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A STUDY OF ACUTE POISONING IN CHILDREN: THREE YEARS EXPERIENCE AT A TERTIARY CARE HOSPITAL OF CENTRAL INDIA.

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ABSTRACT: OBJECTIVE: To determine the profile and outcome (discharge from emergency room after observation, admission or death) of pediatric patients presenting with acute poisoning to a tertiary care centre in central India. **METHODS:** We retrospectively reviewed the last 3-years period from December 2010 to November 2013 hospital records of the pediatric emergency room to profile all cases of pediatric poisoning and noted their outcome. All cases age ≤ 12 years with definite history of poisoning were included. **RESULTS:** 95 cases presented to the pediatric emergency with poisoning during the study period. Mean age of our patients was 2.72 ± 1.54 yrs (SD). The majority of our patients (67.2%) were in the 1-3 yrs age group. Males outnumbered females by a factor of two; the majority of our patients resided in urban areas. Kerosene (32.6%), drugs (19.8%) and insecticides (9.7 %) were the agents most frequently implicated. Almost all (96.8 %) ingestions were accidental in nature. Twenty four patients (25.3%) were asymptomatic after 6hrs of observation in the emergency ward; 71 patients (74.7 %) developed symptoms related to toxic ingestion. The common serious symptoms included altered sensorium, respiratory distress, seizures, ataxia, hypotension, cyanosis and burns; three patients required intubation and mechanical ventilation. Almost one third of our patients underwent gastric lavage; no patient with kerosene poisoning or any other inappropriate indication underwent the same. **CONCLUSION:** Comparative data has revealed that while poisoning in developed countries is mostly due to common household products, in developing countries like ours, it is due to toxic substances which should not have been accessible to children in the first place. **KEYWORDS:** Children, Poisoning, Profile.

INTRODUCTION: Poisoning in pediatric patients is a common and preventable cause of morbidity and mortality. Profile and outcome of poisoned pediatric patients in a given region is influenced by the prevalent social, economic and cultural practices prevalent and also by the availability and the quality of the medical facilities. Studies from the developed countries show that common nontoxic household products are now implicated in the majority of pediatric poisonings and most of their pediatric patients are discharged after a brief period of observation in the emergency room.^{1,2,3}

Decrease in cases of pediatric poisoning related to toxic drugs and chemicals in these countries is due to introduction of child proof packs and bottles⁴, measures which are yet to be implemented in many of the developing countries. There are a few studies from India that describe the profile of poisoned pediatric patients from various regions, most of them are now a decade old and none from this part of India.^{5,6,7}

With increasing urbanization and rapid socio-economic development in India during the last two decades, some change in pediatric poisoning profile and outcome is to be expected. We carried out this study in the pediatric emergency room of a tertiary care centre located in central India with

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the aim of determining the profile and outcome (discharge from emergency room after observation for 6hrs, admission or death) of pediatric patients presenting with acute poisoning.

MATERIAL AND METHODS: We retrospectively reviewed the hospital records of all the pediatric patients who presented with acute poisoning during the 3-years period from December 2010 to November 2013 in the tertiary care institute of central India. We profiled all cases of pediatric poisoning and noted their outcome. All children and adolescents aged less than 18years with a definite history of poisoning were included. Children who had food poisoning, toxic or idiosyncratic reaction to prescribed drugs, snake bites and scorpion stings were excluded from the study.

Data regarding age, sex, type of residence, type and quantity of substance consumed, time of ingestion, nature of ingestion, time of symptom onset, time of presentation to hospital, symptoms and signs, investigations, diagnostic and therapeutic interventions, and outcome was noted on a predesigned proforma. All the data from the duly filled questionnaires was transferred to a microsoft excel spreadsheet. Independent verification of data was done by a second investigator. We analyzed the data using STATA 7.0 (Stata Corp, College Station, Texas, USA).

RESULTS: We retrospectively analyzed hospital records of 95 patients (65 males, 30 females) who presented to pediatric emergency from December 2008 to November 2011. Mean age of our patients was 2.72 ± 1.54 yrs (SD). Our youngest and oldest patients were 0.54 and 11.4yrs old, respectively. The majority of our patients (67.2%) were in the 1-3 yr age group while infants and 6-10yrs old accounted for only 4.4% and 3.7% of our patients, respectively. The median age of children with corrosive ingestion (4 years) was higher than that of other classes of ingestion. The majority (68.4%, 65: males=40, females=16) of our patients resided in urban areas. Only 30 (males=16, females=9) patients resided in a rural area.

