



Clinico-epidemiological profile of poisoning in children in a tertiary care centre of Chattisgarh

Poonam Agrawal^{1*}, Rakesh Nahrel², Hemang Agrawal³

ABSTRACT

Background

Poisoning in children is a major health problem worldwide. Public health authorities and physicians require routine surveillance to update childhood poisoning prevention and treatment strategies. Poisoning is one of the common pediatric emergencies in India. The nature and pattern of poisoning vary with region, socioeconomic, cultural factors and living conditions. This retrospective study has been done to describe pattern of various poisoning in children.

Methods

This was a retrospective descriptive study. Detailed history, examination and outcome were collected in a predesigned proforma from patients under 14 years of age presenting with any type of poisoning in the pediatrics ward of CIMS, Bilaspur (C.G.) from January 2018 to December 2022. Data was analysed using Microsoft excel 2020.

Results

This study included a total 402 study subjects, with female preponderance (50.5%). Majority of children affected belong to 1-4 yr age group, maximum (83.3%) duration of stay in hospital was in the range of 1 – 3 days, while 2.2% death occurred due to poisoning. All deaths were attributed to late arrival to hospital. Common agents of poisoning were Ratanjot seeds (32%), kerosene (18%) and unknown substances (13.1%).

Conclusion

Jatropha was the most common cause of poisoning in children. This descriptive study will help pediatricians and public health authorities to take preventive actions and timely intervention.

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INTRODUCTION

Poisoning can be defined as taking, or being otherwise exposed to, a substance or substances which are injurious to a person's health.¹ Poisoning in children is a major health problem worldwide. It is a preventable cause of morbidity and mortality in children. Among hospital admissions, poisoning is the 12th most common cause in children. As we all know, children are curious about their surroundings and explore it with all their senses like taste and smell. Due to this, home & its surroundings can be a dangerous place when poisonous substances are inadvertently ingested.²

The present day household offers toxic substances at every corner including petroleum products, caustics, insecticides and medicines that provide an easy setting for childhood inquisitiveness to end in disaster. These agents are often mistaken by children for soft drinks or water when they are stored in drinking water bottles/food containers.

The nature and pattern of poisoning vary with region, socioeconomic, cultural factors and living conditions. We planned this study to gather epidemiological data regarding poisoning in children in Bilaspur area, so as to formulate measures that could probably help to reduce the occurrence of poisoning, morbidity and mortality associated with it.

Objective of study: To find out the pattern of poisoning among pediatric age group

Material and methods

This was a retrospective descriptive study, designed with the objective to find out pattern of poisoning among paediatric age group, admitted in pediatric ward of CIMS, Bilaspur (C.G.) from January 2018 to December 2022. Inclusion criteria for the study population consisted of children up to 14 years of age who were admitted in pediatric ward with acute poisoning. Children admitted with coma or suspected coma, respiratory distress, cardiovascular instability (hypotension or cardiac arrhythmia) or any organ failure in the PICU with definite history of consumption of known or unknown substances were also included. Children admitted with food poisoning, scorpion sting, snake bite & insect bite were excluded. Data was collected in a predesigned proforma, checked for completeness and analysed in Microsoft excel 2020. Data was presented in the form of frequency and percentage. Study approval was taken from institutional scientific and ethical committee.

Results

This retrospective descriptive study included 402 study participants admitted with acute poisoning, it constituted 4.9% of total 8220 admission in pediatric ward during the study period. Out of the 402 cases, 203(50.5%) were female with the male:female ratio of 0.98: 1. Most common age group involved was 1 – 4 years (50.5%), followed by 5-9 years (30.8%) with least involvement of <1 year of age (1.5%) (Table no. 1).

