

Evaluation of Poisoning Cases Followed at Van Yüzüncü Yıl University Faculty of Medicine Dursun Odabaş Medical Center: An Eight-Year Retrospective Analysis

Hilmi Demirkıran¹, Arzu Esen Tekeli¹, Ali Haydar Akça², Mehmet Reşit Öncü², Mecnun Çetin³, Sebat İldoğan⁴

¹Van Yüzüncü Yıl University, Faculty of Medicine, Department of Anesthesiology and Reanimation. Van, Türkiye

²Van Yüzüncü Yıl University, Faculty of Medicine, Department of Emergency Medicine. Van, Türkiye

³Van Yüzüncü Yıl University, Faculty of Medicine, Department of Pediatrics. Van, Türkiye

⁴University of Health Sciences, Van Training and Research Hospital, Department of Anesthesiology and Reanimation, Van, Türkiye

Abstract

Introduction: Poisoning cases constitute approximately 0.7-5% of emergency department visits in Türkiye. This study aimed to investigate the demographic, etiological, and clinical characteristics of poisoning cases presenting to the Van Yüzüncü Yıl University Dursun Odabaş Medical Center over 8 year period.

Materials and Methods: This retrospective study was conducted in the adult and pediatric emergency departments. Records of all patient admissions between 2010 and 2018 were reviewed to identify cases diagnosed with intoxication. Data were obtained from the hospital's electronic database using the ICD-10 (International Classification of Diseases) coding system. The patients' demographic characteristics, intoxication agents, modes of exposure, treatment processes, need for ICU admission, and in hospital mortality rate were analyzed in the study.

Results: It was found that 0,63% (n=2,090) of total admissions were intoxication cases. While poisoning cases were most concentrated in the 19–30 age group (25.1%, n=525), the overall age range ranged from 3 months to 85 years. Of the cases, 62.3% (n=1,303) were accidental, while 37.7% (n=787) were due to suicide attempts. Etiologically, the most common agents were drugs and biological substances, accounting for 54.6% (n=1,142) of the cases. The overall in-hospital mortality rate was low at 0.14% (n=3).

Discussion and Conclusion: This study identifies a female predominance (57.7%) and a decreasing incidence trend over eight years, aligning with global patterns. While childhood cases are primarily accidental, suicidal intent (p=0.021) and medical agent ingestion (p<0.001) emerge as critical 'red flags' significantly associated with severe clinical presentations requiring inpatient care. These findings emphasize the need for gender-specific psychosocial support and community education to reduce the persistent burden on emergency departments.

Key words: Poisoning; suicide; attempted; accidents; mortality.

Introduction

Poisoning is defined as the entry of toxic substances into the body through various routes, including the gastrointestinal tract, respiratory system, skin or mucous membranes, and parenteral exposure (1). Worldwide, approximately 84,000 people die each year due to unintentional poisonings, while roughly 720,000 individuals lose their lives to suicide. The vast majority of these deaths occur in low- and middle-income countries, where poisonings impose a significant burden on emergency health services and represent a major public health challenge (2). Although the exact incidence of poisoning in Türkiye has not been clearly established, regional reports indicate that poisoning constitutes approximately 0.7%–5% of emergency department admissions, with an associated mortality rate of nearly 0.03% (3). Depending on the type and dose of the toxic

agent, acute intoxication may result in severe clinical deterioration or death. Since organ failure may not be evident in the early phase of intoxication, close monitoring in intensive care units is often required. Poisoning events may occur unintentionally, such as accidental exposure to pesticides, or intentionally as suicide attempts (4). The present study evaluates poisoning cases monitored at the the adult and pediatric emergency departments of Van Yüzüncü Yıl University Dursun Odabaş Medical Center. The aim was to determine the patients' demographic, etiological and clinical characteristics, need for intensive care unit (ICU) admission and in-hospital mortality rates of poisoning cases over an eight-year period.

