

## Research Article

# A retrospective study of paradigm and outcome of acute poisoning cases in a tertiary care teaching hospital in Southern India

Arulmurugan C.\*, Sarfaraz Ahmed, Mohammad Gani

Department Of Medicine, SRM Medical College and Hospital, Kattankulathur, Kancheepuram, Chennai, India

**Received:** 16 August 2015

**Revised:** 17 August 2015

**Accepted:** 02 September 2015

**\*Correspondence:**

Dr. Arulmurugan C.,

E-mail: drarulc@gmail.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Acute poisoning is a medical emergency. It is important to know the nature, outcome and severity of acute poisoning cases in order to make appropriate prevention and treatment. This study is conducted to assess the paradigm and outcome of acute poisoning cases in a tertiary care hospital in Tamilnadu.

**Methods:** This is a retrospective study conducted in a tertiary care hospital in Tamilnadu. The study included 169 cases and data regarding age, sex, time elapsed after intake, name of the poisons, chemical type; duration of hospital stay; outcome and severity were collected in the structured proforma.

**Results:** Incidence was high among males (60.36%) compared to females (39.64%). Most of the cases of acute poisoning were in the age group 10 to 30 years (60.95%) followed by 30 to 50 years age group (30.77%). A majority of poisoning cases (27.2%) were due to organophosphorus (OPC) insecticide. Total mortality was found to be 5.32%. Mortality rate due to Paraquat, Abrus Pretorius seeds was significantly high compared with OPC because there is no specific antidote. Time lapse had a very significant role in the mortality in cases of poisoning.

**Conclusions:** Poisoning is common with young males. The mortality is high, in cases of self-poisoning with parquat and abrus seeds. Despite the highest consumption rate, no mortality was observed with organophosphorus because of early medical intervention and specific antidote. Early medical care in a tertiary care hospital will help to reduce significant mortality in India.

**Keywords:** Acute Poisoning, Paraquat, Organophosphorus, Tertiary care hospital

### INTRODUCTION

Acute poisoning is an important medical emergency. The nature of poisons used varies in different parts of the world and may vary even in different parts of the same region depending on the cultural diversity and socioeconomic factors. Management of these sick patients will greatly improve if the common causes of poisoning are properly defined.<sup>1</sup> Insecticide self-poisoning accounts for about one - third of the world's suicides. The proportion of all suicides using insecticides differs from 4% in the European region to over 50% in the Western pacific region, but this proportion is not

concordant with the volume of insecticides sold in each region; it is the pattern of insecticide use and the toxicity of the products, not the quantity used, that influences the likelihood that they will be used in acts of self-harm.<sup>2</sup> With the research in the industrial and agricultural field and advances in medical sciences, a large number of insecticides have become available, which on exposure may cause severe toxicity. Information available in India is limited, with regard to acute poisoning in adults, including hospitalized patients.<sup>3-7</sup> In general, and accidental poisoning is more common in children, whereas suicidal poisoning is more common in adults.<sup>3</sup> It is very important to know the nature and severity of

poisoning in order to take appropriate preventive and treatment measures. Studies of this nature will be a very important useful tool in planning and management of critically ill acute poisoning cases. In this context, our study was carried out with the intention to investigate the paradigm and outcome of acute poisoning cases in a tertiary care teaching hospital in Tamilnadu.

**METHODS**

This study is a retrospective study done at SRM Medical College Hospital and Research Centre, a tertiary care hospital in the Kancheepuram district of Tamil Nadu. Study period is 24 months extending from July 2013 to June 2015. All cases of acute poisoning admitted to the hospital were included in the study. Cases of snake envenomation, drug allergy and food poisoning were excluded. Data regarding age, sex, circumstances of poisoning, name of poison, time elapsed after intake, chemical type, duration of hospitalization; severity and outcome were collected in the structured proforma. Circumstantial evidences such as retained empty bottles and drugs were also collected from the patients. Patient blood, gastric aspirate, urine sample were collected and analyzed with a separate toxicological laboratory attached with the ICU complex. Data was analyzed using Epi info software package for windows.

**RESULTS**

Total of 169 cases of acute poisoning were admitted during the study period. Males constituted the majority with 102 cases (60.36%) and female cases were 67 (39.64%) (Table 1). Male: female ratio is 3:2. Most cases of acute poisoning presented in the age group between 10 and 30 years (60.95%) followed by 30 to 50 years age group (30.77%) and 50 to 70 years age group (8.28%) (Table 2).

