

## ORIGINAL RESEARCH

**Clinical profile of organophosphorus poisoning patients admitted at a tertiary health care center****Manisha Shantaram Bolke<sup>1</sup>, Manisha Shivshankar Wanjare<sup>2</sup>, Bhurke D.P.<sup>3</sup>**<sup>1</sup>Assistant Professor, Department of medicine Dr Shankarao Chavan Government Medical College & Hospital Vishnupuri Nanded, India.<sup>2</sup>Former senior resident, Department of Emergency Medicine, Bharat Ratna Atal Bihari Vajpayee medical College, Mangalwar Peth, Pune, India.<sup>3</sup>Professor &HOD Medicine, Dr. Shankarrao Chavan Government Medical College & Hospital - Vishnupuri, Nanded, India.

Received Date: 28/12/2022

Acceptance Date: 25/02/2023

**ABSTRACT**

**Background:** Acute pesticide poisoning has become major public health problem world-wide. Among pesticides organo-phosphorous compounds have become a boon to farmers to control pest and insects affecting plants and crops, and also the widespread use and easy availability of this toxic substances have resulted in many cases of accidental and suicidal poisoning. The aim is to find out demographic social and clinical profile which will help to reduce the risk of poisoning **Aim & Objective:** 1. To study incidence, clinical, social and demographic profile of organophosphorus poisoning patients. 2. To study the complication and outcome of organophosphorus poisoning patients. **Methods:** Study design: Cross sectional Observational Study. Study setting: Medicine ward of tertiary care center. Study duration: From 01/01/2019 to 30/06/2020. Study population: The study population included all the cases with OP poisoning admitted at a tertiary care center. Sample size: 107 **Results:** Most common age of presentation was 21-30 years with 52(48.60%) patients followed by 31-40 years 19(17.76%) patients. There were 78(72.9%) patients were male and the rest 29(27.1%) were female. Male: Female ratio was 2.69:1. A large no. of study patients were having Social and domestic problems 42(39.25%) followed by patients with other reasons like alcohol abuse, Chronic illnesses, Psychiatric disorders, Failure in examination etc in 20(18.69%). Most common mode of the poisoning was suicidal in 80.37% of the study patients followed by accidental in 15.89% cases. There were 3.4% case of homicidal OP poisoning. Most common symptom of the presentation was Excessive salivation in 77 (71.96%) followed by Nausea/ Vomiting 61(57.01%), while 43.93% patients were having breathlessness. Among different signs present in the study patients miosis was the most common 55(51.40%) followed by fasciculations 51(47.66%), bradycardia 48(44.86%), increased bronchial secretions 29(27.1%), neck muscle weakness in 28(26.17%). Oro nasal frothing was present in 9.35% of the study patients. Respiratory failure developed in 6(5.61%), 4 (3.74%) each suffered from Aspiration pneumonia and Circulatory collapse. Out of 107 study patients 93(86.92%) were alive after the treatment was given while rest 14(13.08%) succumbed to death. **Conclusion:** Our study outlines the various demographic groups susceptible to organophosphorus poisoning and the various factors responsible. Our study also highlights the importance of early presentation, reflected by our comparatively lower mortality rate. Health education of farmers and agricultural labourers is important for reducing incidents of poisoning.

**Keywords:** OP poisoning, Farmer, clinical and social profiles, complication, mortality

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## INTRODUCTION

Acute pesticide poisoning has become a major public health problem world-wide. Pesticides have been used extensively in agriculture since the 1950s, promoted as a tool without which developing countries could not develop & become self-sufficient. However, intentional and occupational poisoning from pesticides is a major problem with millions of cases and hundreds of thousands of deaths occurring each year [1]

Pesticide poisoning is a significant problem in India. Organophosphate causes most self-poisoning deaths in southern & central India. In parts of northern India, aluminium phosphide causes most deaths in epidemic that started two decades ago [2]

Organophosphorus compounds are principally used as pesticides, and their exposure is highly prevalent in developing countries, Toxic effects of organophosphorus compounds are associated with significant morbidity and mortality making it a major global clinical problem. Their ease of access and socio-cultural factors play an important role in the choice of organophosphorus compound as a self-poison. The incidence is higher in young, economically active group with a case fatality ratio of 4-30% [3-5].

