

Original Article

Retrospective Evaluation of Adult Poisoning Cases Admitted to Emergency Department of a University Hospital in Turkey

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ABSTRACT

Objective: We aimed to evaluate demographic, etiological, clinical features, and prognosis of poisoning cases applied to a tertiary emergency department retrospectively. **Materials and Methods:** The recordings of poisoning cases aged 18 years old and over which applied to the department of emergency medicine between the dates of 2010–2015 were examined. Age, gender, admission date, amount of time passed since exposure to the poisonous substance, application method, cause of poisoning, laboratory findings at arrival, vital signs, type of poisonous substance, the way of taking, treatment method in urgent care, consultation need, and the outcome of cases were recorded. **Results:** Of the poisoning cases, 437 (52.1%) were female, and 402 (47.9%) were male. The mean age was calculated as 33.50. When the cause of poisonings are examined; 456 patients were found to be poisoned by a suicide attempt, 350 were accidentally poisoned, and 33 were poisoned by treatment complication. As the causing substance of poisoning, medicinal drugs were found in 465 cases (55.4%), carbon monoxide in 205 cases (24.4%), and narcotics in 119 cases (14.2%). Of medicinal drug poisonings, 221 (46.8%) were multiple drug intake. It was seen that 46.6% of the patients were kept under observation with only symptomatic treatment while nasogastric lavage and activated charcoal were applied in 40.2% of them. **Conclusion:** It can be suggested that poisonings are encountered more commonly in young people, especially in women, with medicinal drugs and for suicidal purposes. Drugs detected at high rates in poisonings, such as painkillers and antidepressants, should be used more cautiously.

KEYWORDS: *Emergency service, poisonings, retrospective*

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INTRODUCTION

Poison can be defined as a substance causing harmful effects when taken accidentally or intentionally into a living organism. Almost all substances may be harmful at some doses while some can be harmless at lower doses.^[1]

Poisoning events often occur due to the patient-initiated use of medicines with or without prescription, iatrogenic administer of high doses of medicines by physicians, accidental exposure to chemical substances, or intentional intake of biological agents for suicide.^[2]

Poisoning cases can vary from region to region in terms of demographic characteristics, poisoning

agent, and frequency.^[3-6] Medicinal drugs are the most encountered (47%–86%) agents in poisonings. Among medicinal drugs, paracetamol, nonsteroidal anti-inflammatory drugs, and antidepressants are mostly seen.^[5-7] For each country or region, poisoning profiles should be identified, and precautions should be taken.

The purpose of this study is to evaluate demographic, etiological, clinical features, and prognosis of poisonings by compiling data on poisoning cases applied to a tertiary emergency department retrospectively.


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MATERIALS AND METHODS

The recordings of all poisoning cases aged 18 years old and over which applied to medical faculty emergency department between the dates of February 21, 2010, and October 14, 2015, were examined retrospectively and 839 cases were reached. Age, gender, admission date, and amount of time passed since exposure to poisonous substance, application method, cause of poisoning, laboratory findings at arrival, vital signs and physical examination findings, accompanying trauma and alcohol intake, presence of a chronic illness, type of poisonous substance, way of taking, treatment method in urgent care, consultation need, and the outcome of cases were recorded.

IBM SPSS version 21.0 (Armonk, New York, United States of America) program was used for statistical analysis. The Chi-square test was used for the correlation between categorical variables, the Shapiro–Wilk test in accordance with continuous variables the normal distribution and the Kruskal–Wallis test for the comparison of independent groups. $P < 0.05$ was considered to be statistically significant.

RESULTS

Records of 839 poisoning cases were reached. Of all emergency admissions, 0.31% were poisonings. Of the 839 patients, 437 (52.1%) were female, and 402 (47.9%) were male. The mean age was calculated as 33.50 (± 14.34). A total of 444 patients (52.9%) were between the ages of 18 and 30, 255 (30.4%) were between 31 and 45, 85 (10.1%) were between 46–60 and 55 (6.6%) were over 61 years old. Medicinal drug and narcotic poisonings were more frequent in the 18–30 age group, carbon monoxide poisonings were more frequent in the 31–45 age group ($P < 0.001$).

