Cases of Acute Poisoning in Southeast Anatolia of Turkey

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SUMMARY

This study was conducted to determine the biological effects of acute poisoning, nature of agents involved and pattern of poisoning during 2000 in Diyarbakır City in Southeast Anatolian Region of Turkey.

Data from hospital records of all admissions to Emergency Department (ED) of Dicle University Hospital following acute poisoning collected retrospectively were analysed for the period January to December in 2000. Present study included 44 (25.9%) male (M) and 126 (74.1%) female (F), a total 170 consecutive patients. A M/F ratio was found as 1.0/3.5 in the study.

Mean age of cases was 23.3±6.3 years old; 63 (37.1%) of them were under age of 20 years old and 147 (86.5%) of them were under age of 30 years old. Cases of intoxication have admitted in summer season (93 of 170 patients), especially in April, May and July (24, 26 and 30 patients), respectively. Sixty-two (36.5%) cases due to accidental, 108 (63.5%) cases due to suicidal goal. The cases of suicidal purposeful intoxications were mostly determined in females (77 cases, 71.3%, p<0.05), and singles (74 cases, 68.5%, p<0.05). There were only two deaths (1.2%) among the 170 admissions of acute poisonings during hospitaliztion. One of the deaths was due to pesticides; other one was due to abuse of medical drug. According to physical examination, tachycardia (59, 34.7%), vomit history (55, 32.4%), and unconsciousness (42, 24.7%) were frequently observed; however, hypersecretion (15, 8.8%), bradycardia (5, 2.9%), convulsion (8, 4.7%), and hipertension (2, 1.2%), were seen rarely. Cases who poisoned with pesticide compared other cases have had significantly higher rate of convulsion (6, 10.2%), miosis (6, 10.2%), and hypersecretion (12, 20.3%) (p=0.018, p<0.0001 and p<0.0001), respectively.

In our region, pesticides intoxication especially affected to young unmarried females, and most of them resulted from suicidal purpose. The annual rate of poisoning-related ED visits and mortality were within the reported ranges, psychoactive agents being the most common cause of poisonings.

Key Words: *pesticid, poisoning, suicide, and emergency service.*

Türkiye'nin Güneydoğu Anadolu Bölgesinde Akut Zehirlenme Vakaları

ÖZET

Mevcut çalışma, 2000 yılında Güneydoğu Anadolu Bölgesinde oluşan akut zehirlenmelerin biyolojik etkilerini, zehirlenmelerin paternini ve zehirlenmeye yol açan maddelerin cinsini belirlemek için gerçekleştirildi.

Dicle Üniversitesi Acil Departmanı (AD)'na Ocak – Aralık 2000 arasında başvuran akut zehirlenmelere ait tüm kayıtlardan elde edilen veriler retrospektif olarak analiz edildi. Mevcut çalışma 44 (%25.9)'ü erkek (E) ve 126 (%74.1)'sı kadın (K), toplam 170 ardışık hastayı kapsamaktadır. Çalışmada, E/K oranı 1.0/3.5 olarak bulundu.

Olguların ortalama yaşı 23.3±6.3 yıl idi; olguların 63 (%37.1)'ü 20 yaşın, 147 (%86.5)'si 30 yaşın altındaydı. İntoksikasyon olguları yaz sezonunda (170 hastanın 93'ü), özellikle Nisan, Mayıs ve Temmuz (sırasıyla 24, 26 ve 30 hasta), aylarında başvurmuştu. 62 (%36.5) olgu kazayla, 108 (%63.5) olgu ise suicid amaçlı oluşmuştu. Suisidal amaç taşıyan intoksikasyonlar, sıklıkla kadınlarda (77 olgu, %71.3, p<0.05) ve bekarlarda (74 olgu, %68.5, p<0.05) saptandı. Hastanede yatış esnasında 170 akut zehirlenme olgusu arasında yalnızca iki ölüm (1.2%) oldu. Ölümlerden birisi pestisid kaynaklı, diğeri ise medikal ilaç suiistimaline bağlıydı. Fizik muayenede, taşikardi (59, %34.7), kusma hikayesi (55, %32.4) ve bilinç kaybı (42, %24.7) sıklıkla gözlendi; ancak, hipersekresyon (15, %8.8), bradikardi (5, %2.9), konvülsiyon (8, %4.7) ve hipertansiyon (2, %1.2) nadiren görüldü. Pestisidle zehirlenen olgularda diğer olgularla karşılaştırıldığında, belirgin olarak daha fazla oranda hipersekresyon (12, %20.3) konvülsiyon (6, %10.2) ve miyozis (6, %10.2) (sırasıyla p<0.0001, p=0.018, p<0.0001) bulunuyordu.

