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Clinical Profile, Outcome and Factors Influencing Poisoning in Children Admitted in Tertiary Care Hospital

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Abstract: ***Background**: Accidental poisoning is one of the important causes of childhood morbidity and mortality. 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 making poisoning a preventable problem. As we lack concrete data about poisoning in children from our region, we decided to undertake this study to quantify the problem of childhood poisoning so that effective steps can be taken up to educate the parents and the caretakers to prevent this common problem in the vulnerable pediatric population. Aims and objectives: To know the clinical profile of poisoning, outcome of poisoning & the factors influencing poisoning–age of a child, literacy of parents, socio-economic status& the circumstances of poisoning. Materials and methods: Study Size and Design: This is a hospital-based prospective study where children less than 12 years of age presenting with a history of poisoning or intoxication during the study period. Results: prevalence is 1.92%, out of 123 patients, all are ingestional [100%], most of poisoning by hydrocarbon [39%], age wise 1-3 yrs [52%], more are of males [59.3%], more cases in rural population [57.7%], more in summer season [45.6%], maximum in lower SES [53.4%], maximum were by accidental ingestion [96%], all are survived [100%], with vomitings [43%] as major symptom with mean duration of stay 1-3days [61.8%].***

Keywords: Accidental poisoning, TURPENTINE poisoning, Poisoning, SEASON, Urban, Rural, HYDROCARBON, SURVIVAL, HOSPITALSTAY

1. Introduction

Poisons are substances which produce ill health or death by their constitutional or local effects or both. Children being vulnerable section of our society, have been the principal victims of all social ills, poisoning being no exception. Accidental poisoning, a common pediatric emergency is one of the important causes of childhood morbidity and mortality especially in developing countries. Though there is no significant reduction in the number of accidental poisonings, the pattern of poisoning has shown a great change with new hazards constantly appearing due to introduction of new drugs and chemicals for domestic use, farming or industrial purpose [1]. Unlike adults, childhood poisoning is usually accidental making it preventable with some simple but intelligent interventions. Despite a fair assumption of the magnitude of the problem, we lack concrete data about poisoning in children from our region. Hence the present study was taken up to quantify the problem of childhood poisoning so that effective steps can be taken up to educate the parents and the caretakers to prevent this common problem in the vulnerable pediatric population

Aims and Objectives

The present study is a prospective study of pediatric poisoning cases admitted in government general hospital, Kakinada, undertaken with the following aims and objectives:

1) To know the clinical profile of poisoning.
2) To know the outcome of poisoning.
3) To know the factors influencing poisoning –age of a child, literacy of parents, socio-economic status.
4) To know the circumstances of poisoning.

2. Materials and Methods

Study Size and Design: This is a hospital-based prospective study where children less than 12 years of age presenting with a history of poisoning or intoxication during the study period

Study setting: Government general hospital in Kakinada

Study Subjects: cases admitted with acute poisoning in the pediatric intensive care unit, age 1 to 12 years.

Inclusion Criteria: Following children presenting to the pediatric intensive care unit are included in the study.

- With a history of poisoning with or without clinical features of poisoning
- With a doubtful history of poisoning but with definite signs and symptoms of poisoning

Exclusion Criteria:

- Children presenting with a doubtful history of food poisoning
- Idiosyncratic reaction to drugs.
- Snakebite and insect bites are excluded.

Study Period: From December1st, 2018toJune1st, 2020

Data Collection:
Data will be collected by history taking, clinical examination and investigation done as required, and details like type and quantity of poison consumed, duration between consumption of poison and onset of symptoms, and manner of poisoning. Supportive care and specific treatment are given depending on the type of poison and response noted.

3. Results and Observations

Prevalence of Poisoning
In the present study, 123 children with acute poisoning were admitted to the pediatric emergency department in the government general hospital, Kakinada, during the study period from December1st, 2018, toJune1st, 2020. . The total number of hospital admissions to the pediatric emergency department during this period was 6381. the prevalaence of poisoning was observed to be 1.92%.

1) Pattern of Poisoning

Pattern of Poisoning	No. of Cases	Percentage
Ingested Poisoning	123	100
Inhalation Poisoning	0	0
Total	123	100

In the present study, all the 123 children had ingested poison while none of them had poisoning by inhalation

2) Types of Poisoning

Poison	No. of Cases	Percentage
Hydrocarbon compounds	48	39
Acids & alkalis	13	10.5
Pesticides & insecticides	36	29.3
Drugs	17	13.8
Others	3	2.4
Seeds	6	5
Total	123	100

The majority of acute poisoning was due to hydrocarbon compound ingestion (39%), including petrol, kerosene, and Turpentine.

