

### **Spectrum of pediatric poisoning at tertiary care hospital in Lucknow**

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#### **Abstract**

**Introduction:** In most of the cases pediatric poisoning is acute in nature where a child gets exposed to medicine or household products either unintentionally or accidentally or an adolescent intentionally taken poisonous substance. The colourful and attractive packaging of the

various poisonous substance often inviting children. Indoor poisoning was more than outdoor. Male children are more susceptible to poisoning than female children due to their energetic and curious nature. In rural background pesticide and insecticide used for farming is not well stored and remained access for children. Even

kerosene used as fuel by rural may become potential risk for pediatric poisoning if stored inappropriately.

**Aims and objectives:** The aim of the present study was to describe the pattern and profile of pediatric poisoning patient admitted to Integral institute of medical science and research, Lucknow, India.

**Materials and methods:** The present study was a 2 years retrospective study based on medical records of the pediatric patients who were hospitalized in pediatric department from January 2021 to December 2022.

**Results:** Out of 70 paediatric poisoning male patients (64%) were more than female (36%). Most common age group for poisoning was under 5 years which constitute 68.57% of total poisoning. 71% patient in our study belonged to rural background. 96% case of poisoning were accidental and 4 % of case were intentional in nature. Most common route of poisoning was ingestion (90%) followed by injection (10 %) cases. In 75% case poisoning occurred in home while in 25% case poisoning was outdoor. 35% of pediatric patient were stable while 55 % case were moderately sick and 10% were critically ill at time of admission to hospital. Organophosphorus (40%) was most common cause of poisoning, followed by kerosine (40%). 19% of cases were asymptomatic, 31% cases presented with vomiting, 16% cases presented with abdominal pain, 8% cases with diarrhoea. 67 cases (95.71%) were recovered, 2 case leave against medical advice (LAMA) and mortality was only in 1 case (1.43%).

**Conclusions:** Most of pediatric poisoning are accidental in nature, a few are intentional and rare one is homicidal poisoning. Morbidity and mortality of pediatric poisoning can be adequately restrained by various protective and informative measures. Psychiatric

evaluation must be done in every intentional pediatric poisoning case.

**Keywords:** Pediatric; Poisoning; Rural; Urban; Organophosphorus; Accidental; Intentional

### **Introduction**

Poison is a substance (solid, liquid or gaseous) which if introduced in living body or brought into contact with any part will produced ill effect or death by its constitutional or local effect or both<sup>1</sup>. Mechanical injuries and poisoning account for major proportion of morbidity and mortality among pediatric age group<sup>2</sup>. Poisoning is 4<sup>th</sup> most common accidental injury after Road Traffic Accident (RTA), burn and drowning<sup>3,4</sup>. Poisoning is an emergency that affects all age group of individuals globally. Demographic condition, education, socioeconomic status, customs and traditional belief affects the source and type of poisoning through out of the world<sup>5</sup>. In most of the cases pediatric poisoning is acute in nature where a child gets exposed to medicine or household products either unintentionally or accidentally or an adolescent intentionally taken poisonous substance<sup>6</sup>. The colourful and attractive packaging of the various poisonous substance often inviting children due to their motor development phase to put the objects in their mouth and making them prone for poisoning<sup>7</sup>. Most of the pediatric poisoning is due to indoor exposure to poisonous substance. Very minimal children exposed outdoor<sup>8,9</sup>. Male children are more susceptible to poisoning than female children due to their energetic and curious nature<sup>10</sup>. There is variation in storage of household products between people of different socioeconomic status as household products are stored openly in the house with people of lower socioeconomic status making easy approach to children and making them prone for poisoning whereas people of higher

socioeconomic status stored household products well packed and in closed space like cupboard and making poisoning item out of reach from children and thus there are little chance of pediatric poisoning in higher socioeconomic status family<sup>11,12</sup>. In rural background farming is main source of money and pesticide and insecticide used for farming is not well stored and remained accessible for children. Even kerosene used as fuel by rural and low socioeconomic status people for the purpose of cooking may become potential risk for pediatric poisoning if stored inappropriately<sup>12,13,14,15,16,17</sup>. Morbidity and mortality of pediatric poisoning can be adequately restrained by various protective and informative measures<sup>6</sup>. Well timed and adequate management and intervention is an essential way to save such guiltless and innocent pediatric patient<sup>18</sup>. The aim of the present study is to describe the pattern and profile of pediatric poisoning patient admitted to Integral institute of medical science and research, Lucknow, India.

