


Original Research Article

# Clinical Profile and Outcome of Acute Poisoning in Children Less than 12 years of Age

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## Abstract

**Background:** Poisoning among children is one of the common medical emergencies encountered in Pediatric practice. Rapid industrialization and exposure to harmful chemicals, introduction of newer range of drugs have widened the spectrum of toxic products to which children are exposed.

**Objectives:** To study clinical course, hospital stay and recovery in childhood poisonings, to assess clinical recovery in correlation with hematological, biochemical and radiological changes, to study various complications and mortality in childhood poisoning.

**Materials and methods:** A prospective observational study was conducted and all patients of childhood poisoning under the age of 12 years and meeting the selection criteria admitted in the tertiary health care center in Saurashtra region were included.

**Results:** Maximum incidence of childhood poisoning was between 1-5 years of age (63%) and 56 % were males. Commonest route of exposure was ingestion (53 %) followed by percutaneous route (38%). Among the poisoning agents, envenomation (39%) and kerosene (24%) were the most common. Vomiting (39%) was the predominant clinical feature. Respiratory failure (22%) and pneumonia (22%) were the most common complications. 3 % needed ventilator care. In the present study, the case fatality was 3%.

**Conclusion:** The trends for childhood poisoning noted at our center were different from previous hospital-based studies in two important ways such as in the nature of the poisoning agents used and the higher incidence of accidental poisoning.

## Key words

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Childhood poisoning, Exposure, Ingestion.

## Introduction

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Poisons are known since mankind. The word poison is derived from the Latin word 'Potio' means a drink. Poison is a substance that being in the solution in the blood either destroys life or impairs seriously the function of one or more organs of the body. As we are entering in new millennium, production and usage of various chemicals, drugs and insecticides are increasing day by day. India too is developing fast and is not left behind much in industry and agriculture. As there is an old proverb, "Nothing comes free of cost" is also applied here. Due to industrial development, shift of people from rural to urban areas is increasing. Due to overpopulation job problems, unemployment, social problems, domestic problems and economical problems are increasing leading to psychological disturbances. Acute poisoning is an important pediatric emergency and is a worldwide 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 clinic-epidemiological profile and outcome of childhood poisoning at a teaching hospital in Rajkot. 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 [1]. It also depends upon the availability of poisonous substance, occupation prevalent in the society, religious and cultural influences. More than 50% poisonings occur in children less than 5 years of age and most of them are accidental. More than 90% of toxic exposures in children occur in the home and most involve single substance. Approximately 50% of cases involve non drug

substances such as cosmetics, personal care items, cleaning solutions, plants and foreign bodies. Pharmaceutical preparations, cough and cold products and vitamins are the most commonly reported categories [2].

## Materials and methods

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This prospective observational study was conducted in the department of Pediatrics of K.T. Children Hospital, Rajkot, over a 1-year period from August 2014 to August 2015. All patients aged up to 12 years presenting to the emergency department with a definite history of poisoning were included in the study. Detailed history regarding the nature of poison, clinical features, time interval between poisoning and arrival, social and demographic characteristics of patients, physical examination findings, investigations, treatment given, and outcomes were recorded in a structured performa. A record of mother and father's educational status, profession and family income was made to evaluate socio economic status of the family using Kuppaswamy Scale. The poisoning agents were grouped under 6 heads namely kerosene, envenomation, insecticides, cleaning chemicals, seed poisoning, drugs and unknown agents. Informed written consent was obtained from the parents at enrollment.

Management of children with poisoning: The diagnosis of poisoning was based on one or more of the following: definite history of poisoning and supporting circumstantial and physical evidence. Once the diagnosis was confirmed, the children were shifted to the intensive care unit (ICU) for continuous monitoring and relevant laboratory and radiological investigations. Supportive care in the form of intravenous fluids and oxygen/ mechanical ventilation was provided whenever indicated. Definitive treatment in the form of antidotes and anti-venom were given as per the nature of the poisoning agent. The children were shifted out of the ICU when they

no longer required continuous monitoring. Subsequently, they were discharged from the hospital as per the discretion of the treating physician.

## **Results**

Total 108 children under the age of twelve years were admitted over a period of one year. The study constituted majority of the patients (63%) under the age of 5. The study comprised of higher percentage of male patients (56%). The most common route of exposure in this study was by ingestion (53%). The most common poisonings were envenomation (39%) and kerosene (24%). Other agents (12 cases) include: mosquito repellent, food poisoning, alcohol poisoning, battery ingestion, turpentine, petrol, hydrocarbon poisoning, and diesel poisoning. 75 cases (69%) of the cases of poisoning were from the rural areas. Majority of the patients (81%) were admitted within 4 hours of the poisoning event or symptom onset. Only 2% of the cases presented to the hospital later than 24 hours. The study comprised of 83% of the subjects coming from a lower socioeconomic background which was the majority. 69% of the subjects in this study came from rural neighborhood and the subjects' family occupations were mainly related to labor work (45%) and farming (27%). The most common symptoms observed in the study patients were vomiting and dizziness (**Table – 1**).

Pain (69%) and swelling (76%) were the most common local symptoms observed in the study subjects. 36% of the cases had a raised total leukocyte count. The chest X-Ray findings were abnormal in 17 cases and the abnormalities included pneumonitis (12%), cardiomegaly (3%) and pulmonary edema (1%). Preferred treatments among the study group included application of antidote (45%), intravenous fluid (36%) and antibiotics (31%). 9% of the cases had complications. Pneumonia (2 cases) and respiratory failure (2 cases) were some of the more prevalent complications. Majority of the study subjects (85%) had hospital stay duration

of less than 5 days. The most significant outcome in the study comprised of majority of the patients (83%) discharged after the treatment (**Table – 1**).

