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Research Paper

Clinical Profile and Outcome of Acute Poisoning In Children and Our Experience in GB Pant Hospital GMC Srinagar India.

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ABSTRACT
When the effect of poisoning start appearing within 24 hours of exposure of the poison it is termed "acute poisoning". Exposures may be through oral, transdermal, inhalation, or intravenous route. Our aim is to determine the clinical course and outcome of acute poisoning. and to determine the socio-demographic characteristics of the study population. Our study is a hospital-based prospective observational study conducted in Postgraduate Department of Pediatrics, G.B Pant children's Hospital an associated hospital of Government Medical College Srinagar Jammu and Kashmir India. This study was conducted over two (2) years with effect from November 2019 to November 2021. The study participants were children in the age group of 6 months-18 years old. In our study, 572 cases with acute poisoning were studied over two years; the mean age of childhood poisoning was 3.8 years. The majority of the poisoning cases were accidental, more common in a male child with a male to female ratio of 1.6:1. Most of the cases were seen in lower-middle-class families (65.7%). Organophosphorus was the most common agent involved. Oral ingestion was the predominant route of poisoning. The mean duration of hospital stay was 4.5 days. 35% of cases were treated with a specific antidote. All patients survived. Most of the accidental poisoning seen in less than five years age group due to their innovative character, curiosity, mouthing tendencies, and exploratory nature. The majority of accidental poisonings are preventable using simple preventive measures and reducing the significant mortality among children. Despite rapid socioeconomic changes, organophosphorus remains the commonest agent in pediatric poisoning.

KEY WORDS
accidental poisonings, organophosphorus, socioeconomic, mortality

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I. INTRODUCTION AND BACKGROUND

In acute poisoning the toxic effects occur almost immediately, usually within hours from the time of exposure [1,2]. Acute poisoning is responsible for more than 1 million cases worldwide annually [3]. The world health organization (WHO) estimates that the total number of acute accidental poisonings throughout the world ranges from 2-3 million cases annually, of which one million are severe poisonings resulting in 20000 deaths annually, while the estimated annual intentional poisonings number is about 2 million resulting in 200000 suicides. [4,5] The exact number of incidences can be higher because most cases of the poisoning go unreported. The problem is getting worse with time as newer drugs and chemicals are developing. Poisoning cases are increasing day by day due to changes in lifestyle and social life.[6] Whether the effects follow a single dose or a series of doses or exposures and when the effects appear within 24 hours this is termed "acute poisoning". Exposures may be through oral, transdermal, intravenous, or inhalation route. The substances used in poisonings vary depending on the area and the culture. Typical agents used in poisonings include pesticides, rodenticides, herbicides, pharmaceutical drugs, household chemicals, foods, plants, traditional medicines, and illegal street drugs. [8]

Pesticides particularly Organophosphorus compounds are widely used for agriculture purposes. Besides pesticides both prescription and non-prescription medicines have been used throughout the world for self-poisoning mainly in urban areas. The most commonly used medicines are central nervous system acting drugs such as antipsychotics, antidepressants, barbiturates, and benzodiazepines; followed by analgesics mainly paracetamol; antiepileptic drugs such as carbamazepine; antiseptics and disinfectants; antimalarial drugs such as chloroquine and others. [8] Household products and chemicals, like paraffin, cleaning agents such as bleach and cetrimide, acids and bases used for drain cleaning, shampoos, and soaps, disinfectants such as potassium permanganate and creosote; are the most toxic chemicals that can potentially be involved in acute poisoning incidents. [8,9]

There are also many precipitating factors like Anxiety, depression, isolation, drug addiction, child abuse, bullying, ,failure in examination, are the common ones. [6]

Many kinds of literature also revealed the mortality/morbidity in any case of acute poisoning depends on several factors such as nature of agent, dose of agent, treatment available immediately, and the time lapse between intake of poison and arrival at health care facility. [6,23]. Management include supportive care, gut decontamination using activated charcoal, increasing poison excretion through multi-dose activated charcoal or urine alkalinization with sodium bicarbonate, or charcoal hemoperfusion; use of specific antidotes to counter the effects of the poison. [10,11]

II. AIMS AND OBJECTIVES

- To determine the clinical course and outcome of acute poisoning.
- To determine the socio-demographic characteristics of the study population.