Materials and Methods

After obtaining approval from the local ethics committee (decision no: 2018/11), all patients

*Corresponding Author: Hilmi Demirkıran Van Yüzüncü Yıl University, Faculty of Medicine, Department of Anesthesiology and Reanimation. Zeve Campus, 65000, Van, Turkey Email: h.dkiran@hotmail.com. Orcid: Hilmi Demirkıran [0000-0001-8116-3933](https://orcid.org/0000-0001-8116-3933), Arzu Esen Tekeli [0000-0001-6468-8850](https://orcid.org/0000-0001-6468-8850), Ali Haydar Akça [0000-0001-7372-3582](https://orcid.org/0000-0001-7372-3582), Mehmet Reşit Öncü [0000-0001-9296-2554](https://orcid.org/0000-0001-9296-2554), Mecnun Çetin [0000-0002-3267-8161](https://orcid.org/0000-0002-3267-8161), Sebat İldoğan [0000-0002-1900-4023](https://orcid.org/0000-0002-1900-4023)

Received: 02.01.2026, Accepted: 03.04.2026



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

diagnosed with poisoning between 2010 and 2018 in the adult and pediatric emergency departments were retrospectively reviewed. Clinical data were obtained from hospital records. Poisoning cases identified using the International Classification of Diseases (ICD-10 codes T36–T50.9) were classified as 'intentional' (X60–X69) or 'accidental' (X40–X44). This classification allowed for the differentiation of suicide attempts from unintentional exposures. For each case included in the study, demographic data, such as age, sex, year of admission, and time of admission (categorized into eight-hour shifts: 00:01–08:00, 08:01–16:00, and 16:01–23:59) were recorded. Clinical assessment variables, including the presence of comorbidities, concomitant alcohol use, the specific type of toxic agent (medical agents, food poisoning, corrosive substances, psychotropic drugs, etc.), and the route of poisoning, were examined. To evaluate clinical outcomes and case management, the care setting (inpatient vs. outpatient), need for ICU admission, and in-hospital mortality rates were analyzed.

Ethical approval: The ethics committee approval

was obtained by the Van Yuzuncu Yil University Hospital Clinical Research Ethics Committee with approval number 04-04-2018-11. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Statistical analysis: Descriptive data were expressed as mean, standard deviation, median, minimum and maximum values, as well as frequency and percentage distributions. The normality of variable distribution was assessed using the Kolmogorov–Smirnov test. Comparisons of quantitative independent variables were performed using the Mann–Whitney U test. Qualitative variables were analyzed using the chi-square test, and Fisher's exact test was applied when chi-square assumptions were not met. Statistical analyses were conducted using SPSS version 22.0, and p values below 0.05 were considered statistically significant.

Table 1: Patients' age, sex, and time of hospital admission

	Min–Max 3-85	Median	Mean $\pm$ SD	n (%)
Age	Month–Year	16 Year	17,0 $\pm$ 14,6	
	3 Month -1 Year		48	2.3
	2 Year		222	10.6
	3 Year		250	12.0
	4 Year		152	7.3
	5 Year		43	2.1
Age	6-10 Year		77	3.7
	11-15 Year		196	9.4
	16-18 Year		280	13.4
	19-30 Year		525	25.1
	31-45 Year		187	8.9
	46-85 Year		110	5.3
Gender	Male		884	42.3
	Female		1206	57.7
Year of Admission	2010		506	24.2
	2011		340	16.3
	2012		141	6.7
	2013		217	10.4
	2014		212	10.1
	2015		146	7.0
	2016		239	11.4
	2017		185	8.9
	2018		104	5.0
Admission Time	00:01-08:00		611	29.2
	08:01-16:00		604	28.9
	16:01-23:59		874	41.8

Results

During the study period, 334,462 patients were evaluated, and poisoning was identified in 0.63%

of cases (n = 2,090). The highest frequency of poisoning was observed among individuals aged 19–30 years. Female patients constituted a significantly larger proportion of poisoning cases

(Table 1). Drugs and biological agents were the most frequently identified causes of poisoning, accounting for 54.6% of cases. Accidental

exposure was responsible for 62.3% of poisoning events. Most patients (64.7%) were managed on an outpatient basis (Table 2).

