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Pattern of Pediatric Toxicity in Saudi Arabia-Eastern Province (Incidence, Demographics and Predisposing Factors)

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Abstract

Childhood poisoning is a major cause of morbidity in both developing and developed countries. In spite of the success of some interventions to prevent accidental poisoning in the pediatric population, toxic ingestions continue to be a common occurrence. The purpose of this study was to shed light on the problem of accidental poisoning among children, to determine the factors related to accidental poisoning by the most common medications and household agents in poisoned patients who were visited a pediatric ER department. A prospective study was conducted in the period from January 2011 until December 2013 at the Dammam Maternal and Child Hospital. The studied children were a mix of boys and girls, did not suffer from any mental disabilities, were aged below 15 years old, and were of variable nationalities. The findings of the study demonstrated that the most common toxic presentation in the reported cases were medications toxicity exposure (63.2%) followed by pesticides toxic exposures (16.3%). Acetaminophen exposure represents the most common toxic forum of medication exposures (27.6%). Age from 1-7 year is the most common vulnerable age of toxicity (74.8%). The most common pharmaceutical preparation involved in the toxic presentation was tablets and syrup forum 41.7% and 20.7% respectively. From the studied cases 64.5% of the reported cases were asymptomatic toxic presentation, and on the opposite site 6% were suffered from acute severe consciousness disturbance "Glasgow Coma Scale was less than 8". Effective health promotion programs for parents and careers regarding poisoning hazards are needed to increase awareness and reduce the incidence of poisoning among children.

Keywords: Poisoning; Children; Incidence; Saudi Arabia

Introduction

The incidence of acute poisoning in both developed and developing countries is increasing all over the world during the last few years. This makes the problem of childhood poisoning very likely to get much worse [1].

Acute poisoning in children is still an important public health problem and represents a frequent cause of admission in emergency units. Homes are the place meant to be safe and secure. However, home accidents are the most frequent causes of injury. This gives the impression that homes are not so safe as one may think [2].

Low social standard and high social mobility increase the likehood of accidental poisoning since safe keeping of toxic preparations is not followed, parents are likely to be less knowledgeable about the risks, supervision may be less strict and in disturbed families hunger may be stimulus to ingestion of harmful substances [3].

The epidemimiological surveillance specific for each country is necessary to determine the extent and characteristics of the problem, according to which related preventive measures can be taken [4].

Accidental poisoning in the children is a complex interaction between the child, a hazardous substance and certain environmental factors. Negligence of parents or caretakers can cause an accidents and poisoning in children, which may be of fatal consequences to the child [5,6].

The purpose of this study was to shed light on the problem of accidental poisoning among children, to determine the factors related to accidental poisoning by the most common medications and household agents and finally to describe the epidemiology, pattern, severity of poisoning and the results of treatment of poisoned patients who were visited a pediatric section in Dammam Maternal and Child Hospital.

Subjects and Methods

Study setting

This work was conducted as a prospective (Electronic medical Review) EMR database review study analysis of all acute poisoning and accident cases, who were visited and/or admitted in PICU and or children ward of Dammam MCH with referral sample and electronic consultation at Dammam Regional Poison Control Center-Eastern Region, KSA.

Inclusion and exclusion criteria

Pediatric patients less than 15 years old for suspected toxicity in (Dammam MCH) that were in a three year-long period from the beginning of January 2011 until the end of December 2013. Acute food poisoning patient were excluded from research group

Study population parameters

All clinical reported data and laboratory and non-laboratory Investigations were noted down important and detailed information of all the patients, like their age, sex, nationality, time of poisoning, date of poisoning, route of poisoning, form of poisoning category of poisoning as well as type of medications.

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Grouping of the studied patients

The studied cases were divided into 3 groups according to the age of the studied cases as follows:

Group A: less than one year

Group B: from one to less than seven years «Age of discrimination".

Group C: from seven to less than fifteen years.

Electronic Medical Records Review Process

Three reviewers conducted the entire review process. Taking the help of individual patient record, the child Online Toxicology Analytical Request and Result "OTARR" electronic records were accessed by way of medical record number access into the EMR. Predefined data points fed into a standard type Excel worksheet was set up on a share drive that was password protected which was to be used by ever single reviewer in order to get abstraction of data.

Then every patient was reviewed on an independent basis to be reviewed for agreement purpose followed by checks carried out by the third reviewer to see if there were still any other discrepancies identified. Data extractors had to have total agreement amongst themselves.

The study was approved by Medical Ethics Committee of the Dammam Regional Poison Control Center.

Statistical Analysis

There was a statistical analysis of the entire data with help of the present SPSS statistical package Version 19.0. Chi square, Pearson correlation analysis and variance analysis were employed in the analysis of the data. This data was further presented as mean ± Standard Deviation (SD). Approval of local ethical committee was obtained related with this research.

Results

The current work comprised of 1272 pediatric patients (673 males and 139 females with age SD: 3.9 ± 3.6 years). During the same period a total 5838 case were referred to Dammam Regional Poisoning Control Center for toxicological consultations and investigations. So the pediatric toxicity represents more than 1/5 of the total toxicological emergencies received by Dammam Regional Poisoning Control Center (Table 1).

