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ORIGINAL ARTICLE / ORİJİNAL MAKALE

Epidemiological characteristics of suicide mortality in Turkey and trend over the years, 2007-2019

Türkiye'de intihara bağlı ölümlerin epidemiyolojik özellikleri ve yıllar içindeki trendi, 2007-2019

Ayşe Gülsen Teker[a]

[a]MD, Marmara University School of Medicine Public Health Department Istanbul, Turkey.

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ABSTRACT

Objective: Suicide is an important public health problem today. Accurate, complete, timely, and rapid registration and evaluation of data about suicide will form the basis for preventive interventions to be developed. This study aims to determine the epidemiological features of suicide mortality in Turkey between 2007-2019 and examine the trend of suicide mortality rates. **Methods:** In this study, the Turkish Statistical Institute (TURKSTAT) data was used, all deaths related to suicide in Turkey between 2007-2019 were analyzed. The change in age-adjusted suicide-related mortality rates over time was evaluated by Jointpoint regression analysis. **Results:** Between 2007 and 2019, the age standardised suicide-related mortality rates in males increased by an average of 1.3 percent annually, and this change was statistically significant ($p<0.05$). In females, this value decreased by an average of 2.6 percent annually in the same period, and this change was statistically significant, too ($p<0.05$). There was no statistically significant change in total. In 2019, the male/female ratio in age standardised suicide-related mortality rates was 3.4. However, in the 0-14 age group, the rate was similar for females and males. **Conclusion:** While it decreases in the world, the suicide mortality rates in Turkey do not decrease. The increase in suicide mortality seen in males is noteworthy. In females, the 0-14 age group is seen as risky. Preventive programs and regulations primarily for risky groups are essential in combating this important public health problem.

Keyword: Suicide, Mortality, Epidemiology, Turkey

Correspondence: Ayşe Gülsen TEKER, Marmara University School of Medicine Public Health Department Istanbul, Turkey.
E-mail: aysegulsenteker@gmail.com **Tel:** +90 542 604 66 73

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ÖZ

Amaç: İntihar günümüzde önemli bir halk sağlığı sorunudur. İntihar konusundaki verilerin doğru, tam, zamanında ve hızlı kaydedilmesi ve değerlendirilmesi geliştirilecek koruyucu müdahaleler için temel oluşturacaktır. Bu araştırmanın amacı Türkiye'de 2007-2019 yılları arasında meydana gelen intihara bağlı ölümlerin epidemiyolojik özelliklerini belirlemek ve intihara bağlı ölüm hızlarının yıllar içindeki trendini incelemektir. **Yöntem:** Türkiye İstatistik Kurumu (TUİK) verilerinin kullanıldığı bu araştırmada 2007-2019 yılları arasında Türkiye'de görülen tüm intihara bağlı ölümler analiz edilmiştir. Yaşa göre standardize edilmiş intihara bağlı ölüm hızlarının zaman içinde göstermiş olduğu değişim Jointpoint regresyon analizi ile değerlendirilmiştir. **Bulgular:** 2007-2019 yılları arasında erkeklerde yaşa göre düzeltilmiş intihara bağlı ölüm hızları yıllık ortalama yüzde 1.3 artış göstermiştir ve bu değişim istatistiksel olarak anlamlıdır ($p<0.05$). Kadınlarda ise aynı süreçte bu değer yıllık ortalama yüzde 2.6 azalma göstermiştir ve bu değişim de istatistiksel olarak anlamlıdır ($p<0.05$). Toplamda ise istatistiksel olarak anlamlı bir değişim olmamıştır. Yaşa göre standardize edilmiş intihara bağlı ölüm hızlarının erkek/kadın oranı 2019 yılında 3.4'dir. Ancak 0-14 yaş grubunda kadınlardaki yaşa göre standardize edilmiş intihar bağlı ölüm hızları erkekler ile benzer seyretmektedir. **Sonuç:** Dünyanın aksine Türkiye'de intihara bağlı ölüm hızları azalmamaktadır. Erkeklerde görülen intihara bağlı ölüm hızlarının artışı çarpıcıdır. Kadınlarda ise 0-14 yaş grubu riskli görülmektedir. Özellikle riskli gruplara yönelik koruyucu programlar ve düzenlemeler bu önemli halk sağlığı sorunuyla mücadelede önem taşımaktadır.

