

Analysis of Suicide Cases from Ankara Province: A 3-year Emergency Medical Services Experience

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Abstract. *Aim:* While the term “completed suicide” refers to suicides that have resulted in death, “suicide attempts” refers to all attempts that do not result in death. Analyzing EMS cases is a reliable method of obtaining data on suicide attempts and completed suicides. We aimed to determine the relationship between the occurrences of cases on weekdays, weekends, public holidays or long holidays and case characteristics. *Methodology:* We evaluated EMS data of Ankara Province on completed suicide and suicide attempts including the date range 01.01.2017- 31.12.2019. We evaluated the data in terms of age, gender, mortality at the scene, and suicide method. In addition, we evaluated the data according to the hour, day, month, season, and year of the cases. We classified the suicide cases according to their occurrence on weekdays, weekends, public holidays or long holidays. *Results:* During the 3-year period included in the study, Ankara EMS assigned ambulances to a total of 940,546 cases. Of these cases, 8231 (0.875%) were suicide attempts and completed suicides. Suicide attempts were most frequent in males, in the 20-24 age group, in summer, in July, on Sundays, and between the hours 18:00 and 24:00. Completed suicides were most frequent in males, in the 30-34 age group, in spring, in May, on Mondays and Tuesdays, and between the hours 18:00 and 24:00. *Conclusion:* We evaluated different characteristics of suicide cases of EMS, namely differences among gender, age, days of the week, months, and the various methods used by suicide victims. Of all suicide attempts, more than half were male, and male patients were much more likely to face completed suicides. Both suicide attempts and completed suicides were seen in younger adults, namely between ages 20 to 34. The most common method in suicide attempts was self-poisoning by drugs. Considering completed suicides, the most frequent methods used by patients were self-harm by hanging, by use of firearms, and by jumping from a high place, respectively. Suicide attempts and completed suicides have peaked on weekends, public holidays, and religious holidays. In Turkey, there are only a few studies in the EMS field on this topic. Therefore, we believe that this study will contribute to the epidemiological evaluation of suicides and lead to better preparedness by the EMS teams. We hope that results of this study will help to prevent both suicides and suicide attempts.

Key words: Suicide, parasuicide, attempted suicide, completed suicide, emergency medical services (ems)

Introduction

The World Health Organization (WHO) defined suicide in 1974 as “self-harming, intentionally and willingly, with the intention to kill” (1). According to WHO’s global data, every year, close to 800,000 people take their own lives, and suicide

stands out as the second-leading cause of death among 15–29-year-olds (2). WHO classifies suicide in two groups: suicides and suicide attempts. While suicide describes completed suicides, suicide attempts describe all attempts that do not result in death.

A systemic analysis by Naghavi found that 817,000 deaths had occurred in 2016 due to suicide

in the world. They suggested that between 1990 and 2016, the numbers of suicide-related deaths increased by 6.7%. (3) The global health estimates of WHO showed that most who committed suicide in 2016 were 10-29 years old. (4) Observing the leading causes of death for both sexes aged 15-29 years, suicide was the second most cause of death in 2016, following death by road injuries. (5)

The leading country is currently Guyana, with a suicide rate of 30.2 per 100,000 inhabitants. Also, among males, the suicide rate is the highest in Russia at 48.3 per 100,000. Among females, Lesotho with 32.6 per 100,000 is at the top of world suicide rates. (6) According to the National Vital Statistics Reports of the Center for Disease Control, among the 15 leading causes of death in 2017 in America, death by suicide (intentional self-harm) was the tenth most common cause, with 47,173 deaths in 2017. Also, it has been observed that suicide rates have increased by 3.7% from 2016 to 2017. Suicides still remain a higher cause of death in 2017 than homicides. (7)

The development of suicide in Turkey during the past 39 years has gone through various ups and downs and there appears to be an increasing trend over the years. This increase is noteworthy also for being rapid. Indeed, the number of suicides which was 618 in 1974 increased more than 5-fold by 2013 and reached 3,189, whereas the population of Turkey increased at a rate of 92.5% during the same period. (8) The number of suicide attempts and completed suicides in the world, including Turkey, is increasing every year. (9)

Differences arise between regions and countries with respect to the age, gender, and socioeconomic status of the individuals. The most commonly used methods are self-harm by hanging, self-poisoning with pesticides and medications, and self-harm by firearms. The majority of suicides worldwide are related to psychiatric diseases. Among them, depression, substance use, and psychosis constitute the most relevant risk factors. Since suicide is a major public health issue, priority should be given to reporting and evaluating the data. (10)

The demand for emergency medical services (EMS) in the world and in Turkey is increasing. It is known that EMS is the first medical contact of patients who attempt suicide. (11) To prevent suicides,

EMS professionals need sufficient knowledge and experience regarding suicide. (12)

It would be beneficial to determine preventive health policies by using the case data of EMS, the first contact with patients who attempt suicide.

