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Original article

Childhood Poisoning: Clinical Profile and Outcomes

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ABSTRACT

Background: Rapid socioeconomic development in India during the last decade may have led to changes in the profile of childhood poisoning. **Objective:** To determine the profile and outcome of pediatric patients presenting with poisoning to a tertiary care center in North India. **Methods:** We prospectively enrolled 140 children aged 2 months to 18 years admitted with a definitive history of poisoning between August 2007 and August 2010. **Results:** The median age of the enrolled children was 3.5 years (IQR: 2, 10) and majority were boys (90%). Hydrocarbons (27.9%) and pharmaceutical products (16.4%) were the most frequently implicated agents. The incidence of suicidal poisoning was relatively high (10%), with girls being the predominant victims (8/14). Majority (83; 59.3%) required only observation. Definitive treatment in the form of antidotes and anti-venom was required in 9 (6%) children. The median (IQR) duration of hospital stay was 2 (1, 3) days and none of them died. **Conclusion:** The trends for childhood poisoning noted at our center were different from previous hospital-based studies in two important ways such as in the nature of the poisoning agents used and the higher incidence of suicidal poisoning.

Key words: Poisoning; Suicidal; Children.

INTRODUCTION

Poisoning is an important and preventable cause of morbidity and mortality in childhood. It is responsible for 0.33% to 7.6% of total admissions in pediatric wards at various hospitals across India. It is very likely that this reporting is an underestimate of the actual magnitude of this problem as many cases go unreported[1]. Occupational exposure to industrial chemicals and pesticides, accidental or intentional exposure to household and pharmaceutical products and poisoning due to venomous animals, toxic plants and food contamination, all contribute to the problem. However, the magnitude of the problem, the circumstances of exposure and types of poisoning vary from country to country[2]. New research indicates that various social and demographic factors like family size, socioeconomic condition, attention to child as well as storage place of poison, available medical facilities and expertise to prevent and manage toxic exposures are important factors which significantly influence the acute household poisoning cases in children.2 With increasing urbanization and rapid socioeconomic development in India during the last decade, changes in the profile of childhood poisoning profile are expected. The purpose of this study was to evaluate the clinical profile and outcomes of children with poisoning.

METHODS

This prospective observational study was conducted in the department of Pediatrics at PGIMER, Dr RML Hospital, New Delhi, over a 3-year period from August 2007 to August 2010. All patients aged 2 months to 18 years presenting to the emergency department with a definite history of poisoning were included in the study. Detailed history regarding the nature of poison, clinical features, time interval between poisoning and arrival, social and demographic characteristics of patients, physical examination findings, investigations, treatment given, and outcomes were recorded in a structured performa. A record of mother

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and father's educational status, profession and family income was made to evaluate socio economic status of the family using Kuppuswamy Scale[3].

The poisoning agents were grouped under 8 heads namely, corrosives, hydrocarbons, organophosphates, pharmaceutical agents, plant and plant products, food poisoning, venomous bites and stings, household products and unknown agents. The definitions and agents comprising these groups are provided in panel 1. Informed written consent was obtained from the parents at enrollment.

Management of children with poisoning: The diagnosis of poisoning was based on one or more of the following: definite history of poisoning and supporting circumstantial and physical evidence. Once the diagnosis was confirmed, the children were shifted to the intensive care unit (ICU) for continuous monitoring and relevant laboratory and radiological investigations. Supportive care in the form of intravenous fluids and oxygen/ mechanical ventilation were provided whenever indicated. Definitive treatment in the form of antidotes and anti-venom were given as per the nature of the poisoning agent. The children were shifted out of the ICU when they no longer required continuous monitoring. Subsequently, they were discharged from the hospital as per the discretion of the treating physician.

RESULTS

A total of 140 children with a median age of 3.5 years (IQR: 2 to10) were admitted with a history of acute poisoning during the study period. About two-third of them were boys and were from families of low socioeconomic strata (Table 1). Attempts at suicidal poisoning were noted in 14 (10%) children.

