

Clinical Profile And Outcome Of Children Presenting With Poisoning (A Hospital Based Study)

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Abstract : Introduction: Poisoning though an important cause of morbidity and mortality in children, has received little attention over the years. Objective : To study the profile of acute poisoning in children less than 15 years age admitted to pediatric ward and PICU of a teaching hospital of Ahmedabad. Materials And Methods: Retrospective analysis of hospital records of pediatric patients admitted with a definite diagnosis of poisoning over a three year period-September 2009 to September 2012. Patients were profiled according to age, sex, poison consumed, symptoms, interval between exposure and presentation, duration of hospital stay, nature of poisoning and demographic profile. Results : A total of 176 cases were analysed completely. The mean age was 4.5 years with an age range of 0.25 to 15 years. The overall male female ratio was 1.17:1. The most common poison was kerosene used as fuel, incidence of insecticide poisoning was low. The mortality was 5.1%. Most patients were from urban background(83.5%), as many as 59.65% patients presented within first 4 hours after exposure. Accidental poisoning was found in 98.59% of patients rest being suicidal. Mean duration of hospital stay was 3.3 days and vomiting was the commonest clinical manifestation. Conclusion : Poisonings in children in our setup are caused by substances which should not be accessible to children. This fact calls for prospectively designed multicentric studies all over the country to assess the epidemiological and preventive properties of poisoning in children. [Vasavada H et al NJIRM 2013; 4(4) : 1-7]

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Introduction: Acute poisoning is an important pediatric emergency and is a world wide problem. In many western countries, poisoning is a notifiable disease and hence exact data regarding epidemiology and clinical profile of poisoning are available for those countries. But in India, such reporting is not common and there is paucity of data especially in Gujarat regarding poisoning in children. Our study aims at defining the clinicoepidemiological profile and outcome of childhood poisoning at a teaching hospital in Ahmedabad. The cause and type of poisoning varies in different parts of the world and within the country also depending upon factors such as demography, socioeconomic factors, education, local belief and customs. It also depends upon the availability of poisonous substance, occupation prevalent in the society, religious and cultural influences.¹ According to American Association of Poison Control Center, more than 50% poisonings occur in children less than 5 years of age and most of them are unintentional.² More than 90% of toxic exposures in children occur in the home and most involve single substance. The very nature of the young child predisposes the child to explore the surrounding environment, making it vulnerable to unintentional exposure.

Material & Methods: It was a retrospective study. All children admitted to pediatric ward and pediatric ICU of a tertiary care unit in urban area of Ahmedabad with history of intoxication or poisoning between September 2009 and September 2012 were identified and their medical records obtained from medical records department. All cases upto 15 years of age and with history of intoxication or poisoning were included in study. Those cases who had no signs of life on presentation and cases of food poisoning were excluded from the study. Data were analyzed using SPSS 12.0 software.

It was a retrospective study and identity of the patients was not revealed.

Observation: There were 8136 children above 1 month of age admitted in pediatric wards and PICU during study period. Among them 176(2.16%) were admitted with history of poisoning.

Out of the 176 cases in our study, majority (87.5%) were less than 5 years old, followed by children aged 5-10 years (9.09%). In children less than 5 years old boys outnumbered girls (47.15% against 40.34%) while there was no difference in other two age groups. Youngest patient was 3 months

old with massage oil ingestion given by mistake as it was stored in medicine bottle. (Table 1) Mean age was found to be 4.5 years. 147 patients were from urban area (83.5%) while 29 patients (16.4%) were from rural area

Table 1: Distribution of cases according to age and sex :

Age	Cases	%	Boys	%	Girls	%
<5y	154	87.5	83	47.15	71	40.34
5-10 y	16	9.09	9	5.11	7	3.97
10-15 y	6	3.41	3	1.70	3	1.70
Total	176	176	95	53.97	81	46.02

Among the various substances responsible for poisoning, majority were caused by kerosene (47.15%) followed by bleaching powder solution (10.22%) and insecticides (6.25%). Household products were most commonly ingested by children. In 25 cases the substance remained unknown. Medications kept within reach of children accounted for 6 cases (3.41%). In rural areas, most common agents were found to be kerosene and insecticides followed by plant products.(Table 2)

The commonest route of exposure was ingestion (86.93%) followed by almost equal percentage of inhalation (6.25%) and percutaneous exposure (6.81%). Kerosene being stored in household containers kept within easy reach of children accounted for majority of cases. Insecticides used for spraying fields caused organophosphorous poisoning by inhalation and accidental ingestion. Gaseous poisons were inhaled while bites and stings accounted for percutaneous route.(Table 3)

Majority of the children were discharged (92.04%). Children admitted only for observation are also included in the study. 9 patients expired (5.11%).5 patients took discharge against medical advice, all of which were asymptomatic and hence not willing to stay for observation for 24 hours which is our hospital policy in any case of unwanted exposure.(Table 4)

