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Cost analysis and characteristics of the patients admitted to emergency service with poisoning

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ABSTRACT

Objective: To investigate the cost analysis and hospitalization rates and modes of poisoning of patients who applied to Bakent University Ankara Hospital Adult Emergency Service. **Methods**: Poisoning Patients who applied to emergency service due to suicide attempt between 01.01.2011- 31.12.2014 were included in the study. Patients' age, gender, date of admission, definite diagnosis, the rate of hospitalization, and hospital costs were examined. A total of 646 patients were included in the study. 208 (32.2%) of the patients were male. The median age of the patients was 29 years. **Results**: The most causes of poisoning was drug intake. The median cost of the patients was 75.14 TL (IQR: 66.5). **Conclusion**: There was a positive correlation between age and cost (P<0.05). The majority of the patients apply to emergency dapartment with drug poisoning and female.

1. Introduction

Poisoning is described as the negative impact of an organic or inorganic substance on the functioning of any one of the systems within an organism[1]. Poisoning can be occupational, environmental, recreational or medical. Although poisoning usually occurs as a result of swallowing, it can also develop through many ways such as inhalation, skin, mucous membranes or injection[1, 2]. Rapid and accurate evaluation, followed by the treatment of the patient admitted to the emergency service with the suspicion of poisoning is very important for reduced morbidity and mortality. As with all emergency dapartment patients, maintenance of respiratory and circulatory functions is the most important aspect[2].

Poisoning cases constitute 5%-10% of all the patients applying to emergency dapartment. It was found that 5% of the patients applying to ED due to poisoning required hospitalization and 0.03% of all cases die[3]. In 95% of the poisoning cases applying to ED, the individual intakes the poison willingly while the 5% of those

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are accidentally poisoned. It is more frequent among women, and women under 25 years old in particular, and men between 20-30 years old to intake the poison willingly[4].

Poisoning is a serious public health problem. It is 13th among the causes of death around the world and is the 4th cause of death among those between (15-44) years old[4]. In our country, crude mortality rate rapidly increases due to suicide. While the crude mortality rate due to suicide was 3.9 in 100 000 in 2007, it was 4.2 in 100 000 in 2013. Suicide attempts increase in males older than 45 years and females older than (50-55) years, and the rate of attempts resulting in death is higher in males whereas the rate of attempts not resulting in death is higher in females[5]. The substances used for suicide are mostly analgesics, antibiotics, antidepressants, antiepileptics, and antihistamines[4]. A total of 3 189 people died in our country in 2013 due to suicide. However, use of firearms and hanging are the major methods used in completed suicides in our country[5].

In this study, the aim is to investigate the cost analysis and hospitalization rates and modes of poisoning of patients who applied to Bakent University Ankara Hospital Adult Emergency Service with poisoning.

2. Materials and methods

This study was performed retrospectively at Ba kent University Ankara Hospital Emergency Service upon obtaining the ethics committee approval (dated 07/04/2015, KA15/122).

Patients who applied to emergency service due to suicide attempt between 01.01.2011-31.12.2014 were included in the study. Data used in the study were obtained from patient files and automation system. For the study, 646 patients who applied due to poisoning were investigated.

According to ICD 10 diagnostic codes, patients with diagnostic codes; F10.0, F10.1, F11.0, F15.0, F18.0, F19.0, F19.1, F55, T36.1, T36.9, T39.3, T39.9, T40.9, T42.0, T42.7, T43.0, T43.2, T43.9, T44.3, T46.0, T46.9, T47.0, T51.0, T51.1, T51.8, T51. 9, T52.4, T54.1, T54.2, T54.3, T54.9, T55, T56.1, T58, T59.4, T59.7, T59.8, T59.9, T62.0, Patients with Y14, Y17, and Y19 were included in the study.

Patients' age, gender, date of admission, definite diagnosis, the rate of hospitalization, and hospital costs were examined.

The data were analyzed using SPSS Windows 17.0 program. The descriptive data were the number of patients (N), percent, median and interquartile range (IQR). *Chi*-square test was used in the analysis of qualitative data, Pearson's correlation was used between cost and patient age. A *P*-value <0.05 was considered statistically significant.

3. Results

A total of 646 them were included in the study. 208 (32.2%) of the patients were male, and 438 (67.8%) were female. The median age of the patients was 29 years (IQR: 21)

The most frequent causes of poisoning were drug poisoning and poisoning due to gas exposure. The distribution of cases according to the cause of poisoning is shown in Table.

Table
Subgroup distribution of intoxication events.

Group	Subgroup	*n*	%
Drug	Multi-drug	206	78.6
	Mono-drug	56	21.4
	Antidepressants	102	38.9
	Analgesics	88	33.6
	Antibiotics	68	25.9
	Anti-hypertensive	25	9.5
	Antiepileptic	25	9.5
	Parasympatholytics/ Hallucinogens	2	7.6
	Psychotropic	15	5.7
	Anti-hyperglycemic	12	4.6
	Anti-histamines	10	3.8
	Heart glycosides	9	3.4
	Opioid	8	3.0
	PPI	5	1.9
	Other	5	1.9
Gas	Carbon monoxide	179	85.6
	Carbon dioxide	2	1.0
	Chlorine gas	2	1.0
	Other	26	12.4
Alcohol	Ethanol	115	98.3
	Methanol	2	1.7
Chemical	Acid / alkali	23	50
	Abrasive material (acid /non-alkaline)	18	39.2
	Abrasive organic compound	3	6.4
	Mercury	1	2.2
	Other	1	2.2
Food	Fungus	8	66.7
	Other	4	33.3

208 (32.2%) of the patients applied to emergency service due to poisoning in winter,159 (24.6%) in autumn, 158 in spring and 121 in summer. The rate of cases due to poisoning was the highest in winter months, but the lowest in summer (*P*<0.05).

