

# A Study on Pattern of Poisoning Cases in a Tertiary Care Hospital, Bangalore

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Submitted: 09-01-2014

Accepted: 26-02-2014

Poisoning is a common medico-social problem now days all over the world. It is estimated that up to half a million people die each year as a result of poisoning, due to pesticides and natural toxins. **Objectives:** To determine the socio demographic profile of the poisoning cases reported and to find out the pattern of poisoning cases at a tertiary hospital. **Methodology:** A Hospital based prospective study was conducted at KIMS hospital Bangalore. Patient data relevant to the study was recorded in a suitably designed patient proforma. The collected data was analysed using descriptive statistical analysis. **Results:** Majority (43.6%) of poisoning cases were found in the age group (21-30). Most of the patients were from urban region (66.5%). The population with possibility of exposure to poisoning in their occupations were farmers (31.5%), housewives (21.5%) and students (18.8%). In the study, the maximum numbers of poisoning cases reported were due to organophosphorus (33.3%) and drug overdose (20%). The number of intentional poisoning cases (73.63%) were more when compared to accidental poisoning cases (23.03%). 33% of poisoning cases showed a mean duration of hospitalization of 4-7 days **Conclusion:** This study clearly highlights that the maximum number of victims were in between 21- 30 years with slight male predominance. The most common manner of poisoning was suicidal with oral ingestion. Farmers have been found to be a major risk group by occupation.

**Keywords:** Pattern of poisoning, organophosphorous, Snake Bite, suicidal.

## INTRODUCTION

A poison is a substance that may produce death, serious illness, or harmful effects when introduced into the body in a relatively small quantity.<sup>1</sup> According to World Health Organization,(WHO) poisoning occurs when people drink, eat, breathe, inject, or touch enough of a hazardous substance (poison) to cause illness or death.<sup>2</sup> Poisoning is a medical emergency and a patient is always invariably rushed to the hospital at the earliest possible moment, irrespective of the amount and nature of poison ingested.<sup>3</sup> According to the WHO, more than three million poisoning cases with 251,881 deaths occur worldwide annually, of which 99% of fatal poisonings occur in developing countries, particularly among agricultural workers. Pattern of poisoning in any region depends on availability of poisons, socio economic status of the population, religious and cultural influences, occupation prevalent in the region and likewise.<sup>4</sup> WHO conservatively estimated that though developing countries account for only 15% of the worldwide use of pesticides, about 50% of pesticide poisonings occur in these countries, especially through misuse of chemicals.<sup>5</sup> Deliberate self-harm (DSH) is a major problem in the developing world, responsible for around 600,000 deaths in 1990. The toxicity of available poisons and paucity of medical services ensure that mortality from self-poisoning is far greater in the tropics than in the industrialised world.<sup>6</sup> Snakebite is a common acute medical

emergency faced by rural populations in tropical and subtropical countries with heavy rainfall and humid climate.<sup>7</sup> About 35,000–50,000 people die every year from snakebite, which is a common cause of morbidity and mortality in India.<sup>8</sup> Poisoning is one of the major causes of hospitalization through emergency and is a major public health problem.<sup>9</sup> Considering the cost and outcomes of the poison cases reported to the hospitals, it is found necessary to establish a Poison Information Centre (PIC) which should be networked with other poison information centres in India and with other countries, by which identifying the poisons and managing the cases will become more efficient.<sup>10</sup> Reducing deaths due to poisoning requires improved medical management of acute poisoning. A detailed knowledge about the pattern of poisoning cases in a particular area is not only important for early diagnosis and prompt treatment but also is essential for introducing the new and evaluating the old preventive measures.<sup>4</sup> Against this background, the present study was focussed on the nature of poisoning cases reported in a particular area, to improve the medical management and thereby prevent deaths due to poisoning.

## MATERIALS AND METHODS

The study was conducted at Kempegowda Institute of Medical Sciences (KIMS) and

Research Centre Hospital, Bangalore. A prospective cross sectional study was performed on

patients to review the current pattern of poisoning cases admitted to the hospital. The study was conducted for a period of 9 months from Jun2011-Feb2012. The complete research was done with the permission granted by the Human ethics

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committee of the institution. 165 inpatients admitted to the emergency department of the hospital who satisfied the study criteria were included in the study. Food poisoning, near drowning and drug reaction cases were excluded. Patient data relevant to the study was obtained from treatment charts/ case sheets, laboratory reports and patient or patient's caregiver's interview. The relevant information was collected on a suitably designed patient data collection form. The patient demographics and socio-economic data collected consisted of name, age, sex, domicile, educational status, and occupation of the patient. The type of poisoning, route of administration, reason and time elapsed after the poisoning were included. The name of the drug, dosage regimen (dose, form, route of administration, frequency), duration of therapy & cost of the treatment, duration of hospitalization, laboratory data and past medical and medication history of the patients were the details included in the questionnaire. The data collected was analysed using descriptive statistical analysis. Chi-square/ Fisher test was used to find the significance of study parameters on categorical scale between two or more groups. Results on continuous measurements were presented on mean  $\pm$  SD (Min-Max) and number (%).for categorical variables.