Place of residence could not be classified for 5(4.7%) patients. Kerosene (32.6%), drugs (19.8%) and insecticides (9.7%) were the substances most frequently implicated in our patients. The exact nature of consumed substance could not be determined in 5.1% of our patients (Table 1). The drugs that were ingested included: triclofos, olanzapine, iron, norfloxacin, dicyclomine, sasartan, iodophor, carbamazepine, lisinopril, haloperidol, nalidixic acid, amlodipin, lorazepam, herbal medicine, clonazepam, hydroquinone, metoclopramide, dapson and atropine eye drops. There was no difference in the profile of poisoning between urban and rural setting. Almost all (96.8%) of our cases were accidental in nature.

Three patients were intentionally poisoned [0.7 yr/ male (Mercury), 3yrs/ male (unknown), 0.5 yr/ female (unknown)]. Median time of presentation to the pediatric emergency for our patients was 1.7 hr. (Range=0.1- 240hrs). The median time to presentation was slightly larger for rural patients (5.5 hr) when compared to urban ones (1 hr) ($p < 0.05$). Twenty four patients (25.3%) were asymptomatic after 6hrs of observation in the emergency ward; 71 patients (74.7%) developed symptoms related to toxic ingestion. majority of our patients developed serious symptoms like altered sensorium, respiratory distress, seizures, ataxia, hypotension, cyanosis and burns (Table 2).

Approximately 70% of the patients who developed respiratory distress and 30% of those who had altered sensorium had ingested kerosene. The majority of our patients who were symptomatic had only a single symptom. Dicyclomine and stemetil poisoning respectively (1 each).

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Investigations: Chest radiograph was advised for 53 (55.8 %) patients (34 of them with kerosene poisoning), electrolytes were available for 3 patients, and 2 patients required endoscopy for corrosive poisoning. Only one patient with kerosene poisoning had SaO₂ below 90%. Gastric lavage was done in 29 (30.5 %) patients. No patient with kerosene poisoning or any other inappropriate indication underwent gastric lavage. Three patients were administered charcoal (clonazepam and preservative poisoning, respectively). Specific antidote was required in 5 patients for insecticides,⁽²⁾ dicyclomine, metaclopramide, and stemetil poisoning, respectively (1 each).

Outcome: 64(67.4%) patients were admitted while 31(32.6%) patients were discharged after 6 hrs of observation in the pediatric emergency ward. There were no significant differences in the demographic features between children who needed admission compared with those who were discharged from the emergency room. Five patients, one with gulal (mixture of various salts of heavy metals),⁽²⁾ insecticide and⁽²⁾ rodenticide poisoning, required intubation and mechanical ventilation. None of our patients died.

DISCUSSION: Poisoning among children is one of the common medical emergencies encountered in pediatric practice. Poisoning has become more important probably because of reduction in infection related causes. Rapid industrialization and exposure to hazardous chemical products, introduction of newer range of drugs for treatment, massive use of pesticides in agriculture, increased alcohol consumption, unhealthy dietary habits has widened the spectrum of toxic products to which people are exposed. Children are particularly at risk because of their curious, explorative behavior and hand to mouth activities.

Playing close to the ground magnifies exposure of children to toxins. By 2-3 years of age the child's motility and ingenuity allows him to access any unlocked drawer or cupboard at home. The greater permeability of infant skin increases absorption of chemicals. Children also differ in their ability to metabolize toxins and may be more susceptible to the effects of poisons in the environment. Most studies from India and abroad show a male preponderance in childhood poisoning.^{5,8,9} Exceptions are a study from Ankara and one from Trinidad.^{10,11} Such a pattern was also observed in the present study.

Pediatric poisoning as noted in the present study is predominantly accidental in nature. The reasons cited were medication errors, improper storage of poisonous products and look-alike packings. This is in contrast to poisoning in adults where most of the cases have been noted to be suicidal. Majority of poisonings in the present study were due to Kerosene, as studied by most other Indian studies implicate kerosene followed by drugs as the most frequently encountered poisons in pediatric cases. Singh *et al* studied pattern of pediatric poisoning in a large north Indian tertiary care centre and observed a significant decline in kerosene poisoning in the decade 1980-89 compared to 1970-79.¹²

Kerosene is used as a cooking fuel in our country by low income families and is stored in bottles usually within easy reach of children. Its incidence has probably declined in the recent past because of wider availability of LPG and electricity for cooking purposes. In developed countries, majority of poisonings are due to common non-toxic household products. 25.3% patients were asymptomatic after 6hours of observation and were discharged after a brief period from the emergency ward.¹³⁻¹⁵ Only 20% of our patients presented to the hospital within the first hour of

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exposure to poison, while almost 40% arrived after 5 hours. This reflects on the difficult geographical terrain of the state which causes delayed arrival at a medical facility. The retrospective nature of the present report is a limitation. This may be responsible for non-availability of data on some of the aspects.

