



**RESEARCH ARTICLE**

**A Study to Identify, Assess & Analyze the Incidence of Poisoning Cases in a  
Tertiary Care Teaching Hospital at Davangere, Karnataka**

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**ABSTRACT**

Poison is any substance that causes harmful effect when administered either accidentally or intentionally. In India, as agriculture is the main occupation, pesticides are used to a greater extent and the poisoning with such products is far more common. The objective was to identify and assess the incidence of accidental or intentional poisoning and also to assess the relation between socio economic factors and poisoning. This prospective cohort study was conducted in the departments of medicine, paediatric, emergency and ICU of a tertiary care teaching hospital for a period of 6 months. A total number of 150 cases were collected and categorized into different classes based on type of poisoning agents. In that organophosphate accounts more 31.3% (n=47), followed by snake bite 20% (n= 30). Male predominance were seen 58.7% (n=88), while comparing to female 41.3% (n= 62). Based on economic study, low socio economic peoples were more prone to poisoning i.e., 54.7% (n= 82). Rural people were far front in poisoning 54.7% (n= 82) than urban and sub- urban. The literature status showed that 78.7% (n=118) was literate. Poisoning incidence are more in married subjects i.e., 50.7% (n=76). While considering occupation, farmers were most 30.7% (n= 46). The study highlighted the lacunae of poisoning information services in hospitals. Clinical pharmacist's involvement can improve the identification of poison and toxicity rating.

**KEYWORDS**

Poisoning, Organophosphorous, Economic status, Education

**INTRODUCTION**

Poison is a substance that causes damage or injury to the body and endangers one's life due to its exposure by means of ingestion, inhalation or contact.<sup>1</sup> Acute poisoning is defined as acute exposure (less than 24hrs) to the toxic substance.<sup>2</sup> Acute poisoning due to accidental and suicidal exposure causes significant mortality and morbidity throughout the world.

World Health Organization published in 1990, around 3 million poisoning cases, 220,000 deaths occur annually. Recently some review articles reported that the number of intoxications with organophosphate pesticides was 3 million per year, and the number of deaths and casualties are 300,000 per year worldwide.<sup>3,4</sup>

Rapid industrialization, introduction of newer range of drugs for treatment and massive use of pesticides in agriculture has increased the incidence of poisoning. In advanced countries, it has been observed that poisoning deaths are mainly due to cleansing agents, detergents,

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paracetamol, carbon monoxide and other cosmetic products.<sup>17</sup>

Ever since the dawn of civilization, it has been the major task of man to engage in a continuous endeavour to improve his living conditions. One of the main tasks in which human beings have been engaged is securing relief from hunger, one of the basic human needs. Today India is engaged in the gigantic task of feeding over 1000 million people and a huge cattle population on which the poor farmer is dependent for his livelihood. Secondly, the control of insects, weeds, fungi and other pests of economic or public health is of utmost importance to our government. The task would have been impossible but for the Green Revolution of 1960, which has given reasonable hope for the country being not only self-sufficient in the production of adequate food and fodder for feeding its teeming human and animal population but has become the largest producer of some important commodities.<sup>5</sup> The data from poison information centre of All India Institute of Medical Sciences (AIIMS) reveals that highest incidence of poisoning cases was found in the age group of 14-40 years with male preponderance.<sup>6</sup>

Poisoning is the fourth most common cause of death in India.<sup>7</sup> The most common cause of poisoning in India and other developing countries is pesticides, the reasons being agriculture based economics, poverty, unsafe practices, illiteracy, ignorance and lack of protective clothing and easy availability of highly toxic pesticides. The study site is a 1000 bedded, multi-speciality tertiary care hospital which was established to cater to the wants of the agricultural individuals residing within the district. There were no studies conducted previously in this rural setup.

The main objective of the study was to identify and assess the incidence of accidental or intentional poisoning and also to assess the relationship between socio-economic factors and poisoning.

## **MATERIAL AND METHODS**

A prospective cohort study was carried out in ICU, Emergency, Medicine and Paediatric Wards

for a period of 6 months in a tertiary care teaching hospital. Ethical clearance was obtained from the Institutional Ethical Committee of Bapuji Pharmacy College, Davangere.

Prior to data collection, an informed consent was taken from each & every subject/ subject's representative. Patient information leaflet, informed consent form, data collection form and interview form were used for collecting necessary data required for the project.

### **Inclusion Criteria**

- Patients who were admitted to the hospital due to poisoning.
- Conscious and unconscious patients.

### **Exclusion Criteria**

Special cases such as pregnant women.

## **RESULTS AND DISCUSSION**

A total of 150 poisoning cases were identified during the study period. The demographic details of the victims are showed (Table 1) based on the age group, 1-20 years were 28 (18.7%), 21- 40 years were 90 (60%), 41-60 years were 30 (20%) and more than 60 years were 2 (1.3%) victims/cases respectively. In the present study, we found that the maximum number of cases was in the age group of 21-40 years; this could be due to the reasons that in this age group, people are more prone to work pressure, love failure, marriage problem, quarrel with family and other life settlement factors. Only significant deviation was observed in Korea<sup>8</sup> where maximum number of the victims was in the above 70 year age group.<sup>9</sup> Male predominance was seen (58.7%) with respect to poison consumption when compared to females. The high incidence may be because males are more exposed to stress, strain, and occupational hazards compared to female. The economic status of victims showed low socioeconomic status was observed in 82 (54.7%), 66 (44%) in medium socio-economic status remaining 2 (1.3%) had high status. Low economic group are more vulnerable to poisoning which may be due to financial crisis and other stresses which they are facing in their day-to-day life.

