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Analyses of Etiologic and Sociodemografic Properties of the Intoxicated Cases in Van City and its Environs

Ahmet Cumhur Dulger[1], Sevdegul Karadas[2], Hayriye Gonullu[2]*, Enver Aytemiz[3], Irfan Aydin[2] and Imdat Dilek[4]

[1]Department of Gastroenterology, School of Medicine, Yuzuncu Yil University, Van, Turkey
[2]Department of Emergency Medicine, School of Medicine, Yuzuncu Yil University, Van, Turkey
[3]Department of Hematology, School of Medicine, Yuzuncu Yil University, Van, Turkey
[4]Department of Internal Medicine, School of Medicine, Yuzuncu Yil University, Van, Turkey

Abstract

The purpose of this retrospective hospital-based study was to evaluate clinical and epidemiologic characteristics of acute poisoning cases. All poisonings cases admitted to the emergency department of the Yuzuncu Yil University Training Hospital, Van, Turkey, between June 1999 and May 2005, were evaluated in the study. Etiologic and sociodemografic properties of the intoxicated cases were investigated.

There were males 32.6 % and females 67.3 % in the study. 74.6 % of the cases were suicidal and 25.4 % of them accidental. The highest suicidal attempts were seen in the age group 16-25 years and were mostly occurred during spring. The vast majority of the suicide attempters were also young females. Central nervous system drugs (21.8%), carbamates (17.1%), analgesics (10.3%) and organophosphorus components (10%) were most used agents among intoxicated patients. Half of the patients was treated and released from emergency department without hospitalization. Only 6.4% of the cases admitted to critical care. The percentage of the cases that need intensive care unit was highest in central nervous system drugs. Mortality rate was 1.6% and was mostly due to opioid and organophosphorus-related poisonings.

Based on the study it was suggested that there was a greater incidence of suicide attempts in younger females. Organophosphorus and carbamate containing chemicals are major causative agents for intoxications particularly in females.

Keywords: Poisoning; Emergency department; Organophosphorus poisoning

Introduction

Poisoning is described as the development of adverse events following exposure to chemicals as well as drugs. Human poisoning is just as important to the approach of today's emergency cases as the introduction of new drugs itself. Despite efforts by clinicians to overturn the higher rate of poisoning- related mortality, cessation of human poisoning in the near term is unlikely [1,2].

The worldwide number of intoxicated cases has increased remarkably during the past century. The reported incidence of human poisoning has ranged from 0.7 and 9.3 poison exposures per 1000 population [3-5].

Intoxications mostly due to chemicals, analgesics, cosmetics and hydrocarbons and occur accidentally. Mortality rates are higher in patients with suicide attempts. Nonpharmaceutical agents such as pesticides are responsible for fatal poisoning particularly in rural areas as well as in developing countries [6].

The assessment of etiologic and demographic characteristics of intoxicated cases plays a major role in the clinical management of emergency cases as well as in epidemiologic research. Therefore, the purpose of the current retrospective study was to evaluate the etiologic and demographic characteristics of acute poisoning in patients who admitted to emergency department.

Methods

A great majority of the cases referring to emergency unit of our hospital emergency department (ED) in the period of between June 1999 and May 2005 were retrospectively examined. In this time scale the cases were composed of 321 males (32.6 %) and 661 females (67.3%).

Firstly, all cases were categorized as accidental or intentional. Various demographic (causative agents, age, sex, marital status, education level, inhabitation area, time to contact with emergency department) and clinical factors (underlying diseases, mortality rates, mortal agents and discharging time) were recorded by study group. Psychiatric consultation was also provided for all patients with intentional poisonings.

Causative agents were categorized into 10 groups: drugs, gases, food, corrosives, pesticides, organophosphorus (OP), alcohol, herbs, narcotics, or multiple drugs. The drugs except narcotics were also categorized into five subgroups: central nervous system (CNS) agents, cardiovascular system drugs, gastrointestinal system drugs, endocrine system drugs, antibiotics.

