

Demographic and Clinical Profile of Organophosphorus Poisoning cases in a Medical College Hospital, Tamil Nadu

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Abstract

Introduction: Poisoning is a global issue occurring all over the world involving people of all ages and gender, from all ethnic and economic groups. It is estimated that there are over 3 million cases of organophosphorus poisoning per year worldwide with approximately 300,000 deaths. 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.

Aims of the study: To assess the demographic patterns of OP poisoning with respect to age, sex, occupation, education, socioeconomic status.

Materials and Methods: A retrospective study was conducted in a tertiary care teaching hospital in Madurai, Tamil Nadu. Hospital records of patients with history and clinical features of OP poisoning in the year 2014 were reviewed.

Results and discussion: 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%.

Conclusion: 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 labourers and young people about the toxic and detrimental effects of OP compounds will help in preventing suicidal and accidental poisoning to some extent.

Key words: Poisoning, Organophosphorus compounds, Pesticide, Suicide, Farmers

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Introduction

Poisoning is a global issue occurring all over the world involving people of all age groups, both sex, from all economic and ethnic groups. It can occur in an accidental or deliberate manner. It is estimated that more than 700,000 deaths occur each year as a result of poisoning. About 345,000 occur from unintentional poisoning, and more than 370,000 from suicidal causes.^[1] According to WHO estimates, 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.^[2]

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.^[3,4] According to various studies

organophosphorus compound forms the commonest poisoning substance in Asia.^[5,6,7,8] Intentional and unintentional pesticide poisoning has been acknowledged as a serious problem in many countries, including China, India, Sri Lanka, and Viet Nam.^[9] The estimated mortality rates with OPP in India are around 7-12%.^[10]

According to data available from National Poison Information Centre India, suicidal poisoning with house-hold agents (OPs, carbamates, pyrethrinoids, etc.) is the most common modality of poisoning since it is cheap, highly toxic, capable of being taken along with food or drink and above all easily available.^[11] 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.^[12]

Aims of the study

1. To assess the demographic patterns of OP poisoning with respect to age, sex, occupation, education, socioeconomic status
2. To determine the common OP compounds used for poisoning.
3. To assess the common symptoms and complications

4. To assess the mortality rate

Materials and Methods

A retrospective study was conducted in a tertiary care teaching hospital in Madurai, Tamil Nadu. Hospital records of patients with history and clinical features of OP poisoning in the year 2014 were reviewed. In a pre-structured proforma, data regarding age, sex, area, education, socio economic status, manner of poisoning, type of OP compound consumed, clinical features, complications, and outcome of the patients were recorded.

Results & Discussion

In our study, two-thirds (67%) of poisoning cases were in the age group 21-40 years. 39% of the cases were in the 21-30 age group (Table 1) In the studies conducted by Edwin *et al.*,^[13] Dayanand *et al.*,^[14] Padmanaba *et al.*,^[15] and Subhash *et al.*^[16] 60-80% patient were in the 21-40 years age group with peak incidence between 21-30 years. The people in this age group are described to be most stressful, emotionally weak and vulnerable to minor conflicts, failures or disappointments during this phase of life. The incidence of poisoning was higher in males than in females (61% vs 39%) (Table 2) Similar trend was also observed by Edwin *et al.*,^[13] Dayanand *et al.*,^[14] Padmanaba *et al.*,^[15] and Subhash *et al.*^[16] However, the female to male ratio given by Ather *et al.*,^[17] is 1:1, Tall *et al.*,^[18] is 1:1.8 and Indranil *et al.*^[19] is 1: 1.38 which is quite different from present study.

More than 50% of the victims in our study were illiterates (Table 3). 78% cases were from rural area where agriculture is prevalent for which OP compounds are commonly used (Table 4). 85% cases belong to lower and middle class who are economically weaker sections with almost half of the cases (48.5%) in the lower class group (Table 5). Farmers (40%) and daily-wage labourers (21.5%) are the major victims (Table 6). Similar statistics were seen in the studies conducted by Dayanand *et al.*,^[14] Subhash *et al.*,^[16] Gupta *et al.*,^[20] Goel *et al.*,^[21] Chatterjee *et al.*^[22] and Dhaval *et al.*^[23]

Suicide was the most common manner of poisoning in our study. (Fig. 1) Studies conducted by Dayanand *et al.*,^[14] Padmanaba *et al.*,^[15] Subhash *et al.*,^[16] Indranil *et al.*^[19] and Dhaval *et al.*^[23] also show suicide as the most common manner of poisoning.

Methyl parathion was the most common poison consumed (26.5) followed by Chlorpyrifos (19.5) (Fig. 2). Methyl parathion was also the most common poison detected in the studies of Indranil *et al.*^[19] and Shivakumar S^[24]. Dimethoate was most common in the studies of Dayanand *et al.*^[14] and Tanveer *et al.*^[25] Chlorpyrifos in Edwin *et al.*^[14] and Dichlorvos in Subhash *et al.*^[16]

Nausea and vomiting (88%) was the most common clinical feature in our study. Crackles (69%) and miosis (68%) were present in more than two-third of the cases.

