

## YOĞUN BAKIM ÜNİTEMİZE KABUL EDİLEN İNTOKSİKASYON OLGULARININ RETROSPEKTİF ANALİZİ

RETROSPECTIVE ANALYSIS OF INTOXICATION CASES ADMITTED TO OUR INTENSIVE CARE UNIT

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### ÖZ

**AMAÇ:** Zehirlenmeye yol açan etkenler yaşanan bölgeye, toplumun gelenek ve göreneklerine, sosyoekonomik düzeyine göre değişiklik gösterebilir. Bu nedenle her ülkenin, hatta her bölgenin zehirlenme ile ilgili etyolojik ve demografik özelliklerinin belirlenip, önlemlerin alınması gerekmektedir.

**GEREÇ VE YÖNTEM:** Bu çalışmada Ordu Üniversitesi Tıp Fakültesi Hastanesi Genel Yoğun Bakım Ünitesinde takip ve tedavi edilen zehirlenme olguları retrospektif olarak incelenerek, hastaların demografik özelliklerinin ve dağılımlarının belirlenmesi, klinik bulguları, zehirlenmenin etyolojisi, yoğun bakımda kalış süresi, mortalite, mortaliteyi etkileyen faktörler ve zehirlenme vakalarının incelenmesi amaçlanmıştır.

**BULGULAR:** Son 2 yılda yoğun bakıma kabul edilen toplamda 625 hastanın 54'ünün zehirlenme tanısı ile yoğun bakım ünitemize yatırıldığı saptandı. Bu hastaların % 78'i kadın, % 22'si erkek idi. Olguların yaş ortalaması 22.13±11.33 idi. Zehirlenmeye neden olan madde olarak ise en sık tıbbi ilaçlar (%74) ikinci sırada ise tarım ilaçları (%12.96) yer almaktaydı. Zehirlenme nedeni en sık özkıyım amaçlı ilaç alımı idi (% 88.88). Yoğun bakıma ilk geliş Glasgow koma skorları (GKS) 13,1±1.95, APACHE II skoru ise 5.88±2.47 idi. Mortalite oranımız %3.7 idi.

Bulguların mortalite ile ilişkili olup olmadıkları değerlendirildiklerinde başvuru zamanı 12 saatten fazla olan grup, metil alkol ile zehirlenen olgular, mekanik ventilatör ihtiyacı olan hastalar ve GKS düşük APACHE II skoru yüksek olan hastalar mortalite ile ilişkili olarak saptanmıştır.

**SONUÇ:** Bu retrospektif çalışma Türkiye'deki zehirlenme hasta profili ile benzer bulgular göstermektedir. En sık zehirlenmeler tıbbi ilaçlar ile olmaktadır. Mortalite belirleyicisi olarak hastaların başvuru anındaki GKS ve APACHE II skorları, zehirlenen maddenin tipi ve hangi yol ile alındığı ve hastaneye başvuru zamanı yol gösterici olabilir.

**ANAHTAR KELİMELER:** Zehirlenme, Yoğun Bakım, İlaç İntoksikasyonu

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### ABSTRACT

**OBJECTIVE:** Factors causing intoxication vary depending on region, traditions and customs of the society and socioeconomic level. As a result, determining etiologic and demographic characteristics for each country, in fact each region, is necessary to ensure precautions can be taken.

**MATERIALS AND METHODS:** This study retrospectively investigated the intoxication cases monitored and treated at Ordu University, Faculty of Medicine Hospital, General Intensive Care Unit. The aim was to investigate intoxication cases and to determine the demographic characteristics and distributions of patients, clinical symptoms, intoxication etiology, intensive care stay, mortality and factors affecting mortality.

**RESULTS:** Of a total of 625 patients admitted to intensive care in 2 years, 54 were identified to have been admitted with diagnosis of intoxication. Of these patients, 78% were female and 22% male. The mean age of cases was 22.13±11.33 years. In terms of material causing intoxication, the most frequent was medical drugs (74%) with agricultural pesticides in second place (12.96%). The most frequent cause of intoxication was intake with suicidal intent (88.88%). On first admittance to intensive care Glasgow Coma Score (GCS) was 13.1±1.95 and APACHE II score was 5.88±2.47. The mortality rate was 3.7%. When correlation of findings to mortality was assessed, there was a correlation identified with the group applying more than 12 hours after intoxication, cases poisoned with methyl alcohol, patients requiring mechanical ventilator and patients with low GCS and high APACHE II scores.