The results were also analyzed for six age groups: 1 ± 15 years, 15 ± 25 years, 25 ± 34 years, 34 ± 45 years, 45 ± 55 years, 55 ± 69 and over(>70 years). Statistical analyses were performed using the statistical package SPSS version 10.0. These values were evaluated by means of the Chi-squared test and one-way ANOVA. The Duncan test was used to compare values between the subgroups.

***Corresponding author:** Hayriye Gonullu, Yuzuncu Yil Universitesi, Tip Fakultesi, Arastirma Hastanesi, Acil Tip A.D. Maras Cad. 65300, Van, Turkey, Tel: 009 050 576 72 477; Fax: 009 043 221 68 352; E-mail: drhayriyegonullu@windowslive.com

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Results

The mean age of the total cases intoxicated w as 24.2 (range 1-90). 74.6% of the cases were understood to have suicidal purposes and 25.4% of them constituted accidental conditions. The drug intake aimed for suicide among females was 78% and 66.6% among males. The epidemiologic characteristics of poisoning cases are shown in figure 1, 2 & tables 1, 2. The monthly distribution of suicidal poisonings showed a peak in March (n=81 11%) and a deep point in December (n=45 6%). It was also seen that accidental poisonings were more prominent in May (n=36 14.5%) and had lower numbers in august (n=8 3.2%) (Figure 3).

The most frequently determined intoxication substances were CNS drugs (21.8%), carbamates (17.1%), analgesics (10.3%) and organophosphorus components (10%). Whereas the accidents comprised inhalation 27.8%, corrosive substances 19.7%, carbamates 18.1%, analgesics 13.4% and organicphosphorus 10%, suicidal poisonings consisted of CNS drugs 28.3%, pesticides 18.1%, analgesics 13.4% and organophosphorus 10%. A single agent was responsible for 88% of all drugs poisoning, while multiple agents were noted in 12% of the cases (Table 3).

66.5% of the intoxicated cases were between 16-25 age groups, whereas first intervention on a third of the cases was performed in our emergency department. Two-thirds of them had first intervention in the clinics where they came. Time of contact with ED was significantly shorter in female OP related-suicide attempters than males ($p<0.01$) (Table 4).

Poisonings with organophosphorus 13.9%, pesticides 11.9% and herbal plants 4.1% among the cases who were first intervened in our emergency department were referred to our hospital from rural areas. While accidents were frequently observed between 1-15 and over 70 ages; suicides were observed between 16-25 age group. Those cases living in the villages were most frequently poisoned with pesticides and organic phosphorus, whereas those living in urban areas were found to have a (remove) relatively lower rates of poisoning with this substances. The most frequent poisoning in Van city center and its environs were found to be with CNS drugs. 80% of poisonings with herbal plants constituted those living in villages and towns. Accidents were made most frequently due to inhalation, corrosive substances, pesticides and organophosphorus.

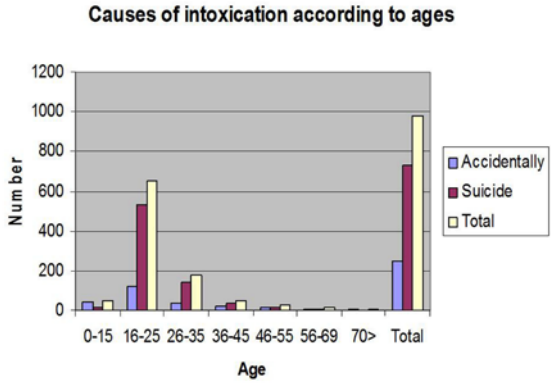

Figure 1: Causes of intoxication according to age groups.

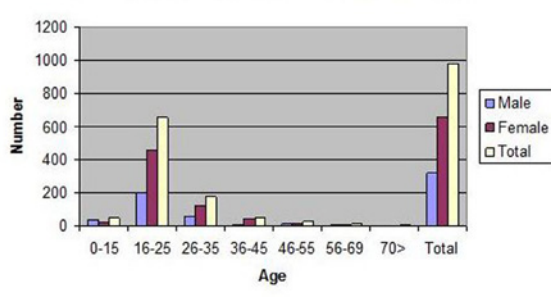

Figure 2: Ages of intoxication cases according to gender.

