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REVIEW ARTICLE

Management of organophosphate poisoning: Role of nursing staff in patient care and recovery

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ABSTRACT

Introduction: organophosphate poisoning is a public health issue due to its common use in agriculture and easy access, leading to an increase in accidental poisonings and suicides.
Objective: to evaluate the role of the nursing team in the management and rehabilitation of patients with organophosphate poisoning, highlighting care strategies and essential interventions in the therapeutic process.
Methodology: a literature review was conducted across several scientific databases, selecting studies addressing the incidence of organophosphate poisonings, clinical management, and the nursing team's actions in these cases.
Development: the management of organophosphate poisoning requires prompt and effective treatment. The nursing team plays a crucial role in the early detection of symptoms, patient hydration, hemodynamic stabilization, and ventilatory assistance in severe situations. It is vital to administer specific antidotes, such as atropine and oximes, along with supportive measures to improve patient prognosis.
Conclusion: continuous training of healthcare personnel is essential to ensure a rapid and effective response to these events. Organophosphate poisoning requires an interdisciplinary approach where the nursing team plays a vital role in the detection, stabilization, and rehabilitation of the patient. Continuous training and updates in the management of such poisonings are crucial to improving care and reducing mortality associated with these cases.

Keywords: Poisoning; Nursing; Delivery of Health Care; Decontamination.

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INTRODUCTION

This research focuses on the role of nursing in relation to organophosphate poisoning, particularly regarding pesticides, whose usage is increasing and causing intoxications. Therefore, nursing staff must understand the mechanism of action, clinical manifestations, and routes of absorption of the causative agent to provide accurate diagnosis and timely treatment, avoiding health complications for the patient.[1] It is worth mentioning that organophosphates are organic substances derived from phosphoric acid, used as insecticides in agriculture (pest control), and likewise used in domestic settings, veterinary medicine, and healthcare.[2]

Another study mentions that organophosphates are agents that can be absorbed through the skin, lungs, and gastrointestinal tract, acting directly on acetylcholinesterases (AChE), rendering them non-functional enzymes by phosphorylating the hydroxyl group present at the active site of the enzyme.[3] Consequently, nursing intervention should focus on caring for the affected areas.

Moreover, globally, the use of insecticides is increasing, as indicated by data from Costa Rica - San José, May 26, 2022, showing that from 2014-2020, the canton of Parrita was the area of the country with the most pesticide poisonings, primarily associated with the agricultural sector, mostly affecting men (87,92 % of the total), with an average age of approximately 32 years, and the agricultural sector being the most impacted at 65,68 % of cases, mainly in banana, coffee, and pineapple plantations. [4]

Cases of patients with organophosphate poisoning in Ecuador are very common in hospital emergency rooms, with the highest incidence among patients from rural areas who work and have direct contact with harmful pesticides, considering it one of the top 10 causes of morbidity and mortality in our country due to the easy availability of these products. It is crucial for nursing staff to be prepared to handle these cases, as nurses are the first point of contact for users seeking care in hospital settings.[5]

According to the Ministry of Public Health, Ecuador reported 2,113 cases of poisoning in 2020, of which 425 were victims of pesticides. In summary, the most affected age group ranges from 20 to 49 years. Organophosphate poisoning is a significant issue within the health sector, with poisoned patients coming from agricultural fields; medically, the damage can be multi-systemic and even fatal, which can be prevented with efficient care.[6]

The vulnerability to poisoning mainly affects young adults and adolescents caught in suicide attempts and random situations faced by farmers (fumigation). Economically, the most affected are those with less education and thus poorer. Therefore, focusing on this issue is important because all the effects mentioned can be prevented with a patient care regime for organophosphate pesticide poisoning that facilitates quick, timely, and effective care.[7]

It should also be noted that in 2018, a total of 424 cases were reported in Ecuador according to the CIATOX (Toxicological Information and Advisory Center) report, in 2019 a total of 426 cases, and in 2020 a total of 33 cases of pesticides that caused poisonings, primarily artificial organic phosphates used to prevent and control pests, which affect the environment and are readily accessible.[6]

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Based on the above, the objective is defined as evaluating the role of the nursing team in the management and rehabilitation of patients with organophosphate poisoning, highlighting care strategies and essential interventions in the therapeutic process.

