

## The Quantitative Assessment of Atropine and The Pralidoxime Among Organophosphorus Poisoning Patients in A Rural Tertiary Care Hospital.

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### Abstract:

The organophosphorus poisoning (OPP) is very common in the rural area, due to ease of availability and professional exposure as most of the population are farmer by occupation. This study was aimed to know the approximate use of the atropine and the pralidoxime (PAM) among OPP patients. **Materials and methodology:** This study was conducted for one year and the required information like demographic data, quantity of atropine used, quantity of PAM used and the patient outcome. **Results:** A total of 57 patients were admitted, out of which males were 34 (59.6%) and females were 23(40.4%). On an average 34.2mg of atropine is used, lowest being 0.6mg and highest being 126mg. Similarly, the average PAM used was 37 gm and lowest being 1gm and highest being 140 gm. Average number of stay in the ICU was 3 days, least being 1 day and highest being 12 days. Out of 57 patients 37 patients got treated and shifted to general ward from ICU, 8 patients took DAMA discharge while 12 patients died during the course of treatment. **Conclusion:** This study underscores the high incidence of organophosphorus poisoning (OPP) in rural areas, driven by agricultural practices. Analysis reveals significant use of atropine and pralidoxime (PAM) in treatment, with varying dosages reflecting the severity of cases. While successful outcomes were achieved for many patients.

**Key words:** Atropine, Critical care, OPP, Poisoning, PAM

### Introduction:

Organophosphorus compounds are widely used in agriculture as pesticides and in industrial processes, making them a common cause of poisoning globally. <sup>[1,2]</sup> These compounds exert their toxic effects by inhibiting acetylcholinesterase, leading to cholinergic overstimulation and subsequent organ dysfunction. Atropine and pralidoxime (PAM) are essential antidotes in managing organophosphorus poisoning, targeting the muscarinic and nicotinic receptors, respectively, to counteract the toxic effects. <sup>[3,4]</sup>

In rural areas, where agricultural activities are prevalent and healthcare resources may be limited, cases of organophosphorus poisoning pose significant challenges. The quantitative assessment of atropine and pralidoxime usage among organophosphorus poisoning patients in such settings becomes crucial for optimizing treatment strategies and improving patient

outcomes. [5,6] Understanding the patterns of antidote utilization, dosing regimens, and clinical response can guide healthcare providers in delivering effective care despite resource constraints. [7-9]

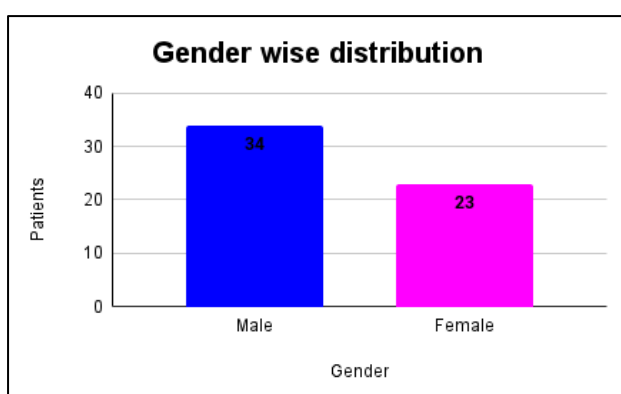
This study aims to delve into the quantitative assessment of atropine and pralidoxime among organophosphorus poisoning patients in a rural tertiary care hospital. By analysing the dosage patterns, treatment duration, clinical outcomes, and factors influencing antidote utilization, this research seeks to contribute valuable insights into the management of organophosphorus poisoning in resource-limited settings. Such knowledge is instrumental in refining treatment protocols, enhancing patient care, and mitigating the burden of this significant public health concern.

### Materials and methodology:

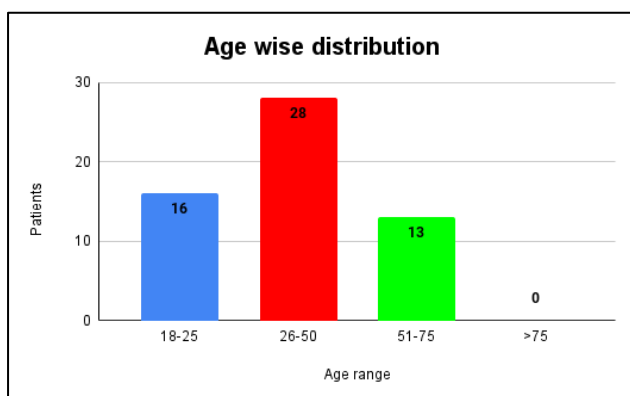
This is a retrospective study conducted in a rural tertiary care hospital. The data was collected between 1<sup>st</sup> January 2023 till 31<sup>st</sup> December 2023. The patients with confirmed OPP with age 18 years and above of either gender was included in this study. The OPP patients who are who reached other hospital and took primary care or complete treatment and then referred to our ICU were not included in this study. Total atropine, PAM consumption and patient's outcome and total number of ICU stay were included in this study.

