ORIGINAL RESEARCH

A Prospective Hospital-Based Study of Acute Childhood Poisoning

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ABSTRACT

Background: Poisoning in children is a worldwide epidemic, and there is no region in the world that is immune to this catastrophe. In paediatric practise, it is one of the most frequently encountered situations that could have been avoided. Both the cause of poisoning and the type of poisoning can vary greatly from one region of the world to another. This is because the availability of poison to children is influenced by a variety of factors, including population, socioeconomic standing, level of education, as well as local beliefs and practises.

Martial and Methods: A future hospital-based study in India with a prospective design. Over the course of three years, beginning in June 2021 and ending in June 2022, children hospitalized to Sambaram Institute of Medical Sciences and Research with suspected acute poisoning were the subjects of a study that was designed as a prospective investigation. A parent or other relative who was present throughout the interview provided background information about the youngster.

Results: 210 children were found to be suffering from acute poisoning. There were 125 males, and there were only 85 girls. In 110 of the instances, household goods were involved, while pharmaceuticals were involved in 62, toxic plants were involved in 21, agrochemicals were involved in 13, and other substances were involved in 4.

Conclusion: In conclusion, I would like to offer some suggestions for some strategies that can assist to minimize the prevalence of childhood poisoning in India, in addition to the morbidity and death associated with it. Keep the containers of kerosene oil securely sealed and out of the reach of youngsters at all times. Do not keep kerosene oil in soft drink bottles. Make people aware of the potential risks associated with vomiting after consuming kerosene oil. Keep any agricultural chemicals in a secure location. Instruct the general public on how to properly dispose of unused medication.

Keywords: Hospital, prospective study, acute, childhood, poisoning.

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INTRODUCTION

Accidental poisoning is a common occurrence among children, however the effect is typically not fatal.[1,2] In many cases, only very little doses of the poison are actually consumed, and there is doubt regarding whether or not it will prove to be innocuous or whether or not immediate aggressive steps should be implemented. Poisoning in children is the consequence of a complicated interplay involving the child, a hazardous substance, and the surrounding environment. There are a number of contextual elements at play here, including but not limited to: the time of day, proximity to meals, availability of product, previous experience with the substance, and the level of family stress.[2,3] Because it is possible to avoid poisoning in children, there is a pressing need to improve preventative

measures. The young children need to be subjected to close monitoring and round-the-clock vigilance at all times. The most effective method of prevention would be to educate and raise awareness among parents about the proper storage of potentially dangerous substances and medications found in the home. The storage of poisonous household goods and the distribution of medicines in containers that are resistant to being opened by children would also be a valuable modality.[4-6] It is imperative that children not have access to any potentially lethal substances, including medications and chemicals. Because the kitchen is the location where people are most likely to become poisoned, the usage of free-standing kitchens should be encouraged. Other efforts include the adoption of safe packaging, the use of bottle lids that prevent children from opening them, and the training of paramedical workers and rural health personnel on the fundamental concepts of identifying potentially hazardous substances and safely storing them. [Figure 1] indicating the Schematic presentation of general rate of poisoning.[7-9]