Table 1: Socio-demographic characteristics of study subjects

Characteristics	Frequency	Percentage
Gender		
Male	199	49.5%
Female	203	50.5%
Age of child		
< 1yr	6	1.5%
1 – 4yrs	203	50.5%
5 – 9yrs	124	30.8%
10 -14yrs	69	17.2%
Socio-economic status		
Upper class	2	0.5%
Upper middle class	56	13.9%
Lower middle class	208	51.7%
Upper lower	115	28.6%
Lower	21	5.3%



Duration of stay in hospital in the majority of cases was 1- 3 days (83.3%) (Table no. 2). When inquired about place of poisoning, 71.6% cases (288) occurred inside home environment (Table no.4). The most common agent responsible was found to be ratanjot(Jatropha Curcas) seeds(32%), predominance of this agent was seen in 5-9 yrs age group(56%) (Table no. 5). kerosene poisoning was more common in 1- 4 years age group(83.3%) . Ingestion of unknown substance was more common in 1 – 4 years age group (77.3%).

Rodenticide poisoning was more common in 1-4 years of age (58.3%) (Table no. 6). In most of the cases, poisoning was accidental (94.3%), whereas 23 cases (5.7%) were suicidal. The suicidal cases were of children in 10-14 years age group. Out of 402 cases, 9 patients died during treatment. Out of 9 cases, 5 cases were suicidal(3 patients had insecticide poisoning and 2 had rodenticide poisoning), 3 died due to kerosene ingestion, 1 died due to ingestion of unknown substance. Survival rate in this study was 97.8 % (Table no. 3).

Table 2:Duration of stay

Duration of stay	Frequency	Percentage
< 1 day	-	-
1 – 3 days	335	83.3%
> 3 days	67	16.7%

Table no 3: Outcome of poisoning

Outcome	Frequency	Percentage
Death	9	2.2%
Survived	393	97.8 %

Table no. 4: Place of poisoning

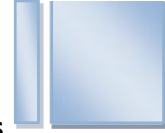
Place	Frequency (%)
Home environment	288 (71.6%)
Outside	114 (28.4%)

Table 3: Table no. 5: Age distribution of various types of poisoning

Types of poisoning / Age group in yrs	< 1 yr	1 – 4yrs	5 – 9yrs	10-14yrs	Total
Dhatura	2(9.5%)	9 (42.9%)	5(23.8)	5 (23.8)	21 (5.2%)
Ratanjot	-	31(24%)	72 (56%)	26 (20%)	129 (32%)
Kerosene	1(1.5%)	60(83.3%)	9(12.5%)	2(2.7%)	72 (18%)
Unknown substance	1(1.9%)	41(77.3%)	10 (18.9%)	1 (1.9%)	53 (13%)
Other hydrocarbons petrol/diesel)	2(25%)	5 (62.5%)	1 (12.5%)	-	8 (2%)
Paint thinner/Turpentine oil	-	18 (75%)	4(16.7%)	2(8.3%)	24 (6%)
Mushroom	-	4 (16.6%)	10 (41.7%)	10 (41.7%)	24 (6%)
Rodenticide	-	7 (58.3%)	-	5(41.7%)	12 (3%)
Insecticide	-	7 (27%)	7 (27%)	12 (46%)	26 (6.4%)
Phenyl	-	6 (66.7%)	1(11.1%)	2 (22.2%)	9 (2.2%)
Iron + FA tablet	-	1(33.3%)	2(66.7%)	-	3 (0.7%)
Paracetamol syrup	-	3 (100%)	-	-	3 (0.7%)
Antihypertensive	-	3 (100%)	-	-	3 (0.7%)
Toilet cleaning acid	-	2 (66.7%)	1(33.3%)	-	3 (0.7%)
Antiepileptic syrup	-	-	1(50%)	1(50%)	2 (0.5%)
Expired ab/urea/permethrin/lice ill/massage oil/mosquito garbatti/alcohol/sindoor	-	6 (60%)	1 (10%)	3 (30%)	10 (2.9%)
Total	6 (1.5%)	203(50.5%)	124(30.8%)	69 (17.2%)	402 (100%)

Table no. 6: Place of residence of case subjects

Place of residence	Frequency	Percentage
Urban	118	29.4%
Rural	284	70.6%



DISCUSSION

Poisoning is one of the most common pediatric emergencies. It is a preventable cause of morbidity and mortality in children. Children are at particular risk for poisoning due to their curiosity to explore their surroundings. Knowledge about types of poisoning and its geographical distribution will be very helpful for prevention and thousands of future lives can be saved and treated accordingly.