Statistics on suicide are published every year in Turkey by the national statistical agency TÜİK. However, these statistics cover data on completed suicides only. It is difficult to reach the exact number of suicide attempt cases, as some of them do not visit any health facilities. Therefore, we think that analyzing suicide-related calls made to the 1-1-2 emergency call center is a more reliable method of obtaining data on both suicide attempts and completed suicide cases.

We retrospectively analyzed EMS data on suicide cases. The data included demographic features, suicide methods, mortality at the scene, and the date, season, and year of the cases from the EMS database ASOS. In addition, we aimed to classify suicide cases according to their occurrence on weekdays, weekends, public holidays, or long holidays. Thus, we aimed to determine the relationship of suicide cases with these variables.

Materials and Methods

This study was designed as a retrospective study and approved by the Ethics Committee of Clinical Research No:1 of Ankara City Hospital. In addition, the necessary legal permission was granted by the Ankara Provincial Health Directorate to study this issue. We reviewed completed suicide and suicide attempt case records of the Ankara EMS database between 01.01.2017 and 31.12.2019. From these records, we determined the age, gender, mortality at the scene, and suicide method of the cases. In addition, we determined the hour, day, month, season, and year of the cases. We also classified suicide cases according to their occurrence on weekdays, weekends, public holidays, or long holidays. In this study, we obtained 8,231 suicide case records. The data were analyzed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp. Released 2017. Armonk, NY: IBM Corp.). Considering the qualitative variables, we presented the number of cases, percentages, and 95% CI values. We tested whether the data showed normal distribution

with graphics and the Kolmogorov-Smirnov test. While making binary comparisons, we used the Mann-Whitney U test for numerical data that did not conform to the normal distribution, and we used the chi-square test for categorical data. A value of $p < 0.05$ was considered statistically significant.

Results

Ankara Dispatch Center received 1,312,284 emergency calls within the relevant date range. Of these, 371,738 were false calls or nonurgent calls. The number of unanswered calls was 8,997. Ambulances were assigned to 940,546 of the calls. We found that 8,231 (0.875%) of the 940,546 calls were recorded as suicide in the EMS database by teams who arrived at the scene and examined the patient. These 8,231 suicide attempts or completed suicide cases were included in our study.

Of these cases, 3,799 (46.1%) were females. Suicide attempts were higher in males, and there was a significant difference between genders in this respect ($p < 0.05$). The mean age was 31.4 ± 13.4 in patients who attempted suicide, while this mean was 32.9 ± 13.3 in male patients and 29.8 ± 12.6 in female patients. Among 496 completed suicide cases considered as dead at the scene, 391 (78.8%) of them were male patients and 105 (21.2%) were female patients. For the completed suicide cases, the ratio of male patients to female patients was 3.7 / 1. The mean age of the suicide completers was 40.5 ± 16.2 , while this mean was 40.6 ± 16.3 in male patients and 39.8 ± 15.7 in female patients.

Considering age distribution, suicide attempts were most frequently in the 20–24 (17%) age group. The group with the lowest suicide attempt number was the 70–74 age group. Completed suicide cases were most frequent in the 25–29 and 30–34 age groups, and least frequent in the under-15 age group. There was a statistically significant difference between age groups ($p < 0.05$).

Considering distribution by months, suicide attempts were most frequent in July (767 patients). February is the month when suicide attempts were least frequent (559 patients). The frequency of completed suicides was highest in May and lowest in

December. While there was a statistically significant difference between the months of the year in terms of suicide attempts ($p < 0.05$), no difference was found in terms of completed suicides.

Considering the distribution by seasons, suicide attempts were most frequent in summer and least frequent in winter. On the other hand, completed suicides were most frequent in spring and least frequent in winter. While there was a statistically significant difference between the seasons in terms of suicide attempts ($p < 0.05$), no difference was found in terms of completed suicides.