**CONCLUSIONS:** This retrospective study found similar findings to the patient profile of intoxication in Turkey. The most frequent intoxication was due to medical drugs. The GCS and APACHE II scores at admission, type of toxic material and intake route and time of application to hospital may be used as indicators of mortality.

**KEYWORDS:** Intoxication, Intensive Care, Drug Intoxication

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## INTRODUCTION

Intoxication is a significant problem affecting societies since very ancient times (1). When any chemical, physical or organic material is ingested, inhaled, absorbed or injected, if the chemical effects of even small amounts cause damage to structures and disrupt functions, then the material is called a toxin, and the event is called intoxication (2). Intoxication is among the most frequent causes of application to emergency services for young adult patients under 35 years of age with non-traumatic coma (1, 3). The yearly incidence of intoxication due to suicidal intent and accidents in developed countries varies from 0.02-0.93% and this continues to increase globally every year (4-6). In Turkey cases applying with intoxication to the emergency service are reported to comprise 0.46-1.57% of all cases (6). Intoxication varies depending on the geographical region, and sociocultural and economic situation, representing a medical and society problem with increasing intensive care rates. Acute intoxication may have different clinical tableaux depending on material used, intake form, exposure duration and many factors relating to the patient (like age, sex, additional diseases) (7). About 5-30% of the capacity of multidisciplinary intensive care units is used by intoxication cases (1, 3, 6). The most frequent intoxications are caused by medicinal drugs, recreational drugs, and industrial and agricultural toxic material (1).

In this retrospective study we aimed to investigate the personal characteristics, etiologic factors, duration to hospital application after intoxication, duration of intensive care stay, clinical situation in intensive care, type of intoxication and whether these factors are correlated with mortality for acute intoxication cases admitted to our general intensive care unit from 01.01.2014 and 31.12.2015. We believe this two year retrospective analysis will be beneficial for diagnosis and treatment of patients admitted to intensive care, for internal evaluation, to identify mortality rates and to determine patient profile for intoxication cases.

## MATERIALS AND METHODS

Our study accessed case data from a scan of hospital archives for retrospective evaluation

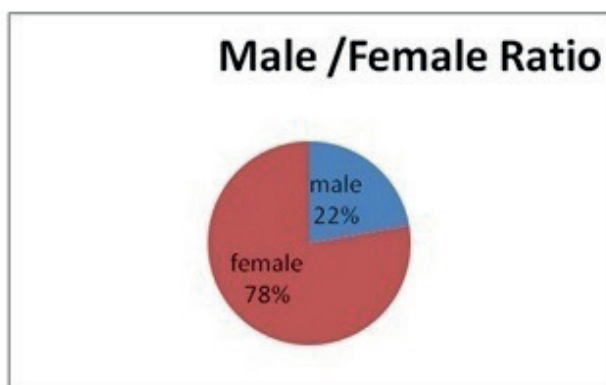
of personal characteristics, etiology and clinical results of intoxication cases admitted to Ordu University, Training and Research Hospital General Intensive Care Unit from Ordu and surrounding counties from 01.01.2014 to 31.12.2015. The study included patients above the age of 18 admitted to the intensive care unit. After obtaining the approval from the Ethics Committee of Samsun Ondokuz Mayıs University (Date: 15/01/2015; Decision number B.30.2.ODM.0.20.08/965)

The demographic data (sex, age), type of material causing intoxication (medicinal drugs, agricultural pesticides, toxic gas, methyl alcohol and other), form of intoxication (accidental, suicide), duration of application to hospital, and route of intoxication were recorded for intoxication cases. The duration of stay in intensive care, requirements for mechanical ventilation, neurological situation at admission Glasgow Coma Score (GCS) assessment and Acute Physiology and Chronic Health Evaluation II (APACHE II) score at admission were added from the records. Clinical results of discharge home, transfer to another ward or death were identified and recorded.

When evaluating the results obtained in the study SPSS (Statistical Package for Social Sciences) for Windows 21.0 program was used for statistical analyses. Descriptive statistical methods were used to investigate patient parameters (frequency, percentage, mean, standard deviation). To compare quantitative data in both groups, parameters without normal distribution were compared with the Mann Whitney U test. To evaluate correlation of mortality with GCS and APACHE II scores, the Mann Whitney U test was again used. Results were evaluated at the 95% confidence interval with significance level of  $p < 0.05$ .

