



## CLINICAL PROFILE OF POISONING IN CHILDREN

## Paediatrics

<b>Dr. Shailaja Milind Potdar</b>	Associate professor, Department of Paediatrics, Rajiv Gandhi Medical College, Kalwa, Thane
<b>Dr. Sunil Vijay Junagade*</b>	Associate professor, Department of Paediatrics, Rajiv Gandhi Medical College, Kalwa, Thane *Corresponding Author
<b>Dr. Vandana Kumavat</b>	Professor & Head, Department of Paediatrics, Rajiv Gandhi Medical College, Kalwa, Thane
<b>Dr. Jayesh Nareshchandra Panot</b>	Assistant professor, Department of Paediatrics, Rajiv Gandhi Medical College, Kalwa, Thane

## ABSTRACT

**Background:** Poisoning is a global problem. In children poisoning is less common and is mostly accidental in nature as compared to adults. Children in their phase of growth and development are temperamentally curious and inherently explorer by nature. Constantly trying to explore their immediate surroundings and environment. This is also a phase when they have tendency of mouthing substances, making them vulnerable for accidental or unintentional ingestion of poisonous or nonedible substances. Across the world poison control centers receive multitude of calls. Emergency departments in hospitals receive thousands of admissions. Profile of poisoning changes in children according to age, nature of poison, mode of exposure, dose and socioeconomic strata.

**Aims:** 1. This study was carried out to find out prevalence, clinical profile and types of poisoning.

2. Studying outcome of accidental poisoning in children admitted in a tertiary care hospital in Thane district which has large component of rural population.

**Material & methods:** It was a Record based retrospective & descriptive study. Children admitted with accidental poisoning during January 2014 to October 2018 were included.

**Results:** 485 children were admitted in our hospital with various accidental poisonings. Out of which 327 were accidental ingestion of variety of household substances and 158 were cases of animal /insects /unknown bites and stings. These will be referred to as parenteral poisonings. 289 (59.59%) were males & 196 (40.41%) were females. Majority, 336(69.27%) were under 5 years of age.

Of all the oral poisons hydrocarbons 132(27.21%) were the commonest followed by scorpion stings & other bites 93(19.17%), snake bites were 65(13.40%).

Household cleansing agents & corrosives were 48(9.89%). Organo-phosphorous and organo-chlorine compounds were 28(5.77%).

In symptomatology GI symptoms were the most common. Nausea, vomiting was seen in 330 (68.04%), while abdominal pain was seen in 298(61.44%). Respiratory symptoms like cough & breathlessness were seen in 74(15.25%). The most critical presentation was respiratory muscle paralysis with ptosis in 1 case, convulsion in 1 case, and hematuria in 2 cases.

Most of the patients were discharged within 48 hours. There was no death.

**Conclusion:** Preventable accidental poisonings are still a significant cause of morbidity and mortality among the children in developing country. Hydrocarbons like kerosene which is still being used as domestic fuel is the most common substance responsible for accidental ingestion. Snakes, scorpion & animal bites and stings contribute a significant burden in rapidly urbanizing rural landscape.

## KEYWORDS

poisoning, children

Poisoning is when the cells are injured or destroyed by the inhalation, ingestion, injection or absorption of toxic substance. Key factors that predict severity and outcome of poisoning are the nature, dose, formulation and route of exposure of the poison, co-exposure to other poisons. State of nutrition of the child along with age, preexisting health condition, availability & quality of medical facilities plays important role in the outcome (1,2).

With increasing urbanization and rapid socioeconomic development, we expect change in the profile of poisoning (2).

Accidental poisoning as compared to intentional poisoning in children is still an important public health problem and remains a frequent cause of admission in emergency units with preventable morbidity & mortality (3).

The incidence of childhood poisonings in numerous studies ranges from 0.33% to 7.6% (4) & 1-2% of total pediatric admissions (3). Poisoning is most commonly observed between 1-5 years of age and these children constitute 80% of all poisoning cases (4).

In the first year of life the main causes of poisoning are medications given by parents. At 2-5 years of age house cleaning products and kerosene oil which is still used as cooking fuel and over the counter medications kept carelessly in the house caused most cases of accidental poisoning (4).