### Materials and Methods

Institutional ethical clearance was taken for this study with reference number IEC/IIMS&R/2023/75 (Institutional Ethics Committee, IIMS&R Integral University, Lucknow). The present study was a 2 years retrospective study based on medical records of the pediatric patients who were hospitalized in pediatric department of Integral Institute of medical sciences & research, Lucknow from January 2021 to December 2022. Various demographic data such as age, sex, type of poisoning, nature of poisoning, route of poisoning, time period between poisoning and arrival at hospital, time period between exposure to poison and start of treatment, clinical presentation, condition of patient at time of arrival to hospital were included in the study.

Medical records having insufficient data were excluded from the study. Data entered in excel sheet and were quantified and analysed statistically using SPSS (Statistical Package for the Social Sciences).

### Results

A total 70 paediatric patient with history of poisoning were enrolled in our study. Male patients (64%) were more than female (36%) with male female ratio was 1.78:1 (Figure 1). Most common age group for pediatric poisoning was under 5 years which constitute 68.57% of total poisoning (Table 1, Figure 2). Most of the patients in our study belonged to rural habitation (50 cases) and account for 71% of all pediatric poisoning cases while 29 % cases belong to urban habitation. (Table 2, Figure 3). In the present study 96% cases of pediatric poisoning were accidental in nature and 4 % of cases were intentional in nature. There was no case of pediatric homicidal poisoning in this present study (Table 3, Figure 4). Route of poisoning was ingestion in 90% of cases while in 10 % cases route of poisoning was injection (bee sting, wasp sting and scorpion sting) (Table 4, Figure 5). In 75% cases poisoning occurred in home while in 25% cases poisoning occur outdoor (Table 5, Figure 6). 20 % of pediatric poisoning cases arrived to hospital with 1 hour, 30% of cases arrived hospital after two hours while most of the cases (50%) arrived hospital between 1 to 2 hours of poisoning (Table 6, Figure 7). 35% of pediatric patients were stable at time of admission to hospital while 55 % cases were moderately sick and 10% were critically ill at time of admission to hospital (Table 7, Figure 8). 80% of pediatric poisoning cases arrived directly to hospital after poisoning, 15% of cases arriving to this hospital were referred from other hospital and 5% of case were referred from other hospital after stabilization for further

management (Table 8, Figure 9). Most common poisonous substance in the present study was organophosphorus (40%), 20% of poisoning was due to kerosine (2<sup>nd</sup> most common cause), 10% due to turpentine, 7.14% due to diesel, 5.71% due to bee sting, 4.28% due to plant seeds, 2.86% each due to drug tablets, betadine liquid and wasp sting, 1.43% each due to scorpion sting, petrol and Lakshman Rekha (Table 9, Figure 10). In 60% (42 cases) gastric lavage done with 2 hours of ingested poison while in 15% cases gastric lavage done after 2 hours whereas gastric lavage not done in 25% of cases (Table 10, Figure 11). In the present study 19% of cases were asymptomatic which required only observation, 31% cases presented with vomiting, 16% cases presented with abdominal pain, 8% cases with diarrhoea, 6% each case with cough, lacrimation and sweating, 4% each case with respiratory distress and fever (Table 11, Figure 12). 67 cases (95.71%) were recovered and discharged, 2 cases leave against medical advice (LAMA) and mortality was only in 1 case (1.43%) (Table 12, Figure 13).

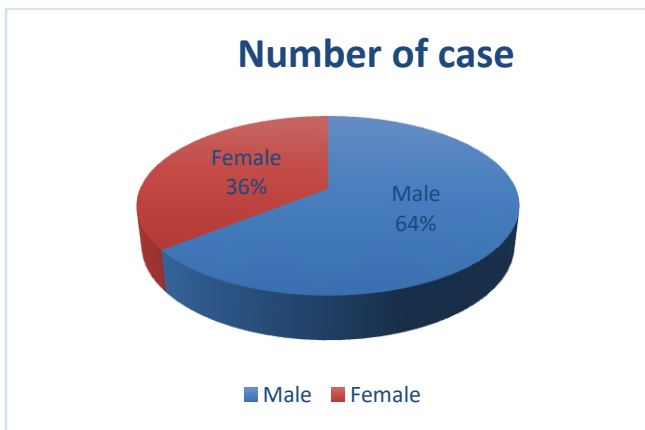


Figure 1: Sex wise distribution of poisoning cases

| Age groups | Number of cases | Percentage |
|------------|-----------------|------------|
| < 5 years  | 48              | 68.57      |
| 5-10 years | 10              | 14.29      |
| > 10 years | 12              | 17.14      |

