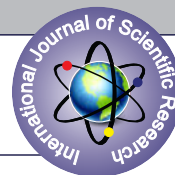


PATTERN AND OUTCOME OF ACUTE POISONING IN CHILDREN OF 1-12 YEARS AGE GROUP ADMITTED IN THE PAEDIATRIC WARD OF A TERTIARY CARE HOSPITAL**Paediatrics**

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ABSTRACT

BACKGROUND: Acute poisoning, a common, yet an important preventable cause of morbidity and mortality in children, is a paediatric emergency globally, responsible for 0.33% to 7.6% of the total paediatric admissions among various hospitals of India. This study was done to assess the changing trends, in the pattern and outcome of poisoning among 1-12 years children.

METHODS: This is an institution-based descriptive epidemiological study with cross-sectional design that includes a hundred children of one to twelve years age, conducted over a period of one and half years in the paediatric department of a tertiary care hospital in India.

RESULTS: In the study period, majority of the patients out of 100 admitted, were male (65%). Most of those (68%) belonged to the 1-3 years age group. The share of hydrocarbon poisoning (46%) was highest with 26 cases of Kerosene ingestion being the most in it. Important presenting complaints were vomiting, pain abdomen, tachypnoea, and pneumonitis. Only 1 patient died during the course, the cause of which remained unknown.

CONCLUSION: The pattern and outcome of acute poisoning in children was quite similar when compared to other studies from different hospitals in India. Survival rates have been increasing due to ongoing improvement in medical infrastructure, which one hopes, shall keep improving along with focus on preventive measures at community levels.

KEYWORDS

Acute poisoning, Hydrocarbons, Accidental, Children, Changing trends.

INTRODUCTION

Poisoning, a common, yet an important preventable cause of morbidity and mortality in children, is a paediatric emergency globally. The pattern of poisoning among the age group

1-12 years is mostly accidental barring some cases that are intentional at the higher ends of age group. Incidence varies globally depending on the type of poisons encountered, the extent of awareness about poisoning, the availability and access to healthcare facilities. Despite being a global problem, reliable morbidity data is lacking and not comparable among different geographical regions.

Among these the frequency of poisoning with substances of daily use in rural and suburban areas like Kerosene and organophosphates, etc are much more, as seen from many studies worldwide.

In a retrospective analysis of poisoning from 8 regional hospitals in different parts of India, paediatric poisoning constituted 0.23-3.3% of total poisonings. The mortality ranged from 0.64%-11.6%.

Pre-school children tend to be more affected with acute accidental poisonings because of their explorative nature that lures them into putting in mouth anything that comes in their way of venturing around; the tendency seemed to decline from after 4 years of age.

An analysis of poisoning cases reported to the National Poisons Information Centre, AIIMS, New Delhi revealed that the highest incidence of poisoning was due to household agents (44%) followed by drugs (19%), agricultural pesticides (13%), industrial chemicals (9%), animals bites & stings (5%), plants (2%) and others. Data from South India identified agrochemical pesticides as the most important agent of acute poisoning (49%) followed by drugs (15%). Corrosive ingestion may account for 0.3%-0.9% of paediatric admissions with death rates ranging from 0%-13%. Bradycardia, tachycardia, tachypnoea, apnoea, hyperthermia, etc are one of many presentations. Most cases have low morbidity and mortality upon conservative management.

Evolving homeostatic machinery and developmental shifts places children (including adolescents) at special risk of exposure and risks (exploratory exposure) to injurious agents.

Outcomes are better with protocol-based management in dedicated/experienced ICUs with close liaison with poison

information centres.

This study was carried out in the paediatric emergency ward of a tertiary care centre, Bankura Sammilani Medical College & Hospital, Bankura, West Bengal, to assess the changing trends in the pattern, type and outcome of acute poisoning.

METHODS

This is an institution based descriptive epidemiological study with cross sectional design which was carried out in Bankura Sammilani Medical College & Hospital, Bankura, West Bengal, India, over a period of one and a half year from April'2019 to September'2020. In all one hundred patients satisfying the inclusion criteria were considered for this study during the study period. Written consent was obtained from the guardian of the children and was kept confidential. Relevant information was collected by using a predesigned case record proforma, filled in every case by interviewing the guardians accompanying the child which included detailed history, clinical examinations, laboratory investigations, etc. Data analysis required Med Calc, IBM SPSS software version 25, comparison of proportion test and Chi-squared test. p-value < 0.05 was considered significant.

