

# Pattern of Pediatric Poisoning and Accident in Patan Hospital

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## ABSTRACT

### Background

Kerosene, drugs, pesticides are chemicals used in home and farms. But because of parents' or caretakers' negligence; accidents and poisoning in children may take life of a child.

### Objective

To study the common causes and outcome of pediatric accident and poisoning cases admitted in Patan Hospital.

### Method

A prospective (2068-69) and retrospective (2066-67) studies of pediatric accident and poisoning cases admitted in Patan Hospital (2066-chaitra 2069) were done.

### Result

Out of 44 registered cases total 35 cases were collected in last 4 years. Twenty one in prospective and 14 in retrospective study. Male female ratio was 1.2:1. Most vulnerable age group was 1-5 years (21) and 11-15 yrs (8). Most common poison was pesticide (11), kerosene (9) and drugs (7).

Twenty percent were suicidal, 3% were homicidal and rest was accidental. Suicidal poisoning was common in 11-14 years. Accidental poisoning was: taking kerosene from mineral water bottle for water. Small children took drugs and pesticides due its easy availability or careless storing.

Five common accidents were near drowning (2), hot water scald, hanging and fall from height.

Outcome was 2 expired; 1 Organo-phosphorous and 1 food poisoning. Mortality was 6%. One hanging survived as vegetation.

### Conclusion

Accident and poisoning are preventable. We need to make our home and surrounding poison and accident proof. Small children should never be left unattended. Drugs, pesticides, hot things, and sharp instruments should be kept out of reach of children and in child proof container in separate places. Pesticide should not be sold to children.

## KEY WORDS

*Paediatric, poisoning, accident*

## INTRODUCTION

Kerosene, drugs, pesticides are chemicals used in home and farms; that are readily available in home. Negligence of parents or caretakers can cause accidents and poisoning in

children, which may be of fatal consequences to the child.

## METHODS

A hospital based prospective (2067-68) and retrospective (2065-66) analysis of all acute poisoning and accident cases from 0-month to 14 years, who were admitted in PICU and or children ward of Patan Hospital was done. Study period was from Baisakh 2065 to Chaitra 2068 (48 months). Data on age, sex, cast, time of the accident or poisoning, time elapsed after intake to reach emergency room. Circumstances of poisoning, name, site and source of the poison (constituent of the poisonous substance, its actual use, and chemical type), hospitalization days, severity and outcome were collected and analyzed. Parent's education, occupation, family type, total expenditure was also analyzed. A performa was developed including all above things. Performa was filled with interview with the patient, parent or attendance for prospective study and performa was filled with patients recorder in retrospective study. All the data were tabulated and studied.

## RESULTS

Out of 44 registered cases total 35 cases were collected in last four years: 21 in prospective and 14 in retrospective study. All demographic background or detail could not be obtained in retrospective study. Most vulnerable age group was 1-5 years (21) and 11-15 years (8) and 3 each from less than one year and 6-10 yrs. Age range from 25 days to 14 years. Common cast involved are newar (10), brahman (7), chhetri (6), 11 from tamang, gurung, magar, limbu and 1 dalit. Most patients were from Patan 24, followed by Kathmandu 5, Bhaktapur 2 and Dhading 3 and Dolkha 1. Most patients were brought to the hospital by father (20), mother (5) parents (4), relative (4), one each by teacher and employer.

Most of the parents were illiterate or had up to primary education 41% followed by 20% secondary and 14% higher education. Most of the parents were laborer, farmers, driver, cook, security guard. 4 of them were businessman and industrialist hotel manager 2, engineer, press owner.

Eighteen (60%) reached hospital emergency room within 3 hours, 23 (77%) in 6 hours of ingestion of poison or after the time of the accident. Time not mentioned in 3 cases of accident or ingestion of poison. Fourteen of them were admitted at afternoon (12 PM- 4 PM), 7 at evening (4-8PM), 6 at late evening (8-12) and 6 at morning (6-12 noon). Ten patients were from joint family and 10 from nuclear family.

Distribution according to prevalent season were summer 14, winter 10, rainy 7 and spring 4.

Site of the poisoning were mostly home (18, 70%) and one each in farm and school. Most common poison was pesticide (11), kerosene (9) and drugs (7). Kerosene poisoning was most common in winter and spring; organophosphorous in summer and winter. Among pesticide six were *organophosphorous*, one *Zinc phosphide*

Tab No. 1 Occupation of the parents.

