

ORIGINAL RESEARCH

Clinical study of etiology & immediate outcome of acute poisoning in children at a tertiary hospital

Rajendrakumar Hiralal Bedmutha¹, Nishad Yashawant Patil²

¹Associate Professor, Department of Pediatrics, Dr. Ulhas Patil Medical College and Hospital, Jalgaon, India.

²Associate Professor, Department of Pediatrics, Dr. Ulhas Patil Medical College and Hospital, Jalgaon, India.

ABSTRACT

Background: Poisoning in children is one of the most common emergencies encountered in pediatric practice and it is a worldwide problem leading to morbidity and mortality. Common poisoning agents in low-income and middle-income countries are fuels such as paraffin and kerosene, pharmaceuticals and cleaning agents. Present study was aimed to study etiology & immediate outcome of acute poisoning in children at a tertiary hospital.

Material and Methods: Present study was prospective, observational study, conducted among children of any gender, less than 14 years of age, came with history of poison consumption, irrespective of presence of signs and symptoms, accompanied or unaccompanied by container or poison OR had doubtful history of consumption of poison but with definite signs and symptoms of acute poisoning. Parents willing to participate in present study.

Results: In present study, 104 children admitted with history of poisoning cases, were studied. Majority of children were from 1-5 years age group (50.96 %), male:female ratio was 1.9:1. Common presenting symptoms were vomiting (64.42 %), drowsiness/altered sensorium (30.77 %), respiratory distress (21.15 %), seizures (16.35 %), while 17.31 % patients were asymptomatic. Common route of administration observed was oral route (98.08 %) & only 1.92 % had history of inhalation. Common poisoning agents were organophosphorus (15.38 %), Kerosene (13.46 %), bleaching solution (7.69 %), unknown agent (25.96 %), unknown seeds (16.35 %) & unknown tablets (8.65 %) were also observed. Majority children were discharged uneventfully (87.5 %), 8 children had taken discharge against medical advice & mortality was observed among 5 children.

Conclusion: Poisoning in children is associated with mortality due to various reasons. Regular surveillance is required to recognize trends in specific agents and other variables related to childhood poisoning.

Keywords: Poisoning in children, organophosphorus, outcome, surveillance

Corresponding Author: Dr. Samir Umesh Khanapurkar, Associate Professor, Department of Pediatrics, Dr. Ulhas Patil Medical College and Hospital, Jalgaon, India.

INTRODUCTION

Poison is defined as a substance which if introduced in the living body or brought into contact with any part thereof will produce ill health or death by its constitutional or local effect or both.¹ Poisoning in children is one of the most common emergencies encountered in pediatric practice and it is a worldwide problem leading to morbidity and mortality.²

The cause and types of poisoning vary in different parts of the world depending upon the factors such as demography, socioeconomic status, education, local belief and customs. Most of the poisoning in children are accidental, unintentional and are preventable.³ Common poisoning agents in low-income and middle-income countries are fuels such as paraffin and kerosene, pharmaceuticals and cleaning agents.^{4,5}

Maximum children exposed to these poisonous substances in home only few children exposed outside. Younger children are more susceptible to poisoning because of their smaller size and less well-developed physiology, particularly as the toxicity of most substances relates to the dose per kilogram of body weight.^{6,7} Proper parental education, safe storage of drugs, adequate supervision can prevent poisoning in children. Present study was aimed to study etiology & immediate outcome of acute poisoning in children at a tertiary hospital.

MATERIAL AND METHODS

Present study was prospective, observational study, conducted in department of paediatrics, at XXX medical college & hospital, XXX, India. Study duration was of 2 years (July 2020 to June 2022). Study approval was obtained from institutional ethical committee.

Inclusion criteria

- Children of any gender, less than 14 years of age, came with history of poison consumption, irrespective of presence of signs and symptoms, accompanied or unaccompanied by container or poison OR had doubtful history of consumption of poison but with definite signs and symptoms of acute poisoning. Parents willing to participate in present study

Exclusion criteria

- Food poisoning
- Idiosyncratic reactions to drugs

Study was explained to patients in local language & written consent was taken for participation & study. Detailed history such as age, gender, socio demographic data, type of poisoning agent, route of exposure, date, time and place of poisoning, Time of arrival to hospital after poison exposure, Manner of poisoning were noted.