Data from developed countries about profile of poisoning in children is available, whereas limited data & statistics from developing countries such as India is lacking. Limited available data shows childhood poisoning as considerable cause of morbidity and mortality in India.

The present study was conducted with an objective to assess profile of childhood poisoning at our centre.

## MATERIAL AND METHODS:

This was a retrospective study which was done at Rajiv Gandhi Medical College, Thane district, over the period of 5 years, from January 2014 to November 2018. It describes the clinical data of acute poisonings (oral and parenteral) in pediatric population from 0 to 12 years of age. Acute food poisoning cases were excluded from the study. Data was obtained from the records of all the patients and was transferred to standard forms and was submitted for statistical analysis. The age, sex, type of poison, manner of poisoning, symptoms, duration of hospitalization and outcome was evaluated.

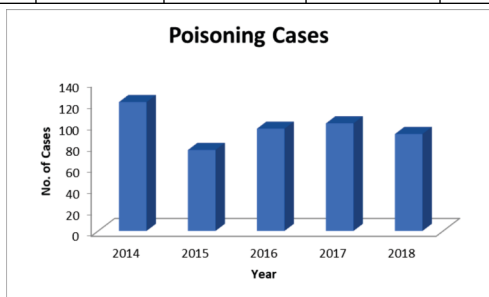
Approval from local ethical committee was taken before starting this study.

## RESULTS:

Total 485 patients admitted with acute poisoning were included in the study. Year wise distribution of poisoning cases is shown in figure 1.

**TABLE 1: YEARWISE DISTRIBUTION**

YEAR	TOTAL ADMISSION	PEDIATRIC ADMISSION	POISONING CASES	PERCENTAGE
2014	29031	3567	121	3.39
2015	29940	3646	76	2.08
2016	29425	3943	96	2.43
2017	30018	3977	101	2.53
2018	35334	4212	91	2.16
<b>TOTAL</b>	<b>153748</b>	<b>19345</b>	<b>485</b>	<b>2.50</b>

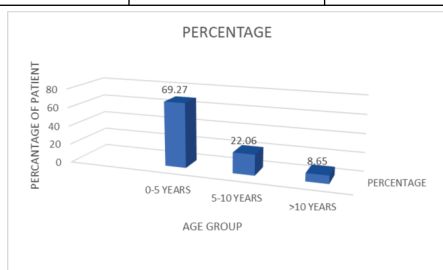


**Figure 1: year wise distribution**

Of them 289 (59.59%) were male and 196(40.41%) were females. Age and sex distribution are shown in the diagram (Table & figure 2 & 3).

**TABLE 2: AGE WISE DISTRIBUTION**

AGE GROUP	NUMBER	PERCENTAGE
0-5 YEARS	336	69.27
5-10 YEARS	107	22.06
>10 YEARS	42	8.65
<b>TOTAL</b>	<b>485</b>	



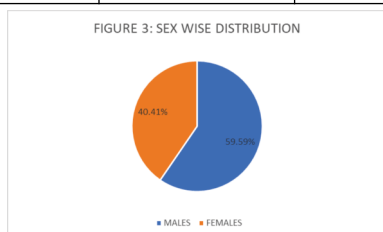
**FIGURE 2: Age wise distribution**

All the poisoning cases were accidental, none were suicidal or homicidal. All the poisonings took place at home except few as snake bites and scorpion stings. This may be because of the inclusion criteria of age, only preadolescent being included (0 to 12 years).

The age group more affected was between 1-5 years 336 (69.27%), between 5-10 years 107(22.06%), and > 10 years 42 (8.65%). Younger age group was mainly affected may be due to their inquisitive nature and mouthing practice.

**TABLE 3: SEX DISTRIBUTION**

<b>MALES</b>	289	59.59%
<b>FEMALES</b>	196	40.41%

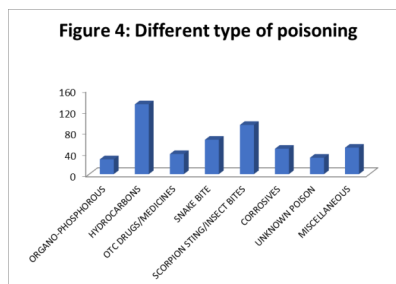


**FIGURE 3: Sex wise distribution**

Among various hydrocarbons, kerosene was the most common than others as diesel or turpentine. The most common poisoning was ingestion of kerosene 132 patients out of 485 (27.21%), as it is still commonly used as fuel, accidental ingestion is common as it is stored

in water bottles. Though nowadays color is added to it, to avoid confusion with water. But the blue colour may attract children and can be ingested.