Bölgemizde, pestisid intoksikasyonları özellikle genç ve bekar kadınları etkilemektedir ve bunların birçoğu da suisidal amaçlıdır. Yıllık, zehirlenme ile ilişkili AD vizitleri ve mortalite oranlarımız daha önce bildirilen düzeylerde olup, en yaygın zehirlenme nedeni psikoaktif ajanlardır.

Anahtar kelimeler: *pestisit, zehirlenme, suisid, acil servis.*

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INTRODUCTION

The rate of suicide in Turkey was 2.2/100,000 persons and total 28,408 suicide deaths were reported between 1974-1998 years. The rate of suicide among male is higher than female (2.7/100,000 persons vs. 1.7/100,000 persons) ($p<0.001$). Male/female (M/F) ratio was 1,5/1. Of these individuals, 37.7% were single, 9.5% were divorsed or seperated, and 52.8% were married. Of these, 62.1% were city dweller, 37.9% were from rural area. However, suicidal attempts were especially widespread among 15-24 years old young depressive or distimic females (1,2).
Organic phosphorus (OP) compounds are inhibited as acetylcholine esterase irreversible and cause to accumulate acetylcholine at the synapse. Because OP compounds dissolve well in fat, they are absorbed well by the conjunctiva, skin, lung, stomach and the intestines (2). Because OP compounds are commonly used in agriculture, different types of intoxications due to OP compounds are encountered. Poisoning often is related to agricultural workers; thus, males aged 15-45 years are more frequent victims. Because they affect cholinergic nerves directly and the strong cholinesterase inhibition of them, OP compounds are very effective toxics (3,4).

The primary research goal in present manuscript was to describe the biological effects of the acute poisoning, nature of agents involved and pattern of poisoning during 2000 in Diyarbakir City in Southeast Anatolian Region of Turkey

MATERIALS and METHODS

The scope of this retrospective hospital-based study was chosen as the cases of intoxication in Emergency Department of Dicle University Medical Faculty in Diyarbakir between January and December in 2000. In this study included a total 170 consecutive patients. 44 (25.9%) of the cases were male and 126 (74.1%) of them were female. A M/F ratio was found as 1.0/3.5.

Diyarbakir is located in Southeast Anatolian Region of Turkey. Population is around 900.000. The southeast Anatolia region is covering Diyarbakir, Batman, Mardin, SanliUrfa, and etc. The University Hospital, in which study was conducted, has about 1.200 beds with all specialties.

In present study, the type of poisoned compounds, age and gender of the patient, marital status, suicidal purpose, hospitalization time, the place where it comes from and the symptoms observed on the cases (absent-mindedness, vomiting, diarrhea, mydriasis, miosis, agitation, disorientation, hypertension, convulsion, cyanoses, tachycardia, hypersecretion, inhalation pneumonia, Babinski sign positiveness, balance losing, dizziness, slumbering, fever, unconsciousness) were investigated.

Complete blood count [hematocrit (HCT, Males: 42-52%, Females: 37-48%), leucocytes (count: 4.3-10.8x1000/mm^3), thrombocytes (count: 130,000-400,000/mm^3)], biochemical [Serum glutamate oxaloacetate transaminase (SGOT; normal, 0-38 IU/L), serum glutamate pyruvate transaminase (SGPT; normal, 0-41 IU/L), Glucose (normal, 75-115 mg/dL)] results are shown on the tables and graphs.

