

Analysing Crime Scene Data, Medical Records and Forensic Information to Determine the Causes of Suicides

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ABSTRACT

Objective: To analyse crime scene data, medical records, and forensic information to unveil insights into the causes and traits of suicides.

Study Design: Descriptive study.

Place and Duration of the Study: Department of Family Medicine, Kayseri City Hospital, Kayseri, Turkiye, between January 2020 to December 2021.

Methodology: A suicide investigation team (doctor, social worker, psychologist) was created to study cases and conduct on-site psychological autopsies. Triggered by emergency calls, the team interviewed suicide victims' relatives using semi-structured questionnaires, gathering data on personal details, time, method, and potential motives. Medical records revealed psychiatric history and medication use, while national judicial systems were reviewed for legal records.

Results: A total of 158 fatal suicides were studied. Males accounted for 73.4%, females 26.6%. The leading cause was psychiatric illness (43%), chiefly depression (39%). Suicide peaked in the fall, especially in September, mainly at 23:00-23:59. Home was the common site (58.9%), and hanging was the primary method (44.3%). Prior hospitalisation for suicide attempts was 7.5%. Criminal records were held by 16.4% (26 individuals).

Conclusion: The results support the idea that suicides have seasonal patterns and that there are temporal windows of increased risk for suicide.

Key Words: *Suicide reasons, Suicide time, Psychological autopsy, Seasonal and temporal patterns.*

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INTRODUCTION

Suicide, in its most general definition, is the conscious and voluntary decision to end one's own life.¹ Suicide is not only a personal behaviour but also a complex, multidimensional social process that depends on psychological, biological and socio-cultural factors.² Psychological factors are one of the most important causes of death in suicide and may increase other mortality risks such as cancer and myocardial infarction.³ In this context, suicide is a public health problem that affects the well-being and social functioning of individuals, families, and societies.⁴ Approximately one person commits suicide every 40 seconds. The World Health Organization (WHO) has issued guidelines to draw attention to this issue, stating that suicide prevention is a "global imperative".⁵

While the number of suicide attempts that do not result in death is higher among young people and women, the number of suicide attempts that result in death is higher among men.¹ Despite the fact that Turkiye's suicide rate is lower than many other countries, the growth in male suicide rates is concerning.⁶

Although suicide is a complex process, it is necessary to look at the concept of suicide from a holistic perspective with an "individual in his/her environment" approach.^{2,3} In order to prevent suicides, it is necessary to know the causes and characteristics. The fact that there are few studies on this subject in Turkiye shows that the causes of suicide have not been sufficiently elucidated. The studies generally consist of suicide attempts and autopsy information after suicide. Therefore, a team formed within the Kayseri Provincial Health Directorate went to the scene of suicide cases that resulted in death and interviewed the relatives of the person and collected information about the person who committed suicide. This study aimed to determine the causes and characteristics of suicides by evaluating medical and forensic records together based on the data collected at the scene.

METHODOLOGY

This descriptive study covered suicide data in Kayseri province, Turkiye, between 01 January 2020 and 31 December 2021.

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Within the Kayseri Provincial Health Directorate, a 'suicide team' was formed consisting of a doctor, social worker, and psychologist to investigate suicide cases at the scene of the incident. This team went to the scene of the incident when a 'suicide report' was received through the emergency call system and administered the semi-structured questionnaire to the relatives of the suicide victim. The questionnaire asked for nationality, address, gender, marital status, occupation, time and type of suicide, and possible reason for suicide. When determining the reasons for suicide, the information received from the participants was taken into consideration. In determining the reason for suicide, the 'most important reason' was considered as the reason for suicide, with the joint decision of the suicide team being one of several reasons. In addition, the presence of a previous psychiatric examination was checked, and the medications used were reported from the social security system, hospital information management systems and public health service databases. His judicial records were accessed through the national judicial information system and the existence of previous criminal records and the acts for which he had been convicted were revealed.

Descriptive statistics for continuous variables were expressed as mean, standard deviation, median, minimum and maximum, while categorical variables were expressed as numbers and percentages. The one-sample Kolmogorov-Smirnov test was used to determine whether the numerical data of the variables followed a normal distribution. The Pearson chi-square test was used to compare categorical data. The statistical significance level was set at 5% ($p < 0.05$) and calculations were performed using SPSS 21.0.

RESULTS

From the studies conducted, 158 people were reached who died in 2020 and 2021. Of the 158 people who committed suicide, 71 committed suicides in 2020 and 87 committed suicides in 2021.

