

# ORIGINAL ARTICLE

## ANALYSIS OF CASES OF ORGANOPHOSPHOROUS POISONING- A CLINICAL STUDY

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### ABSTRACT:

**Background:** Human deaths following poisoning are a matter of great concern. It has high mortality and morbidity. The present study was conducted to assess the organophosphorous poisoning with respect to age, gender, education status etc. **Materials & Methods:** This is a retrospective study conducted in department of forensic medicine in year 2015. Data of all patients with history and clinical findings of organophosphorous poisoning was retrieved from the department. A proforma was made and information such as name, age, gender, education status etc was recorded. **Results:** Out of 842 patients of OP poisoning, males were 516 and females were 326. The difference was significant (P- 0.05). Age group 0-10 years had 78 patients, 11-20 years had 204 patients, age group 21-30 years had 264 patients, age group 31-40 years had 240 patients and above 40 years had 56 patients. The difference was significant (P- 0.01). Out of 842 patients, 454 were illiterate, 210 had primary school education, 115 had high school education and 63 had education upto diploma or degree. The difference was significant (P- 0.04). 29% patients were from rural area whereas 71% were from urban area. The difference was significant (P- 0.01). 45% were farmers, 25% were labourer, 22% were housewives, 6% were students and 2% were businessmen. The difference was significant (P-0.01). Common symptoms like nausea/ vomiting (55%), excessive secretions (50%), muscular weakness (45%), diarrhea (34%), abdominal pain (43%), drowsiness (12%), crackles (72%), tachycardia (24%), bradycardia (22%) and hypotension (8%). Manner of poisoning was accidental in 85%, suicidal in 12% and homicidal in 3%. **Conclusion:** Lack of education, easy availability, cheapness and unemployment increases the OP poisoning. There should be more awareness among farmers and labourers about harmful effects of OP poisoning.

**Key words:** Organophosphorous, poisoning, tachycardia

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### INTRODUCTION

Human deaths following poisoning are a matter of great concern. It has high mortality and morbidity. It is a global matter occurring all over the world involving people of all age groups, both sex, from all economic and ethnic groups. The reason for poisoning can be accidental or intentional. It results into approximately 7 lacs death annually. About 345,000 occur from unintentional poisoning, and more than 370,000 from suicidal causes.<sup>1</sup>

WHO in year 2012 reported that more than 90% of fatal poisoning cases are seen in middle and low income countries i.e. the developing countries in general and agricultural countries in particular.<sup>2</sup>

Organophosphate (OP) compounds are universally used for pest control. It is estimated that there are over 3 million cases of OP poisoning per year worldwide with approximately 300,000 deaths. Majority of these occur in

agricultural countries. The estimated mortality rates with OPP in India are around 7-12%.<sup>3</sup>

Acute organophosphorus poisoning occurs after dermal, respiratory, or oral exposure to either low volatility pesticides such as chlorpyrifos, dimethoate or high volatility nerve agents like sarin and tabun. Inhibition of acetylcholinesterase at synapses results in accumulation of acetylcholine and overactivation of acetylcholine receptors at the neuromuscular junction and in the autonomic and central nervous systems.<sup>4</sup>

National Poison Information Centre India, reported that suicidal poisoning with house - hold agents such as OPs, carbamates, pyrethrinoids, etc. being cheap, highly toxic, capable of being taken along with food or drink and easily availability, is the most common modality of poisoning. Recent data from National crime bureau of India shows suicide by consumption of pesticides account for 14.7%,

14.4% and 10.9% of all cases of suicidal poisoning in the year 2012, 2013 and 2014 respectively.<sup>5</sup>

The present study was conducted to assess the organophosphorous poisoning with respect to age, gender, education status etc.

## MATERIALS & METHODS

This is a retrospective study conducted in department of forensic medicine in year 2015. Data of all patients with history and clinical findings of organophosphorous poisoning was retrieved from the department. A proforma was made and information such as name, age, gender, education status etc was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

## RESULTS

Table I shows that out of 842 patients of OP poisoning, males were 516 and females were 326. The difference was significant (P- 0.05). Table II shows that age group 0-10 years had 78 patients, 11-20 years had 204 patients, age

group 21-30 years had 264 patients, age group 31-40 years had 240 patients and above 40 years had 56 patients. The difference was significant (P- 0.01). Table III shows that out of 842 patients, 454 were illiterate, 210 had primary school education, 115 had high school education and 63 had education upto diploma or degree. The difference was significant (P- 0.04).