Table 2: Patients' comorbidities, poisoning etiology, and prognosis

		n	%
Comorbidity	(-)	1975	94.5
	(+)	115	5.5
Etiology of Poisoning	Medical Agent	1364	65.3
	Non-medical Agent	726	34.7
Alcohol Co-ingestion	(-)	1931	92.4
	(+)	159	7.6
Mode of Poisoning	Suicidal	787	37.7
	Accidental	1303	62.3
Poisoning Agent		n	0.0
Drugs and Biological Agents		1142	54.6
Food poisoning		315	15.1
Alcohol/Narcotics		325	15.6
Corrosive Substances		163	7.8
Psychotropic drugs		80	3.8
Hormones		19	0.9
Autonomic drugs		46	2.2
Current Status	Exitus	3	0.1
	Recovered	2087	99.9
Care Setting	Inpatient	737	35.3
	Outpatient	1353	64.7

Table 3: Evaluation of patients according to suicide and accident status

		Suicidal		Accidental		p-value	
		Mean ± SD	n (%)	Mean ± SD	n (%)		
Age		24.7	± 11.6	12.4	± 14.3	<0.001	m
	3 Month -1 Year	0	0.0	48	3.7		
	2 Year	0	0.0	222	17.0		
	3 Year	0	0.0	250	19.2		
	4 Year	0	0.0	152	11.7		
	5 Year	0	0.0	43	3.3		
Age	6-10 Year	0	0.0	77	5.9	<0.001	X ²
	11-15 Year	79	10.0	117	9.0		
	16-18 Year	215	27.3	65	5.0		
	19-30 Year	334	42.4	191	14.7		
	31-45 Year	102	13.0	85	6.5		
	46-85 Year	57	7.2	53	4.1		
Gender	Male	307	39.0	577	44.3	0.018	X ²
	Female	480	61.0	726	55.7		
	00:01-08:00	230	29.2	381	29.2		
Admission Time	08:01-16:00	231	29.4	373	28.6	0.918	X ²
	16:01-23:59	325	41.3	549	42.1		
Current Status	Exitus	2	0.3	1	0.1	0.506	X ²
	Recovered	785	99.7	1302	99.9		
Comorbidity	(-)	717	91.1	1258	96.5	<0.001	X ²
	(+)	70	8.9	45	3.5		
Etiology of Poisoning	Medical Agents	569	72.3	795	61.0	<0.001	X ²
	Non-Medical Agents	218	27.7	508	39.0		
Alcohol Co-ingestion	(-)	643	81.7	1288	98.8	<0.001	X ²
	(+)	144	18.3	15	1.2		

m Mann-Whitney U test / X² Chi-square test

Patients in the suicide group were significantly older than those in the accidental poisoning group (Table 3, $p < 0.001$). Individuals over 11 years of age were more prevalent in the suicide group, whereas children under 11 years were predominantly represented in the accidental poisoning group (Table 3, $p < 0.001$). Among the fatal cases, two were associated with suicidal poisoning and one with accidental exposure (Table 3, $p = 0.506$). Female patients were significantly more common in the suicide group compared with the accidental group (Table 3, $p = 0.018$). No statistically significant differences were observed between the groups regarding admission time

(Table 3, $p = 0.918$) or in-hospital mortality (Table 3, $p = 0.506$). The presence of comorbid conditions was significantly higher among patients with suicidal intent (Table 3, $p < 0.001$). In addition, poisoning with medical agents and concomitant alcohol use were more frequently observed in the suicide group (Table 3, $p < 0.001$). Hospitalized patients were significantly younger than those treated on an outpatient basis (Table 4, $p < 0.001$). Children under 11 years of age were more frequently hospitalized, whereas patients older than 11 years were predominantly treated as outpatients (Table 4, $p < 0.001$).