It was detected that 164 of the cases (19.5%) applied in the winter season, 289 (34.4%) in spring, 192 (22.9%) in summer, and 194 (23.1%) in autumn. A total of 276 patients (32.9%) reached the emergency service between the hours of 00:00–07:59, 213 patients (25.4%) between 08:00–15:59, and 350 patients (41.7%) between 16:00 and 23:59. It was determined that 722 (86.1%) patients reached emergency service in the first 6 h of poisoning. 76 (9.1%) in the second 6 h, and 41 (4.9%) after 12 h. Medicinal drug and narcotic poisonings were significantly higher in the 16:00–23:59 h group, insecticide poisonings in the 08:00–15:59 group, and carbon monoxide poisonings in the 00:00–07:59 group ($P < 0.001$).

When the cause of poisonings are examined by separating to three groups; 456 patients (54.4%)

were found to be poisoned by a suicide attempt, 350 (41.7%) were accidentally poisoned, and 33 (3.9%) were poisoned by treatment complication. Mean age was 30.39 ± 10.78 years for poisoned by a suicide attempt, 36.94 ± 16.91 for accidentally poisoned, and 39.30 ± 18.28 for poisoned by treatment complication ($P < 0.001$).

There was a statistically significant difference between the cause of poisoning and gender ($P < 0.001$). It was determined that 63.6% of the women and 44.3% of the men who were brought to the emergency service due to poisoning were attempting suicide.

Distribution of cases in terms of vital signs and physical examination findings was shown in Table 1.

As the causing substance of poisoning, medicinal drugs were found in 465 cases (55.4%), carbon monoxide in 205 cases (24.4%), and narcotics in 119 cases (14.2%) [Table 2]. It was noted that 91% of those poisoned by medicinal drugs were attempting

Table 1: Distribution of cases in terms of vital signs and physical examination findings

Parameters	n (%)
Age	
18-30	444 (52.9)
31-45	255 (30.4)
46-60	85 (10.1)
>61	55 (6.6)
Blood pressure	
Hypotensive	381 (45.4)
Normal	207 (24.7)
Hypertensive	251 (29.9)
Pulse	
Bradycardic	14 (1.7)
Normal	546 (65.1)
Tachycardic respiratory rate	279 (33.3)
Bradypneic	7 (0.8)
Normal	69 (8.2)
Tachypneic	763 (90.9)
Body temperature	
Hypothermic	2 (0.2)
Normal	813 (96.9)
Hyperthermic	24 (2.9)
Physical examination finding	
CNS	122 (14.5)
Gastrointestinal system	43 (5.1)
Respiratory system	32 (3.8)
Cardiovascular system	6 (0.7)
GCS score (points)	
3-11	46 (5.5)
12-14	65 (7.7)
15 points	728 (86.8)

CNS=Central nervous system; GCS=Glasgow Coma Scale

suicide. Medicinal drug poisoning was found to be significantly higher in females while alcohol and narcotic poisonings were higher in males ($P < 0.001$).

In 465 cases where medicinal drug poisonings were observed, the causing toxic substances were studied in groups. Of medicinal drug poisonings, 221 (46.8%) were multiple drug intake, 108 (22.9%) were mood stabilizer drug intake, and 77 (16.3%) were painkiller intake [Table 3]. In the 31–45 age groups, mood stabilizer, antibiotic, and hormonal drug poisonings were significantly higher than the other age groups ($P < 0.001$).

In 201 of the 205 cases where carbon monoxide poisoning was detected, carboxyhemoglobin levels were studied. The average carboxyhemoglobin percentage of these 201 patients was calculated as 24.45 (± 13.52). Carboxyhemoglobin levels were found to be below 10% in 37 patients (18.4%), between 10% and 50% in 159 patients (79.1%), and above 50% in 5 patients (2.5%).

