



Original Article

What was the distribution of suicide rates by socio-demographic factors between 2007 and 2016 in Turkey?

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Abstract

Objectives: To identify the distribution of suicide rates in Turkey between 2007 and 2016 by gender, age, marital status, and geographical region.

Methods: Suicide statistics obtained from the Turkish Statistical Institute and population data were used to calculate suicide rates by gender, age, marital status, and geographical region. An independent two-sample t-test and one-way analysis of variance (ANOVA) were used to analyze the data.

Results: In Turkey, suicide rates are low, but they have slowly risen recently. The suicide rate of men was higher than that of women ($p < 0.001$). The highest suicide rate by age group was among people 75 years and older and the second highest was among people 15 to 24 years old ($p < 0.001$). The suicide rate of divorced people was higher than that of other marital status groups ($p < 0.001$). Average suicide rates in the seven geographical regions of Turkey differed from each other, and suicide rates among men and women in each region varied ($p < 0.001$).

Conclusion: The suicide rate between 2007 and 2016 was higher in men, particularly for older ages, the divorced, and those living in both socio-economically developed and underdeveloped regions in Turkey. Socio-demographic characteristics must be taken into consideration in studies focusing on the prevalence and prevention of suicide

Keywords: Age; gender; geographical region; marital status; suicide rate.

Suicide is a complicated pattern of behaviors that includes a combination of psychiatric, biological, psychological, sociological, existential, historical, religious, and economic factors that play a preliminary or triggering role. The concept of completed suicide is deliberately performing an action that results in killing oneself. However, the range of behaviors is quite wide. Different patterns of suicidal behavior such as an idea, attempt, threat, implication, or gesture are often seen in daily life.

There are three basic factors mentioned as the reasons for suicide. The first is the effect of social and cultural variables. The second is the effect of natural environment and neuro-psychological factors.^[1] Finally, suicide behavior is closely related to certain socio-demographic factors (age, gender, marital

status, employment status, social insurance, family structure and relationships, place of residence, etc.) in the socio-cultural context.

The World Health Organization, which evaluates suicide as a globally performed act, reports that 79% of global suicides take place in countries with low and moderate income, and that the completed global suicide rate is 10.6 per hundred thousand (13.5 for males and 7.7 for females) for 2016. Research indicates that more than 20 suicide attempts are made for every one completed suicide act.^[2] The rate of completed suicide acts in the western world is consistently higher for males than females.^[3-5] Considering both genders, suicide attempts are commonly made between the ages of 35 and 44.^[6] Suicide is regarded as the second leading cause of death for

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What is known on this subject?

- This study reviewed the distribution of completed suicide attempts in Turkey between 2007 and 2016 according to socio-demographic variables such as gender, age, marital status, and geographical region using the records of TUIK. The completed suicide rate of males is higher than females and is higher for older ages and youth. Divorced people commit suicide more often, marriage is a preventive factor, and suicide rates vary by country based on the regional development level.

What is the contribution of this paper?

- This study found that the completed suicide rate in Turkey was lower than the mean global rate, but Turkey's rate has been gradually increasing. In addition, results in terms of gender, age, and marital status were similar to those in the literature. Young females, males who lost their wives, and males in the regions with high socio-economic levels and females in the regions with low socio-economic levels had the highest risk of completing suicide.

What is its contribution to the practice?

- The results obtained from this study will guide psychological studies for preventing and/or decreasing the suicide rate, and will clarify the social groups with the highest risk of committing suicide.

people between 15 and 29 years.^[2] Suicide is more common for divorced than married people, and it is a significant risk factor for divorced males.^[7] Marriage is a protective factor against suicide for both genders.^[8]

The suicide-related statistics of Turkey indicate that the completed suicide rate is low, but this rate has been gradually increasing in recent years.^[9-11] The data from the studies published since 1974 reflect that completed suicide acts have been increasing at a rate of one per hundred thousand every decade.^[11] Although the rate of suicide-related deaths is low compared to other causes of death (disease, accidents, etc.), the rate of increase for suicide-related deaths indicates that suicide will become an increasingly greater threat.^[10]

Knowing in advance the risk groups and preliminary/triggering risk factors with the socio-demographic characteristics of the general population will greatly contribute to studies of preventing or decreasing suicide, even if it is not possible to take an active precaution without a clear of display a suicidal behavior. This study focused on a set of socio-demographic characteristics in close relationship with suicide. It demonstrated the distribution of completed suicide acts performed in Turkey between 2007 and 2016 in terms of gender, age, marital status, and geographic region. Considering the determined purpose and time interval, this study also aimed to find whether there was a difference regarding the suicide rates between the gender groups, age groups, marital status, and seven geographical regions.