**Table 1: Age distribution.**

Age group	Frequency	Percent
10-30yrs	103	60.95%
30-50yrs	52	30.77%
50-70yrs	14	8.28%
<b>TOTAL</b>	<b>169</b>	<b>100.00%</b>

**Table 2: Sex distribution.**

Age group	Males		Females	
	Frequency	Percent	Frequency	Percent
10-30yrs	56	54.90%	47	70.15%
30-50yrs	37	36.27%	15	22.39%
50-70yrs	9	8.82%	5	7.46%
<b>TOTAL</b>	<b>102</b>	<b>100 %</b>	<b>67</b>	<b>100%</b>

A majority of the poisoning cases (27.2%) were due to organophosphorus compounds (OPC) followed by Oleander seed poisoning (16.6%), drugs (13.0%), corrosive poisoning (7.7%), rat killer poison (6.5%), pyrethroid Poisoning (5.9%) and others (Table 3). Drugs consumed were acetaminophen, sedatives, anti-epileptics, antidepressants, anti-psychotics and beta blockers (Table 4).

**Table 3: Poisons profile, mortality and chemical analysis reports.**

Diagnosis	Frequency (%)	Mortality (%)	Chemical Analysis Positive
Organophosphorus Poisoning	46 (27.2%)	0	36 (78.3%)
Oleander seed poisoning	28 (16.6%)	1 (3.5%)	20 (71.4%)
Tablet poisoning	22 (13%)	0	20 (90.9%)
Corrosive Poisoning	13 (7.7%)	0	10 (90.9%)
Ratkiller poisoning	11 (6.5%)	2 (18.2%)	7 (70%)
Pyrethroid Poisoning	10 (5.9%)	0	1 (7.7%)
Organocarbamate poisoning	8 (4.7%)	1 (12.8%)	6 (75%)
Organochlorine poisoning	5 (3%)	0	2 (40%)
Parquet Poisoning	3 (1.8%)	2 (66.66%)	2 (66.7%)
Hair dye poisoning	3 (1.8%)	1 (33.3%)	1 (33.3%)
Datura poisoning	3 (1.8%)	0	1 (33.3%)
Abrus precatorius seed poisoning	3 (1.8%)	1 (33.3%)	2 (66.7%)
Phenol Poisoning	2 (1.2%)	0	1 (50%)
Mercuric chloride	1 (0.6%)	0	1 (100%)
Aluminium phosphide	1 (0.6%)	1 (100%)	1 (100%)
others	10 (5.9%)	0	4 (40%)
<b>TOTAL</b>	<b>169</b>	<b>9 (5.32%)</b>	<b>115 (68%)</b>

Corrosives were acid poisoning and kerosene. Blood, urine and gastric aspirate samples were collected soon after admission to hospital and samples analyzed with separate toxicological laboratory attached to the ICU complex. Chemical analysis were positive in 36 cases (78.3%) of OPC, 20 cases (71.4%) of oleander seed, 20 cases (90.9%) of tablets poisoning, 10 cases (90.9%) of rat killer poisoning, 6 cases (75%) organocarbamate, 7 cases(70%) of pyrethroids. Other reports are shown in Table 3. Out of 46 patients of OPC poisoning, 34 (73.91%) showed signs of severe toxicity and respiratory paralysis and required ventilator support. Among 28 cases of oleander seed poisoning, 18 (64.28%) cases

developed bradyarrhythmias, 4 (14.28%) cases developed complete heart block that required temporary pacemaker. Out of 11 patients with rat killer poison, 9 (81.81%) developed coagulopathy and hepatotoxicity, whereas only 3 (13.63%) with drug poisoning had hepatotoxicity.

**Table 4: Incidence of tablets poisons.**

Type	Frequency	Percent
Acetaminophen	8	36.40%
Sedatives	7	31.80%
Anti-epileptics	3	13.60%
Antidepressants	2	9.10%
Anti-psychotics	1	4.50%
Beta blockers	1	4.50%
<b>TOTAL</b>	<b>22</b>	<b>100.00%</b>

Renal failure requiring dialysis occurred in six cases among total of 169, of these 2 cases were due to rat killer poison, one due to abrus seed, one case due to mercuric chloride, one due to hair dye, one due to parquet poison. Total mortality was 5.32% (9 cases) (Table 4).