## **Discussion**

Although the number of children of child poisoning deaths have declined dramatically over the 40 years, there is little decline in emergency department admissions and hospitalizations [3]. The poisoning in children less than 12 years of age was 6% in the pediatric ward and PICU of the study hospital. In a similar study done at other hospital at Nepal the incidence was found to be 1% of the pediatric admissions were due to poisoning. S Budhatoki, et al. found the incidence to be 3.4% [3]. In a similar study done in India, less than 1.0% of all pediatric admissions below 12 years of age were due to poisoning [7]. The incidence of poisoning in children was much more in children < 5 years of age. This corresponds to similar studies by Shivani et al was 1:1 [4]. In our study the ratio was 1.25:1. Boys were more commonly affected in <5 years age group while in children > 5 years; ratio was almost 1.3:1 [5]. Boys are known to be more curious and inquisitive by nature [6].

Majority of the poisonings were due to envenomation (39%) and kerosene (24%) used as a fuel for cooking purposes. Similar studies from Gujarat show that kerosene poisoning is the most common cause [4]. This varies from similar studies in North Gujarat where insecticide poisoning is the most common. Singh et al studied pattern of pediatric poisoning in large tertiary care center in North India and observed a significant decline in kerosene poisoning in the last decade [7].

There were only two cases of alcohol poisoning (2%) as compared to 2.5% in study in Nepal [3] and 4.2% in study in Himachal Pradesh because of prohibition in the state of Gujarat. In the 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.

**Table – 1:** Frequency of variables.

Variable	N = 108(%)
<b>Age (years)</b>	
<5 years	68(63%)
5-10 years	34(31%)
>10 years	6(6%)
<b>Sex</b>	
Boys	60(56%)
Girls	48(44%)
<b>Socioeconomic status</b>	
Low	90(83%)
Middle	18(17%)
Upper	0(0%)
<b>Classification of occupation</b>	
Farmer	29(27%)
Housewife	25(23%)
Laborer	49(45%)
Others	5(5%)
<b>Place/Environment</b>	
Urban	33(31%)
Rural	75(69%)
<b>Housing</b>	
Kuccha	51(47%)
Pucca	54(50%)
Unknown	3(3%)
<b>Mode of poisoning</b>	
Accidental	108(100%)
Suicidal	0(0%)
<b>Route of Exposure</b>	
Ingestion	57(53%)
Inhalation	10(9%)
Percutaneous	41(38%)
<b>Poisoning agent</b>	
Kerosene	26(24%)
Cleaning chemicals	6(6%)
Envenomation	42(39%)
Others	12(11%)
Insecticides	8(7%)
Seed poisoning	8(7%)
Drugs	6(6%)
<b>Duration between exposure and treatment in hours</b>	
<4 hours	88(81%)

4-24 hours	18(17%)
>24 hours	2(2%)
<b>Common symptoms</b>	
Vomiting	42(39%)
Abdominal pain	1(1%)
Fever	7(6%)
Fast breathing	3(3%)
Dizziness	15(14%)
Loss of consciousness	6(6%)
Diarrhea	5(5%)
None	27(25%)
Salivation	6(6%)
<b>Physical Signs</b>	
Restlessness	34(31%)
Tachypnea	11(10%)
Altered sensorium	5(5%)
Miosis	4(4%)
Cool extremities	13(12%)
Hypertension	8(7%)
Bradycardia	1(1%)
Hypotension	1(1%)
Tachycardia	4(4%)
Cyanosis	1(1%)
<b>Complications</b>	
CCF with pulmonary edema	1(1%)
Pneumonia	2(2%)
Respiratory Failure	2(2%)
Right hand cellulitis	1(1%)
Severe dehydration	1(1%)
Shock, encephalopathy	1(1%)
Bleeding	1(1%)
<b>Treatment required</b>	
Antibiotics	34(31%)
Oxygen	13(12%)
Ventilatory care	3(3%)
Gastric lavage	3(3%)
Atropine	11(10%)
IVF	39(36%)
Antihistaminics	1(1%)
Antidote	49(45%)
None	7(6%)
Other	3(3%)
<b>Duration of hospital stay (in days)</b>	
<5 days	92(85%)
5-10 days	15(14%)
10-15 days	1(1%)

Outcome	
Discharge	90(83%)
DAMA	15(14%)
Expiry	3(3%)

Majority of the patients were discharged. The mortality was 3%. 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 39% cases. 28 patients (25%) had no symptoms. Almost 81% of patients in our study presented within 4 hours after exposure while 17% presented within 4-24 hours. This was 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 [4].

Children over 5 years are at risk of snake bite because they are involved more in outdoor games. Incidence was more in boys 57%. The higher incidence in boys could be due to boys more involved in outdoor activities and risky behavior. Most cases of snake bite occurring in rainy season and the incidence varies in India due to different pattern of rainfall and agricultural activities. Majority of cases were admitted within first 6 hours and this helps in assessment of severity of envenomation and administration of antsnake venom [7].

Snake bite is more common in rural areas. Due to unavailability of transport during night hours the primary health centre is not approachable. As seen in our study, 29 % patients presented 3-6 hours after the bite [8]. Snake bite is thus an important and serious medical problem in many parts of India. Early diagnosis, appropriate treatment and close monitoring of children before development of complications and its prompt management can be lifesaving.

## Conclusion

To conclude envenomation and kerosene poisoning were found to be the most common causes of poisoning in our study. The incidence of poisoning was common among children under 5 years. Small children should never be left unattended and preventive measures should stringently be followed. Drugs, pesticides, etc. should be kept out of reach of children and in child proof container in separate places. In addition, developmental and environmental factors may contribute to the risk of a poisoning event. Normal curiosity and desire for oral stimulation may cause children to place new objects directly into the mouth for tasting or swallowing.

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