

**Original article:**

## **A study of clinical spectrum and profile of patients of non organophosphate poisoning**

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### **ABSTRACT:**

**Background:** Nowadays non-organophosphorous compound poisonings are increasing, thus study of their clinical manifestations and outcome is the need of time. In this study, 50 patients who had history of consumption of non-organophosphorous compound were studied and outcome was studied ,it was a prospective observational study. The commonest cause of poisoning in India and other developing countries is organophosphorus compounds.<sup>[1]</sup> along with organophosphorous compounds non-organophosphorous compound poisoning and their outcome needs to be studied .

**Materials and methods:** For this prospective observational study,50 patients who had consumed non organophosphate poison and having symptoms were included in the study after meeting inclusion criteria .It was conducted between September 2016 to May 2018 in PRH Loni, each patient was subjected to detailed clinical history and clinical examination ,well written and informed consent was taken from each relative before including the patient for this study. All the calculations were done by standard formula for calculating mean/average of each variable.

**Results:** Majority of the patients n=29(58 %) were males rest n=21 (42%) were females,the mode of exposure was oral in all patients,most patients survived ,overall mortality was 4 %, mean duration of hospital stay was 3 days,most common poisoning was due to amitraz followed by phenyl compounds.

**Conclusion:** Most common cause for poisoning was amitraz compound followed by phenyl compounds,overall mortality was only 4 %

### **Introduction:**

Everyday around the world, almost 700 people die from poisonings and for every person that dies, several thousands more are affected by poisoning. Poisoning occur in all regions and countries and affect people in all age and income groups. In 1990 (WHO) estimated that more than three million poisoning cases with up to 2,00,000 deaths occur worldwide annually, of which, 99% of fatal poisonings occur in developing countries, particularly among agricultural workers<sup>[1]</sup> Pattern of poisoning in any region also depends on availability of poisons, religious and cultural influences, occupation prevalent in the region and likewise. The monsoon dependent agricultural practice and socioeconomic factors related to it play role in the incidence of acute poisonings. A detailed knowledge about the nature and magnitude of the 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.

India is an agricultural country and more than 70% of its population is dependant directly or indirectly for the livelihood on various agricultural activities. Pesticides are defined in Federal insecticide, fungicide and rodenticide act as “any substance” or mixture of substances intended for preventing; destroying; repelling or

mitigating any insects, rodents, nematodes, fungi or weeds or any other form of life declared to be pests or any substance intended for use in plant regulator, defoliant or desiccant.<sup>[2]</sup>

Increasing population of India has eventually led to increase in the agricultural products, modernization of farming and use of various insecticides has come up for better yield.

It is roughly estimated in India that 5 to 6 persons per lakh population die due to poisoning every year. The commonest cause of poisoning in India and other developing countries is organophosphorus compounds.<sup>[1]</sup>

But nowadays due to availability of different pesticides and insecticides non- organophosphate compound poisonings are increasing in the community so study of different manifestations and clinical outcome of them is the need of the time.

This is an attempt to study spectrum and clinical profile of acute poisoning due to various non-organophosphate compounds

- Inclusion criteria:
  - 1.All patients who had known to be consumed non-organophosphate poison
  - 2.Age more than 12 years.
  - 3.Patients relatives who are willing to give written informed consent
- Exclusion criteria:
  - 1.organophosphate poisoning.
  - 2.unknown compound consumption.

Poisoning management is divided into six phases<sup>[3]</sup>

1) Stabilization. Includes airway breathing and circulation management and advanced life support in selective cases.

2) Laboratory assessment: Include routine studies e.g. complete blood count, serum electrolytes, creatinine, urine analysis, arterial blood gas analysis etc to be done in all patients and specific studies whose results may be used for diagnosis and to direct therapy of overdose

patients.eg digoxin level, acetaminophen level, serum cholinesterase level etc.

3) Decontamination: It involves decontamination of gastrointestinal tract, skin or eyes.