The study participants have been followed at least two weeks to one month. Almost all of patients have been received care prior to arriving at the university hospital. In primary care, gastric lavage, carbon medicinalis orally, and atropine (if patient was needed) have been performed to patients. Additionally, supportive care, including airway control, oxygenation, ventilation, seizure management, and placement of an IV line have been performed to some patients. At first, patients who poisoned with OPs were thoroughly decontaminated by clothing removal and a soap and water (or hypochlorite) bath or shower before entering the emergency department (ED). Other cases were treated by general approach to intoxication. The cases of OPs were examined physically (neurological and cardiological). They were applied Atropine 2 mg IV every 15 to 20 minutes using the drying of secretions or evidence of toxicity as an end point. Atropine will treat the muscarinic effects only. As a cholinesterase reactivator, pralidoxime (2-PAM) were applied 1-2 g IV for duration of 15-20 minutes in every 4-6 hours. Endpoint for

therapy includes improved muscle strength (oximes).

Statistical analyzes were made by the SPSS 7.5 software using chi-square (Fisher's exact) and One Way ANOVA (Post Hoc Bonferroni) test. A difference of $p<0.05$ was considered as statistically meaningful. Data was given as Mean±SD.

RESULTS

Mean age of cases was 23.3±6.3 years old; 63 (37.1%) of them were under age of 20 years old and 147 (86.5%) of them were under age of 30 years old. Majority of intoxication cases have admitted in summer season 93 (54.7%), especially in April, May and July (24, 26 and 30 patients), respectively.

Sociodemographic characteristics of the cases are given in table 1.

Table 1: Sociodemographic parameters of cases according to cause of poisoning.

Parameters	**Cause of Poisoning**		**p**
	Suicidal Purpose n (%)	*Accidental n (%)*	
Gender			
Male	31 (28.7)	13 (21.0)	
Female	77 (71.3)	49 (79.0)	
Marital Status			
Single	74 (68.5)	38 (61.3)	
Married	34 (31.5)	24 (38.7)	
Total	**108 (100)**	**62 (100)**	

Sixty-two (36.5%) cases are due to accidental, 108 (63.5%) cases due to suicidal goal. The cases of suicidal purposeful intoxications were mostly determined in females (77 cases, 71.3%, $p<0.05$), and singles (74 cases, 68.5%, $p<0.05$).

Sociodemographic and clinical parameters of poisoned cases were shown in table 2 and 3.

Table 2: Sociodemographic and clinical parameters of poisoned cases.

Parameters	**Kind of Poison**			**p**
	Pesticide n (%)	*Medical Drugs n (%)*	*Other n (%)*	
Gender				
Male	14 (54.2)	28 (27.2)	2 (25.0)	=0.888
Female	45 (45.8)	75 (72.8)	6 (75.0)	
Marital Status				
Single	32 (54.2)	74 (71.8)	6 (75.0)	=0.064
Married	27 (45.8)	29 (28.2)	2 (25.0)	
Settlement				
City	23 (24.1)	69 (67.0)	6 (75.0)	=0.006
Rural	36 (72.2)	34 (33.0)	2 (25.0)	
Suicidal Purpose				
Yes	26 (24.1)	78 (75.7)	4 (50.0)	=0.002
No	33 (72.2)	25 (24.3)	4 (50.0)	
Total	**59 (100)**	**103 (100)**	**8 (100)**	

According to kind of poisoned substance, 59 (34.7%) of cases were poisoned with pesticide, 103 (60.6%) of cases were poisoned with medical drugs, eight cases (4.7%) were poisoned with other substances. It is seen that 98 (57.7%) cases come from city center, 72

(42.4%) of the cases come from rural area of the Diyarbakır. There were only two deaths (1.2%) among the 170 admissions of acute poisonings during hospital. One of the deaths was due to pesticides, other one was due to abuse of medical drug.