The median age of the subjects (Q1-Q3) was 35 (25.1 - 47.6) years, the median age of men (Q1-Q3) was 39 (27.9-51.6) years, and the median age of women (Q1-Q3) was 42 (29.9-56.6) years. The median age of single persons (Q1-Q3) was 22 (17.7-29.5) years, the median age of divorced/widowed persons (Q1-Q3) was 42 (32.8-54.2) years, and the median age of married persons (Q1-Q3) was 43 (37.8-55.2) years. Overall, 73.4% were males and 26.6% females. The relationship between information on marital status and gender is shown in Table I. When analysing the suicides resulting in death in Kayseri in 2020-2021, the number of men who died by suicide is 2.76 times higher than the number of women.

Table I: Relationship between gender and marital status of suicide victims.

	Male n (%)	Female n (%)	Male/Female Ratio	p*
Married	47 (40.5)	21 (50.0)	2.23	0.452
Single	47 (40.5)	16 (38.0)	2.93	
Divorced/Widowed	22 (19.0)	5 (12.0)	4.40	
Total	116 (100.0)	42 (100.0)	2.76	

*Pearson Chi-square test.

Table II: Some characteristics of suicides and suicide victims.

Distribution of suicides in 2020-2021 by seasons, months and time of death		
	n	%
Season-Month		
Spring (March-April-May)	38	24.1
Summer (June, July, August)	35	22.2
Autumn (September, October, November)	52	32.9
Winter (December, January, February)	33	20.9
Time		
00.00-00.59	5	3.2
01.00-01.59	4	2.5
02.00-02.59	3	1.9
03.00-03.59	2	1.3
04.00-04.59	1	0.6
05.00-05.59	3	1.9
06.00-06.59	4	2.5
07.00-07.59	4	2.5
08.00-08.59	6	3.8
09.00-09.59	9	5.7
10.00-10.59	9	5.7
11.00-11.59	7	4.4
12.00-12.59	9	5.7
13.00-13.59	9	5.7
14.00-14.59	7	4.4
15.00-15.59	11	7.0
16.00-16.59	12	7.6
17.00-17.59	10	6.3
18.00-18.59	7	4.4
19.00-19.59	7	4.4
20.00-20.59	8	5.1
21.00-21.59	5	3.2
22.00-22.59	2	1.3
23.00-23.59	14	8.9
Place of death		
Home	93	58.9
Hospital	33	20.9
Outdoor	24	15.2
Workplace	5	3.2
Boarding organisation	1	0.6
Vehicle interior	1	0.6
Prison	1	0.6
Mode of death in the autopsy/death report		
Hanging	70	44.3
Falling from a height/jumping	44	27.8
Firearm injury	31	19.6
Drug intoxication and complications	3	1.9
Substance abuse	2	1.3
Death by drowning	1	0.6
Penetrating sharp instrument injury	1	0.6
Hit by a train	1	0.6
Drinking corrosive substances and complications	1	0.6
Poisoning	1	0.6
Unknown	3	1.9
Total	158	100

The distribution of suicides according to season, month, and time of death is shown in Table II, and the number of suicides was significantly higher in the autumn season (September). Suicides were analysed by time of death and the distribution of time of death is shown in Table II. The most frequent times of death were between 23:00 and 23:59 with 14 suicides, 16:00-16:59 with 12 suicides, and 15:00-16:00 with 11 suicides. The least common time was between 04:00-04:59, with one suicide.

Suicides were evaluated according to the place and the manner of death in the autopsy/death report and the related data are presented in Table II. The most common place of death was home (58.9%) and the most common method of death was hanging (44.3%).

When collecting information on the reasons for suicide, information was obtained at the scene in 69 cases (43.6%) because it was not possible to obtain information from the relatives of the suicide victims due to grief, anger, etc. According to the information obtained by the suicide team at the scene, the most common reasons for suicide were psychiatric illness (43%), drug use (23%), economic reasons (15%), family reasons (13%) and other causes (6%).

The number of patients who had received psychiatric treatment in the past was 48 (30.3%). When analysing the distribution of psychiatric disorders, 39% were diagnosed with depression, 26% with anxiety disorder, 19% with bipolar disorder, 13% with schizophrenia/psychosis, and 3% with other psychiatric disorders. The rate of those admitted to the hospital with a previous suicide attempt in health and insurance records was 7.5%.

Criminal offence records of 26 suicides (16.4%) were found. Ten of them had criminal records for intentional assault, seven had criminal records for drugs, three had criminal records for disturbing public order and violation of privacy, and two had criminal records for jeopardising security, theft, and sexual assault.