Table 1: Distribution of poisoning cases/victims demographic details

Demographic Details	Number of patients (n)	Percentage (%)
<b>Age in years</b>		
• 0-20	28	18.7
• 21-40	90	60
• 41-60	30	20
• > 60	2	1.3
<b>Gender</b>		
• Male	88	58.7
• Female	62	41.3
<b>Socio economics status</b>		
• Low	82	54.7
• Medium	66	44
• High	2	1.3
<b>Domicile</b>		
• Rural	82	54.7
• Sub-urban	65	43.3
• Urban	3	2
<b>Education</b>		
• Primary education	35	23.3
• Secondary education	44	29.3
• Higher education	39	26
• Illiterate	32	21.3

<b>Marital status</b>		
• Divorced	2	1.3
• Married	76	50.7
• Unmarried	68	45.3
• Widow	4	2.7
<b>Occupation</b>		
• Farmer	46	30.7
• Student	40	26.7
• Housewife	21	14
• Business	10	6.7
• Labour	32	21.3
• Others	1	0.7
<b>Occurrence</b>		
• Suicidal	103	68.7
• Accidental	47	31.3

Higher poisoning rate was found among rural population 82 (54.7%) than suburban 65 (43.3%) and urban 3 (2%) which were similar with other studies done by Rajanandh et.al (2014) and Singh et. al. (2012) but contradicted to the study done in Iran where urban population were more affected.

The literacy status of the cases showed 118 (78.7%) was literate, out of which 35 (23.3%) had primary education, secondary education 44 (29.3%) and 39 (26%) were with higher educational status. Illiterates were 32 (21.3%). Similar results were shown by studies conducted in South India by Rajanandh et.al in 2014.<sup>10</sup>

The marital status of the cases showed that married person was 76(50.7%), unmarried was 68 (45.3%), widow 4 (2.7%) and divorced was 2

(1.3%). Studies conducted by Rajanandh et. al<sup>10</sup> showed similar results.

The occupation details of victims showed that the farmers were 46 (30.7%), followed by student 40 (26.7%), labour 32 (21.3%), housewife 21 (14%) and others accounted for 0.7% (1) cases. Farmers were found to be greater in poison consumption because of easy exposure to the hazards and easy availability of agrochemicals and failure of crops or financial crisis, etc.

Out of 150 cases, 103 (68.7%) cases were intentional and 47 (31.3%) cases were observed as accidental poisoning. The various reasons for intentional poisoning are quarrel with family members, depression, financial crisis, health problem, love failure, suicidal act and remaining cases were due to unknown reason.

Table 2: Details on distribution of type of poisoning substances and number of victims belonging to each poison

Type of Poisoning agents	Number of patients (n)	Percentage (%)
<b>Pesticides</b>	<b>70</b>	<b>46.7</b>
Organophosphate	47	31.3
Organophosphate + Pyrethroid	4	2.7
Pyrethroid	13	8.7
Organochlorine	1	0.7
Neonicotinoid	1	0.7
Carbamate	4	2.7
<b>Bites</b>	<b>37</b>	<b>24.7</b>
Bee sting	3	2
Snake bite	30	20
Scorpion	4	2.7

<b>Medicines</b>	<b>24</b>	<b>16</b>
Hypoglycemic	2	1.3
Anti-hypertensive	2	1.3
Paracetamol	4	2.7
Anti-psychotics	14	9.3
Anti-histamines	2	1.3
<b>Household</b>	<b>15</b>	<b>10</b>
Rat poison	4	2.7
Hydrocarbon	10	6.7
Battery acid	1	0.7
<b>Miscellaneous</b>	<b>4</b>	<b>2.7</b>
Fungicide	2	1.3
Herbicide	2	1.3
<b>Total</b>	<b>150</b>	<b>100</b>

In the present study, the most common poisoning agent was organophosphorous compounds. As agriculture is the main occupation of the people and organophosphorous was commonly used pesticide in this locality, most of the poisoning cases were caused by organophosphorous (47 cases, 67.14%). This is evident from various other studies done in south India.<sup>11,12</sup> Among organophosphorous, aluminium phosphide was found to be high. Similar results were found in studies conducted in North India.<sup>13,14</sup> Out of 150 poisoning cases, snakebite accounted for 20% cases (n = 30). The Deccan plateau with its agricultural land and hot, dry climate provides an ideal environment for Cobras, Kraits and Vipers. Snakes are most likely to bite human beings when they feel threatened, startled or provoked, and or have no means of escape when cornered.

