

Analysis of the Profile and Outcome of the Ingested Poisoning Cases in Pediatric Intensive Care Unit of a Tertiary Care Urban Medical College Hospital in South Tamil Nadu

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Abstract

Background: One of the common causes of admissions in the pediatric intensive care unit is ingestion of harmful substances, which is more common in toddler and school age. Recently with the harmful impact of social media and change in family environments, deliberate consumption of poisoning agents is seen in adolescents.

Objectives: The aim of this study is to analyze the profile and outcome of children admitted with a history of ingestion of poisoning in urban medical college hospital.

Materials and Methods: Children admitted with a history of consumption of poisoning agents over 1 year from January 2019 to December 2019.

Results: Out of 220 children admitted majority belongs to the toddler age group which accounts to 54%. Among 220 children, 131 (59.5%) were male and 89 (40.5%) were female. A total of 88 children had consumed kerosene/thinner which is the common agent in our study, contributing 40% of the cases. The major etiology is accidental (91.8%). Moreover, 217 children (98%) recovered completely and mortality percentage is only 1.36%.

Key words: Accidental, Children, Kerosene, Poisoning, Urban Medical College

INTRODUCTION

Poison is any agent of self-injury absorbed into the system through epithelial surfaces. Accidents, poisoning, vehicular trauma, and falls are important causes of childhood morbidity and mortality. Toddlers are especially predisposed as they are mobile and inquisitive and cannot differentiate between harmful and harmless things. These harmful products are usually familiar, visually appealing in glossy containers, and sometimes even tasty in children.^[1]

Poisoning in children is predominantly accidental than adults and accounts for 1–6% of bed occupancy in pediatric hospitals and 3.9% in the pediatric intensive care unit in India.^[2-4] Recently among adolescents, poisoning is increasingly self-inflicted.^[5] Poisoning is the second most common cause of injury resulting in the hospitalization of children under the age of 5 years.^[6]

High incidence of poisoning in toddlers and preschool children is a direct consequence of the development stage of child. As infants start to mobilize easily around 1 year of age, their human instincts lead them into exploring the surroundings and putting the objects into the mouth. By the age of 2 1/2–3 years, the children's motor development makes themselves vulnerable for exposure to potentially noxious things. Incidence of accidental poisoning decreases after 4 years of age as the child gets more selective in choosing objects for mouthing and ingestions.

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Male children outnumber female due to their greater activity and tendency of exploration of the environment.

The incidence is also higher among children from lower socioeconomic groups due to poor storage facilities of household products and greater accessibility of children to those potentially harmful things.^[7] Incidence is also higher in rural population due to the use of pesticides in agriculture purpose and poor storage facility of such pesticides.^[7] Incidence of kerosene poisoning is common in rural and slum population because in summer months, there is a frequent power failure and also some households may not have electric connection. Due to curiosity and easy accessibility, children often drink kerosene, mistaking it for water. In a poor socioeconomic setup, it is not possible to store kerosene in a childproof pack. Household products rather than pharmaceuticals are now implicated in the majority of pediatric poisoning.^[2,5,8]

These accidents are preventable as the main reason for such incidents is a lack of knowledge, awareness, and adult supervision. The cause of pediatric poisoning varies in different age groups, and hence, preventive strategies should be planned accordingly.

The objective of this study is to analyze the pattern and outcome of childhood poisoning under the age of 12 years in an urban medical college hospital in India to characterize the problem of acute pediatric poisoning.

MATERIALS AND METHODS

This study was conducted in the pediatric intensive care unit of an Urban Medical College Hospital.

Sampling

This was the retrospective study conducted for 1 year duration from January 2019 to December 2019. The data were compiled from the information entered into pediatric intensive care unit as the admission register and nominal register.

All the children with a history of consumption of harmful or unknown substances were included in the study.

All were admitted initially in the pediatric intensive care unit for treatment and continuous monitoring. The parameters analyzed were age, sex, agents consumed, duration of stay, outcome of the act, and treatment.

RESULTS

A total of 7590 children were admitted in the pediatric ward during our study duration of 1 year between January 2019 and December 2019.

Among them 220 children had consumed alleged poisoning agents contributing to 2.89% of the total admission during the study duration [Table 1].