INCLUSION CRITERIA

- Children of 1-12 years presenting with definite history of exposure to toxic substances.
- Clinical features suggestive of possible poisoning.
- Parents/guardian willing to give written consent.

EXCLUSION CRITERIA

- Cases with food poisoning.
- Patients less than 1 year admitted in the Paediatric ward.
- Patients more than 12 years who are not admitted in paediatric ward of Bankura Sammilani Medical College & Hospital.

RESULTS

During the study period of one and a half years 100 children with acute poisoning were admitted satisfying the inclusion criteria. 65% were male leading to male to female ratio of 1.85:1 with increased percentages of hydrocarbon poisoning (67.39%), unknown substance (60%) and pharmaceuticals poisoning (63.6%) in male patients.

According to ethnicity most of the admitted ones belonged to non-tribal population (89%) and rest to the tribal ethnicity (11%).

Children belonging to the age group 1-3 years were found to be most susceptible to acute poisoning (68%), mean age being 3 years 5 months.

Table-1: Distribution of study patient according to age

Age group (years)	Percentage
1-3 years	68%
4-6 years	20%
7-12 years	12%

Most of the cases of acute poisoning occurred in rural setting (70%) and fewer occurrences were seen in urban settings (30%).

There were 46 cases (46%) of hydrocarbon poisoning, out of which 32 cases (69.56%) were from rural setting and 14 cases (30.44%) from urban setting. Total 26 cases of Kerosene poisoning and 15 cases (32%) of Turpentine ingestion were seen. This was followed by unknown substance ingestion/inhalation (15%), pharmaceuticals ingestion (11%), 7% cases of organophosphorous poisoning were seen.

Table 2: Table showing distribution of patient according to type of poisoning-

Types of Poisoning	Count
Abrus precatorius seed ingestion	1
Accidental levosalbutamol ingestion	1
Anti-psychotic poisoning	1
Carbolic acid inhalation	1
Cetrimide lotion ingestion	1
Cypermethrin ingestion	1
DDT exposure	1
Dhatura ingestion	1
Diesel ingestion	1
Ingestion of clonazepam tablet	1
Ingestion of Oral Contraceptive Pills	1
Iron tablet ingestion	1
Kerosene ingestion	26
Lorazepam tablet ingestion	1
L-thyroxine tablet ingestion	2
Mushroom ingestion	2
Nail-polish ingestion	1
Organophosphorus exposure	1
Organophosphorus poisoning	6
Paracetamol ingestion	1
Paracetamol overdose	1
Petrol ingestion	3
Pyrethroid poisoning	3
Rat kill poison ingestion	4
Soap ingestion	3
Turpentine oil ingestion	15
Thymate ingestion	1
Ultramarine poisoning	1
Unknown substance ingestion	14
Unknown substance inhalation	1
Urea poisoning	2
Grand Total	100

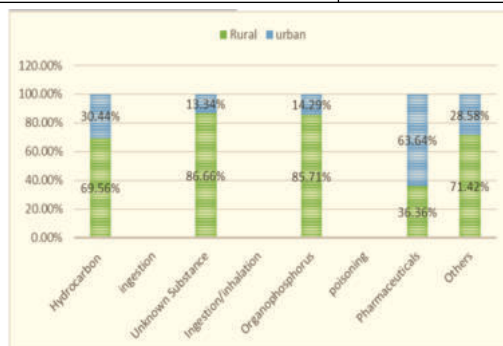


Figure - 1: Bar diagram showing distribution of patient according to type of poison and the setting of poisoning (rural/urban) -

Hydrocarbon ingestion was the most common cause and its occurrence was most documented in spring (32%) and monsoon season (32%). organophosphorous poisoning is more common in rainy season (71.42%).

The most common bracket of time elapsed till presentation, in case of residence in rural setting (72%) as well as in urban setting (56%), was 2-4 hours.

Ingestion (96%) was the most common route of poisoning, 2 cases (2%) of organophosphorous poisoning occurred by both dermal and by ingestion. Also in my study 100% of the patients accounted for accidental mode of poisoning.

My study also showed that 80% of the poisoning cases happened in the indoor environment and 20% in outdoor settings. Among them hydrocarbon (91.3%) and organophosphorous poisoning (100%) occurred in indoor environment. 66.67% of the unknown substance ingestion/inhalation occurred in the outdoor environment.

55% of patients did not develop any signs and symptoms. Among 45 who had signs, symptoms, 56.52% patients with hydrocarbon poisoning developed signs and symptoms leading to treatment and 43.48% required only observational care. 5 cases of organophosphorous poisoning and 1 case of Dhatura poisoning were treated with specific antidote. Gastric lavage was avoided in 81% of total admissions.

