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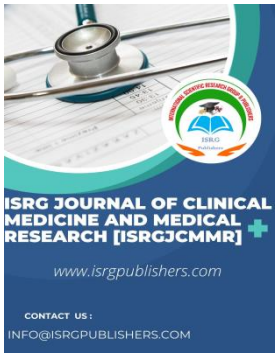

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Acute drug poisoning among children attending a pediatric emergency department in Tishreen University Hospital

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Abstract

Background: *Poisoning is considered a public health problem and one of the leading causes of global mortality, morbidity and health costs.* ***Objective:*** *The aim of this study was to evaluate the prevalence of pharmacological poisoning in children, as well as final outcome of patients.* ***Materials and Methods:*** *A cross-sectional descriptive analytic study was conducted for the period one year (January 2022 – December 2022) at Tishreen University Hospital in Lattakia-Syria. The study included all children attending emergency department that care of children with a history of acute poisoning by drugs.* ***Results:*** *A total of 228 children with a history of poisoning were analyzed, 105(46.1%) patients were with acute drug poisoning. The mean age was 3.24±2.1 years, and the most frequent age group was 1-4 year (81.9%). Males constitute 49.5% of the study sample and females 50.5%. Respiratory drugs represented the most frequent involved drugs(21%), followed by psychotropic(17.1%) and cardiovascular drugs(10.5%). 93.3% of the cases were exposed to the factor unintentionally, and 39% of the accidents were occurred in the morning period according to the exposure time. Exposure to the factor was through the gastrointestinal tract in 100 cases(95.2%), and approximately half of the cases were in winter season without taking any intervention by parents in 95 cases(90.5%). On admission, circulatory and neurological symptoms represented the most frequent symptoms on average 13.3% and 11.4% respectively. There were many emergency procedures conducted for management of children including: gastric lavage(74.3%), activated charcoal(57.1%) and antidote(10.5%). The number of hospital admissions related to poisoning was 32 cases(30.5%).*

Conclusion: *There is an important prevalence of unintentional poisoning in our health center, so that taking prevention strategies for poisoning is considered crucial to improve final outcome.*

Keywords: *Children, pharmacological, poisoning, prevalence, Syria*

1. Introduction

Poisoning is defined as injury that results from exposure to harmful exogenous substance which can damage human body[1,2,3]. Acute pharmacological poisoning is a clinical condition that occurs due to the exposure to one overdose of drug or multiple doses in less than 24 hours[4,5,6]. There is potential for poison exposures during all stages of child life, and most cases that occur in children younger than ten years are unintentional, whereas suicide attempts were observed more frequently in older children and adolescents[7,8,9,10]. There are many risk factors that may contribute to the risk of poisoning, and exploration of surrounding environment places children to the risk of poisoning especially in younger than three years[11]. In addition to, children are at greater

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risk of acute poisoning that results from medication errors[12,13]. Poisoning is considered an important problem that is associated with significant mortality in low-and middle-income countries compared to high-income groups. An annual incidence is estimated to be approximately 1 million worldwide, and might be considerably higher due to underreporting of all cases[14,15]. According to the CDC childhood injury report, prevalence of poisoning is 38% in children younger than 6 years and 8% in adulthood[16]. Poisoning is the 4th leading cause of preventable injury related death after motor vehicle traffic, drowning, and asphyxia. It is a predictable and preventable event like other injuries, so that primary prevention by taking all of the activities to prevent a poisoning from occurring is considered crucial[17,18]. The aims of this study were:1- to investigate the prevalence of pharmacologic poisoning in children compared to other types .2- detecting the most frequent responsible drugs, 3- clinical course and final outcome of patients.

2. Patients and Methods

2.1 Study Population

After approval by local research ethics committee, a descriptive - observational and cross-sectional study was conducted in children attending emergency department at Tishreen University Hospital over a period of one year (January 2022 – December 2022) with definitive history of acute poisoning. Complete history including age, sex, interval between exposure and attending hospital, medication types, methods of exposure, season of poisoning, and intervention was undertaken by family were recorded. At hospital, review of systems and physical examination were performed with initiating appropriate emergency intervention

2.2 Statistical Analysis

Statistical analysis was performed by using IBM SPSS version20. Basic Descriptive statistics included means, standard deviations(SD), median, Frequency and percentages.