It was found that the poisoning substances were mostly taken through the gastrointestinal tract (70.4%) in the body. This is followed by respiratory tract (29.2%), parenteral tract (0.2%), and skin tract (0.1%), respectively.

It was seen that 391 of the patients (46.6%) were kept under observation with only symptomatic treatment, while nasogastric lavage and activated charcoal were applied in 337 of them (40.2%) [Table 4]. The majority of the patients who received antidote treatment were poisoned with paracetamol ($P < 0.001$).

Of the patients, 394 (47%) were admitted to the Intensive Care Unit, 226 (26.9%) refused treatment and left the emergency service, 197 (23.5%) were discharged, 12 (1.4%) were referred to other health institutions, and 10 (1.2%) were hospitalized in the general wards. There were no cases that resulted in death during their stay in the emergency room. The age of those who were admitted to the Intensive Care Unit was significantly higher ($P < 0.001$). Patients with lower Glasgow Coma Scale (GCS) scores, with central nervous system (CNS) or respiratory system findings, with hyperglycemia, with accompanying trauma, with the higher percentage of carboxyhemoglobin, intubated patients, and patients who received antidotes were more likely to be admitted to the Intensive Care Unit ($P < 0.001$). Among accompanying chronic diseases, only chronic obstructive pulmonary disease were found to be associated with admission to intensive care ($P = 0.002$).

It was found that special laboratory tests were requested to measure the level of the poisonous substance in 321 (83.3%) of the 839 patients who were brought to the emergency service due to poisoning. Of these,

Table 2: Distribution of toxic substances

Type of toxic substance	n (%)
Medicinal drug	465 (55.4)
Carbon monoxide	205 (24.5)
Narcotic	119 (14.2)
Insecticide	20 (2.4)
Alcohol	10 (1.2)
Caustic substance	9 (1.1)
Mushroom	4 (0.5)
Medicinal drug + narcotic	4 (0.5)
Medicinal drug + insecticide	2 (0.2)
Medicinal drug + caustic substance	1 (0.1)

Table 3: Distribution of toxic substances in medicinal drug poisonings

Toxic substance by ingredient/group	n (%)
Multiple drugs	221 (46.8)
Paracetamol [#]	46 (9.7)
SSRI antidepressants*	37 (7.8)
Antipsychotics*	30 (6.4)
Anxiolytics*	23 (4.9)
NSAID [#]	19 (4)
Antiepileptics	14 (3)
Antibiotics	12 (2.5)
Other antidepressants*	11 (2.3)
Cardiovascular drugs	11 (2.3)
Acetylsalicylic acid [#]	9 (1.9)
Tricyclic antidepressants*	7 (1.5)
Gastrointestinal system drugs	7 (1.5)
Muscle relaxants	6 (1.3)
Respiratory system drugs	6 (1.3)
Hormonal drugs	5 (1.1)
Other drugs	5 (1.1)
Other painkillers [#]	3 (0.6)

*Mood stabilizers group, [#]Painkillers group. SSRI=Selective serotonin reuptake inhibitors; NSAID=Nonsteroidal anti-inflammatory drugs

Table 4: Distribution of treatments provided to patients in emergency service

Applied treatment	n (%)
Symptomatic treatment and observation	391 (46.6)
Nasogastric lavage	50 (5.9)
Nasogastric lavage + activated charcoal	337 (40.2)
Activated charcoal	5 (0.6)
Antidote	30 (3.6)
Intubation	26 (3.1)
Total	839 (100)

poisonous substances were found to have toxic levels in 133 cases (41.4%). Drug levels were more likely to be toxic in intoxications with paracetamol and cardiac glycosides ($P < 0.001$). Toxic drug levels were encountered more in patients with CNS findings or with lower GCS score ($P < 0.001$). Hypokalemia,

hyperkalemia ($P < 0.001$), hypochloremia ($P < 0.01$), and hyponatremia ($P < 0.05$) were observed more in patients with toxic drug level.