Table 4: Evaluation of patients according to admission status

		Inpatient Mean $\pm$ SD n (%)		Outpatient Mean $\pm$ SD n (%)		p-value	
Age		14.5	$\pm$ 14.8	18.4	$\pm$ 14.3	<i><0.001</i>	^m
	3 Month -1 Age	30	4.1	18	1.3		
	2 Age	115	15.6	107	7.9		
	3 Age	106	14.4	144	10.6		
	4 Age	76	10.3	76	5.6		
	5 Age	23	3.1	20	1.5		
Age	6-10 Age	21	2.8	56	4.1	<i><0.001</i>	^{x²}
	11-15 Age	53	7.2	143	10.6		
	16-18 Age	65	8.8	215	15.9		
	19-30 Age	156	21.2	369	27.3		
	31-45 Age	58	7.9	129	9.5		
	46-85 Age	34	4.6	76	5.6		
Gender	Male	357	48.4	527	39.0	<i><0.001</i>	^{x²}
	Female	380	51.6	826	61.0		
	00:01-08:00	176	23.9	435	32.2		
Admission Time	08:01-16:00	225	30.5	379	28.0	<i><0.001</i>	^{x²}
	16:01-23:59	336	45.6	538	39.8		
Current Status	Exitus	3	0.4	0	0.0	0.081	^{x²}
	Recovered	734	99.6	1353	100.0		
Comorbidity	(-)	688	93.4	1287	95.1	0.090	^{x²}
	(+)	49	6.6	66	4.9		
Etiology of Poisoning	Medical Agents	563	76.4	801	59.2	<i><0.001</i>	^{x²}
	Non-Medical Agents	174	23.6	552	40.8		
Alcohol Co-ingestion	(-)	707	95.9	1224	90.5	<i><0.001</i>	^{x²}
	(+)	30	4.1	129	9.5		
Mode of Poisoning	Suicidal	253	34.3	534	39.5	<i>0.021</i>	^{x²}
	Accidental	484	65.7	819	60.5		

^m Mann-Whitney U test / ^{x²} Chi-square test

Male patients were more common in the inpatient group (Table 4, $p < 0.001$). Admissions between 08:00 and 23:59 occurred more frequently among hospitalized patients (Table 4, $p < 0.001$). All fatal cases were recorded in the inpatient group (Table 4, $p = 0.081$). The overall in-hospital mortality rate was 0.14% (Table 2). No statistically significant differences were identified between inpatient and outpatient groups in terms of

mortality ($p = 0.081$) or comorbidity rates (Table 4, $p = 0.090$). However, poisoning with medical agents (Table 4, $p < 0.001$) and accidental poisoning ($p = 0.021$) were significantly more frequent in hospitalized patients. Conversely, alcohol co-ingestion was significantly more prevalent in the outpatient group (Table 4, $p < 0.001$).

Discussion

Previous studies conducted in Turkey have reported poisoning-related in-hospital mortality rates ranging from 0.5% to 3.7% (5). In the present study, the overall in-hospital mortality rate was 0.14%, which is lower than most national reports. This finding may be attributed to the high proportion of accidental poisonings and pediatric cases. The predominance of female patients in suicidal poisoning cases observed in this study is consistent with existing national and international literature (4,6,9). Psychosocial stressors, higher rates of depressive disorders, and easier access to pharmaceutical agents have been proposed as contributing factors (6,9). In contrast, the higher proportion of male patients requiring hospitalization may be related to exposure to more toxic substances or the development of more severe clinical presentations (4,8). The higher frequency of comorbid conditions in the suicide group supports previous reports indicating that chronic medical illnesses and psychiatric disorders increase the risk of suicidal poisoning (4,13). Alcohol use, which was also more common in this group, has been identified as an independent risk factor for intentional intoxication (13). The increased rate of medical agent poisoning among hospitalized patients and those with suicidal intent suggests that drug-related intoxications are associated with greater clinical severity. Multiple drug ingestion and agents affecting the central nervous system often necessitate inpatient treatment and close monitoring (7,8,14). Similar admission times between suicide and accidental poisoning groups indicate comparable access to healthcare services (4,7). The higher proportion of daytime admissions among hospitalized patients may reflect the referral of more severe cases identified during working hours. The absence of significant differences in-hospital mortality between groups highlights the effectiveness of present emergency and intensive care management strategies (4,7,14). The retrospective design, limited availability of detailed toxic dose information, and insufficient psychiatric data represent the main limitations of this study (4,8). Despite these limitations, the long study duration and large sample size provide valuable regional epidemiological data. Approximately 10% of pediatric poisoning cases in this study were associated with suicidal intent, a finding consistent with previous reports (10,15). Although accidental exposure predominates in childhood, suicidal behavior increases during adolescence (15,16). World Health Organization data indicate that poisoning remains one of the