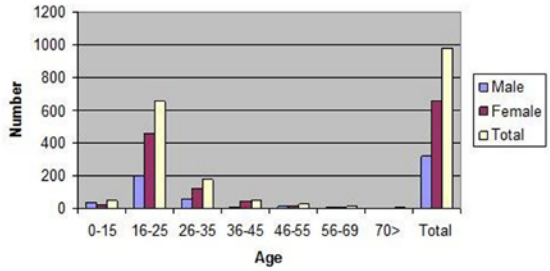

Figure 3: Causes of intoxication according to months.

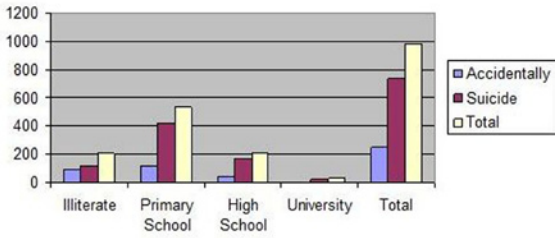

Figure 4: Causes of intoxication according to education levels.

75% of the intoxicated cases consisted of those who were illiterates and primary school graduates. 50 % of the patients were discharged from the hospital, 50% were hospitalized, and 6.4 % were sent to intensive care unit (ICU). Whereas hospitalization rate in the intensive care unit was 6.4% and the higher number of the intensive care patients was seen to be poisoned with CNS drugs (46.8%). (Figure 4)

Psychiatric illness was diagnosed in a total of 6.3% of the intoxicated cases. Mortality rate in the total cases was 1.6% and the highest mortality was seen in opioid and organophosphorus poisonings.

Discussion

Alongside the medical advancements surrounding the human health, at both preclinical and clinical levels, it is clear that the poisoning cases have become more complex. Another important issue in the field of poisoning is that recommendations and guidelines for optimum treatment are currently based on observational data. Poisoning cases also continue to occur frequently, and the consequences can be life-treating. Prompt recognition and treatment of severely intoxicated patients may result in preservation of human life. Therefore, the data obtained from this study is crucial to evaluate the poisoning pattern of patients who were admitted to ED.

Causative Agent	Age groups															
	1-15		16-25		26-35		36-45		46-55		56-69		70<		Total	
	n	%	n	%	n	%	n	%	n	%	N	%	n	%	n	%
Physycoactive Drugs	5	9,62	156	23,96	46	25,99	5	9,62	1	3,45	1	7,14	0	,00	214	21,84
Cardiovascular Drugs	0	,00	14	2,15	2	1,13	0	,00	1	3,45	0	,00	0	,00	17	1,73
Gastrointestinal Drugs	0	,00	9	1,38	1	,56	0	,00	0	,00	0	,00	0	,00	10	1,02
Antibiotics	0	,00	11	1,69	1	,56	2	3,85	1	3,45	0	,00	0	,00	15	1,53
Inhalation Agents	1	1,92	34	5,22	16	9,04	8	15,38	8	27,59	3	21,43	0	,00	70	7,14
Endocrine System Drugs	0	,00	8	1,23	1	,56	1	1,92	0	,00	0	,00	0	,00	10	1,02
Analgesics	0	,00	74	11,37	22	12,43	5	9,62	0	,00	0	,00	0	,00	101	10,31
Corrosives	38	73,08	29	4,45	6	3,39	2	3,85	0	,00	3	21,43	0	,00	78	7,96
Carbamates	1	1,92	119	18,28	30	16,95	8	15,38	8	27,59	1	7,14	1	20,00	168	17,14
Organicphosphorus	2	3,85	71	10,91	9	5,08	8	15,38	6	20,69	2	14,29	1	20,00	99	10,10
Opioids	0	,00	3	,46	11	6,21	1	1,92	1	3,45	0	,00	0	,00	16	1,63
Herbal Plants	1	1,92	8	1,23	8	4,52	3	5,77	0	,00	2	14,29	2	40,00	24	2,45
Food	2	3,85	14	2,15	1	,56	3	5,77	2	6,90	0	,00	1	20,00	23	2,35
Multiple Drugs	2	3,85	87	13,36	22	12,43	6	11,54	1	3,45	2	14,29	0	,00	120	12,24
Alcohol	0	,00	14	2,15	1	,56	0	,00	0	,00	0	,00	0	,00	15	1,53
Total	52	5,31	651	66,43	177	18,06	52	5,31	29	2,96	14	1,43	5	,51	980	100,00