Out of 220 children who had been admitted with the alleged history of consumption of either harmful poisoning agents or unknown substances in the pediatric intensive care unit, increased number was noted in the month of March and May 2019 [Table 2].

On analyzing the age-wise distribution of cases, we found that the majority of the children were toddlers who made 54% of the cases.

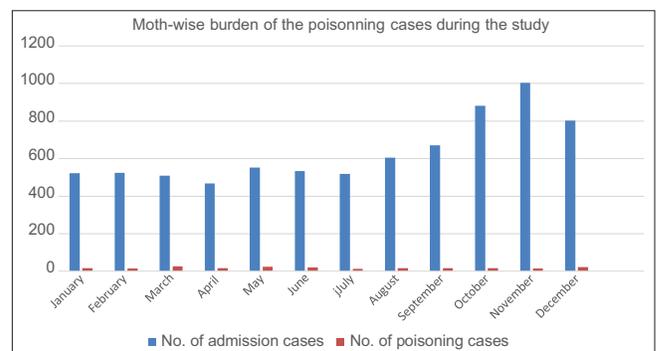
Nearly, 6% were infants, 54% were toddlers, 15% belong to preschool age, and 25% were in school age [Table 3].

Table 1: Burden of poisoning cases among total admissions for 1 year period

Duration	Number of admission cases	Number of poisoning cases (%)
January 2019–December 2019	7590	220 (2.89)

Table 2: Month-wise distribution of poisoning cases during the study

Months	Number of admission cases	Number of poisoning cases (%)
January	523	17 (3.3)
February	524	15 (2.9)
March	509	27 (5.3)
April	467	16 (3.4)
May	552	25 (4.5)
June	533	20 (3.8)
July	519	12 (2.3)
August	605	17 (2.8)
September	670	17 (2.5)
October	881	16 (1.8)
November	1004	15 (1.5)
December	803	23 (2.9)
Total	7590	220 (2.9)



In our study, 131 males and 89 females had consumed harmful substances contributing to 59.54% and 40.45%, respectively [Table 4].

Among the various agents consumed, kerosene and thinner topped the list. A total of 88 children had consumed kerosene/thinner that makes 40% of the poisoning burden and toddlers were the majority victims.

The next common agents consumed were pesticides and rodenticides. Among the pesticides, OPC, carbamates, herbicides, and pyrethroids, contributing 6.8%, 1.8%, 1.8%, and 1.8% of the total poisoning cases, respectively [Tables 5 and 6].

Coming to the etiology behind, the consumption of the listed substances most of them was accidental consumption amounting to 202 (91.81%) of cases, homicidal cases 12 (opc-7, carbamate-4, and rodenticide-1) (5.45%), and suicidal 6 (opc-4 oleander-2) (2.72%) [Table 7].

Totally, 6 children who belong to early adolescents groups had consumed with suicidal intention. Among these 3 girls

Table 3: Age-wise distribution of poisoning cases

Age group	Age range (years)	n (%)
Infants	<1	13 (6)
Toddlers	1–3	119 (54)
Preschool	3–6	33 (15)
School	6–12	55 (25)

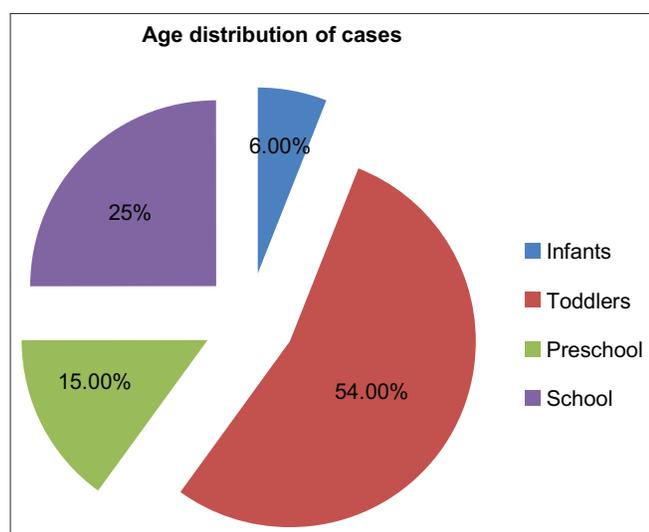


Table 4: Gender-wise distribution of poisoning cases

Total cases	Males (%)	Females (%)
220	131 (59.5)	89 (40.5)

and 3 boys belong to school-age children. Agents used for suicidal were OPC and oleander seeds. All were saved and discharged.

