

ORIGINAL ARTICLE

Medicine Science 2021;10(4):1138-44

The suicidal deaths in Isparta: A 10-year retrospective autopsy study

ID Abdulkadir Yildiz¹, ID Ozge Savci¹, ID Ibrahim Eroglu², ID Erdinc Cayli³¹Suleyman Demirel University, Faculty of Medicine, Department of Forensic Medicine, Isparta, Turkey²Ahi Evran University, Faculty of Medicine, Department of Forensic Medicine, Kirsehir, Turkey³Branch Office of the Council of Forensic Medicine, Isparta, Turkey

Received 22 March 2021; Accepted 04 May 2021

Available online 15.08.2021 with doi: 10.5455/medscience.2021.03.095

Copyright©Author(s) - Available online at www.medicinescience.org

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



Abstract

Although suicide constitutes a critical social and health problem, it is a preventable death cause. The present study aimed to provide epidemiological data to the programs that can be developed to determine and prevent suicide risk through the retrospective examination of 126 suicide-originated autopsies conducted between 2010 and 2019. The mean age was 41.40 ± 19.58 years. 18-40 age group had the highest incidence for both sexes. The male-female ratio was 2.5:1. Data obtained in this study showed that although the home was the most common location and hanging was the most common method of suicide, a statistically significant difference was found in the distribution of suicide locations and methods based on sex ($p < 0.05$). There was a statistically significant difference only in firearm use in the distribution of suicide methods based on age groups. The firearm was used by 38.5% of pediatric cases. Menstrual bleeding was detected in 56.5% of women of reproductive age. Almost half of the relatives (48.4%) did not know that the decedents had problems leading to suicide. 24.6% of the cases had a psychiatric diagnosis, which was depression, in 51.6%. Access to children to firearms is thought-provoking, especially in adolescent suicides. Important legal restrictions and punishments on the supply and possession of firearms and raising public awareness are necessary. One of the most striking findings of this study was that nearly half of the relatives did not know that the decedent had a problem leading to suicide. Unawareness of suicide clues by the relatives constitutes an important problem causing the deprivation of psychosocial support for the individuals and shows that training programs for society are needed to prevent suicide.

Keywords: Forensic autopsy, suicide, suicide methods, risk factors, menstrual cycle

Introduction

As a critical global public health problem, suicide causes more deaths compared to breast cancer, wars or murders. Approximately 800.000 individuals die due to suicide every year. Changing from country to country, the average rate of age-standardized suicide-originated deaths was reported as 10.5 per 100.000 cases based on 2016 data. This rate was reported higher in males (13.7 per 100.000) compared to females (7.5 per 100.000) [1]. Turkish Statistical Institute (TSI) data showed that the number of suicidal deaths in Turkey was 3406 in 2019 (4.12 per 100.000) and 3161 in 2018 (3.88 per 100.000) [2, 3].

The definitions of suicide and suicidal behavior have always been a controversial topic in the literature [4]. Crosby et al. defined suicide as death occurring due to the self-directed injurious behavior of an individual aiming to die [5]. Use of concepts, such as completed

suicide, suicidal attempt and the suicidal tendency, is suggested while using suicide-related terminology [6]. Contemporary theoretical models trying to account for suicidal behavior emphasize the complicated interaction between biological, environmental, psychological and social factors. The possibility of these factors to influence each other and the dependent variable is high [7-9]. Suicide rates generally vary according to sex and life experiences, while the used methods vary according to the countries. Global suicides are mostly related to psychiatric diseases and while depression is the most important, substance abuse and psychosis are among other important risk factors [6]. Apart from these risk factors, there are also studies reporting altitude and climate of the residence among the risk factors [10].

Suicide is a preventable death cause although it constitutes an important social and health problem and it is a subject examined and tried to be solved by many different disciplines. Forensic Medicine discipline also applies autopsy in completed suicide cases. Defining the characteristics of the individuals ending their lives through suicide in the city of Isparta, this study aimed to provide epidemiological data to the interventions which may be developed to prevent suicides.

