

Why are Suicides With Unknown Cause the Most Important Reason for Suicide? A Retrospective Study

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Abstract

This study will help in determining national suicide prevention strategies. Moreover, understanding the reasons for the lack of awareness about completed suicide will strengthen the measures to be taken in this regard. It was determined that the most important rate among the causes 48419 completed suicide in Turkey in the years 2004 to 2019 was the 22645 (46.76%) suicides of unknown cause and there was not enough information about the underlying causes. Suicide statistics data of the Turkish Statistical Institute (TUIK) between 2004 and 2019 were analyzed retrospectively in terms of geographical regions, gender, age groups and seasonality. Statistical analyses of the study were performed using the Statistical Package for Social Sciences for Windows (IBM SPSS version 25.0, Armonk, NY, USA) software. It was determined that the highest crude rate of suicide during 16 years was in the Eastern Anatolia region, the lowest rate was in the Marmara region, and the ratio of the number of female suicides with unknown cause to the number of male suicides was higher in Eastern Anatolia than in other regions, the rate of unknown crude suicide in both genders was highest in the under 15 age group, this rate decreased as the age progressed, the lowest rate was in women with unknown age, the effect of the season was observed in women with unknown cause, but not in men. Between 2004 and 2019, suicides with unknown cause were the most important reason for suicide. We think that there may be geographical, gender, age, seasonal, sociocultural and economic factors that may affect this, national suicide prevention and planning strategies will be insufficient unless this issue is adequately examined, and institutional structures should be established, including psychiatrists, where deep forensic investigations can be carried out.

Keywords

completed suicide, unknown causes, sex, age, season, Turkey

What do we already know about this topic?

There is limited information in the literature on this subject.

How does your research contribute to the field?

I think it will help in determining national suicide prevention strategies.

What are your research's implications toward theory, practice, or policy?

Understanding the reasons for the lack of awareness about completed suicide will strengthen the measures to be taken in this regard.

Introduction

According to the World Health Organization (DSO) Suicide Worldwide in 2019 (Global Health Estimates) publication, it is stated that the data quality is 2 (Data have low completeness and/or issues with cause-of-death assignment which are likely to affect estimated deaths by cause and time trends. Moderate quality issues) in Turkey. In the same publication, it is stated that 2003 people (Female: 517, Male: 1486) completed suicide in Turkey and the crude suicide rate is 2.4 (F: 1.2, M: 2.4) per 100 000 (the reason for the difference could

not be understood as the databases used by WHO could not be accessed),¹ but the Turkish Statistical Institute (TUIK) states

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that 3406 people (F: 780, M: 2626) completed suicide in 2019 and the crude suicide rate is 4.20 per hundred thousand.²

Turkey is a country in the UMI (Upper-Middle-Income) group, which is located in the middle of the east and west in terms of social, economic, psychological and cultural aspects, and also has the characteristics of both developed and developing countries.³ Therefore, it is important to closely monitor the trends in suicide rates in Turkey in order to contribute to both national and international suicide epidemiology.⁴

Although there are methodological differences between countries in the processes of diagnosing, recording and reporting of suicide events, suicide rates in Turkey are lower than in western countries, similar to those in countries where Muslims live predominantly.¹ There are studies in Turkey that indicate that the proportion of Muslims is 82% to 99%.⁵⁻⁷ This ratio may be slightly higher in Eastern Anatolia (EA) and Southeastern Anatolia (SEA) regions, which are known for the abundance of tombs and prefectures belonging to personalities, most of which are sacred by the 3 monotheistic religions, and places with religious meaning.⁸

There are many factors that cause a person to commit suicide. These factors can be grouped into; individual (previous suicide attempt, mental problems such as depression, alcohol and substance addiction, financial problems, unemployment, economic recession, thoughts of hopelessness, social isolation, impulsive and aggressive tendencies, criminal problems, existing chronic diseases, genetic and biological factors), relational (family communication problems, domestic losses, gender-based violence in relationships, child abuse, natural disasters, wars and intra-communal conflicts, cultural differences due to migration, social welfare, health, housing, employment problems and financial difficulties), societal (barriers to health care, easy access to suicide vehicles, inappropriate attitudes or stigma toward psychiatric illness, cultural, religious, legal and historical differences) factors. It is rare for suicide to have a single cause, and it is often a complex but preventable behavioral pattern in which many factors are intertwined.^{9,10}

The World Health Organization states that timely recording and regular monitoring of suicide is the backbone of effective national suicide prevention strategies.¹¹ Considering that this is justified, when we look at the suicide registration system of TUIK; in the suicide statistics forms filled by the gendarmerie and security officers since 1974; it is seen that it contains data about the gender, age, marital status of the person who committed suicide, place of residence, occupation, education level, time of suicide, type of suicide, dependents and the reason for suicide. While it was requested to write the reasons for suicide by explaining in the section about suicide in 1974, it has been divided into 3 as psychological reasons (illness, family incompatibility, economic problems and business failure, emotional relations and not marrying the person wanted, educational failure), reasons which are not psychological and unknown reasons since 1984. In 1987, the distinction between psychological and non-psychological causes of suicide was abandoned, and in the same year, in the

suicide statistics form, it was presented as options (illness, family incompatibility, economic problems and business failure, emotional relations and not marrying the person wanted, educational failure and unknown) instead of explanation, and one of them was asked to be marked.

