

A Retrospective Evaluation of Acute Poisoning Cases in Emergency Departments: Focus on Suicide Attempts by Poisoning

 Mehmet Gün*

Department of Emergency Medicine, Tokat-Turhal State Hospital, Tokat, Türkiye

ABSTRACT

Objective: Identifying poisoning and suicidal characteristics in a country or specific region is crucial for determining risks, implementing necessary precautions, and managing affected individuals. This study aimed to examine the demographic, etiologic, and clinical features of patients with acute poisoning and identify factors associated with suicide attempts by poisoning.

Materials and Methods: One hundred thirty-eight patients with acute poisoning who were admitted to the emergency department of Tokat-Turhal State Hospital between July 2021 and June 2023 were retrospectively included in this study. The patients were divided into two groups based on suicidal intent.

Results: The incidence of poisoning over the study period was 0.048%. The median age was 28.5 (range: 15–47) years, and 81 (58.7%) patients were female. Poisoning cases were most frequent during summer, particularly in June. Thirty patients (21.74%) presented following suicide attempts by poisoning. The most common causes of poisoning were mushrooms (34.26%) and corrosive agents (32.41%) in the non-suicidal group. In contrast, 80% of suicide attempts involved drug poisoning ($p<0.001$), primarily analgesics and psychiatric drugs. Patients in the suicide attempt group had higher rates of psychiatric history ($p<0.001$), poorer health status ($p=0.009$), and more frequent ICU admissions ($p<0.001$).

Conclusion: Suicide attempts mostly occurred via drug overdose, especially among individuals with psychiatric illness, resulting in poorer outcomes and greater need for intensive care. Early intervention, follow-up, and increased public awareness may help improve prognosis and reduce complications.

Keywords: Drug intoxication, emergency department, poisoning, suicide attempt

How to cite this article: Gün M. A Retrospective Evaluation of Acute Poisoning Cases in Emergency Departments: Focus on Suicide Attempts by Poisoning. Compreh Med 2025;17(4):245-251

INTRODUCTION

Acute poisoning is one of the most common reasons for emergency department (ED) referrals and represents a significant public health issue due to its potential morbidity and mortality.^[1] Poisoning occurs from exposure to harmful substances in quantities capable of causing toxic effects, either accidentally or intentionally.^[2] Exposure routes include ingestion, inhalation, injection, or dermal absorption. Admission rates due to acute poisoning vary globally and within countries, influenced by socioeconomic status, geography, culture, and seasonal factors.^[3] Poisoning may occur accidentally, especially in young children, or intentionally as a suicide attempt, particularly in adolescents and adults. Among suicide meth-

ods, poisoning is one of the most frequently used, alongside hanging and firearms. Understanding regional poisoning trends and suicide attempt characteristics is essential for risk assessment and preventive strategies.^[4,5] With advances in modern medicine, technology, and changing sociocultural conditions, the epidemiology of poisoning may vary over time. Recording cases, especially those with suicidal intent, and regularly updating demographic and clinical data are crucial to improve prevention and management.^[6,7]

This study aimed to examine the demographic, etiologic, and clinical characteristics of acute poisoning patients admitted to the emergency department and identify factors associated with suicide attempts by poisoning.

*The current affiliation of the author: Department of Emergency Medicine, Şile State Hospital, İstanbul, Türkiye



Address for Correspondence: Mehmet Gün, Department of Emergency Medicine, Şile State Hospital, İstanbul, Türkiye

E-mail: drmgun1@gmail.com **ORCID ID:** 0000-0003-3466-6014

Received date: 06.03.2025

Revised date: 06.04.2025

Accepted date: 04.06.2025

Online date: 08.10.2025

MATERIALS and METHODS

This study was designed as a single-center, retrospective, and descriptive study conducted between July 2021 and June 2023 in the Tokat-Turhal State Hospital. A total of 288,461 patients were admitted to the emergency department for any reason during this period, and 138 of them were diagnosed with acute poisoning of various origins. Demographic data including age and sex, seasonal and monthly variation, causes of poisoning, route of exposure, clinical features, follow-up, and outcomes were obtained from patient records and hospital databases.