*Corresponding Author: Abdulkadir Yildiz, Suleyman Demirel University, Faculty of Medicine, Department of Forensic Medicine, Isparta, Turkey
E-mail: kadiryildiz05@yahoo.com

Materials and Methods

Examining the reports of 1324 forensic corpse examinations and autopsies applied in the city of Isparta between January 1, 2010, and December 31, 2019, 126 suicidal death cases were included in this study. Autopsy and scene examination reports and previous medical documents of the cases were retrospectively examined for age, sex, suicide method, incident location, suicide time, psychiatric diagnosis, suicide-leading conditions and whether menstrual bleeding was detected based on genital examination and uterus dissection findings of the women at reproductive age during the autopsy. The ages below 18 were taken as pediatric and the ages of 65 and above were taken as elder groups. The age range of 18 and 64 was examined in two groups as 18-40 and 41-64. "SPSS for Windows 17.0" package program was used for data analysis. For descriptive characteristics, constant variables were given as mean $\pm$ standard deviation and discrete variables were given as number and percentage. Pearson chi-square test and Fisher's exact test were used for group comparisons. $p \leq 0.05$ was regarded as statistically significant.

Ethical approval was obtained from Süleyman Demirel University Clinical Research Ethical Committee with date 26 January 2021 and number 29, and Helsinki Declaration rules were followed to conduct this study.

Results

Autopsies of suicide-originated deaths constituted 9.51% of 1324 forensic postmortem examinations applied to the Department between January 1, 2010, and December 31, 2019. Although the lowest number was observed in 2012 and the highest number was observed in 2017 based on the yearly evaluation, a statistically significant proportional difference was not detected in the total number of forensic autopsies. Similarly, a statistically significant proportional difference was not found in the sex distribution of suicide-originated autopsies based on years (Figure 1).

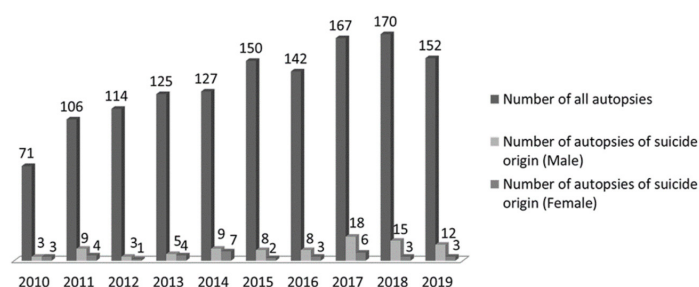


Figure 1. Distribution of autopsies based on years and sex.

With an age distribution between 12 and 90, mean age was 41.40 ± 19.58 , 71.4% of the cases were male and 28.6% were female. Male/female ratio was 2.5:1. Marital status information was available for 85.7% ($n=108$) of the decedents, and 46% of them were married. Hanging was the most common suicide method with 60.3%, while home was the most common incident scene in all cases with 69.8%. 15.9% of the cases had attempted suicide before and only 5.9% of the cases had left a suicide note. Evaluating the suicide causing conditions of the cases based on the information provided by the relatives, 48.4% of the cases did not have any problems/had any problems the relatives knew about, while the relatives stated that 26.2% had psychiatric problems.

When previous medical documents of the cases were examined, no psychiatric diagnosis was found or the medical documents were unreachable in 75.4% and depression was the most common diagnosis in 12.7% of the cases (Table 1). Among 28 cases using firearms as a suicide method, 60.7% used shotguns and 39.3% used pistols and the targeted body regions were head in 78.6%, chest in 17.9% and abdominal areas in 3.6%. When the 13 cases using the toxic substances as suicide methods were examined, 61.5% used drugs, 23.1% used organophosphate and 15.4% used corrosive substance.

