Research Article

Patterns of acute poisoning in children: an epidemiological study from a tertiary care centre

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Abstract

Objectives: Acute poisoning in children is an important public health problem worldwide. It is responsible for 0.33% to 7.6% of total admissions in pediatric wards at various hospitals across India. The aim of this study was to assess the pattern of acute poisoning among children (birth to 12 years).**Methods:** We retrospectively reviewed the hospital records of all children from birth to 12 years of age with definitehistory of poisoning during the 3 years period from October 2012 to September 2015.**Results:** Of the 203 patients admitted with acute poisoning during the study period, majority (81%) were between 1 to 6 years of age. Male to female ratio was 1.36:1. 68.96% were from rural areas and 31.04% from urban areas.Household products (50.24%), drugs (28.07%), and pesticides and rodenticides (13.30%)were the most frequentlyimplicated agents. Kerosene was major household product implicated. Among drugs, analgesics and antipyretics are commonly implicated. The nature of poisoning was accidental in 98.03% cases. Systems involved in the order of frequency were gastrointestinal, cardiorespiratory, neurological, and others. 89% were discharged after treatment, 5.91% went absconding, 3.44% left against medical advice, and 0.98% expired. Both children who died were 3 years of age and had organophosphorous poisoning. **Conclusion:** The pattern of acute poisoning in children noted at our centre was not very different from that observed in other hospitalbased studies from India. There is a strong need for preventive campaign to reduce the occurrence acute poisoning in children.

Key words: Poisoning, Accidental, Intentional, Children and Adolescents.

Introduction

"Poisoning" refers to an injury that result from being exposed to an exogenous substance that causes cellular injury or death [1]. Poisons can be inhaled, ingested, injected or absorbed. The exposure may be acute or chronic and the clinical presentation will vary accordingly. Theseverity of poisoning and its outcome are determined by many factors such as the type of poison, the dose, the formulation, the route of exposure, the age of the child, the presence of other diseases or injuries, and the time interval from theexposure to poison to hospital visit. Acute poisoning in children is an important pediatric emergency and one of the important public health problems worldwide. It is responsible for 0.33% to 7.6% of total admissions in pediatric wards and pediatric intensive care units at various hospitals across India[2].

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Young children are particularly susceptible to the ingestion of poisons, because they are curious and explore their world with all their senses, including taste. Poisoning is predominantly accidental particularly in children below 5 years of age but might be increasingly self-inflicted in older children. Accidental poisoning in the children results from a complex interaction between the child, a hazardous substance and certain environmental factors. Improper storage of poisonous substances and insufficient supervision by parent or caretaker can cause acute poisoning in children, which may be of fatal consequences to the child.

Pattern of acute poisoning in children varies between the different parts of the world as well as within the country and is influenced by age of the child, socioeconomic status of the family, occupation and educational status of parents, and local beliefs and customs of the community. There are few studies available from South India that describes the pattern of

acute poisoning among children. The present study was conducted to assess the pattern of acute poisoning among children (birth to 12 years), so that related preventive measures can be undertaken.

Patients and Methods

This was a retrospective study conducted at department of pediatrics, Kamineni Academy of Medical Sciences and Research Centre, Hyderabad, during the 3 years period from October 2012 to September 2015. We reviewed the hospital records of children from birth to 12 years of age, who were admitted with definite history of acute poisoning and were included in this study.

Children with food poisoning, toxic or idiosyncratic reaction to prescribed drugs, snake bites and scorpion stings were excluded from the study.

The relevant clinical data such as age, sex, type of residence (rural or urban), place of poisoning, mode of poisoning (accidental or intentional), route of poisoning, type of poison consumed, time interval between exposure and admission to hospital, presenting symptoms and signs, and outcome were collected in a predesigned proforma. Collected data were compiled on Microsoft Excel and analyzed by means of proportion. The study was approved by institutional ethical committee.