Materials and Method

Studies of completed suicide acts were conducted with limitations, and the data from these studies were obtained using the retrospective records and psychological autopsy practices. Studies of completed suicide acts were performed to determine the risk factors and risk groups.

This study was conducted with the secondary analysis method using data from the Turkish Statistical Institute (TUIK). It was

performed using retrospective records, and it is a descriptive study as it covered a certain period. This study determined the distribution of completed suicide acts and suicide rates based on gender, age, marital status, and geographical region, and the results were presented through the mean suicide rate according to the specified variables.

Data Collection

The suicide and population statistics from every year between 2007 and 2016 were obtained from TUIK and were used as raw information to calculate the completed suicide rate based on socio-demographic variables.^[12]

TUIK is the formal institution compiling and revealing suicide statistics in Turkey. It began collecting data regarding completed suicide acts from residential areas in 1962. Completed suicide acts performed until 2012 were compiled from the General Directorate of Security Affairs and General Command of Gendarmerie records in all residential areas. After 2012, records related to completed suicide acts as well as the information from death certificates and the Ministry of Justice, General Directorate of Prisons and Detention Houses records were compiled.^[12]

The number of suicides committed between 2007 and 2012 was directly obtained from the booklet "Suicide Statistics," which is published annually by TUIK and can be purchased by researchers.^[13,14] TUIK published the suicide statistics on its official website (www.tuik.gov.tr) rather than in written form. Therefore, the number of suicides committed between 2012 and 2016 was found on the official TUIK website. No further permissions and ethical approvals were needed to use these publically available data published on the Internet. The needed suicide rates and population figures that could not be found on the TUIK website were found through the option of "gaining information", which could be used by researchers on the TUIK website.

The TUIK database indicates suicide acts committed after the age of 15 until the age of 75 in five-year intervals. Suicides committed before the age of 15 and after the age of 75 are recorded as "-15 years" and "75+ years". The age groups between "-15" and "75+" were transformed to ten-year age groups, and suicide rates were calculated over 8 categories rather than 14.

As seen in "Suicide Statistics" published by TUIK, Marmara, Aegean, Mediterranean, Central Anatolia, Black Sea, Eastern Anatolia, and Southeast Anatolia were accepted as geographical regions. The age and marital status for some suicide acts are "unknown," although they have been decreasing for a period of time. For example, the age of 180 people (out of 1702) who committed suicide in 2007 is unknown. Suicides in the "unknown" category were not included in the scope.

The population figures of the period between 2007 and 2016 were obtained from the Address-Based Population Registration System^[15] published by TUIK on its website. Population

figures regarding the marital status of males and females in 2007 are not recorded in TUIK's database. Therefore, the suicide rates regarding marital status were reviewed between 2008 and 2016.

Statistical Analysis

Another aim of this study was to review whether the suicide rates between the subgroups of each socio-demographic variable differed. Licensed SPSS (Statistical Package for the Social Sciences) 21.0 program was used to analyze the data. The Kolmogorov-Smirnov Test was used to check whether the data had a normal distribution. The Levene Test was used to test whether the variance was homogeneous. The data displayed a normal distribution and met the parametric test criteria. In addition, Independent Two-Sample t-Test, a parametric test, was used for two groups to test the differences between the suicide rates regarding the socio-demographic variables reviewed between 2007 and 2016 and One-Way Analysis of Variance was used for more than two groups. Tukey Test, a post-hoc test, was used to determine the source of difference (variable) causing further differences between the age groups, marital status, and residential areas.

Results

The rate of completed suicides committed between 2007 and 2016 slowly increased, despite the decrease seen in 2011 (Fig. 1). Suicide rates ranged between 3.58 and 4.26 per hundred thousand with a mean of 3.97 per hundred thousand in this period.

Gender

A significant difference was present between the suicide rates of males and females for the period in this study. The suicide rate of males was higher than that of females ($t=-3.780$, $p<0.001$). The mean suicide rate of males was 5.66 per hundred thousand compared to 2.28 for females. The proportion of suicide rates of male to females varied between 1.83 and 2.86, and this figure was higher than 2.0 for all years except 2007 (Fig. 2).

