

A study of clinical and epidemiological profile of poisoning in children in a tertiary care hospital

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Abstract

Aim: Poisoning is a relatively common medical emergency worldwide especially in pediatric age group. The aim of the study is to describe the clinical profile of poisoning, type of poisoning and different agents involved in poisoning. To determine the duration between poisoning, presentation to hospital and duration of hospital stay.

Methods: This is a prospective observational study. It was conducted at a tertiary care hospital, over a period of one year. The consent was obtained from the institutional ethics committee. Patients consent was obtained. Fifty three children of age less than 12 years with alleged history of poison consumption were included in the study. Chronic poisoning, snake bite, scorpion sting and food poisoning were excluded from the study. Data was exported to Medcalc version 19.0 and analyzed.

Results: The mean age of case was 3.55±1.35 years. Majority of children (56.60%) were in the age group of

2-4 years. The male: female ratio was 1.65:1 with 62.26 % being male children. Most of the parents belong to the higher secondary level 30.18 % followed by 28.30 % in middle school level. The socioeconomic status belongs to lower class (28.30 %). The most common type of poison observed is hydrocarbon (39.62%). The accidental poisoning was the predominant mode of poisoning (96.22%). After poisoning, 49.05 % of children required the intensive care unit admission. The antidote was used only in 11.32 % children.

Conclusion: Poisoning is an important preventable cause of morbidity and mortality in children. Younger children are most susceptible to poisoning due to their inherent inquisitiveness and higher oral exploratory activity. Male children and preschool age (2-4 years) are more susceptible for poisoning. The main poison agents are kerosene, paracetamol and camphor. The educational and socio-economic status plays an important role in prevention of poisoning.

Keywords: Poisoning, children, Kerosene

Introduction

Poisoning is a relatively common medical emergency worldwide especially in paediatric age group. Acute poisoning is one of the main preventable causes of morbidity and mortality in India. It contributes to around 3-6% of paediatric admissions to tertiary care hospitals in the country.¹ Younger children are more vulnerable, and the risk of accidental poisoning can be partially prevented.² Accidental poisoning is common in preschool children or toddler age groups (less than 5 years old) because children at this age have an exploratory tendency to the substance by ingesting it in the mouth, while suicidal poisoning is more common in adolescents caused by stress or disputes.³ In most paediatric poisonings, the substance is non-toxic or slightly toxic, but occasionally some are severely toxic, requiring immediate special medical intervention to prevent serious injury or death.⁴ The family provides toxic substances in every corner, including caustic alkali, pesticides and drugs, which provide children easy access.⁵ It is often mistaken for soda or water by children. Early detection of the clinical features of patients with acute poisoning and rapid start of treatment can help reduce the mortality of patients with poisoning.^{6,7} Decontamination, enhanced elimination, antidote and supportive care are usually used to manage poisoning cases.⁸ The average incidence of poisoning varies between 0.3% and 7.6%.^{9,5} Hence, the study was done to find out the clinical and epidemiological profile of poisoning in children. To determine the different agents involved in childhood poisoning. To identify the associated factors for poisoning. To study the duration between poisoning and presentation to hospital and duration of hospital stay.

Material and methods

This is a prospective observational study. It was conducted at a tertiary care hospital, over a period of one year from February 2019 to January 2020. Institutional ethics committee consent was obtained. Patients with history of poisoning and consented to participate in the study were included in the study. Chronic poisoning, snake bite, scorpion sting and food poisoning were excluded from the study. Details such as age, sex, social demographic, educational status of the children's parents were collected. Details of the poison was noted such as, name, type of agent, route of exposure, time of arrival to hospital after poison exposure, manner of poisoning. Chief complaints with thorough history were taken. Clinical examination was done by seeing vital signs and systemic examination. Data was exported to Medcalc version 19.0 and analyzed. The statistical significance of mean differences was compared using unpaired t-test and chi-squared test was done to determine the association between study groups. All values were considered significant if the *P*-value was < 0.05.

Results

Fifty three children of age less than 12 years were included in the study. The mean age of case was 3.55 ± 1.35 years. In this study maximum number of cases 56.60% was seen in the 2-4 years age group (n=30) followed 26.42% in the age group >4 years (n=14). Besides, ≤ 2 years age group was 16.68 %, The male: female ratio was 1.65:1 with 62.26 % being male children. Most of the parents belong to the higher secondary level 30.18 % followed by 28.30 % in middle school level. The socioeconomic status belongs to lower class (28.30 %). The most common type of poison observed in the present study belong to hydrocarbon category (39.62%). Kerosene was the predominant agent

used as their poison. Apart from that, paracetamol and camphor were next commonly used. The details of other

poisoning agents are depicted in the table 1

Table 1: Frequency of agents of poisoning

| Agents of poisoning | Frequency | % |
|---------------------|-----------|-------|
| Hydrocarbon | | |
| Kerosene | 14 | 26.41 |
| Paint thinner | 4 | 7.54 |
| Naphthalene | 3 | 5.66 |
| Household | | |
| Camphor | 6 | 11.32 |
| Alkali (ALA) | 4 | 7.54 |
| Eucalyptus oil | 2 | 3.77 |
| Drugs | | |
| Paracetamol | 7 | 13.20 |
| Thyroxine | 2 | 3.77 |
| Insecticide | | |
| Prallethrin | 2 | 3.77 |
| Pyrethrins | 4 | 7.54 |
| Corrosive | | |
| Phenol | 3 | 5.66 |
| Plant | | |
| Oleander Seed | 2 | 3.77 |

The accidental poisoning was the predominant mode of poisoning (96.22%). After poisoning, 49.05 % of children required the intensive care unit admission. The antidote was used only in 11.32 % children.