Considering the distribution of suicide attempt cases by the days of the week, the most frequent day was Sunday, and the second-most frequent day was Monday. Suicide attempts were least frequent on Friday. Completed suicides were most frequent on Monday and on Tuesday and least frequent on Friday. While there was a statistically significant difference between the days of the week in terms of suicide attempts ($p < 0.05$), there was no difference in terms of completed suicides (Table 1).

Our study covered 1,094 days; 781 of them were weekdays, and 313 were weekend days. While 746 of these days covered by our study were on working days, 348 were on public holidays, and 32 were on religious holidays. In terms of both suicide attempts and completed suicides, there was a statistically significant difference between public holidays and working days, between weekends and weekdays, and between religious holidays and other days ($p < 0.05$) (Table 2 and Table 3).

Table 3 compares suicide attempts and completed suicides by working days, public holidays, and long holidays consisting of 3 or more days.

For suicide attempts, emergency calls were made most frequently between 18:00 and 24:00. Urgent calls for completed suicides were most frequent between 12:00 and 18:00. In terms of both suicide attempts and completed suicides, there were statistically significant differences between the 6-hour periods of the day ($p < 0.05$).

Regarding the methods used in suicide attempts, while the first most common method was self-poisoning with drugs (63.1%), the second was self-harm with chemicals (pesticides, cleaning agents, etc.) (12.9%),

Table 1. Comparison of suicide attempts and completed suicides by days of the week

Day of the week	Suicide attempts (n=7,735)			Completed suicides (n=496)		
	n	%	CI 95%	n	%	CI 95%
Monday	1,143	14.8	14.0 - 15.6	81	16.3	13.1 - 19.6
Tuesday	1,114	14.4	13.6 - 15.2	81	16.3	13.1 - 19.6
Wednesday	1,094	14.1	13.4 - 14.9	67	13.5	10.5 - 16.5
Thursday	1,098	14.2	13.4 - 15.0	68	13.7	10.7 - 16.7
Friday	1,019	13.2	12.4 - 13.9	59	11.9	9.0 - 14.7
Saturday	1,075	13.9	13.1 - 14.7	66	13.3	10.3 - 16.3
Sunday	1,192	15.4	14.6 - 16.2	74	14.9	11.8 - 18.1
P	0.005			0.459		

Table 2. Frequencies and percentages of the completed suicides and suicide attempts, by working days and holidays

	Number of days	Suicide attempts	Suicide attempts/ Days (%)	Completed suicides	Patients Died/ Days (%)	Patients Died/ Total number of cases (%)
All days	1,094	7,735	7.1	496	0.45	6.4
Weekend	313	2,267	7.2	140	0.45	6.2
Weekday	781	5,468	7.0	356	0.46	6.5
Public holiday	348	2,536	7.3	158	0.45	6.2
Workday	746	5,199	7.0	338	0.45	6.5
Long holiday	41	289	7.0	18	0.44	6.2

Table 3. Comparison of suicide attempts and completed suicides

		Suicide attempts (n=7,735)			Completed suicides (n=496)		
		n	%	CI 95%	n	%	CI 95%
Weekday or Weekend	Weekday	5,468	70.7	69.7 - 71.7	356	71.8	67.8 - 75.7
	Weekend	2,267	29.3	28.3 - 30.3	140	28.2	24.3 - 32.2
	P	0.000			0.000		
Workday or Holiday	Workday	5,199	67.2	66.2 - 68.3	338	68.1	64.0 - 72.2
	Public holiday	2,536	32.8	31.7 - 33.8	158	31.9	27.8 - 36.0
	P	0.000			0.000		
Long Holiday or not	Long Holiday	289	3.7	3.3 - 4.2	18	3.6	2.0 - 5.3
	Other days	7,446	96.3	95.8 - 96.7	478	96.4	94.7 - 98.0
	P	0.000			0.000		

and the third was self-harm with a sharp or blunt object (12.8%). Considering completed suicides, the most frequent methods used by patients were self-harm by hanging, self-harm by use of firearms, and self-harm by jumping from a high place, respectively. The distribution of suicide attempts and completed suicides according to suicide methods appears in Table 4.

