

ORIGINAL ARTICLE

Profile of Organophosphorus Poisoning at Hitech Medical College and Hospital in Bhubaneswar

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Abstract :

Organophosphorus Compound Poisoning is one of the most common toxicological emergencies encountered particularly in rural agricultural patients presenting to the emergency department of Hitech Medical College and Hospital in Bhubaneswar, Odisha. A total 372 cases of organophosphorus compound poisoning were analyzed during the three-year period from January 2017 to December 2020. The basic demographic data such as age, sex, socioeconomic status, occupation along with specific data such as motive of poisoning, types of compound consumed with its quantity, distance from referral place and the final prognosis. The commonest patients were Young Male agricultural workers. Suicidal intent mainly due to financial crisis was seen to be the commonest among both males and females with Dichlorovos being the most used poison. Of all the cases there were three cases of respiratory failure resulting in multi organ failure.

Keywords : Organophosphorous poisoning, Dichlorovos, Suicidal intent, Bhubaneswar, Respiratory failure, Multi organ failure.

Introduction :

Organophosphorus compounds are very common group of pesticides used particularly in agriculture for crop protection and pest control. Being a highly toxic compound, it acts by inhibiting the enzyme cholinesterase at the synapses and myoneural junction leading to cholinergic over-activity.¹

The world-wide occurrence of Organophosphorus (OP) poisoning is estimated to be approximately 3 million according to WHO, most common in developing countries like India and Sri Lanka.² In India alone, there has been an increasing trend in suicidal poisoning with organophosphorus compound and carries an overall mortality of 4-30%.³

Material and Methods :

This retrospective study was Conducted between January 2017 to December 2020 in Hitech Medical College and Hospital, Bhubaneswar, Odisha. Permission from the Institutional Ethics Committee was sought and duly approved.

A total 372 cases of Organophosphorus Compound poisoning were analyzed during the study period. The data was collected from all poisoning cases admitted through emergency department in a pre-tested pre-approved proforma as per the history given by patient/attendant such as age, sex, socioeconomic status, occupation along with specific data such as motive of poisoning, types of compound consumed with its

quantity, distance from referral place and the final prognosis. All data were analyzed, documented and interpreted as per protocol.

Observations :

A total 372 cases of organophosphorus compound poisoning were registered during the study period from January 2017 to December 2020. The age of patients varied from 1-70 years. The majority of patients were male between the age group of 21-30 years. Majority of the patients were of the lower socio-economic status (65.05%) followed by lower middle class (31.98%). Majority of the patients were from rural background (75.80%) and were mostly illiterate (60.21%) while few were educated up to high school level (28.22%) Table 1.

On the occupation front, agriculture workers were on top of the list (51.07%) followed by house wives (27.68%) and labor class (12.90%) Table 2.

In our study we observed that while Dichlorvos was the most abused poison (40.86%), followed by Methyl Parathion (18.54%). The least used poison was Diazinon (9.67%) Table 3.

Suicide was the most common motive both amongst males (50.80%) and females (43.01%), followed by accidental poisoning (4.83%). Homicidal poisoning was observed rarely, in just 5 (1.33%) cases only Table 4.

It was observed that the mortality rate in our study was fairly low (13.44%); considering that majority of patients reached the hospital well within the fatal period, with financial problem (53.22%) being the commonest reason for suicide Table 5,6. The leading cause of death was respiratory failure followed by multi organ failure. 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.

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Discussion:

Acute organophosphorus compound poisoning is one of the commonest causes of acute poisoning in rural agricultural workers of Odisha with high mortality. The probable causes of high mortality can be attributed to a variety of factors such as easy

Table 1 : Socio-Demographic profile of patients (N=372).

Age (years)	Number	%
01-10	08	2.15
11-20	93	25.00
21-30	163	43.81
31-40	62	16.66
41-50	26	6.98
51-60	15	4.03
61 and above	05	1.34
Total	372	100
Sex	Number	%
Male	205	55.10
Female	167	44.89
Total	372	100
Male to female ratio	1.22:1	
Socio – economic status	Number	%
Lower class	242	65.05
Middle class	119	31.98
Upper class	11	2.95
Total	372	100%
Educational status	Number	%
Illiterate	224	60.21
Up to high school	105	28.22
Up to intermediate	32	8.60
Up to graduate/post graduate	11	2.95
Total	372	100
Residence	Number	%
Rural	282	75.80
Urban	90	24.19
Total	372	100

Table 2 : Occupation of patient (N=372).

