

# Profile of Organophosphorus Poisoning Cases in a Tertiary Care Hospital in Central India

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## Abstract

**Introduction:** Organophosphorus poisoning is an important medical emergency and its pattern and outcome varies from place to place. Given the widespread availability and use of these chemicals, OP poisoning is quite common following either accidental or intentional exposures.

**Aims and Objective:** This study was conducted to evaluate the spectrum of acute poisoning in a tertiary care hospital.

**Materials and Methods:** This is a retrospective study of organophosphorus poisoning cases brought to emergency department/casualty of a tertiary care hospital from Jan 2011 to Dec 2014. **Result:** Total 805 cases of acute poisoning were recorded over a period of 4 years. Acute poisoning was common in men, and age group of 20–40 years was the most affected. The most common offending population was poor class (V) and financial burden was the most common reason noted.

**Conclusion:** From these results we found that Organo Phosphorous compounds are commonly ingested with suicidal intent due to its easy availability by young population in rural areas, more commonly males with economical burdens.

**Key words:** Organophosphorous compounds, acetylcholinesterase, pesticides. Acute Poisoning

## Introduction

This difference in the type of poisoning seen within the country may be due to the difference in the pattern in the use and availability of poisons. Ours is an agriculture-based society and these compounds are easily available and thus, it is the most common class implicated in cases of poisoning.

Due to the low cost and easy availability, they have also become an agent of choice for suicide and self-poisoning. Frequently used OP include malathion, parathion, chlorpyrifos, diazinon, dichlorvos,

fenitrothion, tetrachlorvinphos, and azinphos-methyl.<sup>1,2,3</sup>

OP compounds inhibit acetylcholinesterase, and this results in the accumulation of acetylcholine with the overstimulation of cholinergic synapses. Clinical signs and symptoms depend on the nature of the OP compound, the amount consumed, time lapse between exposure and admission to the hospital, and the severity.<sup>2,3</sup>

Organophosphorus (OP) pesticide self-poisoning is estimated to kill around 200 000 people each year, largely in the Asia-Pacific region. This predominantly occurs in rural communities and is often an impulsive act comparable to self-poisoning with medication in the west; the critical difference being the 10–20% case fatality rate (compared to 0.3% in Britain for example).<sup>4</sup>

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The International Program on Chemical Safety (IPCS)/EC/EAPCCT Poison Severity Score (IPCS PSS) was developed by the International Program on Chemical Safety, the European Community and the European Association of Poisons Centres and Clinical Toxicologists to create a scoring system that produces a qualitative evaluation of the morbidity caused by different forms of poisoning.<sup>5</sup>

### Material and Methods

This study was conducted after due permission from institutional ethical committee. All cases admitted to the emergency department/ casualty of the MGIMS hospital over a period of 4 years (Jan 2011 to Dec 2014) was evaluated retrospectively. Data were obtained from the hospital information system. All patients with acute poisoning were included in the study. The cases of organophosphorus poisoning (OPP) were included and snake bite, food poisoning, and allergic reactions to drugs were excluded in this study.

All poisoned patients were seen on admission by study doctors. Patients were included in this study if they had a history of OP pesticide ingestion as indicated by the patient or relatives, the transferring doctor or the pesticide bottle.

Demographic and routine laboratory results were recorded for the duration of the patients’ stay in the

intensive care unit. All patients received standard medical treatment under the direction of the hospitals’ consultant physicians. Data were documented, analysed as percentage, and final conclusion was drawn. The study involved analysis of de-identified patient data.

### Results

A total of 3692 patients visited to the emergency department/ casualty of the hospital over a period of 4 years. A total of 805 patients were of OPP poisoning. Most cases of acute poisoning presented in the age group of 20-40 years (45.59%) followed by 40-60 years (38.13%), and the majority of patients were of rural background. Men dominated the study with M: F ratio of 1.4:1. Majority of the poisoning cases presented between 20 -40 years of age group.

The mean age in our study was 32.47± 12.95 years.

Majority of the patients consumed poison with suicidal intent (91.80%) as compared with accidental (6.8%) and homicidal (1.3%) cases. With regard to the route of exposure, ingestion was the most common mode of intake compared to inhalational poisoning. Table:1, 2

Table 3 showing the distribution related to socio economic status having maximum number of cases from lower middle and poor social economic status classified according to Prasad et al<sup>6</sup>

**Table 1: Distribution of patients by their age, sex and mode of poisoning**

Age(years)	Male			Female			Total
	Suicidal	Accidental	Homicidal	Suicidal	Accidental	Homicidal	
< 20	55	4	1	34	2	0	96
20-29	73	19	3	89	7	3	194
30-39	53	7	0	113	0	0	173
40-49	96	4	4	36	4	0	144
50-59	137	5	0	18	3	0	163
>60	23	0	0	12		0	35
Total	437	39	8	302	16	3	805

**Table 2: Distribution of patients by their sex and cause of poisoning due to suicide and homicide**

	Marital	Financial	Failure	Family	Discord with parents	Separation/death of boyfriend or girlfriend	Loss of	Total
<b>Male</b>	53	312	39	27	17	13	23	484
<b>Female</b>	63	147	21	58	8	17	7	322
<b>Total</b>	116	459	60	85	25	30	30	805

**Table 3: Poisoning type by socio-economic (se) class based on modified Prasad classification<sup>6</sup>**

Social class	No. of cases
Upper high (class I)	4
High (class II)	2
Upper middle (Class III)	3
Lower middle(ClassIV)	186
Poor(Class V)	531
Below poverty line(ClassVI)	79
Total	805

### Discussion

Our study completed over period of four years involved 805 patients. Majority of the patients were young with a mean age of 32.47 years.