Discussion

During the 3-year period included in the study, the Ankara Dispatch Center assigned ambulances to 940,546 cases. Of these cases, 8,231 (0.875%) were suicide attempts and completed suicides. Suicide attempts were most frequent in males, in the 20–24 age

Table 4. Distribution of suicide attempts and completed suicides according to suicide methods

	Suicide attempts		Completed suicides		Total	
	n	%	n	%	n	%
Intentional self-harm by drugs	4878	63.1	46	9.3	4924	59.8
Intentional self-poisoning by chemicals	994	12.9	1	0.2	995	12.1
Intentional self-harm by sharp or blunt objects	988	12.8	6	1.2	994	12.1
Intentional self-harm by hanging	155	2.0	238	48.0	393	4.8
Intentional self-harm by firearm discharge	183	2.4	138	27.8	321	3.9
Intentional self-harm by crashing of motor vehicle	281	3.6	3	0.6	284	3.5
Intentional self-harm by jumping from a high place	173	2.2	55	11.1	228	2.8
Intentional self-poisoning by exposure to gases and vapours	45	0.6	7	1.4	52	0.6
Others	26	0.3	0	0.0	26	0.3
Intentional self-harm by smoke, fire and flames	7	0.1	0	0.0	7	0.1
Intentional self-harm by drowning and submersion	5	0.1	2	0.4	7	0.1
Total	7,735	100.0	496	100.0	8,231	100.0

group, in summer, in July, on Sundays, and between the hours of 18:00 and 24:00.

The most common method in suicide attempts was self-poisoning with drugs. Completed attempts were most frequent in males, in the 30–34 age group, in spring, in May, on Mondays and Tuesdays, and between the hours 18:00 and 24:00. Considering completed suicides, the most frequent methods used by patients were self-harm by hanging, self-harm by use of firearms, and self-harm by jumping from a high place, respectively. Suicide attempts and completed suicides have peaked on weekends, public holidays, and religious holidays.

In our study, we determined that calls to Ankara EMS because of suicide were 0.875% of all emergency calls. In a study by Moreno et al. in Malaga, Spain, similar to our study, it was reported that 0.9% of emergency calls were related to suicide. (11) In our study, the suicide attempt ratio of males was found to be higher than that of females. In contrast, other studies on suicide attempts found that females had higher suicide attempt ratio than males. In this respect, our study is not compatible with the current literature. (13–15). We think this is because women can now express their ideas openly in family relations and express their problems in different ways along with the developments in social life. When completed suicides were considered, the suicide ratio of men was found to be

3 to 4 times higher than that of women. This result is compatible with the current literature. (16, 17) In a study by Martini et al. on the suicide trends between 2000 and 2016, it was found that men were 3.81 times more likely to commit suicide than females. (18)

In our study, the mean age of patients who attempted suicide was 31.4 ± 13.4 years. In a comprehensive study conducted by Canner et al in the United States, the mean age was found to be 33.2 years, similar to our study. (11) Other studies with similar results have been conducted in European countries. (20) In our study, suicide attempts were mostly in the 20–24 age group; similarly, in the study by Mejías-Martín et al, the attempts were higher in the 20–24 age group. (23) Suicide attempts are most frequent in the 15–24 age group, both in Turkey and in the world. (9, 15, 19, 21).

The 15–24 age spans a period in which people evaluate their expectations from life, and their traditional lifestyles and their expectations are in conflict. (22) Supporting individuals in this age group by identifying the causes leading to suicide might help reduce the number of suicides. (23) In our study, completed suicides were most frequent in the 30–34 age group, and this result is compatible with the literature. (24, 25)

Studies have proposed a role for environmental factors, reporting a significant association between

suicide and temperature, humidity, or weather conditions in seasonal suicide. It was observed that the number of suicide attempts varied according to the seasons, increased in late spring, and decreased in early winter; this has happened in males and violent suicide completers. (26) Considering its distribution by months, suicide attempts were most frequent in July (767 patients). Similarly, in our study, it was found that suicide attempts were most frequent in July and August, respectively. (13) This suggested that a relationship existed between meteorological changes and suicides, and that the increase in air temperature increased the tendency to attempt suicide. Considering that the suicide attempters were mostly young people and most of them were students, we think that the increase in suicide in the summer season may be related to the effect of the changing social environment because of the summer vacation. It can also be speculated that schoolteachers play a preventive role in suicide attempts. Benard et al. suggested that males performed suicide attempts most often in spring, resulting in high mortality, and those suicide behaviors were influenced by climatic and biological factors like sunshine, day-light cycles, temperature, air pollutants, viruses, parasites, and aeroallergens. (22) The results of our study are also compatible with the literature in these aspects.