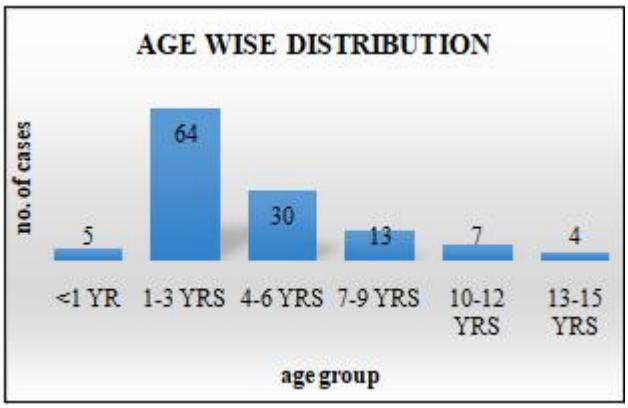
The various drugs used for poisoning were acetaminophen (paracetamol), phenytoin, carbamazepine, and amitriptyline. The most common chemicals responsible for accidental poisoning were ant poisons and pyrethroids.

Six cases of poisoning are due to the ingestion of seeds of Nerium, datura.

3) Age Wise Distribution of Ingested Poisons:

Age (Yrs)	No. of Cases	Percentage
<1 YR	5	4
1-3 YRS	64	52
4-6 YRS	30	24.4
7-9 YRS	13	10.6
10-12 YRS	7	5.7
13-15 YRS	4	3.3
Total	123	100

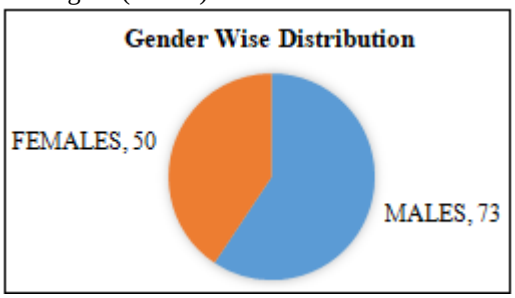
The present study shows that approximately three-fourths of the patients were between 1 to 6yrs of age (94 out of 123 cases). The maximum number of patients were in the age group of 1 to 3 yrs (52%).



4. Gender Wise Distribution of Ingested Poisoning Cases

Sex	No. of Cases	Percentage
Males	73	59.3
Females	50	40.7
Total	123	100

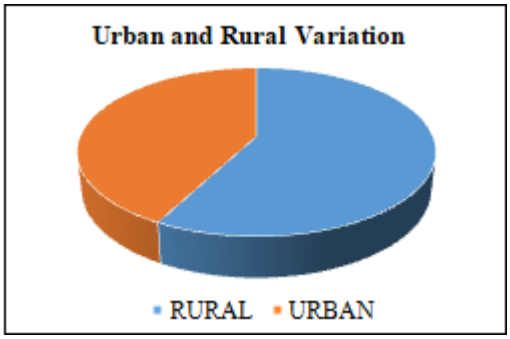
Out of 123 poisoning cases, poisoning was more common in boys than in girls (59.3%). The male to female ratio is 1.46.



5. Urban and Rural Variation

Areas	No. of Cases	Percentage
Rural	71	57.7
Urban	52	42.3

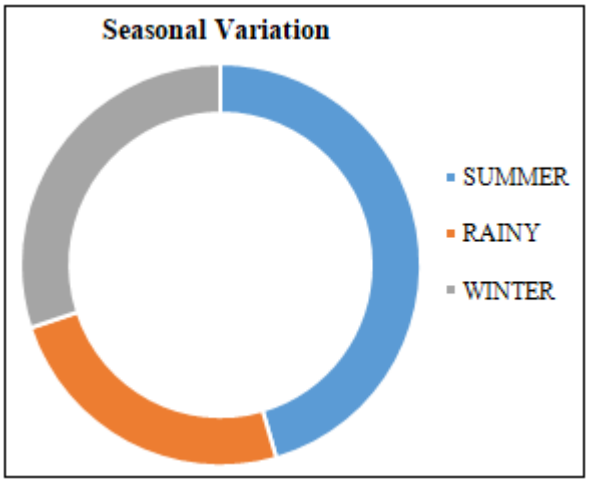
Among 123 ingested poisoning cases, 57.7% cases occurred in the rural population while 42.3% cases occurred in the urban population.