Out of 3 cases of parquet poison, 2 (66.66%) developed severe toxicity and died. Out of 3 cases of abrus seed poison, 1 (33.33 %) developed circulatory failure and expired. Among 3 cases of hair dye, 1 (33.33%) developed severe rhabdomyolysis, renal failure and expired, 1 case of oleander had expired due to complete heart block. Out of 11 cases of rat killer poisoning 2 (18.18%) had severe hepatotoxicity and expired. Out of 8 cases of carbamate poisoning one case (12.8%) expired. Only one case of aluminium poison admitted and expired due to circulatory failure. There was no mortality in organophosphate compounds despite the highest incidence in our study and there was also no mortality among organochlorine, pyrethroids, corrosives and drugs. Mortality rates due to parquet and abrus seeds were significantly high followed by rat killer poison, hair dye poison, oleander seed and carbamate. All the 9 expired cases were admitted more than 6 hours after ingestion of poison and there was no decontamination done outside the hospital. Patients admitted within 6 hours of ingestion had no mortality (Table 5).

**Table 5: Time elapsed since exposure to hospital arrival and mortality.**

Time lapse (hours)	Total cases Expired cases (%)
< 6	Nil
>6	9 (100%)

It was found that 88.75% (150) of cases were of intentional poisoning for suicidal attempt and 11.25% (19) of cases had accidental poisoning (Table 6). All the patients (5.32%) who expired were secondary to suicidal intention. Median hospital stay was 6 days. 54 patients

(31.95%) stayed in the hospital for more than 5 days (Table 7).

**Table 6: Poison intention.**

Suicide	150 (88.75%)
Accidental	19 (11.25%)

**Table 6: Duration of hospitalization.**

<5 days	115 (68.04%)
>5 days	54 (31.96%)

98 cases (57.98%) underwent psychiatric workup and were given psychiatric counseling and drug therapy. Depression was seen in 35 (36.84 %) patients secondary to failure in social, academic, and financial areas and crisis in interpersonal adjustment. Other contributory factors were chronic alcohol dependence, financial stress and bipolar disorder.

## DISCUSSION

In our study, insecticides followed by oleander seed poison were the two common types of poisoning. A study from Pondicherry revealed a rapidly increasing trend in the incidence of Organophosphorus poisoning over a period of 3 years.<sup>8</sup> Other studies also showed that Organophosphorus are the commonly used poisonous compound.<sup>4,7</sup> In contrast, some other studies showed that majority of poisoning admissions were due to drugs.<sup>3,9</sup> A study from the All India Institute of Medical Sciences, Delhi, showed that drugs (19%) and pesticides (13%) are the most common agents out of a total of 728 poisoning cases. Out of this pesticide group, organocarbamate (47%) group followed by Organophosphorus (44%) and organochlorine agents.<sup>3</sup> This difference in the types of poisoning seen within India may be due to the difference in the patterns of use and availability of insecticides. In this study, most cases of acute poisoning presented in the age group between 10 and 30 years (60.95%), similar findings were seen in other studies.<sup>3-5</sup> Males to female ratio of 3:2. The incidence of poisoning among males might be due cultural patterns and change in the lifestyle. In this study, the overall mortality was found to be 5.32 %. It is known from this study that on psychiatric assessment; most of the suicidal cases were associated with reactive depression. High degree of stress in financial, academic and social sectors as well as failure to achieve the targets on professional, education and socioeconomic leading to limited alternatives were the contributory factors in taking self-inflicted harms. Majority of the patients (88.75%) consumed the poison with suicidal intent as compared with (11.25%) of the patients exposed accidentally. A study reported from Kathmandu showed that 97% of the poisoning cases admitted in a hospital were due to suicidal attempt and study did not include snake bite cases as our study.<sup>10</sup> In contrast, another study

done at Delhi reported that nearly half (47%) of poisoning were accidental (1-70 age group).<sup>6</sup> But the study had included pediatric cases, unlike in our study in which we excluded pediatric cases. It is found in our study that time interval lapse has a significant effect on the total outcome. All the expired cases were admitted to hospital after 8 hours of ingestion of poison. All the cases admitted less than 2 hours of ingestion of poison survived despite of heavy consumption. The first aid support like administration of gastrointestinal lavage, dose schedule of various antidotes such as atropine, Pralidoxime, activated charcoal given had considerable impact on the outcome. Patients who did not receive first aid support were probably brought to the hospital directly as they may have been closer to this hospital, and hence administered appropriate treatment earlier compared to others. It is found in our study that time lapse has a significant bearing on the total outcome. This is in comparison with other studies.<sup>11,12</sup>