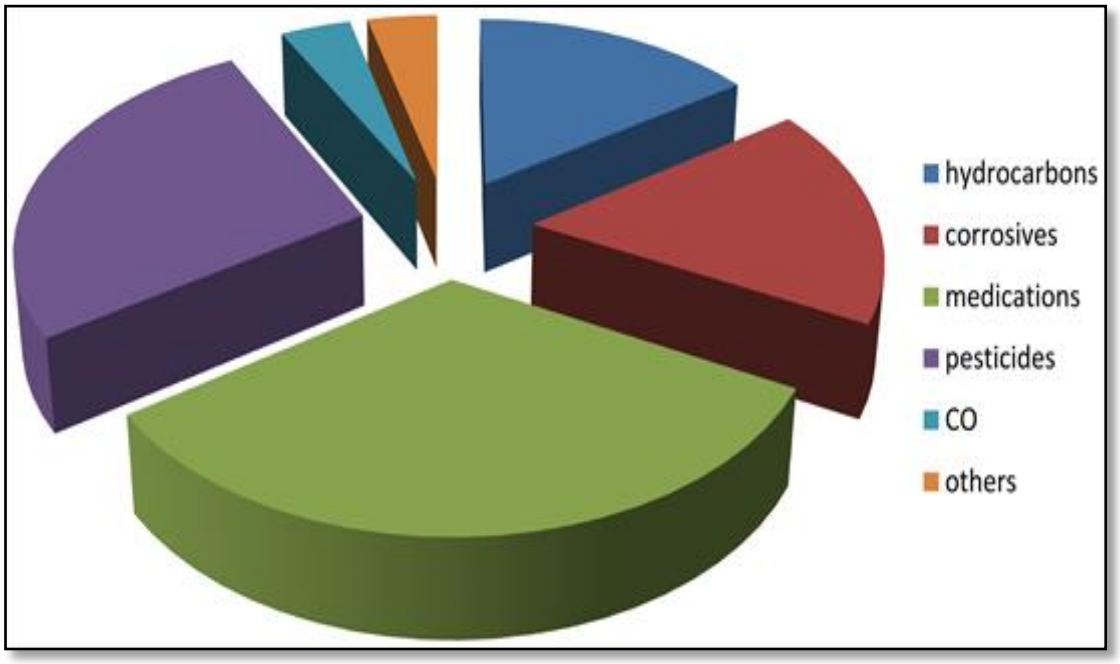

Figure 1: Schematic presentation of general rate of poisoning

The time has come to establish poison information centres in a number of different regions of the country with the overarching goal of preventing and reducing the incidence of childhood poisoning as well as the morbidity and mortality those results from it through the dissemination of information to the general public. In order to facilitate the treatment of poisoning, it is imperative that information regarding toxic substances be made accessible to all users across the nation. In light of recent technical developments, it might not be too difficult to bridge the gap between traditional communication methods like the telephone and more modern ones like the internet. The poisoning of children is a worldwide epidemic, and there is no region in the world that is immune to this catastrophe. In pediatric practice, it is one of the most frequently encountered situations that could have been avoided.[10] Both the cause of poisoning and the type of poisoning can vary greatly from one region of the world to another. This is because the availability of poison to children is influenced by a variety of factors, including population, socioeconomic standing, level of education, as well as local beliefs and practises. The poisoning could have been the result of an accident, attempted suicide, attempted homicide, an industrial hazard, food, or an unknown cause. Even though the prevalence of infant poisoning in different Indian hospitals ranges from 0.3 to 7.6 percent,

the incidence appears to be considerably greater given that there is no community-based study coming from India.[11,12]

MATERIALS & METHODS

Over the course of three years, beginning in June 2021 and ending in June 2022, children hospitalized to the Sambaram Institute of Medical Sciences and Research with suspected acute poisoning were the subjects of a study that was designed as a prospective investigation. A parent or other relative who was present throughout the interview provided background information about the youngster. The patient underwent a thorough medical examination, and the relevant investigations were carried out. During their time in the hospital, children were monitored and the treatment that was administered was documented. The patients who experienced issues were monitored in the clinic. Both food poisoning and poisoning caused by snake venom were expressly excluded from the scope of the study.

RESULTS

During the time period of the study, a total of 210 children presented at Sambaram Institute of Medical Sciences and Research with acute poisoning. There were 125 males and 85 females in all. A spectrum of ages from two weeks to twelve years was present. Table 1 presents the age breakdown of the population.

Table 1: Children as per Age Distribution

Sr. No.	Age(years)	No. of children
1.	<1	45
2.	1-3	85
3.	4-5	50
4.	6-12	30

In 200 cases, poisoning was caused by ingesting, in 10 cases it was caused by inhalation, and in one case it was caused by cutaneous absorption. Insecticide spray, chlorine gas, anti-rust spray, and the fumes from gasoline were the substances that were breathed in. An organophosphate insecticide was what was absorbed through the skin throughout this process. In 105 of the cases, the toxin involved was a domestic product, while pharmaceuticals were involved in 55, toxic plants were involved in 30, agrochemicals were involved in 15, and other substances were involved in 5 cases. [Table 2] displays the various consumer goods that are under question.

Table 2: Different Household products

Sr. No	Household product	No. of children
1.	Kerosene oil	20
2.	Mosquito coils	15
3.	Turpentine	10
4.	Toilet disinfectant	05
5.	Paint thinner	02
6.	Bleaching powder	03
7.	Caustic soda	05
8.	Moth balls	04
9.	Dyes	05
10.	Detergents	08
11.	Match-heads	04

12.	Air freshener	04
13.	Eau de Cologne	01
14.	Glue	02
15.	Furniture polish	03
16.	Perfume	02
17.	Rubber paint	01
18.	Brasso	01
19.	Crayon	01
20.	Torch battery	03
21.	Rigifoam	02
22.	Polythene	01
23.	Salt-petre	01
24.	Mosquito repellent	02

Kerosene oil was the most prevalent product found in homes that had been accidentally consumed, accounting for 20 cases. After receiving reprimands from their parents, six children made the conscious decision to consume kerosene oil. After having an argument with her husband and mother-in-law, a young woman in her teens purposefully gave her infant child kerosene oil to drink. The child was only three weeks old at the time. In my series, a total of 15 children were given coconut milk to induce vomiting, and ten of them really threw up after being given the milk. Ingestion of kerosene oil by five youngsters resulted in the development of pneumonitis, which was treated with antibiotics, with or without steroids. After ingesting kerosene oil, 85 percent of the youngsters who later developed pneumonitis threw up. Two children tragically lost their lives as a result of consuming kerosene oil. Before being admitted to the hospital, all of the patients had thrown up, and their chest x-rays showed substantial pneumonic alterations. They were also sleepy and tachypnoeic. Despite the use of mechanical ventilation and intercostal drainage, both patients ultimately passed away after developing pneumothorax, pneumomediastinum, and pneumopericardium. Two weeks after ingesting kerosene oil, children who had pneumonitis developed pneumatocoeles, but when they were followed up on, these lesions had vanished within six months. [Table 3] presents the cases in which drugs were consumed.