6. Seasonal Variation

Season	No. of Cases	Percentage
Summer	56	45.6
Rainy	30	24.4
Winter	37	30

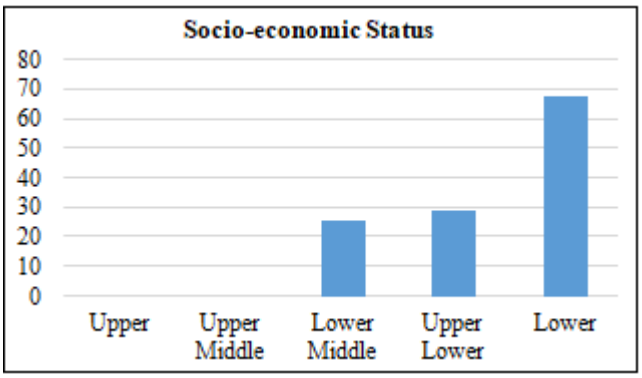
Poisoning due to ingestion showed marked seasonal variation with the highest incidence in the summer season (45.6%).



7. Distribution Based on Socio-Economic Status:

Socio-Economic Class	No. of Cases	Percentage
Upper	0	0
Upper Middle	0	0
Lower Middle	26	21
Upper Lower	29	23.6
Lower	68	55.4
TOTAL	123	100

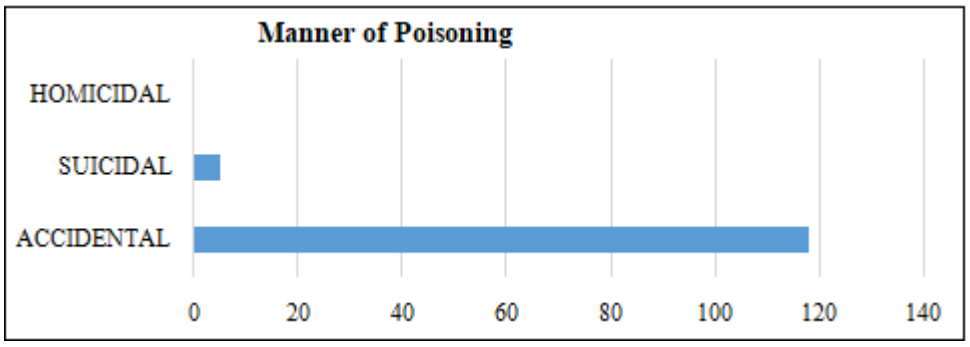
Our study found 21% of cases of ingested poisoning occurred in families belonging to the lower-middle, 23.6% cases in upper-lower, and 55.4% cases in lower socio-economic class (the classification was based on modified kuppuswamy scale).



8. Manner of Poisoning

Manner	No. of Cases	Percentage
Accidental	118	96
Suicidal	5	4
Homicidal	0	0
Total	123	100

Out of 123 cases of ingested poisoning, 118 cases are accidental, while 5 cases are suicidal.



9. Factors Contributing to Suicidal Intention:

Factor	No. of Cases	Percentage
Conflict with parents	4	80
Parental disharmony	0	0
Stress in school	1	20
TOTAL	5	100

Our study found that out of 5 cases of suicidal poisoning, 4 cases (80%) is due to a conflict with parents, and 1 case (20%) due to stress in school.

10. Outcome due to Ingested Poisoning:

Outcome	No. of Cases	Percentage
Survived	123	100
Death	0	0
Total	123	100

Out of 123 cases, all the cases of ingested poisoning survived (100%).

11. Symptomatology of Presentation:

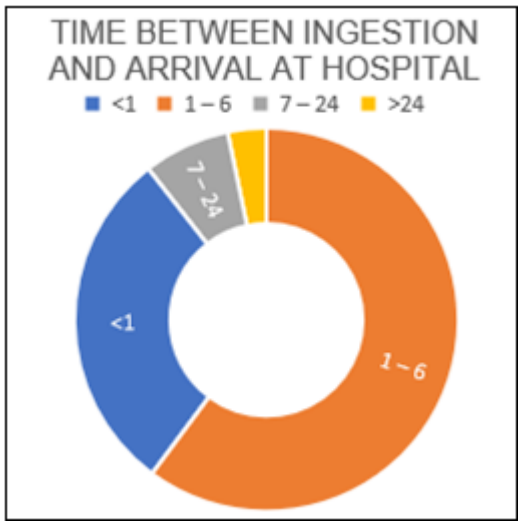
Symptoms	Number	Percentage
Asymptomatic	47	38.2
Vomitings	53	43
Cough	11	8.9
Tachypnoea	12	9.8
Abdominal pain	7	5.7
Lethargy / unconscious	6	4.9
Difficulty in walking	3	2.4
Fever	1	0.8