Graph I shows that 29% patients were from rural area whereas 71% were from urban area. The difference was significant (P- 0.01). Graph II shows that 45% were farmers, 25% were labourer, 22% were housewives, 6% were students and 2% were businessmen. The difference was significant (P-0.01). Graph III shows common symptoms like nausea/ vomiting (55%), excessive secretions (50%), muscular weakness (45%), diarrhea (34%), abdominal pain (43%), drowsiness (12%), crackles (72%), tachycardia (24%), bradycardia (22%) and hypotension (8%). Graph IV shows that manner of poisoning was accidental in 85%, suicidal in 12% and homicidal in 3%.

**Table I** Distribution of patients

Total - 842		
Male	Female	P value
516	326	0.05

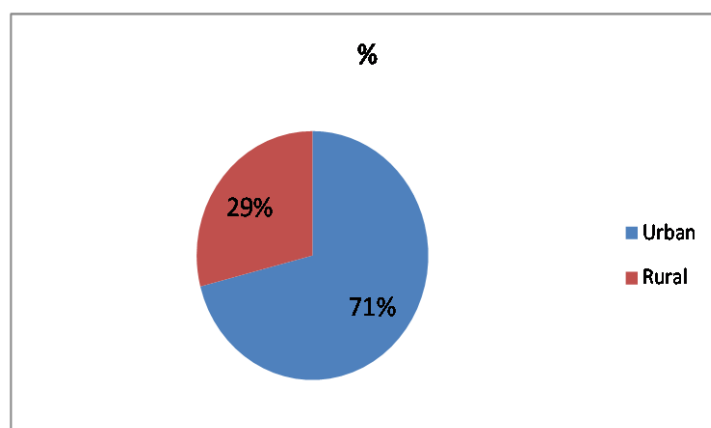
**Table II** Age wise distribution of patients

Age group (years)	Number	P value
0-10	78	0.01
11-20	204	
21-30	264	
31-40	240	
>40	56	

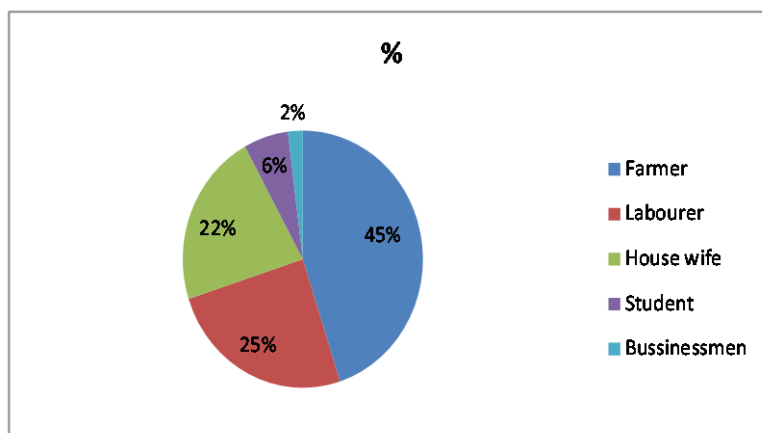
**Table III** Education status of patients

Literacy	Number	P value
Illiterate	454	0.04
Primary	210	
High	115	
Diploma/ Degree	63	