The most common toxic presentation in the reported cases were medication toxicity exposure (63.2%) followed by pesticides toxic exposures (16.3%). Acetaminophen exposure represents the most common toxic forum of medication exposures (27.6%) (Table 2, Figure 1).

Age from 1-7 year is the most common vulnerable age of toxicity (74.8%). Regarding nationality, Saudi children consumed the most common toxic presentation (89.9%). To refer the diurnal and nocturnal pattern of presentation the peak of toxic presentation was started at 1 pm to 11 pm (Table 1, Figures 1 and 2).

The most common pharmaceutical preparation involved in the toxic presentation was tablets and syrup forums 41.7% and 20.7% respectively. From all studied cases a 64.5 % of the reported cases were asymptomatic toxic presentation, and on the opposite site 6% were suffered from acute severe consciousness disturbance «Glasgow Coma Scale was less than 8» (Figure 3).

Summer months showed a significant increase in the number of the presenting samples than winter months. The most presenting

Age mean ± SD	3.9 ± 3.6 years	
Age Category	**No**	**%**
Less Than One Year	58	4.6
From One to less than Seven Years	952	74.8
From Seven to less than Fifteen Years	262	20.6
Sex		
Male	673	52.9
Female	599	47.1
Nationality		
Saudi	1143	89.8
Non-Saudi	129	10.2
Admission Status		
Admitted	720	56.6
Non-admitted	552	43.4
Degree of toxicity		
No Toxicity	821	65
Mild Degree of Toxicity	207	16.3
Moderate Degree of Toxicity	186	14.7
Severe Degree of Toxicity	58	4

Table 1: Demographic and medical assessment characters of the studied cases.

Parameter	**No**	**%**
Poison Type		
Drug Medications	333	63.2
Substance of abuse	20	3.8
Pesticides	86	16.3
Metals	4	0.8
Caustics	2	0.4
Gases	1	0.2
Perfumes	12	2.3
Hydrocarbon ingestions	9	1.7
Herbal medications	4	0.8
Unknown	56	10.6
Type of Pesticides		
Organophosphate Poisoning	41	48.2
Permethrin and Pyrethroid Poisoning	15	17.6
Warfain Poisoning	29	34.1

Table 2: Percentage distribution of variable toxic agents.

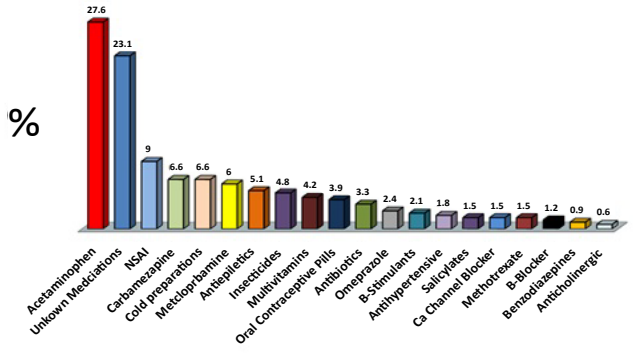

Figure 1: Percentage distribution of variable medications from exposure toxicities in the studied cases.

symptoms in the current research were GIT upset vomiting (24.9%) and abdominal (pain 10.3%), followed by neurological disturbances, convulsion (12.3%) and Irritability (8.6%). As regard to interval between the time of poisoning and arrival time to the ER was 3.7 ± 3.4 hours (Figures 4 and 5).

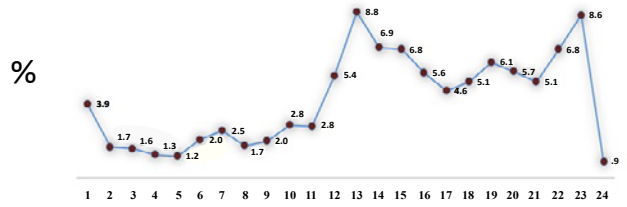

Figure 2: Pediatric case presentation percentage over the daily 24 hours.

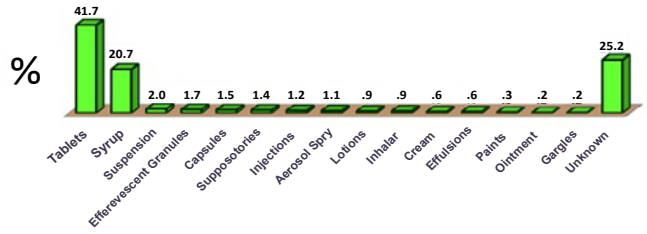

Figure 3: Variable pharmaceutical preparations forms in the studied toxic cases.