DISCUSSION

Suicide is a candidate for a public health problem, with more than 800,000 people taking their own lives annually worldwide, and it is the second leading cause of death among young people aged 15-29 years.¹ In Turkiye, there were approximately 4,200 suicide cases resulting in annual deaths in 2021.⁷ In suicide prevention studies, suicide attempts are the main focus. Studies have focused on suicidal ideation, suicide attempts, and autopsy findings.^{2,3} In the recorded data and official information on suicide, the reasons for suicide are not emphasised.^{8,9} Psychological autopsy studies on the causes of suicide in Turkiye have been carried out in small numbers.^{10,11} This study differs from other studies in terms of psychological autopsy since it was carried out in the environment where the event occurred and immediately after it happened.

Regarding the crude suicide rate by province, Kayseri has a high crude suicide rate when compared to provinces close to it in terms of population.¹² The number of suicides resulting in death in Kayseri was 61 in 2019, 71 in 2020, and 87 in 2021. This situation shows that suicides are increasing in Kayseri Province.⁸

According to the TURKSTAT data, suicide-related deaths are most common among young people (15-29 years).⁷ The meta-analysis evaluated studies on psychological autopsies of suicide victims and found that the median age (Q1-Q3) in a study conducted in Turkiye was 24 (12-62) years.³ The median age of those who committed suicide in Kayseri in 2019 (Q1-Q3) is 31 (24.5-46) years.⁸ The median age in this study was 35 years, which is higher than in the literature. The fact that the number of divorced/widowed and married people is higher than the number of single people in this study, and the fact that the average age at first marriage in Kayseri, the province where this

study was conducted, was 27.5 years for men and 24.7 years for women in 2021 may have affected the median age median and increased it.¹³

A systematic analysis found that the death rate from suicide was higher for men than for women.⁹ The global age-standardised male-to-female ratio for suicides was 1.9 in 2021; 40.7% of those who committed suicide in Turkiye were single, 45.6% were married, and 13.6% were divorced/widowed.⁵ The average male-to-female ratio among suicides was 3.00, 3.00 for married, 3.43 for single, and 2.13 for divorced/widowed.⁷ In addition, a systematic analysis of more than 100 million cases found that the risk of suicide was about twice as high for unmarried people as for married people, and three times as high for divorced people.¹⁴ When compared with the literature, the male-to-female ratio for suicides in this study was found to be consistent with the literature. In terms of marital status, although no statistical significance was found in this study, it can be said that divorced/widowed men commit suicide more than married men, single men, and the general average in these data, contrary to the TURKSTAT data. This difference may be due to the categorisation of suicide data in TURKSTAT.

Psychiatric disorders are an important predisposing factor for suicide.¹⁵ In studies conducted on the causes of suicide, Taktak *et al.* found that 62.1% of suicides had a psychiatric disorder, and 16.1% received psychiatric treatment.¹⁰ This study found that 43% of suicides were committed for psychiatric reasons. In addition, the rate of those receiving psychiatric treatment in this study was 30.3%. The rate of suicides due to psychological reasons was higher than the rate of those who received psychiatric treatment in the literature, and this study suggests that people with psychological disorders do not seek psychiatric help before committing suicide. On the other hand, although it is estimated that for every suicide that results in death there are between 10 and 40 non-fatal suicide attempts, a previous suicide attempt may indicate that this action will be repeated.^{5,16} However, in a study conducted in Turkiye, the rate of recurrent suicide attempts was 12.9%. The rate of suicidal ideation before suicide was 37.1%.¹⁰ In this study, in contrast to the study by Haukka *et al.*, it is important to note that 7.5% of the cases had previously attempted suicide. In the cases of suicide that resulted in death, it is observed that these individuals made relatively few suicide attempts but shared their suicidal thoughts with their relatives. This may suggest that focusing on suicide attempts in suicide prevention studies may not be very effective. Intervening in the course of suicide would be more useful through a system that is activated and is easily accessible when relatives learn about the suicidal thoughts. In cases where suicide is suspected in relatives, the 'panic button' application can be used to set up a system that mobilises the relevant units (a system in which a telephone line is set up that the community can use when a suicide risk is suspected, and the relevant public institutions are notified when the call is received, and the psychosocial status of the person is assessed and, if necessary, placed under observation).

The psychiatric disorders most commonly associated with suicide are depression, anxiety disorders, bipolar disorder and schizophrenia.¹⁷ Anxiety disorders increase the risk of attempting suicide more than twofold, and the combination of depression and anxiety disorders increases the risk approximately 17-fold.^{17,18} When the distribution of psychiatric disorders was analysed in this study, it was found that more than half of the patients had depression and anxiety disorders, followed by bipolar disorder and psychosis/schizophrenia, which is consistent with the literature. It was confirmed that depression is a higher risk for suicide than the conditions in which the ability to evaluate reality is impaired (schizophrenia/psychosis/bipolar mood disorder).