Table 1: Causative agents according to age groups.

Causative Agent	Inhabitation area									
	Village		Town		City		Unknown		Total	
	n	%	N	%	n	%	n	%	n	%
Physycoactive Drugs	30	13.27	59	20.49	125	26.88	0	0.00	214	21.84
Cardiovascular Drugs	1	.44	4	1.39	12	2.58	0	0.00	17	1.73
Gastrointestinal Drugs	2	.88	4	1.39	4	0.86	0	0.00	10	1.02
Antibiotics	2	.88	3	1.04	10	2.15	0	0.00	15	1.53
Inhalation Agents	10	4.42	21	7.29	39	8.39	0	0.00	70	7.14
Endocrine System Drugs	0	.00	4	1.39	6	1.29	0	0.00	10	1.02
Analgesics	16	7.08	31	10.76	54	11.61	0	0.00	101	10.31
Corrosives	15	6.64	13	4.51	49	10.54	1	100.00	78	7.96
Carbamates	73	32.30	64	22.22	31	6.67	0	0.00	168	17.14
Organicphosphorus	48	21.24	30	10.42	21	4.52	0	0.00	99	10.10
Opioids	2	.88	5	1.74	9	1.94	0	0.00	16	1.63
Herbal Plants	12	5.31	8	2.78	4	.86	0	0.00	24	2.45
Food	3	1.33	8	2.78	12	2.58	0	0.00	23	2.35
Multiple Drugs	12	5.31	31	10.76	77	16.56	0	0.00	120	12.24
Alcohol	0	.00	3	1.04	12	2.58	0	0.00	15	1.53
Total	226	23.06	288	29.39	465	47.45	1	0.10	980	100.00

Table 2: Causative agents according to inhabitation area.

In the current study, poisoning cases accounted for 3.6 % of all admissions to the ED. In Turkey, the rate of poisoning-related ED visits ranges from 0.7 to 5% of ED visits annually. Our findings were consistent with previous national reports as well as world data [4,7].

The vast majority of poisoned victims in developing countries has been found as young females [3,4,7]. We found that, 2/3 cases were women and young female patients between the ages of 16 and 25 years had a higher rate of intentional poisoning. Marital status was not different in both genders.

The ED visit rate for intentional poisoning also differs by region. The rate is reported as substantially higher in the eastern part of Turkey than in the West [3]. These data suggested that the increasing suicide trend in younger females may be continuing in the eastern part of Turkey. This phenomenon may be due to accelerated social turmoil particularly in rural areas of the country and contributes substantially to the suicide burden in female gender. There were also similar observations of a high incidence of suicide attempts in rural areas in Iran [8].

Epidemiological studies of human poisoning indicated profound variations in seasonal distribution. But, most of these reports have been showed an association between spring months and suicide attempts [9]. The results of our study showed that 11% of the suicide poisonings occurred in March; it was similar with recent published reports and it may be due to long-lasting negative effect of eastern winter season on human behavior in our region.

In our study, majority of the cases referred to our ED from another hospital. It suggested that, cases with mild poisoning were considered as heavy and most of satellite hospitals had lack of trained specialists as well as medical equipment.

Interestingly, a shorter time to contact with ED was found closest with female cases with OP poisoning ($p<0.01$). This finding is also consistent with a previous report which suggests that the shorter ED admission time correlates with female gender [10]. It also suggests that the relatives of female cases with OP poisoning were more vigilant than those of males.