Table 1: Distribution of poisoning cases according to age groups

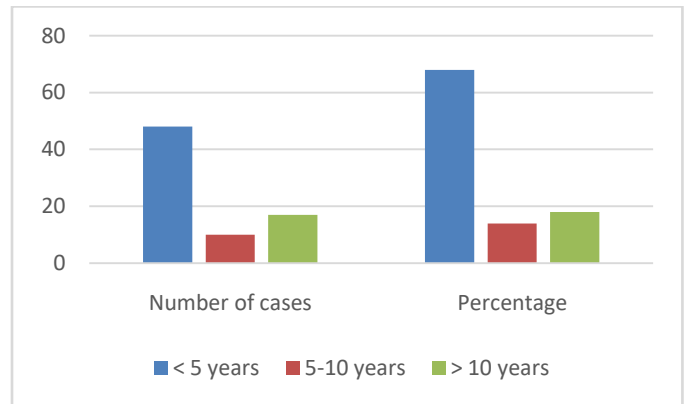


Figure 2: Distribution of poisoning cases according to age groups

| Habitation | Number of cases | Percentage |
|------------|-----------------|------------|
| Rural      | 50              | 71         |
| Urban      | 20              | 29         |

Table 2: Distribution of cases according to habitation

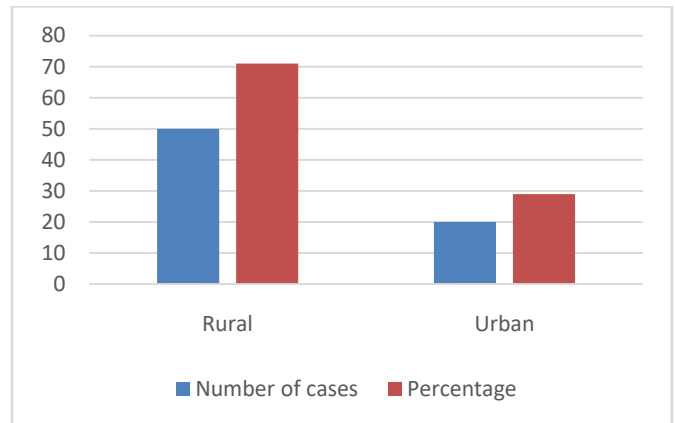


Figure 3: Distribution of cases according to habitation

| Nature of poisoning | Number of cases | Percentage |
|---------------------|-----------------|------------|
| Accidental          | 67              | 96         |
| Suicidal            | 3               | 4          |
| Homicidal           | 0               | 0          |

Table 3: Distribution of cases according nature of poisoning

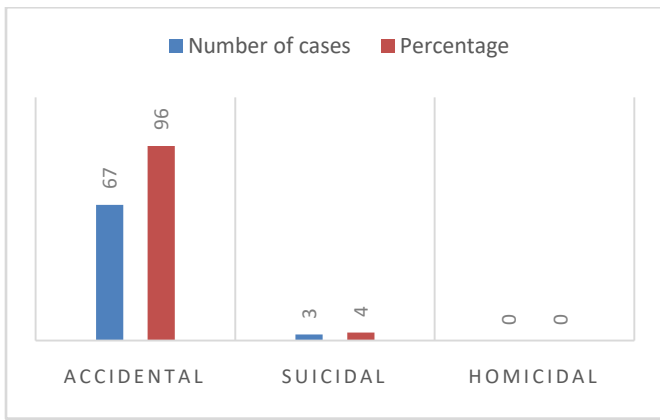


Figure 4: Distribution of cases according to nature of poisoning

| Route of administration | Number of cases | Percentage |
|-------------------------|-----------------|------------|
| Ingestion               | 63              | 90         |
| Injection               | 7               | 10         |

