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## ORGANOPHOSPHORUS COMPOUND POISONING; EPIDEMIOLOGY AND MANAGEMENT (ATROPINIZATION VS PRALIDOXIME) A DESCRIPTIVE ANALYSIS, IN ALLIED HOSPITAL FAISALABAD.

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**ABSTRACT...** **Objective:** 1) To have an overview of epidemiological factors. 2) To determine the outcome of victims. **Study design:** Descriptive study. **Setting:** MU-III Allied Hospital Faisalabad. **Period:** From June 2007 to Dec 2008 **Materials and Methods:** 484 consecutive patients who were admitted, from June 2007 to December 2008, in Medical unit III with history of having organophosphorus poisoning were analyzed for the epidemiological factors, time to arrive in the hospital, conscious level, mode of poisoning (homicidal, suicidal or accidental) treatment given and outcome. **Results:** The results of the study showed that age 14-30 years is the major group involved in poisoning 87.9% as compared to ages 31-45years (10.5%) and age more then 45 years (12%), also age group 14-30 years is having more suicidal tendencies as well as accidental poisoning and these tendencies decrease with increasing age (p value=0.000). Male victims are more as compared to female victims (52.9% vs. 46.7%) in the study group. Suicidal tendencies as well as homicidal poisoning is more in female (n= 127 and 44, respectively) while accidental poisoning is more in male population (n=106), (p value=0.001). Urban population is more at risk of poisoning in all three, homicidal, suicidal and accidental, as compared to the rural population (p vale=0.018). Importantly in study is showed that out come of the poisoning from organophosphorus is directly proportional to the interval between poisoning and presentation in emergency ward (p value= 0.000), conscious level of the victim (p value = 0.000) and does not depend upon the mode of management (oxime or atropine) (p value 0.026). **Conclusions:** Younger urban population have increased tendency of poisoning with a dominance of female population. Rapidity of treatment, time to arrival to hospital and conscious level at presentation are the factors deciding outcome of a given patient rather than the mode of treatment (oximes and atropine both are equally effective).

**Key words:** Organophosphorus poisoning, Suicidal poisoning, Homicidal poisoning, Accidental poisoning, Oximes, Atropine.

## INTRODUCTION

Poisoning has been used by man for murder and suicide as long as recorded history<sup>1</sup>. Several modes of exposure may be recognized in context with poisoning, namely; (i) accidental and or suicidal poisoning that cannot be prevented through legislation or preaching, (ii) occupational exposure, (iii) bystander exposure resulting from off-target drift and (iv) general public exposure who consume food items containing pesticides residues<sup>2</sup>.

Incidence of poisoning, as reported is 13-fold higher in developing countries than in highly industrialized nations<sup>2</sup>. 300,000 people die each year from pesticide self poisoning in the rural developing world<sup>3</sup>. Organophosphorus and carbamates cause most acute fatalities<sup>3</sup>.

Self-poisoning with organophosphate pesticides is a major health problem world-wide<sup>4</sup>, whoever, substance involved in poisoning varies widely between different countries of the world; in South East Asia pesticide ingestion is endemic<sup>12</sup>. In Pakistan, urban population is mostly exposed to household chemicals<sup>5</sup> and social or domestic stresses are the main reason for the increasing suicidal tendencies<sup>5,6</sup>. Suicidal poisoning is followed by accidental and homicidal poisoning as the main causes<sup>7</sup>. Males tend to take more severe attempts with an intention of completing it<sup>6</sup>.

Most of the victims present in unconscious in emergency department<sup>7</sup>. The diagnosis should be state suspected in patients presenting with miosis, sweating and hyperparistalsis<sup>8</sup> even in the absence of good supportive history. Such patients need careful thorough assessment, early diagnosis, vigilant monitoring and aggressive supportive management in the intensive care setting<sup>9</sup>.

Acute organophosphorus pesticide poisoning causes ten thousands of deaths each year across the developing world. Standard treatment involves administration of intravenous atropine and oxime to counter

acetylcholinesterase inhibition at the synapse<sup>10</sup>. Consensus suggests that early resuscitation with atropine, oxygen, respiratory support, and fluids is needed to improve oxygen delivery to tissues. The role of oximes is not completely clear; victims might benefit only patients poisoned by specific pesticides or patients with moderate poisoning<sup>11</sup>.