Gastrointestinal symptoms predominated the presentation 60 (48.7%). Nausea and vomiting were present in 53 (43%), abdominal pain in 7 (5.7%), followed by respiratory complaints 23 (18.7%) with cough in 11 (8.9%) and tachypnoea in 2 (9.8%). asymptomatic cases account for 47 (38.2%)

12. Time between Ingestion and Arrival at Hospital

Time (hrs)	Cases	Percentage
<1	36	29.3
1 – 6	74	60
7 – 24	9	7.5
>24	4	3.2
Total	123	100

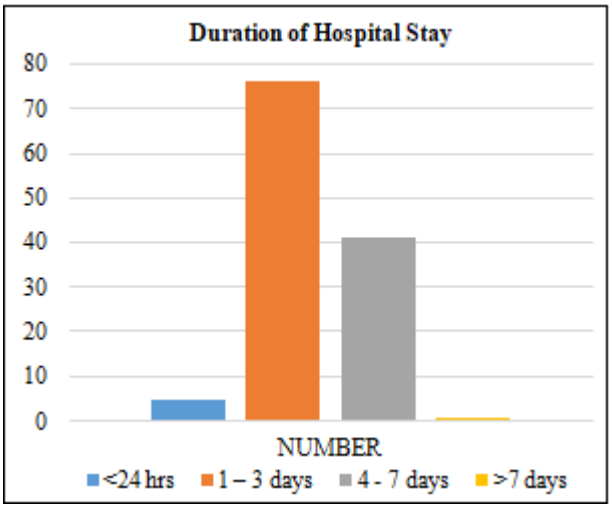
In this study, most of the children, 60% reached the hospital within 1-6 hours.29.3% Reached the hospital within one hour, and 7.5% reached the hospital within 7-24 hours. Only 3.2% reached the hospital more than 24 hours. Most of the patient were brought by parents to the hospital.



13. Duration of Hospital Stay:

Duration	Number	Percentage
<24 hrs	5	4
1 – 3 days	76	61.8
4-7 days	41	33.4
>7 days	1	0.8

The majority of cases (61.8 %) stayed in the hospital from 1 day to less than three days, 33.4% of cases stayed from 3 to 7 days, 4% stayed less than one day, and only 0.8 % stayed more than one week.



4. Discussion

In the present study, 123 children with ingested poisoning were admitted during the study period. In our study, the prevalence of poisoning is 1.92%. In a retrospective study by Shailaja et al., a kalwa study published in 2019, the prevalence of childhood Poisoning was 1.7%[2]. A study was conducted by Vasanthan et al. in the department of pediatrics, Sri Ramachandra MC & R. F., Tamilnadu, in 2015. They noticed that childhood poisoning constituted 1.8% of the total pediatric admission.3, so the prevalence of our study is within the narrow range of the previous results. In the present study, significant season-wise variation was observed, with the highest incidence in the summer season.45.6% of the cases were recorded in the summer season, 24.4% of the cases were recorded in the rainy season, and 30% were recorded in the winter season. In a retrospective study in J. L. N. Medical College and Hospital, Ajmer, the incidence of poisoning was 71.7% in summer, 33.6% in rainy, and 24.7% in the winter season.4The 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 this study highest number of cases occur in the 1-3 years of age group (52%), followed by the 3-6 years of age group (24.4%). In our study, 5 cases were admitted less than one year of age group. Incidence of the Poisoning highest in the 1-3 years age group in Vasantha et al. study (37.3%) [3] and Sridhar PV et al. study (55%) [5]. The high incidence less than five years because of inherent inquisitiveness and higher oral exploratory activity aided by their newly acquired mobility, hand skills, and inability to differentiate between harmful and harmless things. The highest incidence of poisoning occurred in male children (59.3%) than female children (40.7%),. and the male to female ratio 1.42: 1. This is similar to many studies that found a male preponderance [7, 8, 9]. The higher incidence in males is probably due to a greater degree of activity. Most of the case parents belong to the lower class group (55.4%) according to the modified kuppusamy scale. A similar study pattern was observed in a study done by Rimal HS et al.10, Srinivasa et al.11 The reasons for the increased incidence in children of the lower socio-economic class are: Lack of education, Overcrowding, Poor storage facilities, No proper supervision by the mother. Although no cases are reported from families of upper socio-