Excessive secretions (56%) and muscular weakness (55%) were present in more than half of the cases. Seizures were present in only 4% cases. (Table 7) Similar findings are observed in the studies of Edwin *et al.*,^[13] Dayanand *et al.*,^[14] and Indranil *et al.*^[19]

Atropine psychosis (29%) was the most common complication followed by pneumonia (18%) and Respiratory failure (15%). Intermediate syndrome occurred in 9% cases. Similar incidence of complications are also observed in the study of Edwin *et al.*^[13]

118 patients succumbed to poisoning in our study (Mortality rate – 12%). Similar mortality rates were also observed by Subhash *et al.*^[16]. Higher mortality rate was observed by Padmanaba *et al.* (25%)^[15] and Dayanand *et al.* (21.25%)^[14] Low mortality rate of 5.2% was seen by Dhaval *et al.*^[23]

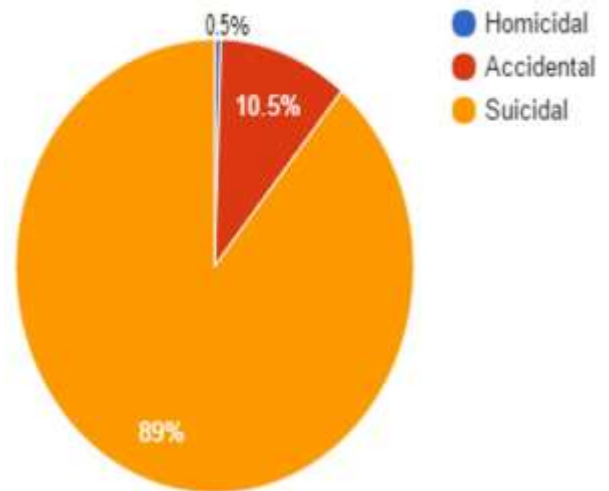


Fig. 1: Manner of Poisoning

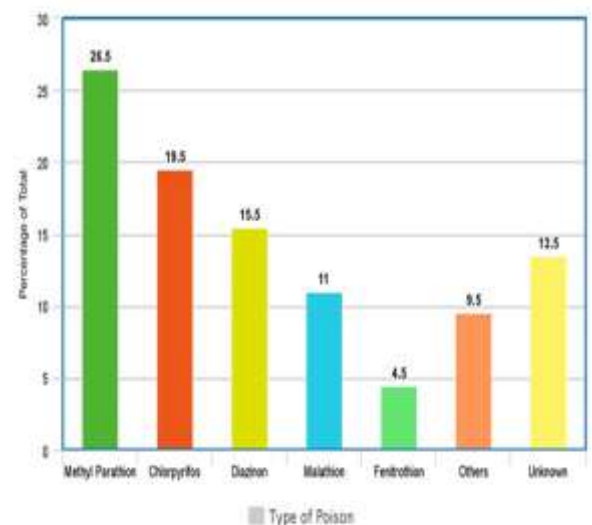


Fig. 2: Type of Poison

Table 1: Age wise distribution

Age in years	Number	%
< 10	10	1
10 – 20	216	22
20 – 30	383	39
31 – 40	275	28
41 – 50	64	6.5
> 50	34	3.5

Table 2: Sex distribution

Sex	Number	%
Male	599	61
Female	383	39

Table 3: Educational status

Literacy	Number	%
Illiterate	511	52%
Primary school	241	24.5
High school	187	19
Diploma/Degree	43	4.5%

Table 4: Area wise distribution

Domicile	Number	%
Rural	216	78
Urban	766	22

Table 5: Socioeconomic status

SES	Number	%
Upper class	147	15
Middle class	358	36.5
Lower class	475	48.5

Table 6: Occupation

Occupation	Number	%
Farmers	393	40
<u>Labourers</u>	211	21.5
House wives	201	20.5
Students	93	9.5
Business man	15	1.5
Unemployed	39	4
Others	30	3

Table 7: Clinical features

Clinical features	Our study	Edwin et al [13]	Devanand et al [14]	Indrani et al [19]
Symptoms				
Nausea & vomiting	88%	75%	-	85.02%
Excessive secretions	56%	44%	57.5%	35.95%
Muscular weakness	55%	-	-	-
Diarrhea	39%	50%	30%	23.96%
Abdominal pain	33%	-	28.75%	47.93%
Altered sensorium/ Drowsiness	29%	38%	36.25%	27.99%
Seizures	4%	3%	3.75%	7.85%
Signs				
Crackles	69%	66%	-	-
Miosis	68%	60%	76.25%	91.94%
Tachycardia	28%	24%	-	8.26%
Hypertension	26%	20%	-	8.98%
Bradycardia	23%	25%	-	37.19%
Hypotension	11%	5%	-	-

Conclusion

1. Majority of patients fall in the 21-30 age group
2. Males were more common victims
3. Majority of cases involve rural population, low class people and illiterates
4. Farmers were the most common occupation involved
5. Suicide was the most common manner of poisoning
6. Methyl parathion was the most common poison consumed
7. Nausea and vomiting were the most common clinical features
8. Atropine psychosis was the most common complication
9. Mortality rate was 12%

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. Enhancing the personnel training and facilities

available at rural levels to render immediate and quality management will help to reduce mortality and morbidity. Last but not the least is the implementation of the pesticide act stringently and ensuring strict vigilance over its availability

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