

Epidemiologic Study of Fatal and Non-Fatal Poisoning Case in Pediatric, Around Jamnagar Region, Gujarat in India (January-December 2013)

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ABSTRACT

Background: In spite of successful interventions and safety measures to prevent accidental poisoning in pediatric population, it contributes significantly to childhood morbidity and mortality.

Methods: This Retrospective study comprising of 204 cases of poisoning was conducted during the period of a year, from 1st January 2013- 31st Dec 2013 at Forensic Medicine Department, Shri M. P. Shah Govt. College, Guru Gobindsinh Govt. hospital (GGG) Jamnagar.

Results: The incidence of poisoning was more in age group of 2-3 year. Majority of victims were male as compared to females. The most common place of incidence of poisoning was home followed by playground. Most common route of poisoning was oral followed by poisonous animal bites and sting. All poisoning cases were accidental in nature. No suicidal or homicidal case was found in our study. Poisoning cases were more common in the months of April and October than in the rest of the months. The most common agent involved in pediatric poisoning was kerosene.

Conclusion: Based on observation most of the cases were accidental poisoning in young children so precaution like proper storage and proper disposal of chemicals and parental awareness regarding these issues could sufficiently reduce the prevalence of poisoning among children.

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► *Implication for health policy/practice/research/medical education:* Epidemiologic Study of Fatal and Non-Fatal Poisoning Case in Pediatric

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1. Introduction:

Poisoning is a common medical emergency in childhood in this field of world (1). It is

almost always accidental in children under 5 year of age (2). In older children and adolescents, suicide attempts or gesture are more common (3). In India there are no community-based data regarding incidence of poisoning. Reports available in literature are hospital-based studies and in most of them all poisoning cases are included under accidental poisoning (1).

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Poisoning is one of the main causes (0.64-11.6%) of the total pediatric admission and is responsible for 0.6% of all deaths during childhood. The incidence and to some extent causative agent vary from region to region and is largely influenced by the life style, socio-economic status and culture habits of the people (1, 2).

Poisoning may result from pica, thirst or hunger. It may be a manifestation of insecurity, self-injury due to guilty feelings or attention seeking behavior. Toxicity due to pharmaceutical agents may occur due to self-administration by parents for minor ailments, prescription of drugs by quack and due to ignorance of doctor (4). Toddlers are at increased risk of accidental poisoning because of their spontaneous activity, curiosity, innocence, mouthing of objects and imitation of adults (1, 2).

Prevention is the most important aspect of the treatment. Since the use of safety containers alone could reduce accidental poisoning by 80%, attempts should be made to educate the parents and public in the routine use of such containers (1). Proper education of parents by both medical and paramedical staff and efforts taken by each individual house hold to prevent poisoning will go a long way in protecting children from poisoning (1, 2).

Despite a fair assumption of the magnitude of the problem, we found lack of concrete data with respect to poisoning in children. We decided to undertake this study with the objective of quantifying the problem. The present study was undertaken to find out the prevalence of poisoning in children due to different categories of poisons and incidence of fatalities.

2. Materials and Methods:

This study was a retrospective prevalence study of fatal and nonfatal poisoning cases among the pediatrics age group (0-13 years). The study was carried out in the Department of Forensic Medicine, Shri M.P. Shah Govt. Medical College, GGG hospital Jamnagar during the period of 1 year (1st January-31st December 2013) retrospectively. All fatal and nonfatal poisoning cases among the pediatrics age group (0-13 years) which were

admitted during the study period were included using inclusion and exclusion criteria. Data were collected from the Medical Record of poisoning cases admitted in to Guru Gobindsinh Govt. hospital, Jamnagar from 1st January 2013-31st Dec 2013.

The relevant data like age, sex, religion, manner, type of poison, place of poisoning, outcome etc. were obtained from the clinical case records.

Inclusion Criteria:

- a) All patient with history of consumption of poison and significant signs and symptoms, accompanied or unaccompanied by container or poison.
- b) Patient with doubtful history of consumption of poison but with definite signs and symptoms of acute poisoning.
- c) All patients with history of bites by poisonous creature like snakes, Scorpions, bees, and insects having positive and significant signs.
- d) Patients with doubtful history of bites due to poisonous creature but with definite acute onset of signs and symptoms locally or systemically.

Exclusion Criteria:

- a) Food poisoning.
- b) Idiosyncratic reaction of drugs.
- c) Patients with history of bites but having no signs and symptom either locally or systemically.
- d) Cases of Dog bites

3. Results:

Out of total 7000 pediatrics patients coming/arriving at GGGH, 204 cases were of poisoning.

