents' individuality or self-expression, their own ideas and opinions being valued. For example, in our study, high-dose drug use or jumping from height was common in adolescents for suicidal purposes. These can be interpreted as manifestations of excessive behavior. In addition, we think that changes in body and hormonal chemistry in some risky behaviors during adolescence may pave the way for suicide, perhaps by the parameters that can form the definition of adolescence.

The prevalence of suicide methods also differs between countries. For example, pesticides appear to be used for suicides, with around 30% of global suicides occurring in rural farming areas, most of them in low- and middle-income countries. Other common suicide methods are hanging and the use of firearms (5). These differences can be seen more clearly in this way. For example regarding Africa, South Africans mostly hang themselves (69% for men, 41% for women). Pesticide and drug poisoning appears to be the second most common method used (35%, mostly women). For the Americacontinent, in the United States suicides are most common by firearms with 61% by men and 36% by women; women also die from poisoning at a rate of 31%. For Asia, in the Asian region, people mostly choose to hang themselves (23% in Hong Kong, 69% in Japan, 92% in Kuwait), but Hong Kong men end their lives in falls more frequently (43%) and with other unspecified methods (23%). European men also die by hanging the most (33% in Finland, 91% in Poland). The use of firearms in male suicide was the second most common method in Finland, Norway, France, Austria and Croatia (21-27%), while falls were common in Luxembourg, Spain and Malta (18-22%). In European women, hanging themselves (15% in Luxembourg, 83% in Lithuania) and other poisonings (7-43%), even in Moldova and Portugal women poisoned themselves with pesticides (18 and 24%), as well as falls (high

(Luxembourg: 29%, Spain: 37%, Malta: 57%) was used as a form of suicide (16). Our results showed almost the same changes. Availability, acceptability, as well as lethality of methods of suicide may vary over time, gender, age, and may depend on modernization. Life changes may also affect methods and causes.

## Conclusion

Suicide is not inexplicable but is a complex situation which is major problem all over the world. We have seen our detailed parameters in Turkey. There were differences between gender, method, cause, and also age groups. The variability of many parameters of suicides may explain the multidimensional nature of suicides in Turkey. Healing all these factors in themselves can be effective in creating a healthier society and preventing suicide.

## Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the author.

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## Conflict of interest

The author has no conflicts of interest to declare

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