

## Original Article



# Profile of Organophosphorus Poisoning

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### Abstract

**Background :** Self poisoning with organophosphate pesticides is a major health problem in world wide. Organophosphorus compound poisoning is a very common toxicological emergency encountered at Mirzapur in Tangail. It is particularly common among the rural agricultural worker's which comprise a substantial group of the population of this region. **Objective:** The objective of this study was to find out the incidence, frequency, pattern of poisoning, outcome and aetiological aspect of Organo phosphorus poisoning patient admitted in Kumudini Women's Medical college Hospital. **Methods:** A total 366 cases of OPC poisoning were analysed during 1 year from January 2015 to December 2015. The emphasis was given on age, sex, socio-economic status, occupation, motive of poisoning, types of compound consumed its quality, place, distance from referral place and the ultimate outcome. **Results:** Young population of rural background, particularly agricultural workers were the commonest patients (51.91%). The most common motive of poisoning was with a suicidal intent, both in males (27.59%) and females (66.39%). Financial crisis was one of the most common reasons analysed as the motive behind the poisoning (54.20%). Three hundred forty four Patients recovered and 22 were expired. The major cause of death in these cases was respiratory failure followed by multi-organ failure. **Conclusion :** Strict 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 compound could help ameliorating the harmful effects of such poisoning.

**Key words:** Organophosphorus compound poisoning, Suicidal, Insecticide, Respiratory failure.

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### Introduction

Poisoning is one of the commonest causes of admission of young adults in the medical ward in Bangladesh. Most of such events are really not to commit suicide and the patients do not repeat such attempt. Self poisoning is commonly a cry for help. 'If the patients recover from the acute effect, the long term prognosis is good. So it is better called deliberate self harm' or 'self poisoning' rather than attempted suicide or parasuicide, as the word suicide gives negative impression for the patients and among health care workers or relatives of the patients. Apart from infections, self poisoning is the common easily managed fully reversible conditions in medical wards. Thus, considering the common occurrence relatively younger age of patients with fully curability of the condition, the successful management of poisoning should be given the top priority by all the doctors. Organophosphate is one of the commonest poisons consumed as it is easily available. Organophosphates (OP) are used as insecticides in agricultural and domestic settings throughout the world Organophosphorus

compound, a common pesticide used in agriculture for crop protection and pest control, is often implicated in accidental and suicidal poisoning. Its wide spread use and easy availability has increased the chances of poisoning with these compound. The mechanism of action is through the inhibition of the enzyme acetyl-cholinesterase, leading to the accumulation of acetylcholine at cholinergic synapses. The excess acetylcholine causes constant acetylcholine receptor triggering, resulting in malfunction of the autonomic, somatic and central nervous systems.<sup>1</sup> WHO estimated that approximately 3 million pesticide poisoning occurs world wide and cause more than 2,20,000 deaths per year. Developing countries report alarming rates of toxicity and death. Developing countries like India, Bangladesh and Sri Lanka report alarming rates of toxicity and death.<sup>2</sup> In Bangladesh poisoning is an important health problem causing around 2000 death per year.<sup>3</sup> Self poisoning constitutes more than half of the total poisoning cases admitted in hospital.<sup>4</sup> Suicidal poisoning with OPC is seen

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with increasing frequency and carries 4-30 % mortality in Bangladesh studies.<sup>5</sup>

Clinical manifestations of OPC poisoning lead to acute cholinergic crisis. Although parasympathetic over stimulation tends to predominate, the over stimulation of nicotinic receptors due to excess acetylcholine can lead to sympathetic over stimulation as well. A second manifestation is the intermediate neurotoxic syndrome-characterised by cranial nerve palsies, weakness of the neck and proximal limbs and respiratory paralysis. Respiratory failure is a common complication of OPC poisoning which is responsible for a high mortality.

The present study was conducted with the objective of determining appropriate planning, prevention and management techniques and assessing the pattern and outcome of poisoning cases admitted at a tertiary care hospital , over a period of one year.

## Material and Methods

A total 366 cases of Organophosphorus compound poisoning were registered during the study period, January 2015 to December 2015. The age of patients varied from 1-80 years.

## Result

The majority of patients were female 69.94% between the age group of 21-30 years. Female to male ratio was 1.25:1. Persons of lower socio-economic status and lower middle class were the commonest patients 65.57% and 31.69% respectively. (Table-I) Most of the patients belonging to rural areas 80%. Occupation wise agricultural workers were on the top of the list 51.91% followed by house wives 28.68% and labourers 12.29% (Table-II).

