

Who commits suicide most? Suicide by gender and age

Abstract

Objective: There is limited research on suicide by age and gender in Turkey. The purpose of the study is to examine suicide rates between 2007 and 2015 by gender, age, and both age and gender by using various statistical analyses.

Method: Secondary data about suicide from 2007 to 2015 were obtained from the Turkish Statistical Institute. The number of suicide cases was 25,696 (72.1% male, 27.9% female). Direct standardization method was used to calculate suicide rates. Line charts were plotted to reveal the trends in suicide rates by gender, age groups, and age groups within gender between 2007 and 2015. Then, a paired-samples t-test and one-way anova (ANOVA) test were conducted to test whether suicide rates significantly differ by gender, age groups, gender within age groups, and age groups within gender.

Results: There is an increase in suicide rates and suicide rates among males while there is a decline in suicide rates among females over time. Males commit suicide 2.6 times as high as females. Suicide rate is higher for those aged above 65 and those aged 15- 24. Suicide rate is the highest among males aged 65+, and among females aged 15-24. There is a statistically significant difference in suicide rates between males and females, among age groups, between males and females within age groups, and among age groups within gender. The suicide ratio of male to female is the highest within age group 45-64. That is, males commit suicide 4 times more than females within that age group.

Conclusion: Younger females and older males have the highest suicide rate. Overall, younger and older people are risky groups for suicide.

Keywords: suicide, gender, age

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Introduction

Suicide, defined as killing oneself deliberately,¹⁻³ is one of the leading causes of death across the world.⁴ In 2015, about 800,000 people ended their lives by committing suicide (World Health Organization).⁵ It is important to note that the global suicide rate per 100,000 people is 16.⁷ Similar to the other countries, although suicide rate in Turkey is about 4 times lower than the global suicide rate⁶ it has been recognized as a public health issue, which requires attention. Suicide rates vary by gender. A number of studies have indicated that males commit suicide more than females^{7,8} Centers for Disease Control and Prevention,⁸⁻¹⁹ The global male/female suicide ratio is about 3.6:1.⁷ For instance, on average, in the U.S., male suicide rates are between three to four times as high as those for females, accounting for 79% of all suicides.⁸⁻¹⁸ Baker et al.²⁰ found that in America between 2000 and 2010, suicide rate increased, and suicide rate increased faster for females than males. Another study found that in America, suicide rates for both genders increased between 2000 and 2014.²¹ In the Republic of Korea, Suicide rate among males in 2015 was 2.5 times higher than that among females.²² In Europe, males are almost five times more likely to commit suicide than women.¹⁹ Similar to the other countries, one study conducted in Turkey found that suicide rate for males was higher than that for females.²³ Suicide rates generally increase with age in many countries although there is a decline with increasing age in a small number of countries.²⁴ Studies have shown that in many countries, suicide rates for those aged >65 years are higher than that of young people.⁷⁻²⁶ More specifically, studies have shown that people aged 75 and older have rates that are three times as high as people aged 15-24 years,¹⁵ and people over 65

years and older¹⁹⁻²⁷ and people between 45-59 years old¹⁹ have the highest suicide rate. In America, suicide rates increased among all age groups between 2000 and 2014.²⁸ Baker et al.²⁰ found that in America in 2010, suicide rate (19.4) was the highest among those between 45 and 59 years old whereas suicide rate (10.5) was the lowest among those between 15 and 24 years old.²⁰ Another study conducted in America examined suicide rate between 1999 and 2014, and found similar results²⁹ Suicide rates also vary by age and gender. Aktas et al.,²³ conducted a study about suicide for the period between 2002 and 2011 in Turkey. They found that males aged 15-24 and males 25-34 had the highest suicide rate, and suicide rate decreased after the age of 55.²³ They also found that females aged 15-34 had the highest suicide rate.²³ The above-mentioned studies have generally examined suicide rates by gender, age, and both gender and age in a descriptive way. More research needs to be conducted to investigate suicide thoroughly by using more advanced statistical analyses. There is also scant research that has investigated suicide rates by gender and age in depth by using statistical analyses, particularly in Turkey. In addition, there might be changes in suicide rates by gender and age over time, which requires new research. To fill the gap in the literature in the context of Turkey, the present study focused on investigating suicide rates by gender, age, and both age and gender by using various statistical analyses. More specifically, the study was designed to seek to address the following research questions:

- I. Is there any variation in suicide rates by gender over time?
- II. Is there any variation in suicide rates by age groups over time?
- III. Is there any variation in suicide rates by age groups within gender over time?

