

Childhood Poisoning, A Rising Epidemic in Developing Nations: Large Single Centre Study

Mishra S¹, Ramkumar TV², Biswas AK³, Panigrahi S⁴

Abstract

Introduction: Poisoning is a major problem in children. The aims of this study were to determine the pattern of poisoning in children along with seasonal incidence, duration of treatment and outcome in referral centre of eastern India. **Materials and Methods:** All the children admitted to paediatric ward of MKCG Medical college and hospital from 1st April 2015 to 31st March 2016 (1 year) with history or suspicion of poisoning and animal bites were included in the study. Brought dead patients and the children with side effects due to ingested drugs in prescribed amount were excluded from the study. **Results:** Total 530 cases were documented with highest incidence in rainy season. 1-6 years children were mostly vulnerable (42.6%). Accidental mode was the major cause in small children and suicidal, in older. Animal bites and stings (n=241) were the commonest followed by chemical poisonings. Kraits were commonest culprit in snake envenomation group. Alprazolam was most common drug causing drug overdose. Total numbers of death were 27. Major cause of death was organo-phosphorus poisoning (OP) and snakebite. Mean days of hospitalization was 2.5 days and death after hospitalization was 1.8 days. **Conclusion:** Most of the childhood poisonings were due to accidental cause. Animal bites were mostly due to snakes. Maximum numbers of deaths were due to OP poisoning. Watchful observation, clean and clear environment, understanding the problems of adolescence, friendly atmosphere in home can prevent most of the poisonings and animal bites in children.

Key words: accidental, childhood poisoning, envenomation, kerosene.

Introduction

According to WHO data, in 2012 an estimated 193,460 people died worldwide from unintentional poisoning. Out of this 84% occurred in low- and middle-income countries. Whereas it has been estimated that about 5 million snake-bites occur each year, resulting in up to 2.5 million envenoming, at least 100,000 deaths and around three times as many amputations and other permanent disabilities. Out of them 41.9 poison exposures are seen in children younger than 6 years/1000 children¹. From WHO data it's apparent that

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poisoning is a major problem in children all over the world². The pattern of poisoning has been changing with new hazards constantly appearing due to introduction of new drugs and chemicals. Childhood poisoning is usually accidental, but suicidal causes are also common in older children due to stressful life. The trends and patterns for paediatric poisoning in developing countries like India are same as it was decades ago, despite the rapid socioeconomic development^{2,3}. In sharp contrast to developing countries, where majority of poisonings are due to common non-toxic household products, most of our patients require hospitalization because of severe symptoms related to dangerous nature of toxins ingested². Cautious parenthood can save many children and adolescents from acute poisoning. There is dearth of large studies to quantify the problem and its solution. The aim of this study was to determine the pattern of poisoning in children along with seasonal incidence, duration of treatment and outcome in department of paediatrics, MKCG Medical College, Odisha, a large referral centre of eastern India.

Materials and Methods

The present study was a prospective observational study conducted over a period of 1 year (1st April 2015-31st March 2016) in department of pediatrics, MKCG Medical College and hospital, Odisha, a tertiary teaching hospital in India. Children with history of consumption of poisons/ bites/ stings and/ with features of poisoning, without actual history were included in the study. The children with side effects due to ingested drugs in prescribed amount were excluded. All the cases were admitted in hospital for at least 24 hours. Following admission, the following data were recorded in a Proforma.

- Duration between consumption of poison and onset of symptoms,
- Delay in hospitalization and duration of treatment were noted in all children in the study.

In case of bites and stings, details of type of bite, site of bite, time of bite were noted. Supportive care and specific treatments were given depending on the type of poison. The ethical clearance was obtained from the ethical committee of MKCG Medical College. Informed consent was signed from parents of the patients who were included in the study. Data were tabulated and statistically analyzed using graph pad version 5.