Of the different poisoning agents, hydrocarbons, pharmaceutical products, and corrosives were found to be the commonest. The nature of the poisoning agent was unknown in 26 (19%) children. Six children presented with history of snake bite. The commonest presenting symptoms were vomiting (52%), drowsiness (34%), and pain abdomen (16%) while the commonest signs were respiratory distress (8%) and unconsciousness (5%). Majority of the children (n=83, 59.3%) required only observation while the remaining were treated supportively. None of them died (Table1).

Majority of the children (n=8, 57%) presenting with suicidal poisoning were girls and most of them presented during the examination months (February to April)

Panel 1. Various poisoning agents and their definitions

Agents	Definitions
Corrosive	Chemical substance that causes destruction or irreversible damage to the living tissues in contact like caustic soda, acids
Hydrocarbon	Kerosene, mobil oil, diesel, nail polish remover, turpentine oil, thinner, phenyl
Organophosphates	Baygon, naphthalene, phenol
Pharmaceutical products	Carbamazepine,phenytoin,reserpine,diazepam,alprazolam,clonidine,thyroxine,metoclopramide,clonazepam,paracetamol,atropine
Plant and plant products	A plant or plant product that when touched or ingested in sufficient quantity can be harmful or fatal to an organism e.g. bhang
Food poisoning	An acute illness typically characterized by gastrointestinal inflammation caused by food that is naturally poisonous or contaminated by pathogenic bacteria
Venomous bites and stings	Snakebite, insect bite
Household products	Mosquito repellant, dettol, laxmanrekha, hairdye, rat poison, mercury, shaving cream

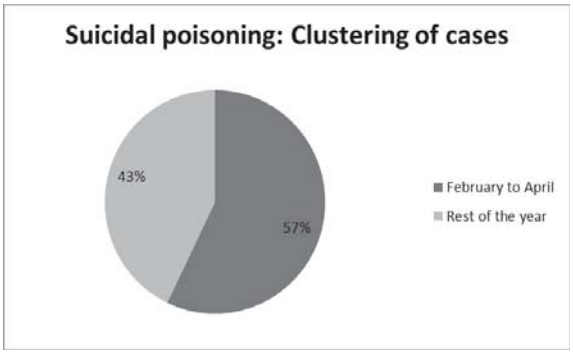
Table 1. Demographic and clinical profile of children presenting with poisoning

Variable	N= 140(%)
Age (years) *median (IQR)*	3.5 (2 to 10)
0-3 years	70 (50)
4-8 years	31 (22.1)
>8 years	39 (27.9)
Sex	
Male	91 (65)
Female	49 (35)
Socioeconomic status	
Low	90 (64.3)
Middle/upper	50 (35.7)
Mode of poisoning	
Accidental	126 (90)
Suicidal	14 (10)
Poisoning agent	
Corrosive	17 (12.1)
Hydrocarbon	39 (27.9)
Pharmaceutical product	23 (16.4)
Plant and plant products	2 (1.4)
Envenomation	9 (6.4)
Household products	15 (10.7)
Unknown	26 (18.6)
Miscellaneous	1 (0.7)
Organophosphates	8 (5.7)
Duration between exposure and treatment in hours , Median (IQR)	2 (2,4)
Common symptoms	
Vomiting	73 (52.1)
Drowsiness	48 (34.3)
Abdomen pain	23 (16.4)
Respiratory distress	12 (8.6)
Cough with crepitations	9 (6.43)
Duration of hospital stay (in day) Median (IQR)	2 (1, 3)
Outcome	
Discharged	140 (100)

(Figure1). The mean age [SD] of the patients was 9.8 [9] years which was higher than those with accidental poisoning (mean [SD]; 5 [4.4]). The most frequently used agents were pharmaceutical products (n=6, 42%); the commonest being sedatives.