- IV. Do suicide rates differ by gender significantly?
- V. Is there a significant difference in suicide rates among age groups?
- VI. Is there a significant difference between males and females within age groups?
- VII. Is there a significant difference among age groups within gender?

It is important to observe suicide rates among age groups and between females and males to determine the risky groups. Based on the findings, policies may be developed to prevent further suicides.

Methods

Data

Secondary data were used for the analysis. The data were extracted from the Turkish Statistical Institute (TUIK) website, which collects official statistics from the other governmental agencies.³⁰ Two different data for each year from 2007 to 2015 were extracted from the TUIK website: number of suicide cases by gender and age⁶ and population by gender and age,³¹ and then, two data were merged.

Measures

The variables were gender and age. Gender was measured as male and female. Age was measured as age groups. Age had fourteen categories (1=<15 2=15-19 3= 20-24 4=25-29 5=30-34 6=35-39 7=40-44 8=45-49 9= 50-54 10=55-59 11=60-64 12=65-69 13=70-74 14=75+). Age was collapsed into four categories (1=15-24 2=25-44 3=45-64 4=65+). Age group <15 was excluded from the new age groups for two reasons: First, the number of suicide cases committed by those aged <15 was low, Second and most importantly, age group <15 covers the age ranging from 1to15. Suicide cannot be committed by those at certain age (i.e., a five years child). Including the age group <15 would also affect the measurement validity. After the new age group was created, population by age group and the number of suicide cases were also collapsed into four categories so that they correspond with age groups. Suicide depends on population. To control for the effects of differences in population age and gender, instead of crude suicide rate, age adjusted suicide rate, age specific suicide rate, gender specific suicide rate, and age-gender specific suicide rate for each year were calculated by using direct standardization method.³² Direct standardization method takes into consideration of population differences for specific groups.³² Crude or unadjusted suicide rate is simply the number of suicides divided by the population at risk, and multiplied by generally 100,000.³² An age-specific suicide rate and gender specific suicide rate is simply a crude suicide rate for a specific age group and gender respectively.³² In other words, age-specific suicide rate was calculated by dividing the number of suicides for each age group by the corresponding population in that age group, and multiplying by 100,000. Gender-specific suicide rate was obtained by dividing the number of suicides for each gender group by the corresponding population in that gender group, and multiplying by 100,000. Age-gender specific suicide rate was calculated by dividing the number of suicide cases for each gender group within each age group, and multiplying by 100,000. Age-adjusted suicide rate was calculated by simply multiplying the age specific suicide rates by the corresponding proportion of the standard population in that age group, and sum these products across four age groups.³²

Analytical strategy

The analyses consisted of several stages: First, a descriptive statistics about suicide by gender, and suicide by age, and suicide by both age and gender was provided. Male to female ratio for gender and age was also presented. Furthermore, line charts were plotted to reveal the trends about suicide by age, suicide by gender, and suicide by both gender and age between 2007 and 2015 separately. In addition, a paired-samples t-test was conducted to test whether suicide significantly differed by gender, and gender within age groups. One-way anova (ANOVA) test was conducted to test whether suicide differed by age groups, and age groups within gender.