Table 3: Drugs ingested cases

Drug	**No. of children**
Drugs for local use	30
Anticonvulsants	10
Psychiatric drugs	05
Miscellaneous drugs	05
Unidentified drugs	05

Surgical spirits, cetrimide lotion, camphor oil, Whitfield lotion, methyl salicylate lotion, and calamine lotion were some of the topical anaesthetics and anti-inflammatory medications that were available. The majority of these medications were supplied at the outpatients department of Lady Ridgeway Hospital into containers that were brought by parents, and there was absolutely no labelling done at any point in the process. These unlabeled containers were frequently stored on the same shelf or table as the bottle of cough syrup or gripe water that was intended for the baby. Ingestion of stelazine and haloperidol was frequently accompanied by oculogyric crises and dystonic responses, and therapy with benzhexol was found to be effective in alleviating these symptoms.

There were four deaths that occurred as a result of minors consuming narcotics. The first person to pass away was an 18-month-old boy who had unintentionally consumed 30 tablets of imipramine. He was unresponsive and had erratic breathing when he was taken to the intensive care unit (ICU), where he was given mechanical ventilation and gastric lavage was performed using a cuffed end tracheal tube. After that, he began to experience arrhythmias, low blood pressure, and fits. He never came back to consciousness and ultimately passed away despite receiving therapy. The second person to pass away was a young girl of 10 years old who had knowingly consumed 43 tablets of phenobarbitone before her passing. Her breathing was all over the place and she was deeply unconscious. She was taken to the intensive care unit where she was given forced alkaline diuresis and mechanical ventilation, but she did not survive the first day. [Table 4] has a listing of all the poisonous plants that were consumed.

Table 4: Various poisonous plants ingested

Sr. No.	Poisonous plant	No. of children
1.	Jatrophus curcas	06
2.	Ricinus communis	04
3.	Dieffenbachia/Alocasia	02
4.	Adenia palmata	03
5.	Amanita phalloides	01
6.	Manihot utilissma	04
7.	Nicotiana tabacum	02
8.	Thevetia peruviana	03
9.	Gloriosa superba	03
10.	Abrus precatorius	01
11.	Datura stramonium	01

The two types of dangerous plants that were consumed the most frequently were Jatropha curcas and Ricinus communis, which accounted for a combined total of 43% of cases. Nausea, vomiting, tiredness, abdominal discomfort, and diarrhoea were the symptoms of the poisoning, which ultimately led to dehydration, an electrolyte imbalance, and shock as a result. The majority of the children had consumed between one and three seeds, while a minority had had between five and six seeds. Gastric lavage and intravenous rehydration were the only forms of treatment that were administered, and everyone made a full recovery without any complications.

14% of the cases involved poisoning with a member of the Dieffenbachia family. The youngsters complained of symptoms including itching, swelling of the lips and tongue, and ulceration of the mouth; these symptoms were treated symptomatically.

Youngsters who had consumed toxic plants were responsible for the deaths of two other children. The first person to pass away was a five-year-old child who had consumed manioc and then followed it up with ginger tea. Two hours later, he began to have recurring convulsions, grew tired, and began vomiting for the first time. He was given ventilation in the intensive care unit, but he did not survive more than a day. There were no specific antidotes that could be used. The second person to pass away was a five-year-old boy who had consumed Adenia palmatum fruit that had been found growing wild on creepers close to a paddy field. He began to experience a high fever, as well as fits, diarrhoea, and vomiting that contained blood, and lethargy. He passed away in spite of receiving anticonvulsants, blood transfusions, and IV hydration therapy. Necrotizing enteritis was discovered during the autopsy of the deceased. [Table 5] includes all of the different agrochemicals that might cause toxicity.

Table 5: Various Agrochemicals

Sr. No.	Agrochemical	No. of children
1	Insecticides	08
2	Rodenticides	05
3	Herbicides	02

Six percent of poisonings were caused by agricultural pesticides. There were no fatalities reported as a result of insecticides or rodenticides being consumed. Two of the seven youngsters who accidentally ingested the herbicide paraquat died as a result. In the first incident, a young child of 11 years old consumed intentionally some paraquat after getting in trouble with his father. After two days, he began experiencing difficulty swallowing, oral ulcers, and jaundice. After that, he ended up with subcutaneous emphysema of the neck as well as increasing dyspnea, and he passed away after five days. In the second incident, a daughter of two years old was coerced by her parents into drinking paraquat, after which both of the kid's parents took their own lives.