most frequently used methods of suicide attempts in the 10–14 age group (17). In patients aged 46–85 years, the rate of suicidal poisoning was approximately 7.2%, which is consistent with literature reporting lower rates in older populations (18,20). While suicide attempts are less frequent in this age group, factors such as chronic illness, functional decline, loneliness, and depression may increase risk (19,20). The predominance of accidental drug ingestion and treatment-related adverse events may explain the relatively low rate observed in elderly patients (4,17,19). A decreasing trend in poisoning rates was observed over the study period. In countries experiencing the most rapid declines, the improvement in the quality of healthcare services and the expansion of medical intervention capacity have been identified as fundamental factors (21). Between 2000 and 2021, a 35% reduction in global age-standardized suicide rates was recorded (17). Similarly, deaths resulting from unintentional poisonings have shown a significant global decline, particularly among males (2).

Study limitations: Several limitations should be considered when evaluating the findings of our study. First, the retrospective design may have introduced uncertainties, as data were interpreted from patient records after the events occurred. The scope and quality of the data were directly dependent on the documentation priorities and detail provided by the healthcare personnel recording the information at the time of admission. Second, the identification of cases solely through ICD-10 diagnosis codes (T36–T50.9) is a limitation, as these codes typically represent broad pharmaceutical categories rather than specific active substance names. This coding constraint also resulted in a lack of data regarding specific clinical interventions, such as CPR requirements or hemodialysis indications. Finally, hospital length of stay and cost data were not included in the primary data collection protocol, which limited further analysis of clinical severity and economic burden.

Conclusion

In this study, the decreasing trend in poisoning rates observed over the eight-year period aligns with global trends, such as the expansion of medical intervention capacity and increased socio-cultural awareness. Our findings confirm that poisonings are more prevalent among the female sex (57.7%) and that the vast majority of childhood cases result from accidental exposure.

From a clinical management perspective, suicidal intent ($p=0.021$) and the ingestion of medical agents ($p<0.001$) emerge as primary 'red flags' in more severe clinical presentations requiring hospitalization. Although the in-hospital mortality rate was low (0.14%), these cases continue to impose a significant burden on emergency departments. In conclusion, psychosocial support programs targeting at-risk women and community education initiatives to prevent childhood accidents should be prioritized. These data provide an essential empirical foundation for the development of preventive strategies and public health policies.

Conflicts of interest: The author has no disclosures to report.

Funding: This research has not received any specific support from public sector agencies, the commercial sector, or non-profit organizations.

Author contributions: Conception or design of the work (HD, AET), Data collection (HD, AET, SI), Data analysis and interpretation (AHA, MRO, MÇ), Drafting the article (AHA, MRO, MÇ), Critical revision of the article (HD, SI), Study supervision, fundings (AET, MÇ, SI)

Acknowledgements: This article was presented as an oral presentation at the 23rd National Multidisciplinary Clinical Toxicology Congress.

Data Availability statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Use of AI tools: AI tools were used for language editing. The authors take full responsibility for the content.