Table 1. Overall characteristics of study sample

		Mean $\pm$ SD	n (=126)	%
Age	Total	41.40 $\pm$ 19.58		
	Male	41.58 $\pm$ 19.69		
	Female	40.97 $\pm$ 19.56		
Gender	Male		90	71.4
	Female		36	28.6
Suicide method	Hanging		76	60.3
	Firearm use		28	22.2
	Poisoning		13	10.3
	Jumping from height		9	7.1
Place of incident	Home		88	69.8
	Open area		22	17.5
	Prison		5	4
	Other		11	8.7
Conditions causing suicide*	Psychological problems		33	26.2
	Family problems		21	16.7
	Economic		11	8.7
	None/Unknown		61	48.4
Previous suicide story	Yes		20	15.9
	None		106	84.1
Suicide Note	Yes		7	5.6
	None		119	94.4
Psychiatric diagnoses**	Depression		16	12.7
	Bipolar Disorder		4	3.2
	Psychotic disorders		3	2.4
	PTSD		2	1.6
	Alcohol/substance addiction		2	1.6
	Anxiety disorder		2	1.6
	Dementia		1	0.8
	Sexual identity disorder		1	0.8
	None/Unreachable		95	75.4

*Learned from relatives

**Learned from previous medical documents

PTSD=Post-traumatic stress disorder

Evaluating the cases for age groups and sex, 10.3% of the cases were under 18 and 42.9% were between 18-40 years of age and the number of male cases were higher than females in all age groups excluding those under 18 but no statistically significant difference was found in sex distribution based on age groups (fisher's exact test, $p>0.05$) (Table 2).

Table 2. Distribution of cases based on age and sex

Age groups	Male		Female		Total	
	n	%*	n	%*	n	%*
≤17	6	6.7	7	19.4	13	10.3
18-40	41	45.6	13	36.1	54	42.9
41-64	32	35.6	11	30.6	43	34.1
≥65	11	12.2	5	13.9	16	12.7
Total**	90	71.4	36	28.6	126	100

*Column percentage is provided. **Row percentage is provided. $p>0.05$

Sex distribution of the cases based on suicide method, incident scene, conditions leading to suicide, psychiatric diagnosis and the season and month of suicide is provided in Table 3. Although the most common suicide method was hanging in both sexes, a statistically significant difference was detected in the distribution of methods (fisher's exact test, $p=0.019$). The most common incident scene was home for both sexes and a very low percentage of women committed suicide outside home and a statistically

significant difference was detected in the distribution of suicide scenes based on sex (fisher's exact test, $p=0.022$). A statistically significant difference was not detected concerning psychiatric diagnosis distributions based on sex. The most common suicide seasons and months were autumn and October for women and summer and August for men, but no statistical difference was detected in their distribution ($p>0.05$).

Table 3. The relationship between sex and –the characteristics of suicides

		Total		Female		Male		p-value
		n	%**	n	%*	n	%*	
Suicide method	Hanging	76	60.3	19	25	57	75	0.019
	Firearm use	28	22.3	5	17.9	23	82.1	
	Poisoning	13	10.3	8	61.5	5	38.5	
	Jumping from height	9	7.1	4	44.4	5	55.6	
Place of incident	Home	88	69.8	32	36.4	56	63.6	0.022
	Open area ^b	22	17.5	2	9.1	20	90.9	
	Prison	5	100	-	0	5	100	
	Other	11	8.7	2	18.2	9	81.8	
Conditions causing suicide	Psychological problems	33	26.2	10	30.3	18	69.7	0.135
	Family problems	21	16.7	6	28.6	15	71.4	
	Economic	11	8.7	-	0	11	100	
	None/Unknown	61	48.4	20	32.8	41	67.2	
Psychiatric diagnosis	Depression	16	12.7	6	37.5	10	62.5	0.922
	Bipolar disorder	4	3.2	1	25	3	75	
	Psychotic disorders	3	2.4	1	33.3	2	66.7	
	Other	8	6.3	2	25	6	75	
	None/Unreachable	95	75.4	26	27.4	69	72.6	
Season	Spring	25	19.8	8	32	17	68	0.134
	Summer	36	28.6	7	19.4	29	80.6	
	Autumn	39	31	16	41	23	59	
	Winter	26	20.6	5	19.2	21	80.8	
Month	January	5	4	-	0	5	100	0.349
	February	11	8.7	3	27.3	8	72.7	
	March	5	4	2	40	3	60	
	April	9	7.1	4	44.4	5	55.6	
	May	6	4.8	1	16.7	5	83.3	
	June	9	7.1	1	11.1	8	88.9	
	July	16	12.7	5	31.2	11	68.8	
	August	15	11.9	2	13.3	13	86.7	
	September	13	10.3	6	46.2	7	53.8	
	October	14	11.1	7	50	7	50	
	November	12	9.5	3	25	9	75	
	December	11	8.7	2	18.2	9	81.8	

