

## Original Article

### Evaluation of cases of Organophosphorous Poisoning in study group- 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 in study groups. **Materials & Methods:** This study was conducted in department of forensic medicine. Data of all patients with history and clinical findings of organophosphorous poisoning was retrieved from the department. **Results:** Age group 21-30 years had 160 patients. 368 were illiterate, 120 had primary school education, 50 had high school education and 38 had education upto diploma or degree. The difference was significant (P- 0.01). Common symptoms were excessive secretions (52%), muscular weakness (50%), diarrhea (24%), abdominal pain (61%), drowsiness (34%), tachycardia (72%), bradycardia (24%) and hypotension (18%). The difference was significant (P- 0.01). Manner of poisoning was accidental in 78%, suicidal in 4% and homicidal in 18%. The difference was significant (P- 0.01). **Conclusion:** Maximum cases were seen in age group 21-30 years. Illiteracy is the main group to be effected.

**Key words:** Hypotension, Illiterate, Organophosphorous.

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#### INTRODUCTION

Organophosphate (OP) compounds have been used worldwide for pest control for over 100 years. 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. According to various studies.<sup>1</sup> National Poison Information Centre India, reported that suicidal poisoning with household agents such as organophosphorous (Ops), carbamates, pyrethroids, 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 15.2%, 14.8% and 11.1% of all cases of suicidal poisoning in the year 2012, 2013 and 2014 respectively.<sup>2</sup> 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>3</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. 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 8-10%.<sup>4</sup> The present study was conducted to assess the organophosphorous poisoning with respect to age, gender, education status etc.

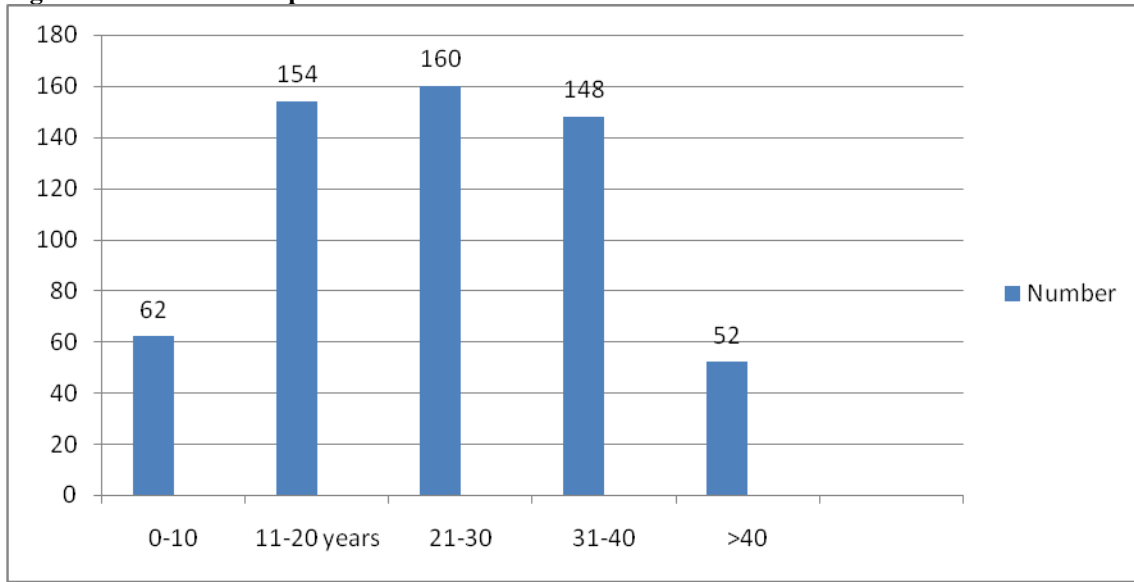
### MATERIALS & METHODS

The present study was conducted in department of forensic medicine. The purpose of the study was explained to the institutional ethical committee. After obtaining approval from the institute data of all patients with history and clinical findings of organophosphorous (OP) 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.