All suicide cases are considered as judicial cases in Turkey and are definitely included in the reports of the police and gendarmerie. When there is a death, the prosecutor's office steps in and if it deems necessary, the case is referred to the forensic medicine department, and as a result of the autopsy report and forensic investigation, it decides whether it is suicide or not.^{12,13} Although there are very reliable national suicide death records in Turkey, it is thought-provoking and worrying that there is almost half the uncertainty regarding the causes of suicide. Although there is no 100% accuracy or scientific certainty in scientific research related to suicide, such a lack of knowledge will make it difficult to understand and characterize the situations that cause suicide.^{14,15} More effective, preventive and protective strategies and plans can be made as reliable data on the cause of suicide can be obtained.

The aim of this study is to determine the possible causes of suicides with unknown cause (SUC) between 2004 and 2019, which can be obtained from TUIK, by gender, age, the season in which the suicide occurred, and its distribution in 7 geographical regions (Marmara, Aegean, Mediterranean, Central Anatolia, Black Sea, SA and SEA).

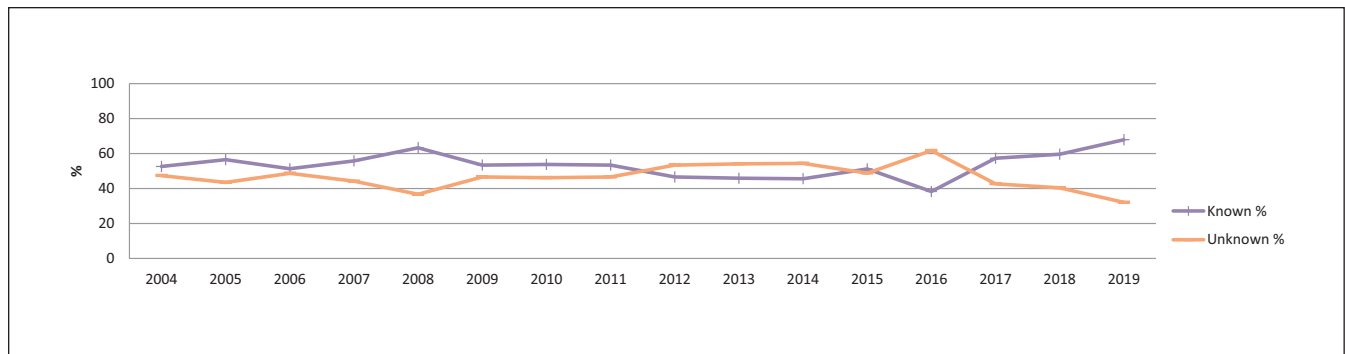
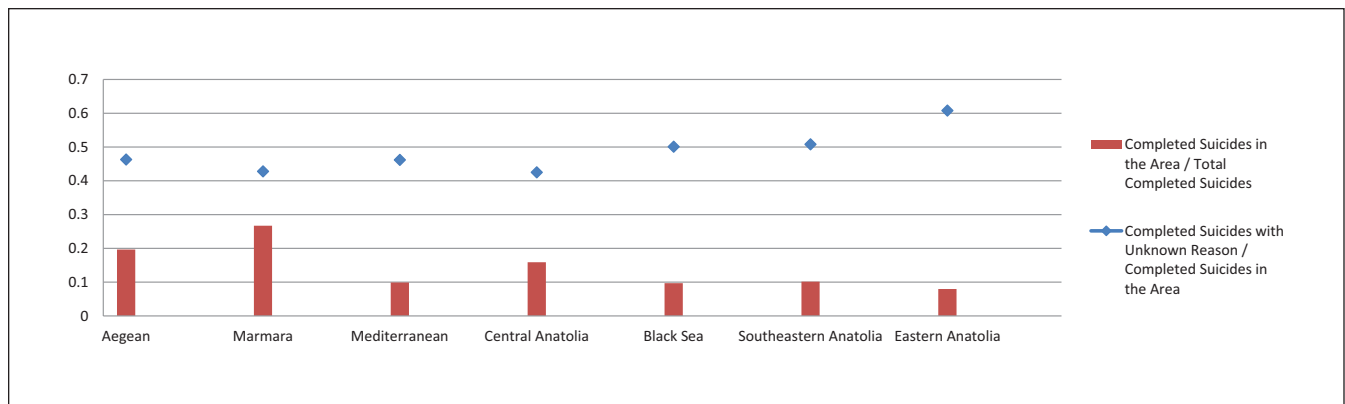
Methods

In this retrospective study, suicide statistics data between the years 2004 to 2019 of TUIK were examined. TUIK is the official organ of the state that compiles suicide statistics and publishes them for a fee starting from 1974. Completed suicides were compiled from the records of the General Directorate of Security and the Gendarmerie General Command from all accommodation unit until 2012. Since 2012, completed suicides have started to be compiled by including information obtained from death certificates and records of the Ministry of Justice, General Directorate of Prisons and Detention Houses. TUIK has been publishing suicide statistics on its official website (www.tuik.gov.tr), not in print, since 2012.

In this study, TUIK's internet database and printed written resources were used and the numbers, ratios and percentages of the obtained data were evaluated. Statistical analyzes were performed using the Statistical Package for Social Sciences for windows (IBM SPSS version 25.0, Armonk, NY, USA) software. Normality assumption of continuous variables was tested with Kolmogorov-Smirnov and Shapiro-Wilk tests. In addition, histogram graphs of the data were also examined for the test of normality. Descriptive statistics of the variables are given as Mean \pm standard deviation. Since observations were taken from the same regions on 16 different dates, the data were compared with the Repeated Measures Analysis of

Table I. Causes of Complete Suicide.