*Row percentage is provided. **Column percentage is provided. ^aStable, warehouse, construction site. ^bGarden, park, field

When the suicides were examined for the day of the week, a statistically significant difference was not detected although Tuesday had the highest rate of 22.2% (Figure 2).

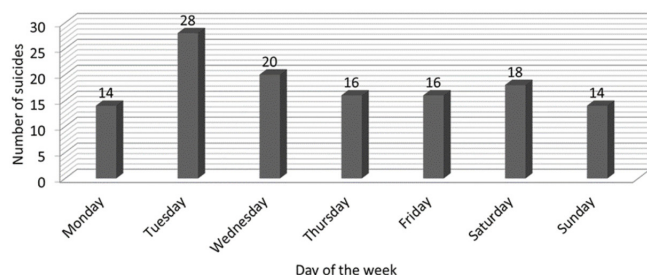


Figure 2. Distribution of suicide cases based on the days of the week

The distribution of death places based on suicide method is provided in Table 4. While death place was the incident scene in 93.4% of hanging cases, hospital treatment rates of individuals, especially in the methods of poisoning and jumping from a height, among other methods, were detected quite high and a statistically significant difference was detected in the distribution of death places based on method (fisher's exact test, $p=0.000$). 56.6% of the 23 cases who died in the hospital died within the first 24 hours, 21.7% died within the 1-10th day, and 21.7% died after the 10th day of treatment.

Hanging had the highest rank in all age groups in the distribution of suicide methods based on age groups. There was a statistically significant difference in the distribution of firearm use based on age groups (fisher's exact test, $p=0.029$) (Table 5).

Table 4. Distribution according to the death location based on suicide method

Suicide Method	Death location						p-value
	Place of incident		Hospital		Total		
	n	%*	n	%*	n	%**	
Hanging	71	93.4	5	6.6	76	60.3	0.000
Firearm use	21	75	7	25	28	22.2	
Poisoning	6	46.2	7	53.8	13	10.3	
Jumping from height	5	55.6	4	44.4	9	7.1	
Total*	91	72.2	35	27.8	126	100	

*Row percentage is provided. **Column percentage is provided.

Table 5. Distribution of suicide methods based on age groups

Suicide Method	Age groups								p-value
	0-17 *		18-40 *		41-64 *		≥65*		
	n	%	n	%	n	%	n	%	
Hanging	6	7.9	31	40.8	26	34.2	13	17.1	0.239
Firearm use	5	17.9	15	53.6	8	28.6	-	0	0.029
Poisoning	2	15.4	5	38.5	4	30.8	2	15.4	0.817
Jumping from height	-	0	3	33.3	5	55.6	1	11.1	0.630
Total*	13	10.3	54	42.9	43	12.7	16	12.7	

* Row percentages are provided

Based on the uterus findings in the autopsies of suicide-originated deaths of 23 women at their reproductive ages (15-49 age group), 56.5% had menstrual bleeding.