References

- Desalew M, Aklilu A, Amanuel A, Addisu M, Ethiopia T. Pattern of acute adult poisoning at Tikur Anbessa specialized teaching hospital, a retrospective study, Ethiopia. *Hum Exp Toxicol*. 2011;30(7):523-527.
- World Health Organization. World health statistics 2023: monitoring health for the SDGs, Sustainable Development Goals. Geneva: World Health Organization; 2023.
- Kekeç Z. Emergency approach to poisoning cases. *Turk J Fam Pract*. 2008;12(2):81-88.
- Kosovalı BD, Yıldız H. Retrospective Evaluation of Four-Year Acute Intoxication Cases Follow-up in Intensive Care Unit. *Turk J Intensive Care*. 2019;17(2):75-81.
- Onur D, Kavak H, Serhat A, Unluer EE, Aksay E. A retrospective analysis of poisoning cases admitted to the emergency department. *J Contemp Med*. 2013;3(1):15-21.
- Geith S, Lumpe M, Schurr J, Schmoll S, Rabe C, Ott A, et al. Clinical course and demographic insights into suicide by self-poisoning: patterns of substance use and socio-economic factors. *Soc Psychiatry Psychiatr Epidemiol*. 2025;60(3):705-718.
- Alva J, Devi ES, Chandrababu R, Abraham J, Balakrishnan JM. Epidemiologic characteristics, the length of hospital stay, and mortality of patients with organophosphate poisoning: A systematic Review. *Clin Epidemiol Glob Health*. 2025;32:101932.
- Cicek M, İmamoğlu M, Çekiç ÖG, Şahin A, Gündüz A. A Ten-Year Clinico-Epidemiology Profile of Poisoned Patients in a Tertiary Care Emergency Department in the Black Sea Region of Türkiye. *Anatolian J Emerg Med*. 2025;8(2):66-73.
- Nazlıcan E, Mete B, Disel NR, OK L. The Use of Pesticides in Suicide Attempts in the Eastern Mediterranean Region of Turkey. *Turk J Psychiatry*. 2022;33(4):248-254.
- Sert S, Buldu E, Dişçi Şİ, Say ŞK, Candan H. Demographic Characteristics and Etiological Distributions of Poisoning Cases Admitted to Pediatric Emergency Clinic: A Retrospective Cross-Sectional Study. *J Gen Med*. 2025;35(1):189-195.
- Celegen M. Epidemiologic and clinical evaluation of the acute intoxication in pediatric patients. *Health Sci Q*. 2021;1(2):69-73.
- Kırcı GS, Öztürk DU, Bölükbaşı HS, Çakır H, Özer E. Evaluation of Intoxication Case Application to the Child Emergency Department Between 2016-2021. *Bull Leg Med*. 2023;28(1):66-73.
- Hösükler E, Erkol ZZ, Şen Yavaş E. Analysis of Forensic Cases Prepared a Report Due to Poisoning: Retrospective Original Research. *Türkiye Klinikleri J Foren Med*. 2025;22(2):109-14.
- Robb EL, Regina AC, Baker MB. Organophosphate toxicity. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. [Updated 2023 Nov 12]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK470430/>
- Hawton K, Saunders K, O'Connor R. Self-harm and suicide in adolescents. *Lancet*. 2019;394(10208):1393-1406.

16. Roh BR, Jung EH, Hong HJ. A comparative study of methods of suicide attempts in children and adolescents. *J Korean Med Sci.* 2021;36(2):e12.
17. World Health Organization. Suicide worldwide in 2021: global health estimates. Geneva: World Health Organization; 2025.
18. Tishler CL, Reiss NS. Overdose suicide attempts: Past, present, and future. *Am J Emerg Med.* 2019;37(5):965-970.
19. Conejero I, Olié E, Courtet P, Calati R. Suicide in older adults: current perspectives. *Clin Interv Aging.* 2018;13:691-699.
20. O'Connell H, Chin AV, Cunningham C, Lawlor BA. Recent developments: suicide in older people. *BMJ.* 2020;368:m635.
21. Yan N, Luo Y, Mackay LE, Wang Y, Wang Y, Wang Y, et al. Global patterns and trends of suicide mortality and years of life lost among adolescents and young adults from 1990 to 2021: a systematic analysis for the Global Burden of Disease Study 2021. *Epidemiol Psychiatr Sci.* 2024;33:e52.