Acute Accidental Poisoning in Children Admitted to Child's Central Teaching Hospital in Baghdad

Mohammed Habib Abdul-Hamed ,Raed Yeihya Salman, Mohammed Ali Mohammed

ABSTRACT:

BACKGROUND:

Poisoning defined as any substance causing a harmful effect when administrated accidently. Acute accidental poisoning is important medical emergency in children worldwide.

OBJECTIVE:

To determine the pattern of accidental poisoning in children, the association between accidental poisoning with gender and residence and to determine the clinical presentation and outcome of each poison.

METHODS:

A prospective study was carried out in Childs Central teaching hospital in Baghdad for all children bellow ten years with history of accidental poisoning during six months period Data including: age, gender, residence, type of poisoning, presenting symptoms, and outcome were studied.

RESULTS:

Total number of children admitted were 10280 cases, of these 250 cases were presented with history of accidental poisoning, accounting for (2.43%) of total cases admitted. Most of patients (93.2%) were within age group of 1-5years.Males to females ratio was (1.27:1).Most common poison was hydrocarbons(50.8%) followed by medications(31.2%) .Most of patients were from urban backgrounds(78.0%).Vomiting was the most common clinical presentation(28.8%). (80.0%) Patients discharged from emergency reception within 24 hours .The mortality rates were (0.8%) .

CONCLUSION:

Poisoning in children are well recognized problem and affecting large number of children. The mortality rate was low.

KEY WORDS : acute accidental poisoning , poisoning in children

INTRODUCTION:

Poisons can be defined as any substance that causes a harmful effect when administrated either by accident or by design, to a living organism [1]. Toxicology is a branch of science that deals with poisons; any substance can be harmful at some doses but at the same time being without harmful effect at some lower doses. Between these two limits there is a range of possible effect, from subtle long term chronic toxicity to immediate lethality.[2,3]

According to WHO acute poisoning are on the fourth place of the lists of morbidity and mortality of children[4,5,6,7]. Poisoning is most commonly observed at 1-5 years of age and these children constitute about 80% of all poisoning cases[8,9]. More than 90% of toxic exposure occur at in the home and mostly involve only single substance. [10]. According to the 2004 world health report, it is estimated that 350,000 people died from unintentional poisoning [11].

Child's Central Teaching Hospital in Baghdad.

Agents used in accidental poisoning:

Children exposed to hydrocarbons either by ingestion, inhalation or having contact with the skin [12]. Ingestion rarely more than (10 ml) but as little as (2 ml) can cause severe chemical pneumonitis [13]. Exposure to plants or ingestion of plant parts(leaves, seeds and flowers) result in either no toxicity or mild self limiting effect [10] The most commonly used insecticides are organophosphate and carbamate, both of them are cholinesterase enzyme inhibitors [12] Many of patients presenting with rodenticides ingestion are children who ingest such substances unintentionally [14] . Caustics include acid and alkali as well as a few common oxidizing agents. Strong acids can produce severe injury even in small amount ingestion. Agents of a PH of <2 or

>12 are most likely to produce significant injury. [10] The Medications are the most common accidental poisoning in childhood, it includes paracetamol poisoning, aspirin poisoning, opiates poisoning, tricyclic anti depressant poisoning, iron poisoning, cough, cold, and allergic preparations poisoning, antihypertensive drug poisoning and anticonvalsant poisoning. [15]

This study aimed to determine the pattern of accidental poisoning in pediatric age groups. Quantifying the rate of intoxication among children. Delineate the association between accidental poisoning and the followings: sex, residence .Determine the clinical presentation and outcome of each poisoning.

PATIENTS AND METHODS:

A prospective study of descriptive type. The study was carried out in Childs' Central Teaching Hospital in Baghdad city on the patients admitted to the Emergency Department for period of six months extending from 1st June 2013 to the 1st December 2013.

All patient under 10 years who visit the emergency department with history of accidental exposure to toxic substances were included in the study.