1. Results

A total of 228 cases of acute poisoning were attending pediatric emergency department during a period of one year. Patients were divided according to the types of poisoning as follows: pharmacologic in 105 cases(46.1%) and non-drug poisoning in 123 cases(53.9%). The baseline characteristics of patients in pharmacologic group were as shown in Table (1). 52 (49.5%) of the study participants were males and 53 (50.5%) were females. Ages ranged from 1 to 14 years (mean 3.24±2.1 years) and age group 1-4 years represented the most frequent group(81.9%), followed by 5-9(15.2%) and 10-14 years(2.9%). Respiratory, psychotropic, and cardiovascular drugs were the most common medication involved in poisoning incidents on average 21%,17.1% and 10.5% respectively. Other drugs included were analgesics(9.5%), hormonal(8.6%), vitamins(6.6%), antihistamine(5.7%), gastrointestinal(5.7%), iron(3.8%), anti-cholinergic(0.9%), lidocaine(0.9%), and other pharmaceuticals (9.5%).

Table 1 Demographic characteristics of the study population

Variables	Results
Age (years)	3.24±2.1(1-14)
Age group (n,%) 1-4 5-9 10-14	 86(81.9%) 16(15.2%) 3(2.9%)
Sex(n,%)	
Male	52(49.5%)
Female	53(50.5%)
List of poisoning medications	
Respiratory	22(21%)
Psychotropic	18(17.1%)
Cardiovascular	11(10.5%)
Analgesics	10(9.5%)
Hormonal	9(8.6%)
Vitamins	7(6.6%)
Antihistamine	6(5.7%)
Gastrointestinal	6(5.7%)
Iron	4(3.8%)
Anti-cholinergic	1(0.9%)
Lidocaine	1(0.9%)
Others	10(9.5%)

As shown in table 2, ingestion represented the main route of entry(95.2%), followed by intravenous injection(2.9%) and intramuscular(1.9%). Approximately half of the cases occurred in winter(52 cases), followed by summer(21 cases), fall(19 cases) and spring(13 cases). The highest rate of exposure was seen in the morning period(39%), followed by noon(31.4%),evening(25.7%) and afternoon(3.8%). Majority of poisonings in children were unintentional(93.3%), followed by therapeutic errors(4.8%) and suicidal attempts(1.9%).

Table 2 characteristics of poisoning types of the study population

Variables	Results
Route of poisoning	
Ingestion 6	100(95.2%)
Venous	3(2.9%)
Intramuscular	2(1.9%)
Season of exposure	
Winter	52(49.5%)
Summer	21(20%)
Fall	19(18.1%)
Spring	13(12.4%)
Time of exposure	
Morning	41(39%)
Noon	33(31.4%)
Afternoon	4(3.8%)
Evening	27(25.7%)
Etiology of poisoning	
Unintentional	98(93.3%)
Therapeutic errors	5(4.8%)
Suicidal exposure	2(1.9%)

Emesis induction was performed in 10 cases(9.5%) at home without undertaking any intervention for the remaining cases(90.5%). Interval between taking drug and arrival to hospital was one hour in majority of cases. Poisoning affected many parts of the body and symptoms related to circulatory system represented the most frequent features(13.3%), followed by neurological(11.4%), gastrointestinal (4.8%),respiratory (3.8%)with presence of combined symptoms in 6 cases(5.7%). According to the treatment methods that applied for patients, gastric lavage was performed in 78 cases(74.3%), 60 patients (57.1%) had activated charcoal and 11 cases(10.5%) received antidote. The need for hospitalization was recorded in 32 cases(30.5%).