Incidence of poisoning was 4.9% which is comparable to the study done by Sridhar PV et al.⁷ (5.6%) and Kariyappa et al.² (5.3%). In the present study, male: female ratio was 0.98:1; there was very little change in proportion of male/female in the various age groups. This finding is in contrast to the study by Kohli et al.⁴ & Adhikari et al.¹¹, where male: female ratio was 2:1. Most of the studies done in India showed male dominance. Female predominance was also seen in the study conducted by Devaranavadagi et al.¹³ (58% females).

Majority of our patients were in the 1 – 4 yrs of age group (50.5%), this is in accordance with study by Kariyappa M et al.² and Ghosh et al.³ Majority of cases in the study were from rural area (n = 284, 70.6%), similar findings is reported by study conducted by Sridhar PV et al.⁷ This finding basically reflects the population profile to which the hospital caters to. Our hospital is a referral hospital for many primary health centres and community health centres.

Duration of hospital stay varied from 1-7 days, most of the cases were confined in hospital for 1 – 3 days, this is similar with study by Devaranavadagi et al.¹³, while in another study 56.1% cases admitted for only <1 day.⁷ We have a policy of keeping the admitted patients for at least 24 hours before discharge.

In our study the most common cause of poisoning was due to ingestion of Ratanjot seeds (n=129, 32%) followed by kerosene (n=72, 18%) and unknown substance (13.1%). *Jatropha curcas*, commonly known as Ratanjot/Jungli erandi/ Bagranda, purging nut tree and Barbados nut tree.¹⁶ Though all parts of the plant are poisonous, seeds have the highest concentration

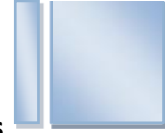
of the toxin and are highly poisonous.¹⁷ It has traditionally been used as medicine, but has recently been introduced as biodiesel fuel.

The poisonous property of the plant is mainly due to presence of toxalbumin called curcin and cyanic acid, related to ricinoleic acid. Though the plant grows in wastelands, it is cultivated mainly for hedges as these are not consumed by cattle. As these plants are ornamental they will often be found in gardens and public areas and are easily accessible. *Jatropha* is a fruit bearing plant and the seeds have a pleasant taste and are particularly attractive to children. In our study the main reason for admission due to *Jatropha* poisoning were vomiting, abdominal pain and weakness. The reasons cited by children for consuming seeds were attractive look, pleasant taste and resemblance to groundnut. A similar study on clinical profile of *Jatropha* poisoning was conducted in our institute by Kosam A et al.¹⁰ One interesting finding in all reports from the literature; *Jatropha* ingestion often involved multiple victims. The fact that the children concerned are older, school-aged children as well as preschool children suggests that the ingestion is a result of curiosity and exploration. Other studies found kerosene, drugs, pesticides, toilet cleaner as the common causes of poisoning.

In the majority of cases the poisoning was accidental (94.3%) and occurred in the home environment (n=228, 57%). 23 cases (5.7%) were suicidal. Mortality rate due to poisoning was 2.3%, which is similar to the study by Vijayalakshmi P et al.¹⁵

CONCLUSION

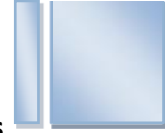
This study provides a basic knowledge about pattern of poisoning in pediatric population in our region. Acute *Jatropha* poisoning is the most common cause of poisoning in children in Bilaspur district of Chhattisgarh due to its cultivation for biodiesel production and plantation along hedges. Cornerstone to prevent these incidents is to make parents and caretakers aware about substances, which can be poisonous to children. Simultaneously school children and parents, especially in rural areas, should be taught about the dangers of ingestion of



unknown plant seed. Poisonous substance should be stored at a safe place away from reach of children. Petroleum products should not be kept in water bottles and soft drink bottles.