Results

Descriptive statistics was provided in table 1. The results indicated that 25,696 people (72.1% males, 27.9% females) above 15 years old committed suicide between 2007 and 2015. Almost 40% of them were between 25 and 44 age year old (74.5% males, 25.5% females). About one fourth of them were between 15 and 24 years old (59.9% males, 40.1% females), and about one fourth of them were between 45 and 64 years old (79.7% males, 20.3% females). Almost 12% of them were 65+ years old (74% males, 26% females). Male to female ratio showed that males committed suicide more than females. More specifically, males committed suicide 2.6 times as high as females. Compared to females in the same age groups, males aged 45-64 committed suicide most (4 times more), followed by males aged 65+ years (3.7 times more), males aged 25 -44 (2.8 times more), and males aged 15-24 (1.4 times more). That is, particularly males above 45 years old committed suicide more than females within the same age group Table 1. Figure 1 shows suicide rates and suicide rates by gender between 2007 and 2015. Overall, suicide rates increased over time. There was an increase in suicide rates among males whereas suicide rates among females decreased over time. A suicide rate among males was always higher than suicide rates among females over time. Figure 2 illustrates suicide rates by age groups between 2007 and 2015. Suicide rates for those aged 65+ was overall always highest. However, in the most recent years, suicide rates for those between 15 and 24 years old exceeded suicide rates for those aged 65+. Finally, suicide rates for those aged 25-44 and those aged 45-64 was similar although suicide rates for the latter age group was a bit higher. That is, suicide has become more prevalent among younger people in the most recent years, followed by older people (Figure 2).

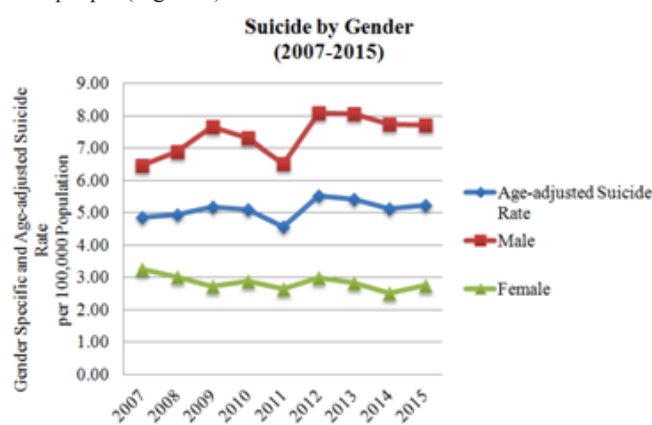


Figure 1 Suicide by gender.

Table 1 Descriptive statistics

Variables	Attributes	Total		Male		Female		Male: Female Ratio*
		n	%	n	%	n	%	
Gender	-----	25696	-----	18517	72.1	7179	27.9	2.6
Age Group	15-24	6456	25.2	3869	59.9	2587	40.1	1.4
	25-44	9823	38.2	7317	74.5	2506	25.5	2.8
	45-64	6379	24.8	5084	79.7	1295	20.3	3.9
	65+	3038	11.8	2247	74	791	26	3.7

Notes: N=25,696.

*When male to female ratio was calculated, the average of suicide rate per 100,000 populations for males and females was used.

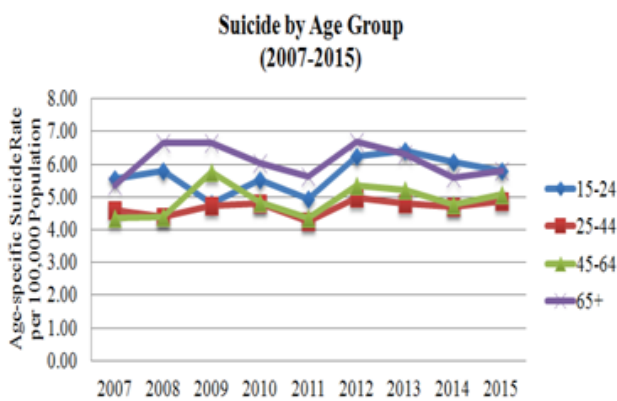


Figure 2 Suicide rates by age groups between 2007 and 2015.