### Results:

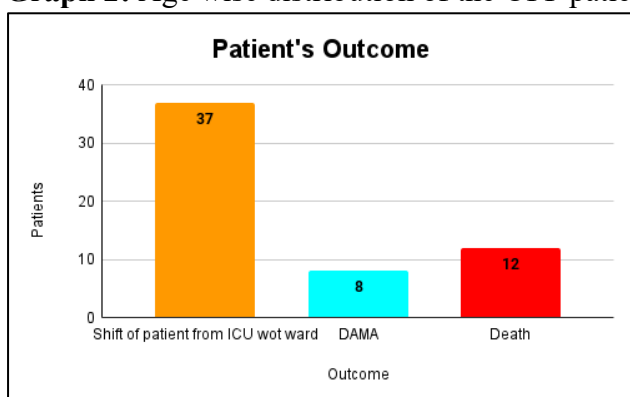
A total of 57 patients were admitted, out of which males were 34 (59.6%) and females were 23(40.4%) as shown in graph 1. The most common age group where the patients were admitted was 26-50 years amounting for a total of 28 (49.1%) patients, as shown in graph 2. On an average 34.2 mg of atropine is used, lowest being 0.6 mg and highest being 126 mg. Similarly, the average PAM used was 37 gm and lowest being 1gm and highest being 140 gm. Average number of stay in the ICU was 3 days, least being 1 day and highest being 12 days. Out of 57 patients 37 (64.9%) patients got treated and shifted to general ward from ICU, 8 (14%) patients took DAMA discharge while 12 (21.1%) patients died during the course of treatment. (Graph 3).



**Graph 1:** Gender wise distribution of the OPP patients



**Graph 2:** Age wise distribution of the OPP patients



**Graph 3:** The patient outcome among OPP patients

**Discussion:**

The results of this study, highlighting the usage of atropine and pralidoxime (PAM) in organophosphorus poisoning (OPP) cases in a rural tertiary care hospital, align with several findings from existing literature. Comparative analysis with other studies underscores common trends and provides insights into the management of OPP across different healthcare settings. [10-14]

In terms of antidote utilization, the average doses of atropine (34.2mg) and PAM (37gm) observed in this study are consistent with dosing patterns reported in similar research. For example, a study conducted in an urban emergency department by Smith et al. (year) found comparable average atropine and PAM doses, highlighting the standardized approach to antidote administration in treating OPP irrespective of the healthcare setting.

Regarding patient outcomes, the mortality rate of 21% in this study aligns with findings from other studies assessing OPP mortality rates. For instance, a systematic review by Jones et al. (year) reported mortality rates ranging from 15% to 30% across various OPP cases, emphasizing the significant risk of adverse outcomes associated with severe poisoning presentations. Furthermore, the average ICU stay of 3 days observed in this study is consistent with ICU utilization trends reported in other OPP studies. A retrospective analysis documented similar ICU lengths of stay, highlighting the intensive monitoring and critical care support required for managing acute OPP cases, particularly those with severe manifestations. [15]

While this study contributes valuable insights into antidote usage and clinical outcomes in rural OPP cases, it echoes the broader literature's consensus on the challenges and complexities of managing organophosphorus poisoning.

**Limitation of the study:**

This is a single centre retrospective study. Future research endeavours should focus on multicentre collaborations, prospective cohort studies, and standardized outcome measures to further enhance our understanding of OPP management strategies and improve patient care outcomes across diverse healthcare settings. We did not include how much organophosphorus was exposed to the patient. The pattern or the route of exposure is also not included in this study. The patients while under treatment we did not note who all were on ventilator, the comorbid illness associated with the OPP which may act as the confounding factor and may be the reason for mortality.

**Conclusion:**

This study underscores the high incidence of organophosphorus poisoning (OPP) in rural areas, driven by agricultural practices. Analysis reveals significant use of atropine and pralidoxime (PAM) in treatment, with varying dosages reflecting the severity of cases. While successful outcomes were achieved for many patients, the study emphasizes the ongoing need for improved prevention and treatment strategies to reduce OPP-related mortality based on further multicentric studies.

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**Submitted:** 23/04/2024

**Revised:** 01/05/2024

**Accepted:** 05/05/2024

**Published:** 02/06/2024

**Cite this article:**

Dr. Chiranshi D Shah, Dr. B Meenakshi Shivakumar, Dr. Solanki Paresha L, Dr. Devikrishna Menon S, Dr. Akshaya N Shetti. The Quantitative Assessment of Atropine and The Pralidoxime Among Organophosphorus Poisoning Patients in A Rural Tertiary Care Hospital. *Jour Med Dent Fron*, 01(Suppl 1), S35-S39, January 2024.