## CONCLUSION

Overall, our study has managed to contribute substantial additional information regarding the epidemiology, paradigm and outcome of poisoning in a tertiary care teaching hospital at a district level. Poisoning is more common in young adolescent males. The overall mortality is significantly high, mainly contributed by self-poisoning with paracetamol and oleander seed in our study. Timely transport and early intervention of all critically ill acute poisoning cases is required to prevent the high mortality among poison victims.

Poison prevention protocols can be implemented at various levels as follows:

1. Strict implementation of insecticide act, so that import, manufacture, transport, sale, distribution and use of insecticides can be under the supervision of the government.
2. Controlling access to dangerous insecticide and follow secure storage practice.
3. Poison information centre should be initiated in each district. It will benefit people in timely diagnosis and treatment.
4. Primary health centre should be upgraded to provide immediate effective treatment to acute poisoning cases.
5. Peoples with psychosocial problems should be identified and should be referred for psychiatric counseling.
6. Health education should be started at school and college level about poisoning and its preventive measures.
7. Strict implementation of anti-dowry law, women empowerment and marriage counseling and will help women in decreasing the stress in married life and decrease in the incidence of poisoning among housewives.

## ACKNOWLEDGEMENTS

We would like to thank our Dean, Medical Superintendent, and Head of the Department of Medicine and Dr. Mohammad Gani V.M.S. MD, Professor, Department of General medicine, for providing his support for the study.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Singh S, Sharma BK, Wahi PL, Anand BS, Chugh KS. Spectrum of acute poisoning in adults. J Assoc Physicians India. 1984;32(7):561-3.
2. David G, Michael E, Michael RP, Fleming K. The global distribution of fatal pesticide self-poisoning: Systematic review. BMC Public Health. 2007;7:357.
3. Das RK. Epidemiology of Insecticide poisoning at A.I.I.M.S Emergency Services and role of its detection by gas liquid chromatography in diagnosis. Medico update. 2007;7:49-60.
4. Unnikrishnan B, Singh B, Rajeev A. Trends of acute poisoning in South Karnataka. Kathmandu Univ Med J (KUMJ). 2005;3:149-54.
5. Dash SK, Aluri SR, Mohanty MK, Patnaik KK, Mohanty S. Sociodemographic profile of poisoning cases. JIAFM. 2005; 27:133-8.
6. Srivastava A, Peshin SS, Kaleekal T, Gupta SK. An epidemiological study of poisoning cases reported to the National Poisons Information Centre, All India Institute of Medical Sciences, New Delhi. Hum Exp Toxicol. 2005;24(6):279-85.
7. Thomas M, Anandan S, Kuruvilla PJ, Singh PR, David S. Profile of hospital admissions following acute poisoning-experiences from a major teaching hospital in south India. Adverse Drug React Toxicol Rev. 2000;19:313-7.
8. Basu A. Study of Organophosphorus poisoning over 3 years. J Assoc Physicians India. 1988;36:21.
9. Rajasuriya R, Awang R, Hashim SB, Rahmat HR. Profile of poisoning admissions in Malaysia. Hum Exp Toxicol. 2007;26:73-81.
10. Singh DP, Acharya RP. Pattern of poisoning cases at Bir hospital. J Institute Med. 2006;28:3-6.
11. Agarwal SB. Study of 190 cases of organophosphorus poisoning. J Assoc Physicians India. 1989;31:66.
12. Adlakha. Profile of organophosphorus poisoning in adults. J Assoc Physicians India. 1988;35:665-6.

**Cite this article as:** Arulmurugan C, Ahmed S, Gani M. A retrospective study of paradigm and outcome of acute poisoning cases in a tertiary care teaching hospital in Southern India. Int J Res Med Sci 2015;3:2654-7.