The diagnosis of poisoning was based on information provided by the patient, family members, or companions regarding the substances involved. The identity of the substance was confirmed when possible, based on the statements of conscious patients or by the physical presence of the substance near the patient. Suicidal intent, thoughts, and plans were identified from interviews with patients or their relatives. The national poison control center was consulted for all cases, and its recommendations were implemented.

All patients received standard poisoning management protocols and were followed up for at least one month. When indicated, combination therapy with gastric lavage, activated charcoal, and decontamination with water and soap was applied. Continuous monitoring, specific antidotes, and elimination techniques were administered as needed. In cases of suicide attempts, additional measures such as continuous observation, prevention of self-harm, psychiatric consultation, and supportive care were applied during and after hospitalization. The time interval between poison intake and hospital admission, as well as mortality data, were also recorded.

All research procedures were reviewed and approved by the Tokat Gaziosmanpaşa University Clinical Research Ethics Committee (Approval Number: 23-KAEK-181, Date: 17/08/2023) and were conducted in accordance with the ethical principles of the Declaration of Helsinki.

Statistical Analysis

All analyses were performed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Histogram and Q-Q plots were used to assess the distribution of continuous variables. Continuous variables are presented as mean±standard deviation or median (1st–3rd quartile) depending on distribution, and categorical variables as frequency (percentage). Normally distributed variables were analyzed using the Student's t-test. Non-normally

distributed variables were analyzed using the Mann–Whitney U test. Categorical variables were analyzed using the Chi-square test, Fisher's exact test, or Fisher–Freeman–Halton test, as appropriate. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 138 patients with acute poisoning were included in this study. The incidence of poisoning during the entire study period was 0.048%. The median age was 28.5 years (range: 15–47), and 97 patients (70.29%) were older than 18 years. Eighty-one patients (58.7%) were female. The highest number of poisoning cases occurred in summer, particularly in June. Most patients (78.99%, n=109) were admitted to the hospital within 0–4 hours of exposure. Thirty patients (21.74%) had attempted suicide. Based on suicidal intent, patients were categorized into two groups. No significant differences were found between the groups in terms of age, sex, or seasonal/monthly distribution (all, $p>0.05$). Demographic data are summarized in Table 1.

Among patients without suicide attempts, the most common causes of poisoning were mushrooms (34.26%), corrosive agents (32.41%), carbon monoxide (15.74%), insecticides or pesticides (4.63%), and other agents such as drugs, food, or methanol (2.78%). In contrast, 80% of patients who attempted suicide were poisoned by drugs ($p<0.001$), including analgesics (n=12), psychiatric drugs (n=9), cardiovascular drugs (n=8), and multiple drugs (n=6). In the non-suicidal group, corrosive substances used included laundry bleach (n=13) and detergent (n=17) ($p=0.032$). All patients in the suicide attempt group were exposed orally ($p=0.002$), while in the non-attempt group, 71.3% were exposed orally, 28.7% by inhalation, and 3.7% by dermal route ($p=0.002$). Details of causes and exposure routes are shown in Table 2 and Figure 1.

Symptom rates were higher in the non-suicidal group ($p=0.025$). Nausea and vomiting were the most frequent symptoms in this group, while nausea and somnolence were more common among those who attempted suicide. Blackout and somnolence were significantly more frequent in the suicide group ($p=0.039$ and $p=0.027$, respectively). Gastric lavage was used in 49.35% of non-suicidal cases and 73.33% of suicide cases ($p=0.043$). Ten patients (33.3%) in the suicide group had a known psychiatric disorder ($p<0.001$). A greater proportion of patients in the suicide group (96.67%) presented within 0–4 hours compared to the non-suicidal group ($p=0.015$). There were no significant

Table 1. Demographic and seasonal characteristics of poisoning cases by suicidal intent