## RESULTS AND DISCUSSION

Poisoning is a common medico-social problem now days all over the world. It consumes not only the valuable health service resources but also causes considerable morbidity and mortality.<sup>11</sup> Many factors affect the outcome including the degree to which the poison's toxicity is understood, the speed at which patient comes to clinical attention and the availability of effective medical treatment.<sup>6</sup> 165 cases of poisoning were admitted to KIMS Hospital Bangalore during the study period. The socio demographic variables are described in Table 1. There were 59.4% males and 40.6% females and the male female ratio was 1.46:1. This finding correlates with a study conducted in a medical college hospital in Calicut, where the results showed that males were more vulnerable than females to poisoning.<sup>12</sup> The majority (43.6%) of poisoning cases were found in the age group between 21-30 years. Mean age of the patients in the study group was between  $30.50 \pm 14.12$  years. A study conducted in Kathmandu also revealed that poisoning was most common in the age group between 21-30 years (40.5 %). This age group was most active, physically, mentally, socially and hence more prone to stress during life.<sup>13,14,15</sup> In our study it was found that poisoning is more prevalent among the people who have no formal education (36.3%) This group is more vulnerable to poisoning which may be due to the fact that they are under continuous financial crises and stressful life. In a study conducted in Kathmandu the results indicated that equal number of literate and illiterate patients were prone to poison

consumption.<sup>9</sup> Poisoning was more prevalent among farmers (31.5%) in our study, possibly due to easy availability and a general belief that poison terminates life with minimal suffering. In a similar study conducted in a tertiary care hospital in Kathmandu, it was revealed that student population (43.9%) were more prevalent among poisoning cases when compared to other occupations.<sup>13,16</sup> However, the present study had more number of cases from urban areas compared to the rural population. This may be due to the fact that the hospital catered more to an urban population (67%) and is situated in a busy urban area. Similar findings were observed in the study conducted in southern India which indicated that poisoning in urban population (56.75%) were more when compared in rural population.<sup>17</sup> As per our finding, family conflict due to misunderstanding at the family level was the main reason for intentional poison consumption (31.5%) when compared to other reasons like accidental poisoning (23%), financial problems (15.1%), unknown (12.1%) & love tragedy (10.9%). The hospitalization time for

**Table 1: Sociodemographic Details of Patients**

Variables	Frequency	Percent
<b>Age (yrs)</b>		
1-10	8	4.8
11-20	23	13.9
21-30	72	43.6
31-40	27	16.4
41-50	16	9.7
51-60	13	7.9
>60	6	3.6
<b>Gender</b>		
Male	98	59.4
Female	67	40.6
<b>Educational qualification</b>		
No formal education	60	36.3
Primary	22	13.3
Secondary	54	32.7
Graduates	29	17.5
<b>Occupation</b>		
Farmer	52	31.5
Housewives	35	21.2
Student	31	18.8
Self employed	06	3.6
Service holder	21	12.7
Others	20	12.1
<b>Region</b>		
Rural	59	33.5
Urban	106	66.5