Gastric decontamination can involve activated charcoal, gastric lavage, whole bowel irrigation, or nasogastric aspiration. Routine use of emetics (syrup of Ipecac), cathartics or laxatives are no longer recommended,

- a. Activated charcoal is the treatment of choice to prevent poison absorption. It is usually administered when the patient is in the emergency room or by a trained emergency healthcare provider such as a Paramedic or EMT. However, charcoal is ineffective against metals such as sodium, potassium, and lithium, and alcohols and glycols; it is also not recommended for ingestion of corrosive chemicals such as acids and alkalis.<sup>[4]</sup>
- b. Whole bowel irrigation cleanses the bowel; this is achieved by giving the patient large amounts of a polyethylene glycol solution. The osmotically balanced polyethylene glycol solution is not absorbed into the body, having the effect of flushing out the entire gastrointestinal tract. Its major uses are following ingestion of sustained release drugs, toxins that are not absorbed by activated charcoal (i.e. lithium, iron), and for the removal of ingested packets of drugs (body packing/smuggling).<sup>[5]</sup>
- c. Gastric lavage, commonly known as a stomach pump, is the insertion of a tube into the stomach, followed by administration of water or saline down the tube. The liquid is then removed along with the contents of the stomach. Lavage has been used for many years as a common treatment for poisoned patients. However,

a recent review of the procedure in poisonings suggests no benefit. It is still sometimes used if it can be performed within 1 hour of ingestion and the exposure is potentially life threatening.<sup>[6]</sup>

d. Nasogastric aspiration involves the placement of a tube via the nose down into the stomach, the stomach contents are then removed by suction. This procedure is mainly used for liquid ingestions where activated charcoal is ineffective, e.g. ethylene glycol poisoning.

4) ANTIDOTE: Some poisons have specific antidotes POISON

5) Elimination enhancement of the toxin: e.g. haemodialysis, forced alkaline diuresis, haemoperfusion, multiple-dose activated charcoal'

6) Observation and disposition:

Observation and supportive care are mainstays of therapy. Disposition of the patient with intoxication may involve medical and psychiatric care as well as social follow up. All patients admitted to the hospital with intentional overdose warrant close observation and suicide prevention.

Various poisonings are come across nowadays due to invention of newer chemicals and their widespread use to increase and preserve crop production to meet the needs of growing population

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Classification of common poisoning which are prevalent is as follows

Classification of poisonings:

Non organophosphate compounds

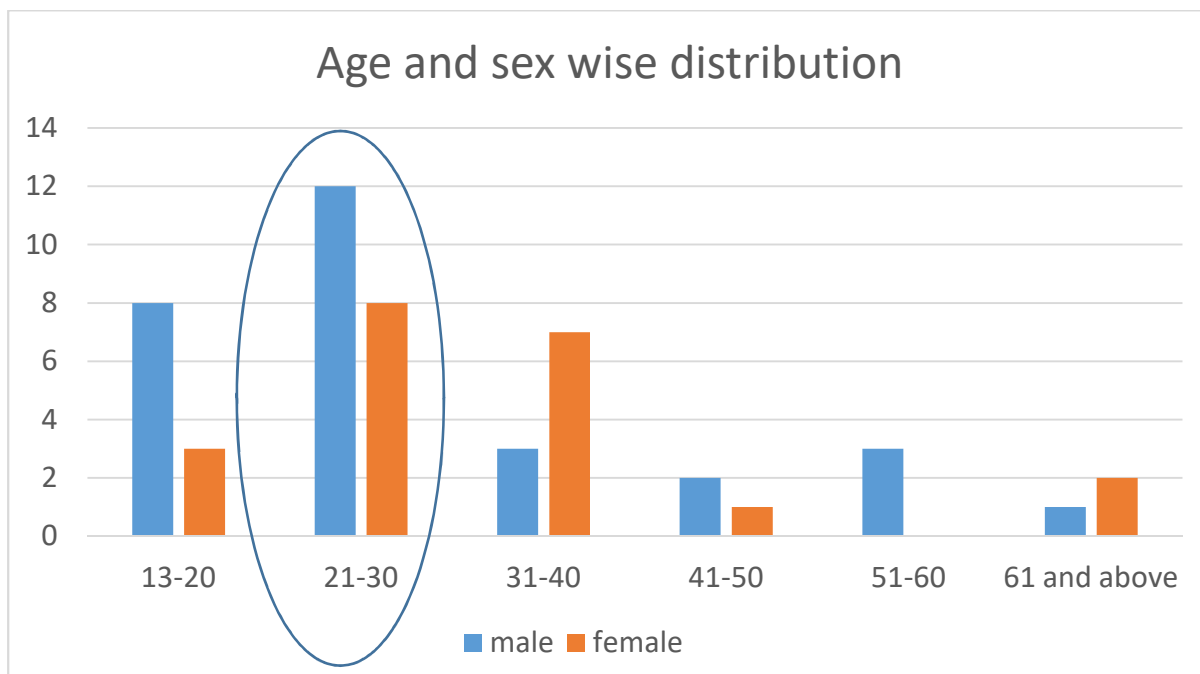
- Organochlorines (eg. DDT, lindane, toxaphane, endosulfan, heptachlor)
- Carbamates (eg. aldicarb, carbofuran, methicarb)
- Pyrethroid derivatives (eg. cypermethrin, permethrin, deltamethrin)
- Formamidine compounds (eg. amitraz, chlordimeform)
- Herbicides (eg. paraquat, glyphosate, oxyfluorfen)
- Rodenticides (eg. zinc phosphide, aluminium phosphide, magnesium phosphide)
- Pharmacological overdosages (eg. paracetamol, phenytoin, valproate)
- Poisonous plants Corrosives (eg. cardiac glycosides)