Result

During the study period (October 2012 to September 2015), the total admissions of children up to 12 years of age to the department of pediatrics were 8753, of which 203 (2.32%) had acute poisoning.Sex wise, 117 (56.63%) were males and 86 (42.37%)were females, giving a male to female ratio of 1.36:1.

The type of residence was rural area in 140 (68.96%) cases and urban area 63 (31.04%)cases. Age wise, the majority i.e., 103 (50.73%) cases belonged to 1 to 3 years age group, 62 (30.54%) between 4 to 6 years, 23(11.33%) between 7 to 12 years, and15 (7.38%) below 1 year of age. The demographic profile and clinical data of poisoned children was shown in Table1.

The place of poisoning was home in 171 (84.23%) cases and outside the homein 32 (15.76%) cases. The mode of poisoning was accidental in 199 (98.03%) children and intentional in 4 (1.97%)children. All the children with intentional poisoning were more than 10 years of age.The routes of exposure were oral in 198 (97.54%) cases and 5 (2.46%) cases were exposed through inhalation. All these inhaled exposure cases occurredaccidentally in the farms with organophosphorous compounds.

The time interval between exposure to poison and admission to hospital was less than 3 hours in 73 (35.96%) cases, 3 to 6 hours in 92 (45.32%) cases, and more than 6 hours in 38 (18.71%) cases. The type of poison involved were household productsin 102 (50.24%) cases, therapeutic drugsin 57 (28.07%) cases, pesticides and rodenticides in 27 (13.30%) cases, toddy (country liquor) in 5 (2.46%) cases, and unknown productsin 12(5.91%) cases.

Among the household products, kerosene was involved in 76 (74.50%) cases, followed by detergents in 10 (9.80%) cases, parathrium (mosquito repellant) in 7 (6.86%) cases, phenyle in 5 (4.90%) cases and turpentine oil in 4 (3.92%) cases. Out of 76 patients with kerosene ingestion, 58 (76.31%) had accidental ingestion of kerosene which was kept in mineral water bottle / soft drink bottle.

Therapeutic drugs constituted 57 (28.08%) cases of acute poisoning, of which 23 (40.35%) had poisoning with analgesics and antipyretics, 12 (21.05%) with antihistaminics and atiemetics, 8(14.03%) with cardiovascular drugs, 6 (10.52%) with antiepileptics, 1 (1.75%) each with antipsychotics, cough suppressant and antimalarial, and drugs were not identified in 5 (8.77%)cases.

Of the 27 cases of poisoning with pesticides and rodenticides organophosphorous was involved in 12 (44.44%) cases, organochloride (endosulphan) in 6 (22.22%) cases, and zinc phosphide (rat poison) in 8 (29.62%) cases. Gastrointestinal symptoms (nausea, vomiting, or abdominal pain) were noted in 107 (52.72%) children, cardiorespiratory (breathlessness, tachycardia/bradycardia, hypotension, or arrhythmias) in 67 (33%) cases, neurological (abnormal tone, altered level consciousness, or ataxia etc.) in 33 (16.16%) cases, and others (skin, eye, nose etc.) in 26 (12.81%) cases.

Of the total cases of acute poisoning admitted, 182 (89.65%) were discharged from the hospital, 12 (5.91%) went absconding, 7 (3.44%) had left the hospital against medical advice (LAMA), and 2 (0.98%) expired. Among the discharged children, 115 (56.65%) were discharged within 48 hours of admission, 75 (36.94%) between 2 to 4 days and 14 (6.89%) after 4 days. Twochildren died, one boy and one girl, both 3 years of age.

This gives a proportionate mortality rate of 0.98%. Both the childrenhad accidental poisoning with organophosphorous compounds and were brought from rural area to the hospital more than 6 hours of ingestion of poison.

Table 1: Demographic and clinical data of children with acute poisoning.