## RESULTS

Of 625 cases admitted to the general intensive care unit of our hospital during the 2 year period, 54 were patients admitted for intoxication (8.64%). Of the cases admitted to the general intensive care unit of our hospital with diagnosis of intoxication 42 (78%) were female and 12 (22%) were male (**Figure 1**).

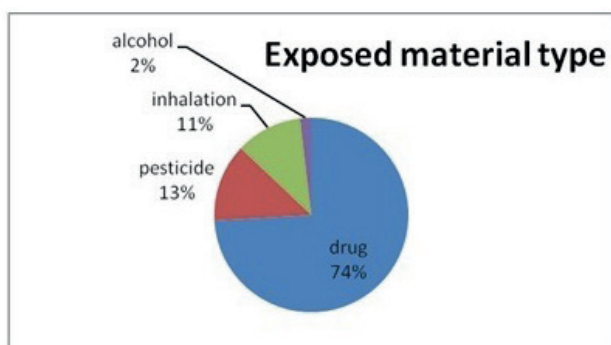


**Figure 1:** Distribution of intoxication cases according to sex

The mean age of cases admitted to the intensive care unit was  $22.13 \pm 11.33$  years (**Table 1**). When the patient group admitted to intensive care for intoxication is evaluated in terms of exposed

**Table 1:** Mean age of cases admitted to intensive care

Cases	N	mean $\pm$ sd	Min.	Max.
Age	54	22.13 $\pm$ 11.33	16	29



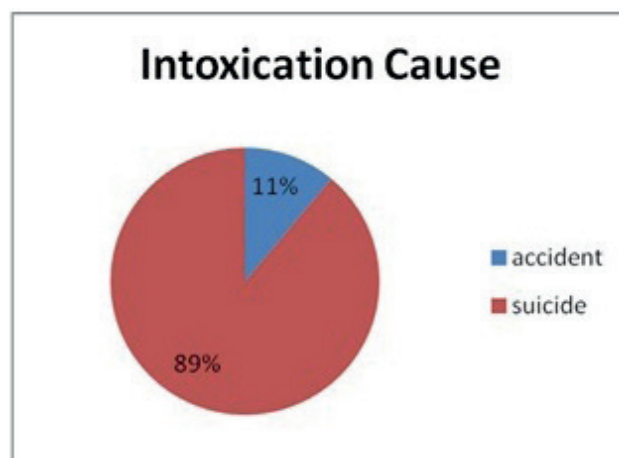
**Figure 2:** Intoxication Cases by Exposed Material Type

material type, 40 patients (74.07%) were exposed to medicinal drugs, 7 patients (12.96%) were exposed to agricultural pesticides, 1 patient (1.87%) was exposed to methyl alcohol and 6 patients (11.11%) were poisoned by gas exposure (**Figure 2**). Of patients admitted to the intensive care unit of our hospital, 74% arrived within the first 6 hours, 16% arrived within 6-12 hours and 9% arrived 12 hours or later (**Table 2**). When the causes of intoxication

**Table 2.** Duration to hospital application of intoxication cases

Time Interval	n=54(%)
First 6 hours	40 (74.74%)
6-12 hours	9 (16.66%)
12 hours or later	5 (9.25%)

of cases admitted to our intensive care unit are evaluated, 6 patients (11.11%) were exposed accidentally and 48 patients (88.88%) patients were intoxicated due to material intake with suicidal intent (**Figure 3**).



**Figure 3:** Cause of Intoxitacation Cases

The stay in intensive care of cases admitted to our intensive care due to intoxication was mean  $2.1 \pm 1.3$  (1-4) days. Two patients (3.7%) required mechanical ventilation, while 52 (96.3%) had sufficient spontaneous ventilation. The mechanical ventilation duration of the 2 cases was  $2 \pm 1.63$  days. At time of admittance the mean Glasgow Coma Score of cases in our intensive care unit was  $13.11 \pm 2.21$ , while the mean APACHE II score was  $7.74 \pm 5.01$  (**Table 3**). After treatment in our intensive care unit for