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REFERENCES

1. Chandha I A. Poisoning. *Indian Journal of Anaesthesia*, October 2003; 47 (5):402-411
2. WHO: World report on child injury prevention 2008. http://www.who.int/violence_injury_prevention/child/injury/world_report/en/.
3. Mallesh Kariyappa, Asha Benakappa, Anil Kumar Kejjaiiah, Rakesh Saraswathipura Ramachandrappa. "Spectrum of Poisoning in Children: Study from Tertiary Care Hospital in South India". *Journal of Evidence based Medicine and Healthcare*; Volume 2, Issue 33, August 17, 2015; Page: 4989-4999.
4. Brata Ghosh V, Jhamb U, Singhal R, Krishnan R. Common childhood poisonings and their outcome in a tertiary care center in Delhi. *Indian J Pediatr*. 2013 Jun;80(6):516-8. doi: 10.1007/s12098-012-0879-5. Epub 2012 Sep 2. PMID: 22941217.
5. Kohli U, Kuttiat VS, Lodha R, Kabra SK. Profile of childhood poisoning at a tertiary care centre in North India. *Indian J Pediatr*. 2008 Aug;75(8):791-4. doi: 10.1007/s12098-008-0105-7. Epub 2008 Jun 25. PMID: 18581069.
6. A Mandal., Das Pradip Kumar, Datta Asok. Clinico-epidemiological Profile of Poisoning in Children Under 8 Years of Age, at Rural Medical College In West Bengal. 2016;5(2): 71-75
7. K SH, Singi Y, V C, Dabhi D. A Study on the Profile of Poisoning in the Paediatric Population in a Tertiary Care Teaching Hospital of Chitradurga Region. *Cureus*. 2022 Dec 10;
8. PV S, M. S, PS T. Clinical profile and outcome of poisoning in pediatric age group at a tertiary care teaching hospital, Mandya, Karnataka, India. *Int J Contemp Pediatrics*. 2016;514-7.
9. J S, RK K. Profile of Poisoning in Children. *Pediatr Oncall*. 2014;11(2).
10. Singh RK, Singh D, Mahendrakar AG. Jatropha poisoning in children. *Med J Armed Forces India*. 2010;66(1):80-1.
11. Kosam A, Nahrel R. Clinical profile of Jatropha Curcas poisoning in children [Internet]. 2014. Available from: www.ijmrr.in
12. Das Adhikari D, Das S, Winston A B, Vazhudhi K, Kumar A, Shanthi Fx M, Agarwal I. A retrospective study on non-drug related poisoning in the community among children from south India. *Hosp Pract (1995)*. 2017 Apr;45(2):39-45. doi: 10.1080/21548331.2017.1303326. Epub 2017 Mar 24. PMID: 28306345.
13. Basu K, Mondal RK, Banerjee DP. Epidemiological aspects of acute childhood poisoning among patients attending a hospital at Kolkata. *Indian J Public Health*. 2005 Jan-Mar;49(1):25-6. PMID: 15989157.
14. Devaranavadi RA, Patel S, Shankar P. A study on profile of poisoning in pediatric population. *Int J Contemp Pediatr* 2017;4:810-5.
15. Jayakrishnan MP, Krishnakumar P, Geeta MG, George B. Changing trends of accidental poisoning in children over the last two decades. Vol. 46, *Indian Journal of Community Medicine*. Wolters Kluwer Medknow Publications; 2021. p. 350-1.
16. Vijayalakshmi P, Shreesail V B, Ravindra B P, Manoj GM, Vikram RKS. A pattern of poisoning in children- an experience from a teaching hospital in southern India. *Pediatric Rev Int J Pediatr Res*. 2020;7(6):279-286.
17. Barceloux DG. Barbados nut (*Jatropha curcas* L.) Medical toxicology of natural substances: foods, fungi, medicinal herbs, plants and venomous animals. Hoboken, New Jersey: John Wiley & Sons Inc; 2008 Chapter 140; p.829-831
18. Levin Y, Sherer Y, Bibi H, Schlesinger M, Hay E. Rare *Jatropha multifida* intoxication in two children. *J Emerg Med* 2000 Aug; 19(2):173-175