Variable	Number	Percentage
Age (years)		
<1 year	15	7.38%
1–3 years	103	50.73%
4–6 years	62	30.54%
7–12 years	23	11.33%
Sex		
Male	117	57.63%
Female	86	42.37%
Residence		
Urban	140	68.96%
Rural	63	31.04%
Place of poisoning		
Home	171	84.23%
Outside home	32	15.76%
Mode of poisoning		
Accidental	199	98.03%
Intentional	4	1.97%
Route of poisoning		
Oral	198	97.54%
Inhalation	5	2.46%
Time interval between exposure and admission to hospital		
<3 hours	73	35.96%
3-6 hours	92	45.32%
>6 hours	38	18.72%
Type of poison		
Household products	102	50.24%
Drugs	57	28.08%
Pesticides and rodenticides	27	13.30%
Toddy (country liquor)	5	2.46%
Unknown products	12	5.91%
System involved		
Gastrointestinal	107	52.71%
Cardiopulmonary	67	33.00%
Neurological	33	16.26%
Others (skin, eye, and nose)	26	12.81%
Outcome		
Discharge	182	89.65%
Absconding	12	5.91%
Left against medical advice (LAMA)	7	3.44%
Death	2	0.98%

Discussion

Acute poisoning is one of the important causes of morbidity and mortality among pediatric patients in developing countries including India. It accounts for 0.33 to 7.6% of bed occupancy in children hospitals and pediatric intensive care units across India [2].

In the present study, children between 1 to 3 years were most commonly involved, followed by 4 to 6 years of age group. This finding is consistent with most of the other studies from India [2, 3, 4]. Children between 1 to 6 years age group are most vulnerable to accidental poisoning, because they are mobile, inquisitive, and cannot differentiate between harmful and harmless things.

Acute poisoning was more common in males than in females in the present study; similar pattern was observed in various studies from India and abroad [2-7]. Poisoning in children is male predominance as they are more active with a drive to explore the environment.

The majority of the children were from a rural background as our hospital caters to a large rural population. Most of the poisoning has occurred at home in our study. The mode of poisoning was accidental in majority of children, whereas intentional poisoning was observed in 4 cases.

Of the intentional poisoning cases, 3 occurred following fight with parents and in 1 following fight with sibling. The oral route was the most common route of poisoning in our study in accordance with results of others studies [8,9].

Household products, drugs, and pesticides and rodenticides were the most frequently implicated substances in our study. Among the household chemicals, Kerosene was the major culprit; similar data was reported by previous studies from India and Pakistan [2,4,10].

Kerosene is mostly used as a cheap cooking fuel and in lighting by low income families in rural areas, and is frequently stored in empty soft drink bottles that are kept on the floor, within easy reach of the children. No deaths were reported due to kerosene ingestion in our study.

Therapeutic drugs were the second most common cause of acute poisoning in our study; similar report was found by Singh et. al. from India[4].

The most common therapeutic drugs implicated in our study were analgesics and antipyretics. Among the pesticides, organophosphorous compounds were found be the most common implicated agent.

The systems involved in the order of frequency in our study were gastrointestinal, cardiopulmonary, and neurological. Our findings are in conformity with findings reported by B A Hassan et al [7]. Mortality was more with organophosphrous poisoning, especially if the patient were brought to the hospital after 6 hours of exposure.

Conclusion and Recommendations: Acute poisoning is an important cause of morbidity and mortality among children. It is predominantly accidental in nature and common between 1 to 6 years of age group with male predominance. Kerosene and therapeutic drugs are commonly implicated substances. This may be due to inquisitiveness of young children as well as carelessness of adults.

The incidence of accidental poisoning can be reduced by safe and child resistant storage ofhousehold chemicals and medicine, strengthening of pesticide act and health education including adolescent counseling.

As this study was based on hospital based admission, there is an urgent need for community survey to find out the pattern of poisoning among children, so that appropriate health education programme for prevention of acute poisoning can be planned and implemented.

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