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Original Research Article

A prospective analysis of organophosphorous poisoning at a Tertiary Care Hospital Vijaywada

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ABSTRACT

This study provides a comprehensive prospective analysis of organophosphorus poisoning cases at a tertiary care hospital in Vijayawada. A total 75 cases of Organophosphorus compound poisoning were analysed during a one-year period from March 2022 to February 2023. The Research focuses on Prevalence, Demographic patterns, Clinical Presentations, and treatment outcomes of patients affected by OP poisoning. The findings underscore the urgent need for public health initiatives to reduce the incidence and improve management of OP poisoning in the region. Young male population of rural background, particularly agricultural workers was the commonest patients (57.3%). The most common motive of poisoning was with a suicidal intent, both in males (38.6%) and females (30.6%), and highest number of patients consumed Dichlorvos (50.6%). Financial crisis was one of the most common reasons analysed as the motive behind the poisoning (57.3%). Sixty-two members (82.6%) patients recovered and Thirteen (17.3%) expired. Study concluded that major cause of death in these cases was respiratory failure followed by multi-organ failure.

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1. Introduction

Organo phosphorus compound, a common pesticide used in agriculture for crop protection and pest control, is often implicated in accidental and suicidal poisoning in India.¹ It's extensive use and easy accessibility has increased the chances of poisoning with these compounds.

It is a common toxicological emergency and acts by inhibiting the enzyme cholinesterase, results in accumulation of acetylcholine at synapses and myoneural junction leading to cholinergic over activity and is encountered in the Vijayawada. It is mainly familiar among

the rural agricultural workers which include a substantial group of the population of this region.

As per WHO estimation that approximately 3 million pesticide poisoning occurs worldwide and cause more than 2,20,0000 deaths annually. Developing countries like India and Sri Lanka report alarming rates of toxicity and death. Suicidal poisoning with Organophosphorus compound is seen with increased frequency and carries 4-30% mortality in Indian studies. The common clinical presentations experienced by patients are Nausea and vomiting, Abdominal pain, Muscle twitching and Respiratory distress and based on the severity the treatment outcomes vary that includes Atropine, Pralidoxime, Mechanical

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Ventilation. Respiratory failure is a common complication of Organophosphorus poisoning which is responsible for a high mortality, so timely effective treatment is crucial for survival. Recovery rate is higher if treated early on time and Mortality rates are less based on the type and quantity of OP poison consumed.

In India OP Poisoning remains one of the medical emergency admissions in hospital.²

The demographic profile, the geographical terrain and the distribution of health care facilities is quite different in Vijayawada as compared to other region of the country.^{3,4} Despite the known dangers, there is a limited prospective data on the epidemiology and clinical outcomes of OP Poisoning in this area. Since there is a paucity of Literature regarding Organophosphorus compound poisoning in Vijayawada, this particular observational study was undertaken.

2. Aim

The Present study aims to fill the gap by providing a detailed analysis of OP Poisoning cases at tertiary care hospital in Vijayawada.

3. Objectives

To Determine the Prevalence of OP Poisoning among patients admitted in tertiary care hospital in Vijayawada

To analyse demographic characteristics and evaluate the clinical presentations and outcomes of patients with OP Poisoning.

4. Materials and Methods

- 1. Study Sample:** A total 75 cases of Organophosphorus compound poisoning were analysed. Clinical course of the cases was monitored and documented.
- 2. Study Period:** The present study was conducted for a period of 1 Year March 2022 to February 2023
- 3. Study Settings:** This study was conducted in Government General Hospital as well as tertiary care hospital Vijayawada.
- 4. Study design:** This is A prospective observational study

4.1. Inclusion criteria

Patients between the age groups of 10-70 years are who have consumed poison are who are willing to participate and ready to give consent were included in study.

4.2. Exclusion criteria

Patients above 70 years and who did not consume op poisoning and who are not willing to participate and refusing to give consent were excluded.

4.3. Study procedure

The data was collected from all poisoning cases admitted through emergency or Causality department, within 24 hours of exposure and in a detailed proforma as per the history given by patient / patient representative with particular importance being given to demographic details of the patient like age, sex, socio economic status, occupation, intention of poisoning, type of compound and its quantity consumed, place from referral and final outcome. All data were analysed, documented and interpreted as per the laid down protocol.

4.4. Statistical analysis

The data were analysed using Microsoft excel and Prism Graph pad.

5. Results

Table 1: Demographic & socio-economic profile of patients (N=75)

Age in years	Number	Percentage
10- 20	11	14.6%
20-30	40	53.3%
30-40	12	16%
40-50	8	10.6%
50-60	3	4%
Above 60	2	2.6%
Total	75	100
Sex	Number	Percentage
Male	43	57.3%
Female	32	42.6%
Total	75	100
Educational status	Number	Percentage
Illiterates	39	52%
Up to High school	22	29.3%
Up to Intermediate	10	13.3%
Up to Graduation	3	4%
Occupation	Number	Percentage
Agricultural workers	36	48%
House wives	17	22.6%
Labourers	12	16%
Students	7	9.3%
Others	3	4%
Total	75	100
Socio-economic status	Number	Percentage
Lower class	42	56%
Middle class	23	30.6%
Upper class	10	13.3%
Residence	Number	Percentage
Rural	57	76%
Urban	18	24%
Total	75	100

Table 2: Intention of poisoning (N=75)