Total (%)		Illness		Family incompatibility		Economic problems and business failure		Emotional relationship and not marrying the person wanted		Educational failure		Other		Unknown	
No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
48419	100	9708	20.04	4370	9.02	4659	9.62	1997	4.12	317	0.65	4520	9.33	22645	46.76

**Figure 1.** Graph of the percentages of suicides with known and unknown cause.**Figure 2.** Comparison of known and unknown suicides in regions

Variance (RMANOVA) method. Differences between regions were compared using the Duncan multiple comparison test, and differences between years were compared using the Bonferroni multiple comparison test. $P < .05$ was interpreted as statistically significant in all statistical analyzes.

There was no need to obtain a separate permission or ethical approval for the use of this data, which is published on the Internet and is available to everyone.

Results

Between 2004 and 2019, there were 48419 completed suicide cases, it was determined that the leading cause of suicide was suicides of unknown origin (SUC), 22645 (46.76%), it was followed by illness (20.04%), economic problems and job failure (9.62%), other (9.33%), family discord (9.02%),

emotional relationship and not marrying the person wanted (4.12%), educational failure (0.65%) (Table 1).

When we examine the distribution of suicide numbers between 2004 and 2019; it is observed that the number of suicides with known and unknown causes is close to each other, while the ratio of the number of SUCs to the total number of suicides (known and unknown causes) in 2004 was 47.6% (1283/2707), it was increased to 61.7% in 2016 (1971/3193) and then started to decline. The ratio of the number of SUCs in the same region to the total number of suicides in the same region (2353/3865) was the highest in the EA region with 60.8%, it was followed by (2496/4911) 50.8% in the SEA, (2357/4701) 50.1% in the Black Sea, (4407/9518) Aegean with 46.3%, Mediterranean (2215/4790) with 46.2%, Marmara with 42.8% (5539/12933), and Central Anatolia with 42.5% (3278/7701) (Figures 1 and 2, Table 2).

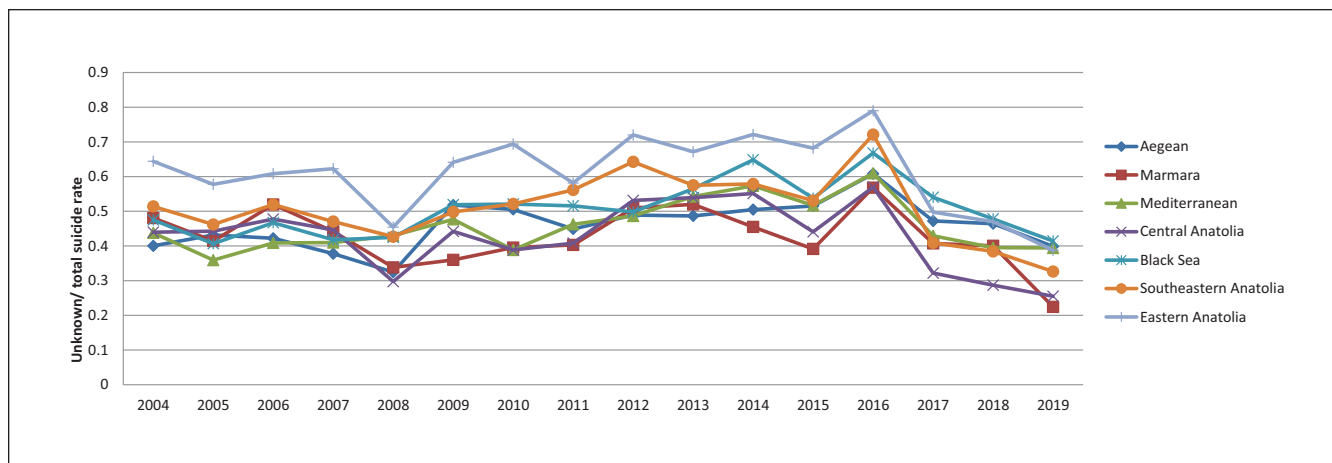


Figure 3. Ratio of suicides of unknown cause in the region.

Considering the ratio of the number of suicides in geographical regions to the total number of suicides (with known and unknown causes); as expected, it is observed that the highest number of suicides occurred in the Marmara region (Turkey's most populated region) with 26.71% (12.933/48.419), followed by 19.65% (9518) in the Aegean, 15.90% (7701) in Central Anatolia, 10.14% (4911) in the SEA, 9.89% (4790) in the Mediterranean, 9.70% (4701) in the Black Sea, and the least in EA (the region with the lowest population density in Turkey) region with 7.98% (3865) (Table 2 and Figure 2).

Considering the distribution of SUC in geographical regions over the years; it is observed that the rate of SUC in the EA region was higher between 2004 and 2016 compared to other regions, peaking at 78.8% in 2016, and a sharp decrease in the rate of SUC in each region after 2016 and after 2017, it is observed that this rate is slightly higher in the Black Sea region compared to other regions (Figure 3).

It is observed that 71.23% (34490) of the total (known and unknown) suicides are male, 28.76% (13929) are female, 70.17% (15891) of those who have SUC are male and 29.83% (6754) are female (Table 3).

When the gender characteristics between regions are examined; it is observed that the region with the highest ratio of women who committed SUC to the number of women who completed suicide in the same region was the EA with 66.70% (1058/1586), followed by SEA with 53.72% (988/1839), Black Sea with 50.23% (736/1465), the Aegean with 47.40% (1159/2445), the Mediterranean with 46.39% (676/1457), Central Anatolia with 42.04% (870/2069), and the lowest is the Marmara region with 41.29% (1267/3068). It is observed that the region with the highest SUC rate in males is EA with 56.82% (1295/2279), followed by Black Sea with 50.09% (1621/3236), SEA with 49.08% (1508/3072), the Mediterranean Sea with 46.17% (1539/3333), Aegean with 45.92% (3248/7073), Marmara with 43.30% (4272/9865) respectively and the lowest region is Central Anatolia with 42.75% (2408/5632) (Table 3).