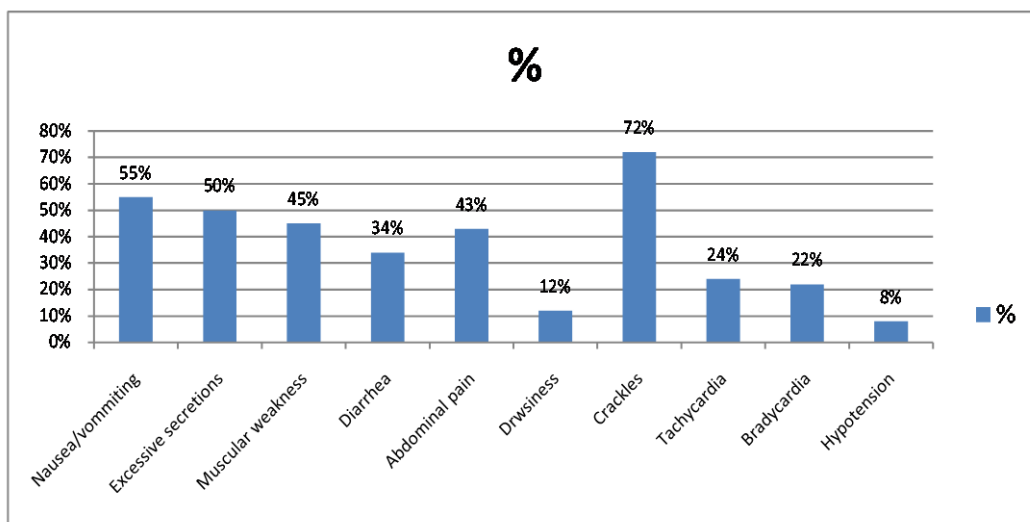
**Graph I** Area wise distribution of patients



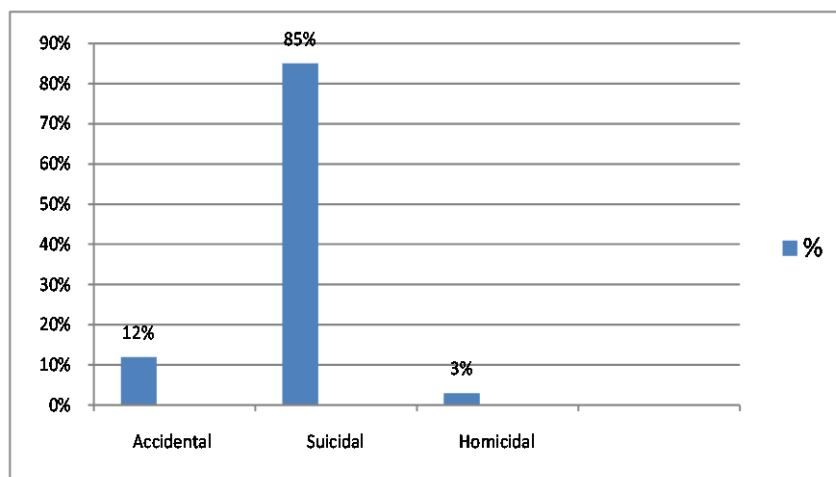
**Graph II** Occupation of patients



**Graph III** Clinical findings of patients



**Graph IV** Manner of poisoning



## DISCUSSION

Acetylcholinesterase inhibition by organophosphorus pesticides or organophosphate nerve agents can cause acute parasympathetic system dysfunction, muscle weakness, seizures, coma, and respiratory failure. Prognosis depends on the dose and relative toxicity of the specific compound, as well as pharmacokinetic factors.<sup>6</sup>

The study was conducted to assess the organophosphorous poisoning with respect to age, gender, education status etc. Our study consisted of 842 patients of OP poisoning in which males were 516 and females were 326. Vinay BS<sup>7</sup> in his study also found maximum of males with OP poisoning. We found that Maximum patients were seen in age group 21-30 years. This is in accordance to Vivek A.<sup>8</sup> We also analyze the education status of victims. Out of 842 patients, 454 were illiterate, 210 had primary school education, 115 had high school education and 63 had education upto diploma or degree. This is in accordance to Suliman et al.<sup>9</sup>

We found that 29% patients were from rural area whereas 71% were from urban area. Similar results were seen with Bawaskar.<sup>10</sup> In this study, 45% were farmers, 25% were labourer, 22% were housewives, 6% were students and 2% were businessmen. This is in agreement with the study of Srivastava et al<sup>11</sup> who found maximum of farmers with OP poisoning.

We found common symptoms like nausea/ vomiting, excessive secretion, muscular weakness, diarrhea, abdominal pain, drowsiness, crackles, tachycardia, bradycardia and hypotension.

Among reasons of poisoning common was suicidal followed by accidental and homicidal. This was similar to results of Edwin J et al.<sup>12</sup>

## CONCLUSION

Lack of education, easy availability, cheapness and unemployment increases the OP poisoning. There should be more awareness among farmers and labourers about harmful effects of OP poisoning.

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