Discussion

Male/female rates were reported between 1:1.8 and 1:3.5 in the studies on living cases who attempted suicide [11-13]. When autopsy studies on completed suicides in Turkey and other countries were examined, high male/females rates changing between 1.6:1 and 3.7:1 were observed contrary to those reported in suicide attempts [14-21]. In line with the findings of similar studies in the literature, male/female ratio was detected as 2.5:1 in this study. Higher life-threatening role of unemployment and other economic factors in males compared to females and higher use of death-causing suicide methods by males explain the higher rate of completed suicides in males [22, 23]. Findings of our study and literature show that male sex is among the most important risk factors for completed suicides.

The average age determined as 41.40 ± 19.58 in this study was consistent with literature [14, 15, 18, 23-25]. 18-40 was the age group in which suicide was the most common with a rate of 42.9%. Based on TSI data, this age group again constitutes nearly half of all suicide-originated deaths [3]. Forensic autopsy studies in Turkey also provided similar findings [15, 17, 18]. A statistically significant difference was not detected among male/female rates in the distribution based on age groups, 18-40 age group stands out as an important risk group for completed suicides.

When the distribution of suicide methods was examined in this study, hanging was detected as the most commonly used method in both sexes and in all age groups parallel to other autopsy studies conducted in Turkey [15, 17, 18, 20]. Hanging was also reported as the most common method in a metaanalysis study examining studies conducted in eight countries in the East Mediterranean Region and in studies performed in countries like Australia and Thailand [26-28]. However, the most commonly used method was reported as a firearm in studies conducted in some provinces of

the United States of America [23, 29], while it was jumping from height in Singapore and Hong Kong [30, 31]. The geographical differences observed in the methods used were evaluated to be related to the reachability of the methods. This difference from other countries may be caused by the harder accessibility of firearms in our country compared to the United States of America, an abundance of high buildings and given that people live in these buildings in Singapore and Hong Kong. In addition to the easier accessibility of hanging material, faster, painless and inevitable death it provides can explain why hanging is the most common method. The statistically significant difference found in the distribution of the methods based on death locations (incident scene - hospital) in this study supported this condition. Rates of deaths not taking place in incident scene but during hospital treatment were detected as 6.6% in hanging, 25% in firearm use, 53.8% in poisoning and 44.4% in jumping from height.

A statistically significant difference was detected when we compared the distribution of used suicide methods based on sex. After hanging, intoxication in females and firearm in males were used significantly more commonly as a suicide method. Suicide methods used by women are generally more easily reachable and contain less violence. The use of methods containing less violence by women was claimed to be caused by their concerns about their body appearance and also having less intention to die [24].

There was no statistically significant difference in the methods of hanging, poisoning and jumping from height when the distribution of the suicide methods used was compared based on age groups, but there was a significant difference in the distribution of firearm use based on age groups. Among 28 cases using firearm, 53.6% were in 18-40 and 28.6% were in 41-64 age groups, while 17.9% were under 18 years of age. No firearm use was observed in the age group of 65 and above. In a study conducted by Kaya et al. on 525 completed suicide cases of individuals aged 60 and above, firearm usage rate was detected as 18% and it was reported that the difficulty of firearm supply compared to other methods could have caused this [32]. Firearm usage was detected in 38.5% of pediatric suicide cases in our study. This rate was reported as 28.8% in the study conducted by Demir et al [18]. A systematic review on pediatric suicides reported that the suicidal death possibility of children living in areas with high gun access rates is twice higher, and more importantly, their firearm usage possibility is seventy times higher [4]. Keeping firearms at home constitutes an important risk factor, especially for adolescent suicides.

Suicides in our study mostly (69.8%) occurred at home. Home was again the most commonly reported suicide place (54.1% - 85%) in the studies conducted in different cities of Turkey and other countries [15, 18, 23, 28, 32]. Home is regarded as a convenient environment for suicidal behavior given that it covers a low number of preventing factors for the individuals aiming to commit suicide and that it is the environment where people feel safest [32]. Although the most common place for suicide was detected as home in both sexes in our study, the incident place distribution based on sex was statistically significantly different. 90.9% of the individuals committing suicide in an open area, and 81.8% of the individuals committing suicide in closed places were male. It was observed that women did not prefer places outside the home as a suicide location.