	La- borer	Farm- er	Service holder	Business and indus- try	House wife	NA*
Father	7	4	11 (driver 4, cook 2, security guard 2, handicraft 2, army 1	6 (hotel manager 2, press owner 1, engineer 1, shopkeep- er 2)		7
Mother	1	3	1 nurse	0	22	Ex- pired 1, NA7
Total	7	6	12	6	22	15(ex.)

\*NA = not available

Tab No. 2 Education status of parents of (2067-68).

	Illit- erate	Just literate	Primary	Sec- ondary	Second- ary	NA (not applied)
Patient	-	-	3	3	1	13
Father	4	3	3	3	3	4*
Mother	4	4	1	7	2	2*
Total parents	8	7	4	10	5	6=40

(*rat poison/ mortein/ bromdiolone .005% rodenticide*), one *organochlorine* (endosulphan vegetable Poison), Parathrium/ *Mosquito repelant*, comitraz (12.5%) *Scabicide/ Denodip*. Common drugs were Benzyl Benzoate, Carbamazepine, Clobazam, two Diethyl carbamazepine, Metron, Salbutamol and Thyroxine. Reason for taking poisons were 25 (77%) were accidental, eight (20%) were suicidal and one (3%) was homicidal. Suicidal poisoning was common in 11-14 years. Common agents used for suicidal poisoning were OP, rodenticide. Accidental poisoning was: taking kerosene from mineral water bottle for water. Children took drugs and pesticides due to its easy availability or careless storing.

Cases of accidental poisoning were seen as taking kerosene put in mineral water bottle for water by a 14 months old male child ; taking scabicide (for dog) by climbing on coffee

Tab No. 3 Distribution of accident and poisoning cases according to season.

Sea- son	Kero- sene	Drug	Organo- phos- pho- rous	In- secti- cide	Acci- dent	Food	Car- bon- mon- oxide	To- tal
Sum- mer	1	5*	3	1 <sup>§</sup> *	3 <sup>*</sup> *	0	1	14
Rainy	2	2 <sup>**</sup>	1	0	1 <sup>#</sup> *	0	0	7
Win- ter	3	1	2	3 <sup>§</sup> *	1 <sup>§</sup> *	0	0	10
Spring	3	0	1	0	0	1	0	4
Total	9	8	7	4	5	1	1	35

NB: \*Carbamazepine, Clobazam, 2DEC, Metron; <sup>\*</sup>Salutamol, Thyroxine. <sup>§</sup>Endosulphan, <sup>^</sup>parathrium (mosquito repelant), Mortin (rat poison), Denodip (scabicide); <sup>+</sup>Carbon monoxide poisoning, Near drowning; <sup>#</sup>Hot water scald; <sup>§</sup>Near drowning.

table from khopa by a 20 months old male child; putting organophosphorous poison in water pots (gargris) from a left over vial on the ground (underneath the bed) by a 2 yr old male child which caused mass poisoning. Two and half year old male child took mosquito repellent liquid from the cupboard. Other child of the same age was given benzylbenzoate instead of metronidazole both which were put together on the same table by his mother. Two and half year old male baby took carbamazepine from the bottle which was left on the ground by his mother after giving his dose. Four year old female was found unconscious with her mother in a closed room with burning coal. The coal was used to warm the room which caused Carbon Monoxide poisoning. A 12 year old girl who had taken stale food along with the family expired because of food poisoning.

Causes of suicidal poisoning were because of fear of scolding by her school teacher for not doing homework and taking rodenticide in school by a 11 yr old girl (which she had bought from the market). Twelve yr old A boy took Organo phosphorous because of fear of scolding by employer and hand over to police because he had stolen something from employer's house. A 12 yr boy took Organo phosphorous in Banepa. He was not allowed to go to Kathmandu with his brother for job. He expired in PICU. A 14 year girl had quarrel with her mother and took Organo phosphorous. She had psychiatric disorder: intentional selfharm, impulsive, underlying emotional instability.

Homicidal intention was seen in a 25 days male baby who was left alone in a room by his mother for few minutes. Mother found a stranger who ran away from the window of the room and the baby was frothing and vomiting blood. Baby was treated as OP poisoning and aspiration pneumonia in hospital. Oral was the most popular route of poisoning.