Twenty-two patients (2.6%) were accompanied by trauma, while 132 patients (15.7%) had alcohol intake. Alcohol intake was significantly higher in males ($P < 0.001$). It was observed that 72% of patients with alcohol intake were brought due to suicide attempts ($P < 0.001$).

A total of 624 (74.4%) of the 839 patients were referred for counseling. Out of 839 participants, anesthesia consultation was performed in 499 (59.5%), psychiatric consultation in 173 (20.6%), cardiology consultation in 14 (1.7%), and internal medicine consultation in 13 (2.5%).

DISCUSSION

The demographic characteristics of poisoning cases differ in terms of regions and socioeconomic factors. In our study, poisonings are accounted for 0.31% of all emergency admissions. When previous studies are investigated, it is seen that this ratio is between 0.38% and 2.43% in our country.^[8-11] In many studies, it is noteworthy that poisonings are seen more commonly in women (56.5%–72.1%).^[5,12,13] In our study, female/male ratio was found to be 52.1/47.9.

It is seen that the patients who applied with poisoning were detected more in the 18–25 age group.^[6,8,13] Similarly, in our study, poisoning events were observed at a higher rate in the 18–30 age group. In addition, the mean age of medicinal drug poisonings was lower than other poisonings. In young people, the prevalence of suicide attempts through drug poisonings and narcotic poisonings is remarkable. The reasons for predisposition to suicidal behavior and narcotic use in young people and the solutions that can be suggested in this issue should be investigated. Poisonings due to treatment complications were observed more in later ages. Drug doses of these patients should be adjusted more carefully, considering the altered metabolism, and mental status of older patients.

Medicinal drug poisonings were observed more frequently between the hours of 16:00–23:59 and carbon monoxide poisonings between 00:00 and 07:59. The evening time is the period that the patients mostly refer to the emergency department.^[14] Moreover, it can be considered that the most appropriate time interval for suicide attempts to obtain secondary profits is those times that correspond to the postworkout period. Especially, those with stoves in their house should be advised to be careful about chimney ventilation before going to bed.

According to our study, 54.4% of all poisonings and 91% of medicinal drug poisonings have occurred as a

result of suicide attempts. When we look at the literature, we see that this ratio varies between 54% and 67% in all poisonings.^[4,7,13] The fact that nowadays almost all households have medicines and access to medicines is easy, can be one of the reasons for medicines to come to mind first in suicide attempts. In our study, it was observed that poisonings were caused mostly by medicinal drugs (55.4%) followed by carbon monoxide (24.4%) and narcotics (14.2%) in accordance with the literature.^[11,13,15] Since the winters are cold and long in our territory, widespread stove use can explain the large numbers of carbon monoxide poisonings. Carbon monoxide poisonings can be reduced by informing the public about the precautions that can be taken.

When looked at poisonings with medicines, our study shows that medicinal drug poisonings occur mostly with multiple drug intake. Similarly, multiple drug intoxication ratio was found to be 62% in a study conducted in İzmir, 58.9% in a study conducted in Norway, and 37.5% in a study conducted in Iran.^[5,16,17] In studies conducted in our country and in the American Association of Poison Control Centers Report, it is reported that psychoactive drugs are the most commonly encountered drug group and it is followed by painkillers.^[3,18-20] Looking at ingredients of toxic drugs alone, paracetamol is reported to be the most encountered poisoning agent in many studies.^[5,7,21,22] In our study, after multiple drug intake, paracetamol (9.7%) was the most common as the drug ingredient, mood stabilizers (22.9%), and painkillers (16.3%) were the most common as the drug group. Paracetamol is the most prescribed analgesic drug worldwide because it is inexpensive, has a lot of preparations on the market, and is easily accessible. This may be the reason that it is the most commonly encountered drug in intoxications.