III. MATERIAL AND METHODS

A hospital-based prospective observational study conducted in Postgraduate Department of Pediatrics, G.B Pant Hospital an associated hospital of Government Medical College Srinagar Jammu and Kashmir India. This study was conducted over two (2) years with effect from November 2019 to November 2021. The study participants were children in the age group of 6 months-18 years old.

After obtaining the ethical clearance from the ethical committee, the present study was conducted in the Post graduate department of pediatrics, GB PANT children's hospital on all patients admitted in the pediatric emergency as acute poisoning. Diagnosis of acute poisoning was made depending upon clinical description and history given by the parents and attendants. Information about the demographic profile, psycho-social determinants, agents responsible for the poisoning, manner of exposure (intentional or unintentional), time of the poisoning, route of exposure, presenting symptom were recorded. Physical, neurological and other systemic examination was done and recorded. Gastric lavage was done in indicated cases, both diagnostic and therapeutic and the sample was preserved and chemical analysis was done at central forensic laboratory Srinagar in cases where the cause of poisoning was not known. Children with unstable vital signs (i.e., respiratory failure, severe hypovolemia, persistent unconsciousness) were admitted to the pediatric intensive care unit (PICU). Patients were followed up till they were discharged from the hospital or died.

IV. STATISTICAL ANALYSIS

The collected data was assembled and entered into a spreadsheet (Microsoft Excel) before being exported to the SPSS Version 20.0 data editor (SPSS Inc., Chicago, Illinois, USA). Statistical software SPSS and Microsoft Excel were used to carry out the statistical analysis of data. Descriptive statistics of data, including percentages and means, were reported. Bar and pie graphs were Statistical significance was described as a P-value of less than 0.05.

V. DISCUSSIONS

This study was conducted over two years and during this period a total of 572 children with acute poisoning were admitted.

In our study highest number of cases occurred in the age group of 1-5 years (60.8%), followed by the 6-10 years of age group (17.5%). In our study, 24 cases were admitted in the age group of less than one year. In the 6-10 years of age group, female cases were found more common than male cases. (**Table 1)** Incidence of the poisoning was highest in the 1-5 years, which conformed with the study reported by **Vasanthan et al. [12]**and **Mandal A et al. [13]**, and many other literature reports **(Goto K, Lifshitz M et al., McGuigan MA)[14-16].**In a study by Vasanthan et al., the maximum number of cases (37.3%) were seen in the 1-3 year age group (28/75) followed by the 12-18 years age group (20/75; 26.7%)**.** This predilection of the age group is related to the oral exploration of the environment during this phase of growth.In a study by **Prasad N et al. [17], t**he age group most prone to poisoning was 0-5 years with 124 children (43 %), while those in age group 5-10 years had 89

children (30.5%) and >10years age group had 76 children (26.5%).

The male children (61.5%) were affected more commonly than female children (38.5%), and the male to female ratio was 1.6:1. This finding was similar to studies done by **Prasad N etal. [17], Mandal A etal. [13]**, **Gangal R et al. [18]**, **Kohli U et al. [19]** and **Budhathoki S et al. [20]** In a study by **Prasad N et al.**[17], the male-to-female ratio was 2.4: 1.

In our study most patients belonged to the lower-middle-class group (65.7%). A similar study pattern was observed in studies done by **Vasanthan M et al. [21] Ahamed B et al. [22] and Kajala P et al. [23]** found a higher incidence of poisoning in the lower middle class (56.0%).