According to physical examination (table 3), tachycardia (59, 34.7%), vomit history (55, 32.4%), and unconsciousness (42, 24.7%) were frequently observed; however, hypersecretion (15, 8.8%), bradycardia (5, 2.9%), convulsion (8, 4.7%), and hipertension (2, 1.2%), were seen rarely. Cases who poisoned with pesticide compared other cases have had significantly higher rate of convulsion (6, 10.2%), miosis (6, 10.2%), and hypersecretion (12, 20.3%) (p=0.018, p<0.0001 and p<0.0001), respectively.

Table 3: Clinical and physical examination parameters of poisoned cases.

	Kind of Poison			
Parameters	*Pesticide n (%)*	*Medical Drugs n (%)*	*Other n (%)*	**p**
Hipertension *(>140/90 mmHg)*				
Yes	2 (68.5)	-	-	=0.117
No	57 (31.5)	103 (100)	8 (100)	
Pulse				
Tacycardia (>80/min)	21 (35.6)	36 (35.0)	2 (25.0)	=0.308
Normal (60-80/min)	37 (62.7)	63 (61.2)	6 (75.0)	
Bradycardia (<60/min)	1 (1.7)	4 (3.8)	-	
Unconsciousness				
Yes	10 (28.7)	32 (31.1)	-	
No	49 (71.3)	71 (68.9)	8 (100)	=0.046
Convulsion				
Yes	6 (28.7)	2 (1.9)	-	=0.018
No	53 (71.3)	101 (98.1)	8 (100)	
Myosis				
Yes	14 (28.7)	3 (2.9)	-	<0.0001
No	45 (71.3)	100 (97.1)	8 (100)	
Hypersecretion				
Yes	12 (20.3)	3 (2.9)	-	<0.0001
No	47 (79.7)	100 (97.1)	8 (100)	
Vomit history				
Yes	26 (44.1)	24 (23.3)	5 (62.5)	<0.0001
No	33 (45.9)	79 (76.7)	3 (37.5)	
Treatment				
Non-specific	29 (24.1)	97 (94.2)	7 (87.5)	<0.0001
Specific	30 (72.2)	6 (5.8)	1 (12.5)	
Hospitalization time				
<3 days	19 (24.1)	61 (59.2)	6 (75.0)	=0.109
3-7 days	36 (72.2)	40 (38.8)	2 (25.0)	
≥7 days	4 (72.2)	2 (1.9)	-	
Outcome				
Exitus	1 (1.7)	1 (1.0)	-	=0.874
Alive	58 (98.3)	102 (99.0)	8 (100)	
Total	**59 (100)**	**103 (100)**	**8 (100)**	

The complete blood count values and blood pressure of the poisoned patients are shown in table 4.

Table 4: Changes in the complete blood count values and blood pressure of the poisoned patients.

	Kind of Poison			
Parameters	***Pesticide*** *n=59*	***Medical Drugs*** *n=103*	***Other*** *n=8*	**p**
Systolic Blood Pressure *(mmHg)*	116±23	113±15	110±17	=0.683
Diastolic Blood Pressure *(mmHg)*	41.1±3.8	40.2±5.8	38.8±5.0	=0.921
Hematocrit *(%)*	41.1±3.8	40.2±5.8	38.8±5.0	=0.439
Leucocytes *(1000/mm^3)*	14.5±5.9	11.9±4.7	10.8±6.7	=0.010
Platelets (*1000/mm^3*)	288±101	260±63	216±87	=0.034
Glucose *(mg/dL)*	131±63	109±40	225±178	<0.0001
SGOT (*U/L*)	23±12	18±12	20±14	=0.034
SGPT (*U/L*)	32±24	24±10	35±27	=0.019

Especially, cases who poisoned with pesticide compared other cases have had higher glucose level (131±63 mg/dL, p<0.0001) and leucocytes' counts (14.5±5.9 x 1000/mm^3, p=0.010), respectively (figure 1 and 2). However, SGOT and SGPT levels were slighty higher in group 3 (other poisons), (figure 3 and 4). In table 5, the category of poisoning agents involved were shown.