Sl.No	Occupation	Cases (%)
1	Agricultural workers	190 (51.07)
2	House wives	103 (27.68)
3	Labourers	48 (12.90)
4	Students	17 (4.56)
5	Drivers	6 (1.61)
6	Clerical	2 (0.53)
7	Businessmen	2 (0.53)
8	Other	4 (1.07)
	TOTAL	372 (100)

Table 3 : Types of poison consumed (N=372).

Sl.No	Type of poison	Cases (%)
1	Dichlorvos	152 (40.86)
2	Methyl parathion	69 (18.54)
3	Malathion	55 (14.78)
4	Fenitrothion	50 (13.44)
5	Diazinon	36 (9.67)
6	Unknown	10 (2.68)
	Total	372 (100)

Table 4 : Motive of poisoning (N=372).

Sl.No	Manner	Male (%)	Female (%)
1	Suicidal	182(50.80)	160(43.01)
2	Accidental	12(3.22)	06(1.61)
3	Homicidal	04(1.07)	01(0.26)
	Total	205(55.09)	167(44.88)

Table 5 : Reason for consuming poison (n=372).

Sl.No.	Reasons	Cases (%)
1	Financial problem	198 (53.22)
2	Domestic problem	142 (38.17)
3	Unspecified	32 (8.60)
	Total	372 (100)

Table 6 : Outcome of poisoning cases (n=372).

Sl.No.	Outcome	Patients (%)
1	Survived	322 (86.56)
2	Expired	50 (13.44)
	Total	372 (100)

availability of the poison, large group of agricultural population, low socioeconomic status of the target population and stressful life. This trend was seen primarily in male population (55.16%) and they were in age group of 21 to 30 years (43.81%), such observations were also noted in other similar studies.⁴⁻⁷

In our study we found that Dichlorvos was the most commonly consumed organophosphorus poison (40.86%) although in another study by Singh et al, Diazinon was reported to be the most commonly used compound.⁸ In a study by Gupta et al., suicide was the most common intent particularly among rural agricultural workers (51.07%) and our finding corroborated with that. In the same study, it showed that 75% of poisonings occurred among the economically weaker section who mainly reside in rural areas.⁹

Conclusion :

Organophosphorus poisoning is one of the most common type of poisoning seen in rural Odisha particularly among young males of low socio-economic status, who are primarily into agriculture. While suicide was the commonest cause of poisoning; lack of education, poverty, cheap and easy availability of the organophosphorus compounds, unemployment and stressful life contributed largely in taking the drastic step.

Thus, the first step to reduce both mortality and morbidity due to organophosphorus compound poisoning is educating the agricultural workers and youth about the harmful and deleterious effects of organophosphorus compounds. On the health care front, upgradation of the primary health center facilities so as to render immediate first aid management to patients of organophosphorus compound poisoning can be a game changer.

References:

1. John E. Hall, Guyton and Hall Textbook of Medical Physiology, 13th ed. Philadelphia: Elsevier; 2016.
2. Darren M Roberts, Cynthia K, Aaron. Managing acute organophosphorus pesticide poisoning. BMJ. 2007;334:629-34.

3. Agarwal SB. Acute organophosphorus poisoning. *Environmental Research*. 1993;62:63-70.
4. Zawar SD et al. Correlation between plasma cholinesterase level and clinical severity of acute organophosphate and carbamate poisoning. *JAPI*. 2001;149:91.
5. Arup K et al. Predictors of mortality in organophosphorus poisoning – hospital based study from suburban West Bengal. *JAPI*. VOL 49; Jan 2011,91.
6. Kiran N, Shobha rani RH, Jai Prakash V, Vanaja K. Pattern of poisoning reported at south India tertiary care hospital. *Indian Journal of Forensic Medicine and Toxicology*. 2008;2:17-19.
7. Shetty B Vinay, Pawar Gurudatta S, et al. Profile of poisoning cases in district and medical College of North Karnataka. *India Journal of Forensic Medicine and Toxicology*. 2008;2:26-28.
8. Singh S et al. Spectrum of acute poisoning in adults (10 years' experience). *JAPI*. 1981;32:561-563.
9. Gupta B et al. "Organophosphorus poisoning facts and myths", *Medicine Update*. 1999; PP1345-1348.