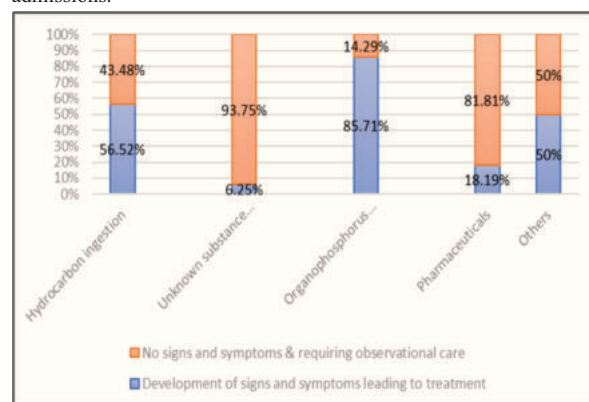


Figure 2- Bar diagram showing relation between type of poisoning & whether treatment was required or not due to development of signs and symptoms-

Gastrointestinal manifestations were the most prevalent presenting symptoms with vomiting (22%) and pain abdomen (16%). Cardiorespiratory signs and symptoms (tachypnoea, tachycardia, Bradycardia, cyanosis, wheezing, crepitations, and respiratory failure) in 35% were noted. Pneumonitis was seen to develop in 12 cases (26.09%) out of the 46 cases of hydrocarbon poisoning. Neurological signs and symptoms (irritability, drowsiness, convulsion, etc) were noted in 26% cases. 10% cases had fever.

Conservative management was done for 80% patients and only 6.6% required ventilation. 99% cases survived and there was only 1 death due to some unknown substance ingestion.

Table-3: Distribution of mortality in comparison to the type of poisoning -

Type of poisoning	Survived No. (%)	Not survived No. (%)	Total patients (%)
Hydrocarbon ingestion	46 (100%)	0 (0%)	46 (100%)
unknown substance ingestion/inhalation	14 (93.33%)	1 (6.67%)	15 (100%)
Organophosphorus poisoning	7 (100%)	0 (0%)	7 (100%)
Pharmaceuticals	11 (100%)	0 (0%)	11 (100%)
Others	21 (100%)	0 (0%)	21 (100%)

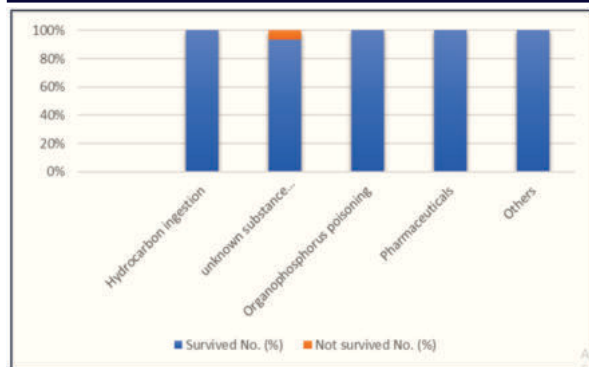


Figure 3- Bar diagram showing relationship between the type of poisoning and mortality associated with it –

Lower levels of Haemoglobin (<11 gm %) was seen as a finding in 84% cases. Most of the patients belonged to the upper lower class (45%) as per the modified Kuppaswamy classification of socioeconomic status.

DISCUSSION

With the increasing use of various chemical substances in households, the incidence of acute poisoning cases has also increased. Most of the poisoning in children is accidental, and most cases of accidental poisoning are preventable (1). In most cases, accidental poisoning in children is a result of oral ingestion of poisonous substances (household products, chemicals, drugs, pesticides, etc.) (2). The reported incidence of childhood poisoning in various studies varies from 0.3% to 7.6% (2-6). Such cases constitute 1-2% of total paediatric admissions in our country as per newer studies < 12 years (7,8).

In this study 65 (65%) of boys out of 100 patients and 35(35%) of girls were affected. Agarwal G et al showed that the maximum cases of their study were male (68.36%) out of 177 cases (9). Gupta S et al showed that acute poisoning in children is more common in boys compared to girls with a male to female ratio of 2.5:1(10). So, my study is corroborating with the following above-mentioned studies. Boys are more exposed to accidental poisoning which may be due to the impulsive nature of boys in comparison to the calm nature of girls at any age.