The use of drug as poison is far more common [n=24 (16%)]. The greater number of cases using

drugs may be related to higher rate of over the counter sale of drugs within the region and better knowledge of people about the toxicity of the drug. The high rate of suicides by the drugs can be due to ease of access to OTC drugs, incurrent administrating of drugs and over dosage of some agents.<sup>15</sup>

Out of 150 cases, 10% (n=15) were due to the household poisoning. Kerosene and paraffin oils are common household energy sources throughout the developing country. Kerosene oil was by far the most common agent, followed by rodenticides, bleach and NaOH-containing oven cleaner<sup>16</sup> and the number of miscellaneous were 2.7% (n=4).

## CONCLUSION

Poisoning is a common cause for hospital admissions. The most poisoning cases were observed with pesticides handled by the farmers in the agriculture fields. The reason for poisoning among the majority of the patient population was family problems which cannot be treated medically. Here, comes the need for counseling.

Clinical pharmacist's intervention/involvement in the poisoning management can improve the identification of poison and toxicity rating of substance followed by providing poison information services to the health care professionals. The poison treatment guidelines / treatment protocol preparation will help the health care professionals to take the treatment decisions quickly, there by mortality rate can be reduced and therapeutic outcomes can be increased. The poison safety strategies will help in reducing / preventing the poisoning cases.

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## REFERENCES

1. Thomas, W. F., John, H. D., Willium, R. H. (2004). *Stedman's medical dictionary* (28th edition). Lippincott William and Wilkins, Newyork. 2007.
2. Klassen, C. D., Andur, M. O., Doull, J. (1986). *Casarett and Doull's Toxicology* (pp.10-17). Macmillian, New York.
3. Singh, B., & Unnikrishnan, B. (2006). A profile of acute poisoning at Mangalore (South India). *Journal of Clinical Forensic Medicine*, 13(3), 112-116.
4. Rao, S., Venkateswarlu, V., Surender, T., Eddleston, M., & Buckley, N. A. (2005). Pesticide poisoning in south India: opportunities for prevention and improved medical management. *Tropical Medicine & International Health*, 10(6), 581-588.
5. Konradsen, F., van der Hoek, W., Cole, D. C., Hutchinson, G., Daisley, H., Singh, S., & Eddleston, M. (2003). Reducing acute poisoning in developing countries—options for restricting the availability of pesticides. *Toxicology*, 192(2), 249-261.
6. Prakash, J., Singh, P. K., Kotwal, A., & Ramakrishnan, T. S. (2009). Unknown poisoning amongst serving personnel. *Medical Journal Armed Forces India*, 65(1), 41-43.
7. Unnikrishnan, B., Singh, B., & Rajeev, A. (2005). Trends of acute poisoning in south Karnataka. *Kathmandu University Medical Journal*, 3(2), 149-152.
8. Shin, S. D., Suh, G. J., Rhee, J. E., Sung, J., & Kim, J. (2004). Epidemiologic characteristics of death by poisoning in 1991-2001 in Korea. *Journal of Korean Medical Science*, 19(2), 186-194.
9. Dash, S. K., Sitarama Raju, A., Mohanty, M. K., Patnaik, K. K., & Mohanty, S. (2005). Sociodemographic profile of poisoning cases. *Journal of Indian Academy of Forensic Medicine*, 27(3), 133-138.
10. Rajanandh, M. G., Santhosh, S., & Ramasamy, C. (2013). Prospective Analysis of Poisoning Cases in a Super Specialty Hospital in India. *Journal of Pharmacology and Toxicology*, 8(2), 60-66.
11. Jesslin, J., Adepu, R., & Churi, S. (2010). Assessment of prevalence and mortality

- incidences due to poisoning in a South Indian tertiary care teaching hospital. *Indian Journal of Pharmaceutical Sciences*, 72(5), 587.
12. Maharani, B., & Vijayakumari, N. (2013). Profile of poisoning cases in a tertiary care Hospital, Tamil Nadu, India. *Journal of Applied Pharmaceutical Science*, 3(1), 91.
  13. Singh, V. P., Sharma, B. R., Dasari, H., & Vij, K. (2004). A ten year study of poisoning cases in a tertiary care hospital. *Indian Internet Journal of Forensic Medicine & Toxicology*, 2(1).
  14. Lall, S. B., Peshin, S. S., Seth, S. S. (1994). Acute poisoning. A ten year retrospective hospital based study. *Annals of the National Academy of Medical Sciences (India)*, 30(1), 35-44.
  15. Townsend, E., Hawton, K., Harriss, L., Bale, E., & Bond, A. (2001). Substances used in deliberate self-poisoning 1985–1997: trends and associations with age, gender, repetition and suicide intent. *Social Psychiatry and Psychiatric Epidemiology*, 36(5), 228-234.
  16. Eddleston, M. (2000). Patterns and problems of deliberate self-poisoning in the developing world. *Qjm*, 93(11), 715-731.
  17. Gargi, J., Rai, H., Chanana, A., Rai, G., Sharma, G., & Bagga, I. J. S. (2004). Current trends of poisoning—A hospital profile. *Journal of Punjab Academy of Forensic Medicine & Toxicology*, 3(3), 41-45.