Among the homicidal cases of 12 children, seven were OPC, four were carbamates, and one was rat killer paste. There were 3 children (1.36%) who unfortunately died due to poisoning. Among these three, two had been given OPC by mother and stayed for 8 and 3 days, respectively. Another one was given rat killer paste by father and stayed for 4 days. Totally 168 children (76%) had been discharged successfully after the treatment and careful observation period of 1 week [Table 8].

DISCUSSION

In our study, the burden of the poisoning cases among total admission during 1 year period of January 2019 to December 2019 was 2.89%. Mandal *et al.* had reported 89 cases of poisoning during 1 year, constituting 1% of all pediatrics admission.^[9,10] In our study, males ($n = 131$, 59.5%) outnumbered females ($n = 89$, 40.5%). Devaranavadaji *et al.* had reported a slight female preponderance that out of 38 cases of poisoning, 16 (42%) are male and 22 (58%) are females.^[11] Jadhav *et al.* state that according to her study, the incidence of poisoning was more common in males (72%) at most 3 times those in females (28%). In Mandal *et al.* study, 57 cases were male (64%) and 32 cases were female (38%; $n = 89$).^[9]

Analysis according to the age of the children in our study shows that majority are toddlers ($n = 119$, 54%) between 1 and 3 years of age, giving $P < 0.0033$ which is statistically significant. This fact is supported by Mandal *et al.*, who reported that out of 89 cases, 62 (69.66%) were between 1 and 3 years.^[9]

In our study, the common agent consumed is kerosene/thinner being consumed by 88 children (40%) followed by pesticides by 27 children (12.3%).

In Jadhav *et al.*^[10] study, hydrocarbon poisoning (kerosene) was the most common type of poisoning 32% of total cases followed by insecticides 10% of cases correlating with our study results.

In our study, only 10 had been admitted with consumption of medicine (tablets and syrups) that makes 4.54%. Roy *et al.* reported ingestion of medicine ($n = 34$, 17%).

In our study, 91.81% ($n = 202$) had consumed the harmful substances accidentally. In Mandal *et al.* study, all poisoning cases ($n = 89$) were accidental in nature by substances with-in reach of children. Jadhav *et al.* stated that most of

Table 5: Case distribution according to consumed poison

Agents	Infant	Toddler	Pre-school age	School age	Total
Kerosene/thinner	3	62	13	10	88
Rodenticide	1	6	1	10	18
OPC	0	7	1	7	15
Mosquito repellent/coil	2	6	2	0	10
Acid	0	2	3	4	9
Lice killer	0	1	2	4	7
Camphor	1	3	1	1	6
Oleander	0	1	2	2	5
Ant Killer	0	3	1	1	5
Carbamate	0	3	0	1	4
Herbicide	0	3	0	1	4
Pyrethroid	0	3	0	1	4
Neem oil	1	3	0	0	4
Diazepam	0	0	0	3	3
Alkali	0	0	1	2	3
Oduvanthalai	0	0	0	2	2
Paint	1	1	0	0	2
Diesel	0	0	1	1	2
Lindane	0	0	1	1	2
Matchstick powder	0	2	0	0	2
Cowdung powder	0	2	0	0	2
Fish egg	0	0	2	0	2
Phenol	0	0	1	1	2
Dettol	1	1	0	0	2
Iron tablet	0	1	0	0	1
Paracetamol	1	0	0	0	1
Cough syrup	0	1	0	0	1
GBHC	0	1	0	0	1
Sulfa powder	0	1	0	0	1
Mefenamic	0	1	0	0	1
Sodium fusidate	0	1	0	0	1
Contaminated lizard water	1	0	0	0	1
Turpentine oil	0	0	0	1	1
Ear oil	0	1	0	0	1
Pvc paste	0	1	0	0	1
Vapor absorber	0	0	0	1	1
Bleaching powder	0	1	0	0	1
Povidone iodine	0	0	0	1	1
Kmno4	1	0	0	0	1
H2O2	0	1	0	0	1
<i>Abrus precatorius</i>	0	0	1	0	1
Total	13	119	33	55	220

the cases (94%) were due to accidental ingestion of the concerned agents.