The most common methods of suicide worldwide are hanging, falling from a height, and gunshot wounds.⁵ In the United States of America (USA), gunshot wounds account for 50 per cent of suicides, hanging for 25 per cent, and poisoning for 15 per cent.¹⁹ An analysis of TURKSTAT 2021 data in Türkiye found that the most common causes of suicide were hanging at 48.8 per cent, gunshot wounds at 26.3 per cent, and falling from a height at 12.4 per cent.⁷ Although the data in this study are compatible with the global data, they differ from the ranking given in the TURKSTAT data, and the incidence of falling from a height is higher than that of firearm injuries. This may be because the average storey height of buildings in Kayseri is 8.2, the highest in Türkiye, and this high structure emphasises jumping from heights as a means of suicide.^{20,21} Suicides due to firearm injuries may be related to factors such as the personal characteristics of the suicide victim and their medical history but are mainly related to access to firearms. The widespread use of firearms in society may influence the frequency of suicide methods by increasing the possibility of access to firearms. The ease of access to firearms for people in the USA may also have increased the incidence of suicide by firearm in that country as well.²²

Regarding judicial records, a previous study conducted in Istanbul reported that 6.5% of the cases had a judicial record.¹⁰ In this study, 16% of the cases had a judicial record, and the most common crimes were intentional injury and drug-related crimes. In both studies, it was found that most of the suicides had no criminal record.

Approximately three-quarters of suicides in the USA occur at home; 85 per cent die at the scene before they can be taken to hospital.²³ The study conducted in Türkiye found that 61.3 per cent of suicides that resulted in death occurred at home, 13.7 per cent in a public building, 13.7 per cent in a place other than the building in which the house is located or that belongs to the house, and 12.1 per cent in a place other than the home.¹⁰ In the present research, suicides that resulted in death were found to occur most frequently at home, which is consistent with the literature. Contrary to the literature, the study found that the second most common place for suicides that resulted in death was a hospital. This may be related to the early intervention of the environmental or health units with the suicide attempters,

or it may be related to the fact that the suicide attempters kept the violence low.

In a study that examined the seasonal and monthly distribution of suicides resulting in death, it was found that suicides occurred most frequently in autumn and most frequently in September.²⁴ Another study found that suicides that resulted in death have temporal and seasonal patterns, there are more suicides in December, and the risk increases, suicide cases are not homogeneous in time. They are influenced by temporal and seasonal factors such as months, official-religious holidays, and public holidays.²⁵ Furthermore, in a review of 45 studies, it was found that 40 studies provided data on seasons and months, and that suicides peaked in spring and early summer.⁴ In the present study, it was found that suicides resulting in death occurred most frequently in the autumn season and most frequently in September, and the results of this study support the idea that suicides have seasonal patterns.

In one study, when suicides resulting in death were analysed temporally, it was found that suicides occurred most frequently between 15:00-16:00.²⁴ In the study by Taktak *et al.*, it was found that suicides occurred most frequently between 12:00-20:00.¹⁰ In this study, the most frequent suicides occurred at the end of the day between 23:00 and 23:59, but it was observed that suicides were committed 'as the day draws to a close'. The second most common time interval in this study was 16:00-16:59, followed by 15:00-15:59. It can be inferred that 'ending life while finishing work' may have come to the fore. Although there may be many factors at the time of suicide, the end of the day or the end of the day may have an effect. In conclusion, this study supports that there are temporal windows of increased risk for suicide. The limitation of the study is the low participation of the relatives of the suicide victim during the heat of the event with the mentality of 'our grief is fresh'.

This study differs from other research in its approach to collecting information immediately at the suicide scene by a team. The impact of conducting on-site investigations immediately after suicides and working with relatives of the deceased shortly after the suicide event to determine the causes of suicide was investigated. The results of this study also support the idea that suicides follow a seasonal pattern and that there are windows of time when the risk of suicide increases. The presentation of suicide times in one-hour intervals also distinguishes this study from others. The findings of this study make an important contribution to directing further research and prevention efforts towards understanding and preventing suicide.

CONCLUSION

Intervening and recording data immediately after suicide incidents can contribute to a better understanding of the causes of suicide. In addition, taking into account seasonal and temporal factors can play a crucial role in developing strategies to reduce suicide risk.

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ETHICAL APPROVAL:

Permission was obtained from Kayseri Provincial Health Directorate by letter dated 02.08.2021 and numbered 93079172. Ethics committee approval was obtained from Karabük University Non-Interventional Ethics Committee with decision dated 20.01.2022 and number E-77192459-050.99-98867.

PATIENTS' CONSENT:

Informed consent was obtained from the relatives of all patients. Patient consent was not required in this study, as the data were taken from the patient's records without mentioning the patient's details or pictures.

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

ARB, ES: Literature search, study design, drafting, revisions, editing, statistical assistance, and conduction of study. Both authors approved the final version of the manuscript to be published.

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