During this period 250 cases were included, the age, sex, residence, type of poisoning, presenting symptoms, progression of signs and symptoms,and outcome with period of admission were studied.

Statistical Analysis:

Statistical package for social sciences-version 20 (SPSS v.20) was used for data input and analysis. All P values two sided. Findings with P value <0.05 were considered significant.

RESULTS:

The total number of children admitted to emergency department at Central Childs' Teaching hospital of pediatrics in Baghdad were 10280 patients for 6 months period extending from 1st June 2013 to the 1st December 2013. Of these patient 250 cases presented with accidental poisoning, accounting for (2.43%) of total hospital admission.

AGE:

OF the total 250 cases admitted to Emergency Department; 233 cases (93.2%) with age range 1-5 years, 10 cases (4.0%) were those below 1 year, and 7 cases (2.8%) were above 5 years, Median age was 2.4 years ± 1.04year SD. (Figure 1)

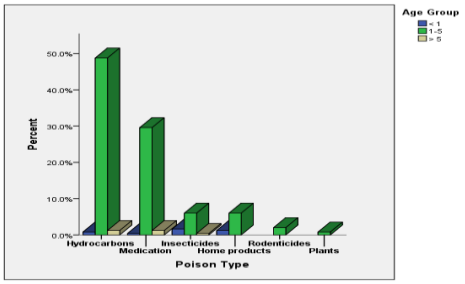

Figure 1: Distribution of poisoning cases according to type of poisoning and to age group.

There was significant association between age of patient and type of poisoning, that 1- 5 years were dominant age group in all types of poisoning (Table 1).

*The minimum expected cell count is less than one; chi square results may be invalid.

Gender: of the 250 cases studied, 140 cases (56%) males, and 110 case (40%) were females Male: Female ratio of 1.27:1. This study found no significance association between type of poisoning and gender of the patient(Table 1) .

Type of poisoning:

The most common poison encountered was hydrocarbons; constituting 127 cases of total cases admitted (50.8%), followed by medications 78 case (31.2%),(Figure 3).

Table 1: Distribution of sampled poisoning according to type of poison and to age, gender of patient.

Poison Type												
Variables	Hydrocarbons		Medication		Insecticides		Home products		Rodenticides		Plants	
Age Group	N	%	N	%	N	%	N	%	N	%	N	%
< 1 year	2	1.6	1	1.3	4	20.0	3	16.7	0	0.0	0	0.0
1-5 year	122	96.1	74	94.9	15	75.0	15	83.3	5	100.0	2	100.0
> 5 year	3	2.4	3	3.8	1	5.0	0	0.0	0	0.0	0	0.0
P = 0.004*												
gender	N	%	N	%	N	%	N	%	N	%	N	%
• Male	70	55.1	44	56.4	13	65.0	8	44.4	4	80.0	1	50.0
• Female	57	44.9	34	43.6	7	35.0	10	55.6	1	20.0	1	50.0
P = 0.719*												

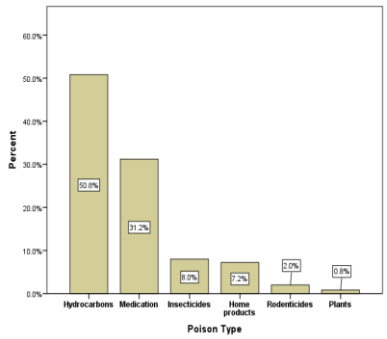

Figure 3: Distribution of sampled children according to type of poison.

Medications poisoning group were 78; of these 19 case were Anti-hypertensive drugs (24.4%), followed by cold syrups and antihistamines 10 case (12.8%), (**Table 2**).

Table 2: The frequency and percentage distribution of poisoning cases according to type of medication.