Anahtar Kelimeler: Intihar, Ölüm, Epidemiyoloji, Türkiye

Introduction

Suicide is defined as death resulting from intentional self-harm.[1]

Suicide is an important public health problem. There are approximately 800 000 deaths from suicide each year in the world. This number is higher than deaths from breast cancer, malaria, or murder. Suicide is among the 20 most common causes of death globally. More than half of suicides occur before the age of 45. In the 15-29 age group, suicide is the second most common cause of death after traffic accidents. In 2016, 79% of suicides occurred in low-middle-income countries. When suicides are evaluated as a rate, Africa, Europe, and Southeast Asia regions of the World Health Organization (WHO) have suicide mortality rates above the world average.[2]

Suicide data show differences according to variables such as age, gender, means of suicide. There are also significant differences between WHO regions. These differences can be as high as ten times. Cultural and economic factors are influential in these differences. For this reason, it is essential to record and evaluate country-specific suicide data regularly and to organize these data according to international standards.[3,4]

Suicide is a preventable cause of death. Therefore, reducing suicide-related deaths is one of WHO global goals. A United Nations Sustainable Development Goals domain to reduce preventable deaths by one-third by 2030 is to reduce suicides. WHO characterizes the regular evaluation of suicide data as the backbone of establishing an effective prevention program and emphasizes the importance of making evaluations according to age, gender, and means of suicide. Thus, the size of the problem can be revealed, and solutions specific to risk groups can be developed.[4]

In addition, the fact that Turkey is a developing country, is in a location that unites Asia and Europe, and has both regions' socio-cultural and economic characteristics makes it essential to examine the trend of suicide-related deaths in Turkey.

This study aims to determine the epidemiological characteristics of suicide-related deaths that occurred between 2007-2019 in Turkey and to examine the trend of suicide-related mortality rates over the years.

Methods

The data for the research was taken from the official website of the Turkish Statistical Institute (TURKSTAT).[5]

All death records at the national level are collected and presented annually by TURKSTAT. TURKSTAT is the only institution where death data is collected. TURKSTAT records suicide-related deaths with the variables of age, gender, means of suicide, the reason for suicide, education level, marital status, province of residence, and month of suicide. In this study, data used were the number of suicides, age, gender, means of suicide, educational status, and marital status variables. TURKSTAT allows the use of publicly available data for scientific purposes. Since there were data between 2007-2019 in the TURKSTAT database, the period of 2007-2019 was examined in the study.

With the number of suicide-related deaths obtained from TURKSTAT, firstly, the crude mortality rates (CMR) and age-specific mortality rates for women and men were calculated for each year, and then age standardised suicide-related mortality rates (ASMRs) were calculated using the standard population rates of the World Health Organization (WHO).[6]

In the last step, to evaluate the trend of mortality over the years, with Joinpoint regression analysis (Joinpoint Regression Program, version 4.9.0.0; Statistical Methodology and Applications Branch, Surveillance Research; Program, National Cancer Institute, Bethesda, MD, USA) annual average percent change (AAPC) of ASMRs values was calculated.

Jointpoint regression analysis was created primarily to evaluate cancer-related mortality trends, and then it started to be used in more expansive areas. This analysis shows whether the change in mortality rates over the years is statistically significant. Descriptive findings were presented with numbers and percentages, and the statistical significance level was taken as <0.05. Ethics committee approval for the study was obtained from Ethics Committee of Marmara University School of Medicine (Protocol Number: 09.2021.717 Date:04.06.2021).

Results

In the 13 years between 2007 and 2019, a total of 40,180 suicide-related deaths occurred; 29,287 of these were seen in men (72.9%) and 10,893 (27.1%) in women. 1.8% of male suicides occurred between the ages of 0-14, 85.4% between the ages of 15-64, and 11.6% at 65 and over. In women, these rates are 5.6%, 82.4%, and 10.6%, respectively (Table 1 and Table 2).

ASMRs values were 4.91 per 100,000 in men in 2007; 6.10 in 2019 and 2.59 per 100,000 in women in 2007; 1.81 in 2019. While the female/male ratio of ASMRs values was 1.9 in 2007, it increased to 3.4 in 2019. The only age group in which ASMRs values were similar in women and men was the 0-14 age group. Total ASMRs values were 3.72 in 2007 and 3.95 per 100,000 in 2019 (Table 3).