Followed by kerosene poisoning, scorpion sting, 93 patients out of 485 (19.17%), and snake bites 65 out of 485 patients (13.40%) were found. Household cleansing agents as Phenyl, Lysol, was seen in 48 patients (9.89%). Insecticides were also seen in few cases. Over the counter medicines, sedatives or the medicines prescribed to the family members were also found to be cause of poisoning in 38 (7.83%) patients. The different poisonings which were observed in our study are mentioned in the figure 4.



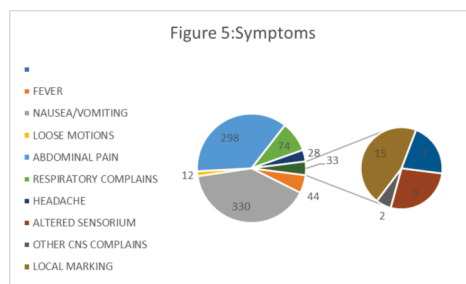
**Table 4: Different type of Poisoning**

NO	POISONING	CASES	PERCENTAGE
1	ORGANO-PHOSPHOROUS	28	5.77
2	HYDROCARBONS	132	27.21
3	OTC DRUGS/MEDICINES	38	7.83
4	SNAKE BITE	65	13.40
5	SCORPION STING/INSECT BITES	93	19.17
6	CORROSIVES	48	9.89
7	UNKNOWN POISON	31	6.39
8	MISCELLANEOUS	50	10.30
	<b>TOTAL</b>	<b>485</b>	

The symptomatology of presentation is mentioned in the Table & figure 5. Gastro-intestinal symptoms predominated the presentation 330(68.04%). Nausea and vomiting were present in 330 (68.04%), abdominal pain in 298(61.44%), followed by respiratory complaints 74(15.25%) and fever 44(9.07%) figure 5. The most critical presentation was respiratory muscle paralysis with ptosis in 1 case, convulsion in 1 case, and hematuria in 2 cases. They were associated with snake bite & scorpion sting.

**Table 5: symptomatology of presentation**

NO	SYMPTOM	PATIENT	PERCENTAGE
1	FEVER	44	9.07
2	NAUSEA/VOMITING	330	68.04
3	LOOSE MOTIONS	12	2.47
4	ABDOMINAL PAIN	298	61.44
5	RESPIRATORY COMPLAINS	74	15.25
6	HEADACHE	28	5.77
7	ALTERED SENSORIUM	9	1.85
8	OTHER CNS COMPLAINS	2	0.41
9	LOCAL MARKING	15	3.09
10	OTHER	7	1.44



All the patients were brought to the hospital immediately within two hours of ingestion of poisoning at our center. Total duration of stay in the hospital was 0-10 days and most of the patients were discharged within 48 hours. None of the patient died and 100% of the cases had favorable outcome.

**DISCUSSION:**

Poisoning in children is an important cause of morbidity and mortality especially in developing country. The incidence of poisoning can vary from 0.33 to 7.6 % of total admissions. It is very likely that this could be underestimated as most of the cases get unreported (2). Age, sex, demography, incidence, type of poison, nature of poisoning will vary as per the region (5,6). Oral poisoning was common in less than 5 years whereas parenteral poisoning was common after age of 5 years (6).

It is common cause of unnatural death in children. Poisoning is common in pediatric patients due to easy access, temperamental & behavioral changes. Increased screen media exposure, unreasonable expectations of parents. This pattern can be seen in intentional poisoning in older children (7).

In our study of 1,53,748, total admissions during this period, 485 cases of poisoning were admitted (2.5%). Nonfatal poisoning was found more common in the age group of 1-5 years (1,3,8). Younger children are more affected because of their inquisitive nature and as they are unaware of the consequences (5). Majority of these cases were accidental ingestion of poisonous agent due to curious nature and oral exploration of environment during this phase of growth (8,9). Also, their smaller size, less developed physiology, and higher concentration of toxins due to smaller weight, have dangerous effects. In older children suicidal poisoning can be seen.

