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Original Research Article

Psychosocial factors in children presenting with poisoning in a tertiary care centre

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ABSTRACT

Background: Poisonings in children pose a significant challenge for paediatricians in India due to the diversity of substances and their clinical manifestations. This study investigates the psychosocial factors contributing to acute poisoning among children, aiming to identify key risk factors.
Methods: A prospective, observational study was conducted on 50 children under 18 years admitted for poisoning at Kamineni Academy of Medical Science and Research Centre, Hyderabad, over 24 months (September 2022–September 2024). Data on age, sex, socio-demographic details, poison type, route of exposure, time to hospital arrival, storage practices, and psychosocial factors were analyzed.
Results: Findings reveal that most poisoning cases occurred in children under five years, with 94% being accidental. Hydrocarbons accounted for 36% of cases, with three-fourths of incidents involving children aged 1–6 years. Rural areas contributed to 56% of cases, and poisoning incidents peaked during the summer (54%). A majority (58%) of cases were from lower socioeconomic backgrounds. All cases involved ingestion, and survival rates were 100%. Psychosocial analysis indicated significant risks associated with family dynamics: lack of emotional support, parental psychological illness, and substance abuse were observed in cases of suicidal poisoning.
Conclusions: Childhood poisoning is a critical medical emergency with substantial morbidity. Beyond accidental incidents, it highlights underlying behavioral and family maladaptations, emphasizing the need for early psychosocial interventions to mitigate long-term consequences.

Keywords: Poisoning, Accidental poisoning, Psycho-social factors, Hydrocarbon poisoning, Turpentine oil

INTRODUCTION

A substance (solid, liquid, or gas) that produces ill health or death by its constitutional or local effects or both when introduced into the living body or brought into contact with any part thereof is called poison. Poisons are as old as mankind can find their description in the ancient Egyptian, Hebrew, Babylonian, and Greek literature. Atharvana Veda (1500 BC), Kalpasthana, Chikitsaathana, and Uttarasthana of the Shastras have described poisons' symptoms as well as antidotes. Sushruta (350 BC) detailed methods for introducing poisons into various mediums such as food, drinks, perfumes, medicines, bathing water, snuff, and sprinklers. Ancient Indian practices also included the creation of "Vishkanyas," women trained and imbued with toxins to deliver fatal outcomes through their interactions.[1]

The distinction between poison and medicine is often blurred, as poisons in small doses can act as medicine, while medicines in large doses can become toxic. The primary legal differentiation between the two lies in the intent of their use. Childhood poisoning is a significant pediatric emergency, increasingly prevalent with the rise in household chemical usage. Most cases are accidental and preventable.

Children, as one of society's most vulnerable groups, are disproportionately affected by poisoning. Accidental poisoning commonly occurs in toddlers and preschoolers, driven by their natural curiosity, while adolescents may experience intentional overdoses. These incidents range from exposure to traditional poisons to the misuse of recreational drugs and chronic exposure to industrial chemicals.

Accidental poisoning is a frequent pediatric emergency and a significant cause of morbidity and mortality among children, particularly in developing nations. It is most prevalent in children under five years of age, driven by their curious and exploratory behavior. High incidence of poisoning among preschool children also affects the developmental stage of the child.[2]

Children typically start crawling, creeping, and walking around their first year, during which their natural curiosity drives them to explore and put objects into their mouths. By two and a half to three years, their motor skills and ingenuity increase access to harmful substances. However, by the fourth year, accidental poisoning cases decline as children become more selective and apply their past experiences. Male children are more often involved in poisoning incidents due to their higher activity levels. Poisoning is also more prevalent in children from lower socioeconomic backgrounds, likely due to inadequate storage facilities. Another critical aspect is poisoning from animal bites, particularly snake bites, which is a common medical emergency in rural India where farming is a primary livelihood. Children of field workers, often engaged in child labor, face significant life-threatening risks in such occupations.[4]

While the incidence of accidental poisonings remains steady, the patterns have shifted significantly over the decades. Emerging hazards stem from the introduction of new domestic products, pesticides in agriculture, industrial chemicals, and increased access to medications, leading to potential misuse. Changes in social structures and lifestyles, such as the breakdown of joint families and parents being away for work all day, have also contributed, often leaving children in daycare or similar settings.