The change in ASMRs values over the years was evaluated by Jointpoint regression analysis. Accordingly, between 2007 and 2019, ASMRs in men increased by an average of 1.3 percent annually, and this change was statistically significant ($p<0.05$). In women, ASMRs values decreased by an average of 2.6 percent annually in the same period, and this change was statistically significant, too ($p<0.05$). There was no statistically significant change in total (Table 4 and Figure 1).

Table 1. Number of suicide-related deaths between 2007 and 2019 by age group in men

Years	0-14		15-64		+65		unknown		Total	
	n	%	n	%	n	%	n	%	n	%
2007	34	1.9	1476	81.6	189	10.5	109	6.0	1808	100.0
2008	28	1.5	1545	80.3	262	13.6	89	4.6	1924	100.0
2009	49	2.3	1795	85.0	256	12.1	11	0.5	2111	100.0
2010	48	2.3	1763	85.0	239	11.5	23	1.1	2073	100.0
2011	45	2.4	1577	84.1	240	12.8	14	0.7	1876	100.0
2012	53	2.2	2018	84.9	270	11.4	36	1.5	2377	100.0
2013	39	1.6	2041	85.7	279	11.7	23	1.0	2382	100.0
2014	59	2.5	2020	85.9	246	10.5	27	1.1	2352	100.0
2015	36	1.5	2050	86.9	267	11.3	5	0.2	2358	100.0
2016	42	1.7	2096	86.4	286	11.8	2	0.1	2426	100.0
2017	36	1.5	2132	87.2	277	11.3	0	0.0	2445	100.0
2018	34	1.3	2196	86.8	299	11.8	0	0.0	2529	100.0
2019	38	1.4	2300	87.6	288	11.0	0	0.0	2626	100.0
Total	541	1.8	25009	85.4	3398	11.6	339	1.2	29287	100.0

Table 2. Number of suicide-related deaths between 2007 and 2019 by age group in women

Years	0-14		15-64		+65		unknown		Total	
	n	%	n	%	n	%	n	%	n	%
2007	58	5.9	777	78.9	79	8.0	71	7.2	985	100.0
2008	48	5.4	737	82.6	63	7.1	44	4.9	892	100.0
2009	46	5.8	655	83.2	83	10.5	3	0.4	787	100.0
2010	59	6.9	713	82.9	82	9.5	6	0.7	860	100.0
2011	58	7.2	670	83.6	69	8.6	4	0.5	801	100.0
2012	53	5.8	743	81.6	111	12.2	3	0.3	910	100.0
2013	46	5.3	726	83.4	94	10.8	4	0.5	870	100.0
2014	64	7.8	647	79.2	100	12.2	6	0.7	817	100.0
2015	47	5.3	725	81.6	110	12.4	6	0.7	888	100.0
2016	39	5.1	641	83.6	87	11.3	147	1.3	767	100.0
2017	30	4.1	599	82.8	94	13.0	0	0.0	723	100.0
2018	37	4.6	688	84.6	88	10.8	0	0.0	813	100.0
2019	25	3.2	658	84.4	97	12.4	0	0.0	780	100.0
Total	610	5.6	8979	82.4	1157	10.6	294	2.3	10893	100.0

Table 3. ASMRs in 100000 by gender, 2007-2019

Years	male				female				Total
	0-14	15-64	+65	total	0-14	15-64	+65	total	
2007	0.09	4.10	0.72	4.91	0.17	2.19	0.23	2.59	3.72
2008	0.08	4.21	1.01	5.29	0.14	2.04	0.19	2.37	3.78
2009	0.13	4.80	0.95	5.88	0.13	1.79	0.24	2.16	3.99
2010	0.13	4.63	0.84	5.60	0.17	1.91	0.23	2.30	3.93
2011	0.12	4.07	0.82	5.01	0.17	1.77	0.18	2.11	3.54
2012	0.14	5.13	0.90	6.18	0.15	1.93	0.28	2.36	4.25
2013	0.11	5.11	0.90	6.11	0.13	1.86	0.23	2.22	4.14
2014	0.16	4.99	0.75	5.89	0.18	1.63	0.24	2.05	3.96
2015	0.10	4.99	0.77	5.86	0.13	1.80	0.25	2.19	4.01
2016	0.11	5.02	0.81	5.94	0.11	1.57	0.19	1.87	3.89
2017	0.10	5.05	0.75	5.89	0.08	1.45	0.20	1.73	3.80
2018	0.09	5.13	0.78	5.99	0.10	1.64	0.18	1.93	3.94
2019	0.10	5.29	0.71	6.10	0.07	1.55	0.19	1.81	3.95