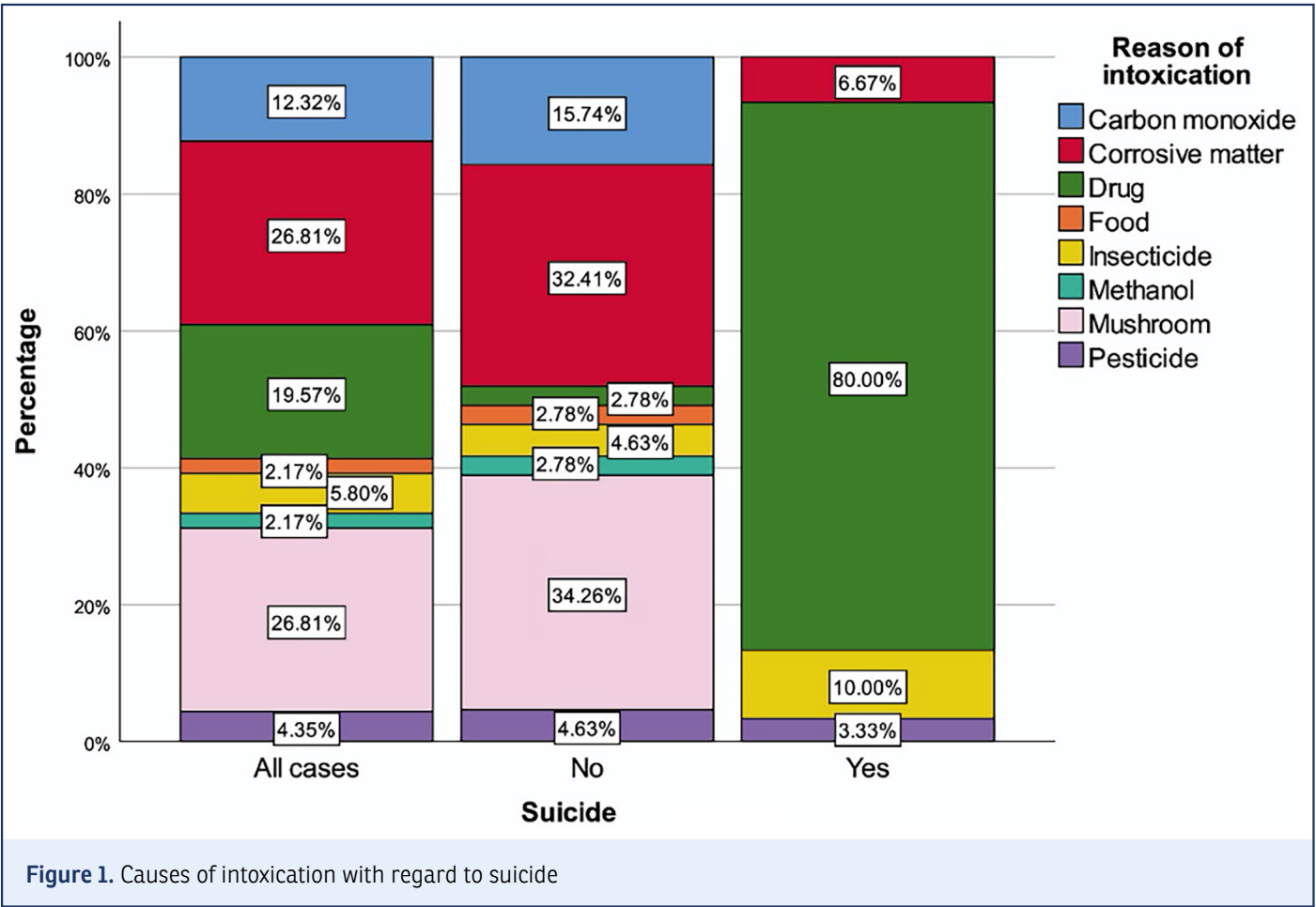
Variables	All cases (n=138)		No suicide attempt (n=108)		Suicide attempt (n=30)		p
	n	%	n	%	n	%	
Age (years), median (IQR)	28.5 (15–47)		30 (13–51)		23.5 (18–42)		0.722
<18 years	41	29.7	34	31.5	7	23.3	0.523
≥18 years	97	70.3	74	68.5	23	76.7	0.523
Sex - male	57	41.3	47	43.5	10	33.3	0.428
Sex - female	81	58.7	61	56.5	20	66.7	
Season - winter	38	27.5	30	27.8	8	26.7	0.066
Season - spring	22	15.9	17	15.7	5	16.7	
Season -summer	53	38.4	46	42.6	7	23.3	
Season -autumn	25	18.1	15	13.9	10	33.3	