A total of 6 children presented with history of snake envenomation during this period. The mean (SD) age was 9.5 (2.5) years. The median duration (IQR) between the time of bite and hospitalization was 2.5 (2, 3) hours. None of them presented with history of tourniquet application. However, three of them received local treatment in the form of incision and cleaning. Hematotoxic and neurotoxic envenomation were found in 3 and 2 children respectively. ASV was administered in five children. All the six children were discharged after a median duration (IQR) of 2.5 (1, 4) days.

Figure 1. Distribution of cases of suicidal poisoning throughout the year



Accidental exposure to hydrocarbons occurred in 32 (83.3%) children. Most commonly used substance was kerosene oil in 26 patients (66.7%) and the mean (SD) duration between exposure and hospitalization was 3.7 (1.8) hours. None of the children admitted to the hospital had undergone lavage, as we strictly follow no lavage policy for hydrocarbon poisoning. The common presenting features were respiratory distress, gastrointestinal disturbances in the form of vomiting, pain abdomen and neurological symptoms like drowsiness. Chest X-ray was done in all children within 6 hours as per protocol and was found to be abnormal in 28 (72.2%) patients. Blood gas showed hypoxia (SpO2 of 90%) in only one child. All children were managed conservatively with humidified oxygen and nebulization with salbutamol. None of the patients required mechanical ventilation and all were discharged after a median duration (IQR) of 2 (1, 4) days.

DISCUSSION

In this prospective observational study 140 children were admitted with history of acute poisoning over a 3 year period. The baseline characteristics such as age, sex, socioeconomic status and others were not much different from previously published studies from developing countries across the world except for two important differences such as in the nature of the poisoning agents used and the incidence of suicidal attempts[1,4-6].

Hydrocarbons, kerosene in particular, pharmaceutical products such as anticonvulsant's, sedatives, antihypertensive's, paracetamol and corrosives such as acids and caustic soda in decreasing order of frequency, were the commonest agents implicated in our poisoned patients. While kerosene still remains the single most important cause of poisoning in our patients similar to previously reported studies, no deaths were reported[4-6]. Toxicity due to drugs seems to be increasing in our country as compared to previous studies despite the availability of child proof containers and blister packs. Increasing awareness and accessibility to over the counter medications and habit of self-medication might be contributing to this increased risk [7,8].

The second major difference noted in our study patients was the higher incidence of suicidal poisoning (10%) in comparison to figures (3-6%) from previous studies from our country as well as other developing countries[6,9]. There was clustering of cases during the examination months i.e. February-April. The most common agent used in suicidal poisoning was pharmaceutical products while in previous studies insecticide and kerosene were commonly used[4,10]. Easy accessibility of pharmaceutical products and increasing awareness as cited above could be the contributory factors. Female children were more common victims of suicidal poisoning which could be explained by the differential care that parents subject their children to or other unknown factors which need further research.

Most of the children improved with close observation and supportive care alone and none of them died. The good outcome seen in our study can be attributed to the supportive care and close monitoring of these patients apart from factors such as early seeking of medical attention by parents and easy accessibility to the health care facilities.

The dramatic reduction, over the last 30 years, in fatal poisoning in young children is frequently cited as a classic example of the success of injury prevention and Control [11-12]. However, while fatal poisonings are now rare[11,12], the persistently high incidence of childhood poisoning necessitates an extensive search for effective strategies to reduce the

burden of ingestion related injuries in young children. A study indicated that the elimination of factors, such as inattention of parents and storage below 150 cm, would lead to the prevention of 13% and 19% of poisonings in childhood, respectively[2]. Community based, multi-strategy approaches to the problem of childhood injury is currently advocated[13]. Although adequate evidence regarding the effectiveness of community-based childhood poisoning prevention programs is lacking at present, simple measures like parental education, safe storage, and use of child proof packing and containers for drugs, could be effective in preventing a large proportion of childhood poisoning[14].

To conclude, the trends for childhood poisoning noted at our center were almost similar to those observed in previous hospital-based studies except for certain important differences such as, in the nature of the poisoning agents used; shorter time interval between poisoning and hospital admission and higher incidence of suicidal poisoning.

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