

## ORIGINAL ARTICLE

## CLINICAL SPECTRUM AND OUTCOME OF CHILDREN PRESENTING WITH POISONING TO TERTIARY CARE HOSPITAL

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**Background:** Accidental poisoning is one of the important emergencies in children. The objective of this study was to enlighten the clinical spectrum and outcome of poisoning in children presenting to a tertiary care hospital. **Methods:** This retrospective study was done in one of tertiary care hospitals, from Jan 2018 to Dec 2019. Retrieved from data, children of either sex aged from one month to 13 years admitted with diagnosis of accidental poisoning were included. Patients' age, sex, poisoning product, presenting symptoms to hospital and outcome from hospital as discharge, expired, transfer out, or left against medical advice were documented. Analysis of data was done using SPSS-20 and  $p < 0.05$  was taken as significant. **Results:** There were 51 patients, 33 (64.7%) males and 18 (35.3%) females. Patients' mean age was  $4.24 \pm 3.6$  years (Range: 1 month to 13 years). Children up to two years of age accounted for 45.1% of patients. The majority (41.2%) of poisoning was due to organophosphorus compounds. Opioids were major type of poisoning in younger children. The most common clinical presenting feature was vomiting and diarrhoea in 45.1% patients followed by the other presenting feature of respiratory difficulty which was present in 21.6% patients. Antidote was given in 68.6% patients. Out of 51 patients, 45 (88.2%) got discharged, 4 (7.8%) expired while 2 (3.9%) were transferred to other hospitals. **Conclusion:** Young male children are more at risk of poisoning. Organophosphorus compounds are leading cause of poisoning and the most common presentation is with vomiting and diarrhoea.

**Keywords:** Children, Poisoning, Organo-phosphorus Compounds, Kerosene oil

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## INTRODUCTION

Poisoning in children is one of the common emergencies.<sup>1</sup> Children can present with history of accidental ingestion of poisonous substances or inhalation of harmful substances.<sup>2</sup> It is one of the important preventable aetiology of morbidity and mortality in children as mortality due to acute poisoning is 3,000 per year in children younger than 14 years.<sup>3</sup> It is being reported that there is increase in incidence of poisoning in children due to lack of supervision and vigilance by elders, behavioural issues in children, easy accessibility to different poisonous substances, multiple health products and drugs, and increased media viewing.<sup>4</sup> Different studies have shown variable incidence of poisoning in children ranging between 0.3% to 7.6%.<sup>5</sup> Regardless of clinical spectrum of poisoning, it is always an emergency in paediatric patients. Children of age 1 to 5 year are more prone for poisoning due to more activity and curiosity. They tend to explore the environment around them due to less mobility and inexperience. With increase in age and cognitive development, the incidence of accidental poisoning decreases.<sup>6</sup>

Majority of children who present with history of poisoning, only require symptomatic treatment but a few patients may require immediate and specific treatment including antidotes to prevent the sequel of

poisoning.<sup>7</sup> Management of poisoning in children include gastric lavage, decontamination, giving activated charcoal, specific antidotes and supportive treatment.<sup>8</sup>

It is important for emergency doctor working in paediatric emergency to have knowledge about the poisoning substances and their effects on body along with presenting clinical features whenever patient is being evaluated.<sup>9</sup> It not only saves life of patient but also leads to teaching and training of young doctors, nurses and paramedics.

Reasons of accidental poisoning in children are different in different countries and age groups. The knowledge of different poisoning substance and clinical spectrum in children can help in planning and taking care of paediatric patients. The objective of this study was to enlighten the clinical spectrum and outcome of poisoning in children presenting to tertiary care hospital.

## METHODOLOGY

This study was performed in Paediatrics Department of one tertiary care hospital in Khyber Pakhtunkhwa. The data was retrieved from the records of patients admitted from January 2018 to December 2019 after approval from Institutional Review Board. The calculated sample size was 51 patients taking the incidence of poisoning in children as 3.40% and using Open-Epi sample size calculator.<sup>5</sup> Children of either sex from one month to 13

years age who got admitted with diagnosis of accidental poisoning (ingestion, inhalational, injection, contact) were included in the study. Children who got admission with intentional poisoning, poisoning due to foreign body ingestion, or aspiration or food poisoning were excluded. Patients with incomplete medical records were not included in the study. Patients' age, sex, poisoning product, container in which the poison was stored or kept, presenting symptoms to hospital, treatment given in emergency, antidote given if required, parents knowledge about the poisoning substance and outcome documented as discharge, expiry, transfer out, or left against medical advice were recorded. Patients were categorized into three groups according to age. In group 1 children age on month to 2 years were included. In group 2 children aged 2.1 years to 5.0 years were included. In age group 3 children aged above 5.1 years were included. Recorded data was analysed on SPSS-20 and  $p \leq 0.05$  was considered statistically significant.