Considering the ratio of US female suicides to SUC male suicides between regions, the EA region is higher than other regions between 2004 and 2016, while SEA stands out in the following years. Between 2005 and 2009 and in 2011, only in the EA region, the number of SUC female suicides was found to be higher than SUC males (Figure 4).

It was found that the distribution of total crude suicide rates between 2004 and 2019 was not statistically significant ($P=.755$), the total suicide rate was 3.88 to 4.34 per hundred thousand, but the SUC rate was 1.58 to 2.57 per hundred thousand and it was statistically significant ($P=.000$). While there has been a slight increase in the total crude suicide rate after 2016, it is observed that there is a decreasing trend in the rate of SUC. In terms of unknown suicide events, the lowest number of cases was detected in 2019 with an average of 1.46 ± 0.47 per 100 000 population, and the highest case in 2016 with an average of 2.57 ± 0.48 (Table 4, Figure 5).

According to the regional distribution of suicide cases per 100 000 population in Turkey in 2004 to 2019, the difference between regions in terms of SUC events is statistically significant ($P=.000$). It was observed that the crude SUC rate was highest in EA with 2.89 ± 0.59 average, followed by Aegean with an average of 2.31 ± 0.38 , Black Sea with 2.03 ± 0.24 , Mediterranean with 1.83 ± 0.45 , SEA with 1.81 ± 0.38 , Central Anatolia with 1.70 ± 0.43 , at least in the Marmara region with 1.51 ± 0.37 . The difference between regions in terms of total (known and unknown) suicide rates is also statistically significant ($P=.000$). In terms of total suicide rate, the region with the highest mean suicide rate per 100 000 population is the Aegean with an average of 5.01 ± 0.25 , followed by the EA with 4.75 ± 0.60 , the Black Sea with 4.05 ± 0.4 , Central Anatolia with 3.98 ± 0.3 , the Mediterranean with 3.97 ± 0.46 , and the SEA with 3.56 ± 0.37 and the lowest rate was found in the Marmara region with a mean of 3.52 ± 0.31 per 100 000 population (Table 5).

In Table 6, the distribution of SUC rates for women and men by age between 2004 and 2019 is given. According to this table, statistically significant relationships ($P=.000$)

Table 3. The Ratio and Distribution of Suicides of Unknown Reason and Total Suicide in the Region by Gender Between 2004 and 2019 in the Geographical Regions.

	Aegean			Marmara			Mediterranean			Central Anatolia			Black Sea			Southeastern Anatolia			Eastern Anatolia									
	Ulkn.		Total	Ulkn.		Total	Ulkn.		Total	Ulkn.		Total	Ulkn.		Total	Ulkn.		Total	Ulkn.		Total							
	F.	M.	F. M. Total	F.	M.	F. M. Total	F.	M.	F. M. Total	F.	M.	F. M. Total	F.	M.	F. M. Total	F.	M.	F. M. Total	F.	M.	F. M. Total							
2004	81	126	212	305	100	249	224	502	47	55	92	141	55	109	127	246	66	86	145	175	68	80	116	172	74	87	110	140
2005	71	163	182	360	76	209	185	503	32	65	88	182	51	111	134	232	58	79	154	183	47	68	99	150	75	70	121	130
2006	77	140	163	351	110	261	214	500	37	75	91	183	81	131	157	287	63	93	144	190	65	69	120	138	91	86	158	133
2007	67	126	156	355	89	237	220	518	29	71	69	175	58	150	143	323	62	78	150	185	62	73	131	156	71	61	116	96
2008	64	121	139	431	57	176	180	509	39	59	98	130	33	99	130	314	43	87	89	217	66	74	136	192	61	53	120	131
2009	82	235	144	468	73	212	172	620	38	85	77	181	59	143	117	340	47	104	79	212	60	79	109	170	66	68	89	120
2010	85	199	156	406	73	248	185	627	43	79	100	214	50	126	124	329	51	86	84	179	60	100	114	193	69	85	97	125
2011	65	182	137	413	54	191	158	450	41	89	86	195	54	119	124	300	45	71	76	149	50	105	93	183	102	80	127	186
2012	81	229	152	482	117	368	234	718	45	117	100	233	71	210	138	391	42	98	71	210	85	129	126	207	69	93	89	136
2013	82	226	159	474	97	360	191	688	45	121	91	215	80	202	134	389	46	115	67	218	70	141	128	239	75	99	100	159
2014	69	240	140	472	76	292	176	633	57	158	114	261	60	225	116	401	53	137	73	220	75	120	116	221	66	97	82	144
2015	82	238	150	471	66	262	192	646	58	109	99	224	57	185	149	400	31	119	70	209	72	127	133	242	71	107	95	166
2016	76	312	146	492	106	435	177	775	56	158	86	265	68	218	115	387	42	133	63	199	68	126	103	166	64	109	77	142
2017	54	234	129	481	68	293	175	711	36	116	89	265	26	134	95	402	36	111	63	209	50	85	112	218	31	78	60	159
2018	67	251	139	546	72	312	194	765	44	86	93	236	44	117	150	411	28	114	68	229	53	60	102	192	41	61	67	150
2019	56	226	141	566	33	167	191	700	29	96	84	233	23	129	116	480	23	110	69	252	37	72	101	233	32	61	78	162
Total	1159	3248	2445	7073	1267	4272	3068	9865	676	1539	1457	3333	870	2408	2069	5632	736	1621	1465	3236	988	1508	1839	3072	1058	1295	1586	2279