Routine hematological investigations (CBC, LFT, KFT, PT, aPTT, INR, sr electrolytes, sr. cholinesterase) were done. X ray chest, gastric aspirate, urine, cerebrospinal fluid investigations conducted as per requirement whenever needed. Clinical examination for vital signs like pulse rate, respiratory rate, temperature, blood pressure, level of consciousness, the state of the eyes, pupils, tongue and skin, presence of any suicidal or homicidal injuries over the body was done. A thorough systemic examination of cardiovascular system, respiratory system, abdomen and central nervous system was done.

Standard treatment was provided according to the individual cases. Psychiatric counseling was done for suicidal intended poisonings. Immediate outcome of the cases was noted in term of discharge or death. Data was collected and compiled using Microsoft Excel & statistical analysis was done using descriptive statistics.

RESULTS

In present study, 104 children admitted with history of poisoning cases, were studied. Majority of children were from 1-5 years age group (50.96 %) followed by 6-9 years (30.77 %), 10-13 years (13.46 %) & <1 year (4.81 %). Male (65.38 %) were more than female (34.62 %), male:female ratio was 1.9:1. Common presenting symptoms were vomiting (64.42 %), drowsiness/altered sensorium (30.77 %), respiratory distress (21.15 %), seizures (16.35 %), while 17.31 % patients were asymptomatic.

Table 1: General characteristics

Characteristics	No. of patients	Percentage
Age groups (in years)		
<1	5	4.81%
1-5	53	50.96%
6-9	32	30.77%
10-13	14	13.46%
Mean age (mean \pm SD)		
Gender		
Male	68	65.38%
Female	36	34.62%
Presenting features		
Vomiting	67	64.42%
Drowsiness/altered sensorium	32	30.77%
Respiratory distress	22	21.15%
Asymptomatic	18	17.31%
Seizures	17	16.35%
Hematemesis	4	3.85%

In present study, common route of administration observed was oral route (98.08 %) & only 1.92 % had history of inhalation. Common poisoning agents were organophosphorus (15.38 %), Kerosene (13.46 %), bleaching solution (7.69 %), Carbamates (2.88 %), Iron tablets (2.88 %), Hair dye (1.92 %), Pyrethroids (1.92 %), Tobacco (1.92 %) & Massage oil (0.96 %). While unknown agent (25.96 %), unknown seeds (16.35 %) & unknown tablets (8.65 %) were also observed.

Table 2: Distribution of the poisoning cases

Characteristics	No. of patients	Percentage
Route of administration		
Oral	102	98.08%
Inhalation	2	1.92%
Poisoning agent		0.00%
Unknown	27	25.96%
Unknown seeds	17	16.35%
Organophosphorus	16	15.38%
Kerosene	14	13.46%
Unknown tablets	9	8.65%
Bleaching solution	8	7.69%
Carbamates	3	2.88%
Iron tablets	3	2.88%
Hair dye	2	1.92%
Pyrethroids	2	1.92%
Tobacco	2	1.92%
Massage oil	1	0.96%

Majority children were discharged uneventfully (87.5 %), 8 children had taken discharge against medical advice & mortality was observed among 5 children.

Table 3: Immediate outcome

Outcome	No. of patients	Percentage
Discharge	91	87.50%

Mortality	5	4.81%
Discharged against medical advice	8	7.69%

DISCUSSION

In most of the cases, accidental poisoning in children is a result of oral ingestion of poisonous substances (household products, chemicals, drugs, pesticides, etc.).⁸ The risk of accidental poisoning is further augmented when some of these toxic substances are removed from their original containers and stored in drinking water bottles or food containers.⁹ These substances are often mistaken by children for water and ingested.