METHODS

The research included articles selected through a search in electronic documents from various databases such as: PubMed, Scielo, Dialnet, Redalyc, Google Scholar, Lilacs. To select the documents and include them in the article, keywords such as "nursing intervention" and "organophosphate poisoning" were used.

For the selection of studies, consideration was given to the keywords used as search strategies, the year of publication, and a manual search of each article was conducted to evaluate its relevance and relationship to the investigated problem, extracting the necessary data and citing the authors in Vancouver style.

The exclusion criteria were based on:
- Publication date (2019-2024)
- Languages: Spanish, English, and Portuguese
- Articles from indexed journals
- Duplicate sources
- Articles from paid sources or inaccessible full texts
- Information irrelevant to the review

For the selection of studies, the keywords used as search strategies were considered, and based on them, a manual search of each article was conducted to assess its relevance and relationship to the investigated problem. Once the articles that were part of the review were selected, the initial data extraction process was carried out, which is detailed in the following section. The extraction process began with identifying the studies included in the review according to the inclusion and exclusion criteria. The diagram used for systematic validation under PRISMA parameters is presented below, ensuring compliance with copyright through citation in Vancouver style, using the Mendeley bibliographic manager.

A specific sheet was designed for the data collection process from the selected studies, aiming to gather relevant information. The extracted data focused on research regarding poisoning by organophosphates and the role of nursing in it. A systematic approach was followed to ensure consistency in the data collection process.

DEVELOPMENT

The research included articles selected according to the guidelines (PRISMA) Preferred Reporting Items for Systematic Reviews and Meta-analyses, conducting a search in electronic documents from various databases such as: PubMed, Scielo, Dialnet, Redalyc, Google Scholar, Lilacs. To select the documents and include them in the article, keywords such as "nursing intervention," "poisoning," "fetal impact," and "nursing care" were used.

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In addition, a descriptive analysis of the data extracted from the studies included in the review was conducted through author triangulation, allowing for discussion and exchange of ideas for presenting the conclusions obtained. This approach involved summarizing the findings and presenting them in table form to facilitate understanding and visualization of the results. See Table 1.

Table 1. Main nursing roles in cases of poisoning.

Title	Year	Journals	Data Base	Authors	Findings
Knowledge and nursing care regarding organophosphate poisoning in patients visiting the emergency service of the National Hospital Dos de Mayo, 2022 [8]	2022	Repository of Nober Wiener University	Repository of Nober Wiener University	Lino Aguilar, Milagros Stefany	Knowledge questionnaire on organophosphate poisoning with 24 items, validation p=0,12 and KR-20 reliability=0,89, final value: low, medium, and high; and the Nursing Care Observation Guide on organophosphate poisoning with 22 items; validation p=0.11 and KR-20 reliability=0,87, final value: inadequate and adequate.
Nursing intervention plan for the care of patients with organophosphate poisoning at the Chalhuahuacho Health Center in the Chalhuahuacho district. [9]	2022	Digital Institutional Repository of the University of Callao		Gonzales Cruz, Carolina	Timely intervention for patients presenting with organophosphate poisoning; Considering that cases of poisoning with these compounds are varied and may present with or without harm to the individual. It will similarly contribute to the prevention and control of cases of organophosphate poisoning and promote the well-being of individuals and their families by promptly detecting and addressing cases in families visiting the Chalhuahuacho Health Center.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(S1): e6901

Approach to the patient poisoned by organophosphates. (10)	2023	Dialnet		Sara Lilibeth Flores Fiallos, Maria Jose Puchaicela Beltrán, Gissela del Cisne Rojas Rosales	To determine the best approach for the patient poisoned by organophosphates, given that currently, pesticide poisoning is a global problem due to the excessive use of these products, making it essential for health professionals to understand their mechanism of action, clinical manifestations, and routes of absorption to provide a good diagnosis and timely treatment to prevent possible complications.