## RESULTS

There were total 51 patients in this study. Out of 51 patients, 33 (64.7%) were male and 18 (35.3%) were female. Age of the patients ranged from 1 month to 13 years with mean age  $4.24 \pm 3.6$  years. The most affected age group was of children up to two years of age accounting for 45.1% of patients, followed by children age group 2–5 years, which had 25.5% patients. Children aged above 5 years accounted only for 29.4% patients. The most common poisonous substances taken were organo-phosphorus compounds including insecticides and rat killer poisons in 41.2% of patients. The other leading causes of poisoning were pharmaceuticals (antiepileptic drugs, benzodiazepines) and kerosene oil. Opioid poisoning was also an important cause but it was mostly in younger children in whom parents gave as remedy for treatment of acute respiratory infections (Table-1).

The most common container in which the poisonous substance was stored was either tablet pack or bottle as it was in cases who had used drugs. Cold drink bottles were the containers in case of kerosene oil poisoning. One patient presented with opioid poisoning with ingestion of cigarette containing cannabis from cigarette pack (Table-2).

The most common clinical presentation to hospital was vomiting and diarrhoea which was present in 45.1% patients followed by respiratory difficulty present in 21.6% patients. Respiratory difficulty was due to central respiratory depression and most of younger children were given opioids as cough remedy. Other features are shown in Table-3.

The majority of patients (51%) were given symptomatic treatment while gastric lavage was done in 31.4% patients. Gastric lavage was done in patients who

presented within two hours of ingestion of poisoning and it was not done in patients with kerosene oil or acid/alkaline poisoning. Activated charcoal was given in 5.9% patients and decontamination was done in 11.8% patients. Antidote was given in 68.6% patients while in 31.4% patients no antidote was required. Antidote included naloxone for opioids, atropine for organophosphorus, and oxygen for kerosene oil poisoning.

Out of 51 patients, 45 (88.2%) got discharged, 4 (7.8%) expired while 2 (3.9%) were transferred to other hospitals. All expiries were due to organo-phosphorus poisoning. Parents of only 27.5% patients had knowledge about the poisonous substance that how much it can be dangerous.

**Table-1: Poison substances**

Substances	Frequency	Percentage
Organo-phosphorus compounds/Insecticide	21	41.2
Plant/atropine	1	2.0
Opioid poisoning	9	17.6
Kerosene oil	9	17.6
Pharmaceutical drugs	11	21.6
Total	51	100.0

**Table-2: Poisoning containers**

Container	Percentage
Nil	39.2
Cold drink bottle	15.7
Glass	2.0
Tablet bottle/pack	29.4
Spray bottle	11.8
Cigarette packet	2.0
Total	100.0

**Table-3: Clinical features at presentation**

Features	Frequency	Percentage
Drowsiness	10	19.6
Vomiting diarrhoea	23	45.1
Breathing difficulty	11	21.6
Fever	1	2.0
Seizures	3	5.9
Vomiting, constipation	3	5.9
Total	51	100.0

## DISCUSSION

As children grow, they have tendency to explore the surrounding environment, which at times can be hazardous. Though presentation with poisoning in children is not uncommon to paediatric emergency department, yet it is one of the important emergency visits. The paediatrician in emergency department must be familiar with common presentation of different poison substances and management.

Majority of poisoning is accidental in children and occurs at home; male children are more at risk for poisoning.<sup>10</sup> In this study children who presented with accidental poisoning were included. Majority of patients were male, which is comparable to the other studies. Studies have shown that children younger than 5 years of age are more at risk due to exploration

activity and curiosity for presentation with poisoning especially age group less than 2 years.<sup>11</sup> In our study 70.5% of children who got admitted with acute poisoning were up to 5 years of age and overall 45.1% children were up to 2 years of age. There were younger children less than 6 months with poisoning but parents gave them different plant derivative like opioid as remedy for treatment of acute respiratory infection. In one systematic review, Bhatta S *et al*<sup>12</sup> concluded that there is limited evidence that environmental change intervention reduces child injuries. Lee J *et al*<sup>13</sup> did a retrospective study in one of tertiary care hospital of Taiwan. In their study 52.3% children were male. The leading cause of poisoning was pharmaceutical drugs in 41.4% patients followed by pesticides in 9.5% patients. In our study the leading cause of poisoning was the organo-phosphorus compounds including insecticides, while second leading cause of poisoning was pharmaceutical drugs. The other two important causative agents of poisoning were kerosene oil and opioids. In Taiwan due to industrialization, more health products and drugs are available and parents kept at home, that's why Lee J, *et al* study the leading causes of poisoning are pharmaceutical products. Dayasiri MB, *et al*<sup>3</sup> did one study on plant poisoning in children in Sri Lanka. In their study 57% patients were male and 64% patients were less than 5 years of age. In their study 32% of parents did not know the severity of poisoning while in our study parents of 72.5% patients did know the nature of poisoning. Due to less education and lack of supervision by adults, majority of parents do not know that the poisoning in children can be hazardous. In Sri Lanka, the literacy rate is very high as compare to Pakistan that may be the reason parents are more aware of childhood poisoning hazardousness.