Males are commonly affected due to their aggressive & explorative nature and relatively having more freedom. Higher stress, expectations & other social factors also contributes. They are brought to the hospital more promptly. (2,5,7). Most of the poisonings were oral ingestion. In parenteral poisoning snake bites & scorpion sting were common, which were seen in children <5 years due to outdoor games.

Intentional poisoning is seen mainly in older patients & adolescent. Stress being most common factor (5).

Hydrocarbons, insecticides, household items and over the counter medications are the most commonly identified substances (9,10). Kerosene was most common cause, as it is still used as fuel in many families. It is easily available and is mistaken with water hence accidentally consumed (2,8,11). Though nowadays it is marketed in blue color to avoid confusion, the vibrant color may attract the children. In other studies, also, it is found to be the most common cause of poisoning as in our study. Insecticide poisoning is also becoming major factor in increasing the incidence of poisoning. (2,5,7). But in our study kerosene was still found to be common cause of poisoning.

Drug poisoning is also common due to over the counter availability of the medications, excessive use of drugs, as well as negligence of family (4,5,9). It's found as most common cause in some studies (3,9). A broad group of drugs including anti-epileptics, anti-psychotics, iron and thyroxine were common medication (2). Public education regarding safety of medication, keeping it away from children in non-accessible places (9). Prescribing carefully or prescribing lesser toxic drugs, making the tamper-proof packing, these precautions will go long way in preventing accidental drug ingestion.

Food poisoning was not included in our study. Corrosive poisoning was seen in 9.8% cases. Mosquito repellent ingestion under miscellaneous poisoning was seen 10.30% in our study like others, this may be because of attractive & fragrant covering (8).

The commonest presenting complaints were related to gastrointestinal system as the commonest mode of poisoning was ingestion (9). Nausea, vomiting, abdominal pain were common symptoms. Respiratory complaints were seen due to vomiting and aspiration of kerosene (8). CNS complaints and hematuria were seen in scorpion bite & snake bite.

Supportive and symptomatic management is the main way of treating these patients. Gastric lavage is done in the most cases of poisonings, its useful only if patients are brought within 2 hours of ingestion of poisonous agent. It can't be practiced in cases of kerosene poisoning.

The overall mortality is 6% (8) but, there was no mortality in our cases as compared to other studies in India. (3). It may be due to early help, timely management & identification of poisonous agent. Most of the patients were discharged within 48 hours of admission.

Accidental poisoning is prevented by early detection & first aid. Strategic planning, Public education regarding this can help in better outcome. Nature of poison, dose consumed, level of availability of medical facility and time interval between intake of poison & arrival in the hospital will determine the outcome of these patients (12). Also, public awareness regarding storage of medicines, realizing the possibilities of poisoning, early rushing to health care services and creation of poison control cells can have better outcome in cases of poisoning (3,8,9).

In older patients the admissions due to poisoning are mainly intentional & suicidal 52%, followed by abuse 32%, ADR 9%, rest 6% (12).

In a study carried to compare demographic pattern & types of poisoning, drug poisoning was common in Delhi, kerosene was common in all states except Shimla, pesticide was common in Punjab and plant poisoning was common in west Bengal. Significant number of cases of snake envenomization was recorded from Maharashtra. More community surveys must be planned to find magnitude of the problem in different areas. (6)

So, some variation could be attributed to different geographical and socioeconomic background. (13)

**CONCLUSIONS:**

The trends of pediatric poisoning are not different from other studies. Poisoning is common cause of morbidity & mortality in children. All fatal & non-fatal poisonings are more commonly seen in lower socioeconomic status. Type of poison will vary as per the area, industry, local beliefs' and cultural practices. Also, the toxicity, nature, storage of the poisonous agents & access to it are also the risk factors. Most of the patients improved with conservative management and good supportive care.

Poisoning can be reduced by removing the poisonous agent from market or replacing it with less toxic product. Legislation for safe & smart tamper-proof packaging for products can reduce incidence of accidental ingestion in children. Medical association like IAP can issue consensus statement stressing need for this legislation. Poison control centers to triage poisonings with skilled personnel can give better outcome in managing these cases. Regional toxicology centers with equipped labs can help to guide and treat the problem

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