

ASSESSMENT OF THE PATTERN OF ACUTE POISONING IN ADULTS ADMITTED TO KASR AL-AINI NATIONAL ENVIRONMENTAL AND CLINICAL TOXICOLOGY AND RESEARCH CENTER IN 6 MONTHS

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ABSTRACT

Background: acute poisoning is exposure to a poison on one occasion or during a short period. The toxic effects can occur immediately or within hours of exposure. It is an essential medical emergency, which can be due to accidental or suicidal exposure causing significant mortality and morbidity. **Aim of the work:** to study the pattern of acute toxicity among adult patients admitted to nectr. **Subjects and methods:** it is a prospective cross-sectional analytical study that included 106 patients admitted due to acute poisoning. Patients of both sexes and 18 years or older were involved in assessing the pattern of toxicity. **Results:** the most common age group was 18 to 29 years (67%). Females represented most cases (63.2%) in comparison to males, and most of the cases were from urban regions (71.4%). Suicide was the most common manner of poisoning (77.5%), the oral route of poisoning represented the highest percentage of cases (88.5%), and most of them were admitted within 2 to 4 hours (44.3%). Pesticides were the commonest substances in studied cases (34%). **Conclusion and recommendations:** strict guidelines for the selling and using of pesticides should be enforced. Patients with suicide attempts should be referred to a psychiatry clinic.

Keywords: Acute poisoning – Pattern - Kasr El-Aini poison center

INTRODUCTION

Acute poisoning is defined as acute exposure (less than 24hrs) to a toxic substance. This exposure may be accidental or suicidal, which may lead to significant morbidity and mortality (Maharani et al., 2013).

Acute poisoning is a common cause of hospitalization. Cases of acute poisoning account for 0.7 to 8.8% of all hospital admissions and 3 to 17% of admissions to intensive care units. In developed countries, the rate of mortality from poisoning is 1 to 2%, while in developing countries, mortality is much higher (Rahim et al., 2016 and Boukatta et al., 2014).

Home is the commonest site of poisoning, irrespective of gender, occupation, type of family, age group, and residence (Vashishtha, 2019).

Causes of poisonous events can be patient use of medicines with or without prescription, iatrogenic administration of high doses of medicines by physicians, accidental exposure to chemical substances, or intentional intake for

suicide (Sungur et al., 2018).

Most cases of poisoning are due to suicide attempts, some are accidentally poisoned, and very few are the result of treatment complications. Attempted suicide cases were more common among females than males (Rasheed et al., 2020). Psychiatric problems, conflicts (family, marital, social), emotional disturbance, and substance abuse were identified as underlying reasons for poisoning (Chelkeba et al., 2018).

In Egypt, poisoning is considered an important public problem. Easy availability of street drugs and cleaning products, wide use of pesticides, and the ignorance of hazards of household products are the main important factors in this problem (Seif et al., 2016).

AIM OF THE WORK

This work aims to study the pattern of acute toxicity among adult patients who are admitted to Kasr Al-Aini National Environmental and Clinical Toxicology and Research Center over six months.

PATIENTS & METHODS

This is a prospective analytical study conducted on patients admitted to Kasr Al-Aini National Environmental and Clinical Toxicology and Research Center (NECTR) for six months (January 2021-June 2021). Both males and females, 18 years old and above, were included after getting the consent to participate in the study. Cases were analyzed regarding (1) Demographic data of the patient: age, sex, residence, marital status, and educational level. (2) Primary data to assess the patient: manner of toxicity, type of poison, place of exposure, route of exposure, amount and form of poison, time of exposure, and duration between exposure and arrival. (3) Past medical history of patients, including medical and psychiatric conditions and history of medication. (4) Data regarding lines of treatment: first aid measures, GIT decontamination, symptomatic treatment, and antidote. (5) Admission, whether the patient needed admission to the ICU, observed for a few hours, or no admission required. (6) Outcome, either improved and discharged, discharged on their responsibility, complicated or died. Statistical Analysis was performed using the appropriate statistical methods according to the type of data. The variables were described in numbers and percentages. Quantitative variables were represented by mean \pm deviation rate. P-value < 0.05 was considered statistically significant. Statistical Package SPSS was used.