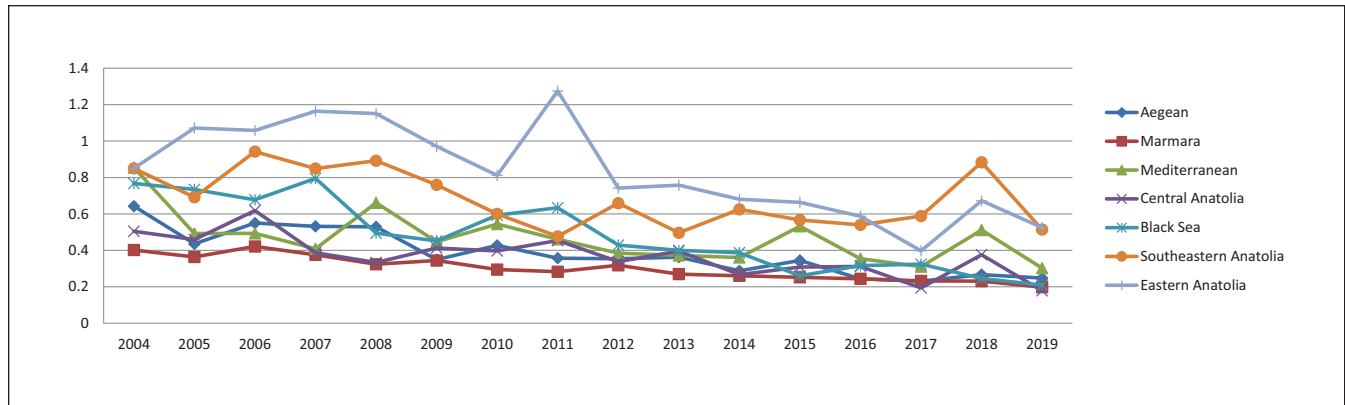


Figure 4. Interregional female suicides with unknown causes/male suicides with unknown causes.

Table 4. Distribution of Suicide Attempts in Turkey in the Years Between 2004 and 2019 (Per 100000 Population).

Years	Unknown ^a Mean \pm SD	Total ^a Mean \pm SD
2004	2.00 \pm 0.61abcd	4.09 \pm 0.70
2005	1.82 \pm 0.57abc	4.09 \pm 0.82
2006	2.10 \pm 0.67abcd	4.26 \pm 0.88
2007	1.83 \pm 0.40 abc	4.03 \pm 0.52
2008	1.58 \pm 0.41ab	4.09 \pm 0.76
2009	1.99 \pm 0.54 abcd	4.00 \pm 0.65
2010	1.98 \pm 0.58 abcd	4.03 \pm 0.45
2011	1.91 \pm 0.79 abcd	3.88 \pm 1.17
2012	2.39 \pm 0.40cd	4.33 \pm 0.50
2013	2.42 \pm 0.46cd	4.34 \pm 0.57
2014	2.44 \pm 0.51cd	4.22 \pm 0.58
2015	2.24 \pm 0.64bcd	4.27 \pm 0.58
2016	2.57 \pm 0.48d	4.00 \pm 0.69
2017	1.76 \pm 0.39abc	4.00 \pm 0.49
2018	1.68 \pm 0.44bc	4.07 \pm 0.66
2019	1.46 \pm 0.47a	4.20 \pm 0.69
<i>p</i>	.000	.755

^aThere is not a statistically significant difference between the means shown with the same letter in the same column ($P > .05$).

were found between age groups and unknown suicide rates in both genders and it was determined that the rate of unknown cases among suicide cases (the ratio of SUC cases to total suicide cases) in children under the age of 15 was higher than in other age groups. It was determined that, especially in women, the rate of unknown suicide cases is 0.61 ± 1.35 per hundred thousand in the group under the age of 15. It is observed that the rate of unknown suicide cases decreases with increasing age, and this rate reaches the lowest level in the group of women of unknown age (0.39 ± 0.24 per 100000). It was determined that there was a significant relationship between age groups and unknown suicide rates in men ($P = .000$), and the unknown suicide rate (0.65 ± 0.14) in the group under the age of 15 was higher than those in other age groups. It was determined that the unknown suicide rates

decrease as the age of the groups increased in men, and that the unknown suicide rate of the only age-unknown group was relatively high (0.60 ± 0.20 per 100000) unlike the women.

It is observed that the difference between the seasonal distribution of female crude SUC rates is statistically significant ($P = .000$), while these cases decrease in winter and autumn months, they increase in spring and summer months. Likewise, it is observed that the effect of the season is statistically significant ($P = .005$) in women whose cause of suicide is known, and while the values increase in the spring and summer seasons, they decrease in the winter and autumn seasons. It was determined that the difference between the seasonal distribution of suicide rates in men was not statistically significant, and the P value was .076 in those with known cause of suicide and .163 in those with unknown cause (Table 7).

Discussion

Although there are publications stating that there is approximately 50% uncertainty about the causes of cases that are decided to be suicidal in Turkey, exceeding 50% in some years, as the reason for this; they attribute suicide to the fact that the relatives of the suicide victims, who are affected by the disapproval of the society (stigma and taboo), may be reluctant to explain the real reason(s) behind the suicide because of a traumatic event, or that the authorities may be sensitive, filling out the forms as soon as possible and documenting it as an unknown suicide.¹⁴⁻¹⁶ The concept of obscurity is thought to be the result of multidimensional, relative, and complex interactions of many factors, rather than an event that can only be attributed to security officials or the relatives of the victim. Although it is not sufficient, we will try to explain the subject in the light of the data (gender, age, region and time of the event) we can reach through TUIK and based on the data related to the subject in the literature.