Results

In present study incidence of cases of poisoning was 530 (3.9%) out of 13,312 admitted children in one year. Male children constituted 68.3% of the total poisoning group (n=530). The incidence of poisonings was highest in rainy season, i.e. months of August and September (14.1% and 13.7%) respectively. The incidence of poisonings followed declining trend from September to March indicating lowest in the winter season, i.e. October to February. The highest numbers of poisoning cases were seen in 1-6 year age group consisting 42.6% of whole incidence followed by 10-14 year group which add 23.4% to the incidence. Accidental poisoning was most common cause in all the age groups where as homicidal cause of poisoning was seen in one patient. The incidence of accidental consumption of chemical was 268 out of 510 accidental poisonings (Table-1). There was very high incidence of kerosene poisoning in chemical poisoning group. Turpentine poisoning was the second common cause of chemical poisonings. Snake bite and scorpion stings were most common causes of animal bite. Alprazolam overdose was commonest cause of drug overdose (Table-2). Home prepared food poisoning was the most frequent cause of food poisoning. Maximum incidence of kerosene poisonings were seen from April to June (38.3%) followed by July to September (33.8%). The snakebite was highest in July to September (31.7%). The incidence of scorpion sting was also highest from July to September. There were 27 deaths during the study period. The mean duration of stay was 2.5 days.

Table 1: Age specific incidence poisonings+ bites (intoxications & envenomations)

Age group	Accidental (poisonings+ bites)	Suicidal	Total (%) n=530
0-1 year	84 (63+21)	0	84 (15.8%)
1-6 year	226 (175+51)	0	226 (42.6%)
6-10 year	92 (28+64)	4	96 (18.1%)
10-14 year	108 (2+106)	16	124 (23.3%)

Table 2: Substance specific incidence

Toxic agent	Types of agent	Number (%) (n=530)	Death (%) (n=27)
Chemical N=223	Kerosene and petrol	88 (16.6%)	2 (7.4%)
	Organophosphorus	18 (3.4%)	4 (14.8%)
	Datura	5 (0.9%)	0
	Turpentine	47 (8.8%)	0
	Anti-Mosquito liquid	9 (1.6%)	0
	Dettol	2 (0.3%)	0
	Dye	2 (0.3%)	0
	Mercury	6 (1%)	0
	Toilet cleanser	3 (0.5%)	0
	Rat killer	11 (2%)	0
	Fenbalmate	2 (0.3%)	1 (3.7%)
	Fungicide	4 (0.6%)	1 (3.7%)
	Scabicide	3 (0.5%)	0
	Bleach powder	1 (0.2%)	0
	Cypermethrin	3 (0.5%)	1(3.7%)
	Castor oil	1 (0.2%)	0
	Laxman Rekha (Anti-cockroach Chalk)	3 (0.5%)	0
	Gun powder	1 (0.2%)	0
	Camphor	3 (0.5%)	0
	Oleander	3 (0.5%)	1 (3.7%)
Unknown	8 (1.2%)	3 (11.1%)	
Bites N=241	Snake	172 (32.4%)	9 (33.3%)
	Scorpion	54 (10.1%)	1 (3.7%)
	Spider	1 (0.2%)	0
	Insect	2 (0.3%)	0
	Unknown	12 (2.2%)	1 (3.7%)
Medication N=29	Alprazolam	10 (1.8%)	0
	Anti-hypertensive	4 (0.6%)	0
	Thyroxine	3 (0.5%)	0
	Clonazepam	1 (0.2%)	0
	Folvite	1 (0.2%)	0
	Lorazepam	3 (0.5%)	0
	Phenergan	1 (0.2%)	0
	Anti-psychotic	1 (0.2%)	0
	Iron tablet	1 (0.2%)	0
	Phenytoin	1 (0.2%)	0
Unknown	3 (0.5%)	0	
Food N=35	Mushroom	8 (1.5%)	0
	Botulinum	4 (0.6%)	2 (7.4%)
	Home food	19 (3.5%)	0
	Unknown	2 (0.3%)	1 (3.7%)
Miscellaneous		4 (0.6%)	0

Discussion

This was a single centre large study on paediatric poisonings. The overall incidence of pediatric poisoning in our study was 3.9% which is higher than previous studies done by Khadwagat but the incidence in our study falls within the range of incidence described by Khadwagat in Southern Asia (0.3%-7.6%)^{2,3,4}. The high incidence in this study can be explained by regional variation.