The importance of pesticides in India can be understood from the fact that agriculture is a major component of the Indian economy. It contributes 22% of the nation's GDP and is the livelihood of nearly 70% of the country's workforce. In India, use of insecticides accounted for more than two thirds of the total pesticide consumption in the last decade. The potential adverse impact on human health from exposure to pesticides is likely to be higher in countries like India due to easy availability of highly hazardous products and low risk awareness.

Cases of acute organo-phosphorous poisoning cause significant morbidity and mortality worldwide especially in developing countries. There is no reliable estimate as to how many persons per year suffer from pesticide related health effects this is due to several reasons including lack of standardized case definition. Present study comprises cases of acute pesticide poisoning admitted in tertiary care center during study period.

## AIM AND OBJECTIVES

1. To study incidence, clinical, social and demographic profile of organophosphorus poisoning patients.
2. To study the complication and outcome of organophosphorus poisoning patients.

## MATERIAL AND METHODS

**Study design:** Cross sectional observational study

**Study setting:** Medicine ward of tertiary care center

**Study duration:** from 01/01/2019 to 30/06/2020.

**Study population:** The study population included all the cases with OP poisoning admitted at a tertiary care center

## INCLUSION CRITERIA

1. Patients with a history of acute organophosphorus poisoning of either sex and  $\geq 12$  years of age admitted to hospital in the study period were included in the present study.
2. All the patients who are willing to participate and given such written informed consent.

## **EXCLUSION CRITERIA**

1. Patients with chronic exposure to pesticide / organophosphorus poison were excluded.
2. Those patients referred to other hospitals were not included in this study.
3. Terminally ill patients and vitally unstable patients were excluded.

### **Approval for the study**

Written approval from the Institutional Ethics committee was obtained beforehand. Written approval of the Internal Medicine and related departments was obtained. After obtaining written informed consent from all patients with the definitive diagnosis of OP poisoning admitted to the medicine ward of a tertiary care center such cases were included in the study.

**Sample Size:** 107

### **Methods of Data Collection and Questionnaire**

Written informed consent for the participation in the study and counselling was done. Detailed history was taken and clinical examination was conducted. Necessary investigations were carried out and these findings were noted in case record form.

After approval by the ethics committee and written informed consent, the out-patients and patients admitted in ward, fulfilling the inclusion/exclusion criteria were enrolled in the study.

Diagnosis of acute organophosphorus poisoning was made on the basis of reliable history of organophosphorus compound consumption obtained from patients (if conscious) or from relatives and suggestive clinical picture (if unconscious).

Demographic factors such as age, sex, occupation, education and socioeconomic status were evaluated. Reasons for consumption such as social and domestic problems, marital friction, financial stress, unemployment and love affairs were evaluated. Previous history of alcohol abuse, psychiatric illness and chronic diseases were noted. Time interval for hospitalization was observed.

Patients were examined with special emphasis on level of consciousness, smell of poison, oro-nasal frothing, pulse rate, respiratory rate, blood pressure, size of pupils, cyanosis and fasciculation. Systemic examination was done to rule out any systemic disorder

On admission in casualty all contaminated clothes were removed and contaminated skin or portion of body soiled with vomitus or saliva was washed with soap and water. Adequate airway was maintained in unconscious patients and if necessary endotracheal intubation was done and ventilatory support was given.

In all patients routine investigation including complete blood count, urine examination, random blood sugar, blood urea, serum creatinine, serum bilirubin, serum alanine aminotransferases (ALT) and aspartate aminotransferases (AST) were done. Fundus, ECG, X-ray chest, ABG, blood culture and USG was done whenever necessary. Specific investigation like serum butyryl (pseudo) cholinesterase inhibition was analysed in each and every patient.

All patients were managed according to standard line of management with gastric lavage, decontamination, injection Pralidoxime, Inj. Atropine. Other necessary treatment was given according to the clinical condition of the patient whenever needed and in case of respiratory failure endotracheal intubation was done.