Considering the results of the studies on the causes of suicide, including different provinces and regions, evaluating completed suicides in Turkey; In studies conducted in different

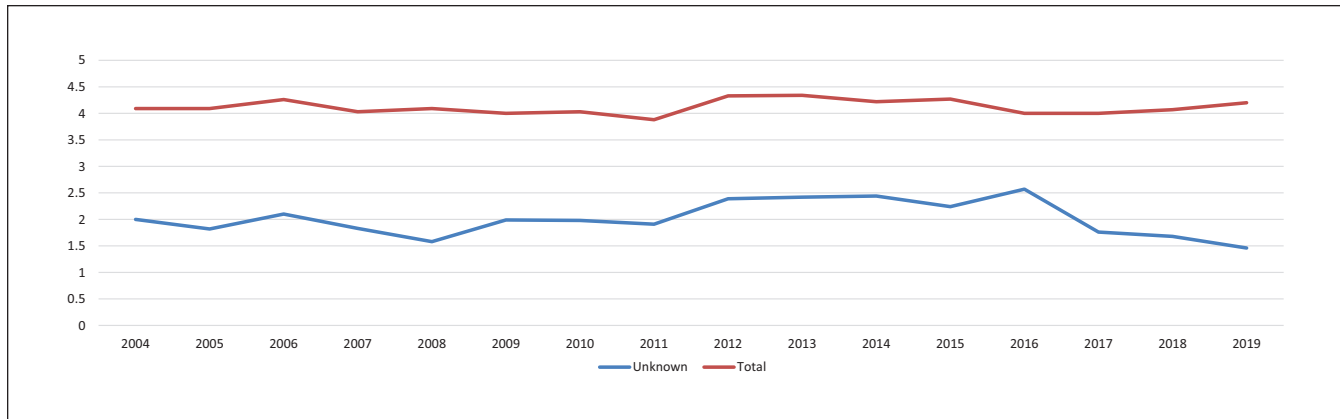


Figure 5. Distribution of suicides between 2014 and 2019 (per 100 000 population).

Table 5. Distribution of Suicides by Region in 2004 to 2019 in Turkey (Per 100 000 Population).

Regions of Turkey	Unknown ^a Mean \pm SD	Total ^a Mean \pm SD
Aegean	2.31 \pm 0.38d	5.01 \pm 0.25c
Marmara	1.51 \pm 0.37a	3.52 \pm 0.31a
Mediterranean	1.83 \pm 0.45bc	3.97 \pm 0.46b
Central Anatolia	1.70 \pm 0.43ab	3.98 \pm 0.3b
Black Sea	2.03 \pm 0.24cd	4.05 \pm 0.4b
Southeastern Anatolia	1.81 \pm 0.38abc	3.56 \pm 0.37a
Eastern Anatolia	2.89 \pm 0.59e	4.75 \pm 0.60c
<i>p</i>	.000	.000

^aThere is not a statistically significant difference between the means shown with the same letter in the same column ($P > .05$).

Table 6. Unknown Suicide Case Rates by Age Groups.

Age groups, year	Unknown female ratios	Unknown male ratios
< 15	0.61 \pm 0.13e	0.65 \pm 0.14c
15-24	0.54 \pm 0.10de	0.52 \pm 0.08b
25-34	0.44 \pm 0.07ab	0.43 \pm 0.07a
35-44	0.41 \pm 0.07ab	0.41 \pm 0.07a
45-54	0.42 \pm 0.07ab	0.43 \pm 0.07a
55-64	0.42 \pm 0.08ab	0.42 \pm 0.06a
≥ 65	0.49 \pm 0.09cd	0.47 \pm 0.06ab
Unknown age	0.39 \pm 0.24a	0.60 \pm 0.20c
<i>p</i>	.000	.000

geographical regions and provinces of Turkey.¹⁷⁻²⁹ while it is stated that there is no unknown cause, it is estimated that the reason for suicide is unknown in the study of Mete et al in the province of Bingöl of 99 cases (18% of all cases),³⁰ in the study of Şimşek et al. in the province of Manisa of 615 cases (9%),³¹ in the study of Goceoglu and Balci in Muğla province of 42 (24%),³² Bork et al of 89 cases (24.4%) in Elazığ province,³³ of 22 cases (11%) in Şevik et al 's study in Kastamonu,³⁴ of 12 cases (7.2%) in Çiftçi et al.'s study in Kars,⁹ in the study of

Arslan et al in Hatay province of 4 cases (4.94%).³⁵ While it is stated in the studies that the reason for suicide is mostly unknown, it is not entered into details and is not included in the statistical analysis, while in the studies of Oğuzhanoglu et al and Karataş et al it is stated that the relatives of the victims do not want to explain the real reason/reasons of suicide due to the effect of stigma and taboos.^{36,37} In the study conducted by Demir in Bursa, it was reported that no data on the cause of suicide could be reached.³⁸ From this, it is understood that the attitudes and behaviors of the researchers, as well as the attitudes of the victims' relatives, may vary according to the geographical region and provinces where the study was conducted.

Between 2004 and 2009, there was statistical significance in terms of suicide rates per hundred thousand, the cause of which is unknown, there has been a decrease in the rate of SUC since 2016, and in the same way, in terms of the number of suicides, after the SUC rate in 2016 reached 61.7% (78.8% in the Eastern Anatolia region), starting of this rate to decrease in every geographical region (Figures 3 and 5) brings to mind the military coup attempt on July 15, 2016, which concerns the whole society (in the decision of the state of emergency proceedings investigation commission dated 27.05.2022, it was stated that 125 678 dismissals from public service were carried out).