Khalid M, *et al*<sup>14</sup> in their study included 74 patients and males were 66%. In their study 54% of patients were between age of one and 5 years. In study 39% patients presented with ingestion of pesticides and 17.5% patients with kerosene oil poisoning. Where as in our study organo-phosphorus compounds including insecticides accounted for 41.2% cases and kerosene oil poisoning was present in 17.6% patients, which are almost equal to Khalid M, *et al*<sup>14</sup> study result as this study was done in Multan. Their study mortality rate was 16.2% while in our study mortality was 7.8%. In our study, kerosene oil poisoning was one of leading cause of poisoning in children, as the poison container was the cold drink bottle. In our part of world cold drink are used frequently even by children especially during summer season. Kerosene oil is mostly used for cooking and also used in paints. So when parents keep it in cold drink bottles, children take it for cold drink and present with kerosene oil poisoning. In one of study by Hassan B, *et al*<sup>15</sup> in Egypt described poisoning due to petroleum products in 13% of patients. Ahmad I,

*et al*<sup>16</sup> in their study included 104 children, out of which 56% were male. The most common cause of poisoning was organ phosphorus compounds in 26% patients and kerosene oil poisoning in 21% patients, with overall mortality of 4.8%. In one of study by Malla RR *et al*<sup>17</sup>, 154 children were included. Out of 154 patients 57% were male and 43% were female. The most common poisoning was with Organophosphorus compounds (44.8%) while kerosene oil was in 13.63% and medicines were in 11.68% patients. Mortality was 1.29%. Omer HAM *et al*<sup>18</sup> studied the accidental poisoning in children in Yemen. In Omer HAM, *et al* study the most common poisoning was with kerosene oil which was present in 34.9% cases. One of study done by Obu DC *et al*<sup>19</sup> in Nigeria was regarding childhood poisoning. The study results showed male to female ratio of 2.3:1. In Obu DC *et al* the most common poisoning was with kerosene oil in 50% of patients and mortality was 5%.

Khan NU, *et al*<sup>20</sup> in their study checked for the trends of acute poisoning in children and adults. In their study 34.5% patients were children. The most common agents of poisoning in children were pesticides, hydrocarbons and pharmaceutical drugs. In our study also the common agents of poisoning in children were organo phosphorus compounds, pharmaceutical drugs and kerosene oil poisoning. Nisa B, *et al*<sup>21</sup> in their study included children with kerosene oil poisoning. In their study 75% of patients were male and in most of cases the kerosene oil container was plastic or cold drink bottles. Sanjeev RK *et al*<sup>22</sup> in their study checked for poisoning in children with carbamate which is one of organophosphate poison. It accounted for 21.88% poisoning cases. While in our study 41.2% patients were with organo-phosphorus poisoning. In study done by Abbas SK, *et al*<sup>23</sup>, there were 46.5% less than 3 years of age while in our study 45.1% children were less than two years of age. The pharmaceutical drugs were the leading cause of poisoning followed by kerosene oil and organo-phosphorus compounds where as in our study organo-phosphorus compounds including insecticides were the leading cause of poisoning followed by pharmaceutical products and kerosene oil. In their study 7 patients left against medical advice while in our study none of patient left against medical advice. Memon Y, *et al*<sup>24</sup> in their study concluded that majority of children with poisoning were up to five years of age and kerosene oil poisoning was the most common form of poisoning. There was mortality of 3.22% in their study. In comparison in our study, majority of patients were up to five years of age but kerosene oil poisoning was third leading cause of poisoning. In our study the mortality was 7.8%.

In another study done by Assar S, *et al*<sup>25</sup> in Iran described poisoning pattern in children as their study showed that majority of children were up to five years

of age. Opioids were the cause in 11.9% of cases as mostly in children less than 6 months of age. The common presenting features were vomiting in 50% of patients and decrease level of consciousness in 67% of patients. In our study opioids were one common cause in younger children as 17.6% of children presented with opioid poisoning. In our study the main presenting feature was vomiting and diarrhoea in 45.1% patients followed by breathing difficulty in 21.6% patients. Drowsiness as presenting feature was present in 19.6% patients. Poisoning is one of major cause of unintentional injury in young children with hydrocarbons, medicines and pesticides as common ingested agents.<sup>26</sup> Kumar *et al*<sup>27</sup> found 13.5% children with corrosive ingestion. In our study there was no patient with corrosive ingestion.

## CONCLUSION

Poisoning in children is a common emergency in Pakistan. Male and young children are more at risk for poisoning. Organo-phosphorus compounds including insecticides along with pharmaceutical drugs and kerosene oil are leading poisoning materials in children.

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**BA:** Critical review, data analysis

**KM:** Literature search

**MAR:** Literature search

**SN:** Literature search and supervision

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