Data are presented as n (or median (IQR) unless otherwise specified. IQR: Interquartile range

Table 2. Causes and routes of poisoning in all patients and comparison by suicidal intent

Variables	Suicidal attempts						p
	All cases (n=138)		No (n=108)		Yes (n=30)		
	n	%	n	%	n	%	
Causes of Poisoning (n=138)							
Carbon monoxide	17	12.32	17	15.74	0	0.00	<0.001
Corrosive matter	37	26.81	35	32.41	2	6.67	
Drug	27	19.57	3	2.78	24	80.00	
Food	3	2.17	3	2.78	0	0.00	
Insecticide	8	5.80	5	4.63	3	10.00	
Methanol	3	2.17	3	2.78	0	0.00	
Mushroom	37	26.81	37	34.26	0	0.00	
Pesticide	6	4.35	5	4.63	1	3.33	
The use of corrosive substances (n=37)							
Laundry bleach	13	35.14	13	37.14	0	0.00	0.032
Detergent	17	45.95	17	48.57	0	0.00	
Other	7	18.92	5	14.29	2	100.00	
Type of drug used for poisoning (n=27) (1)							
Cardiovascular drugs	8	29.63	0	0.00	8	33.33	0.532
Analgesics	13	48.15	1	33.33	12	50.00	1.000
Psychiatric drugs	10	37.04	1	33.33	9	37.50	1.000
Other drugs	5	18.52	1	33.33	4	16.67	0.474
Multiple drugs	6	22.22	0	0.00	6	25.00	1.000
Exposure route (n=138) (1)							
Intravenous	0	0.00	0	0.00	0	0.00	N/A
Oral	107	77.54	77	71.30	30	100.00	0.002
Dermal	4	2.90	4	3.70	0	0.00	0.577
Inhalation	31	22.46	31	28.70	0	0.00	0.002

Data are given as mean±standard deviation or median (1st quartile - 3rd quartile) for continuous variables according to normality of distribution and as frequency (percentage) for categorical variables. (1) Individuals may have more than one of the followings. N/A: Not applicable



differences in vital signs or other cardinal findings (all, $p>0.05$). Clinical features are provided in Table 3.

Poor or fair health status was more common among patients in the suicide group ($p=0.009$). This group also had lower rates of discharge with full recovery and higher rates of intensive care unit admission ($p<0.001$). Thirteen patients in the non-suicidal group were referred to another hospital. Two deaths occurred due to methanol ingestion in the non-suicidal group, both admitted more than 4 hours after exposure. Clinical outcomes are presented in Table 4.

DISCUSSION

This study aimed to examine the demographic, etiologic, and clinical characteristics of patients with acute poisoning and to identify factors associated with suicide attempts. We found a poisoning incidence of 0.048% over the study period, which is relatively low. In Turkey, reported rates of poisoning-related ED admissions range between 0.8% and 5%.^[6] The lower rate in our study may reflect local and regional differences. Our study was conducted in Turhal, a

small town with a mixed rural–urban population of 78,219. To investigate local poisoning patterns and the impact of geography, we included all acute poisoning cases over a two-year period.

Female patients made up 58.7% of the study population, consistent with national data. However, sex distribution varies by region. Studies have reported female predominance in cities such as Diyarbakır (74.1%), Düzce (63.2%), and İstanbul (66%).^[7,8] In contrast, the U.S. National Poison Data System reported equal sex distribution in over 2.7 million cases.^[9] Due to variation in sample sizes, patient profiles, and regional factors, it is difficult to draw a definitive conclusion about sex distribution in acute poisoning cases.