**Table 3.** Glasgow Coma Score and APACHE II score of intoxication cases at time of application

	N	Mean $\pm$ s.d.	min	max
Glasgow Coma Score	54	13.11 $\pm$ 2.21	8	15
APACHE II Score	54	7.74 $\pm$ 5.01	2	28

intoxication diagnosis, 41 cases (75.9%) were discharged, 11 (20.37%) were transferred to other wards and 2 (3.7%) were exitus. Within all intoxication cases, these two patients were those who required mechanical ventilation. One of these cases died after intake of methyl alcohol, while the other had taken 70 gr metformin with suicidal intent. Evaluation of the relationship between GCS and APACHE II score on admission to intensive care found that

the exitus patient group had significantly low GCS and significantly high APACHE II score (\* $p < 0.05$ , respectively  $p = 0.02$  and  $p = 0.04$ ) (**Table 4**).

**Table 4.** Correlation between GCS and APACHE II scores at time of admittance and mortality (\* $p < 0.05$ )

GCS and APACHE score on admittance to intensive care	Deceased cases	Surviving cases	Median	p value
	Mean±sd	Mean±sd		
GCS	6.18±1.23	13.1±1.95	12	0.02*
APACHE II	21.32±4.91	5.88±2.47	9	0.04*

## DISCUSSION

Intoxication is a topic affecting societies since very ancient times. Any chemical, physical or organic material when absorbed, inhaled or enters the organism through the parenteral route that may damage the organism or disrupt systems and functions due to chemical effects at even very low doses is called a toxin and the event caused by this material is given the name intoxication (8). As is known, intoxication is a significant health and socioeconomic problem for humans. Due to technology developed in recent years and the pharmaceutical industry, intoxication is increasing and becoming more complicated.

The most common intoxications are due to the developing pharmaceutical industry and easy access to toxins such as medications, recreational drugs, home, industrial and agricultural toxic material, some food material (especially mushrooms) and carbon monoxide (9). Intoxication should be considered for those brought to emergency services with non-traumatic coma, especially patients below the age of thirty five, and this situation comprises 7-10% of all admissions to emergency service with coma (10, 11). These patients are encountered by anesthesia experts in intensive care units or during emergency resuscitation of patients in the emergency service. In the United States of America, intoxication cases comprise 5-10% of all patients admitted to intensive care units (12).

Clinically when acute intoxication is suspected, diagnosis and treatment must proceed rapidly due to high mortality and morbidity rates.

Additionally factors causing intoxication vary depending on region, societal traditions and customs and socioeconomic level. As a result, determining etiologic and demographic characteristics related to intoxication in each country, in fact in each region, is necessary to ensure precautions can be taken (13).

The most common age group of intoxication cases is 15 years and above. Intoxication due to medications involve the use of medications for treatment, in addition to the more common high dose medication intake with suicidal intake (13,14). Suicidal attempt with high dose medication intake is the most common method of suicide (15). There is a correlation identified between suicide and socioeconomic factors like depression, educational level, economic level, unemployment, population increase and psychosocial stress and many factors linked to cultural structure (16,17). Our results are in accordance with the literature; the majority of our cases were above the age of 15 and a high rate of 88.8% took medication with suicidal intent.

A study by Özköse et al. (18) found the female-male ratio of 180 acute intoxication cases applying to emergency service within a year was 3:1, with 63.6% of cases below the age of 25 and the major cause of acute intoxication was medical drugs with a rate of 75.9%. The highest rate within medical drugs was identified as pain killers with a rate of 29.7%. Other causes of acute intoxication were gas inhalation 17.6%, food 2.6%, corrosives 2.2%, pesticides 0.9%, and alcohol 0.9%. There was no report of cases resulting in death and they linked the high rate of pain killers as being due to high habitual prescription rates for pain killers (18). In our results, there was a high rate of intoxication cases due to agricultural pesticides and two of our cases were exitus. This result may be related to the high population involved in agriculture in the Black Sea region.

Serinken et al. (19) in their study found 71% of 257 acute intoxication cases were female, with 88.7% in the 17-40 age group and they identified high rates of suicidal intent with medical drugs. Within all acute intoxication cases, the suicide with medical drugs rate was reported as 93.3%.



In conclusion they reported acute intoxication linked to suicide had high rates in young adults and especially women (19). Our results coincide with the results of Serinken et al. Of our cases 78% were female and 88.8% took drugs with suicidal intent.

