

## ANALYSIS OF ORGANOPHOSPHORUS POISONING, AT TERTIARY CARE HOSPITAL: A REPORT

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**ABSTRACT: BACKGROUND:** Organophosphorus (OP) compounds are the most common suicidal poison in developing countries and mortality continues to be high. The present study was aimed to know the pattern and outcome of the OP poisoning. **METHODOLOGY:** A record based retrospective study from January 2013-December 2013 was Conducted in a tertiary care hospital and data regarding age, gender, domicile, type of poison, manner of poisoning, seasonal trends, marital status, motive behind poisoning, socio-economic status and outcome was collected in a pre-structured Performa. All data were documented, analyzed and interpreted as per the laid down protocol. **RESULTS:** out of total 1575 cases of OP compound poisoning, 71.73% (1130) were male, 28.27% (445) were female, 34.6% were in the age group 21-30 years, 70.95% were of low socio-economic status, Occupation wise agricultural workers were on top of the list (70.07%), The commonest (93.78%) motive behind poisoning was suicidal in both males and females, Financial problem was one of the commonest (51.22%) reasons of poisoning. The mortality rate in our study was 13.47%. **CONCLUSION:** Young and adult males of Low socio-economic class, rural, both literate and illiterate agriculturists commonly abuse this substance to commit suicide.

**KEYWORDS:** Organo-phosphorus compound, Suicide, profile.

**INTRODUCTION:** WHO estimated that approximately 3 million pesticide poisoning occurs worldwide and cause more than 2,20,0000 deaths per year. Developing countries report alarming rates of toxicity and death.<sup>[1]</sup> Because the OP compounds are readily available and relatively cheap and having rapidly lethal action even in smaller doses, they are widely used as suicidal poisons<sup>[2]</sup> Suicidal poisoning with OP compound is seen with increasing frequency and carries 4-30% mortality in Indian studies.<sup>[3]</sup> Most of the fatality rate is of intentional poisoning by OP compounds, which has been reported in southern and central India.<sup>[4]</sup> 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.

**MATERIALS AND METHODS:** This Retrospective hospital record based study was conducted in a tertiary care hospital of Hyderabad Karnataka region. Permission was obtained from the RMO of the hospital to allow us to access the information from the patient's case sheet in the record section; strictly for the purpose of this research. The study included 1575 cases of OP poisoning reported to hospital during Jan13 - Dec13.

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## RESULTS:

<b>Age (years)</b>	<b>Number</b>	<b>%</b>
01-10	15	0.95
11- 20	78	4.95
21- 30	545	34.6
31- 40	482	30.6
41- 50	194	12.31
51 -60	114	7.23
>60	155	9.84
Total	1575	100
<b>Sex</b>	<b>Number</b>	<b>%</b>
Male	1130	71.73
Female	445	28.27
Total	1575	100
Male to female ratio	1: 2.5	
<b>Socio-economic Status</b>	<b>Number</b>	<b>%</b>
Low	1118	70.95
Middle	409	25.98
Upper	48	3.05
Total	1575	100
<b>Educational Status</b>	<b>Number</b>	<b>%</b>
Illiterate	819	52
Literate	756	48
Total	1575	100
<b>Domicile</b>	<b>Number</b>	<b>%</b>
Rural	960	60.95
Urban	615	39.15
<b>Total</b>	<b>1575</b>	<b>100</b>

Table 1: socio-demographic profile of OP poisoning (n=1575)

<b>Sl. No.</b>	<b>Occupation</b>	<b>Cases (%)</b>
1	Agricultural workers	1104 (70.07)
2.	Home maker	121 (7.68%)
3.	Labourers	172 (10.90%)
4.	Students	40 (2.56%)
5.	Drivers	10 (0.61%)
6.	Clerical	24 (1.53%)
7.	Businessmen	24 (1.53%)
8.	Others	80 (5.12%)
<b>Total</b>		<b>1575 (100%)</b>

Table 2: Occupation of the victim (n= 1575)

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Sl. No.	Type of Poison	Frequency, (%)
1	Dichlorvos	598 (38%)
2	Methyl Parathion	316 (20.08%)
3	Malathion	259 (16.44%)
4	Fenitrothin (Tic-20)	165 (10.46%)
5	Diazinon	139 (8.8%)
6	Unknown	98 (6.22%)
	<b>Total</b>	<b>1575 (100%)</b>

Table 3: Types of Poison Consumed (n= 1575)

Time of consumption	No of cases	%
6 am-12 noon	321	20.36
12 noon-6 pm	676	42.92
6 pm-12 mid night	472	30.00
12mid night - 6am	106	6.72
<b>Total</b>	<b>1575</b>	<b>100</b>

Table 4: Time of poisoning (n=1575)

Manner	No	%
Suicidal	1477	93.78
Accidental	76	4.82
Homicidal	22	1.40
<b>Total</b>	<b>1575</b>	<b>100%</b>

Table 5: Motive of Poisoning (n = 1575)

Reasons	Cases (%)
Financial Problem	807(51.22%)
Domestic Problem	554(35.17%)
social	69 (4.41%)
Unspecified	145 (9.2%)
<b>Total</b>	<b>1575(100%)</b>