In our study, out of all poisoning cases, 202 were accidental (91.8%), 12 were homicidal (5.54%), 6 were suicidal (2.72%). Agarwal *et al.*, all poisoning episodes were either suicidal (38, 46.9%) or accidental (43, 53.1%) and none were homicidal.

In our study, the mortality percentage was 1.36% and majority was discharged successfully.^[12] Roy *et al.* study revealed that out of 195 cases, 75% ($n = 154$) of children with poisoning were discharged and 16% of children ($n = 37$) left the hospital without any intimation. Death occurred in four (2%) cases ($n = 4$). Mandal *et al.* study reported that number of death was 6 (6.67%) and that of survival was 83 (93.25%).

Table 6: Agents consumed

Groups	Agents	No. of cases (%)
Rodenticides		18(8.2)
Pesticides	OPC	15 (6.8)
	Carbamates	4 (1.8)
	Pyrethroids	4 (1.8)
	Herbicides	4 (1.8)
Plant poisoning	Oleander	5 (2.3)
	Oduvanthalai	2(0.9)
	Abacus	1 (0.45)
Tablets	Diazepam	3 (1.36)
	Paracetamol	1 (0.45)
	Ferrous sulfate	1 (0.45)
	Mefenamic	1 (0.45)
	Sulfa powder	1 (0.45)
	Sodium fusidate	1 (0.45)
	GBHC	1 (0.45)
	Cough syrup	1 (0.45)

(Contd...)

Table 6: (Continued)

Groups	Agents	No. of cases (%)
Corrosive	Acids	9 (4.09)
	Alkali	3 (1.36)
Others	Kerosene/thinner	88 (40)
	Mosquito repellent	10 (4.5)
	Lice killer	7 (3.18)
	Camphor	6 (2.72)
	Ant killer	5 (2.2)
	Neem oil	4 (1.8)
	Lindane ingestion	2 (0.9)
	Povidone iodine	1 (0.45)
	H ₂ O ₂	1 (0.45)
	KMnO ₄	1 (0.45)
	Cow dung powder ingestion	2 (0.9)
	Fish egg ingestion	2 (0.9)
	Phenol ingestion	2 (0.9)
	Match stick powder	2 (0.9)
	Dettol	2 (0.9)
	Diesel	2 (0.9)
Paint ingestion	2 (0.9)	
Lizard contaminated water ingestion	1 (0.45)	
Turpentine ingestion	1 (0.45)	
Ear oil ingestion	1 (0.45)	
PVC paste ingestion	1 (0.45)	
Vapor absorber	1 (0.45)	
Bleaching powder	1 (0.45)	

Table 7: Etiology distribution of cases

Mode	Accidental	Homicidal	Suicidal
Percentage	202 (91.81%)	12 (5.45%)	6 (2.72%)

Table 8: Final outcome of poisoning cases

Outcome	n (%)
Discharged	217 (98)
Death	3 (1.36)
Total	220

In our study, among three deaths, two were due to OPC poisoning and one was due to aluminum phosphide poisoning. Devaranavadagi *et al.* had documented that out of 38 cases of poisoning, two cases (5.2%) died both due to aluminum phosphide poisoning.

CONCLUSION

Accidental poisoning is common among toddlers and suicidal poisoning is on the rise among early adolescents. Lack of parental care, influence of social media, and peer pressure can be attributed to this emerging rise of suicides among adolescents. Unconditional parental love and proper moral classes by teachers can prevent poisoning. Parents should be educated through newspapers, advertisements, and media about accidental exposures and curious instincts of toddlers and also measures to prevent accidental poisoning among toddlers. Moreover, for medical professionals, it should be remembered that a high index of suspicion is required for the identification of poisoning. History of poison ingestion should be thought and sought whenever any hyperacute onset of symptoms occurs in an apparently healthy child.

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