

CLINICO-EPIDEMIOLOGICAL STUDY OF ORGANOPHOSPHATE POISONING AT A TERTIARY CARE CENTRE IN TAMIL NADU

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ABSTRACT

BACKGROUND

There has been a marked increase in organophosphate poisoning in developing countries due to its wide spread use. The main objective of the study is to analyse the clinico-epidemiological aspects of OPC poisoning in detail which includes history, social factors, sex predilection, clinical symptoms, time needed to seek medical intervention, complications and outcome.

MATERIALS AND METHODS

This is a cross sectional observation study done on patients admitted with OPC poisoning at Omandurar Medical College and Government Kasturba Gandhi Hospital for a duration of 6 months from December 2017 to May 2018.

RESULTS

80 cases were studied. Most of the patients belonged to age group 20-50 years with males more commonly associated with poisoning. Suicide was the main cause of poisoning and oral ingestion the common mode. Almost all patients were illiterate. Most patients sought medical attention within 12 hours of consumption of poison and mean hospital stay was less than 1 week. Muscarinic symptoms were present in all patients and more than two third of the patients who received standard treatment protocol survived.

CONCLUSION

The incidence of OPC poisoning is increasing. There is need for strengthening of the surveillance system for OPC poisoning. Surveillance should be strengthened in both the public and private sector facilities. It is important to design an appropriate health education programme for the prevention of both suicidal and accidental OPC poisoning.

KEYWORDS

Organophosphate poisoning, sociodemographic, suicide, surveillances.

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BACKGROUND

Organophosphate poisoning is a major public health problem in developing countries, resulting in significant morbidity and mortality.¹ Organophosphorus (OP) compounds are used as pesticides, herbicides, and chemical warfare agents in the form of nerve gases (Sarin gas) and as therapeutic agents, such as ecothiopate used in the treatment of glaucoma.^{2,3} There has been a marked increase in organophosphate poisoning in developing countries due to the widespread use, which makes it readily available and leads to indiscriminate handling and storage accompanied by lack of awareness of the consequences of poisoning.⁴ Acute OP poisoning is a medical emergency and the patients are invariably admitted to the hospital through emergency services. The poisoning may be suicidal, accidental or

homicidal. Accidental organophosphate poisoning may occur through inhalation while spraying pesticides on crops. Because the OP compounds are readily available and relatively cheap and have a rapidly lethal action even in smaller doses, they are widely used as suicidal poisons.⁵ The best-known effect of the OP compounds is inhibition of acetylcholinesterase (AChE), which causes the accumulation of acetylcholine in GABA and glutamate systems, N-Methyl-D-Aspartate (NMDA) receptors.⁶

Patients exhibit muscarinic and nicotinic symptoms based on the severity of the compound. Poisoning with these compounds is very serious and requires treatment in intensive care unit as they present with life-threatening complications and may result in mortality. There was always correlation with type of compounds, prehospitalization period, and the type of management, and they are useful for preventing the mortality rate in developing countries such as India.⁷ Treatment includes early resuscitation with oxygen, airway protection, gastric lavage, intravenous fluids, muscarinic antagonist such as atropine, and acetylcholinesterase activator such as PAM.

Although extensive data is available regarding the pattern of OP poisoning in India, there is only little information regarding the victim profiles and the factors

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which influence mortality in southern India. The present study aimed to analyse the patterns, the social and epidemiological factors and the clinical outcomes of OP poisoning in this region.

Objectives

To study the clinical aspect of OP poisoning in detail with hospital stay, clinical course, complication, and recovery, mortality in OP poisoning and to have a complete clinico-epidemiological profile all the OPC poisoning cases admitted under the department of Internal Medicine.

MATERIALS AND METHODS

Methodology

This is a cross sectional observational study conducted in Govt Omandurar Medical College and Government Kasturba Gandhi hospital for a duration of 6 months from December 2017 to May 2018.

Sampling Method

Convenient sampling technique was used.

Inclusion Criteria

All patients getting admitted in medical wards and intensive care unit under department of general medicine with history of OPC poisoning were included in the study.