Majority (68%) affected by acute poisoning were in the age group of 1-3 years. Mean age of acute poisoning is 3 years 5 months. Median age of poisoning is 2 years 9 months at a standard deviation of 2.60105. Sarkar K et al showed that out of 134 cases, children falling in the age group of 1-3 year are most affected (11). Majority of the children with poisoning i.e 139 (54.94%) children were of the age group 1-4 years as per Sridhar PV et al (12). The findings of my study regarding the age distribution in case of acute poisoning in children are in line with other studies in India (9, 13, 14). Children in the age group of 1-3 year are more susceptible to poisoning in comparison to other age group because of their curiosity, exploratory behaviour, hand to mouth activity & inability to differentiate between harmful and harmless substance.

In my study 70% patients are from rural setting in comparison to 30% patients from urban setting (3, 12, 15, 16) probably due to the fact that our hospital caters more to the rural population. Majority (100%) of the poisoning were accidental in accordance to other studies (8, 12) and so was the route of poisoning which was ingestion (96%) (14, 17).

My study shows that 96 % cases were brought to our tertiary centre within 6 hours and only 4 cases after 6 hours of occurrence of poisoning. 4 cases took > 6 hours to reach us. Otherwise the findings are consistent with other studies (7, 18). This delay may be due to the ignorance by the parents or may be due to the appearance of symptoms at a later stage.

In my study 80% of the acute poisonings took place in the indoors in comparison to 20% in the outdoor setting. Among this, 91.3% of the indoor poisonings were hydrocarbon poisoning and in the outdoor setting unknown substance ingestion/inhalation was the most common (66.67%). Findings on these aspect of acute poisoning corroborates well with other studies (12, 14, 17).

In the matter of distribution of types of poisoning, hydrocarbon ingestion accounted for 46% of all poisonings and it comprised of 26 cases of Kerosene ingestion, 15 cases of Turpentine ingestion. It is

followed by 15 cases (15%) of unknown substance ingestion and inhalation and 7 cases of OP poisoning/exposure. Pharmaceuticals accounted for 11% of the patients admitted. The findings corroborated well with other studies (11, 12, 13, 14, 18, 19, 20). My study is based on admissions in a hospital catering more to rural population and with a lower socioeconomic status. The use of Kerosene as a fuel in cooking is still prevalent in these parts.

Kerosene ingestion was found to be highest among hydrocarbon ingestion and occurred mostly during spring (32%) and monsoon (32%) and organophosphorous poisoning peaked during monsoon season (71.42%).

In my study 55 % of the patients did not develop any symptoms and were kept under observation and discharged without any morbidity or mortality. 45% developed symptoms and were given treatment. It corroborated with other studies (1, 12, 14). Hydrocarbon poisoning was the main cause of poisoning that required treatment (56.52%) as well as observational care (43.48%).

Among the treated children, 80% patients received just conservative treatment in the form of iv fluids, iv antacids, iv antiemetic, iv painkillers, oxygen & iv antibiotics when needed. 81% patients did not require gastric lavage. 99% of the cases survived and 1 patient with unknown substance ingestion did not survive even after being given ventilatory support and this finding was in concordance with other studies (7, 12, 14, 20).

Gastrointestinal manifestations were the most prevalent presenting symptoms with vomiting (22%) and pain abdomen (16%). Cardiorespiratory signs and symptoms (tachypnoea, tachycardia, bradycardia, cyanosis, wheezing, crepitations, and respiratory failure) in 35% were noted. Neurological signs and symptoms (irritability, drowsiness, convulsion, etc) were noted in 26% cases. These findings were in line with other studies (7, 14). Pneumonitis was seen to develop in (26.09%) hydrocarbon poisoning. Also in my study 84% cases had Haemoglobin value < 11g%.

CONCLUSION

Acute poisoning continues to be an important cause of hospital admissions among children, more in the lower age group, with much of them belonging to a lower socioeconomic status. Most cases in this age group, as per my study had accidental ingestion and hydrocarbons topped the list. This is because of the community-wide excessive use of the products and the failure of adult members of family to keep them out of children. This warrants for increasing the knowledge and awareness among the parents about the variety of potentially poisonous substances, proper storage in child proof packs and their proper disposal, through holding workshops, national media and basic health education in schools. In our study most patients requiring treatment improved with conservative management, eliciting the importance of a concentrated supportive care in management of poisoned patients. This has been possible with improvements in medical infrastructure, which, one hopes will keep improving for upkeep of the child's health.

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Conflict of interest: None declared.

Ethical approval: This study got approval from institutional ethical committee of Bankura Sammilani Medical College, Bankura, India.

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