Figure 3 presents the trends about suicide rates by age groups within males and females between 2007 and 2015. Among males, although there was a decline in suicide rates for those aged 65+, they always committed suicide most over time, followed by those aged 45-64. There is an increase in suicide rates for the other age groups over time. Although suicide rates for males aged 25-44 were higher than that for those aged 15-24 in the past, however, in recent years, suicide rates for those aged 15-24 has become higher than suicide rates for those aged 25-44. Among females, those aged 15-24 committed suicide most over time although there was a decrease in suicide rates for them. The second highest suicide rate was for females aged 65+, and suicide rate for them increased over time. Although suicide rates for females aged 25-44 and those aged 45-64 were almost stable over time, suicide rates for females aged 25-44 were higher than that for those aged 45-64 Figure 3. Overall, among males, those aged 65+ had the highest suicide rate, and those aged 25-44 had the lowest suicide rate (in recent years). However, among females, those aged 15-24 had the highest suicide rate, and those aged 45-64 had the lowest suicide rate. That is, among males, the older ones committed suicide most whereas among females, younger people committed suicide most (Figure 3).

Table 2 provided the results of paired sample t-test. The results indicated that there was statistically significant difference in suicide rates between males and females ($t(8) = 18.6, p < .001$). More specifically, suicide rate for males ($M = 7.38, SD = 0.62$) was higher than suicide rate for females ($M = 2.85, SD = 0.22$). The results also suggested that there was a statistically significant difference in suicide rates between males and females within all age groups including 15-

24 ($t(8) = 4.4, p < .01$), 25-44 ($t(8) = 21.1, p < .001$), 45-64 ($t(8) = 20.7, p < .001$), and 65+ ($t(8) = 17.9, p < .001$). Mean of suicide rates for males within each group was higher than of that for females (Table 2). Table 3 presents the results of one-way anova (ANOVA) test. The results indicated that suicide rates differed significantly by age groups ($F(32,3) = 17.8, p < .001$). More specifically, except for the difference between age groups including between 15-24 and 65+, and 25-44 and 45-64, there was a statistically significant difference in suicide rates between the other age groups including 15-24 and 25-44 ($p < .001$), 15-24 and 45-64 ($p < .001$), 25-44 and 65+ ($p < .001$), and 45-64 and 65+ ($p < .001$). In other words, suicide rate for those aged 15-24 and 65+, and suicide rate for those aged 25-44 and 45-64 were similar. According to the results, suicide rate for those aged 65+ was the highest ($M = 6.08, SD = 0.52$), followed by 15-24 ($M = 5.69, SD = 0.55$), 45-64 ($M = 4.91, SD = 0.49$), and 25-44 ($M = 4.69, SD = 0.23$). That is, younger and older people committed suicide most (Table 3).

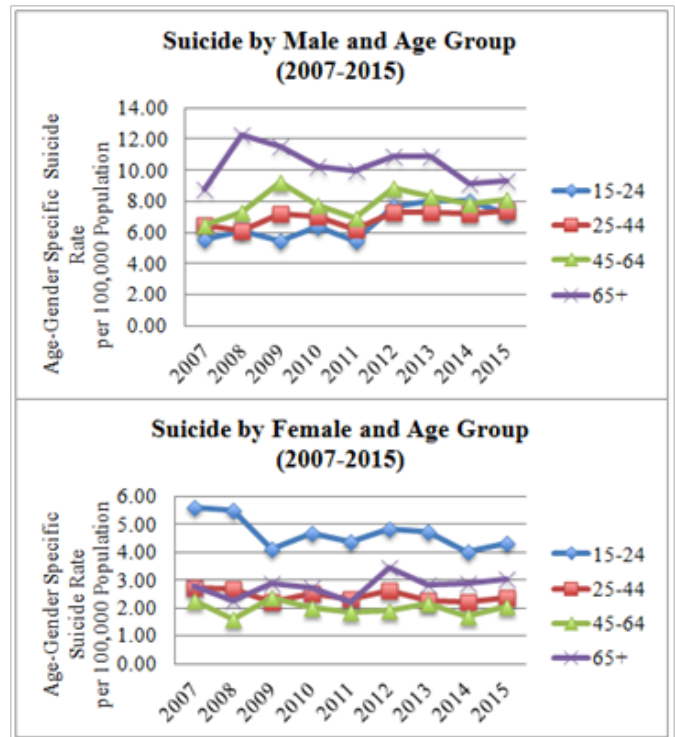


Figure 3 Suicide rate by age groups within gender between 2007 and 2015.