Source: Creation of the authors

Summary:

Table 1 shows some of the metadata and main findings of articles on the nursing role in patients with poisoning. These articles, published between 2019 and 2025 in indexed databases such as Academic Repositories, Dialnet, PubMed, LILACS, and Scielo, reveal that implementing quality improvement projects has a positive impact on clinical outcomes by reducing complications. Additionally, the importance of proper coordination of the nursing role in poisoned patients is highlighted, which is associated with a decrease in mortality. Nursing leadership is identified as a crucial factor, promoting team coordination, clear communication, and appropriate decision-making. These findings, based on the selected articles, contribute to existing knowledge and can guide future research and clinical practice. See Table 2

Table 2. Poisoning by organophosphates.

Title	Year	Journal	Database	Authors	Findings
Nursing Care in the Management of Organophosphate Poisoning in Patients in the Emergency Service of the Acobamba Health Center, Tarma, 2019 (5)	2019	Repository of the Digital Institutional Repository of Callo University	VRI UNAC	Rodríguez Alcalde, Rossy Arazeli	Organophosphate, which is composed of phosphorus and highly toxic; when introduced into the human body it causes physiological alterations with different reactions in each organism, manifesting nicotinic and muscarinic signs and symptoms, classified as mild, moderate, or severe, and by time they are divided into acute or

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					chronic. These intoxications can occur intentionally or accidentally.
Nursing Care in Patients with Organophosphorus Pesticide Poisoning in Ecuador. [10]	2022	Institutional Repository of the State University of Milagros		Guillén Godoy, Mauricio Alfredo Vera Salavarría, Fernanda Leonor Avilés Acosta, María Maholy	Through the investigations conducted, sufficient information was collected that allowed determining the factors with the highest prevalence of organophosphorus poisonings in Ecuador; it is established that between the years 2019 and 2022 there are approximately 1,075 confirmed cases reported by the Ministry of Public Health of Ecuador.

Synthesis

Table 2 shows some of the metadata and main findings from articles on organophosphate poisoning. These articles, published between 2019 and 2025 in indexed databases such as Academic Repositories, Dialnet, PubMed, LILACS, and Scielo, reveal that the implementation of quality improvement projects has a positive impact on clinical outcomes, reducing complications. Additionally, the importance of adequate coordination of the nurse's role in poisoned patients is highlighted, associated with a decrease in mortality. Nursing leadership is identified as a crucial factor, promoting team coordination, clear communication, and appropriate decision-making. These findings, based on the selected articles, contribute to existing knowledge and can guide future research and clinical practices.

According to informative data collected from Table 1, precise information is obtained regarding nursing intervention plans for the care of patients with organophosphate poisoning compared to a study which,[11] mentions that it is common to receive patients suspected of some type of poisoning. In other cases of poisoning in Emergency Services, nursing staff should apply the management of acute poisoned patients based on the following points: resuscitation and stabilization; history and physical examination; decontamination methods; laboratory tests; toxin elimination methods; and antidotes.

Through inquiries from Table 2, sufficient information was compiled that allowed us to determine the most prevalent factors of organophosphate poisonings compared to a study which,[12] states that organophosphate poisoning is a very common public health problem in the country. It can cause structural or functional injuries to organs or systems and can even lead to death, resulting in a significant social impact as it predominantly affects the economically active population.

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Additional inquiries obtained from Table 1 gathered relevant information about the approach to patients poisoned by organophosphates, as this is a global issue due to the excessive use of these products compared to a specific study,[13] which indicates that it is essential for health professionals to know their mechanism of action, clinical manifestations, and routes of absorption to provide a good diagnosis and timely treatment to prevent possible complications.