Table 4: Distribution of cases according to route of administration

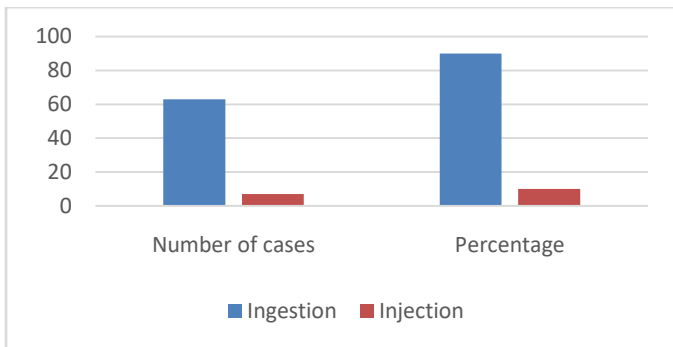


Figure 5: Distribution of cases according to route of administration

| Place of poisoning | Number of cases | Percentage |
|--------------------|-----------------|------------|
| Home               | 53              | 75         |
| Outdoor            | 17              | 25         |

Table 5: Distribution of cases according to place of poisoning

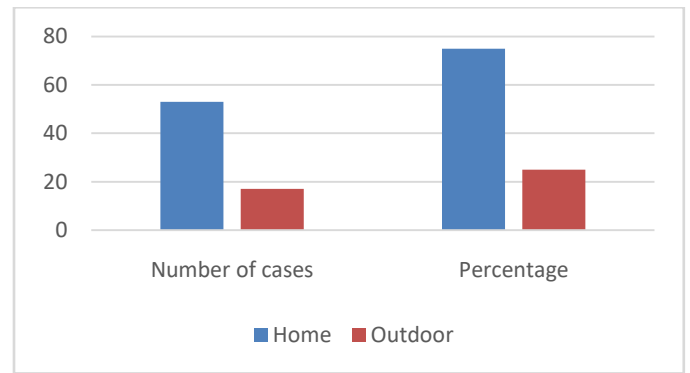


Figure 6: Distribution of cases according to place of poisoning

| Time period | Number of cases | Percentage |
|-------------|-----------------|------------|
| < 1 Hours   | 14              | 20         |
| 1-2 Hours   | 35              | 50         |
| > 2 Hours   | 21              | 30         |

Table 6: Time period required to reach hospital after exposure to poison

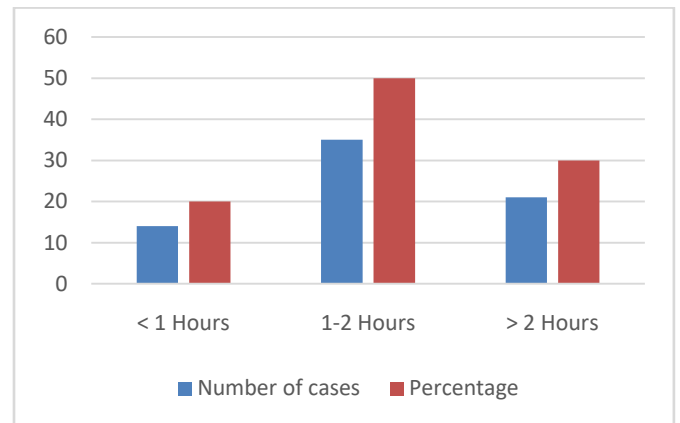


Figure 7: Time period required to reach hospital after exposure to poison

| Condition of patient at time of admission | Number of cases | Percentage |
|-------------------------------------------|-----------------|------------|
| Stable                                    | 25              | 35         |
| Moderately sick                           | 38              | 55         |
| Critical                                  | 7               | 10         |