Table 2 Results of paired sample t-test

Variable	Attributes	Male		Female		Mean Diff	t (8)
		M	SD	M	SD		
Gender	----	7.38	0.62	2.85	0.22	4.53	18.6***
Age Group							
	15-24	6.66	1.09	4.68	0.56	1.98	4.4**
	25-44	6.9	0.51	2.43	0.21	4.47	21.1***
	45-64	7.85	0.88	1.99	0.25	5.86	20.7***
	65+	10.34	1.16	2.79	0.37	7.56	17.9***

*p < .05. **p < .01. ***p<.001

Table 3 Results of one-way Anova (ANOVA) test

Mean Difference										
Variable	Attribute	M	SD	F (32,3)	(15-24)-(25-44)	(15-24)-(45-64)	(15-24)-(65+)	(25-44)-(45-64)	(25-44)-(65+)	(45-64)-(65+)
Age Group				17.8***	1.0***	0.78**	-0.39	-0.22	-1.39***	-1.17***
	15-24	5.69	0.55							
	25-44	4.69	0.23							
	45-64	4.91	0.49							
	65+	6.08	0.52							
Gender										
Male				28.7***	-0.24	-1.19	-3.68***	-0.95	-3.44***	-2.49***
	15-24	6.66	1.1							
	25-44	6.9	0.51							
	45-64	7.85	0.88							
	65+	10.34	1.15							
Female				91.4***	2.25***	2.68***	1.89***	0.43	-0.36	-0.79***
	15-24	4.67	0.56							
	25-44	2.43	0.21							
	45-64	1.99	0.25							
	65+	2.79	0.37							

*p < .05. **p < .01. ***p<.001

The results (see also Table 3) also indicated that suicide rates differed significantly between age groups among males (F (32, 3) =28.7, p<.001). More specifically, among males, except for the difference between age groups including 15-24 and 25-44, 15-24 and 45-64, and 25-44 and 45-64, there was a statistically significant difference in suicide rates between age groups including 15-24 and 65+ (p<.001), 25-44 and 65+ (p<.001), and 45-64 and 65+ (p<.001). That is, suicide rates for those between 15 years old and 65 were similar. In addition, among males, those aged 65+ had the highest suicide rate (M=10.34, SD=1.15), followed by 45-64 (M=7.85, SD=0.88), 25-44 (M=6.90, SD=0.51), and 15-24 (M=6.66, SD=1.10). Stated differently, among males, suicide rate increased with the increase in age. The results (see Table 3) also suggested that age groups differed significantly by age groups among females (F (32, 3)=91.4, p<.001). Specifically, except for the difference between age groups including 25-44 and 45-64, 25-44 and 65+, age groups that differed significantly

with each other included 15-24 and 25-44 (p<.001), 15-24 and 45-64 (p<.001), 15-24 and 65+ (p<.001), and 45-64 and 65+ (p<.001). In other words, suicide rates for those between 25 and 65 years old were similar. In addition, among females, those aged 15-24 had the highest rate (M=4.67, SD=0.56), followed by 65+ (M=2.79, SD=0.37), 25-44 (M=2.43, SD=0.21), and 45-64 (M=1.99, SD=0.25). In other words, among females, suicide rate decreased with the increase in age by the age of 65. However, females aged 65+ years had the second highest suicide rate following those aged 15-24.