Among the types of poisoning, the most common poisoning was due to organophosphorus, followed by kerosene oil and drugs. Most of the consumed substances in our study were the ones present at home, and the commonest among them was organophosphorus poison. (**Graph 1**). The finding can be explained by the fact that most of the patients belonged to the fruit growing background where these compounds are used as pesticides/insecticides and they keep these substances in various containers at home, thereby giving easy access to the children. The second common acute oral poisoning was due to kerosene. Kerosene is the commonest household fuel used in lower-middle-class families. Since it is being kept in bottles on the floor in the kitchen, children easily drink those bottles as water or play with them due to curiosity. Kerosene was the most common poison type found in studies done by **Rathore S et al. [24]** and **Vasanthan M et al. [21]** However, a study conducted by **Gangal R [18]** found insecticides and Pesticides as the commonly consumed substances, and another study conducted by **Aqeel M et al. [25**] found drugs as the common poisoning agent.

The third commonest agent involved was drugs. Drug poisoning is common in children because they have easy access to parent, sibling, or grandparent's medicines and their instinct to put things in their mouth. Drug constitutes (11.8%) of cases. The drugs were 1%Gamma benzene hexachloride, Amitriptyline, paracetamol, phenytoin, sodium valproate, thyroxine, iron tablets, and tramadol. Other common agents involved were mineral spirit or thinner, usually mixed with paints for painting the houses. It also comes under the hydrocarbons group. This type of poisoning was seen in the families of children involved in the construction work. Children accidentally were drinking it as water. This finding is in conformity with a study conducted by **Andiran N. [26]**

The next common poisoning agents were household substances (11.2%) commonly encountered were rat killer paste/yellow phosphorus, pyrethrins, and naphthalene. Rat killer is a common cause of poisoning because of its easy availability and access at home. Pyrethrins are used as a spray to kill fleas, flies, moths, and many other pests. Pyrethrins also come in shampoo to apply topically to kill lice. Other agent commonly used for poisoning was urea (fertilizer). Urea (fertilizer) is commonly used in rural areas as fertilizer in agricultural fields.

In our study, the most common mode was accidental followed by suicidal. Accidental poisoning was more common in the 1-5 years of age group, an age at which a child is curious and liked to put things into his or her mouth. We also found that accidental poisoning was more common in children of working mothers. Also, most caregivers are grandparents, and they find it difficult to manage the children in the home. Suicide is the next common mode due to immaturity, fear of parents scolding them for poor school performance, and family disputes. Agents commonly used for suicidal poisoning were Organophosphates, Urea(fertilizer), drug ingestion, and yellow phosphorus. In a study conducted by **Aqeel M,[25]** drug ingestion was the most common substance used in suicidal poisoning. Male Children were affected more than the females in our suicidal poisoning cases.

In our study, oral ingestion was the most common route. Our results were similar to studies done by **Vilaça L et al.[27] and Andiran N et al. [26]**

We found that the most common presenting symptom was vomiting (37.8%) followed by cough (14%). 11.9% of children presented with respiratory complaints. Other common manifestations were CNS symptoms, abdominal pain, giddiness, seizure and muskuloskeltal symptoms like fasciculations. Kerosene and mineral spirit poisoning presented with respiratory symptoms like cough and distress. Only 7% of children were without symptoms**. (Graph 2)** In a study by **Vasanthan M et al. [21]** the predominant system involved was the gastrointestinal system (34/75) followed by the central nervous system (29/75). The common presenting symptom of poisoning were emesis (38.7%) followed by convulsions in 22.7% of the patients.