Gündüz et al. (20) in their study reported the female-male ratio was 3.4/1. A study of 1085 patients applying with acute intoxication to Uludağ University emergency service by Akköse et al. (5) again reported more women than men applied with a rate of 69.4%. A study by Keleş et al. (15) supported the conclusion that numerically more women applied. All of these results support the numerical excess of women. This situation may be due to women's lack of social security and lower participation in working life.

When the time to application to hospital after exposure to material is evaluated, Kekeç et al. (21) found that 63.2% of patients applied within the first 5 hours; Özayar et al. (6) found mean time to hospital was 4.4 hours; while Yeşil et al. identified the mean duration to hospital application was 7.61 hours (2). In our study 74.74% of our patients applied to hospital within the first 6 hours. The mortality rate was found to be significantly high in the patient group applying 12 hours or later. Five of our cases (9.25%) applied after 12 hours, with 2 cases developing mortality within this group arriving at hospital more than 12 hours later. This once more displays the importance of early diagnosis and treatment of intoxication cases. We believe the educational level and socio-cultural level of people in the region affects this duration.

When the relationship of risk factors to mortality are examined, Liisanantti et al. in a broad scale study researching lengthened intensive care stay and risk factors for death due to acute drug intoxication, found the intensive care mortality rate of 2755 intoxication patients was 1.5%, with APACHE II and GCS scores of exitus patients 27.4 and 9.7, respectively (22). A review of mortality of acute intoxication cases in intensive care by

Şencan et al. (23) divided cases in two groups as exitus and survivors and found that the mean age and APACHE II score of the exitus group was significantly high compared to survivors while the GCS at time of application was significantly low. The mechanical ventilation duration of dead patients was found to be significantly longer (23). In our study mortality was significantly high in the group applying to hospital more than 12 hours after intoxication. At the same time, low GCS and high APACHE II scores were closely related to mortality. These scores may be helpful to estimate intensive care stay, to plan treatment and predict clinical progression of patients on first admission of intoxication patients. Death due to acute intoxication is closely related to the intoxication vector.

In conclusion, with this retrospective study we found that our 2 year intoxication cases were mainly in accordance with intoxication cases in Turkey generally. In this study similar to intoxication cases in the country in general, we found that more females applied, with more drug intake for suicidal intent, and similar mean age to the country mean. The fact that toxic agents were most frequently ingested through the oral route and the material causing intoxication was mostly medicinal drugs was confirmed again in our study. Among important factors affecting mortality of cases admitted to intensive care was type of toxin, route of intoxication, duration to application to hospital and GCS and APACHE II scores at time of application. Low GCS score and high APACHE II score at admission are helpful methods to estimate a longer stay in the intensive care unit and may be used to predict mortality. We believe our study, completed in Ordu province, will guide clinicians in their approach to intoxication cases and admission of intoxication cases to intensive care in the future.

It should be remembered that the strength of the toxin, general situation on admission to hospital and GCS and APACHE II scores may be very effective on clinical results.