the poisoning cases in our study, varied between 1-41 days with 33.3% showing a mean duration of hospitalization of 4-7 days.(Table 2). A similar result was found in the study conducted in southern India, which indicated that the average number of days of hospitalization was 3-7 days (73.64%).<sup>17</sup> The time interval between the intake of poisoning and attendance by medical staff was less than 6 hrs in most of the poisoning cases in our study. Similar results were observed in the study conducted in southern India which indicated that the average time lapsed was 3-6 hours.<sup>17,18</sup> The reasons for consumption of poisoning in the study population is summarised in Figure 1. It is noteworthy that most of the cases were due to Organophosphorous (33.3%), drug poisoning (Overdose of tablets and capsules) (20%), and were the two most frequent agents involved in poisoning.(Figure 2) Our results show a similarity with those conducted in tertiary care hospital at Kathmandu, which indicated that Organophosphorous poisoning (19.5%) were more when compared to other types of poisoning cases.<sup>13</sup> The pattern of poisoning with respect to gender in our study indicates that there were more cases of poisoning among the male patients compared to female patients in cases of Organophosphorous poisoning, snake bite, rat poisoning and aluminium phosphide. The incidence of poisoning with drug overdose, unidentified poisoning, Bed bugs poisoning, Corrosive acid poisoning, Insecticide & Kerosene were more with the female patients in our study. The distribution of poisoning as per age depicts that most of the patients in our study (43.6%) were in the young age group 21-30years. There were 26 cases of Organophosphorous poisoning, 15 cases of Drug poisoning and 11 cases of Rat poisoning in this age group. The major route of intake of poisons among our study participants was through the oral route (83.63%) as compared to other routes. Similar results were observed in the study conducted in a tertiary care hospital in Kathmandu where the results indicated that oral route of exposure was more when compared to inhalation route of poisoning.<sup>9</sup> The study showed that the number of intentional poisoning cases (73.63%) were more when compared to accidental poisoning cases (23.03%). A similar result was observed in a study conducted in a rural hospital of Bangladesh, which indicated that the suicidal mode of poisoning (76.06%) is more when compared to the accidental route of poisoning.<sup>19</sup> Severity of poisoning was graded using modified Dreisbach's Classification for Severity of Poisoning.<sup>20</sup> 57.5% presented with the mild poisoning, 27.8% with moderate poisoning & 14.8% with severe poisoning. Similar study by Sheikh J.M et al in university hospital Pakistan reported that the mild poisoning 57.7% is more when compared to other categories.<sup>21</sup> Mortality rate in our study was 7.8% which correlated with that in some other studies.<sup>3,22</sup> (Table 3)

**Table 2: Number of Days of Hospitalization**

No. Of Days	No. of Patients	Percentage
Upto 1 day	26	15.7
1-3	46	27.8
4-7	55	33.3
8.15	26	15.7
16.30	9	5.4
>30 Days	3	1.8
<b>Total</b>	<b>165</b>	<b>100.00</b>
Mean±SD	5.59±6.34	
Min-Max=1-41 days		

**Table 3: Mortality Due to Poisoning**

Type of Poisoning	No. of Patient died	Male	Female
Organophosphorous	4	3	1
Snake bite	3	3	0
Rat Poisoning	2	2	0
Aluminum Phosphate	2	2	0
Insecticide	1	0	1
Bed Bugs poisoning	1	0	1
<b>Total</b>	<b>13</b>	<b>10</b>	<b>3</b>

Diagnosis was made based on history of exposure or contact to the poisons and characteristic clinical picture. Nausea, vomiting, diarrhoea, respiratory discomfort, and fluctuations in the blood pressure and heart rate were the commonly observed symptoms in our study patients. Patients diagnosed as poisoning cases were initially brought to emergency department of our hospital. Treatment was started immediately at the emergency department. Gastric lavage with distilled water and normal saline was administered to 121 patients. Oxygen was started in most of the patients. The patients were shifted to ICU for further management. Atropine 1-2 mg bolus intravenously was administered to 47 cases of Organophosphorous poisoning followed by pralidoxime 1gm IV infusion bolus to 41 patients. Glycopyrolate 1gm IV infusion bolus was given to 13 patients in severe conditions. This was followed by adjuvant therapy. In cases of drug poisoning first aid - gastric lavage was given to 29 patients and antidote like atropine, glycopyrolate and acetylcysteine were commonly used for paracetamol poisoning and followed by drugs like antibiotics, anti-ulcer and antiemetics. Then adjuvant therapy was given based on history of exposure. During the management of snakebite, 17 patients received anti snake venom and adjuvant therapy like antibiotic, adrenergic, antiulcer and antiemetic. In the management of rat poisoning (zinc phosphide) common first aid like gastric lavage were given to all the patients who consumed rat poison. Then antidote like drug - atropine, pralidoxime and the adjuvant therapy was given. The different categories of drugs given to the 165 patients were