High number of rural population depending upon cultivation and forest for livelihood dwell in this area of world which leads to more numbers of snakebites as many areas of eastern and north-eastern India and Nepal are endemic to varieties of snakes. Accidental intake was seen more commonly than suicidal and homicidal. Suicidal cause of poisoning was common in adolescent and pre adolescent age group. All the poisonings in less than 5 years age group were accidental. Children have greater risk than adults for unintentional poisoning, because they are smaller, have faster metabolic rates and are less able to physically handle toxic chemicals. In addition natural curiosity and their desire to put everything in their mouth increase their poisoning risks⁵. In all previous studies done in India, Bangladesh, Nepal and Srilanka reveal the similar statistics (very recent study by Rimal HS et al)^{5,6,7}. Snakebite was more common in 6-10 and 10-14 age groups. Male children were highly affected in all the groups which go in hand with almost all previous studies⁸.

Snakebite was most common cause of death. Cobra was the snake attributed to increase in death toll. There was one death due to scorpion sting due to late presentation. Preserved meat was responsible for death of two brothers causing botulism. They presented very late to the emergency department after neurological complications.

Commonest chemical consumed as poison was kerosene followed by turpentine as seen in study of Ganga N et al⁸. The high incidence of kerosene and turpentine poisoning can be explained by careless attitude of parents who keep the needful chemicals in the reach of children. Another cause is storage of kerosene and turpentine in beverage bottles. Small children can't differentiate easily and drink kerosene thinking it to be water due to its transparent and translucent features. The higher incidence of kerosene poisonings are seen in the time of disasters due to long power cuts when people need more use of kerosene due to poor light, keeping in water bottles⁹. The increase in trends of volatile liquid is evident in some other studies of India and Srilanka⁷. According to Rimal HS kerosene poisoning is second

highest in eastern Nepal⁶. But in this study kerosene poisoning is the leading cause of poisoning. Our study has similar conclusion as Rathore⁵. It can be explained by regular power cuts in this area for long time which obliges citizens to use kerosene in night.

In chemical poisoning group maximum deaths were due to OP Poisoning. All were suicidal. Other chemicals like cypermethrin, felbamate, fungicide poisonings caused one deaths each.

In the animal bite group snakebite takes the lead consisting 32.4% of all the incidences. It is higher than previous studies^{1,10}. The high incidence can be explained by geographical variation and more numbers of children going to fields to work and thatched kachcha house which is an abode for poisonous snakes like krait. The incidence faces a peak in the July to August due to rainy season. In this time snakes come out of their hole due to seepage of water inside it. This was in agreement with various other works especially done by Matiyahu L¹¹. Scorpion stings are also high in incidence in this season due to swampy weather and habit of floor sleeping in children. Scorpion sting consisted 10.1% of total incidence. Increased incidence of bites & stings in male children is seen probably because of increased outdoor activity, playing in open fields and going to agricultural fields along with their fathers.

In the drugs group the sedative alprazolam was commonest cause comprising 1.8% of all incidences. This incidence varies from area to area. In the study by Ghai opioid was one of the leading causes of poisoning¹⁰. In our area people live remain in joint families where older grandparents use sedatives that could be consumed accidentally by children. Due to restricted use of opioids in Orissa there were no cases of opioid poisoning. Other drugs like anti hypertensives, thyroxine etc were also cause of medications.

Food poisoning after eating in home was most common cause in the food poisoning due to poor storage system and rewarming of food. Mushroom poisoning was a common cause of food poisoning. Intake of unknown mushroom by tribal students in a residential school was the cause. Botulism by consuming stored meat was also a cause of poisoning in four children. A study done by Jan MA from Pakistan stated that mushroom poisoning was a common cause of poisoning in children¹².

Out of all these admissions 27 children died. The Case Fatality Rate (CFR) in our study was 5.1%. CFR varied in studies done by Rathore and Ghai^{5,6,9,10}. It could be due to types of poisons late presentation to hospitals.

Conclusion

Poisoning is a major cause of hospitalisation in paediatric age group. Mostly it is accidental but suicidal causes are rampant in adolescent age group. The incidence of chemical poisonings were significantly high and in increasing trend. Snakebite and scorpion stings

are very common in this area of the world that can be prevented by sleeping on the cots and using mosquito nets. Mortality and morbidity due to paediatric poisonings are preventable hazards. Watchful observation of the child and sharing quality moment with adolescent people will prevent unnecessary casualties.

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