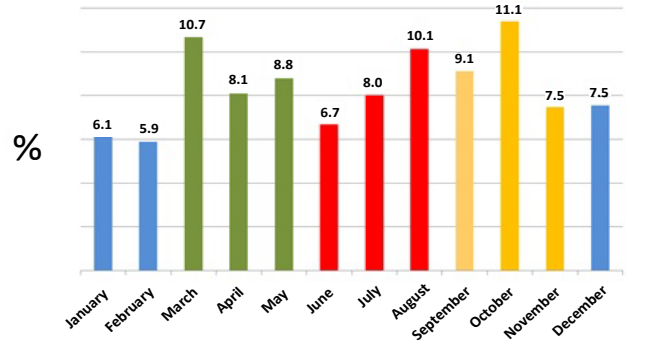

Figure 4: Monthly distribution of pediatric case presentation.

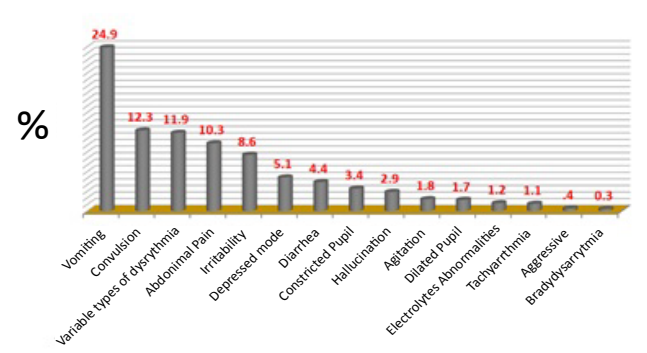

Figure 5: Percentage of symptomatic presentation in the studied pediatric cases.

Discussion

In the current research about 1272 pediatric case consultation were received over 3 year period from overall number 5838 case toxicological consultation reports.

Acute poisoning is one of the critical causes of ER admissions. Detection and reporting of epidemiological aspects were consisted of great concern to line the strategy of prevention and treatment measures. Dammam Maternal and Child Hospital is the biggest hospital in Dammam City. In this study, the mean age in the studied cases was 3.9 ± 3.6 year, on contrast with our result; there was a low mean age from the current research as research done by Kheja [7] who found the mean age in male and female percentage were 2.97 ± 3.33 and 2.86 ± 2.69. Add to this report another higher mean age then reported in the current research were found in the study done by Sabiha [8] who reported the mean age of the studied children were 5.35 ± 3.1. The variance by increase or decrease from the current research in the mean age may be attributed to small sample size of the comparative research as 147 and 218 reported cases respectively. In this age less than four years old, putting small foreign objects like drugs into mouth by children can cause poisoning.

The most common form of pediatric toxic exposure was adult medication exposure in concise with the previous mention results Burghardt et al. [6] who clarified that adult medication exposures were significantly associated with exposures and poisoning in children of all ages. Across, medications, the greatest risk was among children 0-5 years old. Hypoglycaemics and B-blockers were highest events (60.1% and 35.2%, respectively). Also, same conclusion were detected by Khajeh et al., and Sabiha et al., who represent the incidence of medication toxicity in their published research as (37.4%, 48.4%) [7,8]. On the opposite site to our finding Raed et al., found in their study in Alexandria-Egypt, is the most common form of poisoning in pediatric cases was household poisoning 60.2% in comparison to adult medication poisoning 23.4% [9]. Paracetamol was the most common drugs. This is may be due to the publicity of the drug between all family members and placing the drug in easily accessible places.

In this study the percentage of male/female ratio was 1.2. Andrian and Sarikayalar detect that in 489 poisoning cases were more frequent in male especially in age group less than 10 years. Similar finding have been reported from developed and developing countries [10].

In the current study; about 66% were non-toxic or mild toxic exposure status. In oppsite of our results Al-Hazmi reported in his study of accidental toxic exposure in the children of Jeddah city; he found that only about 7% of the studied cases were reported as nontoxic exposure while 93% were admitted as toxic exposure in a period between January 1994 to December 1996. We may attributed the difference between two figures may be attributed to filtration of cases severity by primary health unit before transfer to secondary care hospital in Dammam and Jeddah.

As in the literature, our research revealed that the most common (75.5%) route was the ingestion of poison. Non-steroidal anti-inflammatory, one of the common modalities in the treatment of painful complains and hyperthermia was the second common cause of drug related poisonings. Also the most presenting symptoms in the current research were GIT upset vomiting (24.9%). The previous mentions results were in a harmony with multiple research results [11-14].

Conclusion and Recommendations

Small children are curious; they explore everything and put it in mouth; so all medicine or poisons should be put in cupboard lock up. Accidental poisoning is common in the pediatric age group. Poison

and medicine should not be put together in same place/self. Small infants should not be left unattended. Parents and the teacher should understand psychology of the child and behave accordingly. Also, the magnitude of the problem of accidental poisoning all over KSA should be studied on a national basis. Finally; the use of warning Design Label on dangerous substances, which should be on national basis and children should be warred and educated not to touch.

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Conflict of Interest

Ahmed R. Ragab and Maha K. Al-Mazroua, declare no conflict of interest.

Compliance with Ethics Guidelines

This article does not contain any studies with human or animal subjects performed by any of the authors.

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