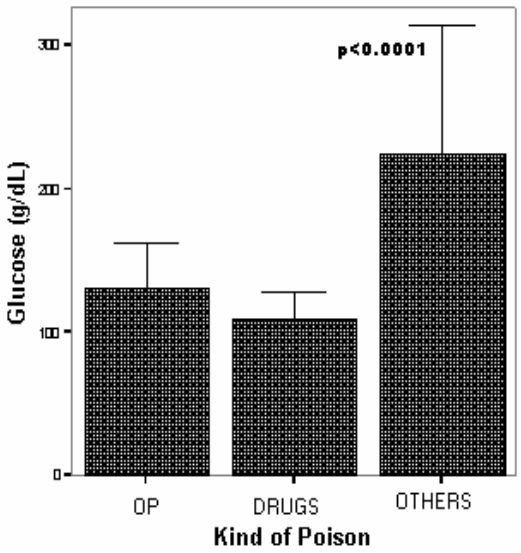

Figure 1: Mean glucose levels of cases according to kind of poison.

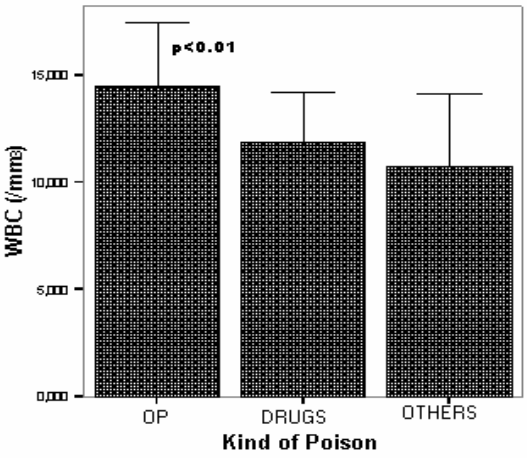

Figure 2. Mean WBC counts of cases according to kind of poison.

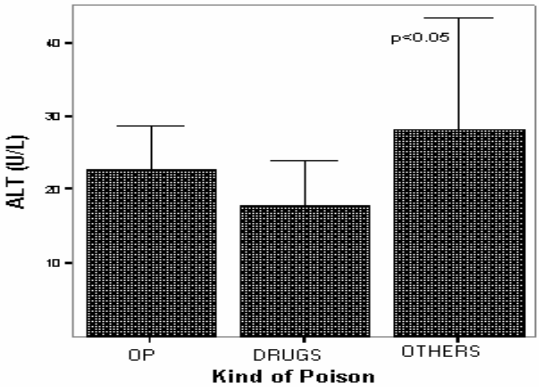

Figure 3: Mean SGPT levels of cases according to kind of poison.

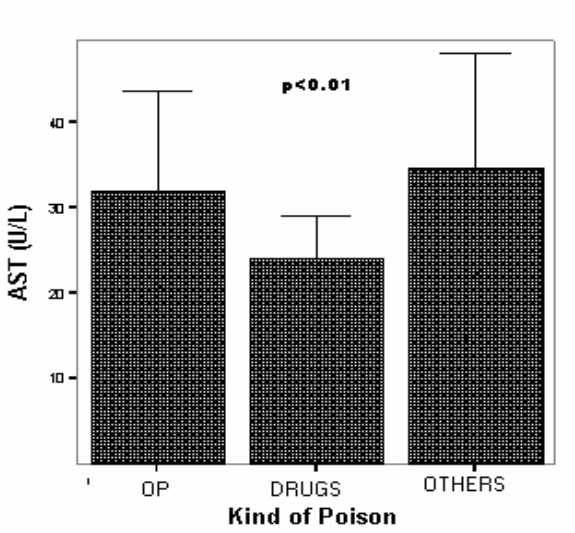

Figure 4: Mean SGOT levels of cases according to kind of poison.

Table 5: The category of poisoning agents involved.