Manner	Number (Male)	Percentage	Number (Female)	Percentage
Suicidal	29	38.6%	23	30.6%
Accidental	11	14.6%	8	10.6%
Homicidal	3	4%	1	1.3%
Total	43	57.2%	32	42.5%

Table 3: Types of poison consumed (N= 75)

Type of poison	Number	Cases%
Dichlorvos	38	50.6%
Methyl parathion	18	24%
Malathion	13	17.3%
Others	6	8%
Total	75	100

Table 4: Reason and outcome for consuming poisoning (N=75)

Reason	Number	Percentage
Financial	43	57.3%
Domestic	24	32%
Unspecified	8	10.6%
Total	75	100
Outcome	Number	Percentage
Survived	62	82.6%
Expired	13	17.3%
Total	75	100

6. Results

A total 75 cases of Organophosphorus compound poisoning were registered during the study period, March 2022 to February 2023. The age of patients varied from 1- 70 years.

The majority of patients, according to gender distribution were male (57.3 %) between the age group of 21-30 years. Persons of lower socio-economic status and lower middle class were the commonest patients (56%) and (30.6%) respectively. Most of the patients were either illiterate (52%) or educated up to high school (29.33%) and mainly belonging to rural areas (76%) (Table 1) Occupation wise agricultural workers were on top of the list (48%) followed by house wives (22.6%) and labours (16. %) (Table 2). It was observed in our study that highest number of patients consumed Dichlorvos (50.6%), followed by Methyl parathion (24%), the least consumed compound was Others (8%). (Table 3) The commonest motive of poisoning was suicidal in both males (57.3%) and females (42.6%), followed by accidental (14.3%). Homicidal poisoning was observed in 3 (4%) in males and females observed in 1 (1.33%) cases only (Table 4). Financial problem was one of the commonest reasons of poisoning (57.3%). The mortality rate in our study was 13.44%; it was fairly low because the majority of patients reached our hospital well within the fatal period. Respiratory failure was the leading cause of death in our study, followed by multi-organ failure. Acute

complications were noted very frequently and were related to morbidity and mortality.

7. Discussion

Acute Organophosphorus compound poisoning is one of the commonest cause of acute poisoning in Vijayawada with high mortality, particularly among the agricultural workers. The probable cause of high mortality are depending on the variety of factors such as easy availability of the poison, large group of agricultural population, socioeconomic status of the population and stressful life, particularly of youth. Incidence of cases are majorly seen in male (55.16%) and they were in age group of 21 to 30 years (43.81%); similar observations were noted in other studies.⁵

In our study among the Organophosphorus compounds, Dichlorvos was the most commonly consumed Poison (50.6%), although Diazinon was the most commonly used compound in another study as reported by Singh et al. In present study the most common motive of poisoning was with a Suicidal intention and the higher number of victims were agricultural workers (51.07%), residing specifically in rural areas. Studies suggest that Organophosphorus compound as an insecticides, pesticides and fungicides was more in rural areas than urban especially pesticide poisoning was responsible for 30% of the global fatalities, in addition to majority of suicide emergency care admissions in developing countries.⁶⁻⁸

Thungs et al also reported incidence of death (6.3%) to be higher in participants having taken >30ml compound than those with <30ml intake (2.7%) during acute OP poisoning episode.⁹

One more study showed that 75% of poisonings occur among economically weaker sections, which mainly reside in rural areas. Accidental poisoning in our study was mainly seen in children due to accidental ingestion and in adults due to accidental exposure.^{10,11}

In our study the mortality rate was 17.3%, which was is quite low because the majority of the victims received treatment in the EMS 108 ambulance which provides primary care treatment to patient within half an hour, hence the survival rate was higher in our study.

Similarly, one more study conducted in Eastern Ethiopia, identified in the community level of awareness is very low regarding pesticide use.^{12,13}

Zaheer et al., found that most people believe that poison terminates life with minimal suffering.^{14,15}

Most commonly used insecticides for poisoning were Methyl Parathion and Dichlorvos which is part of OP poisoning and this is consistent with other studies carried out in Nepal.¹⁶⁻¹⁸

Poisoning due to inhalation cases are less when compared with oral intake which is a major intake of OP Poisoning similar to our study.¹⁹

It has been observed that incidence of death was found to be significantly more in those patients in whom a greater time interval had elapsed between consumption of the poison and hospitalization.

8. Conclusion

This Prospective analysis of organophosphorus poisoning is one of the most common poisonings in and around the rural areas of Vijayawada, predominantly in the young population with a male predominance, belonging to low socioeconomic class. The commonest motive of poisoning was suicidal. Lack of education, poverty, cheap and readily easy availability of the Organophosphorus compounds, unemployment and stressful life were the common reasons behind the reason of poisoning. Hence education amongst the agricultural workers and youth about the harmful and deleterious effects of Organophosphorus compounds and up gradation of the primary health centre facilities to render immediate management of Similarly strict implementation of the pesticide act and involving a new policy by the government to educate the public and youth in large about the dangerous, life threatening effects of Organophosphorus compounds could help ameliorating the harmful effects of such poisoning.

9. Recommendations

Implement public health education programs about the dangers of OP compounds, strengthen mental health services to address underlying causes of intentional poisoning.

Conduct further research to monitor the long-term trends and effectiveness of intervention strategies.

10. Ethical Approval

The study was approved by the Institutional Ethics Committee

11. Source of Funding

None.

12. Conflict of Interest

None.

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