Seasonal variation also appeared relevant. In our study, poisoning cases peaked in summer, while suicide attempts occurred more frequently in autumn. Similar seasonal patterns were observed in previous research. Baydin et al.^[10] found increased poisoning cases in summer. while Doğanay et al.^[11] linked suicide attempts with temperature, humidity, and sunlight duration. International data show variability: in

Table 3. Clinical characteristics of patients and comparison by suicidal intent

Variables	Suicidal attempts						p
	All cases (n=138)		No (n=108)		Yes (n=30)		
	n	%	n	%	n	%	
Symptoms (n=138) (1)	116	84.06	95	87.96	21	70.00	0.025
Dizziness	18	13.04	16	14.81	2	6.67	0.361
Headache	19	13.77	17	15.74	2	6.67	0.247
Abdominal pain	20	14.49	19	17.59	1	3.33	0.075
Nausea	72	52.17	59	54.63	13	43.33	0.374
Vomiting	36	26.09	30	27.78	6	20.00	0.533
Diarrhea	3	2.17	3	2.78	0	0.00	1.000
Skin burning	5	3.62	5	4.63	0	0.00	0.585
Burning mouth/throat	16	11.59	15	13.89	1	3.33	0.194
Blackout	10	7.25	5	4.63	5	16.67	0.039
Dyspnea	12	8.70	11	10.19	1	3.33	0.462
Somnolence	18	13.04	10	9.26	8	26.67	0.027
Syncope	4	2.90	2	1.85	2	6.67	0.206
Gastric lavage (n=107)	60	56.07	38	49.35	22	73.33	0.043
Activated charcoal (n=107)	60	56.07	39	50.65	21	70.00	0.111
The history of Psychiatric disease (n=138)	10	7.25	0	0.00	10	33.33	<0.001
Systolic blood pressure (n=138)	120.93±18.77		120.97±18.70		120.77±19.35		0.958
Diastolic blood pressure (n=138)	74.62±10.87		75.06±11.04		73.00±10.25		0.359
Body temperature (n=138)	36.66±0.21		36.66±0.21		36.69±0.21		0.518
Oxygen saturation (n=138)	99 (97–99)		99 (97–99)		98.5 (97–99)		0.910
Heart rate (n=138)	89 (78–100)		87 (77–100)		91 (78–100)		0.414
Time of admission to hospital (n=138)							
0–4 hours	109	78.99	80	74.07	29	96.67	0.015
>4 hours	29	21.01	28	25.93	1	3.33	

Data are given as mean±standard deviation or median (1st quartile–3rd quartile) for continuous variables according to normality of distribution and as frequency (percentage) for categorical variables. (1) Individuals may have more than one of the followings.

Finland, female poisoning peaked in autumn,^[12] and in Italy, suicides by poisoning peaked in spring and late autumn.^[13] Thus, seasonal asymmetry appears to vary with age, sex, and regional or methodological factors.

Suicide and suicide attempts are major global health concerns with personal, familial, and societal impact. According to the WHO, over 700,000 suicide deaths occur annually, accounting for 1.3% of all global deaths.^[14] In Türkiye, common suicide methods include hanging, drug ingestion, sharp tools, jumping from heights, and firearms.^[2] Recent studies and meta-analyses have shown an increasing rate of suicide attempts by poisoning, particularly among ado-

lescents and young adults.^[15] In our study, the median age of patients attempting suicide was 23.5 years, with 80% using medications. Analgesics and psychiatric drugs were the most common agents, consistent with national data. This may be linked to prescription trends and accessibility.

In contrast to Turkish data, Värnik et al.^[16] reported that hanging was the most common suicide method in Europe (49.5%), followed by drug poisoning (12.7%). Additionally, in rural regions like South Africa, pesticide-related suicides were more prevalent than drug-related ones due to greater availability.^[17] These findings highlight how suicide methods vary with geography and access to substances.