Unintentional (accidental) poisonings were mostly seen in patients older than 70 years of age and younger than 15 years old. Furthermore, corrosive agents were the most common toxins seen in pediatric cases. Results were consistent with data previously reported in the literature [11,12]. Based on this result, it may speculate that keeping corrosive agents out of reach of children may be life-saving. The number of serious accidents, including fatal outcomes may prevent keeping corrosive agents out of children's reach.

According to a recent report from Turkey, the majority of intoxicated patients are used analgesics for suicide attempts [4]. Interestingly, this study found that physicoactive drugs including CNS drugs were the leading cause of intentional poisonings, whereas analgesics was determined as third cause of intoxications. This phenomenon may be due to unprohibited sales of these drugs in our region.

Organophosphate and carbamate poisoning are generally used as global pesticides. The heavy toxicity of these agents was found to be due to their irreversible inactivation of acetyl cholinesterase, which resulted in devastating effects [13,14]. In Turkey, pesticides account for 7% to 12% of emergency admissions due to poisoning [3,15].

In the current study, the poisoning with pesticides was found higher than other agents. We also found that, time of arrival to the emergency department was significantly shorter among female suicide attempters who poisoned with OP than males. This finding suggests that, male patients with organophosphorus poisoning were more constant in their suicide purposes.

Our data also supports the literature and suggest that pesticide-related poisonings is a common cause of emergency admissions. This

Causative Agent	Gender											
	Male				Female				Total			
	Causes of poisoning				Causes of poisoning				Causes of poisoning			
	Accidentally		Suicide		Accidentally		Suicide		Accidentally		Suicide	
	n	%	n	%	n	%	n	%	n	%	n	%
Physycoactive Drugs	2	1.87	46	21.50	5	3.55	161	31.14	7	2.82	207	21.8
Cardiovascular Drugs	0	0.00	5	2.34	0	0.00	12	2.32	0	0.00	17	1.7
Gastrointestinal Drugs	0	0.00	2	0.93	0	0.00	8	1.55	0	0.00	10	1.0
Antibiotics	0	0.00	6	2.80	0	0.00	9	1.74	0	0.00	15	1.5
Inhalation Agents	27	25.23	0	0.00	42	29.79	1	0.19	69	27.82	1	7.1
Endocrine System Drugs	0	0.00	1	0.47	0	0.00	9	1.74	0	0.00	10	1.0
Analgesics	0	0.00	38	17.76	3	2.13	60	11.61	3	1.21	98	10.3
Corrosives	36	33.64	11	5.14	13	9.22	18	3.48	49	19.76	29	8.0
Carbamates	7	6.54	37	17.29	28	19.86	96	18.57	35	14.11	133	17.1
Organicphosphorus	7	6.54	17	7.94	18	12.77	56	10.83	25	10.08	73	10.1
Opioids	0	0.00	16	7.48	0	0.00	0	0.00	0	0.00	16	1.6
Herbal Plants	11	10.28	0	0.00	13	9.22	0	0.00	24	9.68	0	2.4
Food	6	5.61	0	0.00	17	12.06	0	0.00	23	9.27	0	2.3
Multiple Drugs	1	0.93	31	14.49	2	1.42	86	16.63	3	1.21	117	12.2
Alcohol	10	9.35	4	1.87	0	0.00	1	0.19	10	4.03	5	1.5
Total	107	33.00	214	67.00	141	21.40	517	78.60	248	25.30	731	100.0

Table 3: Gender of cases and causes of poisoning according to causative agents.