In terms of population density of geographical regions, Marmara comes first, followed by Central Anatolia, Mediterranean, Aegean, Black Sea, SEA and least EA region.¹⁴ Considering the ratio of the number of SUCs in the regions to the total number of suicides in the relevant region (Table 2); it is observed that the 3 regions with the lowest in the economic and social development index³⁹ in Turkey's geographical regions are ranked (EA, SEA and Black Sea regions). Considering the crude suicide rates as supporting data of this (Table 5); it is understood that the lowest crude SUC rate is 1.51 \pm 0.37 per hundred thousand in the Marmara region, where the development level is the highest, while the EA region with the lowest development level has the highest crude SUC rate with 2.89 \pm 0.59 per hundred thousand, and that the level

Table 7. Suicide Cases by Seasons.

Seasons	Known female	Known male	Unknown female	Unknown male
WINTER	100.06 ± 17.90a	273.18 ± 61.28	88.5 ± 18.04a	227.87 ± 55.24
SPRING	121.68 ± 25.42b	310.81 ± 57.01	113.0 ± 24.63c	266.50 ± 63.89
SUMMER	123.81 ± 26.17b	305.25 ± 60.66	125.37 ± 21.10c	270.31 ± 56.91
AUTUMN	102.87 ± 20.62a	273.18 ± 64.54	95.25 ± 22.80b	228.50 ± 63.65
P	.005	.163	.000	0.076

of development plays an active role in this regard. However, when looking at the crude SUC rates of other regions, for example, it is seen that the Aegean (second in the development index) region ranks second with 2.31 ± 0.38 per hundred thousand, while the SEA region immediately follows the Marmara (where the Forensic Medicine Institute is located) region with 1.81 ± 0.38 . This shows us that the concept of obscurity cannot be explained only by the level of development of the regions, and socio-cultural factors are also involved. Again, the similarities in the unknown and total (known and unknown) suicide rates in the EA and Aegean regions suggest that other factors such as internal migration may also have played a role, although there are cultural differences between the 2 regions.

Altınanahtar et al examined the determinants of suicide in Turkey for the period 1974 to 2007 and found that the most important factor having a crucial effect on suicide was the urbanization rate for the country.⁴⁰ Economic, social, cultural, geographical, demographic and political reasons are among the main causes of internal migration in Turkey. An important consequence of the internal migrations experienced because of the insufficient income from agriculture due to the rapid population growth in Turkey is the change in the social environment in which the individual lives and taking part in new social relations as well as individual changes. These social consequences have an impact on families, and with the migration, the extended family, which is accepted as the structure of the traditional village society, turns into an elementary family, and social solidarity patterns turn into urban organizations. Migrations cause high rates of unemployment, increasing impoverishment, inequality of income distribution and education costs, and the spread of child labor.^{39,41,42} In particular, it can be thought that these migrations to cities with a strong social and cultural infrastructure such as Marmara and Aegean regions may increase the suicide rates, and this may cause an increase in the SUC rates of the non-immigrants, especially those left behind.

The EA region, which occupies the largest area among Turkey's geographical regions, also draws attention with its very rugged and high altitude. Various factors affect the climate of the EA region. The average elevation of 2000 m (Turkey's average altitude is 1132 meters) and the climate characteristics that get harder from west to east affect vegetation, population distribution, habitation pattern and socio-economic life.⁴³ Climate characteristics, natural living conditions, sources of income, industrialization, education, demographic structure,

customs and traditions show significant differences in geographical regions of Turkey.⁴⁴ While the welfare level of the Aegean, Marmara and Mediterranean regions in the west of Turkey is higher, the welfare level of the EA and SEA regions is lower than other geographical regions.⁴⁵ The level of well-being may be one of the reasons why the causes of suicide are poorly known in these regions.⁴⁶ In addition, the fact that settlements and houses are widely spaced, the psychological effects of excessive rain and rainy weather on individuals and the widespread use of firearms in the Black Sea region are important factors that cause an increase in suicide rates.¹⁵

While the fact that it consists of a combination of individual and related situations, social and social factors that play a role in a person's suicide is constantly emphasized in the studies,^{33,42,47} it is observed that TUIK focuses on a single reason. According to TUIK data, it is understood that the most important reason for known suicides is disease (no physical or mental distinction was made) in both genders, economic problems are more prominent in men, family discord and problems in emotional relationships are more common in women, the rest are ranked as failure in education, others and unknown.⁴²

It is observed that the gender ratios of SUC ($M=70.17\%/F=29.83\%$) and total (known and unknown causes) ($M=71.23\%/F=28.76\%$) suicides are similar. When we examine the gender characteristics of SUC cases in geographical regions; it is observed that the EA region has a high level of unknown cases in both genders, and then it is ranked according to the approximate level of development (Table 3). In fact, it is observed that the number of women SUCs was higher than men in the EA region between 2005 and 2009 and in 2011. The fact that the F/M numerical ratio of SUC cases in SEA region surpassed the EA region after 2016 shows that similar problems are experienced in both adjacent regions (Figure 4 and Table 3).