RESULTS

This study included 106 patients presented to Kasr Al-Aini National Environmental and Clinical Toxicology and Research Center (NECTR). They were subdivided according to age into three age groups (18-29, 30-40, and >40) and according to sex into male and female.

The mean age was 26.56 ± 9.24 years, with an age range from (18-61 years). The most common age group was from 18 to 29 years (71 patients, 67%), while the least common were patients older than 40 years (10 patients, 9%) (Fig. 1).

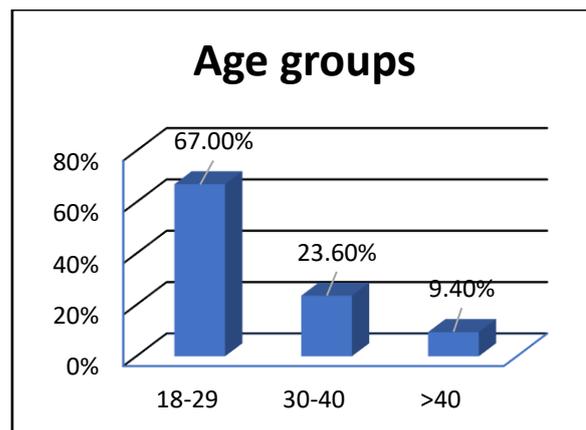


Figure (1): Frequency distribution of age among studied cases.

Females represented 63.2% of the cases (67 patients) with a mean age of 25.06 ± 8.21 years, while (39 patients, 36.8%) were males with a mean age of 29.13 ± 10.40 years. (Fig. 2).

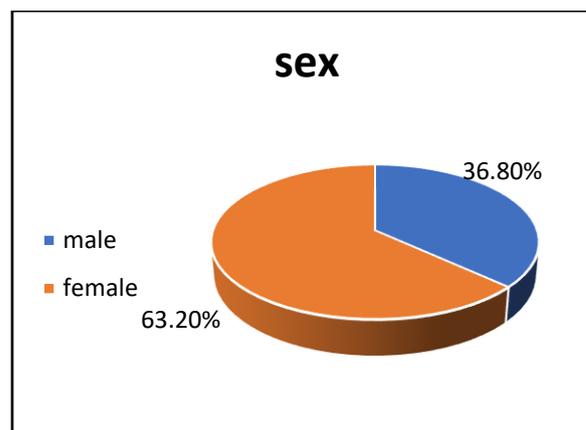


Figure (2): Frequency distribution of studied cases according to sex.

As shown in (Fig. 3), most cases were from urban regions (65 patients, 71.4%), while (26 patients, 28.6%) were from rural regions.

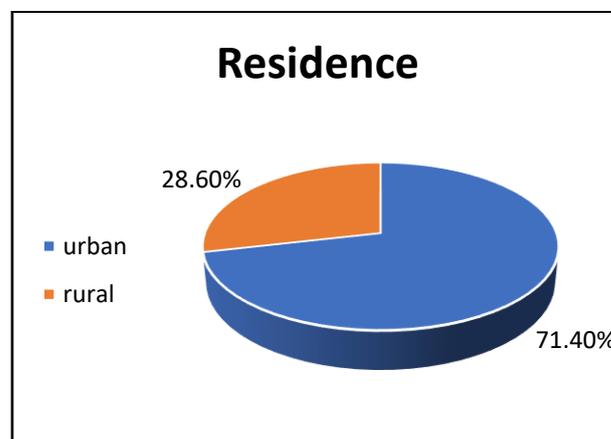


Figure (3): Frequency distribution according to the residence.

According to marital status, single patients represented (51.1% of the studied cases), while married patients represented (48.9%). (Table 1).

Table (1): Frequency distribution of studied group according to marital status.

Marital Status	single	48	51.1%
	married	46	48.9%

Table (2) shows that most of the studied cases had more than 12 years of education (28 cases, 33.7%), followed by patients with 12 years of education (27 cases, 32.5%), and next were cases with less than six years of education (13 cases, 15.7%), then nine years of education (11 cases, 13.3%) and the least were patients with six years of education (4 cases, 4.8%).