Carbon Monoxide and zinc phosphide were two inhalation poisoning. Most patients consume the substances available in home easily. One bought rodenticide from market.

Common accidents were near drowning, hot water scald, fall from height and hanging. Most accident occurred in summer and 75% of accident poisoning occurred in home in our study. Among the accidents 7 months female had scald by hot water in the thermos flask left near him. Four year old male had near drowning in a ditch made for storing water in neighbor's garden. Twelve year old girl hanged herself by a rope because her elder brother scolded her for not studying well, survived as vegetation.

Duration of hospital stay was 1 to 18 days average being 3.8. Ten patients had PICU care (6 Organo-phosphorous, one hanging, one food poisoning, 1 carbamazepine, 1 clobazam), and 33 patients had ward care.

Total hospital expenditure was from Rs. 600 to 61,685 with average of Rs.9808 per patient for 21 patients in 2 years (2067-68). Most of them were OP poisoning and had PICU care. Minimum expenditure for last 4 years was Rs 475

and average expenditure for 35 patients was Rs 6692 per patients. Admission in PICU increased the cost of treatment.

Two patients expired one each due to Organo-phosphorous and food poisoning respectively. Mortality was 6%.

Common Risk factors for poisoning in our study were: easy availability of the poison on floor, table, cup-board without lock, leaving babies (neonates) alone unattended, keeping drugs and poison together in same self, medicines left in front of children, fear of parents or school teachers, inappropriate storage of hydrocarbons (kerosene) in familiar beverages or household containers (mineral water bottle), leaving kerosene lamp near children, coal used for warming the room without ventilation, leaving ponds or ditches open in garden without covers, leaving hot water utensils eg. Thermos flask near children, leaving the children in heights without safety.

## DISCUSSION

Most vulnerable age group of poisoning and accident was 1-5 years (21) and 11-15 yrs (8). Lall SB et al reported 2009 cases of acute poisoning in 1 year 2000 in 45 centres of Oman. 59.5% of cases belonged to paediatric age group. Out of which one quarter were of 1-4 year age group.<sup>1</sup> According to Rashid AKM et al, 1-3 yrs was the most vulnerable age group to be affected in 2004 - 2005 in Khulna Medical College in Pakistan.<sup>2</sup> While Khadka SB et al reported 2-5 yrs was the common age of poisoning for children among 67 cases of poisoning, who attended emergency of Kathmandu Medical College Teaching Hospital in one year study period.<sup>3</sup>

Female Male ratio was 1.2:1 similar to 1.14:1 Dash SK et al, 1.09:1 in Kathmandu Medical College Teaching Hospital and 1.34:1 in Dhulikhel.<sup>3-5</sup> Female male ratio was very high; 3.5:1 in South East Anatolia of Turkey and 2.3:1 Sivas region of Turkey.<sup>6,7</sup>

Forty percent of our parents were laborer and farmers similar to Marahatta SB et al 40% farmers.<sup>5</sup>

In our study 18 (60%) patients reached hospital emergency within three hour while 23 (77%) within 6 hours of the incident. In a similar study conducted at Bir Hospital by Singh DP et al 61.6% of patients reached hospital within three hours.<sup>8</sup> Duration of hospital stay was one to 18 days, average being 3.8 days. While it was 1-6 days mean being 5.9 days in study by Singh DP et al.<sup>8</sup>

All our OP poisoning occurred in afternoon similar to study done by Bhattarai MD et al.<sup>9</sup> OP poisoning was common in winter and summer than rainy season in our study. OP poisoning is most common in 12-14 yrs except one 25 days of homicidal case and two children. OP was most common poisoning as reported by Maharaththa SB et al and was the most abused substances in Orissa India as reported by SK Dash et al.<sup>5,4</sup>

Kerosene poisoning was most common in winter and spring

in our study. While it was more common during winter in Pakistan as reported by Rashid AKMM et al.<sup>2</sup> Khadka SB et al reported that OP poisoning was the most common in adult and kerosene poisoning in children.<sup>3</sup> In our case too kerosene poisoning is most common in 15 months to three years of age.