Discussion

The current study examined suicide rates by gender, age, and both age and gender between 2007 and 2015 by using various statistical analyses. More specifically, the study focused on two issues: First, the trends about suicide rates, suicide rates by gender, suicide rates by age groups, and suicide rates by age groups within gender. Second,

whether there was statistically significant difference in suicide rates between females and males, among age groups, between males and females within age groups, and among age groups within gender. The results showed that with respect to the trends about suicide by gender, there was an increase in suicide rates and suicide rates among males while there was a decline in suicide rates among females over time. Regarding the trends about suicide by age, suicide rate for those aged above 65 was overall always highest until the recent years. However, in the recent years, suicide rates for those aged 15-24 exceeded suicide rates for those aged 65+. That is, younger and older people had the highest suicide rate over time. In terms of the trends about suicide by age within gender, those aged 65+ had the highest suicide rate among males while those aged 15-24 had the highest suicide rate among females although suicide rates for both age groups declined over time. That is, among males, older people committed suicide most whereas among females, younger people committed suicide most. The results also indicated that there was a statistically significant difference in suicide rates between males and females, among age groups, between males and females within age groups, and among age groups within gender. Specifically, males committed suicide 2.6 times as high as females. Suicide rate for those aged 65+ was the highest, followed by 15-24 while those aged 25-44 had the lowest suicide rate. That is, younger and older people are risky groups for suicide. Compared to females in the same age groups, suicide was committed most by males aged 45-64 (4 times more), followed by males above 65 years old (3.7 times more). That is, males above 45 years old committed suicide more than females. With respect to suicide rates among age groups within gender, suicide rates increased with the increase in age among males while suicide rates declined with the increase in age among females by the age of 65. Overall, males aged 65+ had the highest suicide rate, followed by males aged 15-24 years while females aged 15-24 having the highest suicide rate, followed by females aged 65+ years. The results are consistent with some of the previous literature. In other words, males commit suicide more than females (i.e., Bertolote & Fleischmann, 2002; Centers for Disease Control and Prevention (CDC), 2010; Cibis et al., 2012; Parra Uribe et al., 2013). Although in Turkey, there is a decline in suicide rates among females, however, for instance in America, suicide rates for females increased (Baker, Hu, Wilcox, H, & Baker, 2013; SPRC, 2017). Another finding is that those aged 65+ have the highest suicide rate, followed by those aged 15-24. This is generally consistent with the previous studies (i.e., Bertolote & Fleischmann, 2002; Hyman et al., 2012; Segal & Needham, 2007; Shah, 2007) except for a couple of studies (i.e., Baker et al., 2013; Curtin et al., 2016). For instance, Baker et al. (2013) found that in America in 2010, suicide rate was the highest among those aged 45-59 years, however, the lowest among those between 15 and 24 years old. Another finding is that suicide rate is the highest among males aged 65+, and females aged 15-24 years. This is not consistent with some of the findings of the study conducted by Aktas and Kantar (2016). They found that suicide rate was the highest among males aged 15-24. The present findings have a number of practical policy implications. According to the results, overall, older (aged 65+) and younger people (aged 15-24) are the risky groups for suicide. More specifically, males aged 65 and above, and females aged 15-24 are the ones who committed suicide most. For younger people, different programs, which aim to increase coping skills with stressful life events, should be implemented. Parents should be trained to increase the awareness about suicide, and about how they can help their children to overcome difficulties. In schools, students should also be trained about how to cope with problems when they face. For older people, family and

institutional support may help them a lot to solve the problems in their lives. Thus, families should be trained about that. More social services for older people should be provided. Older people should also be encouraged to participate in social activities. The study has some limitations. First, the data was based on the agency data, which may have some errors. Finally, the data just include the reported suicide cases, and thus, may not reflect all suicide cases. The future studies need to focus on investigating the causes of suicide by gender and age to develop more specific intervention plan. In addition, a study about suicide method by age groups should be conducted to understand why some certain age groups have the highest suicide rate.

Acknowledgments

None

Conflicts of interest

The author declares that there is no conflicts of interest.

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