Type of medication	Number	Percent %
antihypertensive	19	24.4%
Cold syrup and antihistamine	10	12.8%
anticonvulsant	8	10.3%
benzodiazepine	7	8.9%
antibiotics	5	6.4%
Tricyclic antidepressant	4	5.1%
Paracetamol	3	3.8%
Iron	3	3.8%
Aspirin	1	1.3%
Antimotility	2	2.6%
Others	16	20.5%

Residence:

Most of patients were residing in urban areas constitute 195 cases (78.0%) of total patient admitted, while those from rural area constitute 55 cases (22.0%)(Figure 4),In our study the percentage of insecticidal, rodenticidel and plant poisoning is more in rural than in urban and there was significant association between type of poisoning and area of residence as showed in (Table 3).

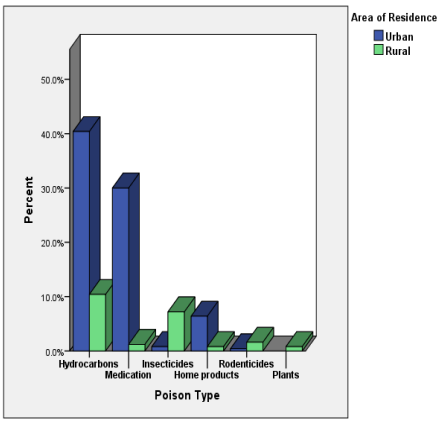

Figure 4: Distribution of sample poisoning according to residence.

Clinical presentation :

Vomiting was the most common clinical manifestation that encountered in 71 cases (28.4%) of total cases admitted , followed by respiratory symptoms in 70 case (28%); whereas symptomatic patient present in 52 cases (20.8%). There was significant association between the clinical presentation and the type of poisoning (Table 3).

Table 3: Distribution of sampled poisoning according to type of poisoning and clinical presentation, Residence.

Poison Type												
Variables / Clinical presentation	Hydrocarbons		Medication		Insecticides		Home products		Rodenticides		Plants	
	N	%	N	%	N	%	N	%	N	%	N	%
Respiratory symptoms	56	44.1	0	0.0	0	0.0	12	66.7	2	40.0	0	0.0
Vomiting	30	23.6	27	34.6	5	25.0	6	33.3	3	60.0	0	0.0
Asymptomatic	15	11.8	37	47.4	0	0.0	0	0.0	0	0.0	0	0.0
Fever	25	19.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Decreased level of consciousness	1	0.8	7	9.0	15	75.0	0	0.0	0	0.0	0	0.0
Irritability	0	0.0	7	9.0	0	0.0	0	0.0	0	0.0	2	100
P < 0.001*												
Residence	N	%	N	%	N	%	N	%	N	%	N	%
Urban	101	79.5	75	96.2	2	10.0	16	88.9	1	20.0	0	0.0
Rural	26	20.5	3	3.8	18	90.0	2	11.1	4	80.0	2	100
P < 0.001* *The minimum expected cell count is less than one; chi square results may be invalid.												

Outcome:

207 cases (82.8%) were discharged well from emergency department , while 35 case (14.0%) admitted in ward. Two cases (0.8%) were admitted to (ICU) intensive care unit and died. Six cases (2.4%) were referred to another hospital. (Figure 6). There was significant association between type of poisoning and outcome.(Table 4).

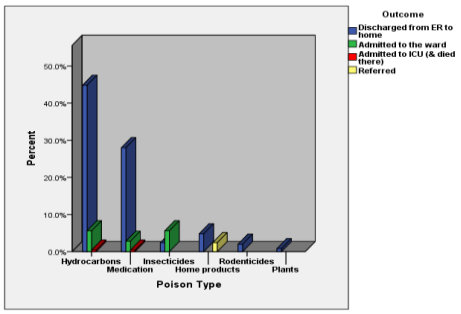

Figure 6: Distribution of sampled poisoning cases according to type of poison and outcome.

Table 4: Distribution of sampled poisoning according to outcome.