CONCLUSION: Comparative data has revealed that while poisoning in developed countries is mostly due to common household products, in developing countries like ours, it is due to toxic substances which should not have been accessible to children in the first place. This is the reason that poisoning is the fourth most common cause of mortality especially in rural India. This calls for formulation of preventive strategies to reduce the burden of poisoning related injury. These may take the form of health education, improved living conditions, use of child resistant containers for drugs, safer storage of chemicals in household, strengthening of the Pesticide Act, reducing stress at school and providing counseling for adolescents.

REFERENCES:

1. Marchi AG, Renier S, Messi G, Barbone F. Childhood poisoning: a population study in Trieste, Italy, 1975 - 1994. *J Clin Epidemiol* 1998; 51: 687-95.
2. Rodgers GC, Matyunas NJ. Poisoning: Drugs, Chemicals and Plants. In: Kleigman RM et al, Nelson's Textbook of Pediatrics. Philadelphia: Elsevier: 19th ed. 2010; 2362-6.
3. Lamireau T, Llanas B, Kennedy A, et al. Epidemiology of poisoning in children: a 7-year survey in a paediatric emergency care unit. *Eur J Emerg Med* 2002; 9: 9-14.
4. Lawson GR, Craft AW, Jackson RH. Changing Pattern of poisoning in children in Newcastle, 1974 - 81. *BMJ* 1983; 287: 15-7.
5. Kohli U, Kuttait VS, Lodha R, Kabra SK. Profile of Childhood Poisoning at a Tertiary Care Centre in North India. *Indian J Pediatr* 2008; 75: 791-4.
6. Sitaram S, Sharma U, Saxena S. Accidental Poisoning in children. *Indian Pediatr*, 1985; 22: 757-60.
7. Singh S, Singhi S, Sood NK et al. changing pattern of childhood poisoning (1970 - 1989): Experience of large North Indian hospital. *Indian Pediatr* 1995; 32: 333-6.
8. Adejuyigbe EA, Onayade AA, Senbanjo IO, Oseni SE. Childhood poisoning at the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria. *Niger J Med* 2002; 11 (4): 183-186.
9. Oguche S, Bukbuk DN, Wabila IM. Pattern of hospital admissions of children with poisoning in the Sudano-Sahelian North eastern Nigeria. *Niger J Clin Pract* 2007; 10(2):111-5.
10. Andiran N, Sarikayalar F. Pattern of acute poisonings in childhood in Ankara: what has changed in twenty years? *Turk J Pediatr* 2004, 46 (2): 147-152.
11. Pillai GK, Boland K, Jagdeo S, Persad K. Acute poisoning in children. Cases hospitalized during a three-year period in Trinidad. *West Indian Med J* 2004; 53 (1): 50-54.
12. Singh S, Singhi S, Sood NK, Kumar L, Walia BNS. Changing pattern of childhood poisoning (1970-1989): Experience of large North Indian hospital. *Indian Pediatr* 1995; 32: 333-336.
13. Rodgers GC, Matyunas NJ. Poisoning: Drugs, Chemicals and Plants. In: Kleigman RM et al, Nelson's Textbook of Pediatrics. Philadelphia: Elsevier: 19th ed. 2010; 2362-6.
14. Lamireau T, Llanas B, Kennedy A et al. Epidemiology of poisoning in children: a 7-year survey in a paediatric emergency care unit. *Eur J Emerg Med* 2002; 9: 9-14.

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15. McGuigan MA. Common culprits in childhood poisoning: epidemiology, treatment and parental advice for prevention. *Paediatr Drugs* 1999; 1: 313-24.

Poisoning	No. of cases	%
Heavy metals	2	2.1
Kerosene	31	32.6
Naphthalene	3	3.2
Insecticide	9	9.5
Alkali	6	6.3
Turpentine oil	3	3.2
Drugs *	19	19.8
Unknown	5	5.7
5% Phenol	1	1.1
Acid	2	2.1
Pesticide	4	4.2
Camphor	1	1.1
Preservative	6	6.3
Miscellaneous	3	3.2
Total	95	100

TABLE 1. Poisoning Profile

(*drugs included: triclofos, olanzapine, iron, norfloxacin, dicyclomine, sasartan, iodophor, carbamazepine, lisinopril, haloperidol, nalidixic acid, amlodipin, lorazepam, herbal medicine, clonazepam, hydroquinone, metoclopramide, dapsone and atropine eye drops) *For some patients, accurate data was missing.

Symptom	No. of Cases
Vomiting	23
Altered sensorium	21
Respiratory Distress	21
Seizures	9
Diarrhea	4
Headache	4
Pain Abdomen	4
Ataxia	3
Burns	3
Hematemesis	2
Abdominal Distention	2
Facial Flushing	1

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Oliguria	1
Skin rash	1
Dysphagia	1
watering eye and nose	1
Dystonia	1
Psychosis	1
Cyanosis	1

TABLE 2. Common Symptoms in Patients with Poisoning

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