In our study, children received the various form of treatment. In most cases (65%), treatment was supportive, including gastric lavage, decontamination, oxygen, intravenous fluid, and other supportive therapy. Among 572 children admitted only 35% (n-202)received specific antidotes like atropine, Pralidoxime, Physostigmine, N-Acetyl Cysteine, Vit K. when indicated. These results were samilar to the previous study by **Kohli U et al**

The majority of the patients required only a shorter ICU stay compared to insecticide and pesticide poisoning cases. The mean duration of hospitalization was 4.5 days**. (Table 2 &3)** This might be due to serious condition at presentation. Supportive measures and antidotes were less effective in cases reported late in the hospital. The mean duration of hospital stay was 3.8 days in a study by **Budhathoki S et al. [20]**

In our study, all children with poisoning survived and were discharged. This was similar to **Vsanthan M et al. [21], Vasavada H et al. [28] Kohli U et al. [19], Budhathoki S et al. [20] and Goto K et al. [14]**

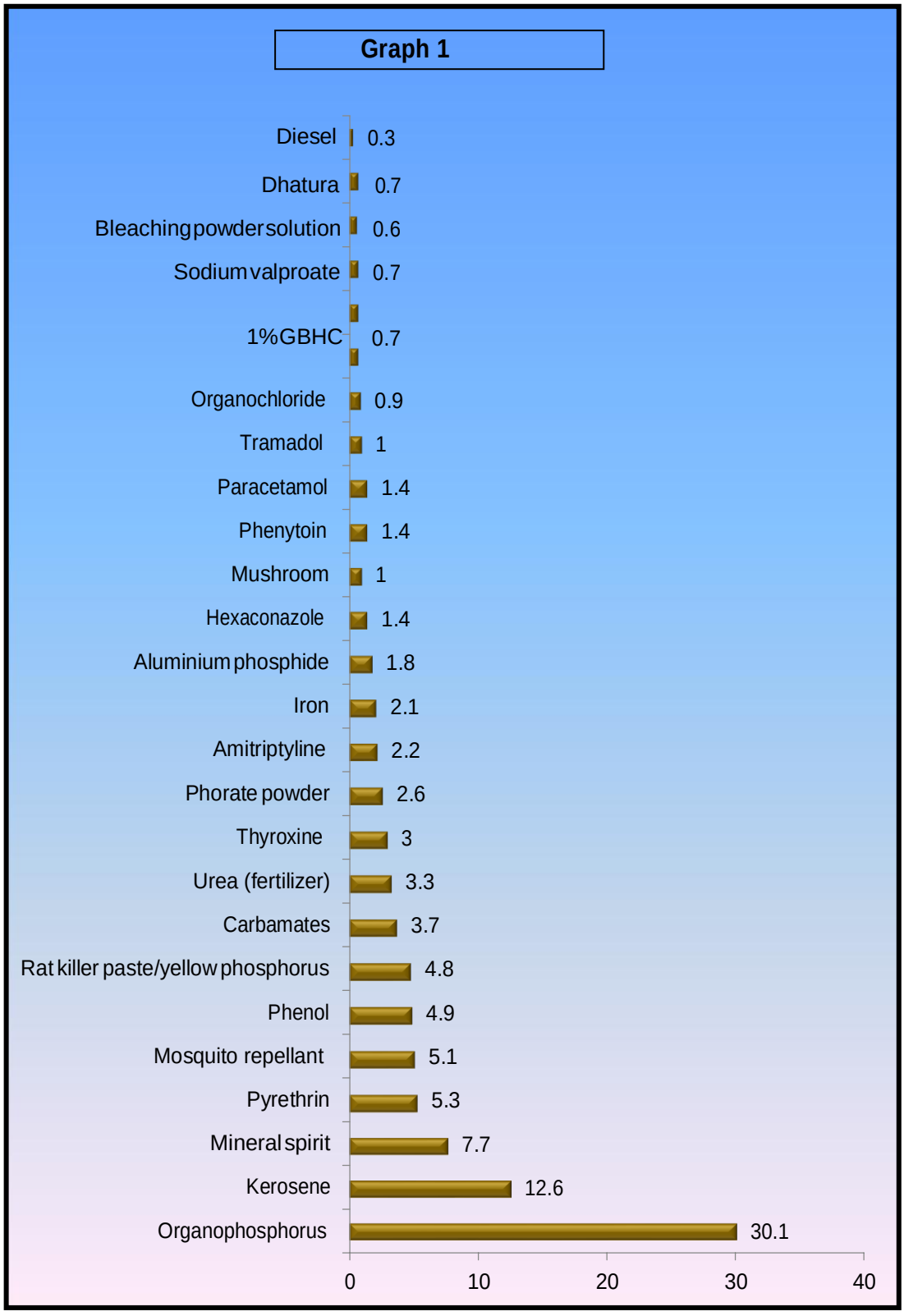
VI. RESULTS

Tables and graphs Table 1 shows demographic data of our study

Table 1:

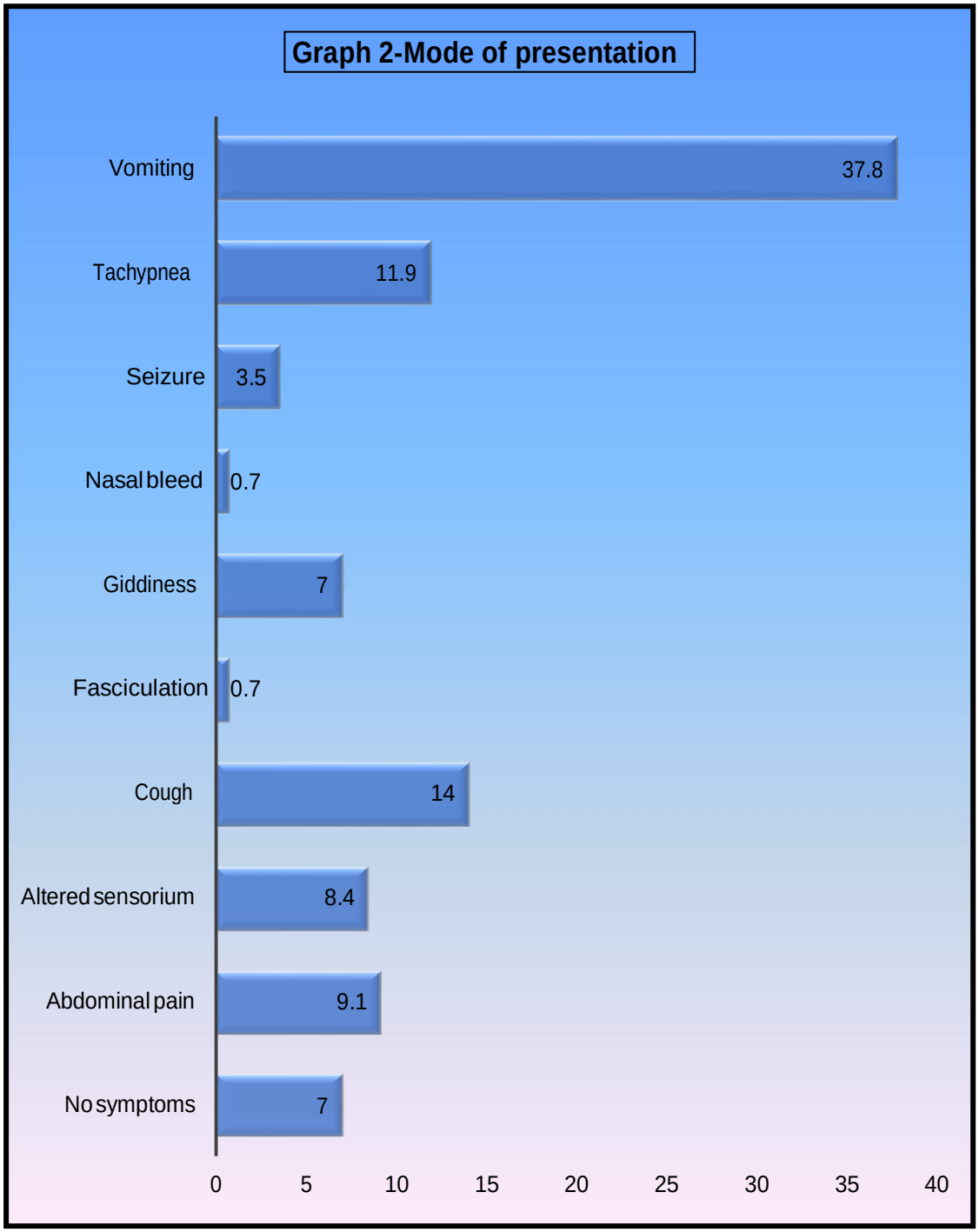
Parameter	Number of patients (n)	Percentage
Age		
<1 year	24	4.2
1-5 years	348	60.8
6-10 years	100	17.5
11-17 years	100	17.5
Gender		
Male	352	61.5
Female	220	38.5
Educational status of parents		
Illiterate	16	2.8
Primary	64	11.2
Middle school	348	60.8
High school	124	21.7
Graduate	8	1.4
Secondary	8	1.4
Intermediate	4	0.7
Socioeconomic status		
Lower	84	14.7
lower middle	376	65.7
Upper lower	40	7.0
Upper middle	72	12.6
Upper	0	0
Mode of poisoning		
Accidental	482	84.3
Suicidal	90	15.7
Total	**572**	**100.0**