economic class in our study, it does not mean that poisoning is completely absent. Better living environment and greater awareness of hazards in the upper socio-economic class make accidental poisoning less common in children. Among the most common type of poisoning is hydrocarbons (39%), Turpentine (32.5%) is the commonest agent involved. Turpentine is used as a mineral spirit or thinner, usually mixed with paints for painting houses. It also comes under the hydrocarbons group. This type of poisoning is found in the children of families involved in building construction work, paintings. Turpentine is the most common agent of poisoning due toStorage of Turpentine in bottles used for drinking water and in cool drink bottles, Easy accessibility, as in most households, is kept on the floor or in open cupboards, and most of the time, the bottles are not capped properly. Children mostly mistake it as waterIn some studies like Rathoreetal. [12], Vasanthaetal. (3), kerosene is the most common poisoning agent. Previously kerosene used to be the commonest household fuel used in lower-middle-class group families. Since it was kept in bottlon the kitchen floor, children easily drink those bottles as water or play due to curiosity. Insecticides & Pesticides are the most commonly consumed substance attributed to the agriculture-based rural population and seen in a similar study by Sunanda et al[13]. In a retrospective study conducted in District Hospital, Belgaum, from January 1999 to December 2003, the commonest poison consumed was observed to be organophosphorus Compounds (48%). In our study, the most common mode is accidental, followed by suicidal poisoning. Accidental poisoning is more common in 1-3 years age group with male predominance because most of the male child is more active and poor care given to the children by parents since they are going to works. Most of the caregivers are grandparents, and difficult to manage the children at home. Suicide is the next common-mode due to immaturity, Fear of parents scolding them for poor school performance, and family dispute. Agents used for suicidal poisoning isant poison (lindane), rat poison (bromadiolone), Lysol, trihexyphenidyl tablets. Male Children are affected more than females involved in suicidal poisoning. In other studies, suicidal poisoning by drug ingestion being most common (14). Female Children are more commonly involved than male children in suicidal poisoning in our study. Similar results are seen in other studies like kandeel et al.1[5]In Our study we found that out of 5 cases of suicidal poisoning, 4 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 Krishna Kumar et al., Calicut, 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, and 50% of children with school stress also had family stress.6 (50%) children were suffering from major depressive episodes, and 3 (25%) children had features of conversion disorder or oppositional defiant disorder. The mean duration of poisoning and presentation was 4.31 hours. The duration was shorter in the urban population compare to the rural population. It could be explained by the longer distance these rural patients traveled to reach our hospital and received initial treatment at a nearby hospital. This was similar in a study done by Ravi gangal et al.1[6], Narahari et al.1[7]n this study, the most common mode of presentation is vomiting (43%) followed by respiratory distress (9.8%).8.9% of children presented with cough. Kerosene and mineral spirit poisoning usually presented with cough and respiratory distress.38.2% of children were asymptomatic, second only to vomitings. Other common manifestations were lethargy, abdominal pain, giddiness, slurred speech. In our study, children received various forms of treatment. In most cases (80%), treatment was supportive, including oxygen, intravenous fluid, and gastric lavage other supportive therapy. The most common duration of hospitalization was 1-3 days. A similar duration of hospitalization was 1-3 days in kandeel et al.][15], Ravi gangal et al.1[6]. The mean duration of hospital day was as low as 0.66 days in a Nigeria study to 3.8 days and 3.78 days in the buthathoki et al. study ([18]). In our study, 100 % (n-123) of children with poisoning were survived and discharged. The majority of the patient required only shorter duration I. C. U stay compared to insecticide and pesticide poisoning cases. In our study, out of 123 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.1[9]

5. Conclusion

123 cases with poisoning were studied over a period of one and a half year, with the following results

- In this study, the mean age of childhood poisoning is 3.8 years
- The majority of the poisoning in children is accidental, with96%
- Childhood poisoning occurs most commonly in a male child, with male to female ratio of1.46: 1
- Most of the poisoning occurs in lower socio-economic class families (55.4%)
- Hydrocarbons are the most typical agent involved in childhood, followed by insecticides
- Oral ingestion was the predominant route of poisoning
- The mean duration of hospital stay is 2.5days
- The overall survival rate is 100%, and mortality is 0%

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