Table (2): Frequency distribution of studied group according to education level.

Education	<6 years	13	15.7%
	6 years	4	4.8%
	9 years	11	13.3%
	12 years	27	32.5%
	>12 years	28	33.7%

A large percentage of the studied cases were students (23 cases, 31.9%), followed by patients who were housewives (20 cases, 27.8%), while the least common were pharmacists (one patient, 1.4%) (Table 3).

Table (3): Frequency distribution of studied group according to occupation.

Occupation	Housewife/ stay-at-home	20	27.8%
	Unemployed	10	13.9%
	Nurse	2	2.8%
	Student	23	31.9%
	Farmer	3	4.2%
	Worker	9	12.5%
	Pharmacist	1	1.4%
Businessman	4	5.6%	

The most common manner of poisoning was suicidal (79 patients, 77.5%), followed by accidental intake (22 patients, 21.50%), while the least common manner of poisoning reported was homicidal with only one patient (1%) (Fig. 4).

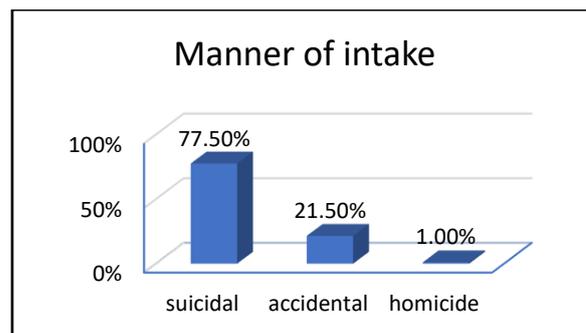


Figure (4): Percentage of cases according to the manner of poisoning.

Most suicidal poisonings were within the age group (18-29 years) (62 patients), twelve patients were between 30 and 40 years old, and only five patients were older than 40 years. This comparison was statistically significant ($P < 0.001$).

The oral route represents the highest percentage of cases (92 patients, 88.5%), followed by the dermal route (8 patients, 7.2%), while the parenteral route was the least (four cases, 3.8%) (Table 4).

Table (4): Frequency distribution of the studied cases according to the route of poisoning.

Route	oral	92	88.5%
	parenteral	4	3.8%
	dermal	8	7.7%

Thirty-nine patients (44.3%) were admitted within 2 to 4 hours, followed by (27 patients, 30.7%) in less than 2 hours, (17 patients, 19.3%) between 4 to 8 hours, and finally, (14 patients, 5.6%) were admitted after the 1st 8 hours of poisoning. (Table 5)

Table (5): Frequency distribution of the studied groups according to the time of hospital admission.

Delay time	less than 2 h	27	30.7%
	2 to 4	39	44.3%
	4 to 8	17	19.3%
	8 to 12	4	4.5%
	more than 12	1	1.1%

Table (6) shows that the oral route was the commonest in both sexes but was significantly higher in females, while the parenteral and dermal routes were commoner in males than females. This comparison was statistically significant ($p = 0.005$). Similar results were obtained regarding the suicidal manner of poisoning, where suicide was most common

among both sexes but was significantly higher ($p < 0.001$) among females (92.1%). The accidental manner was higher in males than females (46.1% versus 6.3%) ($p < 0.001$). Although there was no statistical significance as

regards to delay time ($p = 0.208$), more females presented with a delay time of 2 to 4 hours, and males more often presented to the hospital in less than 2 hours than females.

Table (6): Comparison between males and females as regards route of intake, manner of intake, and delay time in admission.

		sex				p-value
		male		female		
		Count	%	Count	%	
Route	oral	30	76.9%	62	95.4%	0.005*
	parenteral	4	10.3%	0	0.0%	
	dermal	5	12.8%	3	4.6%	
Manner of intake	suicidal	21	53.8%	58	92.1%	< 0.001*
	accidental	18	46.1%	4	6.3%	
	homicide	0	0.0%	1	1.6%	
Delay time	less than 2 h	10	33.3%	17	29.3%	0.208
	2 to 4	11	36.7%	28	48.3%	
	4 to 8	8	26.7%	9	15.5%	
	8 to 12	0	0.0%	4	6.9%	
	more than 12	1	3.3%	0	0.0%	

Acute poisoning due to single drug intake was the commonest among cases (100 cases), whereas 6 cases were due to multiple drug poisoning (Table 7).