Age

Evidence regarding the suicide rates for age groups indicated (Fig. 3) a significant difference ($F=56.962$, $p<0.001$). This difference arose from the significant difference regarding the suicide rates between the group of people under fifteen and other age groups. The suicide rate was the highest for the group of people aged 75 and over (mean: 7.43 per hundred thousand). Compared to other age groups, the suicide rate of those between the ages of 15 and 24 (mean: 5.58 per hundred thousand) and 65 and 74 was higher. The suicide rate was low for people under 15 (mean: 0.50 per hundred thousand).

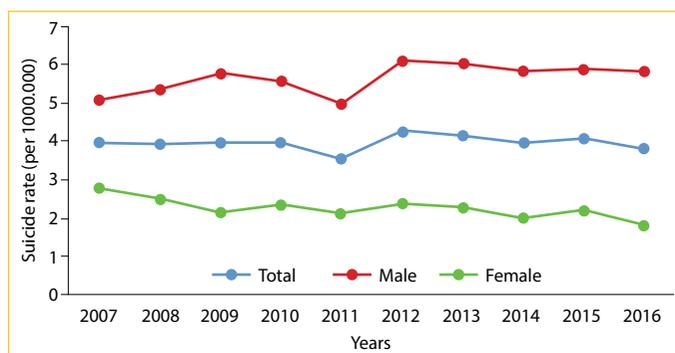


Figure 1. Suicide rate by year and gender.

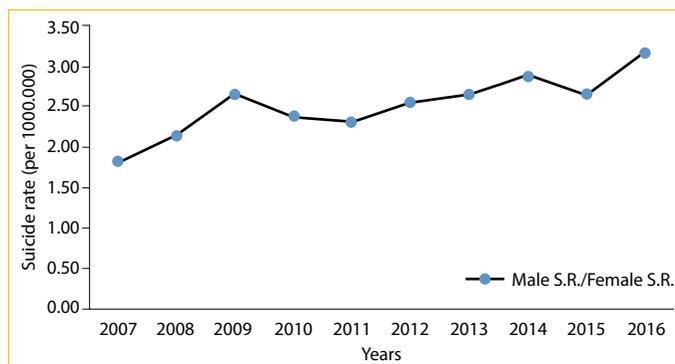


Figure 2. Proportion of suicide rates of male to females by year (Male Suicide Rate/Female Suicide Rate).

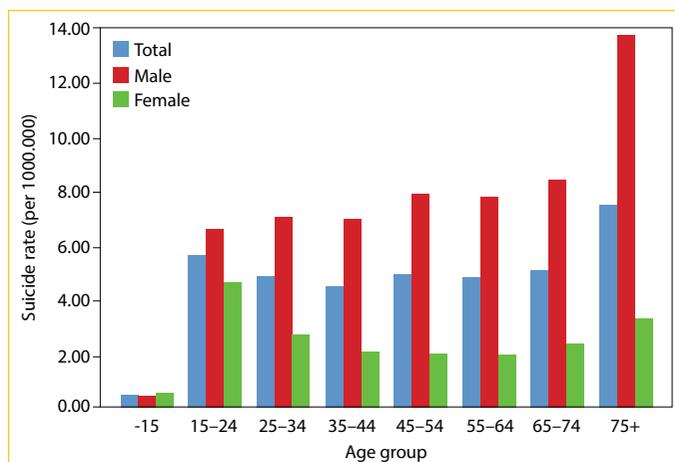


Figure 3. Mean suicide rate by age group.

The suicide rate was different for both genders in each age group. Another interesting result in Figure 3 is that the suicide rate of males increased with age, whereas that of females decreased. As males grew older, their rate of committing suicide was greater than that of females, which reached more than four times greater for people aged 75 and over. As ages of males decreased, their suicide rate decreased compared to that of females. The mean suicide rate of females under 15 was slightly higher than that of males, and the proportion of male to female suicide rate was under 1.0 only in this age group.

Marital Status

The evidence regarding the distribution of suicides by marital status (Fig. 4) indicated a statistically significant difference between the suicide rates ($F=29.55$, $p<0.001$). The difference found at the end of Tukey test arose from the suicide rates of married and divorced people within the stated period.

According to the results in Figure 4, the rate of suicide was highest for divorced people (mean: 10.48 per hundred thousand) followed by single people (mean: 6.43 per hundred thousand). The lowest suicide rate was displayed by the people whose partners passed away and by married people. The suicide rate of males was higher than females in all categories related to marital status. The most distinctive difference between the suicide rates of males and females was observed in the category of people whose partners passed away. The proportion of male to female mean suicide rate was 7.39. In the category of divorced people, the proportion of the mean suicide rate for males was 3.33 higher than for females. In the suicide rate of single people, the difference between males and females decreased to 1.71.