As organophosphorus poisoning is one of the major issues in emergency department and also the poor availability of oximes due to the cost problem the study was conducted to observe retrospectively the effects of atropine versus oxime on mortality and morbidity.

## MATERIALS & METHODS

### DATA COLLECTION

The study was performed retrospectively on 484 patients admitted in medical unit III of Allied hospital Faisalabad, from June 2007 to December 2008, with history of organophosphorus poisoning.

Patients were diagnosed as a case of organophosphorus poisoning on bases of history of the victim or attendants along with clinical features like miosis, increased salivation, increased respiratory secretions, muscle cramps and abdominal discomfort. These treatment included with specific antidote like oxime (in affording, and where hospital fund sported) and supportive treatment like atropine, the outcome was compared in both groups and also with the factors like time to come to emergency and conscious level at presentation. The victims were also sorted for different epidemiological factors like sex, age, representative area (urban or rural), and mode of intake (suicidal, homicidal or accidental).

### DATA ANALYSIS PROCEDURE

The study was analyzed on SPSS-Ver-10 for windows. In the study variable of interest were age, gender, background (urban or rural), mode of intake (suicidal, homicidal or accidental), time to come to emergency,

mode of treatment given (oxime or atropine) and conscious level at presentation. Intake of organophosphorus compound was an independent variable and remaining all was dependent one. Among epidemiological factors frequency (f) and percentage (%) was calculated, and, out come and mode of treatment was analyzed in relation with time to come to emergency and conscious level at presentation, chi-square statistics were applied and level of significance was  $P = 0.05$ .

**RESULTS**

The results of the study showed that age 14-30 year is the major group involved in poisoning 87.9% as compared to ages 31-45(10.5%) and age more than 45(12%) (Table I), also age group 14-30 year is having more suicidal tendencies as well as accidental poisoning and these tendencies decrease with increasing age ( $p$  value=0.000) (Table IV) Male victims are more as compared to female victims (52.9% vs. 46.7%) in the study group (Table I).

**Table-I.**

	Age			Gender		Mode of Treatment		Mode of Undertake		Time of Presentation in Emergency			Outcome		Conscious level			Population in case, from		
	A	B	C	M	F	A*	O	S	H	A**	a	b	c	D	E	F	G	H	I	
Total No. of Pts	427	51	8	257	227	404	87	238	84	166	329	135	19	426	58	337	130	17	349	35
Frequency	87.8	10.6	1.2	52.9	46.7	83.1	10.5	49	17.3	83.3	67.7	26	3.9	87.7	11.9	61.8	26.7	3.3	71.8	27.8

*A = Age group 14-30 year      B = Age group 31-45 year      C = Age group more than 45 year      M = male, F = female;  
 A\* = atropine    O = oxime      S = suicidal    H = homicidal      A\*\* = accidental    a = 1-6hour    b = 7-12hour  
 c = more than 12hour    D = survive    E = death      D = oriented    E = Unconscious    F = Urban    G = Rural*

**Table-II.**

Gender	Suicidal	Homicidal	Accidental	Total
Male	111	40	106	257
Female	127	44	56	227
Total	238	84	162	484

*P value = .001,      Degree of freedom = 2*

**Table-III.**

Back ground	Suicidal	Homicidal	Accidental	Total
Urban	181	50	118	349
Rural	57	34	44	135
Total	238	84	162	484

*P value = 0.018 Degree of freedom = 2*

Table-IV.

Age (Yrs)	Suicidal	Homicidal	Accidental	Total
14-30	200	73	154	427
31-45	37	10	4	51
46-80	1	1	4	6
Total	238	84	162	484
<i>P-Value = 0.000, Degree of freedom = 4</i>				

Table-V.

Outcome	Treated with Atropine	Treated with Oxime	Total
Death	42	16	58
Survive	362	64	426
Total	404	80	484
<i>P value = 0.026, Degree of freedom = 1</i>			

Table-VI.

Outcome	Fully oriented	Drowsy	Comatose	Total
Death	6	35	17	58
Survive	329	97	-	426
Total	335	132	17	484
<i>P-value = 0.000, Degree of freedom = 2</i>				

Table-VII.