Table 6: Reason behind Poisoning (n=1575)

Status	Male (%)	Female (%)	Total
Married	1071 (68%)	141 (9%)	1212 (77%)
Unmarried	331 (21%)	32 (2%)	363 (23%)
<b>Total</b>	<b>1402 (89%)</b>	<b>173 (11%)</b>	<b>1575 (100%)</b>

Table 7: Association of Poisoning with Marital status (n= 1575)

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Season	Cases (%)
Winter	530 (33.65 %)
Summer	423 (26.85 %)
Rainy	622 (39.50%)
<b>Total</b>	<b>1575 (100%)</b>

Table 8: OP poisoning in relation to season (n=1575)

Time lapse in hrs	No of cases	%
Up to 1	165	10.45
1-3	443	28.13
3-6	663	42.11
6-12	284	18.09
12-24	12	0.82
>24	8	0.52
unknown	0	00
<b>Total</b>	<b>1575</b>	<b>100</b>

Table 9: Survival patterns (n= 1575)

Hospitalisation (in days)	No of patients	%
Up to 1	84	5.34
1-3	143	9.10
3-7	998	63.31
7-15	287	18.25
15-30	42	2.65
>30	21	1.35
<b>Total</b>	<b>1575</b>	<b>100</b>

Table 10: Hospital stay (n= 1575)

Outcome	Patients (%)
Survived	1374(87.53%)
Expired	211(12.47%)
Total	1575(100%)

Table 11: Outcome of Poisoning (n=1575)

A total 1575 cases of OP compound poisoning were registered during the study period, January 2013 to December 2013. The majority of patients were male 1130 (71.73%) and 445 (28.27%) were female; Male to Female ratio was 1:2.5. The age of Patients varied from 1- 80 years. OP poisoning was maximum (34.65%) in 21- 30 year group followed by 31-40 years group (30.6%), Persons of low socio-economic status were involved maximum (70.95%), both literates

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and illiterates chose this method for causing self-harm 52% and 50% respectively (Table 1), Occupation wise agricultural workers were on top of the list (70.07%) followed by labourers (10.90%) and home makers (7.68%) (Table 2), It was observed in our study that highest number of patients consumed Dichlorvos (38%), followed by Methyl parathion (20.08%), the least consumed compound was Diazinon (8.8%). (Table 3)

Consumption of poison commonest 42.92% (676) during 12 noon to 6pm and least during 12 mid night to 6 am (Table 4).

The commonest motive of poisoning was suicidal (93.78%), followed by accidental 76 (4.82%) (Table 5), Financial problem was the commonest reason behind poisoning (51.22%). (Table 6) Married males involved in suicidal poisoning more 1071(68%) followed by unmarried males (table 7).

Incidence was more 622 (39.50%) during rainy season followed by winter 33.65% (table. 8).

The time which elapsed between the poison intake and the start of the treatment, varied from 30minutes to one day and maximum number of patients reached hospital in about 3-6 hrs 42.11% (663), followed by within 1-3hr, and less number of patients in >24 hours.(Table 9).

Out of 1575 cases hospital stay is about 3-7 days, in majority cases 63.31% (998) followed by 7-15 days, 18.25% (287), least number of patients stayed till 30 days. (Table 10)

The mortality rate in our study was 12.47%, respiratory failure was the leading cause of death. (Table 11)

**DISCUSSION:** Poisoning is a major public health problem worldwide, with thousands of deaths occurring every year, mainly in the developing countries. OP 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. Most of the poisonings occur due to deliberate self-ingestion of the poison.

OP compound poisoning is one of the commonest cause of acute poisoning in India particularly among the rural, agricultural workers, evaluation of data obtained revealed that 1575 patients admitted with OP poisoning consisted of 1130 (71.73%) males and 445 (28.27%) females Sex distribution; findings are similar with<sup>[5][6][7][8]</sup> this could be due to male indulge with economic activities and responsibilities of running families. A majority of the victims were in the age group of 21-30 years which is similar to that in other studies.<sup>[5][6][8][9][10][11][12][13][14]</sup>

This age group was the most active one, physically, mentally and socially and so, it was more prone to stress during life. Time of poison consumption is between 12 noon to 6pm 42.92% (676) this could be due to the plan and execution of idea to end their own life, this finding correlate with.<sup>[9,13]</sup> The 6 cases which were seen under the age of 10 in this study were accidental, and 11-20 years group is comparatively less; this could be due to school going children not associated with agricultural activities and having no economic burden.

The present study had an equal number of literate and illiterate cases and this could be explained on the basis that the unemployment problem, among both the groups, town population are also indulge in farming in this area; similar finding were found in.<sup>[5][6][9]</sup> Incidence was more among rural population (60.95%) than to urban population (39.05%), this is in concurrence with

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report depicting higher incidence even up to 82 % in patients of poisoning from rural area.<sup>[5]</sup> This is because use of the OP compound as an insecticides, pesticides and fungicides was more in rural areas than urban. Maximum no victims (77%) were married; similar findings observed by<sup>[6][9]</sup> this may be due to early marriage culture cultivated in this area; this in turn lead to stress and social mal-adaptation. In present study maximum culprits (70.95%) were in low socio economic status; this findings correlate with other workers<sup>[5][6]</sup> this can be explained on the basis that Bellary belong to backward area- Hyderabad Karnataka region (The provisions of Article 371(J) of the Constitution).

