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Research Article

**FREQUENCY AND FACTORS RESPONSIBLE FOR  
VENTILATORY SUPPORT IN ORGANOPHOSPHOROUS  
POISONING**<sup>1</sup> Dr. Hamid Raza, <sup>2</sup> Dr. Abdul Ghani Rahimoon, <sup>3</sup> Dr. Naveed Aslam Lashari,<sup>4</sup> Dr. Hamid Nawaz Ali Memon, <sup>2</sup> Dr. Imran Karim and <sup>2</sup> Dr. Muntaha Irshad<sup>1</sup> Assistant Professor of Anesthesiology, Department of Anesthesia & Intensive Care Unit,  
Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro<sup>2</sup> Department Medicine Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro<sup>3</sup> Medical Specialist PAF Hospital Lahore<sup>4</sup> General Practitioner Zulekha Hospital Dubai United Arab Emirates**ABSTRACT:****OBJECTIVE:** To determine the frequency and factors responsible for ventilatory support in individuals with organophosphorous poisoning.**PATIENTS AND METHODS:** All the patients who were diagnosed as organophosphorous compound admitted in department of Medicine and intensive care unit (ICU) at Liaquat University Hospital Hyderabad / Jamshoro were included in the study and were explored for the needs of ventilatory support while the data was collected and analyzed to calculate the frequencies, percentages and mean  $\pm$ SD.**RESULTS:** During six months, the total 72 patients were studied of which 45 (62.5%) were males and 27(37.5%) were females. The ventilatory support was given in 55 (76.3%) because of tachypnoea (respiratory rate > 25 b/minutes, fasciculation, GCS score of  $\leq$ 8. Patients who were ventilated required a higher dose of atropine during 48 hours of hospitalization as compared to non ventilated population.**CONCLUSIONS:** Patients who presented with tachypnoea, using of accessory muscles of respiration, higher fasciculation score, reduced GCS score of  $\leq$ 10, increase duration of poison and hospitalization, reduced and oxygen saturation were more likely to require ventilation.**KEYWORDS:** Organophosphorous, Poisoning and Insecticides**Corresponding author:****Dr. Hamid Raza,**

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**INTRODUCTION:**

Organophosphorous substance discovered more than one hundred years ago and is a major health issue not only in developing countries but also in developed countries. It has been found that nearly half of the admissions to accident and emergency department with acute poisoning are due to organophosphorous compound poisoning and at present the common group of substance is of insecticides employed globally for pest control and is leading cause of death in agricultural countries [1]. The compound is organic derivatives of phosphorous containing acids which is easily available and accessible at agricultural shops and is responsible for increase accidental and suicidal attempt of poisoning [2]. The biological effects of organo-phosphorous compound are due to accumulation of endogenous acetylcholine at sites of cholinergic transmission and impair nerve transmission both at central and peripheral nervous system and is readily absorbed through mucous membrane of oral, gastrointestinal, respiratory and also skin as it is lipid soluble while its binding is reversible if prompt and immediate pharmacological measures has been taken [3]. The diagnosis based on clinical history and duration of exposure and physical examination for cholinergic symptoms while the management protocols includes atropine or glycopyrrolate, a physiological antidote and mechanical ventilator support in severe cases whereas the complications as respiratory and cardiac failure and central nervous system depression should be explored & treated [4] The common cause of death in organophosphorous compound poisoning is ventricular arrhythmias, seizures, respiratory failure and bronchospasm, gastric content aspiration and pulmonary edema and CNS depression [5, 6]. This study was conducted to evaluate the frequency and

factors for predicting the need for ventilatory support in individuals with organophosphorous poisoning (OP) at tertiary care teaching hospital

**PATIENTS AND METHODS:**

Total seventy two patients with OP poisoning were explored, studied and managed in the department of Medicine and ICU during six months cross sectional study conducted at tertiary care hospital. The subjects admitted with history of OP poisoning were intensively monitored for respiratory distress, using of accessory muscles of respiration, oxygen saturation, cardiac auscultation and pulse examination. Patients with concomitant illness (chronic lung disease), with dual poisoning with other poisons were excluded from the study. All the patients had advised for all the baseline investigations along with specific investigation as arterial blood gas analysis and if any or more are exists then the decision for mechanical ventilator was planned. Based on factors the influence for the need for ventilatory support, the severity and duration of OP poisoning was categorized as mild (GCS 12-15, pupil size  $\geq 4$  mm and fasciculation score 0-1), moderate (GCS 8-11, pupil size 2-3 mm and fasciculation score 2-4) and severe poisoning (GCS  $< 7$ , pupil size  $\leq 1$  mm, existence of convulsions, fasciculation  $\geq 5$  and sign of respiratory distress). The data was collected on pre-structured proforma while the frequencies, percentages and means  $\pm$ SD was calculated.