Geographical Regions

Figure 5 indicates the different suicide rates in seven geographical regions of Turkey. The difference between the regions was statistically significant ($F=49.14$, $p<0.001$). This significant difference arose from the difference regarding the suicide rates between the Aegean Region, Marmara Region, and Southeast Anatolian Region. The regions ordered from highest to lowest were Aegean (4.98 per hundred thousand), Eastern Anatolian (4.40 per hundred thousand), Mediterranean (4.22 per hundred thousand), Central Anatolian (4.01 per hundred thousand), Black Sea (3.85 per hundred thousand), Southeast Anatolia (3.61 per hundred thousand), and Marmara (3.48 per hundred thousand).

The statistical analysis indicated that suicide rate according to gender displayed a significantly different distribution in all regions (Table 1). Test results indicate that males had higher suicide rates in all regions.

The highest male suicide rate was in the Aegean Region. The Marmara Region, on the other hand, had the lowest female suicide rate, lowest mean suicide rate, and a mean suicide rate three times higher for males than females. The proportion of males' mean suicide rate to that of females is smaller than 2.0 in the Eastern Anatolia Region (1.38). Despite the low suicide rate, the proportion of males' mean suicide rate to that of females is smaller than 2.0 in the Southeast Anatolia Region (1.52).

Discussion

The rate of completed suicide acts slightly increased in a ten-year period between 2007 and 2016, and suicide rates ranged between 3.58 and 4.26. Oner et al.^[16] found that the suicide rate in Turkey between 1990 and 2000 ranged between 2.02 and 3.19 per hundred thousand. The suicide rates decreased between 2000 and 2016 for many Scandinavian (e.g. Lithuania, Belarus, Russia, Latvia, and Ukraine) and European countries (e.g. Denmark, Austria, Belgium, Switzerland, France, Hungary, Finland, and Slovenia) known to have high suicide rates. In addition, for this period, these rates were reported to increase in the USA (from 11.3 to 15.3 per hundred thousand), Portugal (from 7.5 to 14 per hundred thousand), Italy (from 7.8 to 8.2 per hundred thousand), Greece (from 3.4 to 5 per hundred thousand), and Armenia (from 3.3 to 6.6 per hundred thousand).^[2]

This study indicated that the suicide rate of males was higher than that of females, which is in accordance with the literature. Many researchers and authors agree that results regarding the completed suicide acts and gender are similar, and suicide rates of males are higher than those of females^[4,10,16-20] in countries other than China.^[4,5] Although studies indicate the male suicide rate is at least three times higher than that of females in many European countries,^[5,8,17] results of this study indicated this rate was between 2.0 and 3.0. The male suicide rate was higher than that of females in all age groups between 1981 and 2008 in Spain, a country with an increased, albeit low, suicide rate in the recent years.^[20] Women con-

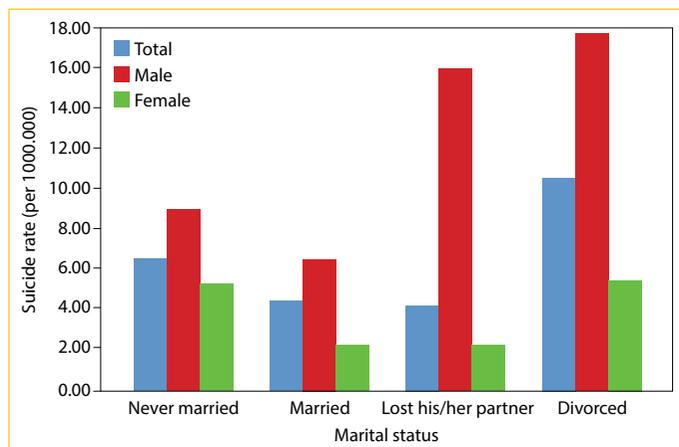


Figure 4. Mean suicide rate by marital status.