### **Data entry and analysis**

The data were entered in Microsoft Excel and data analysis was done by using SPSS demo version no 21 for windows. The analysis was performed by using percentages in frequency tables.  $p < 0.05$  was considered as level of significance using the Chi-square test

**RESULTS****OBSERVATIONS AND RESULTS****Table 1: Age distribution in the study subjects**

Age in Years	Number of patients	Percentage
Up to 20	11	10.28
21 to 30	52	48.60
31 to 40	19	17.76
41 to 50	13	12.15
51 to 60	9	8.41
>60	3	2.80
<b>Total</b>	107	100.00

Most common age of presentation was 21-30 years with 52(48.60%) patients followed by 31-40 years 19(17.76%) patients. Age >60 was the least common age of presentation with only 3(2.8%) patients. The mean age in the study patients was 32.66±11.91.

**Table 2: Sex Distribution**

Sex	Number of patients	Percentage
Male	78	72.90
Female	29	27.10
<b>Total</b>	107	100.00

There was male dominance in the study. 78 (72.9%) patients were male and the rest 29 (27.1%) were female. Male: Female ratio was 2.69:1.

**Table 3: Various risk factors for OP poisoning**

Risk factors	No. of cases	Percentage
Social and domestic problems	42	39.25
Marital friction	14	13.08
Financial stress/Job problems	14	13.08
Love affairs	7	6.54
Unknown reason	10	9.35
Others	20	18.69
<b>Total</b>	107	100.00

This table showed the various sociodemographic factors which were the reasons for OP poisoning as narrated by the study patients. A large no. of study patients were having Social and domestic problems 42(39.25%) followed by patients with other reasons like alcohol abuse, Chronic illnesses, Psychiatric disorders, Failure in examination etc in 20(18.69%). The least number of patients 7(6.54%) were having problems in love affair. Also, there were each 14 (13.08%) patients having problems of Marital friction and Financial stress/Job problems.

**Table 4: Mode of poisoning**

Mode of poisoning	Number of patients	Percentage
Suicidal	86	80.37
Accidental	17	15.89
Homicidal	4	3.74
<b>Total</b>	107	100.00

Most common mode of the poisoning was suicidal in 80.37% of the study patients followed

by accidental in 15.89% cases. There were 3.4% cases of homicidal OP poisoning.

**Table 5: Incidence of various symptoms among OP poisoning cases.**

Symptoms	No. of cases	Percentage
Nausea/ Vomiting	61	57.01
Abdominal pain	48	44.86
Excessive salivation	77	71.96
Giddiness	30	28.04
Breathlessness	47	43.93
Diarrhoea/loose motions	17	15.89

Most common symptom of the presentation was Excessive salivation in 77(71.96%) followed by Nausea/ Vomiting 61(57.01%). Abdominal pain was present in 44.86% while 43.93% patients were having breathlessness. Loose motions was the least common presenting complaint in 17(15.89%) of the study patients.

**Table 6: Incidence of various signs in the study cases.**

Signs	No. of cases	Percentage
Miosis	55	51.40
Fasciculation	51	47.66
Increased bronchial secretions	29	27.10
Bradycardia	48	44.86
Neck muscle weakness	28	26.17
Altered sensorium	4	3.74
Oro-nasal frothing	10	9.35

Most common sign was Miosis (51.40%) followed by fasciculations (47.66%) and bradycardia (44.86%). Increased bronchial secretions were seen in 27.10% of patients along with neck muscle weakness in 26.17% of patients.

**Table 7: Incidence of complications among OP poisoning patients.**

Complication	No. of cases	Percentage
Respiratory failure	6	5.61%
Aspiration pneumonia	4	3.74%
Circulatory collapse	4	3.74%
Peripheral neuropathy	3	2.80%
Cardiotoxicity	3	2.80%

In this study respiratory failure developed in 6(5.61%), 4 (3.74%) each suffered from Aspiration pneumonia and Circulatory collapse.