Fig. 1: Bar Graph Showing Reasons of Poison Consumption

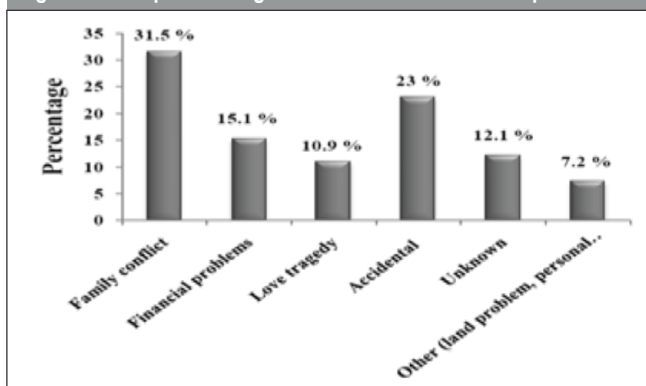
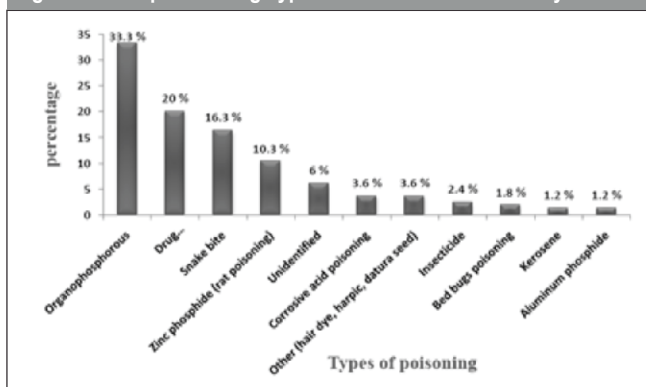


Fig. 2: Bar Graph Showing Types of Poisons Consumed by Patients



antidotes through IV Routes 77% ,oral route 1.8% followed by anti snake venom through IV Route 10.3%, antibiotic through IV Routes 94.5% oral route 21.8%, anti ulcer through IV route 97% oral 55.2%, adrenergic drugs through IV Route 10.3%, antiemetic through IV Route 24.2% Oral 3.6%, analgesic through IV Routes 4.2%, Oral 1.8% & antipyretic through IV Route 0.6%, Oral 18.2% and followed by the adjuvant therapy. The cost of medication and hospitalization for the poisoning cases were also assessed in our study. The majority of the patients, 61.2% spent in range of 1-10,000 INR for their treatment. 21.2% patients spent in range of 10001-20,000 INR and 16.9% patients had expenditure more than 20,000 INR for their treatment. The average cost of medication used in the treatment of poisoning cases was found to be 5406 INR and their average cost of hospitalization was found to be 8587 INR. The average total cost spent was 13994 INR. The average total cost spent by patients on medicines and hospitalization, was highest in case of snake bite poisoning 22,096 INR, followed by Organophosphorous poisoning 21,260 INR, Corrosive acid poisoning 14,410 INR, Aluminium phosphide 9402 INR, Rat poisoning 7358 INR, Bed bugs poisoning 7320 INR .The study confirms the fact that the prevention and treatment of poisoning should merit a high priority in the healthcare of the local population.

## CONCLUSION

Poisoning remains an important method of deliberated self-harm (DSH) and carries a significant impact on morbidity and mortality. The pattern and magnitude of poisoning are thus multidimensional and demand multi-sectoral approach for facing this problem. Awareness and education about the potential toxicity of commonly used pesticides and drugs may help in reducing the burden of poisoning. The present study indicates that younger age(less than 30 years), male sex, low educational level, intra familial conflicts (with spouse or parents) and domestic violence are the significant risk factors associated with self-harm behaviour. Pesticide poisoning was the most common method of DSH and thus reflecting a positive association between impulsive suicidal behaviour and easy availability of pesticides in the region. Public education against domestic violence and timely psychosocial management of the vulnerable cases through a protracted community based mental health program may help to reduce morbidity and mortality. The cost of medication and hospitalization for the poisoning cases was also assessed in our study If we consider the cost and outcomes of the poison cases reported to the hospital, it is recommended that, we should have to establish a poison information centre (PIC) which should be networked with other poison information centre in India and with developed countries which can help in identifying the poison and managing the cases. We as a developing country should handle the multifunctional tasks and provide broad toxicological information service, which can disseminate information to the public regarding poison prevention. Various health-care centres need to organize mass education programs to create awareness and stress the significance of a proper history to minimize the mortality due to poisoning. This study highlighted the need for a poison information center for the better management and prevention of poisoning cases.

## ACKNOWLEDGEMENTS

We wish to acknowledge the management of KIMS hospital and Visveswarapura Institute of Pharmaceutical Sciences Bengaluru, for giving us an opportunity to carry out this project and for the support provided in the successful completion of this project.

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