AGENTS OF POISONING



GBHC -Gamma benzene hexachloride

Graph 1: shows organophosphorus (30.1%) and kerosene (12.6%) poisoning were most common, followed by drugs (11.9%), mineral spirit (7.7%), and pyrethrin (5.3%).



Graph 2 : shows 37.8% presented with vomiting followed by cough in 14%, tachypnea in 11.9%, abdominal pain in 9.1%, and altered sensorium in 8.4%. 7% presented with giddiness. The least were seizures, nasal bleed, and fasciculation.7% had not shown any symptoms.

DURATION OF HOSPITAL STAY

Table 2-Duration of hospital stay		
Duration of hospital stay	**Number of patients (n)**	**Percentage**

<3 DAYS	348	**60.8**
3-5 DAYS	148	**25.9**
6-10 DAYS	76	**13.3**
Total	**572**	**100.0**

Table 2: The mean duration of hospital stay was 4.5 days. In this study, 60.8% of the children were being discharged within 3 days and 25.9% in 3-5 days, 13.3% in more than 6 days.

DURATION OF ICU STAY AND ANTIDOTE USED

Table 3-Duration of ICU stay, and antidote used

	No		**Yes**		
	N	**%**	**N**	**%**	**Total**
ICU stay	340	59	232	41	572
Specific antidote used	370	65	202	35	572

Table 3: In this study, 59% of children were admitted to ICU and 41% were not admitted in ICU. Out of 572 cases, only 35% received specific antidote and 65% received supportive treatment. All patients survived in our study.

VII. SUMMARY

In our study, 572 cases with acute poisoning were studied over two years; the mean age of childhood poisoning was 3.8 years. The majority of the poisoning cases were accidental, more common in a male child with a male to female ratio of 1.6:1. Most of the cases were seen in lower-middle-class families (65.7%). Organophosphorus was the most common agent involved. Oral ingestion was the predominant route of poisoning. The mean duration of hospital stay was 4.5 days. 35% of cases were treated with a specific antidote. All patients survived.

VIII. CONCLUSION

Childhood poisoning is one of the pediatric medical emergencies. Most of the unintentional poisoning seen in less than five years age group due to lack of maturity about the nature of the agent. Most of the unintentional poisonings can be prevented by using simple preventive measures. Despite rapid socioeconomic changes, still organophosphorus is the commonest agent involved in childhood poisoning. The main cause of pediatric poisonings is due to negligence and ignorance and this could be prevented by giving more attention at home. At present there is a need for community-based educational programs about poisoning.

IX. LIMITATIONS

- Long-term complications could not be followed up in this study.
- The serum level of toxic agents could not be estimated.

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