In present study incidence of poisoning was higher in males 131cases (64.22%), than female 73 cases (35.78%). In the present study the maximum numbers of poisoning cases were observed in the age group of 2-3 years with 39 cases (16.2%), followed by age group 3-4 years with 31 cases (15.2%), least incidence was found in the age group of 9-10 and 11-12 years with 3 cases (1.2%) (Table 1). In the present study the incidence of poisoning cases was maximally observed in Hindu children with 167 cases (81.86%)

Table 1: Distribution of poisoning cases according to Age and Sex wise.

| Age (years) | Sex | | Total (%) |
|----------------|-------------|------------|------------|
| | Male (%) | Female (%) | |
| 0-1 | 4 (1.96) | 1 (0.49) | 5 (2.45) |
| 1-2 | 13 (6.37) | 11 (5.39) | 24 (11.76) |
| 2-3 | 26 (12.75) | 13 (6.37) | 39 (19.12) |
| 3-4 | 16 (7.84) | 15 (7.35) | 31 (15.2) |
| 4-5 | 17 (8.33) | 7 (3.43) | 24 (11.76) |
| 5-6 | 19 (9.31) | 9 (4.41) | 28 (13.73) |
| 6-7 | 9 (4.41) | 3 (1.47) | 12 (5.88) |
| 7-8 | 8 (3.92) | 2 (0.98) | 10 (4.9) |
| 8-9 | 6 (2.94) | 3 (1.47) | 9 (4.41) |
| 9-10 | 2 (0.98) | 1 (0.49) | 3 (1.47) |
| 10-11 | 3 (1.47) | 4 (1.96) | 7 (3.43) |
| 11-12 | 2 (0.98) | 1 (0.49) | 3 (1.47) |
| 12-13 | 6 (2.94) | 3 (1.47) | 9 (4.41) |
| Total | 131 (64.22) | 73 (35.78) | 204 (100) |

Table 2: Distribution of poisoning cases according to Locality.

| Locality | Cases | % of case (n=204) |
|----------|-------|----------------------|
| Urban | 155 | 75.98 |
| Rural | 49 | 24.02 |
| Total | 204 | 100 |

followed by Muslim children with 37 cases (18.14%). The incidence was more common in urban area- 155 cases (75.98%) as compare to rural area with 49 cases (24.02%) (Table 2).

The present study showed that maximum numbers of poisoning cases were observed in month of April and October with 26 cases (12.7%) followed by August with 25 cases (12.2%), November with 23 cases (11.2%), March with 17 Cases (8.3%). Incidence was relatively less in the month of December with 1 case (0.4%) (Table 3).

In present study, the maximum cases of poisoning were seen in preschool children- 144 cases (70.58%) followed by 1st std students - 23 cases (11.27%), while least common seen in 9th std students- 1 case

(0.49%). Present study observed that the most of the incidence occurred at home-170 cases (83.33%), followed by playground 21 cases (10.29 %), and least incidence took place at farm 1 cases (4.90%) (Table 4).

In present study the most common route of poisoning was oral, 146 cases (71.56%) followed by scorpion or bee sting with 40 cases (19.60%) and the least incidence of poison cases is of poisonous animal bites with 18 cases (8.84%) (Table 5). In present study most cases were of unknown poisons - 63 cases (30.88%). In known poisons maximum cases were of kerosene poisoning - 39 cases (19.11%) followed by household poisons other than kerosene - 30 cases (14.7%) and minimum were of poisoning due to vegetable seeds-3 cases (1.47%) (Table 6).

In the present study we observed that maximum number of cases were hospitalized for 1 day with 101 cases (49.51%) and followed by 45 cases (22.06%) were hospitalized for 2 days. Out of 204 cases only one case was died during treatment rest of all cases were treated successfully.

Table 3: Distribution of poisoning cases according to Months wise.

| Months | Number of cases | % of cases (n=204) |
|-----------|-----------------|--------------------|
| January | 13 | 6.37% |
| February | 14 | 6.86% |
| March | 17 | 8.37% |
| April | 26 | 12.74% |
| May | 16 | 7.84% |
| June | 16 | 7.84% |
| July | 11 | 5.39% |
| August | 25 | 12.25% |
| September | 16 | 7.84% |
| October | 26 | 12.74% |
| November | 23 | 11.27% |
| December | 01 | 0.49% |
| Total | 204 | 100% |

Table 4: Distribution of poisoning cases according to place of incidence.

| Place of incidence | Cases | % of cases (n=204) |
|--------------------|-------|--------------------|
| Home | 170 | 83.33 |
| School | 12 | 5.89 |
| Play ground | 21 | 10.29 |
| Farm | 1 | 0.49 |
| Total | 204 | 100 |

4. Discussion:

Poisoning is an important concern in children associated with high morbidity and mortality (5, 6). This issue is much more prominent in developing countries, because of poor hygiene, limited access to the health care resources and inadequate and knowledge about poison (1, 7).

Based on the finding from our study, male children were more prone to poison, which was the same trend with the other studies reported (6, 8, 9). Male children are known to be more active and restless as compared to their female counterparts and that nature could be the responsible factor of higher poisoning incidence among them (5, 10, 11). But Sahin *et al* found that majority of poisoning cases were higher in females

Table 5: Distribution of poisoning cases according to route of poisoning.

| Route | Cases | % of cases (n=204) |
|-----------------------|-------|--------------------|
| Oral | 146 | 71.56 |
| Poisonous animal bite | 18 | 8.84 |
| Scorpion/ bee Sting | 40 | 19.60 |
| Total | 204 | 100 |

(51.6%) as compared to males (48.8%). But he did not give any explanation for this finding which was in fact different from most of the other studies (12).