ASMRs: age standardized suicide-related mortality rates

Table 4. The trend of suicide mortality over the years 2007-2019

	AAPC						
	Lower Endpoint	Upper Endpoint	AAPC	Lower CI	Upper CI	Test Statistic (t)	p value
Total	2007	2019	0.3	-0.5	1.1	0.8	0.431
male	2007	2019	1.3*	0.4	2.3	3.0	0.012
female	2007	2019	-2.6*	-3.6	-1.6	-5.7	<0.001

AAPC: average annual percent change. CI: Confidence interval
*Indicates that AAPC is significantly different from zero at the alfa=0.05 level

Figure 1. The trend of suicide mortality over the years 2007-2019

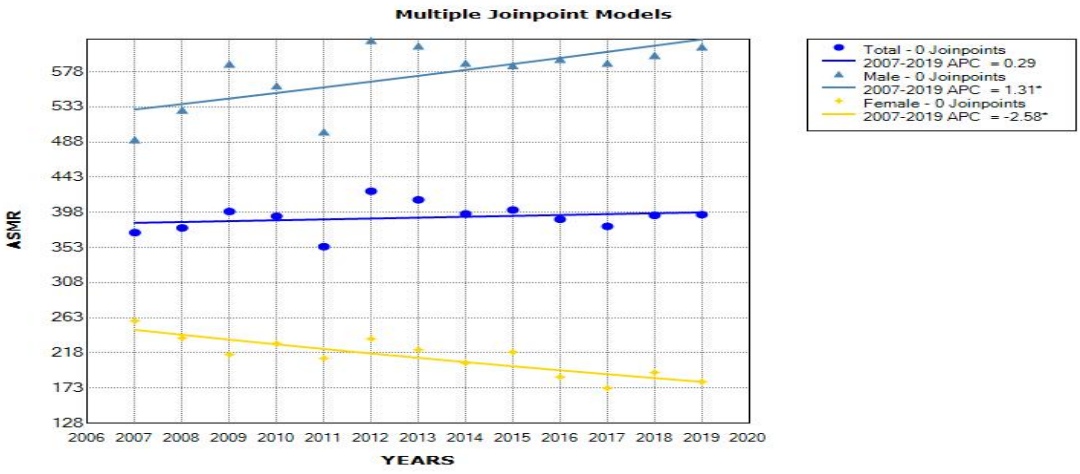

Table 5. Distribution of people who died by suicide by education level and marital status, 2007-2019

Education level	male		female		Total	
	n	%	n	%	n	%
Illiterate	496	1.7	1368	12.6	1864	4.6
Literate	1841	6.3	820	7.5	2661	6.6
5-year primary school graduate	8946	30.5	3208	29.5	12154	30.2
8-year primary school graduate	5243	17.9	2135	19.6	7378	18.4
Secondary school or an equivalent school graduate	2755	9.4	837	7.7	3592	8.9
High school or an equivalent school graduate	6065	20.7	1439	13.2	7504	18.7
Higher education graduate	2906	9.9	735	6.7	3641	9.1
Unknown	1035	3.5	351	3.2	1386	3.4
Total	29287	100.0	10893	100.0	40180	100.0
Marital status						
Never married	10738	36.7	4374	40.2	15112	37.6
Married	15268	52.1	4847	44.5	20115	50.1
Widowered	996	3.4	792	7.3	1788	4.4
Divorced	1916	6.5	770	7.1	2686	6.7
Unknown	369	1.3	110	1.0	479	1.2
Total	29287	100.0	10893	100.0	40180	100.0

The education level of the suicide cases was mostly 5-year primary school graduate (30.2%), and the second most frequent was high school or equivalent school graduate (18.7%); marital status was most frequently married (50.1%) and second most frequently never married (37.6%).

As for the means of suicide, hanging was the most frequently used method in both men and women (49.0% and 49.1%, respectively). The second most common means of suicide in men was using firearms (30.8%); jumping from heights in women (16.8%). The third most common means of suicide in men was jumping from heights (8.0%) and using firearms in women (15.3%). The fourth most common means of suicide in both men and women was chemical substances (4.6% and 11.1%, respectively) (Table 6).