Most poisoning were accidental 26 (76%), 8 (18%) were suicidal and 1 (6%) were homicidal. Suicidal poisoning was common in 11-14 years similar in Dhulikhel.<sup>5</sup> Suicidal poisoning was reported 97% in Bir Hospital, 58% in KMCTH, 63.5% (P=0.005) and 6% in Oman and Pakistan respectively.<sup>1-3</sup> The majority of poisonings involving young children are classified as unintentional. In contrast, approximately one – half of poisoning exposures involving teenagers are intentional in America in 2009.<sup>10,11</sup>

Oral route is the most common (29, 93.4%) route of poison in our study, similar to 98% in Dhulikhel Hospital and 86.57% in KMCTH.<sup>3,5</sup> Common drug poisoning in our study was Clobazam, Carbamazepine, DEC and Metronidazole. Hakan A et al reported drug was the cause of poisoning in 55%; common drugs were antidepressant, analgesic anti-inflammatory, antihypertensive and miscellaneous in turkey in 1994-98.<sup>7</sup> Lall SB et al reported 59.5% of Accident and Poisoning were because of animal bite and sting (scorpion stings, bee or wasp stings and snake bites) and rest 39% were because of ingestion of substance (pharmaceutical, food and house hold product).<sup>1</sup>

The substances most frequently involved in pediatric (<6 years old) exposures were cosmetics and personal care products, followed by analgesics, and household cleaning products.<sup>11</sup> The categories of substances most frequently involved in fatalities in children ≤5 years of age include analgesics, batteries, hydrocarbons, and plants as per Annual Report of the American association of Poison Control Centers National Poison Data System (NPDS).<sup>10,11</sup>

Seventy percent of poisoning and 75% of accident occurred in home in our study., while over 90% of poisoning exposures occur at home in America as reported by Bronstein AC et al.<sup>12</sup>

Ten had PICU care in our study, while six had ICU care in six months in Bir Hospital.<sup>8</sup> Mortality was 6% in our study, 7.4% in Dhulikhel Hospital, 4.68% in Pakistan, 3% in Bir Hospital study, 0.2% mortality among 2000 per one year in Anatolia Turkey.<sup>5-8</sup> There were no mortality in 2000 cases per year during the study period in Oman.<sup>1</sup>

Average hospital expenditure was Rs. 6999 per patient for last two years (2067-68) and Rs 4884 per patients for last four years. PICU admission in increased the cost of the treatment. In Oman one of the hospital reports no death but high morbidity indicated by 78% of poisoning cases for 1-10 days occupying a total of 134 days with an average loading cost of US dollar 5550 excluding medical care costs. A recent four year prospective hospital – based study from Sultan Qaboos University Hospital revealed that 73% of

poisoning cases were admitted to hospital, for periods ranging from 1-175 days, further confirming the high poisoning- related morbidity in this country. There were no mortality among 5 aluminium phosphide poisoning in Bir Hospital.<sup>8</sup>

Singh DP et al reported most common used OP for poisoning were methyl parathion (metacid) and dichlorovos (nuvan). Paracetamol alone or combined with antihistaminic were the most common analgesic and benzodiazepine were the most common anxiolytic in Bir Hospital.<sup>8</sup>

Preventive measures are: Small children should never be left unattended. Drugs, pesticides, hot things, and sharp instruments should be kept out of reach of children and in child proof container in separate places. Pesticide should not be sold to children.

Age and sex are factors to consider in evaluating a child's or adolescents' risk for poisoning. In addition, developmental and environmental factors may contribute to the risk of a poisoning event.<sup>10</sup>

The normal developmental progression of young children, including exploration of their environment, places them at risk for poisoning.<sup>12</sup> As children become mobile, they are able to maneuver through the home; they learn to open cabinets and to examine the contents.<sup>10</sup> As children begin to walk, they may be able to grab items that were previously out of reach.<sup>10</sup> 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 the mouth for tasting or swallowing.<sup>10</sup> Well-meaning preschoolers may try to help by using toxic cleaning products or by attempting to self-administer medication.<sup>10</sup> Inappropriate storage of hydrocarbons (kerosene) in familiar beverages or household containers (mineral water bottle), lead to accidental ingestion by young children as reported by Lohani SP et al.<sup>13</sup>

## CONCLUSION

Small children are inquisitive; they explore everything and put it in mouth; so all medicine or poisons should be put in cupboard lock up. Accidental poisoning is common in the pediatric age group. Poison and medicine should not be put together in same place/ self. Small infants should not be left unattended. Parents and the teacher should understand psychology of the child and behave accordingly.

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