Numerous epidemiological studies on childhood poisoning in India highlight various causative agents, with most emphasizing the need for improved prevention programs. While childhood poisonings are predominantly accidental, adult cases are largely suicidal or homicidal. Preventive measures, if implemented effectively, can significantly reduce childhood poisoning. Shifting trends in poisoning patterns have likely altered associated risk factors, which include psychosocial issues such as parental psychological problems, lack of social support, inadequate education for children, psychiatric disorders like depression, substance abuse by fathers, and insufficient emotional support. Despite the seriousness of the issue, recent concrete data on childhood poisoning in our region is limited. This study aims to address this gap by exploring the prevalence, risk factors, and fatalities associated with accidental poisoning in children across various categories of toxins.

METHODS

This study was a prospective, observational study where children less than 18 years of age admitted with history of poisoning during study period of 24 months from September 2022 to September 2024 were included in the study group. Total of 50 study participants were included in the study at Kamineni Academy of Medical Science and Research Centre, Hyderabad. The study protocol was approved by the institutional board of the Kamineni academy of medical science and research center, Ethical committee clearance was obtained in our hospital to conduct our study. Informed consent obtained from parents and care givers of the children before including them in the study. Patients who do not give consent for the study and children with snake bite, scorpion sting and other poisonous bites were excluded.

All the children admitted with history of poisoning in NICU, PICU and paediatric ward during study period were studied according to the age, sex, social demographic data. A thorough history was obtained pertaining to details of the poison, type of agent, route of exposure, time of arrival to hospital after poison exposure, manner of poisoning, any poisonous plants in home garden, unsafe storage of agro-chemicals, household chemicals and drugs.

A very importantly detailed history regarding psycho-social factors like if mother working during the daytime/employed outside the station, marital problems among parents, young age of mother, personality and behavioral abnormalities in the child, economic problems in the family, lack of schooling/education to the child, lack of family and social support, psychological illness in the parents, inadequate supervision of the child and developmental delay in the child obtained. Then the data was entered in Microsoft excel and analyzed using epi-info version 1.6.6.1 and statistical package for the social sciences (SPSS) and represented in the form of tables and diagrams. The main measures and indicators used for analyzing the descriptive tables were frequency distributions for the variables and correlation of these variables with the poisoning. Statistical significance was set at $p<0.05$ for all values.

RESULTS

A prospective observational study was conducted to evaluate the psycho-social factors of children attending to the hospital with poisoning. The paediatrics patients enrolled in the study were 50 in number. The present study shows that approximately three fourth of the patients were between 1 to 6 years of age (36 out of 50 cases). The maximum number of patients were in the age group of 1 to 3 years (46%). Out of 50 poisoning cases, poisoning was more common in boys than in girls (58%). The male to

female ratio is 1.38. One participant was of the age group <1 year and he was a male. 56% cases occurred in the rural population while 44% cases occurred in the urban population. Present study found 26% of cases of ingested poisoning occurred in families belonging to the upper-lower, 16% cases in lower middle, and 58% cases in lower socioeconomic class (the classification was based on modified Kuppuswamy scale). Poisoning due to ingestion showed marked seasonal variation with the highest incidence in the summer season 27 (54%), 12 (24%) in rainy season and 11 (22%) in winter season. Most of the mother's education belongs to the primary school level 24% followed by 22% having middle school education, 20% at the high school level, 5% were illiterates, 8% were graduate level (Table 1).

Table 1: Characteristics of patients.

Parameters	Percentage (frequency)
Gender	
Male	58 (n=29)
Female	42 (n=21)
Age (years)	
<1	2 (n=1)
1-3	46 (n=23)
4-6	24 (n=12)
7-9	16 (n=8)
10-12	8 (n=4)
13-15	4 (n=2)
Residence	
Rural	56 (n=28)
Urban	44 (n=22)
Socio-economic status	
Lower middle	16 (n=8)
Upper lower	26 (n=13)
Lower	58 (n=29)
Seasonal variation during poisoning	
Summer	54 (n=27)
Rainy	24 (n=12)
Winter	22 (n=11)
Educational status of mother	
Illiterate	10 (n=5)
Primary education	24 (n=12)
Middle school	26 (n=13)
High school	24 (n=12)
Graduate	16 (n=8)