In study by Sridhar PV et al.,¹⁰ poisoning patients constituted 5.667% of all Pediatric admission (n=253), Male: Female ratio was 1.24: 1, majority were from rural area (62.06%), were of the age 1- 4 years (54.94%), had accidental poisoning (85.77%), kerosene (35.18%) was the most common compound responsible, followed by drugs (15.02%). 142 (56.13%) children were discharged within 24 hours of admission, overall survival rate noted in the study was 98.81%.

Ramawat and Jain¹¹ studied 50 children of poisoning. 74% patients were under 5 year of age while 56% were boys and 44% were girls. Patients admitted due to ingestion of Insecticides and pesticides (18%), hydrocarbons (14%), medicines (12%) and agricultural products (8%), plant products ((16%) and others. Maximum number of patients intoxicated with household products (56%). Age was significantly associated with residence (p = 0.02) and place of exposure (p = 0.01) and nature of poisoning (p = 0.05).

Arpitha B et al.,¹² studied 25 cases were of accidental poisoning, was male preponderance was noted. Hydrocarbon (40%) was the most common household agent causing poisoning, followed by pyrethroid (24%) & NSAID'S (8%). Most common symptom was vomiting. The mean time elapsed to reach hospital was 97.80 minutes. In majority of the cases, hospital stay was for 2 days (52%).

In study by Qazi M et al.,¹³ 227 children, Male: female ratio was 1.2:1. Organophosphorus poisoning was the commonest poisoning (57.30%), followed by snake bite (55.77%), insect bite (32.69%), Phenol (77.78%), kerosene (12.36%) and rat poison (11.23%). Route of poisoning was ingestion (76.21%) followed by bites (23.35%) and inhalation (0.44%) case. Aspiration pneumonia (43.59%) followed by respiratory failure (17.95%) were the most common complications. During treatment 67 (27.91%) received gastric lavage and 28 (12.33%) received antidotes. Overall survival was 210 (92.51%), among remaining cases 2 (0.88%) cases died in hospital.

Navneet K B et al.,¹⁴ studied 117 patients presented with acute poisoning, majority were from 1 - 6 year age group (60.68%), male to female ratio was 1.4:1. Insecticides (37.61%), drugs (25.64%), and Kerosene oil (18.8%) were the agents most frequently implicated. 36 patients (30.7%) remained asymptomatic, the rest developed symptoms related to toxic ingestion and required symptomatic or definitive treatment. 13 patients required ICU care and 7 required intubation and mechanical ventilation. Gastric lavage was done in 34% patients and specific antidote was given to 28 (23.9%) patients. Four patients (3 adolescents and 1 preschool child) died.

In study by Saikia D et al.,¹⁵ majority (77.8%) belonged to the age group of 1-5 years and were males (65.4%). In 94.1% poisonous substance was accidentally ingested by the child itself, 85.6 % occurred at home, while 11.8 % cases occurred in home surroundings. Of the 153 cases, 1.3 % presented with the history of diarrhoea, 7.8 % had altered sensorium, 3.9 % had fever, 10.5 % presented with cough, 24.2 % presented with excessive secretions from mouth. 20.3 % had vomiting without blood staining and 7.8 % had blood-stained vomiting as their chief complaint. Mucosal injury was noted in 41 cases (26.8%).

Management of acute poisoning depends on several factors such as nature of agent, dose of agent, treatment available immediately, and the time lapse between intake of poison and arrival at health care facility.¹⁶ Management include supportive care, gut decontamination using activated charcoal, increasing poison excretion through multi-dose activated charcoal or urine alkalization with sodium bicarbonate, or charcoal hemoperfusion; use of specific antidotes to counter the effects of the poison.^{17,18}

Accidental poisoning is one of the preventable causes of childhood morbidity and mortality. Approximately half of suicides in India are due to intentional poisoning of which the majority are from pesticides. Young children are commonly poisoned by accidental ingestion, unintentional dermal or inhalational exposure, whereas adolescents are more severely poisoned if attempting self-harm through intentional ingestion.¹⁹

CONCLUSION

Poisoning in children is associated with mortality due to various reasons. Regular surveillance is required to recognize trends in specific agents and other variables related to childhood poisoning; this also helps create prevention strategies and helps ED physicians effectively identify and manage poisoning according to age and time.

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