While 621 (96.1%) of the patients were being examined and treated in the ambulatory setting, 25 (3.9%) patients had to be hospitalized and treated.

The median cost of the patients was 75.14 TL (IQR: 66.5). There was a positive correlation between age and cost (*P*<0.05).

4. Discussion

Poisoning is classified into two groups, as accidental intake and conscious intake for suicide. These substances, which are accidentally or consciously taken or exposed, can be the cause of morbidity and mortality[1-4].

In the previous studies, the median age of the patients was reported as (16-35) years[6-10]. Similar to the literature, the median age of

the patients in our study was 29. The frequency of female patients in the literature is reported to be between 66%-75%[7-10]. In our study, 78% of the patients were female. The higher rate of suicide attempts among women can be due to the higher level of pressure on young women in our society, and also it is possible that women tend to attempt suicide as they try to attract attention since they are more emotional. In accidental poisoning cases, we think that the rate of inhalation toxicity due to exposure to natural gas is higher among females as the females spend more time at home.

The studies in the literature report the rate of drug poisoning as 60%-76%, alcohol as 15%, and carbon monoxide as 15%[9-12]. In this study, similar to the literature, it was found that the most frequent cause of poisoning is drug intake. The main reason behind attempting suicide by drug intake can be that the drugs are easily obtained and are considered as a painless and easy approach.

In our literature review, we found that 37.7% of the cases are due to mono-drug poisoning, and 42.3%-78.6% of the cases are due to multidrug poisoning[9,12]. In this study, the frequency of multiple drug intake was found to be 78.6%. We think that the most fundamental reason behind this is that the individual tries to increase the number of drugs to get the most out of the process, and since he cannot find more of the same drug, he buys other drugs[13].

In the United States, among all poisoning cases, suicide attempts with psychiatric drugs are ranked first among all poisoning cases[2]. In studies performed in Turkey, the most frequent cause of poisoning among patients is drug poisoning, and antidepressants are ranked first among all drug subgroups[9,14]. In our study, antidepressants were the most frequently used drugs in cases of mono-drug poisoning. The reason behind the high poisoning rate due to antidepressants can be the tendency of the psychiatric drug users to attempt suicide.

Carbon monoxide is a colorless, odorless and nonirritant gas that can be easily absorbed by the lungs[4]. It reaches its peak amount in autumn and winter months[15]. In our country, its frequency among all poisoning cases is 7%-14%[16-18]. In our study, 85.6% of gas inhalation toxicity cases was due to carbon monoxide. The rate of poisoning due to CO was higher than the literature, and the most fundamental reason behind this can be that the natural gas is cheaper than the solid fuels, which results in its increased use in places with inadequate infrastructure, eventually leading to the increased rate of poisoning.

Studies show that 3%-8.7% of all poisoning cases in ES are due to alcohol use[8,9,15]. In this study, 18% of the patients were intoxicated due to alcohol intake. We think that the high number of restaurants selling alcohol and pubs around the hospital can be the cause of the rate of alcohol poisoning being higher than the literature.

Poisoning with house chemicals occurs due to bleach, caustic substances and detergents. Although the majority of these cases are children, there is accidental intake, and excessive intake for suicide purposes are reported in adults[11]. While the reported rates of poisoning due to chemicals vary, it can be as high as 20%[8,11]. In our study, the highest poisoning rate was due to contact with acid/alkali substances, and we think that this is accidental.

Studies in the literature report that frequency of poisoning increases in spring and summer, particularly in May, June, July, and August [8,9,11,19]. In our study, unlike the literature, we found that the frequency of poisoning increased during the winter months. The main cause of this can be the increased CO poisoning in winter. Poor weather conditions during winter can also cause decreased communication between the individuals due to decreased activity, which can eventually lead to increased rate of suicide attempts among depressive individuals.

Majority of the cases applying to emergency department with poisoning are not critical[20]. Follow up, and hospitalization rate of the cases applying to emergency department can depend on the clinical status of the patient, physical structure of the emergency department in the hospital, personnel status and bed occupancy rate of the clinics[21]. Studies in the literature report that 15.6-36.3% of the patients are treated in inpatient care[22-24]. In this study, about 4% of the patients were hospitalized. Our study shows similarities to the other studies performed in our country. We think that the rate of discharge from emergency department is high due to the inefficient prevalence of toxicology department in our country, little toxicity of most of the substances used, insufficient knowledge and experience regarding the poisoning of most substances.

There is a limited amount of data on the cost analysis of the patients admitted to emergency department due to poisoning, and many parameters are not considered in the studies which evaluate the data that changes the cost in emergency department. However, the average cost varies between 11.792 to 686.89 dollars[25-29]. In our study, the median cost of patients in hospital emergency department was 75.14 TL and is concordant with the literature. It was found that the cost of emergency department increases as the age of the patient increases. We think that the cost increases as the comorbidities also increase with the advanced age.

Since the majority of the patients apply to emergency department with drug poisoning, we think that the rate of poisoning cases can be reduced with appropriate social support. Also, we predict that the presence of experienced people within the poisoning management team can reduce the cost.

Conflict of interest statement

The authors report no conflict of interest.

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