Therapeutic Agents	n (%)
Analgesics	20 (18.2)
Psychoactive drugs	42 (38.2)
Antibiotics	9 (8.2)
Bronchodilators	5 (4.5)
Cardiovascüler	5 (4.5)
Antiepileptics	9 (8.2)
Benzodiazepins	5 (4.5)
Other drugs	15 (13.7)
Total	110 (100)

The distrubition of cases according to admission date to hospital is showed in figure 5. According to figure 5, patients have been hospitalised especially in summer, April (24 cases, 14.1%), May (26 cases, 15.3%) and July (30 cases, 17.7%), respectively.

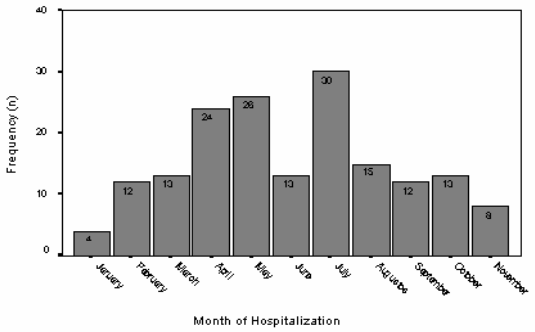

Figure 5: The distrubition of cases according to month of hospitalization.

DISCUSSION

Poisoning-related injury is a common acute medical emergency (5). There may be marked differences in the patterns of poisoning between centers in various countries. In the developed countries, the annual incidence of both accidental and deliberate human poisoning varies between 0.2 and 9.3 poison exposures per 1000 population, and continues to increase annually worldwide (6,7). A strong clinical suspicion is necessary to make an early diagnosis and treatment of acute poisoning (8,9). Therefore, it is crucial to know the etiologic and demographic aspects of acute poisoning (10).

According to study of Göksu et al. (10), 179 (0.7%) of patients were cases of acute adult poisonings who were admitted to ED during one-year period the poisoning rate was highest between the ages 16 and 25. Most of the patients who were admitted to ED were females (68.8%). The majority of poisonings resulted from oral intake accounting for 78.8% of the cases. The deliberate self-poisoning was most common cause of poisoning (58.6%), and followed by accidental exposure (39.1%). Of deliberate self-poisonings, 41 (36.6%) were male and 71 (63.4%) were female patients. The mean age of the female patients who had suicidal attempts was 27±10 years.

The rate of poisoning-related ED visits varies substantially throughout the world, and ranges from 0.076 to 0.7% of ED visits annually (7,11). Studies in western countries revealed annual rates of poisoning related ED visits about 0.26% (11,12). It was reported that the poisoning rates in male and female patients were 55.8 and 44.2%, respectively, as the 63% of the patients were under 40 years of age (13). According to another study, the Female-to-male ratio of poisoning-related ED visitors was 3/1, and the majority of patients (63.6%) were less than 25 years (14).

In another study from Turkey, Ozkose et al. (15) were evaluated two hundred and twenty-eight adults (of which 180 were suicidal poisoning cases) that were admitted to the emergency center with acute poisonings. This was 0.7% of all emergency admissions. They reported that the female-to-male ratio

was 3/1, and the majority of patients (63.6%) were below the age of 25 years. According to our study, 0.7% of patients were cases of acute poisonings who were admitted to ED. Majority of intoxication 93 (54.7%) cases have admitted in summer season. The vast majority of patients were female and under 30 years of age. The female-to-male ratio of patients was 1.0/3.5. Sixty-two (26.5%) cases due to accidental, 108 (63.5%) cases due to suicidal goal. 68.5% of suicidal poisoning cases were unmarried and 71.5% them were female, respectively.

According to the studies from the developed countries, analgesics, particularly acetaminophen, are the most common cause of deliberate poisonings in adults (1,9,11). In some other studies, psychoactive drugs are reported to be the most common cause of deliberate self-poisonings (16,17). According to study of Abdollah et al. (18), in adults, drugs were the most common cause of intoxication (60.2%). Of these, benzodiazepines (24.5%) were the most frequent, followed by antidepressants (20.5%) and analgesics (18%). Pesticide and opiate intoxications were also commonly observed. OP insecticides were responsible for 57% of total pesticide poisoning cases. Of the deaths, 87.5% were attributed to suicide.