Table 7: Status of patient at time of admission to hospital

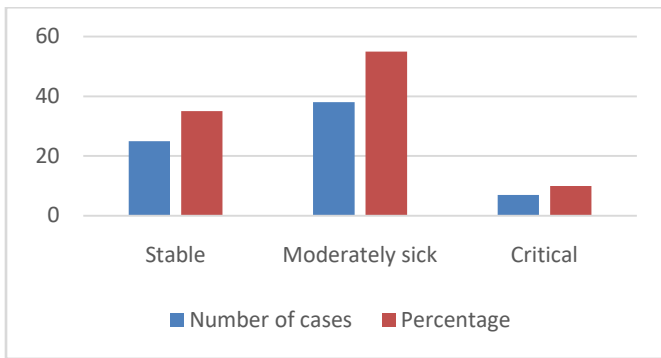


Figure 8: Status of patient at time of admission to hospital

| Arrival to Hospital                              | Number of cases | Percentage |
|--------------------------------------------------|-----------------|------------|
| Directly Arrived                                 | 56              | 80         |
| Referred from other hospital                     | 10              | 15         |
| Referred from other hospital after stabilization | 4               | 5          |

Table 8: Arrival of patient to hospital

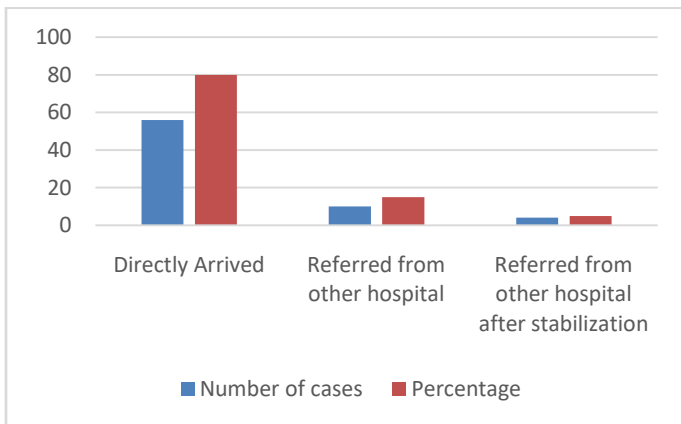


Figure 9: Arrival of patient to hospital

| Poisoning substances | Number of cases | Percentage |
|----------------------|-----------------|------------|
| Organophosphorus     | 28              | 40         |
| Kerosine             | 14              | 20         |
| Turpentine           | 7               | 10         |
| Diesel               | 5               | 7.14       |
| Bee sting            | 4               | 5.71       |
| Plant seeds          | 3               | 4.28       |
| Drug tablet          | 2               | 2.86       |

|                |   |      |
|----------------|---|------|
| Betadine       | 2 | 2.86 |
| Wasp sting     | 2 | 2.86 |
| Scorpion sting | 1 | 1.43 |
| Petrol         | 1 | 1.43 |
| Lakshman Rekha | 1 | 1.43 |

Table 9: Various substances involved in pediatric poisoning

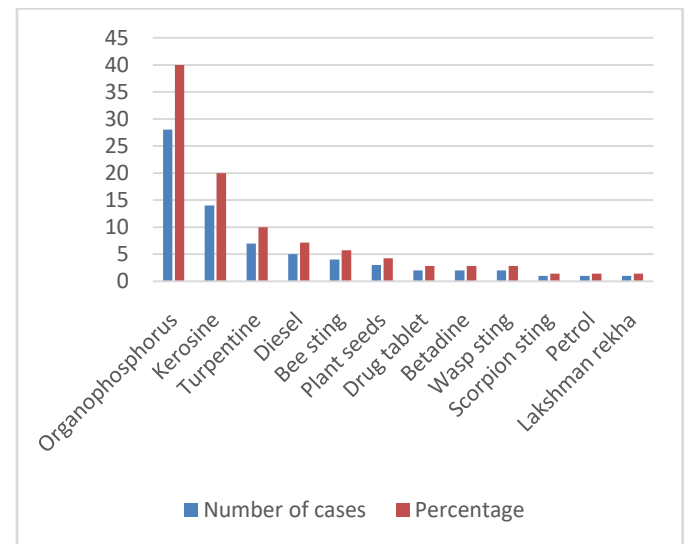


Figure 10: Various substances involved in pediatric poisoning

| Time period for gastric lavage | Number of cases | Percentage |
|--------------------------------|-----------------|------------|
| < 2 Hours                      | 42              | 60         |
| > 2 Hours                      | 11              | 15         |
| Gastric lavage not done        | 17              | 25         |