Table 2: Agents causing poisoning in children

Group	Substance	Number	Percentage	
Household liquids	Kerosene	83	47.15	
	Bleaching solution	18	10.22	
	Nilgiri oil	1	0.56	
	Massage oil	1	0.56	
	Shampoo water	1	0.56	
	Hair dye	1	0.56	
	Petrol	1	0.56	
	Acid	1	0.56	
	Insecticides	Pyrethroids	4	2.27
		Carbamates	3	1.70
Organophosphorous		3	1.70	
Orgnochlorine		1	0.56	
Laxman Rekha		2	1.13	
Plant		Castor seeds	9	5.11
	Unknown seeds	7	3.97	
Envenomation	Snake bite	4	2.27	
	Scorpion bite	1	0.56	
	Unknown insect bite	7	3.97	
Medicines	Alprazolam tablets	3	1.70	
	Iron tablets	1	0.56	
	Unknown tablets	1	0.56	
	Gentian violet	1	0.56	
Others	Unknown gas	11	6.25	
	Lizard	4	2.27	
	Paint thinner	3	1.70	
	Tobacco	2	1.13	
	Alcohol	1	0.56	
	Camphor	1	0.56	
Total		176		

Table 3 : Route of exposure :

Route	Number	Percentage
Ingestion	153	86.93
Inhalation	13	7.38
Percutaneous/injection	10	5.68

Table 4 : Outcome of children :

Outcome	Number	Percentage
Discharge	162	92.04
Expiry	9	5.11
DAMA	5	2.84

Table 5 : Presenting clinical features of children with poisoning :

Clinical feature	Number	Percentage
Vomiting	54	30.68
None	51	28.97
Crepitation in chest	45	25.57
Breathlessness	32	18.18
Diarrhea	10	5.68
Dizziness	9	5.11
Miosis	6	3.41
Salivation	6	3.41
Fever	4	2.27
Coma(GCS<8)	3	1.70
Seizure	3	1.70
Mydriasis	2	1.13
Bleeding tendency	1	0.56
Abdominal pain	1	0.56

Vomiting was the commonest presenting complaint (30.68%) observed with a wide variety of ingested poisons. 51 patients (28.97%) were asymptomatic and admitted only for observation. Kerosene poisoning patients had breathlessness and crepitations in chest due to chemical pneumonitis. 45 out of the total 83 patients developed pneumonitis (54.21%). Patients with organophosphorous and carbamate poisoning had diarrhea, salivation, miosis and fever. 3 patients presented with seizures while 3 presented with coma, 2 of which had snake bite. Bleeding tendency was noted in 1 patient with snake bite.(Table 5). Majority of the patients presented within 4 hours after exposure (59.65%). Only 2 patients presented 24 hours after exposure. (Table 6)

Table 6 : Distribution according to hrs

Presentation	Number	Percentage
Within 4 hours	105	59.65
4-24 hrs	69	39.201.13
>24 hrs	2	1.13

Table 7 : Distribution according to Nature

Nature	Number	Percentage
Accidental	174	98.59
Suicidal	3	1.70

As only children under 15 years were studied, most of the cases were accidental(98.59%). 3 patients in adolescent age group had alleged history of suicidal ingestion, of which 1 expired.

Table 8 : Treatment required

Treatment	Number	Percentage
None	75	42.61
Antibiotics	47	26.70
Oxygen	30	17.04
Ventilatory care	11	6.25
Gastric lavage	9	5.11
Atropine	6	3.41
Pralidoxime	3	1.70
Antisnake venom	4	2.27

Mean duration of hospital stay was 3.3 days with median at 3 days. The longest stay was in a 15 year old boy with organophosphorous poisoning who required ventilatory care. Of the 11 patients requiring ventilatory care 3 had organophosphorous poisoning and 8 had kerosene poisoning. Majority of the patients required no treatment(42.61%). Antibiotics needed to be given in 47 patients (26.70%). 11 patients required ventilator care(6.25%) of which 8 expired. Specific antidotes like atropine, pralidoxime and anti snake venom were given as required. (Table 8).

Discussion: Poisoning among children is one of the common medical emergencies encountered in pediatric practice.³ Rapid industrialization and exposure to harmful chemicals, introduction of newer range of drugs, massive use of pesticides for agriculture have widened the spectrum of toxic products to which people are exposed. Children are particularly at risk because of their curious and exploratory behavior and hand to mouth activities. By 2-3 years of age the child's mobility and ingenuity allow him to access any unlocked drawer of cupboard in the house. The increased permeability of infant skin increases absorption of chemicals. Children also differ in their ability to metabolize toxins and may be more susceptible to effect of poisons in environment.⁴ Although the number of child poisoning deaths have declined dramatically over the last 40 years, there is little

decline in emergency department presentations and hospitalizations. The poisoning in children under 15 years of age was 2.16% in the pediatric ward and PICU of study hospital. In a similar study done at other hospital at Nepal the incidence was found to be 4%.⁵ Budhatoki et al found the incidence to be 3.4%. In a similar study done in India less than 1% of all pediatric admissions below 12 years of age were due to poisoning, but they had excluded those patients kept only for observation and who did not require any treatment.