In the present study, all the 50 children had ingested poison while none of them had poisoning by inhalation. The majority of acute poisoning was due to hydrocarbon compounds (36%). Pesticides and insecticides were consumed by 24%, drugs by 16% and others by 3%. Out of 50 cases of ingested poisoning, 47(94%) cases are accidental, while 3 cases are suicidal, 2 participants who had conflict with parents took rat poison. One participant who had stress in school took lysol. Both were statistically significant with p value <0.05. In this study, turpentine 12 cases, all-out 6 cases, rat poison 2 cases, other pesticide 18 cases, other hydrocarbon compounds 8 cases are the most common poisoning agents. Gastrointestinal symptoms predominated the presentation. Nausea and vomiting were present in 26 (52%), abdominal pain in 8 (16%), followed by respiratory complaints with cough in 8 (16%) and tachypnoea in 7 (14%). asymptomatic cases account for 20 (40%). In this study, most of the children, 54% reached the hospital within 1-6 hours. 36% Reached the hospital within one hour, and 8% reached the hospital within 7- 24 hours. Only 2% reached the hospital more than 24 hours. Most of the patients were brought by parents to the hospital. Most cases (42%) stayed in the hospital from 1 day to less than three days, 52% of cases stayed from 3 to 7 days, 4% stayed less than one day, and only 2% stayed more than one week. Out of 3 cases of suicidal poisoning, all the cases survived. Out of 50 cases, all the cases of ingested poisoning survived (100%) (Table 2).

Table 2: Characteristics of poisoning.

Parameters	Percentage (frequency)
Pattern of poisoning	
Ingested	100 (n=50)
Inhalation	0 (n=0)
Types of poison consumed	
Hydrocarbon compounds	42 (n=21)
Acids and alkali	18 (n=9)
Pesticides and insecticides	24 (n=12)
Drugs	16 (n=8)
Manner of poisoning	
Accidental	94 (n=47)
Suicidal	6 (n=3)
Homicidal	0
Factors affecting suicidal poisoning	
Conflict with parents	80 (n=2), p=0.0002
Stress in school	20 (n=1), p=0.0006
Time between ingestion and arrival at hospital (hours)	
<1	36 (n=18)
1-6	54 (n=37)
7-24	8 (n=4)
>24	2 (n=1)
Outcome	
Survived	100 (n=50)

When psycho-social factors which are influencing the poisoning in children were studied it is found that lack of social support was present in 2 children who committed suicide which was statistically significant with p value <0.05. Lack of schooling/education to the child was present in 1 student who committed suicide which was statistically significant with p value <0.05. Father using alcohol or illicit drugs was present in 2 students who committed suicide which was statistically significant with p value <0.05. Psychological illness in parents was present in 1 student who committed suicide which was statistically significant with p value <0.05. Lack of emotional was

present in 2 students who committed suicide which was statistically significant with p value <0.05 (Table 3).

When gender was correlated with type of poisoning it is found out that it is not significantly associated with type of poisoning. Likewise, age was not significantly associated with type of poisoning and also educational status of mother was also not statistically significant with type of poisoning (Table 4).

Table 3: Association between various psycho-social factors and poisoning.

Psycho-social factors	Percentage (frequency)	P value	X^2
Lack of social support	4 (n=2)	0.000053	20.826
Lack of schooling/education to the child	2 (n=1)	0.007	7.151
Father using alcohol or illicit drugs	4 (n=2)	0.0005	20.82
Psychological illness in parents	2 (n=1)	0.007	7.15
Lack of emotional support	4 (n=2)	<0.001	7.12
Conflict with parents	4 (n=2)	0.0002	17.5
Stress in school	2 (n=1)	0.0006	11.7

Table 4: Association of various parameters and type of poisoning.

Parameters	Accidental poisoning	Suicidal poisoning	P value	X^2
Gender				
Males	30	1	0.29	1.11
Females	17	2		
Age (years)				
1-6	36	0	0	3.34
7-12	10	1		
>12	1	2		
Educational status of mother				
Illiterate	3	2		
Primary education	11	1	0.3288	4.61
Middle school	13	0		
High school	12	0		
Graduate	8	0		

DISCUSSION

In the present study, 50 children with ingested poisoning were admitted during the study period. In the present study, poisoning due to ingestion showed marked seasonal variation with the highest incidence in the summer season 27 (54%), 12 (24%) in rainy season and 11 (22%) in winter season. In a retrospective observational study by Khadgawat et al, the incidence of poisoning was 71.7% in summer, 33.6% in rainy, and 24.7% in the winter season.[3] The higher incidence of ingested poisoning in the summer season may be due to increased thirst during summer months, due to which toddlers may inadvertently drink poisonous substances, especially turpentine that is stored in drinking bottles.

In the present study 52% were of the age group 1-3 years, followed by the 4-6 years of age group (24%) similar to the studies done by Vasathan et al, Sridhar et al and Shilaja et al.[4-6] The highest incidence of poisoning occurred in male children (58%) than female children (42%) and the male to female ratio is 1.38:1 similar to a study done by Sridhar et al where males were 55.3% and Shailaja et al where males were 59.6%.[5,6] This is also similar to many studies done by Ravi et al, Kohli et al, and Budhathoki et al where there was male preponderance.[7,9,10] The higher incidence in males is probably due to a greater degree of activity.