Poison Type												
Variables	Hydrocarbons		Medication		Insecticides		Home products		Rodenticides		Plants	
Outcome	N	%	N	%	N	%	N	%	N	%	N	%
Discharged from ER to home	112	88.2	70	89.7	6	30.0	12	66.7	5	100.0	2	100.0
Admitted to the ward	14	11.0	7	9.0	14	70.0	0	0.0	0	0.0	0	0.0
Admitted to ICU (& died there)	1	0.8	1	1.3	0	0.0	0	0.0	0	0.0	0	0.0
Referred	0	0.0	0	0.0	0	0.0	6	33.3	0	0.0	0	0.0
P < 0.001*												
*The minimum expected cell count is less than one; chi square results may be invalid. ER: emergency reception ICU: intensive care unit												

DISCUSSION:

In this study, poisoning accounts for (2.43%) of total hospital admission to emergency department , this results is accordance with a Turkish study conducted by Mutlu et al.[9] in which the incidence range between (0.21-6.2%) Whereas; in the western countries the prevalence of pediatric poisoning is much less and range between(0.28-0.66%) of total cases admitted [16,17]. According to these results , it is suggested that poisoning is still an important issue in our community.

These according to several studies, it has been reported that highest percentile of poisoning occur between 1-5 years of age[8,9]. In this study, (93.3%) of total cases studied were between 1-5 years. These results near to a Saudi study conducted by Alhazmi [14] in which (87.8%) of total cases were within this age group, but it was higher than that observed in another Turkish study conducted by Nabeel Manzar et al. [3] in which (66.0%) of cases were within this age group.

The high percentage of poisoning in this age group may attributed to child ability to move independently and his/her contact with objects around, reach the surrounding , often can climb

up to reach objects at high levels without being aware of the risk that may arise from objects around them.

Males accounted for the highest percentage of cases (56.0%) , and this agree with most studies from India and abroad in which male gender was preponderance in childhood poisoning[18,19,20], With Exceptions of a study from Ankara and Trinidad [21,22]. This high percentage in poisoning in male may be related to higher activity of male children. In our study, the poisoning predominantly occur in urban areas (78.0%), and this result consistent with previous Iraqi study by Omar Isa [23] in which (73.3%) of cases from urban area, and this may be due to wide use of medications and household products by people living in these areas. But this results is not observed in Indian study conducted by Shivani et al [24] , in which (80.0%) of patient belong to rural back ground .The high percentage of insecticidal, rodentecidel and plant poisoning in rural area may related to more availability of these material in this area. Hydrocarbons including kerosene accounts for the highest proportion of poisoning in this study (50.8%). Kerosene is the commonest hazards substance which ingested accidently by children in developing countries as Pakistan, India and Srilanka[12,13]. Also these findings agree with findings conducted by Alhazmi study [25], and a study conducted by Omar Isa[23] in which hydrocarbons constitute (41.4%) of total cases, and this may due to wide use of kerosene as a fuel and lighting, together with improper storage of kerosene in open containers and utensils used for drinking. The result of current study contrast with data from USA, UK, Qatar (26,27,28) in which medications represent the principle offenders.

Medications are the second most common cause of accidental poisoning (31.2%) of total cases studied, and this in agreement with Alhazmi study [12]. The most frequent medication causing accidental poisoning in this study were Anti-hypertensive drugs (24.3%) and this might related to high prevalence of Hypertension in our community. The second medication causing poisoning in this study was Cold syrups and antihistamines (12.8%), since these drugs available over the counter in most of Iraqi pharmacies, followed by Anticonvulsants (10.2%) , then Benzodiazepines (8.9%).

These results disagree with previous Iraqi study by Omar Isa[23] , in which Anti-cholinergic drugs are the most common poisons (9.52%) followed by Psychotropic's (2.85%) and Paracetamol (2.85%). Insecticides in our study constitute the 3rd most common cause of accidental poisoning (8.0%), most of these (90.0%) occurred in rural areas, and this attributed to wide use of these substances by farmers and due to easy availability of insecticides in most rural households, being stored in empty medicine bottles and this predisposing young children to accidental poisoning.