The incidence of poisoning in children was much more in children <5 years of age. This corresponds to similar studies by Shivani et al and Butathoki et al. This is the age where child's nature is inquisitive and exploratory but the child does not have the understanding to differentiate between useful and harmful substances.

Most studies from India and abroad show a male preponderance in childhood poisoning^{5,6,7}. Exceptions are a study from Ankara and one from Trinidad^{8,9}. The male female ratio in study by Shivani et al was 1:1. In our study the ratio was 1.17:1. Boys were more commonly affected in <5 years age group while in children >5 years, ratio was almost 1:1.

Majority of the poisonings in present study were due to kerosene used as a fuel for cooking purposes. Similar studies from Gujarat show that kerosene poisoning is the commonest.^{10,11} This varies from similar studies in North Gujarat where insecticide poisoning is commonest^{1,2}. Singh et al studied pattern of pediatric poisoning in large tertiary care centre in North India and observed a significant decline in kerosene poisoning in the past decade. In Gujarat kerosene is used as fuel in many places and is stored in bottles within easy reach of children. Moreover, the bottles used are soft drink bottles or soda bottles so accidental ingestion can occur. In North Indian states, agriculture is the prime occupation and so insecticides are used on a large scale especially in rural households. The incidence of organophosphorous poisoning has been shown to

be 10.1% in India while studies from Australia and Cambodia show 2.4% and 4% respectively.^{12,13} This is because of greater awareness and child resistant packing of insecticides in foreign countries. Low educational status of parents is an important factor due to which cooking fuels like kerosene are not kept away. Due to large family size, children are not adequately supervised. A study in Aurangabad shows kerosene poisoning at 43%¹⁴. Singh et al showed a 25% incidence of kerosene poisoning while the incidence in Cambodia is a meager 0.9%.¹⁵

There was only one case of alcohol poisoning (0.56%) as compared to 2.5% in study in Nepal and 4.2% in study in Himachal because of prohibition in the state of Gujarat. As majority of patients were from urban area bleaching solution, medications, household oils, shampoo water, paint thinner etc were culprits, while insecticides, plant products and envenomation were more common among rural population.

Majority of the patients were discharged. The mortality was 5.11%. In other study from Nepal the mortality was 12% but they had excluded asymptomatic patients kept for observation. The mortality in previous Indian studies varies from 0 to 11.6%. The symptomatology closely follows the nature of the poison consumed. Majority of the patients had hydrocarbon poisoning resulting in breathlessness and crepitations in chest. Vomiting was the commonest feature accounting for 30.68% cases. 51 patients (29.80%) had no symptoms. Organophosphorous poisoning patients presented with salivation, diarrhea, miosis and fever. Three cases of snake bite had neurogenic features while one had hematologic features.

Almost 60% of patients in our study presented within 4 hours after exposure while 39% presented within 4-24 hours. This is in contrast to study by Shivani et al where only 20% patients presented within first hour and 40% arrived after 5 hours. This is because of difficult geographical terrain of Himachal Pradesh where this study was carried out.

In our study, children received various forms of treatment in the hospital. 42.61% patients required no treatment. Antibiotics were used in 26% cases. Specific antidotes were given as indicated. As gastric lavage is contraindicated in kerosene poisoning which forms a major share of poisoning in our study, only 5.11% patients. This is in contrast to previous Indian studies where rate of lavage is shown to be almost 30%. A similar type of treatment like gastrointestinal decontamination and specific antidote were received in a substantial number of patients in a study done in Ethiopia. In a hospital based study in Oslo, almost 87% patients received gastric lavage.

Poisoning among children is one of the common medical emergencies encountered in pediatric practice.³ Rapid industrialization and exposure to harmful chemicals, introduction of newer range of drugs, massive use of pesticides for agriculture have widened the spectrum of toxic products to which people are exposed. Children are particularly at risk because of their curious and exploratory behavior and hand to mouth activities. By 2-3 years of age the child's mobility and ingenuity allow him to access any unlocked drawer of cupboard in the house. The increased permeability of infant skin increases absorption of chemicals. Children also differ in their ability to metabolize toxins and may be more susceptible to effect of poisons in environment.⁴

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number of patients in a study done in Ethiopia. In a hospital based study in Oslo, almost 87% patients received gastric lavage.

Conclusion : The trend in pediatric poisoning observed in our study is similar to studies from Gujarat while it differs from other Indian studies. Data from Gujarat regarding poisoning is scarce as reporting is not proper and it is not a notifiable disease. The incidence is still high suggesting that this preventable cause of morbidity and mortality has received little attention over the years.

Comparative data has revealed that while poisoning in developed countries is commonly due to household substances, in developing countries like ours it is due to toxic substances which should not have been accessible to children in the first place. This calls for formulation of preventive strategies to reduce burden of poisoning related admissions. These may be in form of health education, improved living conditions, use of child resistant packaging for drugs and safer storage containers for household chemicals. Reduction of stress at school and counseling for adolescents can go a long way in preventing suicidal poisoning.

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