**RESULTS:**

Total 72 patients were admitted studied with the history of OP poisoning. The mean  $\pm$  SD for age (yrs) and duration (hrs) of OP poisoning was  $27.97 \pm 7.85$  and  $6.84 \pm 3.75$ . The results are presented in Table 1 and 2.

**TABLE 1: THE DEMOGRAPHICAL PROFILE OF THE STUDY POPULATION**

<b>Parameter</b>	<b>Frequency (N=50)</b>	<b>Percentage (%)</b>
<b>AGE (yrs)</b>		
16-20	18	25
21-29	20	27.7
30-39	22	30.5
40-49	10	13.8
50+	02	2.7
<b>GENDER</b>		
Male	45	62.5
Female	27	37.5
<b>DURATION OF POISONING (hrs)</b>		
≤3	50	69.4
>3	22	30.5
<b>SEVERITY OF POISONING</b>		
Mild	20	27.2
Moderate	22	30.5
Severe	30	41.6
<b>VENTILATORY SUPPORT</b>		
Yes	40	55.5
No	32	44.4
<b>CLINICAL FEATURES</b>		
Hypersalivation	35	88.8
Nausea / vomiting	50	69.4
Abdominal pain and diarrhea	42	58.3
Increased lacrimation	28	38.8
Hypotension	30	41.6

**TABLE 2: THE COMPOUNDS AND SIGN OF ORGANOPHOSPHOROUS POISONING**

<b>Parameter</b>	<b>Frequency (N=50)</b>	<b>Percentage (%)</b>
<b>COMPOUND</b>		
Methyl parathion	40	55.5
Dimethoate	32	44.4
<b>FASCICULATION</b>		
Yes	32	44.4
No	40	55.5
<b>MIOSIS</b>		
Yes	37	51.3
No	35	48.6
<b>GCS</b>		
≤8	40	55.5
>8	32	44.4
<b>BRADYCARDIA</b>		
Yes	38	52.7
No	34	47.2
<b>TACHYPNOEA</b>		
Yes	35	48.6
No	37	51.3
<b>OXYGEN SATURATION (≤90%)</b>		
Yes	40	55.5
No	32	44.4
<b>USE OF ACCESSORY MUSCLES</b>		
Yes	36	50
No	36	50

**DISCUSSION:**

Acute Organophosphorous compound poisoning is one of the most frequent poisonings and suicidal attempt is major etiology for poisoning in under develop countries while accidental poisoning is also common in countries like Japan [7]. In present study among 72 individuals with OP poisoning majorities of patients were 21-39 years of age as 42 (58.2%) [20 patients were in 21-29 age group and 22 patients were in 30-39 year age group] along with male population dominance and this correlates with the observation of previous studies,[7-9] while it is contrast with another study where female population was predominance [10]. The common clinical features observed were vomiting 50(69.4%), abdominal pain and diarrhea 42 (58.3%) and hypersalivation 35 (88.8%) and is correlates with the studies by Peter JV et al [11]. Generalized fasciculation were observed in 32 (44.4%) patients while the studies done by Hu XZ, et al shown that OP poisoning patients had fasciculation [12]. Miosis was identified in 37(51.3%) individuals and managed on ventilator support while the study conducted by Robert et al 72 73% patients had pupil size  $\leq 1$ mm required ventilation. Bradycardia was detected in 38 (52.7%) patients, tachypnoea in 35 (48.6%) patients and had ventilator support; the higher respiratory rate was probably due to increased secretion and more severe respiratory paralysis caused by the poisoning and the findings are consistent with the study by Sungur M, et al [13]. Oxygen saturation ( $\leq 90\%$ ) and use of accessory muscles was observed in 40 (55.5%) and 36 (50%) patients and all were best managed by ventilator support. The observations are consistent with the study by Ahmed, SM et al [14]. Patients who were ventilated 40 (55.5%) required high dose of atropine within period of hospitalized than not ventilated population and is consistent with the study by Eddleston M, et al [15]. The higher dose of atropine may indicate the poisoning severity which might have caused respiratory paralysis requiring ventilation. In present study the compounds responsible for poisoning were methyl parathion 40 (55.5%) and dimethoate 32 (44.4) and is consistent with the study by Rousseau JM, et al [16]. Ventilatory support was required by 40 (55.5%) patients who had a GCS < 8 and is correlates with the study by Kang E, e t al [17]. The population with severe poisoning required mechanical ventilation because of greater time between poison consumption and hospitalization leads to delay in treatment as initiation of gastric lavage and administration of atropine.

**CONCLUSION:**

The factors predicted the need for ventilatory support in organophosphorous compounds poisoning were higher fasciculation score, low GCS score, miosis, time interval between poisoning and hospitalization, tachypnoea, use of accessory muscles, low oxygen saturation and severity of poisoning while the increasing dose of atropine also a indicator of initiation of mechanical ventilation.

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