Outcome	1-6 hrs	7-12 hrs	More than 12 hrs	Total
Death	5	37	16	58
Survive	324	99	3	426
Total	329	136	19	484
<i>P-value = 0.000, Degree of freedom = 2</i>				

Suicidal tendencies as well as homicidal poisoning is more in female (n= 127 and 44, respectively) while accidental poisoning is more in male population (n=106), (p value=0.001) (Table-II). Urban population is more at risk of poisoning in all three, homicidal, suicidal and accidental, as compared to the rural population (p vale=0.018) (Table-III). Important in the study is shown that out come of the poisoning from organophosphorus is directly proportional to the interval between poisoning and presentation in emergency ward (p value= 0.000) (Table-VII), and conscious level of the victim (p value = 0.000) (TableVI), and does not depends on the mode of management (oxime or atropine) (p value 0.026) (Table V).

## DISCUSSION

Organophosphorus insecticide poisoning is a common, rapidly progressive and potentially fatal clinical entity<sup>9</sup>. Acute poisoning is of significant magnitude<sup>14</sup> and one of the largest causes of coma in our hospitals<sup>13</sup>. Those who have urban background mostly ingest household chemicals<sup>5</sup>. Self-poisoning with organophosphate pesticides is a major health problem world-wide. Through the inhibition of acetylcholinesterase, organophosphorus poisoning is characterized by the clinical picture of acute cholinergic crisis. Other manifestations are the intermediate neurotoxic syndrome and delayed polyneuropathy<sup>4</sup>.

Poisoning is a significant health hazard<sup>15</sup> and paucity of medical attention towards it has caused an increased mortality in the developing world (10-20%) as compared to 0.5-1% in the developed countries<sup>12</sup>, in certain seasons mortality may reach to 70%<sup>12</sup>.

So this study was conducted to have an overview of the epidemiological factors particularly of organophosphorus poisoning, and also to determine the outcome of victims comparing, important factors like time to reach to the causality and conscious level at presentation to the management of victim with oxime or atropine.

The study is comparable to one conducted by Abu Noem Farooqi, Sharjeela Tariq, Farah Asad, Faisal Abid, Osama Tariq<sup>6</sup>, in which the incidence of poisoning is more in younger population. This study also showed that the incidence of poisoning decreases with increasing age, hence it differs from that of Muhammad Yaqoob, Muhammad Yar, Muhammad Farooq, Anjum Rashid Butt, Rizwan Waseem, Tahira S Izhar who said that poisoning is more frequent in third and fourth decade<sup>16</sup>. However, our study showed a female predominance in all modes of poisoning which is different from Abu Noem Farooqi, Sharjeela Tariq, Farah Asad, Faisal Abid, Osama Tariq<sup>6</sup>.

Our study also showed that urban population is more exposed to the poisons as compared to rural population. The second part of the study related to the management comparison between oxime or atropine and to the factors like time to arrival to the emergency and conscious level at presentation is worth mentioning because no such comparison is available in Pakistan, however some of the text and foreign studies do support the fact that role of oximes is not very clear<sup>6</sup>, they may be harmful or beneficial<sup>18</sup> and that complete and early atropinization is essential part of management<sup>12</sup> so is early resuscitation with maintenance of airway<sup>11</sup>, as aspiration pneumonia is the main cause of death and has been emphasized<sup>17</sup>.

Our study proved the fact that the time interval between poisoning and arrival at hospital were major determinants of lethality, as also said by Muhammad Imran Suliman, Rushd Jibran, Manzoor Rai<sup>18</sup>. Our study also compares the level of consciousness at arrival in the hospital to survival of the victim and it proved that good conscious mean good prognosis.

Surprisingly enough there was no significant difference between the patients treated with oxime or atropine in terms of survival, this observation definitely needs to be studied more extensively.

So all this discussion emphasizes upon the rapidity of shifting patient to the hospital, early recognition and management with atropine to prevent mortality.

### LIMITATION OF THE STUDY

Number of patients in this study is very small nevertheless it may be taken as an ignition to conduct more studies about the comparative role of atropine and oximes in acute organophosphorus poisoning.

### CONCLUSION

There is an increasing frequency of organophosphorus poisoning in the developing countries like Pakistan, also urban population is more at risk and so are the younger age group and female sex. Most important in the management in order to have a good outcome is rapid transport to hospital, early diagnosis and complete atropinization.

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