DISCUSSION

In developing countries, ingested compounds represent household toxins. Kerosene oil used for heating accounts for 60% of poisoning in India, according to one study. In my series, 30% of poisonings involved medications and 50% involved home items.[13] 36% of Indian youngsters were poisoned by kerosene oil. Several variables contribute to kerosene oil poisoning. Almost every home has kerosene oil. Second, kerosene oil containers are commonly kept in conveniently accessible places like the kitchen floor, a low table, or a low shelf. Children commonly mistake kerosene oil for soft beverages due of its colour. In kerosene oil poisoning, there are 2 major pathogenic effects: an irritative effect on lung alveolar walls with rapid development of chemical pneumonitis and a lowering effect on the brain from absorption of poisonous material from the alimentary and respiratory tracts. In India, moms induce vomiting after kerosene intake using coconut milk. Vomiting causes aspiration. Publicize the dangers of kerosene oil emesis. Due to its low surface tension and high vapour pressure, even a few ml of kerosene oil in the airways causes severe pneumonitis. 6% of poisonings involved mosquito coils. These contain low amounts of pyrethrins or synthetic pyrethroids, and their toxicity is low due to inadequate absorption. Nobody needed treatment.[14]

Local drugs were often stored in unlabeled vials with baby medication. Most of these substances were accidentally given to children by adults. These containers should have a red caution sign saying they shouldn't be taken orally. Anticonvulsants and psychiatric medicines are frequently prescribed fortnightly or monthly so they're always on hand. Children emulate adults who regularly use these medications. Not surprisingly, youngsters regularly swallowed these medications. Coloring and sugar coating may not cause unintentional poisoning. Adding attractions to toxic medications is unwise. A youngster consumed 20 lozenge-type paracetamol tablets. Sweetness is more hazardous than colour. Weta and Beheth endaru seeds contain poisonous glycoproteins curcin and ricin. Ingestion of 2-6 seeds can be fatal11. Some kids in my series at 5-6 seeds, but no one died. Intense vomiting after intake likely reduced my patients' toxicity.[15]

Ginger can release hydrocyanic acid from glycoside. Children accidentally eat 'Hondala' fruit because it resembles passion fruit. The fruit includes cyanogenic glycoside, toxalbumin, and emulsin, which can emit hydrocyanic acid. Toxalbumin causes necrotizing enteritis. Poison control centres give information to physicians on chemicals, toxicity, predicted symptoms, and recommended therapy in situations of acute poisoning from domestic goods and pharmaceuticals.

A multicenter investigation found that transparent blister packs were more harmful than opaque blister packs, strip packs, and sachets. Safer packaging doesn't replace parental vigilance, kid guidance, or safe storage. It adds safety with minimal parental effort. Pharmaceuticals, household items, and agrochemicals need safer packaging. Stickers are placed on hazardous items to prevent youngsters from handling or ingesting them. One study demonstrated that poison safety stickers may not dissuade children from touching marked toxins. Prescriptions must include the drug's name and strength. This can help identify drugs in emergency situations like accidental poisoning and reduce medication mix-ups at home. The preschooler ingests a wide assortment of poisons, indicating he'll eat anything visible and accessible. In my series, lack of adult supervision and negligent storage and disposal of poisonous items caused unintentional preschool poisoning.

CONCLUSION

In conclusion, I would like to offer some suggestions for some strategies that can assist to minimize the prevalence of childhood poisoning in India, in addition to the morbidity and death associated with it. Keep the containers of kerosene oil securely sealed and out of the reach of youngsters at all times. Do not keep kerosene oil in soft drink bottles. Make people aware of the potential risks associated with vomiting after consuming kerosene oil. Keep any agricultural chemicals in a secure location. Instruct the general public on how to properly dispose of unused medication. You should not throw away any unused tablets in the yard or on the road. It is important to remind parents that children are excellent imitators and should not see them taking medicine in front of them. Before administering any medication, the label on the bottle should always be read. Be sure to name all of your medications, and include a warning label in bright red on any bottles that contain topical preparations. It is not a good idea to store medicine in empty cough syrup or gripe water bottles because doing so makes it more likely that mistakes will be made. Children in schools should be made aware of all aspects of the dangers of childhood poisoning. Advice drug producers that they should refrain from making their products look more appealing to young people. Keep infants and toddlers under close watch at all times because unintentional poisoning is most common in children of this age. Child-resistant packaging should be used when dispensing medications such as anticonvulsants and psychiatric medications that are administered on a fortnightly or monthly basis.

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