Neurochemical changes formed on the human body by season-related environmental conditions, such as high temperature, sunlight, low precipitation rate and moisture, are reported to be effective on suicidal behavior [10]. The number of suicides was reported to be highest in spring in Denizli, summer in Kahramanmaraş and winter in Mersin based on other studies on completed suicides in different cities of Turkey, while suicides were high in spring in Iowa and winter in Bangkok based on the studies conducted in other countries [18, 20, 23, 28, 33]. Similar differences were also observed in the distribution of suicides based on months [15, 18, 34]. The suicides were mostly committed in autumn with a rate of 31% and in summer with a rate of 28.6% in our study. Suicide-originated autopsies were performed mostly in July, August and October, respectively, when examined on a monthly basis. However, no statistically significant difference was detected in the distribution of suicides based on months and seasons.

Evaluating the suicide causing conditions of the cases based on the information provided by the relatives, the relatives stated that 48.4% of the cases did not have any problems/had any problems they knew about, while they stated that 26.2% of the cases had psychiatric, 16.7% had familial and 8.7% had economic problems. In the study conducted by Persons et al., the condition of not knowing the conditions leading to suicide was detected as 22.07% [23]. One of the important findings of this study was that nearly half of the relatives of the decedents did not know that they had a problem leading to suicide. Unrecognition of suicide clues by relatives attracts attention as a significant risk factor causing the social support and medical aid deprivation of the individuals.

It was reported that psychiatric diseases were responsible for the majority of suicides and suicide attempts, suicide incidence in individuals with the psychiatric disease was at least 10 times higher than the general population, and most of the other causes were related to interpersonal and economic problems [6, 23]. In an autopsy study on 394 cases in the United States of America, a psychiatric diagnosis was not present or reachable in 54.1% of the cases, while 45.9% had a psychiatric diagnosis [14]. Another autopsy study reported psychiatric disease detection rate as 37% [23]. 24.6% of the cases were observed to have a psychiatric diagnosis when previous medical documents of the cases were examined in our study. When the diagnosis distribution of 31 cases with a psychiatric diagnosis was examined, 51.6% had depression, 12.9% had bipolar disorder and 9.6% had psychotic disorder diagnoses. In line with the results of our study, suicide risk was reported to increase, especially in psychiatric diseases, such as depression, bipolar mood disorder and schizophrenia and depression with a suicide prevalence, changing between 13.1% and 59.2% was the main risk factor [6, 23, 35].

The relevant literature reported that the fluctuations in estradiol (E2) and progesterone (P4) among ovarian hormones during the monthly menstrual cycle could cause an increase in suicide risk and the studies showed significant individual changes in the neurobiological sensitivity forming due to normal hormone changes. Normal monthly flux was reported to cause negative mood and behavioral changes in some women "sensitive to hormone" [36, 37]. In many cross-sectional studies reviewed by Saunders and Hawton, an increase was reported in hospitalization

risk due to suicidal behavior in perimenstrual weeks (before and during menstruation) [38]. Although the pathophysiology of hormone sensitivity has not been completely understood yet, it is predicted as a risk factor for suicide [36]. When the uterus findings of 23 women of reproductive age (ages of 15-49) were examined in the suicide-originated female deaths in our study, detection of menstrual bleeding in 56.5% of the women in this age group was supportive for increased suicide behavior risk in perimenstrual weeks.

Conclusion

While women committed suicide at much higher rates compared to men, this condition is reverse in completed suicide rates. Age group of 18-40 stands out as the riskiest age group for both sexes. The perimenstrual period was also observed among the risk factors in women at reproductive age; however, more advanced studies are needed. Although hanging is the first selection among suicide methods, firearm use is also quite common. Access to children to firearms is thought-provoking, especially in pediatric and adolescent suicides. Important legal restrictions and punishments on the supply and possession of firearms and raising public awareness are necessary. One of the most important findings of this study was that nearly half of the relatives of the decedents did not notice that they had a problem leading to suicide. Suicide clues unnoticed by the relatives constitute an important problem causing the deprivation of social support and psychiatric follow-up and treatment for the individuals and show that training programs are needed for the whole society to prevent suicides.