Age group of 2-3 years showed higher incidence of poisoning (16.2%) followed by an age group 3-4 years (15.2%) which was consistent with observation of Buch *et al* (13) Mehrpour *et al* (9) and Abbas *et al* (14). Rapid neurological development leading to increased exploratory activity and tendency to mouth objects could be reason for frequent involvement of preschool children in poisoning accidents (6, 10, 15). This finding was in contrast with the study of Tarvadi *et al* (16) which found maximum number of case in 11-15 years of age group. In present study, higher incidence of poisoning was in Hindu children. We could

Table 6: Distribution of poisoning cases according to type of poison.

| Type of poison | Cases | % of cases (n=204) |
|-------------------------------|-------|-----------------------|
| Kerosene | 39 | 19.11 |
| Agricultural | 10 | 4.90 |
| Household other than kerosene | 30 | 14.70 |
| Snake bites | 18 | 8.82 |
| Stings(Scorpion) | 22 | 10.78 |
| Stings (Bee) | 13 | 6.37 |
| Vegetables Seeds | 03 | 1.47 |
| Medicine | 06 | 2.97 |
| Unknown | 63 | 30.88 |
| Total | 204 | 100 |

not compare the religion wise variations due to non-availability of data regarding religions of cases in studies by other workers. But we can explain that majority of population of India is Hindu (17). So obviously the incidence of poisoning would be more in Hindu children.

Present study observed predominance of poisoning in urban children which was consistent with studies of Sharma *et al* (11) Kholi *et al* (15) and Singh *et al* (18). This observation can be attributed due to higher availability of various poisons to urban children due to the more use of various chemical products available at house hold in urban area, as well as improper storage of chemicals and household poisonous substance on one hand and lower level of care towards children on the other (5, 19). While, Kumar *et al* (20) and Shivam *et al* (6) reported higher incidence of poisoning in rural as compared to urban area, this difference could be due to various geographic variations, study time and environmental factors.

Most of the studies show that most of cases were accidental oral ingestions, followed by poisonous animal bites and scorpion/bee sting which was consistent with our study (6,

7, 9, 11, 16, 20). As children become mobile, they are able to maneuver through the home; they learn to open cabinets and to examine the content. As children begin to walk, they may be able to grab items that were previously out of reach. Improved fine motor skills enable toddlers to open simple screw on caps or bottle tops. Normal curiosity and desire for oral stimulation may cause children to place new objects directly into mouth for tasting or swallowing (5-7).

Observations of various authors (9, 10, 18) showed most of the cases were of preschool children followed by the school children, which was consistent with our study. The vulnerability of the preschool could be attributed to inquisitiveness and high exploratory activity associated with their developing mobility and hand skills. They also try imitating their parents or grandparents taking medication (9, 10).

Travadi *et al* (16) found that pediatric poisoning took place more in the victim's own house both accidental and suicidal. Similar findings were observed in our study; however, we did not find any suicidal case.

Shivam *et al* (6) found 28.1% cases between the month April and June followed by Oct. to Dec. 25.1%. In July to September 24% and January to march had least number of patient 22.9%. Kumar *et al* (20) found 43% in Feb.-May, 37% in the June-Sep., and 20% in Oct.-Jan. Oral poisoning was common in summer. Mehrpour *et al* (9) reported most cases (68.28%) occurred in warm season except ethanol and hydrocarbon poisonings which mainly occur in the cold season. Sahin *et al* (12) found in their study that poisoning occurred mostly in winter and peak of poisoning was observed in January. November was the month of the lowest rate of poisoning. Rathore *et al* (19) found in their study that maximum number of cases was reported in rainy season followed by summer, winter and spring. Present study found that maximum cases were found in the month of April and October which is consistent with the study of Kumar *et al* (20), Shivam *et al* (6), and Rathore (19). This can be explained on the basis of summer being a dry season, thirst causes an increased attraction toward liquid thus

increasing cases of poisoning, while October being a rainy season, so due to filling of water in the snake burrows and thus increasing the human snake interaction resulting in more number of bites by poisonous animal during this season.

In our study maximum number of poisoning cases were by kerosene (19.11%) which is consistence with Kholi *et al* (15), Gupta *et al* (21), and Basu *et al* (7) while Travadi *et al* (16) found that agricultural poisoning cases (40.2%) were maximum followed by snake bite (15.9%) and household poisons other than kerosene (14%). So we can say that in most of the studies poisoning due to household and agricultural poisons was common. In this study we found that poisoning due to kerosene was common in pediatrics age; it was due to the fact that kerosene was easily available in most of Indian houses.

5. Conclusion:

We deduct from present study that there is a high rate of accidental poisoning in young children and most common poisonous compounds were kerosene and other household chemicals and products, so proper storage and proper disposal of chemicals and parental awareness regarding these issues could sufficiently reduce the prevalence of poisoning among children.

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