Observation tables:.

**Table 1-**

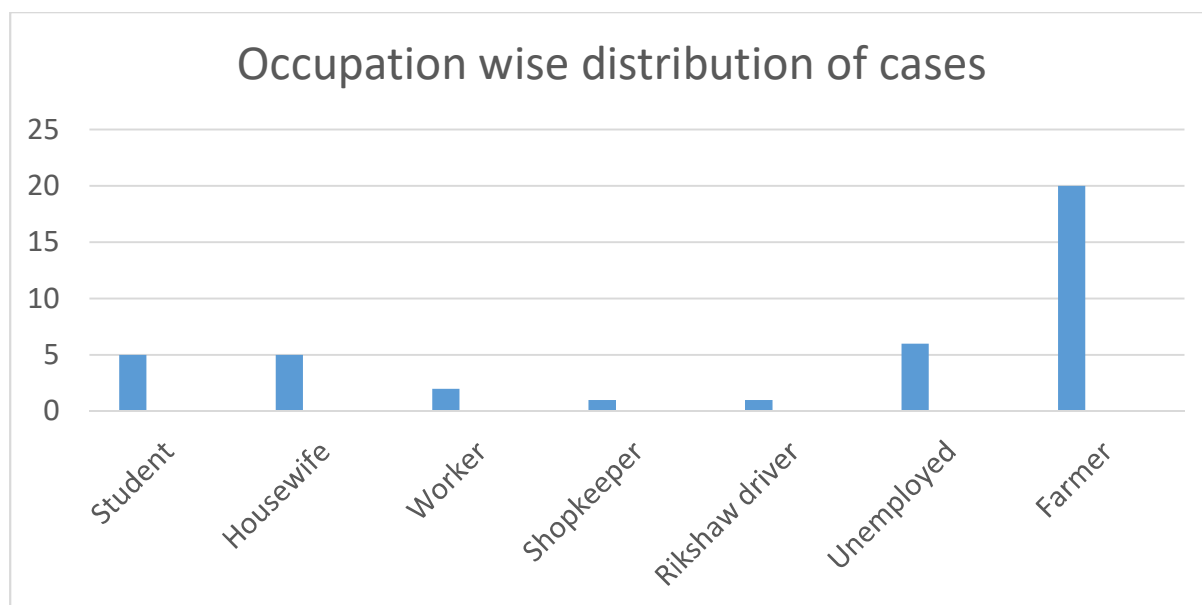
Age(years)	Male	Female	No.of patients(%)
13-20	8	3	11 (22 %)
21-30	12	8	20 (40 %)
31-40	3	7	10 (20 %)
41-50	2	1	3 (6%)
51-60	3	0	3 (6%)
61 and above	1	2	3 (6 %)
Total	29	21	50(100 %)

Age and sex wise distribution of cases :