Exclusion Criteria

Patients with history of consumption or exposure to entirely different compound other than OPC, patients with OPC poison mixed with any other poison are excluded from the study.

A total of 80 patients were included in the study. The diagnosis of the poison which was consumed was based on reliable information from the victim, his/her relatives and friends and also from the police. Examination of the container from which the poison had been consumed and the clinical findings were also noted.

Details regarding age, sex, name, address, marital status, occupation, socioeconomic class, psychological problems, family history, major illness, etc. were taken into consideration. Detailed history regarding poison such as name of poison, quantity, route, intention, mean time delay, type, and site was noted in each case.

General and systemic examinations with detailed clinical examination of respiratory system, cardiovascular system, alimentary system, and central nervous system were done in all cases. Also, the need for mechanical ventilation and duration of in hospital stay and outcome were recorded.

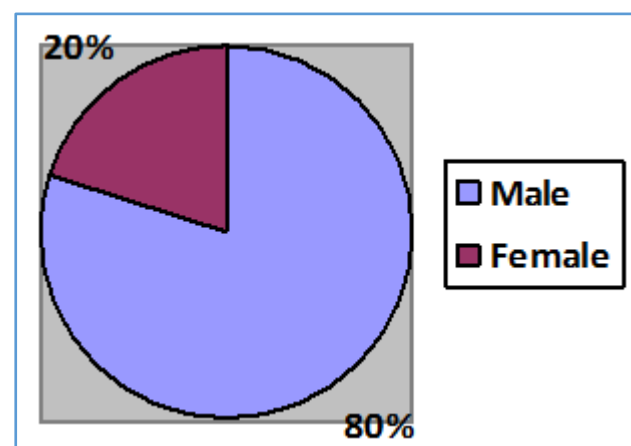
Statistical Analysis

Data analysis was done using SPSS software V16. The results are expressed as percentage prevalence.

RESULTS

A total of 80 patients were studied.

Most of the patients were men around 80% (n=64) when compared to women who constituted 20% of the patients (16).



Graph 1

Highest number of cases were between the age group 20-30 years which constitute around 37.5% of total patients

Age Group in Years	No. of Patients	Percentage
<20	6	7.5
20-30	30	37.5
31-40	14	17.5
41-50	18	22.5
>50	12	15.0

Table 1

Most of the patients admitted belonged to rural population 65% when compared to urban population 35%. Also, most patients were illiterate 87.5%.

Region	Patients	Percentage
Urban	28	35%
Rural	52	65%

Table 2. Regional Distribution

Education	Patients	Percentage
Illiterate	70	87.5%
Literate	10	12.5%

Table 3. Educational Status

87.5% of patients who were diagnosed with OPC poisoning had suicidal intention and the commonest route of poisoning was oral which accounted for 95% of cases.

Intention	Patients	Percentage
Suicidal	70	87.5%
Accidental	10	12.5%

Table 4. Intention

Route	Patients	Percentage
Oral	76	95%
Inhalational	4	5%

Table 5. Route of Poisoning

The type of OPC compound most commonly used as poison were Chlorpyrifos 25% followed by Monocrotophos 17.5% and Profenofos 12.5%.

Compound	Patient	Percentage
Monocrotophos	14	17.5
Dimethoate	8	10
Triazofos	6	7.5
Chlorpyrifos	20	25
Profenofos	10	12.5
Phorate	12	15
Quinalphos	10	12.5

Table 6. Type of Compound

Time elapsed between poison intake to start of treatment varied between 30 minutes to 12 hours and most of the patients reached between 2 to 6 hours.

Time Interval between Consumption to Admission (hrs.)	Patient	Percentage
<2	18	22.8
2-6	56	70
6-12	6	7.5

Table 7. Time Interval

We observed that muscarinic symptoms were more common than nicotinic symptoms. Among muscarinic symptoms, nausea and vomiting were present in all cases. Other symptoms in decreasing order were perspiration and incontinence of stool and urine (57.5%), abdominal pain (10%), altered sensorium (20%), seizure (5%), respiratory failure (17%) and miosis (37.5%).