Table 10: Time period required for gastric lavage after exposure to poison

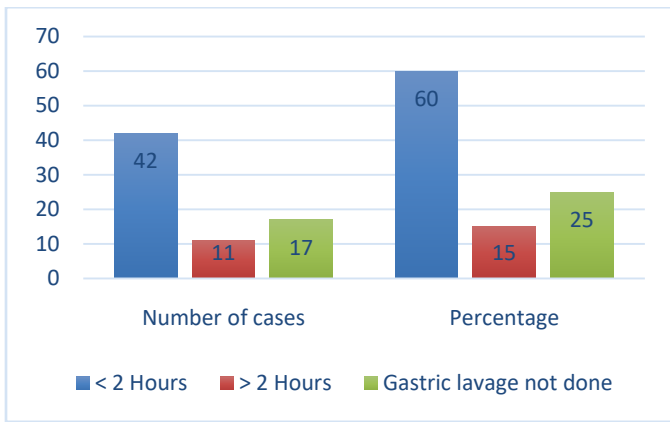


Figure 11: Time period required for gastric lavage after exposure to poison

| Clinical Presentation | Number of cases | Percentage |
|-----------------------|-----------------|------------|
| Asymptomatic          | 13              | 19         |
| Vomiting              | 22              | 31         |
| Abdominal pain        | 11              | 16         |
| Diarrhoea             | 6               | 8          |
| Cough                 | 4               | 6          |
| Respiratory Distress  | 3               | 4          |
| Lacrimation           | 4               | 6          |
| Sweating              | 4               | 6          |
| Fever                 | 3               | 4          |

Table 11: Common presenting symptoms in various poisoning

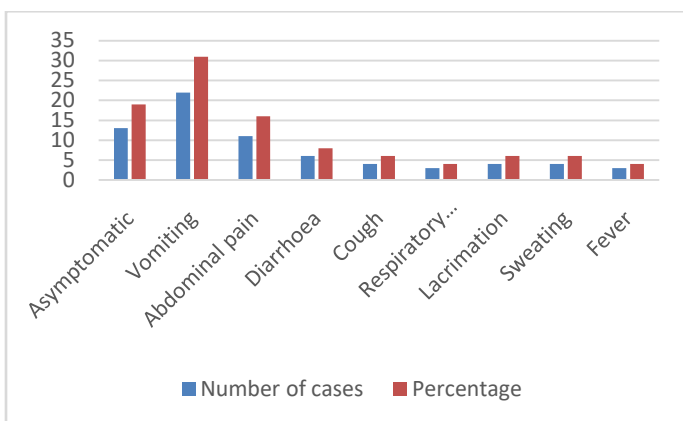


Figure 12: Common presenting symptoms in various poisoning

| Outcome of poisoning     | Number of cases | Percentage |
|--------------------------|-----------------|------------|
| Recovered and discharged | 67              | 95.71      |
| LAMA                     | 2               | 2.86       |
| Mortality                | 1               | 1.43       |

Table 12: Distribution of outcome of admitted poisoning patients in the hospital

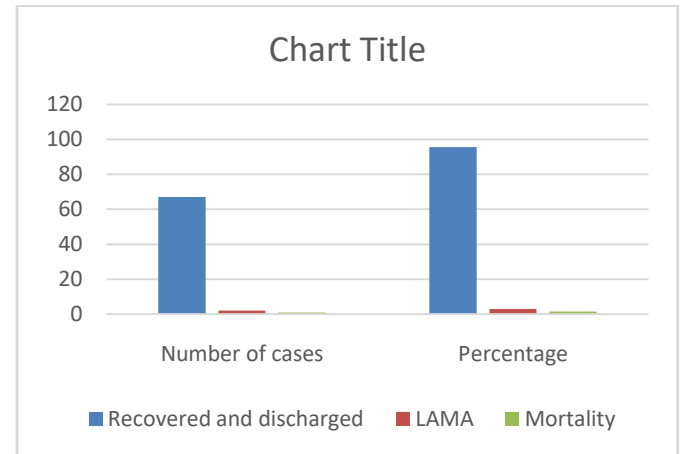


Figure 13: Distribution of outcome of admitted poisoning patients in the hospital