**Table 8: Outcome of the study patients**

Outcome	No. of cases	Percentage
Alive	93	86.92
Dead	14	13.08
<b>Total</b>	<b>107</b>	<b>100.00</b>

Out of 107 study patients 93(86.92%) were alive after the treatment was given while the rest 14(13.08%) succumbed to death.

## DISCUSSION

This hospital based, cross-sectional study was carried out in the Department of General Medicine at the Government tertiary health care center, which is an important referral center for management of acute agricultural pesticide poisoning.

Most common age of presentation was 21-30 years with 52(48.60%) patients followed by 31-40 years 19(17.76%) patients. Age >60 was the least common age of presentation with only 3(2.8%) patients. The mean age in the study patients was 32.66±11.91. In studies done by Gannur DG et al, Nigam M et al and Kar SM et al, highest incidence of poisoning was observed in young age group i.e. in 16-30 years [6-8]. There was male dominance in the study. 78(72.9%) patients were male and the rest 29(27.1%) were female. Male: Female ratio was 2.69:1. Our study showed male predominance in OP poisoning which was comparable to studies done by Khan FY et al and Raja KS et al[9,10]

A large no. of study patients were having Social and domestic problems 42(39.25%) followed by patients with other reasons like alcohol abuse, Chronic illnesses, Psychiatric disorders, Failure in examination etc in 20(18.69%). The least number patients 7(6.54%) were having problems in love affair. Also there were each 14 (13.08%) patients having problems of Marital friction and Financial stress/Job problems.

Risk factors for pesticide poisoning according to Vander hoek W and Konrodsen FV were young age, low socioeconomic status, unemployment, unstable emotional status, psychiatric disorders and alcohol abuse [11]

Most common mode of the poisoning was suicidal in 80.37% of the study patients followed by Accidental/Occupational in 15.89% cases. There were 3.4% cases of homicidal OP poisoning. Study done by Agarwal et al reported that 67.4% of the cases had the intention of committing suicide, 16.8% of the cases were the result of occupational exposure, and 15.8% of the cases were from accidental poisoning [12]

Most common symptom of the presentation was Excessive salivation in 77(71.96%) followed by Nausea/ Vomiting 61(57.01%). Abdominal pain was present in 44.86% while 43.93% patients were having breathlessness. Loose motions was the least common presenting complaint in 17(15.89%) of the study patients. Study done by Khan FY et al[9]. Reported that most common symptoms were excessive salivation (100%), agitation (87.5%), disturbances of consciousness (75%), abdominal pain (62.5%) and abdominal cramps (50%) which was comparable to our study.

Most common sign was Miosis (51.40%) followed by fasciculations (47.66%) and bradycardia (44.86%). Increased bronchial secretions were seen in 27.10% of patients along with neck muscle weakness in 26.17% of patients. Among different signs present in the study patients miosis was the most common 55(51.40%) followed by fasciculation 51(47.66%), bradycardia 48(44.86%), increased bronchial secretions 29(27.1%), neck muscle weakness in 28(26.17%). Oro nasal frothing was present in 9.35% of the study patients and the least common sign present was Altered sensorium in 4(3.74%) patients. Similar trend was noted in studies done by Gannur DG et al [13] and Muhammad IS et al.[14]

In this study respiratory failure developed in 6(5.61%), 4 (3.74%) each suffered from Aspiration pneumonia and Circulatory collapse and peripheral neuropathy developed in 3(2.8%), cardiotoxicity in 3(2.8%) . Studies done by Khan FY et al [9] showed much higher incidence of complications than present study.

Out of 107 study patients 93(86.92%) were alive after the treatment was given while the rest 14(13.08%) succumbed to death. Mortality in present study was much lesser as compared to

study conducted by Agarwal SB et al [12]

## CONCLUSION

Our study outlines the various demographic groups susceptible to organophosphorus poisoning and the various factors responsible. Maximum incidence of poisoning is found in younger age group with male predominance. Organo-phosphorous poisoning is more common among farmers and agricultural labourers. Health education of farmers and other agricultural labourers about precautions use and hazardous effects of organo-phosphorous compounds may help to reduce the incidence of OP poisoning. Our study also highlights the importance of early presentation, reflected by our comparatively lower mortality rate.

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