Limitations

Although the number of cases in this study was at an expectable rate for the population of Isparta, it was relatively low. Unreachability of all demographic data of the cases due to its retrospective character and the lack of histopathological examination despite the detection of uterus dissections and menstrual bleeding in the autopsies were some of our limitations in the present study.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

All authors declare no financial support.

Ethical approval

Ethical approval was obtained from Suleyman Demirel University Clinical Research Ethical Committee with date 26 January 2021 and number 29, and Helsinki Declaration rules were followed to conduct this study.

References

- World Health Organization. Suicide in the world: Global health estimates. <https://apps.who.int/iris/handle/10665/326948>. access date 25.12.2020.
- Turkish Statistical Institute. Death Statistics. <https://data.tuik.gov.tr/Bulten/Index?p=Olum-Istatistikleri-2018-30701>. access date 25.12.2020.
- Turkish Statistical Institute. Suicide Statistics. <https://data.tuik.gov.tr/Search/Search?text=%C4%B0NT%C4%B0HAR>. access date 25.12.2020.
- Soole R, Kolves K, De Leo D. Suicide in children: A systematic review. *Arch Suicide Res.* 2015;19:285-304.
- Crosby AE, Ortega L, Melanson C. Self-directed violence surveillance; uniform definitions and recommended data elements, version 1.0. Atlanta (GA): Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2011.
- Bachmann S. Epidemiology of suicide and the psychiatric perspective. *Int J Environ Res Public Health.* 2018;15:1425.
- De Beurs D, Fried EI, Wetherall K, et al. Exploring the psychology of suicidal ideation: A theory driven network analysis. *Behav Res Ther.* 2019;120:103419.
- Klonsky ED, May AM, Saffer BY. Suicide, suicide attempts, and suicidal ideation. *Annu. Rev. Clin. Psychol.* 2016;12:307-30.
- O'Connor RC, Kirtley OJ. The integrated motivational-volitional model of suicidal behaviour. *Philos Trans R Soc Lond B Biol Sci.* 2018;373:20170268.
- Asirdizer M, Kartal E, Etli Y, et al. The effect of altitude and climate on the suicide rates in Turkey. *J Forensic Leg Med.* 2018;54:91-5.
- Kıymet ME, Goceoglu UU, Yururdurmaz B, et al. Assessment of suicide attempt in the forensic medicine outpatient clinic in Muğla. *Bull Legal Med.* 2020;25:83-9.
- Deniz I, Ersoz AG, Ildes N, et al. A study on suicides and suicide attempts in the official records of the province of Batman during the period 1995-2000. *J Soc Pscy Sts.* 2001;1:4-24.
- Atli A, Uysal C, Kaya MC, et al. Assessment of admission to the emergency department due to suicide attempt: Sanliurfa sample. *J Mood Disorders.* 2014;4:110-4.
- Cuchara B, Diaz FJ. An 8-year retrospective study on suicides in Washington, DC. *Am J Forensic Med Pathol.* 2020;41:18-26.
- Demirci S, Gunaydin G, Dogan KH. Retrospective evaluation of death cases related with suicide occurred in Konya between 2000 and 2005. *Bull Legal Med.* 2007;12:62-7.
- Cibis A, Mergl R, Bramesfeld A, et al. Preference of lethal methods is not the only cause for higher suicide rates in males *J Affect Disord.* 2012;136:9-16.
- Karaarslan B, Bilen AG, Celikel A, et al. A Retrospective study in suicides deaths that occurred in Gaziantep province between Years 2005-2011. *J For Med.* 2014;28:268-74.
- Demir S, Yazar ME, Dereli AK, et al. Analysis of suicidal deaths in Denizli A 10-years retrospective autopsy study. *Bull Legal Med.* 2018;23:93-9.
- Jørs E, Christoffersen M, Veirum NH, et al. Suicide attempts and suicides in Bolivia from 2007 to 2012: Pesticides are the preferred method—females try but males commit suicide! *Int J Adolesc Med Health.* 2014;26:361-7.
- Erkol Z, Beyaztas FY, Buken B, et al. Analysis of suicidal deaths cases in Kahramanmaraş City. *Türkiye Klinikleri J Foren Med.* 2007;4:7-16.
- Yavuz Y, Yurumez Y, Kucuker H, et al. Evaluation of suicidal deaths. *Genel Tip Dergisi.* 2006;16:181-5.
- Stuckler D, Basu S, Suhrcke M, et al. The public health effect of economic crises and alternative policy responses in Europe: An empirical analysis. *Lancet.* 2009;374:315-23.
- Persons JE, Hefti MM, Nashelsky MB. Epidemiology of suicide in an Iowa cohort. *Public Health.* 2019;177:128-34.
- Kölves K, McDonough M, Crompton D, et al. Choice of a suicide method: Trends and characteristics. *Psychiatry Res.* 2018;260:67-74.
- Erel O, Katkici U, Dirlik M, et al. The evaluation of the autopsied suicide cases at our department. *ADU Tip Fakültesi Dergisi.* 2003;4:13-5.
- Morovatdar N, Moradi-Lakeh M, Malakouti SK, et al. Most common methods of suicide in Eastern Mediterranean Region of WHO: A systematic review and meta-analysis. *Arch Suicide Res.* 2013;17:335-44.
- Stefanac N, Hetrick S, Hulbert C, et al. Are young female suicides increasing? A comparison of sex-specific rates and characteristics of youth suicides in Australia over 2004–2014. *BMC Public Health.* 2019;19:1-11.
- Tulapunt N, Phanchan S, Peonim V. Hanging fatalities in Central Bangkok, Thailand: A 13-year retrospective study. *Clin Med Insights Pathol.* 2017;10:1179555717692545.
- Bready JC, Bready RJ, Chute DJ. A ten-year study of suicides from a Rural/ Suburban County. *J Forensic Sci.* 2017;62:911-4.
- Chia BH, Chia A, Ng WY, et al. Suicide methods in Singapore (2000–2004): types and associations. *Suicide Life Threat Behav.* 2011;41:574-83.
- Wong PW, Caine ED, Lee CK, et al. Suicides by jumping from a height