In our study, 10% of medicinal drug poisonings are antidepressants, and most of them are selective serotonin reuptake inhibitors (SSRIs). CNS (14.5%) and gastrointestinal (5.1%) findings, hyperthermia (2.9%) may be raised due to SSRIs. The risk of suicide was higher in patients who were taking antidepressants and who was recently prescribed antidepressants.^[23] It has been suggested that fluoxetine from the SSRI group increases suicide risk.^[24] SSRIs' side effects are known to be lesser compared to the tricyclic antidepressants.^[7] In our study, SSRI poisonings had higher GCS scores and required fewer consultations when compared to other antidepressant poisonings. Study patients mostly had CNS findings [Table 1].

In our study, poisonings with mood stabilizing drugs were detected more frequently in patients aged 31–45 years. Especially, patients with antidepressant use in these ages should be monitored carefully for suicidal thoughts.

In our study, it was determined that 47% of the patients who were brought to the emergency service due to poisoning were admitted to the Intensive Care Unit, 50,4% left the emergency room by discharging or refusing treatment. Looking at the studies conducted on this matter, it is observed that the discharge rate is higher. Intensive care admission rates vary between 4% and 50%.^[5,11,25,26] The high rate of intensive care admissions observed in our study can be attributed to the surplus of carbon monoxide poisoning. Carbon monoxide poisonings are followed up in Intensive Care Unit mostly.^[27] Dal *et al.* reported that 17.9% of the patients left the emergency room without permission in their study.^[5] This rate was detected as 26.9% in our study. It was also noted that 71.7% of the patients, who refused treatment and left the emergency room, was brought to the hospital due to suicide attempts. This suggests that some of the suicide attempts are carried out for obtaining secondary profits. There were no cases resulting death in the emergency room within poisoning patients in our study. When studies conducted on this matter are examined, it is seen that mortality rates due to poisoning are between 0% and 7.4%.^[5,11,25,28] Mortality and morbidity can be reduced by early diagnosis and proper intervention in poisonings.

Intensive care admission rates were found to be higher in some patient groups. Patients with CNS or respiratory system findings, lower GCS score, hyperglycemia, blood urea nitrogen elevation, white blood cell elevation or depression, higher carboxyhemoglobin percentage, accompanied trauma, or obstructive pulmonary disease were found to have more intensive care admissions. Özhasenekler *et al.* found that there is a significant relationship between GCS and mortality in their study.^[29] It can be argued that poisoning cases attending to the emergency department and showing these findings would present a more severe clinical course. Further studies are needed on this matter.

It is remarkable that alcohol intake is very high in poisoning cases. There are studies reporting alcohol intake frequency to be between 2% and 13%.^[7,12,25] In our study, this rate was found as 15,7%. Hypovolemic signs such as tachycardia (33.3%), hypotension (45.4%), CNS (14.5%), and gastrointestinal (5.1%) findings may be rised due to alcohol intake. Besides, it was found that 72% of patients who had alcohol intake before admitting to the emergency room had attempted suicide. In several studies, it has been shown that suicide attempts are encountered more in alcoholics.^[30,31] It is known that there is an evident association between alcoholism and depressive disorders.^[32] This may help to explain the high incidence of suicide among those with alcohol intake. There is a considerable difference between men and

women in terms of alcohol use. Alcohol addiction and alcohol poisonings are more commonly seen in males.^[7,13] In our study, alcohol poisonings and poisonings with accompanying alcohol use were found more frequently in men.

CONCLUSION

It can be suggested that generally poisonings are encountered more commonly in young people, in women, in the evening time, in the summer season, with medicinal drugs and for suicidal purposes. Since drugs such as painkillers and antidepressants are detected at high rates in poisonings, preventive approaches can be applied, such as not prescribing medication more than necessary, preventing drug accumulation at home, and advising patients when prescribing such medicines. Given that poisonings are mostly caused by suicide attempts, social, economic, and cultural problems leading individuals to suicidal thoughts should be revealed, and studies should be done for solutions.

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Conflicts of interest

There are no conflicts of interest.

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