The commonest motive of poisoning was suicidal in both male 27.59% and females 66.39%, followed by accidental 6% (Table-III). Financial problem was one of the commonest reasons of poisoning. The mortality rate in this study was 6.01%, (Table-IV) it was fairly low because the majority of patients reached this hospital within the fatal period. Respiratory failure was the leading cause of death in this study, followed by multi-organ failure.

**Table I :** Socio Demographic profile of patients ( n-366)

Age (years)	Number	%
0-10	05	1.36
11 -20	90	24.59
21 -30	165	45.08
31 -40	62	16.93
41 -50	25	6.83
51 -60	14	3.82
60 -above	05	1.36
Total	366	100

Sex	Number	%
Male	110	30.05
Female	256	69.94
Total	366	100

**Table II:** Occupation of the patients (n-366)

Occupation	Cases %
Agriculturalworker	190(51.91)
House wives	105(28.68)
Labourers	45(12.29)
Students	18(4.91)
Drivers	4(1.09)
Businessmen	2(.54)
Others	2(.54)
Total	366(100)

**Table III:** Motive of poisoning ( n-366)

Manner	Male	Female
Suicidal	101(27.59)	243(66.39)
Accidental	09(2.45)	13(3.55)
Total	110	256

**Table IV:** Outcome of poisoning cases ( N-366)

Outcome	Patients %
Survived	344(93.98)
Expired	22(6.01)
Total	366(100)

## Discussion

Poisoning is a major public health problem worldwide, with thousands of deaths occurring every year, mainly in the developing countries. Organophosphorus compounds occupy the greatest burden of poisoning related morbidity and mortality. India, holding 70% of agricultural-land, accounts for one third of pesticide poisoning cases in the third world, the farm workers being the worst affected.<sup>6</sup> Most of the poisonings occur due to deliberate self-ingestion of the poison. Acute Organophosphorus compound poisoning is one of the commonest cause of acute poisoning in Bangladesh 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, socio-economic status of the population and stressful life, particularly of youth. In This study majority of patients were female 69.94% . Age of the majority of the poisoning cases was between 21-30 years (45.08%). Males dominated in a study done in tertiary care hospital in Karnataka, India where male to female ratio was 3:1.6. However some other studies have shown that males are marginally higher compared to females.<sup>7,8</sup> This high proportion of poisoning among male might be due to change in life style and cultural patterns in this area. In present study the commonest motive of poisoning was with a suicidal intention and the maximum number of victims were agricultural workers 51.91%, residing specifically in rural areas. Because use of the OPC compound as an insecticides, pesticides and fungicides was more in rural areas than urban. The causes of

high rate of occurrence are depending on the variety of factors such as rain dependent agriculture, following traditional methods rather than scientific methods of farming, natural calamities, low socio-economic status and dis-satisfaction, non fulfilment of desires and stressful life. There is an urgent need to save farmers by making farmer protection act by the Government including 1) Crop insurance schemes 2) fixing value added price for agricultural products 3) Along with pesticide, free pact of antidote made available. Many of the study showed that 75% of poisoning occur among economically poor, which mainly reside in rural areas.

Accidental poisoning in This study was mainly seen in children due to accidental ingestion and in adults due to accidental exposure. In this study the mortality rate was 6.01%, which is quite low because the majority of the victims received treatment in the hospital within half to one hour, hence the survival rate was higher in our study. 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.

Hence education amongst the agricultural workers and youth about the harmful and deleterious effects of OPC poison and upgradation of the primary heath centre facilities to render immediate management of Organophosphorus compound poisoning, which is an important step in management of such poisoning, could go a long way in helping to reduce both mortality and morbidity due to Organophosphorus poisoning. Similarly strict 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. The existing law in relation to pesticide should be incorporated for their production, distribution, sale, storage and application. Public awareness about seriousness of poisoning expected to reduce the incidences.. Train the medical officers of primary health centres in initial treatment of OPC poisoning. Providing ventilators at community health centres and ventilator fitted ambulances made available even at remote area is felt.

## Conclusion

Organophosphorus poisoning is one of the most common poisoning in the rural areas in Mirzapur, predominantly in the young population with a female predominance, belonging to low socio-economic 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.

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