Study the Maharani B found that commonest poisoning agent was organ phosphorus compounds and Most of the cases were in the age group of 21-30 years finding is similar to present study.<sup>7</sup>The study conducted by Jeyaratnam found around 2 million people hospitalized for suicide attempts mostly includes serious patients.<sup>8</sup>

Acute poisoning was commonly seen among male laborers, farmers, house wives and students. More cases

were reported during summer season and day time. The finding of present study coincides with the study conducted over the population of North Karnataka by padmanabha,<sup>9</sup> similarly findings coincided with study conducted by Mishra<sup>10</sup> and Pal et al <sup>11</sup> on population of Bengal.

The study conducted by Hubdekari<sup>12</sup> on study the population Karnataka found male predominance which is similar to the present study. Similarly study conducted by Aron R et al found predominance of young men comparable with women. Majority of the patients were from rural areas, which can be explained by the fact that in the rural areas the compounds are easily available due to their utility in farming practices.<sup>13</sup>

The findings are similar to the study done by Das et al the commonest route of exposure was oral and Majority of cases were in the age group of 11-30 years and maximum cases were found between 21-30 years.<sup>14</sup>

### Conclusion

We found that Organo Phosphorous compounds are commonly ingested with suicidal intent due to its easy availability by young population in rural areas, more commonly males with economical burdens. A large number require intensive care in tertiary centers but initial management and resuscitation in periphery maybe invaluable. The incidence of poisoning and its morbidity and mortality can be reduced by developing and implementation of effective prevention strategies.

**Ethical Clearance:** Taken from institutional ethical committee.

**Funding:** Article did not receive any specific grant from funding agency

**Conflict of Interest:** Author declares that there is no conflict of interest

**Acknowledgment:** Our sincere thanks to all participants.

### References

1. Leibson T, Lifshitz M. Organophosphate and carbamate poisoning: review of the current literature and summary of clinical and laboratory experience in southern Israel. *Isr Med Assoc J.* 2008 Nov; 10(11): 767–70.
2. Eddleston M, Buckley NA, Eyer P, Dawson AH. Management of acute organophosphorus pesticide poisoning. *Lancet.* 2008 Feb; 371(9612): 597–607.
3. Barelli A, Soave PM, Del Vicario M, Barelli R. New experimental Oximes in the management of organophosphorus pesticides poisoning. *Minerva Anesthesiol.* 2011; 77(12): 1197–203..
4. Eddleston M, Phillips MR. Self-poisoning with pesticides. *Br Med J* 2004; 328:42–4.
5. Persson HE, Sjoberg GK, Haines JA, Pronczuk dG. Poisoning severity score. Grading of acute poisoning. *J Toxicol Clin Toxicol* 1998; 36:205–13.
6. Agarwal AK. Social Classification: The Need to Update in the Present Scenario; *Indian J of Community Medicine*, 2008;33 (1): 50-51.
7. Maharani, N. Vijayakumari. Profile of Poisoning Cases in a Tertiary care Hospital, Tamil Nadu, India. *Journal of Applied Pharma Scie.*2013;3: 091-4.
8. Jeyaratnam J. Acute pesticide poisoning: A major global health problem. *World Health Stat Q* 1990; 43:139-44.
9. Padmanabha TS. Study of Profile of Organophosphorus Poisoning Cases in a Tertiary Care Hospital, North Karnataka, Bidar, India. *Int J Pharm Bio Sci*, 2014; 5: 332 - 339.
10. Mishra A, Shukla SK, Yadav MK, Gupta AK. Epidemiological Study of Medicolegal Organophosphorus Poisoning in Central Region of Nepal. *J Forensic Res*, 2012;3:167.
11. Pal DK, Mondal T, Ghosh R. Evaluation of Organophosphorus Poisoning Cases in a Rural Block of West Bengal. *Journal of Dental and Medical Sciences*,2015;14: 12:08-10.
12. Hubdekari I. Acute Poisoning with Organophosphorus Pesticide: Patients Admitted to a Hospital in Bijapur, Karnataka. *JKIMSU*, 2012;1:38-47.
13. Aaron R, Joseph A, Abraham S, Muliyl J, George K, Prasad J et al. Suicides in young people in Rural Southern India. *Lancet*, 2004; 363:1117-1118.
14. Das R K. Epidemiology of insecticide poisoning at A.I.I.M.S. Emergency service and role of its detection by gas liquid chromatography in diagnosis. *Medico legal update*;2007; 7: 49-60.