Table 4. Clinical outcomes of patients and comparison by suicidal intent

Variables	Suicidal attempts						p
	All cases (n=138)		No (n=108)		Yes (n=30)		
	n	%	n	%	n	%	
Health status (n=138)							
Good	103	74.64	87	80.56	16	53.33	0.009
Fair	24	17.39	15	13.89	9	30.00	
Poor	11	7.97	6	5.56	5	16.67	
Status (n=138)							
Discharged with full recovery	29	21.01	28	25.93	1	3.33	<0.001
Hospitalized, service	77	55.80	63	58.33	14	46.67	
Hospitalized, intensive care unit	32	23.19	17	15.74	15	50.00	
Mortality (n=138)	2	1.45	2	1.85	0	0.00	1.000
Refuse to hospitalization (n=109)	20	18.35	18	22.50	2	6.90	0.114
Referred to another hospital (n=138)	13	9.42	13	12.04	0	0.00	0.071
Referral indication (n=13)							
Gastroenterology	3	23.08	3	23.08	0	0.00	
Pediatric gastroenterology	1	7.69	1	7.69	0	0.00	
Hyperbaric oxygen therapy	4	30.77	4	30.77	0	0.00	
Dialysis	1	7.69	1	7.69	0	0.00	
Intensive care unit	1	7.69	1	7.69	0	0.00	
Pediatric intensive care unit	1	7.69	1	7.69	0	0.00	
Intensive care unit with dialysis	2	15.38	2	15.38	0	0.00	

Data are given as mean±standard deviation or median (1st quartile-3rd quartile) for continuous variables according to normality of distribution and as frequency (percentage) for categorical variables

Psychiatric conditions are key risk factors for suicide. Various studies have identified associations with disorders such as depression, anxiety, PTSD, and personality disorders.^[18,19] In our study, 33.3% of patients who attempted suicide had a known psychiatric illness, suggesting a strong correlation. Psychiatric deterioration, such as behavioral change or withdrawal, should be closely monitored by healthcare providers and family members. Patients with suicidal ideation should be directly questioned to assess risk and guide timely intervention.

Suicide attempters face increased risk of repeat attempts or completion. Understanding patterns and trends helps inform public health strategies. Poisoning is a growing public health issue requiring intensive care and long-term monitoring.^[20] In our study, patients who attempted suicide had poorer clinical status, higher ICU admission rates, and lower discharge rates, though no deaths occurred. This may reflect the availability of close monitoring and sufficient resources.

This study has limitations. First, it is a retrospective, single-center design, which may introduce bias. Second, specific toxins could not be confirmed due to lack of toxicological screening. Third, variables such as comorbidities, dosage, time to ED arrival, poisoning severity, and physician experience may have influenced outcomes.^[21] Lastly, as a hospital-based study, the results may reflect more severe cases and may not be generalizable to the broader population.

CONCLUSION

In conclusion, suicide attempts via drug poisoning were common in our study, particularly among those with psychiatric illnesses. These patients had worse clinical outcomes and required more intensive care. Early intervention, psychiatric evaluation, and increased public awareness may improve outcomes and reduce suicide-related complications and mortality.

Disclosures

Ethics Committee Approval: The study was approved by the Tokat Gaziosmanpaşa University Clinical Research Ethics Committee (No: 23-KAEK-181, Date: 17/08/2023).

Informed Consent: Informed consent was obtained from all participants or their caregivers, where applicable.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Funding: The authors declared that this study received no financial support.

Use of AI for Writing Assistance: No AI technologies utilized.

Peer-review: Externally peer-reviewed.