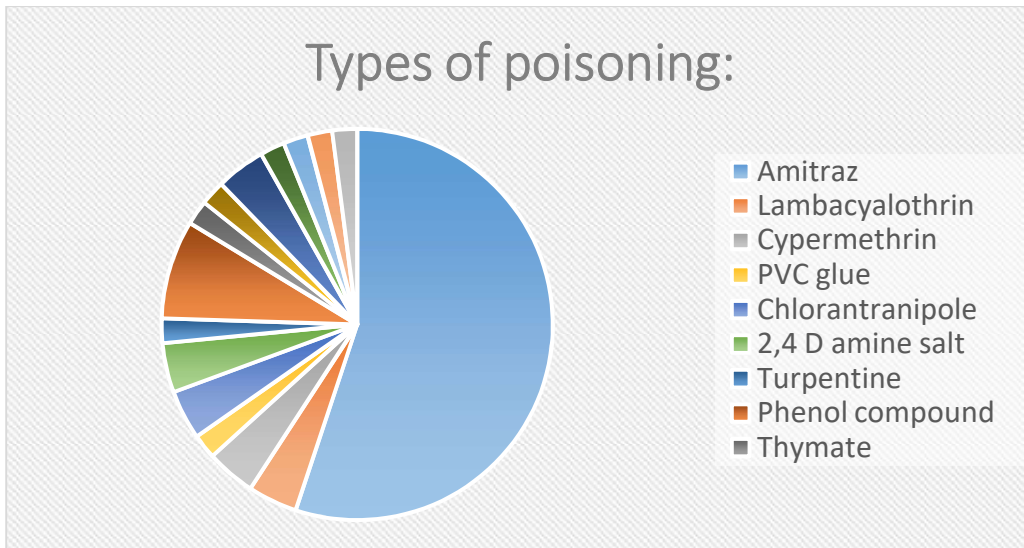
**Table-2: Occupation wise distribution of cases**

Occupation	No.of patients	% of patients
Students	5	10
Housewife	5	10
Farmer	20	40
Worker	2	4
Shopkeeper	1	2
Rikshaw driver	1	2
Unemployed	6	12
Total	50	100



**Table-3 :Types of poisoning**

Compound	No.of patients	Percentage (%)
Amitraz	27	54
Lamdacyalothrin	2	4
Cypermethrin	2	4
PVC glue	1	2
Chlorantraniprole	2	4
2,4-D amine salt	2	4
Turpentine	1	2
Phenol compound	4	8
Thymate	1	2
Bromodilone	1	2
Deltamethrin	3	6
Sulphuric acid	1	2
Fibronil	1	2
Amlodipine ,Atenolol	1	2
Paracetamol	1	2
Total	50	100



**Table-4: Duration of hospital stay**

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Duration of Stay(days)	No.of patients(total 50)	% of patients
1	3	6
2	18	36
3	22	44
4	3	6
5	2	4
6	2	4

**Table-5: Outcome of poisoning**

Outcome	Number of patients:
Survived	48
Died	2
Absconded	0
Total	50

**Discussion:**

This study 'Clinical Spectrum & Profile of patients of Non Organophosphate Poisoning' a prospective observational study was conducted in PRH Ioni a tertiary care hospital from September 2016 to may 2018. In the study period 50 cases were evaluated for their clinical presentation, spectrum of poisoning and their outcome.

From table number 1 we can conclude that:

Total no of males were n=29 and females were n=21.

Shreemanta Kumar Dash et al [7] mentioned that in their study Three hundred and six cases were admitted to the Hospital with diagnosis of acute poisoning. 53.3% of the cases were male with male to female ratio 1.14:1.

Peak incidence was observed in the age group 21-30 years (124 cases).

Karki RK, Risal A. et al [8] in their study found that the study sample included 75 males (54.7%) and 62 females (45.3%). The maximum cases were seen during the third decade (32.1%) followed by fourth decade (22.6%).

K. N. Ramesha et al [9] Studied total of 136 patients of various poisoning cases. Incidence was more common among males (75.4%) compared to females (24.3%) with a ratio of 3:1. Most cases of acute poisoning presented in the age group between 20 and 29 years (31.2%) followed by 12 to 19 year age group(30.2 %).

Subash Vijaya Kumar [10] mentioned in their study that the majority of poison cases were between 21 - 30 years of age. There were more male patients than females, with 52.15% (n = 1161) and 47.84% (n = 1,065) male and female, respectively

In all above studies incidence was more common in males than females probably because it also included organophosphate poisonings which were more common in males because of its relation with farming occupation. In our study organophosphate poisoning was excluded and hence there was no significant difference found in age groups

.From table number 2 we can conclude that:



Most of the victims of poisoning were farmers n=20(40 %) followed by unemployed n=23(12 %), students n=5(10 %), housewives n=5(10 %).