The Chi square analysis for type of poisoning according to different age groups such as ≤ 2 years, 2-4 years and >4 years which showed significant association of age and type of poisoning (Table 9). Specifically, 2.1 to 4 years age group was predominant and hydrocarbon poisoning

was the major source in this group (Fig.9). Both gender had positive association with poisoning agents which were highly significant ($P < 0.0001$). The educational status of the parents and the children who are affected with agents of poisoning were significantly associated which was statistically significant ($P < 0.0001$). The middle and higher secondary school levels educated parent's children were predominantly observed to have poisoning in this study (Table 2).

Table 2: Chi square test for agent of poisoning with educational status of parents

| Educational status | Alkali(Ala) | Camp hor | Eucalyptus Oil | Kerosene | Naphthalene Ball | Oleander Seed | Paint Thinner | Paracetamol | Phenol | Prallethrin (All-Out) | Pyrethrins | Thyroxine | Total | Chi square | P-value |
|--------------------|-------------|----------|----------------|----------|------------------|---------------|---------------|-------------|--------|-----------------------|------------|-----------|-------|------------|---------|
| Illiterate | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 5 | 160.86 | <0.0001 |
| Primary | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 6 | | |
| Middle School | 2 | 1 | 0 | 5 | 1 | 0 | 1 | 2 | 1 | 0 | 2 | 0 | 15 | | |
| Higher secondary | 1 | 1 | 0 | 5 | 1 | 2 | 2 | 2 | 1 | 0 | 1 | 0 | 16 | | |
| Graduate | 0 | 2 | 1 | 0 | 1 | 0 | 1 | 2 | 0 | 2 | 0 | 2 | 11 | | |

The socio-economic status of the parents and the children who are affected with agents of poisoning were significantly associated which was statistically significant ($P < 0.0001$). The lower and lower middle class children were predominantly affected with poisoning agents in this study (Table 2).

Table 2: Chi square test for agent of poisoning with socio-economic status

| | Alkali | Camp | Eucalyptus | Kerosene | Naphthalene | Oleander | Paint | Paracetamol | Phenol | Prallethrin | Pyrethrins | Thyroxine | Total | Chi square | P value |
|--------------------|--------|------|------------|----------|-------------|----------|-------|-------------|--------|-------------|------------|-----------|-------|------------|---------|
| Lower Class | 2 | 1 | 0 | 8 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 15 | 163.02 | <0.0001 |
| Lower middle class | 0 | 2 | 1 | 4 | 0 | 0 | 1 | 2 | 1 | 0 | 3 | 0 | 14 | | |
| Middle class | 2 | 0 | 0 | 1 | 1 | 2 | 1 | 3 | 0 | 1 | 0 | 0 | 11 | | |
| Upper middle class | 0 | 3 | 1 | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 0 | 2 | 13 | | |

Discussion

Various substances that pose a risk in daily life include various household products, agricultural pesticides, medicines, industrial chemicals, poisonous plants and various other products. In India, due to demographic structure, socio-economic factors, and the wide distribution and easy availability of different products for various uses, the ways of poisoning are different. In this study highest number of cases occurs in the 2-4 years of age group (56.60%). Vasanthan et al.,¹⁰ and Achinta Mandal et al.,¹¹ reported that the incidence of the poisoning is highest in the 1-3 years age group.

Consistent with the results of current study, literature surveys show that there are many reports that children are accidentally poisoned in the age group of <5 years.^{12,13} According to the National Centre for Injury Prevention and Control (NCIPC), among children under the age of 5, more than 50,000 medical visits are made. Similarly household products rank among the top five most common substances involved in poisoning in children less than 5 years of age, as reported by the AAPCC.¹⁴ Highest incidence of poisoning occurred in male children (62.26 %) than female children (37.73%) and male to female ratio 1.65:1. This is similar to many studies where

they have found a male preponderance.¹⁵ Males outnumbered females in consonance with other studies.¹⁶ Most of the parents belong to the higher secondary level 30.18 % followed by 28.30 % in middle school level. Earlier study found that there was a significant association between parent's education and poisoning. The present study results were also in line with the earlier study observations. Most of the children who involved in poisoning belongs to lower class and lower middle class in this study. This could be probably due to less educational status of their parents, more number of family members, less storage spaces and overcrowding in these families. A similar study pattern was observed in a study done by Vasanthan et al,⁹⁴ Ahamed et al,¹¹¹ and Pyarelal Kajala et al.¹¹² Among the type of poisoning most common was Hydrocarbons. Kerosene (39.62%) was the commonest agent involved in this study. It shows kerosene being the commonest household fuel used in lower middle class group families, since it is being kept in bottles on the floor in kitchen, children's easily drink from those bottles thinking it to be water or playfully drink from it due to curiosity. Similar results were reported in previous studies.^{94,113} Similar studies from Gujarat show that kerosene poisoning is the most common cause ¹¹⁴because it is used as a fuel for cooking purposes.

Conclusion

Poisoning is an important preventable cause of morbidity and mortality in children. Younger children are most susceptible to poisoning due to their inherent inquisitiveness and higher oral exploratory activity. Male children and preschool age (2-4 years) are more susceptible for poisoning. The main poison agents are e kerosene, paracetamol and camphor. The educational and

socio-economic status plays an important role in prevention of poisoning.

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