Table (7): Frequency distribution of the studied groups according to single versus multiple drug intake.

	Count	%
Single drug	100	94.3%
Multiple drugs	6	5.66%

The most common substances that caused single drug poisoning were pesticides (36 patients, 34%), antipsychotic drugs were the second most common (14 patients, 13.2%), then bronchodilators (10 patients, 9.4%), the least common were antimalarial drugs and thyroid drugs (0.9% each) (Table 8).

Table (8): Frequency distribution of the studied groups with single drug intake.

	Count	%
Antiepileptic drugs	3	2.8%
Antidepressant drugs	4	3.8%
Antipsychotic drugs	14	13.2%
Pesticides	36	34.0%
Animal envenomation	8	7.5%
Substance of Abuse	7	6.6%
Corrosives	4	3.8%

Analgesics	8	7.5%
Bronchodilators	10	9.4%
Cardiovascular drugs	2	1.9%
Oral Hypoglycemic drug	2	1.9%
Thyroid drug	1	0.9%
Antimalarial drug	1	0.9%

As shown in Table (9), a total of 40 cases received supportive care in the form of oxygen, oxygen, and suction, or intubation. Decontamination measures were given to 82 cases. Specific antidote was given to a total of 52 cases according to the cause of acute poisoning, and MDAC was given to 47 patients.

Table (9): Frequency distribution of the studied group according to management received.

		Count	%
Supportive Care	oxygen	38	95.0%
	oxygen and suction	1	2.5%
	intubation	1	2.5%
Decontamination	activated charcoal	71	86.6%
	paraffin oil	1	1.2%
	lavage and 4 Amp. NaHCOH2	6	7.3%
	demulcent	4	4.9%

Antidote	atropine	1	1.9%
	atropine and toxogonin	28	53.8%
	snake antivenom	4	7.7%
	N-Acetylcysteine	10	19.2%
	naloxone	4	7.7%
	scorpion antivenom	4	7.7%
	dextrose	1	1.9%
MDAC (multiple-dose activated charcoal)	yes	47	44.3%
	no	59	55.7%

Most of the studied cases were discharged upon request of their families (63 patients, 59.4%), while (43 patients, 40.6%) were discharged after improvement (Fig. 5).

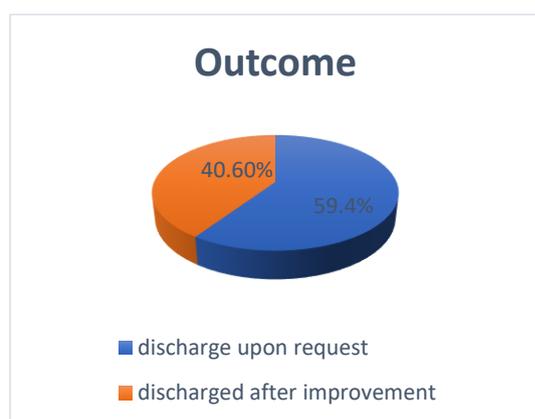


Figure (5): % of cases according to the outcome of management.

DISCUSSION

Acute poisoning is a medical emergency. It is important to know the nature, severity, and outcome of acute poisoning cases to do appropriate planning, prevention, and management actions (Resiere et al.; 2020).

Poisoning is reported to be the 7th leading cause of death and the 10th leading topic for the burden of diseases in low- and middle-income countries of Europe, Africa, and central Asia. (Manini et al.; 2011).

Poisoning is an incident in which the body absorbs a substance, through inhalation, injection, ingestion, or skin exposure, in amounts that cause toxic symptoms, damage to the body, and sometimes threaten life. The poisoning incidence varies based on geographical and cultural characteristics (Hitti

et al.; 2020).