K. N. Ramesha et al<sup>[11]</sup> in their study found that by occupation, 44.8% of the cases were manual labourers (61) followed by housewives (13.2%, 18), students (12.5%, 17), farmers and unemployed (10.2%, 14) and businessmen (8.8%, 12).

From table number 3 we can conclude that:

Most common poisoning was of amitraz compound with total no. of patients n=27(54 %) followed by phenol compound n=4 ( 8 %), deltamethrin n=3(6 %) .

Srivastava A et al<sup>[12]</sup> mentioned The highest incidence of poisoning was due to household agents (44.1%) followed by drugs (18.8%), agricultural pesticides (12.8%), industrial chemicals (8.9%), animals bites and stings (4.7%), plants (1.7%), unknown (2.9%) and miscellaneous groups (5.6%). Household products mainly comprised of pyrethroids, rodenticides, carbamates, phenyl, detergents, corrosives etc. Drugs implicated included benzodiazepines, anticonvulsants, analgesics, antihistamines, tricyclic antidepressants, thyroid hormones and oral contraceptives. Among the agricultural pesticides, aluminium phosphide was the most commonly consumed followed by organochlorines, organophosphates, ethylene dibromide, herbicides and fungicides.

Shreemanta Kumar Dash et al<sup>[13]</sup> in their study found that most common poisoning was due to organophosphate compound n=70(22.9%). In non-organophosphate group phenyl was most common with n=29(9.5%) followed by rodenticide n=27(8.8%) followed by drugs n=22(7.2%).

Zine KU, Mohanty AC et al<sup>[14]</sup> mentioned The common agents were insecticides in 93 cases, alcohol in 65 cases, medicinal drugs in 24 cases, copper sulphate in 10 cases, phenolic group and miscellaneous in 27 cases.

K. N. Ramesha et al<sup>[11]</sup> in their study found that majority of the poisoning cases (36.0%) were due to organophosphorus compound (OPC) followed by snake bite (16.2%), drugs (11.0%), rat poison (7.3%) and others.

Subash Vijaya Kumar et al<sup>[15]</sup> in their study found that The exposure substances identified as most commonly encountered in the emergency department included snakebite 9.3% (n = 208), OP 17.2% (n = 383), overdose of drugs 8.4% (n = 187), unknown pill 7.7% (n = 173), hair dye 2.6% (n = 58), corrosive 3% [n = 65), endosulphan 6.42% (n=143), rodenticide 3.1% (n= 71), kerosene ingestion 2.15% (n = 48).

From table number 4 we can conclude that:

Hospital stay for maximum no of patients n=22(44 %) was 3 days, n=18(36 %) patients were in hospital for 2 days. Maximum duration of hospital stay was 6 days. Mean duration of hospital stay was 3 days.

.K. N. Ramesha et al<sup>[11]</sup> mentioned in their study that Median hospital stay was 4 days. Only 13 patients (9.6%) stayed in the hospital for more than 15 days. Karki RK, Risal A et al<sup>[16]</sup> mentioned Most of the cases were non fatal and were discharged from hospital within four days (62.1%).

From table number 5 we can conclude that:

Majority of victims survived and went home well n=48(96 %), overall mortality was n=2(4 %)..

Subash Vijaya Kumar et al<sup>[15]</sup> mentioned results of our study illustrate that a total of 2,226 patients were hospitalized due to acute poisoning in the hospital. Of these, 186 (8.3%) patients died due to poisoning.

K. N. Ramesha et al<sup>[11]</sup> in their study found that Total mortality was found to be 15.4% (21).

Zine KU, Mohanty AC et al <sup>[17]</sup> mentioned overall mortality was 11.3 percent insecticides were responsible for 58 percent of the deaths.

Bhoopendra Singh B et al <sup>[18]</sup> mentioned out of 192 patients 48 (15%) patients died.

Raizada A et al <sup>[19]</sup> mentioned The overall mortality was estimated to be 13.18% with 53.2% being caused by the consumption of aluminium phosphide

**Limitations:**

This study was conducted in a single tertiary care hospital and represents only a small population mostly rural.

**Conclusion:**

In this study total 50 patients of non-organophosphate poisoning were studied,29 patients were males and 21 patients were females,The mode of exposure was oral in all patients,Most patients survived .overall mortality was 4 %.Mean duration of hospital stay was 3 days.Most common poisoning was due to amitraz followed by phenyl compounds.

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