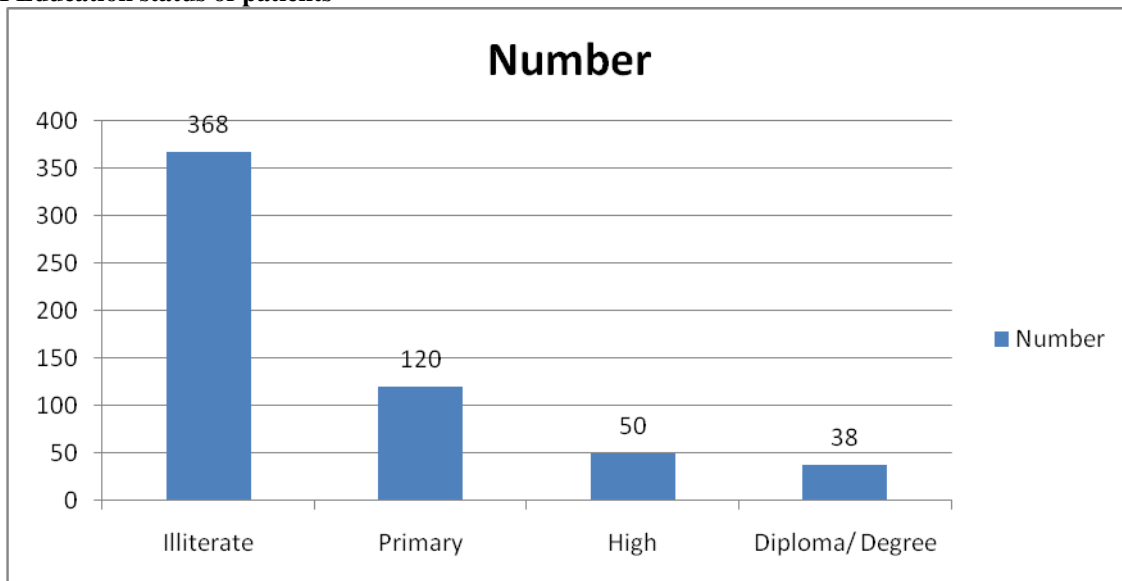
### RESULTS

**Graph I Age wise distribution of patients**



Graph I shows that age group 0-10 years had 62 patients, 11-20 years had 154 patients, age group 21-30 years had 160 patients, age group 31-40 years had 148 patients and above 40 years had 52 patients. The difference was significant (P-0.01).

**Graph II Education status of patients**



Graph II shows that 368 were illiterate, 120 had primary school education, 50 had high school education and 38 had education upto diploma or degree. The difference was significant (P- 0.01).

**Table I Clinical findings of patients**

Clinical features	Percentage	P value
Excessive secretions	52%	0.01
Muscular weakness	50%	
Diarrhea	24%	
Hypotension	18%	
Bradycardia	24%	
Tachycardia	72%	
Abdominal pain	61%	
Drowsiness	34%	

Table I shows common symptoms were excessive secretions (52%), muscular weakness (50%), diarrhea (24%), abdominal pain (61%), drowsiness (34%), tachycardia (72%), bradycardia (24%) and hypotension (18%). The difference was significant (P- 0.01).

**Table II Manner of poisoning**

Manner	Percentage	P value
Accidental	78%	0.01
Homicidal	18%	
Suicidal	4%	

Table II shows that manner of poisoning was accidental in 78%, suicidal in 4% and homicidal in 18%. The difference was significant (P- 0.01).

## DISCUSSION

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>5</sup>

Acetyl cholinesterase 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>

Out of 578 cases, age group 0-10 years had 62 patients, 11-20 years had 154 patients, age group 21-30 years had 160 patients, age group 31-40 years had 148 patients and above 40 years had 52 patients. Ashish et al<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. We also analyze the education status of victims. We found that 368 were illiterate, 120 had primary school education, 50 had high school education and 38 had education upto diploma or degree. This is in accordance to Manu et al.<sup>8</sup>

We found common symptoms like nausea/ vomiting, excessive secretion, muscular weakness, diarrhea, abdominal pain, drowsiness, tachycardia, bradycardia and hypotension. Selvaraj et al<sup>9</sup> found that 67% of poisoning cases were in the age group 21-40 years. The incidence was higher in males than in females. More than 50% of the

victims in our study were illiterates. 78% cases were from rural area. 85% cases belong to lower and middle class. Farmers (40%) were the major victims. Suicide was the most common manner of poisoning. Methyl parathion was the most common poison consumed (26.5%). Nausea and vomiting (88%) were the most common clinical features. Atropine psychosis (29%) was the most common complication. Mortality rate was 12%.

Prognosis depends on the dose and relative toxicity of the specific compound, as well as pharmacokinetic factors. Initial resuscitation, then atropine and oxygen, are considered to be the mainstays of treatment, although good quality studies to show benefit have not been found. The optimum dose of atropine has not been determined, but common clinical practice is to administer sufficient to keep the heart rate >80 bpm, systolic blood pressure above 80 mmHg, and the lungs clear. Glycopyrronium bromide may be as effective as atropine in preventing death, with fewer adverse effects, although no adequately powered studies have been done.<sup>10</sup>

Among reasons of poisoning common was suicidal followed by accidental and homicidal. Illiteracy, poverty, cheap and easy availability of the OP compounds, lack of employment and stressful life-style were the common reasons behind suicidal poisoning. Health education of farmers, other agricultural laborers and young people about the toxic and detrimental effects of OP compounds will help in preventing suicidal and accidental poisoning to some extent. This was similar to results of Neswu et al.<sup>11</sup>

## CONCLUSION

Maximum cases were seen in age group 21-30 years. Illiteracy is the main group to be effected.

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