Around 17.5% of patients required ventilator support during the stay in hospital.

Most of the patients had less than one week of hospital stay (87.5%). We found that around 82.5% patients survived, death occurred in 7.5% of patients and 10% of patients were discharged against medical advice.

DISCUSSION

OP Poisoning is common in India, as ours is an agriculturally based society and as the OP compounds are easily available at a cheap rate. Organophosphates are the commonest class of pesticides which have been implicated in cases of poisoning.

In our study we see that male patients were more involved (80%) in poisoning than females (20%). s. Whereas the finding by Banerjee et al.⁸ showed that female subjects are more commonly involved. A South African surveillance study over a decade ago, which reported 67% of cases being men.⁹

Maximum incidence of OP poisoning was in between 20 and 50 years' age group, which is comparable to the study by Emerson et al.¹⁰ which shows 95% cases in 30–50 years' age group and the lowest incidence in extremes of ages.

The present study had more number of patients from rural population 65% when compared with urban, because in India agriculture is the main occupation of rural population and OPC is the most commonly used pesticide. In a study by Kora S.A et al.¹¹ there were more number of urban cases when compared to rural because the study was conducted in an urban based institution.

The present study has more number of illiterate's 87.5% when compared to literates. This could be explained on the basis that more number of rural cases lead to more number of illiterate patients.

This study found out that 87.5% of cases of OPC poisoning were suicidal which is similar to study conducted by Kar S. M et al.¹² in which almost 100% of patients with poisoning were having suicidal intention. The majority of the suicide attempt group required prolonged ICU permanence. The high incidence of suicide attempts and the high morbidity and mortality related to these cases suggest that preventive strategies to reduce suicide should be addressed to these chemicals, aiming the reduction of the indiscriminating access to these potent toxic agents.

The most common mode of poisoning was ingestion of OPC 95% when compared to other routes. This can be explained by the increased rates of suicidal intention with OPC poisoning. The reasons for the suicide in males may include lack of employment, poverty, urbanization and various other stress related factors. In females, it may be due to marital disharmony.

Most of the patients reached hospital within 6 hours of poisoning but in those who got delayed in seeking medical attention the prognosis was poor which is similar to other studies.¹³

This study shows that muscarinic effects predominates and appears first and then nicotinic effects. Study by Emerson et al. shows that muscarinic symptoms were found in 92% cases. Miosis is a good clinical sign to diagnose OP poisoning, which is also comparable with CHA study that showed 64%.

In our study miosis was found in 37% of patients. Nicotinic symptoms appear late, and that indicates progression of disease process. Convulsion occurred in 5% of patients in this study. The mean hospital stay was 5.17 days, with a majority of the cases staying for 3 to 7 days in the hospital (87.5%) which is similar to the study conducted by Kora S. A et al.¹¹

In our study, nearly, more than two-thirds of patients survived (82%), which is comparable with the study by Gohel et al.¹⁴ in which 70% patients recovered and 27% expired. For those patients who have passed the acute phase, chances of survival are better in them.

CONCLUSION

As agricultural industries are growing, OP poisons are widely used as insecticides. The incidence of poisoning is

increasing. It affects mainly the young population. Males are at higher risk of poisoning. Alcohol is a major contributor for ingestion of poison. Increasing indebtedness, fear of failing in different aspects, stress of the society are major reasons of suicide. The mortality in patients with OP compounds is high even if antidotes are available. There is need for strengthening of the surveillance system for OPC poisoning. Surveillance should be strengthened in both the public and private sector facilities, and there must be intersector collaboration to properly monitor the problem. It is also more essential to strengthen the preventive measures like educating people through drug awareness programmes, promoting poison information centers, introducing separate toxicology units in hospitals and upgrading the peripheral health centers to manage the cases of OP poisoning in an emergency. So, to conclude, it is important to design an appropriate health education programme for the prevention of both suicidal and accidental OP poisoning for the benefit of the public at large.

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