In our study, it was also found that emergency calls for suicide attempts were most frequent between 20:00 and 24:00 hours. Suicide attempts generally increase in the evenings. Mejías-Martín et al. and Moreno-Küstner B et al. found that calls about suicide attempts were most frequent between 16:00 and 23:00 hours. (23, 24) Note that suicide attempts take place at the end of work and school during the day, usually at the time when family members are at home and family communication begins. Sayl et al. highlighted the importance of effective communication within the family in preventing suicide attempts. (28)

Considering the relationship between the days of the week and suicides, we found that suicide attempts were most frequent on Sundays and Mondays, and completed suicides were most frequent on Mondays. The results of our study are compatible with the literature in this regard. (13, 14, 29) Another reason why suicide attempts peak on Sundays may be that young people increase their alcohol consumption on

weekends. Studies in the literature report that there is a relationship between alcohol use and suicide attempts. (30) In a comprehensive study conducted by Bozsonyi et al., suicide cases for both men and women were observed to be most frequent on Monday and the weekend. (31) We think that this is because the Monday after a holiday starts with an intense and stressful workload, and we believe that it will be useful to take measures to reduce work stress on Monday to correct this issue. Both completed suicides and suicide attempts were least frequent on Friday. This may be because Friday is the last working day and is a sacred day for Turks who are Muslims in the majority. There was also a significant increase in the number of the cases during public holidays. Similar to what Mejías-Martín et al. reported, we observed that there were more suicide-related emergency calls to EMS on public holidays than on workdays. (23)

In our study, we found that the most common method used in suicide attempts was self-poisoning with drugs (63.1%). Similar to our study, Canner et al reported that the most common suicide attempt method was self-poisoning with drugs (66.5%). (11) In contrast, a study by Koo et al. found that suicide by hanging was the most common method in older adults. (32). In another study by Berecz et al., suicide by hanging was also the leading method in 2001, with 63.7% (33) Studies conducted in Turkey reported that the most common method used for suicide attempts was self-poisoning with drugs. (15, 34) The reason these methods were used frequently in suicide attempts may be that drugs and chemicals are easily and quickly accessible. Considering suicide cases that resulted in death, the most frequently used method was found to be “self-harm by hanging” in our study. These results are compatible with the literature. (35) It is being reported that the “self-harm by hanging” method is used more because the hanging material is easily accessible and can be applied quickly. (36) In our study, the second-most commonly used suicide method was “self-harm with a firearm.” According to statistics of the United States in 2005, 52.1% of suicide attempters used firearms, while 22.2% of them used the hanging method and 17.6% used poisons. (37) In Turkey, the most used method by suicide attempters was the “self-harm by hanging” method, while it was the “self-harm

by firearms” method in the United States. We believe it is because firearms are less accessible in Turkey than in the United States. Our conclusion from all these studies is that the tools that can be obtained simply and quickly determine the method of the suicide attempt. Therefore, it may be beneficial to prevent people at risk of suicide from easily accessing drugs and firearms.

The limitation of our study was a lack of data on the existing physical-psychiatric diseases, socioeconomic statuses, previous suicide attempts, and drugs of the suicide attempters included in the study. Perhaps future studies will better evaluate the causes of suicide by including this data.

Conclusion

In this study, we retrospectively studied suicide cases that were reported to Ankara EMS during a time period of 3 years. Our study evaluated various features of suicide-related emergency calls to EMS. Differences were seen among results and type of method used regarding attempted and completed suicides. Suicide attempts were most frequent in males, in the 20-24 age group, in summer, in July, on Sundays, and between the hours 18:00 and 24:00. The most common method in suicide attempts was self-poisoning by drugs. Completed suicides were most frequent in males, in the 30-34 age group, in spring, in May, on Mondays and Tuesdays, and between the hours 18:00 and 24:00. Considering completed suicides, the most frequent methods used by patients were self-harm by hanging, by use of firearms, and by jumping from a high place, respectively. Suicide attempts and completed suicides have peaked on weekends, public holidays, and religious holidays. In Turkey, there are only a limited number of studies in the EMS field regarding this issue. Therefore, we believe that this comprehensive study conducted in the capital city Ankara will contribute to the epidemiological evaluation of suicides. Suicides, whether attempted or completed, remain an issue for society, and must be further investigated to increase awareness and to improve the quality of life. We hope that the results of this study will help in the prevention of both suicides and parasuicides.

Acknowledgments: Thanks to numerous individuals participated in this study.

Author Contributions: The authors contributed equally to this study

Conflicts of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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Received: 29 July 2020

Accepted: 24 August 2020

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