Table 6. Distribution of people who died by suicide by means of suicide, 2007-2019

Means of suicide	male		female		Total	
	n	%	n	%	n	%
Hanging	14341	49.0	5348	49.1	19689	49.0
Using a firearm	9022	30.8	1671	15.3	10693	26.6
Jumping from heights	2335	8.0	1826	16.8	4161	10.4
Using chemical substance	1335	4.6	1209	11.1	2544	6.3
Drowning	496	1.7	208	1.9	704	1.8
Using a cutting tool	438	1.5	95	0.9	533	1.3
Using natural gas, cylinder gas etc.	139	0.5	13	0.1	152	0.4
Jumping under a train or other motorized vehicle	134	0.5	38	0.3	172	0.4
Burning	114	0.4	28	0.3	142	0.4
Other	933	3.2	457	4.2	1390	3.5
Total	29287	100.0	10893	100.0	40180	100.0

Discussion

This study found that the age-standardised suicide-related mortality rates in Turkey increased between 2007 to 2019 in men, decreased in women, did not change in total and that the suicide rate in men exceeded three times that of women in 2019.

According to WHO data, the suicide mortality rate in the world in 2016 was 10.5 per 100,000. Thus Turkey is a country with low suicide mortality rates. However, ASMRs decrease in other regions of the WHO except for the Americas.[2,7] Again, according to the Global Burden of Disease Study, there was a 32.7% decrease in ASMRs worldwide between 1990 and 2016. While the rate in women decreased by 49%, this decrease was 23.8% in men.[3] However, according to this study, ASMRs do not decrease in Turkey. There was a decrease in women, but an increase in men, but no significant change was found in the total. In a previous study conducted in Turkey with a similar methodology examining the change between 2002 and 2015, it was found that suicide rates increased by 2.3% per year in men, and it decreased by 3.1% in women annually.[8]

In another study, it was found that suicide-related death rates increased in all age groups in men in Turkey.[9]

Previously, the male/female ratio in suicide mortality was found to be 1.53 in Turkey[8] and present study revealed that this ratio has increased. This difference is similar across the world. According to WHO data, the ratio of male/female suicide mortality rates worldwide is 1.8. However, while this ratio is close to 3 in high-income countries, the rates for men and women are almost equal in low-income countries.[2] In this sense, data for Turkey are in line with high-income countries. This does not mean that women in Turkey are less likely to attempt suicide. Various studies examining suicide attempts in Turkey reveal that women attempt suicide equally or generally more than men.[10-15] However, the completion rate of suicide attempts is 3-5 times higher in males.[10,11] Although ASMRs were generally lower in women, similar rates were observed in the 0-14 age group between men and women. Studies conducted in Turkey and other parts of the world support this result.[3,8] This reveals that being in the 0-14 age group may be a risk factor for suicide in women. Suicide-related deaths in this age group were primarily observed in low-middle-income countries. Therefore, socio-economic and cultural factors may be influential.[2]

Considering the suicide patterns, almost half of the cases used the hanging means. In previous studies in Turkey, hanging is the most frequently used means in completed suicides.[8,9,16] However, when all suicide attempts are examined, it is seen that drugs and other chemical substances are used much more frequently.[10-15,17-19] While hanging is in the first place in the world, the use of firearms is the most frequently used means in the Americas.[20]

The study's strength is that all suicide-related deaths recorded in the TURKSTAT database between 2007 and 2019 were examined. Its limitations are that only suicides that resulted in death were studied; only the data in the TURKSTAT database were used, and cultural, economic, and regional differences were not examined due to lack of data.

Conclusion

In conclusion, in this study, which analyzed all deaths caused by suicide in Turkey during the 13 years between 2007-2019, ASMRs in men increased unlike the world, decreased in women and ASMRs did not decrease in Turkey in total. The suicide mortality rates in men exceeded three times that of women except for the 0-14 age group; women's suicide rates were similar to men's. Its critical data on suicide-related deaths must include socio-economic, cultural, and economic differences and developing preventive programs in light of these data, especially for risky groups that will form the basis of combating this important public health problem.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Marmara University School of Medicine (Protocol Number: 09.2021.717 Date:04.06.2021).

Conflict of Interest: The author have no conflict of interest to declare.

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