REFERENCES

- Gokalp G. Evaluation of poisoning cases admitted to pediatric emergency department. *Int J Pediatr Adolesc Med* 2019;6:109–14. [\[CrossRef\]](#)
- Büyüker SM, Duvar T, Altınbilek E. Retrospective analysis of poisoning cases admitted to the emergency department between 2015 and 2020. *Ann Clin Anal Med* 2023;14:550–5. [\[CrossRef\]](#)
- Arikan C, Bora ES, Yurtsever G, Çınaroğlu OS, Acar H, Şahan TD, et al. The epidemiology of poisoning in emergency department in Turkey. *Ann Clin Anal Med* 2022;13:280–2. [\[CrossRef\]](#)
- Li Z, Xiao L, Yang L, Li S, Tan L. Characterization of acute poisoning in hospitalized children in southwest China. *Front Pediatr* 2021;9:727900. [\[CrossRef\]](#)
- Grabska K, Pilarska I. Acute poisoning among children and adolescents: a narrative review. *Med Sci Pulse* 2022;16:33–9. [\[CrossRef\]](#)
- Gedik M, Hakkoymaz H, Kilci A. Evaluation of the demographic, etiological & the costs of drug intoxication. *Med Sci* 2023;12:462–5. [\[CrossRef\]](#)
- Güloğlu C, Kara IH. Acute poisoning cases admitted to a university hospital emergency department in Diyarbakir, Turkey. *Hum Exp Toxicol* 2005;24:49–54. [\[CrossRef\]](#)
- Sacak ME, Akoglu H, Onur O, Altinok AD. An analysis of 1344 consecutive acute intoxication cases admitted to an academic emergency medicine department in Turkey. *North Clin Istanbul* 2021;8:377.
- Gummin DD, Mowry JB, Spyker DA, Brooks DE, Fraser MO, Banner W. 2016 annual report of the American association of poison control centers' national poison data system (NPDS): 34th annual report. *Clin Toxicol* 2017;55:1072–254. [\[CrossRef\]](#)
- Baydin A, Yardan T, Aygun D, Doganay Z, Nargis C, Incealtin O. Retrospective evaluation of emergency service patients with poisoning: a 3-year study. *Adv Ther* 2005;22:650–8. [\[CrossRef\]](#)
- Doganay Z, Sunter AT, Guz H, Ozkan A, Altintop L, Kati C, et al. Climatic and diurnal variation in suicide attempts in the ED. *Am J Emerg Med* 2003;21:271–5. [\[CrossRef\]](#)
- Räsänen P, Hakko H, Jokelainen J, Tiihonen J. Seasonal variation in specific methods of suicide: a national register study of 20 234 Finnish people. *J Affect Disord* 2002;71:51–9. [\[CrossRef\]](#)
- Preti A, Miotto P. Seasonality in suicides: the influence of suicide method, gender and age on suicide distribution in Italy. *Psychiatry Res* 1998;81:219–31. [\[CrossRef\]](#)
- Jang H, Lee W, Kim Y-o, Kim H. Suicide rate and social environment characteristics in South Korea: the roles of socioeconomic, demographic, urbanicity, general health behaviors, and other environmental factors on suicide rate. *BMC Public Health* 2022;22:1–10. [\[CrossRef\]](#)
- Glenn CR, Kleiman EM, Kellerman J, Pollak O, Cha CB, Esposito EC, et al. Annual Research Review: A meta-analytic review of worldwide suicide rates in adolescents. *J Child Psychol Psychiatry* 2020;61:294–308. [\[CrossRef\]](#)
- Värnik A, Kölves K, van der Feltz-Cornelis CM, Marusic A, Oskarsson H, Palmer A, et al. Suicide methods in Europe: a gender-specific analysis of countries participating in the "European Alliance Against Depression". *J Epidemiol Commun Health* 2008;62:545–51. [\[CrossRef\]](#)
- Davies B, Hlela MBKM, Rother H-A. Child and adolescent mortality associated with pesticide toxicity in Cape Town, South Africa, 2010–2019: a retrospective case review. *BMC Public Health* 2023;23:792. [\[CrossRef\]](#)
- Alswedani S, Mehmood R, Katib I, Altowaijri SM. Psychological health and drugs: Data-driven discovery of causes, treatments, effects, and Abuses. *Toxics* 2023;11:287. [\[CrossRef\]](#)
- Bryan CJ, Rozek DC, Butner J, Rudd MD. Patterns of change in suicide ideation signal the recurrence of suicide attempts among high-risk psychiatric outpatients. *Behav Res and Ther* 2019;120:103392. [\[CrossRef\]](#)
- Mégarbane B, Oberlin M, Alvarez J-C, Balen F, Beaune S, Bédry R, et al. Management of pharmaceutical and recreational drug poisoning. *Ann Intens Care* 2020;10:1–30. [\[CrossRef\]](#)
- Jensen TL, Tejlbo Frost M, Dalhoff K, Studsgaard Petersen T. Repeated poisonings in Denmark - a nationwide study. *Clin Toxicol (Phila)* 2023;61:392–9. [\[CrossRef\]](#)