In a study from Turkey (15), drugs were the major cause in 75.9% of the cases. Analgesics were the most common cause of drug poisoning (29.7% of all substances). Therapeutic agents were found to be involved in most of the poisonings accounting for 62.5% of all poisoning cases. Analgesics were the most common agents (42.4%) among the drugs incriminated in poisoning, and followed by psychoactive agents (17.5%). Acetaminophen was the most frequent analgesic used (32.2% of all drugs) (10). In our study, drugs (60.6%) were the major cause of poisonings and psychoactive drugs (38.2%) were the most common cause of deliberate self-poisonings. Patients who had suicidal purpose easily reach to drugs, because of their related or theirselves used such medicines. On the other hand, OP insecticides were mostly observed in pesticide poisoning cases in our study.

Patients with poisoning present with a spectrum of manifestations ranging from gastrointestinal symptoms (nausea, vomiting, and diarrhea) to severe neurological manifestations (fasciculations, seizures, neuromuscular weakness, and paralysis) or cardiac manifestations (arrhythmia and conduction disturbances, even respiratory and cardiac arrest) (8,19). In the Agarwal's study (4), in 25.3% of the cases sinus tachycardia, in 6.3% of the cases, ST segment changes and in 1.1% of the cases, T changes were observed. The most common symptoms were vomiting (96.8%), nausea (82.1%), miosis (64.2%) and excessive secretion (61.1%). The most common symptoms in the Rivera's study (20) were nausea (six cases) and excessive bronchial secretion (eight cases). It was reported in OP intoxication studies that hyperglycemia was observed in the cases (21,22-26). Increases in SGOT and SGPT levels were observed in five of the 53 cases in Finkelstein's study (27). In Rivera's study (20), in 10 of the 14 cases leukocytosis, hyperglycemia in five cases and hypokalemia in four cases was observed.

In our study, vomiting were seen in 26 (44.1%) of the cases with pesticide poisonings, and in 24 (23.3%) of the cases with drug poisonings. However, tachycardia were seen in 36 (35.0%) of drug poisonings and in 21 (35.6%) of pesticide poisonings, respectively. Unciousness was observed much more in drug poisonings than other poisoning kinds (32 cases, 31.1%). This condition was related with drug poisonings frequently resulted from psycoactive drugs. On the other hand, convulsion (6 cases, 28.7%), hipersecretion (12 cases, 20.3%) and miosis (14 cases, 28.7%) were seen much more in cases with pestisid poisonings. Furthermore, leukocytosis and hyperglisemia were present in cases with pestisid poisonings, these were found normal range in cases of other poisonings.

According to study of Putze et al. (28), the management consisted of clinical examination alone or unspecified therapy in 71.6%; 28.6% were treted by gut decontamination, 20.7% received antidotes and 2.1% underwent forced renal elimination. A total of 79.6% were

treated as outpatients (53.5% discharged within the first 12h), 3.7% were admitted to intensive care unit (ICU), 6.7% were hospitalized, 5.2% left the ED without medical permission, and one patient died.

The mortality rates after intoxications range between 0.24 and 27% (28-32). According to study of Göksu et al. (10), the mean ICU stay was 3.8±1.1. OP, household product and carbon monoxide poisonings were the causes of mortality, and the mortality rate was 2.8%. In our study, generally nonspecific treatment were performed to patients (78.2%). 50% of our patients were discharged from hospital in third day of hospitalisation, 45% of patients were discharged between third and seventh day. There were only two deaths (1.2%) among the 170 admissions of acute poisonings during hospital. One of the deaths was due to pesticides, other one was due to abuse of medical drug.

As a conclusion, despite being a hospital-based study, we believe that these data provide important preliminary information on the pattern of symptomatic poisoning in this particular region of our country. In our region, pesticides intoxications especially affected to young unmarried females, and most of them resulted from suicidal purpose. The annual rate of poisoning-related ED visits and mortality were within the reported ranges, psychoactive agents being the most common cause.

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