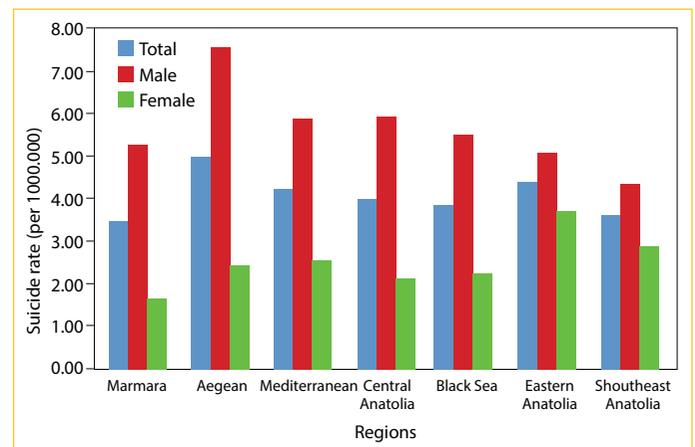


Figure 5. Mean suicide rate by geographical region.

Table 1. Comparison of the mean suicide rates of males and females in seven geographical regions

Regions	Gender	Suicide rate 2007–2016		
		Mean±Standard deviation	Test Value	Sig. (p)
Marmara	Male	5.28±0.14	-3.780	0.001
	Female	1.63±0.08		
Aegean	Male	7.52±0.20	-3.780	0.001
	Female	2.42±0.07		
Mediterranean	Male	5.86±0.14	-3.782	0.001
	Female	2.55±0.09		
Central Anatolia	Male	5.91±0.15	-3.780	0.001
	Female	2.12±0.07		
Black Sea	Male	5.49±0.18	-3.781	0.001
	Female	2.22±0.22		
Eastern Anatolia	Male	5.08±0.18	-3.402	0.001
	Female	3.69±0.21		
Southeast Anatolia	Male	4.33±0.15	-3.780	0.001
	Female	2.85±0.13		

template committing suicide more often and thus attempt suicide more frequently. However, males perform more completed suicide acts. This is related to the a) differences in gender roles, b) methods selected by males and females, c) issues related to substance use, and d) male and female behaviors of seeking assistance, as indicated by Eskin^[10] in the suicidology literature.

This study supports the literature regarding the age variable. The suicide rate was highest for people aged 75 and older. Issues related to retirement and physical and mental problems (particularly depression) are prominent in middle and old age, and these health issues may cause desperation. As seen in other developmental periods, despair is the most significant emotion driving people to kill themselves.^[10,21]

Another interesting result was that the second highest group of individuals who committed suicide was aged between 15 and 24. Suicide rates were the lowest for people under 15. According to Grøholt and Ekeberg,^[22] the frequency of displaying suicidal behavior is low for children under 15, and the possibility of recording the reasons of death for children who pass away due to different accidents as suicide is high.

This study indicated that the male suicide rate increased following the age group of 25–34. The male suicide rate was three to six times higher than that of females in the older age groups, but this difference decreased in the younger age groups. Globally, the suicide rate is five to eight times higher in older age groups.^[10,17,18,23] For example, in a study reviewing the male suicide rates in Austria between 1970 and 2001, the male suicide rate was five times higher than that of females for people 90–99 years old.^[3]

The difference between the suicide rates of males and females decreased for those aged between 15 and 24 years. According to the official records of the previous decade (1998–2007), the

average suicide rate of females (42.22%) was higher than that of males (24.52%) for the ages between 15 and 24 years. According to official records, females in this age group commit suicide due to “domestic problems” and “diseases,”^[24] which indicates that young females might have been affected by the issues experienced by young generations in Turkey such as education problems, unemployment, future-related concerns, being stuck between modern and traditional life, and facing cross-generational conflicts.

Marital status had a distinctive effect on suicide rates.^[23] The suicide rate was high for divorced and low for married people, which supports the literature. Studies demonstrate that suicide is common among divorced and single people.^[19,25] A study showed that suicide risk was high for divorced males between 1979 and 1989 in the USA, which was not the case for females.^[7] A study conducted between 1982 and 2005 in England and Wales indicated that married people are the least at-risk group, despite changes in the ideas and concepts related to marriage. Suicide rates of divorced males and females are three times higher than married males and females. The difference between the divorced and married males aged 45 and over decreases to three times in this period, and this difference is 2.5 times for females.^[26] Suicide rates are highest for divorced males compared to other groups in Austria. Suicide rates of divorced males are five times higher than that of females, followed by married males and single males.^[3]

The frequency of suicide acts among divorced and single people is related to being alone, low levels of social adaptation, social isolation, and failure to adequately benefit from social support mechanisms. Females can consider the friendship relationships they formed after their marriages result in divorce or widowhood, and they can achieve emotional and social support from these relationships.^[7,19,23]

Another interesting result of the study was that the suicide rate significantly decreased among the married females and those whose husbands passed away. The greatest difference between the genders in terms of marital status was observed in the category of males whose partners died, which is related to the assumption that males are more affected by the death of their partners due to housework, cooking, and failure to meet personal needs. Evidence indicated that males whose partners passed away or who were divorced carried a greater risk of committing suicide.