In most of the cases, parents studied up to middle school level (28%) the number of cases more in less-educated parents group. Most of the cases, parents belong to the lower-class group (58%) according to the modified kuppusamy scale. A similar study pattern was observed in a study done by Srinivasa et al (48%) and Rimal et al (78%) where most of the cases belong to lower.[8,11]

Among the most common type of poisoning is hydrocarbons (36%), turpentine (32.5%) is the commonest agent involved similar to the studies done by Vasanthan et al, Shailaja et al and Srinivasa et al.[4,6,8] In some studies like Vasanthan et al and Rathore et al kerosene is the most common poisoning agent.[4,12] Insecticides and pesticides are the most consumed substance attributed to the agriculture-based rural population and seen in a similar study by Sunanda et al.[13] In our study, the most common mode is accidental, followed by suicidal poisoning. These findings are similar to study done by Vasanthan et al where 77.3% and Srinivasa et al where 85% of the poisoning were

accidental.[4,8] Similar results were also seen in the studies done by Andiran et al and Kandeel et al.[14,15]

In the present study, we observed 3 cases of suicidal poisoning, of which 1 case is due to ingestion of ant poison, 1 case due to lysol poisoning, and 1 case due to ingestion of rat poison. In a study done by Kumar et al in Calicut Kerala rat poison was the commonest source of suicidal poisoning (34%) and other pesticides were organophosphorus pesticides (3; 10%) and pyrethrin (2; 7%).[16] We found that out of 3 cases of suicidal poisoning, 2 cases (80%) is due to a conflict with parents, 1 case (20%) is due to stress in school and 0 case (0%) is due to parental disharmony. In a study conducted by Kumar et al they found that conflict in the family was present in 6 (50%) children, eight (67%) children had stress at school, family stress alone was present in 2 (17%) children, major depressive episodes are seen in 6 (50%) of children, and 3 (25%) children had features of conversion disorder or oppositional defiant disorder.[16] In a study done by Hawton et al, we have found that school-related stress was strongly associated with deliberate self-poisoning in children. The stress factors related to school were poor academic achievement and examination failures, school change, teacher stress, and peer stress.[17] In a study done by Wai et al, high parental expectations and parental behaviors contribute to school-related stress.[22] Similar patterns was observed in a study done by Gangal et al and Narahari et al.[18,19] In the present study the majority of cases (42%) stayed in the hospital from 1 day to less than three days, 52% of cases stayed from 3 to 7 days, 4% stayed less than one day, and only 2% stayed more than one week. A similar duration (74.6%) of hospitalization was 1-3 days in Kandeel et al and Gangal et al where 55% have 1-3 days of hospitalization.[15,18]

In our study, out of 50 cases of ingested poisoning, no cases died. According to WHO, mortality due to poisoning in children up to 4 years of age varies between 0.3 to 7.0 per 1,00,000 in various countries. However, no such information is available from India.[20] Lack of emotional was present in 2 students who committed suicide which was statistically significant with p value <0.05 which was similar to a study done by Dayasiri et al where psychological problems in parents, lack of social support, lack of schooling/education to the child was found to be significantly associated with poisoning.[23]

Also, in a study done by Kumar et al where suicidal attempters show that 57% had family history of psychiatric morbidity with alcoholism, suicide and depression as the common problems.[21]

Limitations

Since this study was conducted over a limited time frame, the number of patients selected based on the inclusion criteria was insufficient. Additionally, the study was carried out in a single hospital.

CONCLUSION

The patterns of pediatric poisoning differ from those in adults, as children are primarily cared for by adults. Most cases of poisoning in children are unintentional, with accidental poisonings being most common in those under five years of age due to their curiosity, mouthing tendencies, and exploratory nature. Hydrocarbon ingestion was the leading cause of acute poisoning. Both fatal and non-fatal poisonings were more frequently observed in children from lower socioeconomic backgrounds. The highest number of cases occurred in the 1 to 3-year age group. Poisoning incidents showed a significant seasonal variation, with the peak occurring in the summer. Maternal education also played a key role, as most mothers in the study had only completed primary school. Lack of social support was noted in children who committed suicide. Preventive measures, such as removing poisonous agents from the market or replacing them with less toxic alternatives, along with legislation for safe, tamper-proof packaging, can help reduce the incidence of accidental poisonings in children.

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