Causative Agent	Time to contact to the emergency department (hours)							
	Male		Female		Total		F	P
	$\bar{X}$	**SD**	$\bar{X}$	**SD**	$\bar{X}$	**SD**		
Physycoactive Drugs	2.67	2.05	2.95	2.53	2.88	2.43	0.489	0.485
Cardiovascular Drugs	1.80	.84	3.58	3.12	3.06	2.75	1.535	0.234
Gastrointestinal Drugs	1.50	.71	5.75	6.73	4.90	6.21	0.727	0.419
Antibiotics	3.67	1.97	2.44	1.24	2.93	1.62	2.215	0.160
Inhalation Agents	3.37	1.67	2.37	1.79	2.76	1.80	5.447	0.023*
Endocrine System Drugs	8.00	1.80	2.33	1.41	2.90	2.23	14.450	0.005**
Analgesics	2.13	1.72	3.15	3.47	2.77	2.97	2.852	0.094
Corrosives	2.83	3.58	2.44	1.43	2.67	2.92	0.339	0.562
Carbamates	4.02	6.44	2.69	3.30	3.04	4.36	3.071	0.082
Organicphosphorus	3.61	2.86	2.05	1.22	2.42	1.85	14.156	0.000**
Opioids	3.19	2.23	0.00	0.00	3.19	2.23		
Herbal Plants	2.36	2.01	7.69	13.57	5.25	10.26	1.653	0.212
Food	3.17	1.83	9.71	28.47	8.00	24.47	0.307	0.586
Multiple Drugs	2.89	3.34	2.50	1.92	2.60	2.37	0.635	0.427
Alcohol	3.07	1.54	1.00	0.00	2.93	1.58	1.683	0.217

'*' P<0.05
'**' P<0.01

Table 4: Anova analysis for time to contact to the emergency department according to causative agents and gender.

is, probably due to Van region which is an agricultural area. More complete nationwide registration should clarify this.

Van is a city of roughly 400.000 inhabitants, and situated around the higher mountains of the eastern part of Turkey. The lowest average temperature is around subzero Celsius during winter. Carbon monoxide (CO) is emitted whenever flammable materials are burned. Breathing high levels of the CO may cause severe illness or death due to respiratory failure. CO poisoning generally occur during autumn and winter [16].

In our study, inhalation of gases (mostly carbon monoxide) was found as leading cause of accidental poisonings. It was possible that cold temperature with higher altitude, using gas-powered generators without CO detector and the lack of availabity of infrastructure were probably responsible for this situation.

A Turkish study showed that, low educated patients were more likely to be prone to suicide attempts than patients who had high education levels [17]. Significant correlation was found between education level and suicide attempt. ED visit rates of intoxicated patients were higher among the low education level. Our data was in accordance with previous reports from Turkey.

The percentage of patients who admitted to critical care was 6.4%. This rate has been reported as high as 27% in Western world [9]. In our country, the rate of patients who need intensive care was reported as 13 .3%. In our study, the lower rate of intensive care unit admission was probably due to mild to moderate poisoning pattern in poisoning cases.

In this study, personal psychiatric illness was diagnosed in a total of 6.3% of the poisoning cases. The rate of psychiatric illness among suicide attempters was found significantly much lower in our region than other parts of Turkey [17].

Approximately half of the cases were discharged from the emergency department. The lower percentage of hospitalized patients shows us that most of the cases were mild. This data was compatible with published reports from Turkey [4].

Published studies from Turkey, mortality rate were reported as 1% to 2% among poisoning cases [12-18]. In the present study, mortality rate was found as 1.6%, which was compatible for Turkish data.

Poisoning with pesticides, especially those containing organophosphorus, has been associated with increased risk of mortality [19]. In the current study, mortality was found significantly correlated with opioid and organophosphorus poisonings. Our data was also similar with recent reports published from Turkey [20].

Conclusion

Many younger females living in rural areas have chronic social problems that challenge their future and it was observed that the female cases between 16-25 age group in our region was more likely to commit suicide with agricultural substances most frequently. Due to the fact that, our study was conducted on a hospital bases, our findings were in coherence with the worlds and our region's poisoning characteristics though it may not reflect results of general population.

However, if would be much more tempting to say that further studies to based on multiple centers and means and modes should be conducted in order to have an adequate understanding of precise epidemiologic and clinic findings and data.