This study was carried out to focus on the pattern of acute poisoning among adult patients admitted to Kasr Al-Aini National Environmental and Clinical Toxicology and Research Center (NECTR). It is a prospective cross-sectional analytical study that included 106 patients for six months.

The study revealed that the mean age of cases was 26.56±9.24 years, with ages ranging from 18 to 61 years. This result was consistent with a study in Ethiopia that showed a median age of 25.5 years (Adinew et al.; 2017) and another study conducted in Morocco that showed a median age of 26.26 years (Boukatta et al.; 2014).

This study also showed that the most common age group was from 18 to 29 years, while the least common was >40 years. This was consistent with results from a study in India, where most cases were between 21 to 30 years (Guntheti & Laxman; 2020).

Regarding gender, poisoning was higher in female patients (63.2%) than in male patients (36.8%). This was consistent with a study conducted in Lebanon, where female patients represented 60.2% of the studied cases (Hitti et al.; 2020). Other studies in developing countries revealed that acute poisoning is more common in females with a higher incidence of suicide due to cultural malpractices against them (Gebremariam et al., 2016 and Chelkeba et al., 2018).

The distribution of toxicity cases in the present study showed that most of the cases were from urban regions (71.4%), while 28.6% were from rural regions. This was as per two studies, one in Ethiopia, where toxicity cases in urban areas were higher compared to rural areas (65%, 35% respectively) (Getie & Belayneh; 2020); and the other conducted in Ain shams University, where urban residence was higher (56%). This might be explained by the easy accessibility of poison centers to urban residents (Abd El Al et al.; 2016).

The present study showed that patients with more than 12 years of education were more common (33.7%) than patients with only six years of education (4.8%). This agrees with a study by Muhammad et al. (2020) where patients with graduate education were a majority. While another study found that most patients with acute poisoning were illiterate (59.2%), followed by primary and secondary school students, than those in higher levels of

education (Wakushie et al., 2016).

A large percentage of the studied cases were students (31.9%), followed by housewives (27.8%), and the least common were pharmacists (1.4%). A study by Acherjya et al. (2020) reported that most patients were students (48.9%). This can be explained in terms of occupational attributes and socio-economic status that can affect the victims negatively (Chatterjee et al., 2020 and Chelkeba et al., 2018).

The most common **manner of poisoning** in this study was suicide (77.5%), followed by accident incidents (21.50%), while the least common was homicide with only one patient (1%). This was consistent with the results of a study at the University Hospital of Martinique, where the suicidal manner of toxicity accounted for the highest percentage of poisoning (Resiere et al.; 2020).

Furthermore, most **suicidal poisonings** were within the age group of 18 to 29 years (58.5%), which is similar to the results of a study at Menoufia University, where the most common age group in these cases was within 15 to 25 years (Hegazy & Elfiky; 2016).

This study showed that the commonest **route** of exposure was the oral route (88.5%), which was significantly higher in females than males, while the parenteral and dermal routes were more common in males ($p=0.005$). This was consistent with (Koylu et al.; 2014) and (Getie & Belayneh; 2020), where the oral route was (86.9%) and (92.5%) respectively. This can be explained by the easy way of drug intake by mouth and the ability to ingest the poison without assistance. This follows that reported by Adinew et al. (2017), who found that oral ingestion was the most preferred (88.9%).

As for the **time of hospital admission**, (44.3%) were admitted within 2 to 4 hours, followed by (30.7%) in less than 2 hours, (19.3%) between 4 to 8 hours, and finally, (5.6%) were admitted after the first 8 hours of poisoning. Although there was no statistical significance regarding delayed time ($p=0.208$), more females presented with a delay time of 2 to 4 hours, and males more often presented to the hospital in less than 2 hours. This agrees with Getie & Belayneh (2020), where cases admitted to the hospital within 2 to 4 hours of poisoning represented (50.8%) followed by those within 2 hours of poisoning (27.5%) and after 4 hours (21.7%). Also, according to Adinew et al. (2017), most cases (90%) reached

the hospital within 2 hours of ingestion, that's because most of the patients in this study were from urban regions with better accessibility to poison centers.