Table 3 Clinical features and management of the study population on arrival at hospital

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Variables	Results
Clinical manifestations	
Circulatory	14(13.3%)
Neurological	12(11.4%)
Gastrointestinal	5(4.8%)
Respiratory	4(3.8%)
Combined	6(5.7%)
Emergency interventions	
Gastric lavage	78(74.3%)
Activated charcoal	60(57.1%)
Antidote	11(10.5%)
Need for hospitalization	.
Present	32(30.5%)
Absent	73(69.5%)

1. Discussion

This is cross-sectional descriptive analytic study in all children with proven history of acute poisoning attending pediatric emergency department during one year, in which 46.1% of them were acute pharmacologic. Current study showed the main findings: patients were of a wide range of ages and 50.5% of them were females. This finding is in agreement with Berta et al(19), Yura et al(20), Sultan et al(21), Tharwat et al(22) and Sabiha et al(23).On the other hand, Zaher et(24) and Abd Elhaleem et al(25) demonstrated that poisoning was more frequent in males which might be explained by gross motor activity in males and tending for exploration surrounding environment. Peak poisoning frequency occurs in the age group 1-4 years, and this is in agreement with Sultan et al(21), Tharwat et al(22),Zaher et(24) and Sabiha et al(23). Interval between exposure to drug and attend to hospital was one hour in majority of patients in the current study, whereas interval was 4.7 hours in the study of Tharwat et al(22) and 3 hours in Sultan et al(21). Respiratory drugs represented the most frequent group of drugs that lead to poisoning, followed by psychotropic and cardiovascular. In contrast to the current study, non-opioid analgesics represented the most frequent etiology of pharmacologic poisoning in the studies of Sultan et al(21), Tharwat et al(22),Zaher et(24),Berta et al(19) and Abd Elhaleem et al(25). Gastrointestinal system was the most common route of entry the factor, followed by intravenous and intramuscular injection, and this finding is in agreement with Sultan et al(21), Tharwat et al(22), and Sabiha et al(23).Poisoning occurred more frequently in winter and lower incidence was in spring which might be related to high prevalence of respiratory diseases and need for bronchodilator drugs which constitute the highest percentage that lead to poisoning. Abd Elhaleem et al(25) found that peak poisoning frequency occurred in fall(37.8%) and lower occurrence was in winter(18.9%), whereas distribution according to seasons was similar in the study of Zaher et al(24). There was an agreement between the current analysis and the study of Zaher et al(24) regarding etiology of poisoning in which unintentional exposure represented the most common cause, followed by therapeutic errors that result from errors in detecting proper doses according to child weight or errors in drug dispensing, and suicide attempts. This findings might be explained by cultural and social status in our country with the ability for buying drugs without prescription. No intervention was undertaken by parents in majority of cases with induction of emesis in limited cases, and this is in agreement with the study of Berta et al(19). Children were symptomatic in 39% of the cases, cardiovascular and neurological symptoms represented the highest rate, followed by combined symptoms, gastrointestinal and respiratory symptoms. Zaher et al(24) demonstrated that respiratory, combined and neurological were the most frequent clinical features. In contrast to the current study, Sabiha et al(23) showed that majority of the cases were symptomatic and gastrointestinal symptoms represented the most common features. Need for hospital stay was recorded in 30.5% of the cases, in which 3.8% of them were in intensive care unit. Low acuity hospital admissions might be related to shorter interval between poisoning and presenting to hospital with initiating an emergency interventions. Finally, there were many emergency procedures that performed for patients such as gastric lavage, administration of activated charcoal and antidote. Abd Elhaleem et al(25) demonstrated that gastric lavage was performed in 64.4% and administration of antidote in 18.9%.

2. Conclusion

In summary, it is essential to take in consideration importance of prevention strategies of poisoning, in which education is considered the most relevant to the pediatric health care provider without any delay in demanding doctor consultation in presence of suspicion of poisoning and importance of product engineering in safe forms.

Declaration:

Competing of Interests:
All the authors do not have any possible conflicts of interest.

Ethical Consideration
After discussing the study with the parents, all of them gave complete and clear informed consent to participate in the study.

Availability of data and materials
Most of the data was in the article, and other data can be asked from the corresponding author.

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