- in Hong Kong: A review of coroner court files. *Soc Psychiatry Psychiatr Epidemiol.* 2014;49:211-9.
32. Kaya A, Tasar PT, Meral O, et al. The characteristics of older people suicides by sex and age subgroups. *Leg Med.* 2020;46:101721.
33. Metin A, Cileli G, Kocar I, et al. The sociodemographic characteristics of suicide cases in Mersin. *Bull Legal Med.* 2014;19:49-52.
34. Kucuker H, Aksu A. Elazig'da gorulen intihar olgularinin adli tip acisindan incelenmesi. [Investigation of suicide cases in Elazig in terms of forensic medicine.] *Düşünen Adam.* 2002;15:16-20.
35. Yilmaz EB. Evaluation and management of the suicide risk in psychiatry patients. *Curr App Psych.* 2019;11:438-50.
36. Owens SA, Eisenlohr-Moul T. Suicide risk and the menstrual cycle: a review of candidate RDoC mechanisms. *Curr Psychiatry Rep.* 2018;20:106.
37. Schmidt PJ, Nieman LK, Danaceau MA, et al. Differential behavioral effects of gonadal steroids in women with and in those without premenstrual syndrome. *N Engl J Med.* 1998;338:209-16.
38. Saunders KE, Hawton K. Suicidal behaviour and the menstrual cycle. *Psychol Med.* 2006; 36:901-12.