## REFERENCES

1. Demirel İ. Elazığ Eğitim ve Araştırma Hastanesi Yoğun Bakımında izlenen zehirlenme olgularının geriye dönük analizi. *Fırat Tıp Dergisi* 2010;15(4):184-87.
2. Yeşil O, Akoğlu H, Onur Ö, Güneysel Ö. Acil servise başvuran olguların geriye dönük analizi. *Marmara Medical Journal* 2008;21(1):26-32.
3. Demir G, Eren GA, Hergünel O, Çukurova Z, Kızanlık Y. Yoğun bakım ünitemizde 2003-2007 yılları arasında takip edilen zehirlenme olgularının geriye dönük analizi. *Bakırköy Tıp Dergisi* 2008;4(4):139-43.
4. Göksu S, Yıldırım C, Koçoğlu H, Tutak A, Öner Ü. Characteristics of acute adult poisoning in Gaziantep, Turkey. *J Toxicol Clin Toxicol* 2002; 40(7): 833-37.
5. Akköse Ş, Bulut M, Armağan E, Cebicci H. Acute poisoning in adults in the years 1996-2001 treated in the Uludağ University Hospital, Marmara region, Turkey. *Clin Toxicol* 2005;43(2):105-109.
6. Özayar E, Değerli S, Güleç H, Şahin Ş, Dereli N. Yoğun bakıma kabul edilen zehirlenme olgularının retrospektif analizi. *Yoğun Bakım Dergisi* 2011;3(1):59-62.
7. Yüce HH. Giresun bölgesinde yoğun bakım ünitelerinde takip edilen zehirlenme olgularının retrospektif analizi. *Bidder Tıp Bilimleri Dergisi* 2011;3(1):32-35.
8. Tunçok Y. Toksikoloji Tanımı ve Tarihçesi. *Türkiye Klinikleri Farmakoloji*, 2003;1(1):1-5.
9. Kayhan Z. Klinik Anestezi. İstanbul:Logos Yayıncılık, 1997. (2. Basım): 754-58.
10. Fuller GN, Rea AJ, Payne JF, Lant AF. Parasuicide in central London 1984-1988. *J R Soc Med* 1989. 82(11): 653-56.
10. Kurtoğlu S. Zehirlenmeler Teşhis ve Tedavi. 1. Basım. Kayseri: Erciyes Üniversitesi Tıp Dergisi; 1992 (1):46-47.
11. Leykin Y, Halpern P, Silbiger A, Sorkin P, Niv D, Rudick V et al., Acute poisoning treated in the intensive care unit: A case series. *Isr J Med Sci*, 1989;25(2): 98-102.
12. Öner N, İnan M, Vatanserver Ü, Turan Ç, Çeltik C, Küçükuşurluoğlu Y ve ark., Trakya bölgesinde çocuklarda görülen zehirlenmeler. *Türk Pediatri Arşivi*, 2004 ;39(1):25-30.
13. Buffoni L, Reboa E, Galletti A, De Santis L, Tarateta A. Epidemiological aspects of poisoning in children observed over a 10 -year period. *Clin Toxicol*. 1981; 18(10): 1149-56.
14. Park GD, Spector R, Goldberg MJ, Johnson GF. Expanded role of charcoal therapy in the poisoned and overdosed patient. *Arch Intern Med*.1986;146(5):969-73.
15. Keleş A, Demircan A, Aygencel G, Karamercan A, Turanlı S ve ark. GÜTF Acil Servise başvuran zehirlenme olgularının geriye dönük analizi. *Akademik Acil Tıp Dergisi* 2003;1(2): 39-42.
16. Akköse S, Fedakar R, Bulut M, Çebiçi H. Zehirlenme Olgularının Beş Yıllık Analizi. *Acil Tıp Dergisi* 2003; 3(1): 8-10.
17. Tountas C, Sotiropoulos A, Skliros SA, Kotsini V, Peppas TA, Tamvakos E et al. Voluntary self-poisoning as a cause of admission to a tertiary hospital internal medicine clinic in Piraeus, Greece within a year. *BMC Psychiatry* 2001;1(4):1-4
18. Özköse Z, Ayoğlu F. Etiological and demographical characteristics of acute adult poisoning in Ankara, Turkey. *Hum Exp Toxicol*. 1999;18(10):614-8.
19. Serinken M, Yanturalı S. Acil Serviste intihar amaçlı zehirlenmelerin geriye dönük analizi. *Toksikoloji*. 2003; 1(1): 15-19.
20. Gündüz A, Kesen J, Topbaş M, Nancı H, Yandı M. İntihar amaçlı zehirlenme nedeniyle acil servise başvuran hastaların analizi. *Türk Silahlı Kuvvetleri Koruyucu Hekimlik Bülteni*. 2004; 3(10):234-42
21. Kekeç Z, Sözüer EM, Duymaz H, Ökkan S. Acil servise başvuran çoklu ilaç zehirlenmelerinin yedi yıllık analizi. *Türkiye Acil Tıp Dergisi* 2005;5(2):69-72.
22. Liisanantti JH, Ohtonen P, Kiviniemi O, Laurila JJ, Ala-Kokko TI. Risk factors for prolonged intensive care unit stay and hospital mortality in acute drug poisoned patients: An Evaluation of the psychologic and laboratory parameters on admission. *J Crit Care* 2011;26(2):160-65.
23. Şencan A, Adanır T, Aksun M, Karahan N, Aran G. Yoğun bakıma kabul edilen akut zehirlenme olgularında bireysel ve etiyolojik özelliklerin mortalite ile ilişkisi. *Türkiye Anesteziyoloji ve Reanimasyon Dergisi* 2009;37(2):80-5.