This study also indicated that suicide rates in Turkey differed by geographical region. As mentioned before, Marmara, Aegean, Mediterranean, Central Anatolia, Black Sea, Eastern Anatolia, and Southeast Anatolia were accepted as geographical regions. The climatic characteristics, natural life conditions, sources of income, industrialization, education, demographic structure, and traditions and customs significantly differ for each region. The wealth of the people living in the Aegean, Marmara, and Mediterranean Regions is relatively higher than that of the Eastern Anatolia and Southeast Anatolia Regions.

The highest suicide rate in recent years was in the Aegean Region followed by the Eastern Anatolia Region. However, the socio-economic development level of these regions is different. Although the suicide rates of other regions fluctuated over time, their mean rates were close to one another. The results of this study are similar to those by Alptekin,^[11] which show the completed suicide rate increases from eastern to western Turkey. This picture has changed in recent years, and suicide rates in eastern and northern Turkey have been slowly increasing.

The possibility of witnessing different suicide rates among the regions is higher in other countries. For example, suicide-related deaths are seen more often in Galicia and Asturias, Spain compared to other regions. Unemployment has been suffered for a long time in Andalucia, another region with a high suicide rate, and male suicides are believed to be closely related to unemployment in this region.^[20] There are differences regarding the suicide rates in Italy. According to national suicide rates, the suicide rate is 25–30% higher in the northeast and 20–25% lower in the south. The northern region has the highest suicide rate for married, single, or divorced people.^[25]

In addition, the suicide rate in every region of Turkey significantly differed by gender. The suicide rate was higher for males in the regions with high development status (Marmara, Aegean, and Mediterranean), but the proportion of male to female suicide rate was lowest in Eastern Anatolia and Southeast Anatolia.

Compared to other regions of Turkey, the female suicide rate was higher in Eastern Anatolia and Southeast Anatolia, which is related to regional development level, hard life conditions, and social life patterns. Despite the absence of an extensive study on both regions, we hypothesize the female suicide

rate is high because females face gender-based pressure (e.g. father pressure before marriage and husband pressure after marriage),^[27] the social structure in rural areas limits the preferences and actions of women (e.g. girls unable to go outside and to school, and marrying at an early age),^[28] female suicides are related to honor killings,^[29] and the longevity of terrorist acts adversely impacts people, causing desperation,^[30] which affects female suicides.

The distribution of suicides in Turkey was reviewed by gender, age, marital status, and geographical region in this study. The time considered in this study (10 years) is short. This study is limited by the data of TUIK. Difficulties are occasionally experienced in collecting the data regarding completed suicide acts because not all suicide cases are recorded to official archives and the recorded cases have missing or insufficient information (as seen in the age and marital status variable in this study). However, this study provides a starting point for the general suicide-related tendencies in Turkey regarding the socio-demographic variables examined.

Conclusion

This study indicated that suicide rates displayed a different distribution in terms of socio-demographic characteristics such as gender, age, marital status, and geographical residence. This study showed that older males, younger females, males who are divorced or lost their partners and who live in socio-economically developed regions, and females who live in the regions that are not socio-economically developed bear the risk of displaying suicide-related behavior. Socio-demographic characteristics should be considered in studies of suicide prevalence and risk groups. Future studies should review the completed suicide acts in Turkey for a broader period, and these studies should be reviewed in a manner to reveal the mutual relationship between other socio-demographic variables (permanent residential areas such as villages or cities, educational status, profession, monthly income, social status, etc.). Records regarding completed suicide acts should be kept in an organized style, which will help us understand the nature of suicide and determine the precautions and strategies needed.

Knowing the socio-demographic characteristics of people is significant for guiding professionals (psychiatrists, psychiatry nurses, psychologists, and social workers) playing a role in prevention, protection, treatment, care, and psycho-social support services and for providing these professionals significant opportunities. Therefore, the professionals working in the mental health field should be aware of the socio-demographic characteristics of suicide, which vary over a lifetime.

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