These results disagree with Shivani study et al.[16], in which insecticides are the most common cause of poisoning. This difference may be attributed to the high percentage of those residing in rural area in the Indian study. Home cleanings such as bleach and detergents in this study accounts for (7.2%) of the total cases studied, this results much higher than Omar Isa study [23] in which home cleanings constitute (1.9%) of cases and slightly higher than a Kosovo study conducted by Mehmedali et al.(25), in which household products constitute (6.06%) of total cases studied and this might be due to high use of these substances nowadays and easy availability of these products in each home.

Rodenticides constitute (2.0%)of total cases studied and this higher than France study by Berny et al.[29] as it constitute (0.6%) of total cases studied, and this might be attributed to higher use of rodenticides in our community. In our study 2 cases (0.8%) were admitted due to plant (Belladonna) poisoning and this much lesser than Indian study by Gupta et al.[30] , as it constitute (4.3%) of total cases studied.

Vomiting constitute the most predominant symptom of poisoning cases studied (28.4%). Followed by respiratory symptoms (28.0%); whereas asymptomatic patients accounts for (20.8%) of total cases studied. These results disagree with a study by Omar Isa (23) in which asymptomatic patients constitute (44.2%) and presenting the most clinical presentation.

In this study most of the asymptomatic patients are of those who ingest medications (47.4%), and this agree with previous Qatar study by Dawood et al. (28) as most of drug poisoning being asymptomatic (51.7%), and this might attributed to the dose of drug ingested, induction of emesis and type of drug that has been taken.

CNS manifestations as{irritability and decreased level of consciousness} were demonstrated in (12.6%) of total cases studied and this agree with previous Iraqi study by Omar Isa [21] as CNS manifestations constitute (12.3%) of total cases admitted.

Of the 18 cases studied due to home products poisoning, six of them need referral to another hospital for endoscopy and they constitute

(2.4%)of total cases. Of total 250 cases studied , 2 cases (0.8%) were admitted in ICU and died and they represent the mortality rate of this study and this agree with previous Iraqi study by Omar Isa [23], were the mortality rates (0.95%). And this may attributed to establishment of poison control centers, early admission of poisoned child and use of specific antidotes. These results much less than study by Shivani et al.[24] in which Mortality rate were (23.8%).The higher mortality rate were (13.6%) registered by Baber Mi et al. [5] in Pakistan.

CONCLUSION:

Younger children are more liable to have accidental poisoning mainly due to their activity ,curiosity, inappropriate storage of drugs, dangerous household chemicals and due to negligence by the parents. Poisoning cases more frequent in males and this might be attributed to their activity. The most common cause of accidental poisoning were hydrocarbons , followed by medications and household chemicals, most cases were from urban areas. Most of patients admitted were asymptomatic or had mild to moderate symptoms and being admitted within few hours from exposure episodes with low mortality rates.

Recommendation : that's the responsibility of most families toward their poisoned child, easy access to medical care center (including hospitals) and effectiveness of medical facilities offered.

REFERENCES:

1. Ernest Hodgson (editor). A text book of modern toxicology 3rd edition, John Wiley and Sons, USA 2004:3.
2. Akm Mamunur Rashid, Razia Sultana, Ham Nazmul Ahasan, et al. Seasonal variation of childhood acute poisoning. Med Sci 2007;23:443-45.
3. Nabeal M anzar, Syed Muhammed Ali Suad, Sueda Shazeen Fatima. The study of etiological and demographic characteristics of acute house hold accidental poisoning in children in Pakistan. BMC Pediatrics 2010;20:22-28.
4. Yate Kim M. Accidental poisoning in Newzeland. Emergency Medicine 2003;15:244-49.
5. Babar MI, Bhait Ro, Cheema ME. Kerosene poisoning in children. J Coll Physicians surg pak 2002;12:472-76.
6. Alsam M, Baluch GR, Hussain W, et al. Accidental poisoning in children, PP J 2002;26:67-70.
7. Calvert GM, Plate DK. Acute occupational pesticides-related illness in the US 1998-1999; surveillance finding from the Sensor pesticides program. AMJ and Ind Med 2004;45:14-23.
8. Petridou E, Kouri N, Ploychronopoulou A. Risk factors for childhood poisoning, a case control study in Greece. Inj prv 1996;2:208-11.
9. Mutlu M, Cansu A, Karakas T. Pattern of pediatric poisoning in the east Karadeniz region between 2002-2006. Hum Exp Toxicol 2010;29:131.
10. Kathreine A, O'Donnell, Michelle B. Poisoning. In: Robert M. Kligeman, Richard E. Behrman, et al. (editors). Nelson Textbook of pediatrics.19th edition. Saunders, Philadelphia 2011:250-70.
11. World Health Organization. The world health report 2004-changing history. [online]. Available at: www.who.nt/whr/2004/en/ [date accessed Jan 5th,2014].
12. Abed M Alhazimi. Pattern of accidental poisoning in Jeddah, Saudi Arabia. Annals of Saudi Medicine 1998;18:457-59.
13. Shannon DW(editor). Current emergency diagnosis and treatment 5th edition, Mcgraw Hill, 2004:996-1011.
14. Bronstein Ac, Spiker DA, Cantilena LR, et al. Annual Report of the American association of poison control centers, national poison data system, 27th Annual Report. Clin Toxical (phila) Dec. 2010;48:979-1178.
15. Shotar AM. Kerosene poisoning in childhood: a (6) years prospective study at the Princes Rahmat Teaching Hospital. Neuro-Endocrinal Lett 2005;26:835-38.
16. Nintegi S, Fernand A, Alustiza J, et al. Emergency visit for childhood poisoning: a 2 year prospective multicenter survey in spain. Pediatr Emerg Care 2006;22:334-38.
17. Burillo Putze G, Munne P, Duenas A, et al. National multi center study of acute intoxication in emergency department of spain. Eur J Emerg Med 2003;10:101-4.
18. Kohli U, Kuttiat VS, Lodha R, et al. Profile of childhood poisoning at a tertiary care center in north India. Indian J Pediatr 2008;75:791-94.
19. Adejuyigbe EA, Onayade AA, Senbanjo IO, et al. Childhood poisoning at the Obafemi Awolowo University Teaching Hospital ,Nigeria. Niger J Med 2002;11:183-86.

20. Oguche S, Bukbuk DN, Watila IM, et al. Pattern of hospital admissions of children with poisoning in the Saudano-Sahelian North eastern Nigeria. Niger J Clin Pract 2007;10:111-15.

21. Andrian N, Sarikayalar F. Pattern of acute poisonings in childhood in Ankara. Turk J Pediatr 2004;46:147-52.

22. Pillai GK, Boland K, Jagdeo S, et al. Acute poisoning in children. Cases hospitalized during a three year period in Trinidad. West Indian J 2004;53:50-54.

23. Omar Isa. Accidental poisoning in children, Thesis,Pediatrics Baghdad 1998.

24. F Hauck, C Hunt. Sudden infant death syndrome in 2000. Current problems in pediatrics 2000:241-61.

25. Mehmed Ali, Mallinda Berisha, Selim Kolgeei, et al. Frequency, Etiology and several sociodemographic characteristics of acute poisoning in children. University Clinical center of Kosovo. Mat Soc Med 2012;24:76-80.

26. Litoviz TL, Baily KM, Schmitz BF, et al. Annual Report of the American Association of Poison Control Centers, Data Collection System. Am J Emerg Med 1991;9:461-509.

27. Lawson GR, Graft AW, Jackson RH. Changing pattern of poisoning in Newcastle. BMJ 1983;287:15-17.

28. Dawod ST, Genelin RS, Asfoura EG. Accidental poisoning of children in Qatar. Ann Saudi Med 1989;9:243-46.

29. Berny B, Velardo J, Pulce C, et al. Prevalence of anti-coagulant rodenticide poisoning in France, Julius-Kuhn 2011:140-42.

30. Gupta S, YC Govil, PK Misra, et al. Trends in poisoning in children. The National Medical Journal of India 1998;11:166-68.