It is mentioned in some studies that differences in age group may also lead to differences in the causes of suicide. When the suicide rate by age group in the TUIK 2011 suicide statistics is examined, as in other years, it is stated that the lowest number of completed suicides is in men under the age of 15, the highest male age group is in the 15 to 34 age group, and about 31.2% of the men who commit suicide are younger than 30 years old. It was determined that suicide intensified in the 15 to 34 age group in women, and 53.1% of the cases were younger than 30 years of age. In the study of Gönültaş,¹⁷ mostly anger at parents and self-restriction of parents were

cited as reasons for suicide in children. In this study, it is noteworthy that the rate of SUC in both genders was 0.61 ± 1.35 per hundred thousand ($P = .000$) at the highest in the group under 15 years of age, and the rate of unknown suicide decreased with increasing age, especially in this age group where the rate of suicide is the lowest in boys. This suggests that the families or relatives of boys are more over-protective and protective of the child, that they do not want to give more information about the child, or that the security forces do not want to receive more information about the children and perhaps children may have come under a burden (physical/sexual abuse or a mental disorder.) that they cannot bear at an early age. In a study conducted by Gören et al in Diyarbakır, it was stated that most of the causes of suicide in children and young people are caused by family problems after a mental illness.⁴⁸ In the studies of Büyükbodur and Siyez, it is stated that most of the adolescent suicides are caused by interpersonal and family conflicts.^{49,50} The relatively high rate (0.60 ± 0.20), especially in the male group with unknown age, makes us think that more effective investigations should be conducted by the security forces on this issue. The fact that the SUC rate is higher in child-aged girls than in other age groups brings to mind the concept of “child bride,” apart from the parent-child relationship. In the study of Boran et al it was stated that the rate of marriage under the age of 18 among women is 32% and 7% for men in Turkey and these girls were exposed to domestic violence more than women who were married at other ages. It can be said that these marriages, which are probably made with imam marriage, were carried out especially in the eastern regions of the country where rural life is more intense. As a matter of fact, the relatively low rate of SUC (0.39 ± 0.24) among women of unknown age, perhaps without identity, may be an indication that the social oppression of women is taken into account more by the security officials. The low rate of SUC in the elderly can be explained by the fact that physical diseases and loneliness are felt more at these ages, but this situation is known by the relatives of the elderly and they did not see any harm in explaining this to the security forces.

Although weather conditions are not a major cause of suicide, research indicates that suicide rates in both hemispheres reach their maximum in spring and summer and minimum in winter.^{42,51-53} In this study, it is seen that the crude suicide rates are higher in spring and summer months than in other seasons in both genders in suicides of known or unknown cause. Although it is claimed that suicide deaths do not differ according to gender in terms of seasonality in the studies of Oravec et al⁵² and Lee et al,⁵³ it is observed that the seasonality effect on female suicide is higher in this study, as in the study of Masterton.⁵⁴ At the same time, in this study, it is observed that while the season has no effect on male suicides with known or unknown causes of suicide, it has a statistically significant effect on female suicides, and women commit suicide relatively more in summer, especially in suicides of unknown cause, it is observed that women choose deaths

more frequently in the summer than those whose cause is known, or more precisely, the security forces keep more obscurity records in women during the summer months. We consider that not wanting to know the underlying causes of female suicides, social gender inequality, as well as environmental factors such as seasons may have a negative impact on human behavior as the reason why SUC is predominantly observed in the EA region (the region with the longest winter months) and the unknown numbers of men and women are closer to each other than in other regions.

It is obvious that the level of uncertainty in the causes of suicide should be reduced in order to understand and categorize completed suicides. For this reason, it is essential for security and health officials to collect real information about the causes of suicide in accordance with professional rules, away from subjective evaluations and social prejudices. We think that in-depth social studies on the causes of suicide and the application of effective psychological autopsy methods in completed suicide cases can reduce the rates of suicide due to an unknown cause. Prevention and treatment of suicidal behavior require comprehensive management in which patients, family, and community are provided with coping-tools; behavioral interventions that directly address suicidal-thoughts and behaviors; emotional management through psychological therapies; conventional therapies together with new information and communication technologies; support through therapeutic alliances and brief contact interventions; support for adherence to treatment, environmental management, and health education for patients and community. Education is essential to improve suicide rates in each area, as it is necessary for the general population as well as health and non-health professionals to maintain an adequate and up-to-date level of information regarding preventive measures, as well as knowledge of risk and protective factors.^{55,56}

Strength and Limitation

Among the 48419 completed suicide cases between 2004 and 2019, it is understood that there were 131 (0.27%) of those with unknown marital status, 967 (1.99%) of those with unknown age, 1386 (2.86%) of those whose educational status was unknown, and the concept of obscurity was used for the reason of suicide with a maximum rate of 46.76%, the officials had the most difficulty in keeping records on this issue or that the relatives of the victims did not want to give information about this issue. In order to develop an effective suicide prevention strategy, it was especially necessary to understand the unknown causes of suicide. Therefore, such a comprehensive study has been conducted for the first time.

Since the gender and related data of those who completed suicide as SUC could only be reached in 2004 and later, the study could only be carried out between 2004 and 2019. We hope that in the coming years, such a vital issue can be clarified with more data covering a longer period of time.

Conclusion

It is understood that suicides of unknown cause were the most important reason of suicide between 2004 and 2019, there may be geographical, gender, age, seasonal, socio-cultural and economic factors that may affect this, and national suicide prevention and planning strategies will be insufficient unless this issue is adequately examined. Although it is known that the data on the causes of suicide is the most problematic area in terms of data on suicide, and it is difficult to know the real reason behind a completed suicide, in this study which is conducted to eliminate the need to question the underlying causes of possible causes; it can be said that the security forces, which are the source of Turkey's suicide statistics, marked about half of the information declared by their relatives, who wanted to be a shield to the suicide victim due to the social and religious beliefs of the society they live in, as suicide of unknown cause, however, while doing this, they were affected by the geography, gender, age of the deceased and the season in which the case was occurred. It is clear that a conclusion cannot be reached by filling out only single-choice forms in order to understand the reasons for suicide. In order to overcome this problem, it is necessary to establish a psychological autopsy team with psychiatrists and institutional structures where effective forensic investigations can be carried out. Thus, we think that possible causes of suicide can be understood and effective suicide prevention strategies and health policies can be developed.

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