Agricultural workers are maximum (70.07%) this observation is similar with other study,<sup>[5]</sup> this can be explained on the basis of this area comes under low rainfall zone and spars ground water and rain dependent forming. In our study among the OP compounds, Dichlorvos was the most commonly consumed Poison (40.86%), although Diazinon was the most commonly used compound in another study as reported by Singh et al.<sup>[15]</sup> In present study the commonest motive of poisoning was with a Suicidal intention and the maximum number of victims were agricultural workers (51.07%), residing specifically in rural areas. as it is highly toxic compound effective in smaller doses most common motive is suicidal findings correlate with other workers<sup>[5][6][7]</sup> Most of the studies from India<sup>[16][17][18][19][20]</sup> and from other countries<sup>[10][11][21][22][23][24]</sup> showed that suicide (in the present study, it was 93.78%) was the commonest reason for the non-accidental poisoning. The time interval between intake of poison and arrival hospital, attendance by doctor takes about 3-6 hrs in majority of cases, followed by 6-12 hrs and hospitalisation time varies between 3-15 days. This finding is similar with.<sup>[9,14]</sup> This could be due to, about 75% of poisonings occur among economically weaker sections, which mainly reside in rural areas. Time is lapsed between transport of the patients, In our study the mortality rate was 12.47%, 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. 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. <sup>[3]</sup>

Financial problem secured top in reason behind poisoning (51.22%) similar findings with<sup>[5][6]</sup> more no of cases recorded during rainy season(39.50%) this finding is similar with<sup>[7][9]</sup> in present study survival rate was 87.53% findings correlate with other workers<sup>[5][7][8]</sup>

## COMPARISON WITH OTHER STUDIES:

		Present study	Joshi S C et al	Kora S A et al	Sheetu M K et al	Patel D J, Tekade P R	Shah et al	Dash et al
Sex	Male	71.73	55.01 %	43.92 %	52	56.94	52.5	
	Female	28.27	44.89 %	56.08 %	46	43.05	47.5	

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Age (years)	11- 20	4.95	25 %	20.94 %	21.4	29.86		
	21- 30	34.6	43.8 %	46.62 %	38.8	44.44		
Domicile	Rural	60.95	75.80 %	43.24 %	67.35	82.29	52	
	Urban	39.15	24.19 %	56.75 %	32.65	17.71	48	
Literacy	literate	52	39.79	50				
	illiterate	48	60.21	50				
Marital status	married	77		67		74.65	54.2	
	unmarried	23		33		25.35	45.8	
Socio-economic state	Low SE	70.95	65.05			48.95		
	Middle SE	25.98	31.98			28.81		
Occupation	Agriculture workers	70.07	51.07	18.24				
	Home maker	7.68	27.68	37.76				
	Labourers	10.9	12.09					
Type of OP compound	Dichlorovos	38	40.86			7.29	9.3	
	Malathion	16.44	14.78			19.09	8.5	
	Tic-20	10.46	13.44			26.38		
	diazinon	8.8	9.67			11.45		
Motive of poisoning	suicidal	93.78	93.81		69.9	86.86		
	accidental	4.82	4.83		28.6	12.50		
Reason behind poisoning	Financial problem	51.22	53.22			45.48		
	Domestic problem	35.17	38.17			34.41		
Relation to season	Winter	33.65		27.70	31.1			
	Summer	26.85		19.67	33.7			
	Rainy	39.50		52	35.2			
Time of consumption	6 AM to 12 Noon	20.36		26%				28%
	12Noon – 6 PM	42.92		44%				37%
	6PM – 12 Mid night	30		25%				21%
	12Mid night-6 AM	06.72		5%				11%
Time lapse (in	Up to 1	10.45		9.45				7.1

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hours)	1-3	28.13		35.13			45
	3 - 6	42.11		37.16			21
	6 - 12	18.09		16.89			10
	12 – 24	0.82		0.67			8.6
	>24	0.52		0.67			1.4
Hospitalisation in days	Up to 1	5.34		7.43			32
	1 - 3	9.1		8.1			7.1
	3 - 7	63.31		73.64			28.6
	7 - 15	18.25		9.45			22.8
	15 - 30	2.65		1.35			1.4
	>30	1.35		0.0			1.4
Out come	survived	87.53	86.56		89.29		87.3
	died	12.47	13.44		10.71		12.7

**CONCLUSION:** The results of current study revealed Acute OP poisoning is commonest among the agricultural workers. 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 socioeconomic 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 pack of antidote made available. Train the medical officers of primary health centres in initial treatment of OP poisoning. Providing ventilators at community health centres and ventilator fitted ambulances made available even at remote area is felt.

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