Single drug ingestion was most common among cases (94.3%), whereas only (5.7%) were due to multiple drug poisoning. This was like results in Turkey (53.25%) (Sungur et al.; 2018) and Romania (65.88%) (Sorodoc et al.; 2011), where most of the cases were due to single drug intake. In contrast, a study in Paris revealed that multidrug poisoning was more common (Beaune et al.; 2016).

The commonest substances that caused single drug poisoning were pesticides (34%), while pharmaceuticals such as antipsychotic drugs, antidepressants, antiepileptics, analgesics, and bronchodilators were less common. This was consistent with a study from Morocco where pesticide toxicity was more prevalent than medications (64.17% and 22.38%, respectively). The prevalence of pesticides can be explained by their wide use and availability and the economic status of the region, which is mainly agricultural (Boukatta et al.; 2014). This contrasted with a study in Turkey where pharmaceuticals were more common than pesticides (68% versus 9.3%) (Avsarogullari et al.; 2012) and a study in Taiwan where drugs were more common (49.9%) than pesticides (14.5%) (Lee et al.; 2008).

Regarding the outcome of admitted cases, all patients involved in this study were discharged, most of them upon request of their families (59.4%), while (40.6%) were discharged after improvement. In contrast, a study by Hegazy & Elfiky (2016) showed that only (83%) of cases improved while (3%) died. Another study by Mostafa et al. (2014) showed that while most patients were discharged after complete recovery (92.2%), 7.1% were discharged against medical advice, 0.4% died, and 0.3% were transferred to another department.

CONCLUSION & RECOMMENDATIONS

All physicians should be well informed of the indications, dose, adverse effects, and toxicity of different drugs. As pesticides are the most common substance causing acute toxicity, strict regulations regarding the import, sale and use of pesticides should be implemented, especially in agricultural governorates. Accessibility to poison control centers and

treatment protocols in various hospitals around the country will help in early management and improve the outcome for patients. Further studies are necessary to collect more data, which will help determine risk factors of acute poisoning, and develop education and prevention programs.

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المخلص العربي

تقييم نمط التسمم الحاد لدى المرضى البالغين في المركز القومي للسموم الإكلينيكية والبيئية بقصر العيني في مدة 6 أشهر

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التسمم الحاد هو التعرض لمادة سامة خلال فترة زمنية قصيرة، ويعتبر حالة طبية طارئة، ويمكن أن يحدث بشكل عرضي أو لمحاولة الإنتحار، ويتسبب وفقا لمنظمة الصحة العالمية في وفاة نحو مليون شخص حول العالم. تم اجراء هذه لدراسة لتحديد نمط التسمم الحاد بين المرضى البالغين ممن تم دخولهم إلى المركز القومي للسموم الإكلينيكية والبيئية بقصر العيني. أجريت هذه الدراسة الإستباقية على 106 مرضى، وكانت الفئة العمرية الأكثر شيوعا من 18 إلى 29 عاما (67%)، وشكلت الإناث غالبية الحالات (63.2%)، وكانت معظم الحالات من المناطق الحضرية (71.4%)، ونسبة الطلاب (31.9%)، ومن حصلوا على تعليم لأكثر من 12 عاما (33.7%). كان أكثر أنواع التسمم شيوعا هو الإنتحار (77.5%)، وغالبية الحالات عن طريق الإبتلاع (88.5%)، وتم دخول (44.3%) من المصابين خلال 2 – 4 ساعات، وتبين أن أكثر المواد السامة شيوعا بين الحالات المدروسة هي المبيدات الحشرية (34%). تلقى (37.7%) من الحالات رعاية داعمة، وتمت إجراءات إزالة التلوث في (77.3%) من الحالات، وإعطاء ترياق محدد في (49%)، وإعطاء جرعات متعددة من الفحم المنشط في (44.3%) من الحالات. وقد خرج (59.4%) من الحالات بناء على طلبهم، وخرج (40.3%) من الحالات بعد تمام الشفاء.