### Discussion

Total 70 patients were enrolled in this 2 years retrospective study. Out 70 pediatric patient most of patient were male (64%) whereas females were 34% which was similar with the various other studies where male were predominant poisoning patients<sup>19,20,21,22,23,24</sup>. This may be due to more energetic and curious nature of male children. 68.57% of pediatric poisoning patients were below 5 years of age. Similar finding was also reported by KS Reddy et al<sup>24</sup> who found 65.7%, Das Adhikari et al<sup>22</sup> who observed 77.42%, Reddy et al<sup>23</sup> reported 70.4% of under 5-year pediatric poisoning patient and finding of many others<sup>3,18</sup>. So pediatric age groups of under 5 years are at greater risk of poisoning hence requires extra attention and care from parents. Most of the pediatric patients (71%) in this present study



belonged to rural habitation which was similar with the study done by K et al<sup>12</sup>, KS Reddy et al<sup>24</sup> and Agarwal et al<sup>27</sup>. The reason for higher incidence of poisoning in rural area is due to more exposure to pesticide, insecticide and kerosine uses in rural background than urban. 96% of poisoning in this study was accidental in nature which was similar to the findings of Kohli et al<sup>13</sup>, K et al<sup>24</sup>, Ghosh et al<sup>28</sup> and Gupta et al<sup>29</sup> which revealed that inadequacy of parents towards proper storage of toxic items and curious nature of children to put everything in their mouth. In the present study most common route of poisoning was ingestion (90%) which was similar with finding of Kohli et al<sup>13</sup>, Abdelrahman Ahmed et al<sup>30</sup> and Parmila Ramawat & Nilesh Jain<sup>31</sup>. In 10% cases poisoning was through injection (scorpion bite, beet bite and wasp bite). Higher reason for ingested exposure is due to curious tendency of children to put everything in their mouth.

Most of the cases (75%) poisoning occurred inside home which was similar with findings Sarika D<sup>32</sup> and Parmila Ramawat & Nilesh Jain<sup>31</sup>. Only 25% of cases of poisoning occurred outdoor. Reason for more indoor poisoning is due to storage of maximum number of poisonous items inside home. In our study most of the cases of poisoning (50%) reached to the hospital within 1 to 2 hours, 20% with one hour and 30% after 2 hours. So, 70% patient reached to hospital within 2 hours. At the time of admission condition of 35% of children were stable while 55% were moderately sick and condition of 10% of children were critical. Almost similar finding was reported by Parmila Ramawat & Nilesh Jain<sup>31</sup>. 80% of cases were directly arrived to the hospital, 15% were referred from other hospital and 5% of cases were referred from other hospital after stabilizing the condition of the children. In the present study most,

common poisoning was due to organophosphorus (40% cases) which was similar with the many findings in India<sup>12,17,19,33</sup> and in Nepal<sup>18,34,35,36</sup>. The 2<sup>nd</sup> most common poisoning in our study was due to kerosine which was similar with many other studies<sup>37,38</sup>. Reason behind more common poisoning due to organophosphate and kerosine is due to most of cases come from rural area and where organophosphate used in agriculture and kerosine used as source of fuel. In the present study gastric lavage was done in 75% of case out of which, in 60% of patients gastric lavage was done within 2 hours of exposure which was almost similar with finding of Parmila Ramawat & Nilesh Jain<sup>31</sup> who described in their study that gastric lavage done in 70% of poisoning cases but only in 56% of pediatric poisoning patient gastric lavage was performed with 1 hour of ingestion of poison. Most common clinical presentation in the present study was vomiting (31%), abdominal pain (16%), diarrhoea (8%), cough (6%) and respiratory distress (4%) which was similar with the many findings<sup>21,31,39,40</sup>. The outcome of the poisoning was very good in the present study as 67 (95.71%) patients were recovered and discharged, 2 cases (2.86%) were leave against medical advice (LAMA) and only 1 (1.43%) patient died which was similar with the finding of Vijayalakshmi P et al<sup>40</sup>.

### Conclusions

Pediatric poisoning is a medical emergency. Most of pediatric poisoning are accidental in nature, a few are intentional and rare one is homicidal poisoning. Dereliction and carelessness at home are major cause of pediatric poisoning which can be avoided by parent awareness at their home. Morbidity and mortality of pediatric poisoning can be adequately restrained by various protective and informative measures. Psychiatric



evaluation must be done in every intentional pediatric poisoning case.

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