References

1. Meredith TJ (1993) Epidemiology of Poisoning. Pharm Ther 59: 251-256.
2. Repetto MR (1997) Epidemiology of poisoning due to pharmaceutical products, Poison Control Centre, Seville, Spain. Eur J Epidemiol 13: 353-356.
3. Goksu S, Yildirim C, Kocoglu H, Tutak A, Oner U (2002) Characteristics of Acute Adult Poisoning in Gaziantep, Turkey. J Toxicol Clin Toxicol 40: 833-837.
4. Özköse Z, Ayoglu F (1999) Etiological demographical characteristics of acute adult poisoning in Ankara, Turkey. Human Toxicol 18: 614-618.
5. Hanssens Y, Deleu D, Taqi A (2001) Etiologic and demographic characteristics of poisoning: a prospective hospital-based study in Oman. Clin Toxicol 39: 371-380.
6. Litovitz TL, Klein-Schwartz W, White S, Cobaugh DJ, Youniss J, et al. (2001) 2000 Annual Report of the American Association of Poison Control Centers toxic exposure surveillance system. Am J Emerg Med 19: 337-395.
7. Karakaya A, Vural N (1985) Acute poisoning admissions in one of the hospitals in Ankara. Human Toxicol 4: 323-326.
8. Groohi B, Rossignol A.M, Barrero, SP, Alaghehbandan R (2006) Suicide Behavior by Burns Among Adolescents in Kurdistan, Iran: A Social Tragedy', Crisis: The Journal of Crisis Intervention and Suicide Prevention. Psyc articles 27:16-21.
9. Islambulchilar M, Islambulchilar Z, Kargar-Maher MH (2009) Acute adult poisoning cases admitted to a university hospital in Tabriz, Iran. Hum Exp Toxicol 28: 185-190.
10. Kavalci C, Çevik Y, Ozer M, Durukan P, Ikizceli I, et al. (2009) Characteristics of poisoning cases ın Ankara, Turkey. The Internet Journal of Emergency Medicine 1.
11. Spiller HA, Appana S, Brock GN (2010) Epidemiological trends of suicide and attempted suicide by poisoning in the US: 2000–2008. Legal Medicine 12: 177–183.
12. Kekec Z, Gunay N, Sozuer EM, Guven M, Sungur M (2004) An analysis of 682 adult poisonings in Central Anatolia of Turkey. Vet Hum Toxicol 46: 335-336.
13. Tsai JR, Sheu CC, Cheng MH, Hung JY, Wang CS, et al. (2007) Organophosphate poisoning: 10 years of experience in southern Taiwan. Kaohsiung J Med Sci 23: 112-119.
14. Hosokawn T, Satoh T (2000) Organophosphates and their impact on the global environment. Neurotoxicology 21: 223-227.
15. Baydin A, Yardan T, Aygun D, Doganay Z, Nargis C, et al. (2005) Retrospective Evaluation of Emergency Service Patients With Poisoning: A 3-Year Study. Adv Ther 22: 650-658.
16. Hung DZ, Deng JF, Yang CC, Jen LY (1994) The climate and the occurrence of carbon monoxide poisoning in Taiwan. Hum Exp Toxicol 13: 493-495.
17. Cengiz M, Baysal Z, Ganidagli S, Altindag A (2006) Characteristics of poisoning cases in adult intensive care unit in Sanliurfa, Turkey. Saudi Med J 27: 497-502.
18. Akkas M, Coskun F, Ulu N, Sivri B (2004) An epidemiological evaluation of 1098 acute poisoning cases from Turkey. Vet Hum Toxicol 46: 213-215.
19. Kanchan T, Menezes RG (2008) Suicidal poisoning in Southern India: Gender differences. J Forensic Leg Med 15: 7-14.
20. Ozer C, Kuvandik G, Gokel Y, Duru M, Helvaci MR (2007) Clinical presentation and laboratory findings of organic phosphorus poisoning. Adv Ther 24: 1321-1329.
21. Yusuf HR, Akhter HH, Rahman MH, Chowdhury ME, Rochat RW (2000) Injury related deaths amongst women aged 10-50 years in Bangladesh, 1996-97. Lancet 355: 1220-1224.