Further inquiries from Table 2 considered nursing care in managing organophosphate poisoning in emergency service patients, comparing it to a study which,[14] helps to promptly identify the risks associated with organophosphates, highlighting the importance of efficient management of these patients, as it can make the difference between life and death. It is essential that all healthcare personnel in emergency services are well trained to recognize the symptoms of poisoning and act quickly and effectively.

CONCLUSIONS

Organophosphate poisoning occurs due to involuntary occupational exposure in agriculture, being a serious medical emergency that can result in severe neurological symptoms, respiratory difficulties, and in extreme cases, death. Urgent treatment includes decontamination, administration of specific antidotes such as atropine, and symptomatic support to minimize damage. Prevention through the safe handling of these chemicals is crucial to avoid these devastating incidents. The initial approach to patients poisoned by organophosphates, like any emergency, will stabilize using the mnemonic ABCDE. After this, in patients poisoned by organophosphates, gastric lavage and activated charcoal administration may be performed within the first hour after ingestion.

BIBLIOGRAPHIC REFERENCES

1. Flores Fiallos SL, Puchaicela Beltrán MJ, Rojas Rosales G del C. Abordaje del paciente intoxicado por organofosforado: Approach to the patient poisoned by organophosphorate. LATAM [Internet]. 11 de abril de 2023 [citado 21/10/2025]; 4(1): 4154–4164. Disponible en: https://latam.redilat.org/index.php/lt/article/view/555

2. Pino Vázquez A, Brezmes Raposo M. Intoxicación por organofosforados. Protoc diagn ter pediatr [Internet]. 2021 [citado 21/10/2025]; 1: 793-801.Disponible en: https://www.aeped.es/sites/default/files/documentos/55_intoxicacion_organofosforados.pdf

3. Saborío Cervantes IE, Mora Valverde M, Durán Monge MP. Intoxicación por organofosforados. Med. leg. Costa Rica [Internet]. 2019 Mar [cited 21/10/2025]; 36(1): 110-117. Available from: http://www.scielo.sa.cr/scielo.php?script=sci_arttext&pid=S1409-00152019000100110&lng=en.

4. OPS. ONU alerta a Costa Rica sobre alto costo del uso plaguicidas en la salud [Internet]. OPS; 2022 [cited 21/10/2025]. Disponible en: https://www.paho.org/es/noticias/27-5-2022-onu-alerta-costa-rica-sobre-alto-costo-uso-plaguicidas-salud

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(S1): e6901

5. Robles Gy. Cuidados de Enfermería en pacientes con intoxicación por pesticidas organofosforados en Ecuador. Milagro: UNEMI; 2022 Agosto.

6. Ministerio de Salud Pública. SUBSECRETARÍA DE VIGILANCIA DE LA SALUD PÚBLICA. SUBSISTEMA DE VIGILANCIA SIVE- ALERTA ETECTOS TÓXICOSY QUIMICOS; 2021[cited 21/10/2025]. Disponible en: https://www.salud.gob.ec/wp-content/uploads/2021/03/Toxicos-y-quimicos-SE-10.pdf

7. Gerstner RMF, Soriano I, Sanhueza A, Caffe S, Kestel D. Epidemiología del suicidio de adolescentes y jóvenes en Ecuador. Rev Pan Am Salud Publica [Internet]. 2018 [cited 21/10/2025]; 42: e100. Disponible en: https://iris.paho.org/bitstream/handle/10665.2/49163/v42e1002018.pdf

8. Aguilar L. Conocimientos y cuidados de enfermería sobre la intoxicación por organofosforado en pacientes que acuden al servicio de emergencia del Hospital Nacional dos de Mayo, 2022 [Tesis]. Lima – Perú; 2022 [cited 21/10/2025]. Disponible en: https://repositorio.uwiener.edu.pe/server/api/core/bitstreams/03781610-8525-4fdf-b781-f33c4a2fd820/content

9. Gonzales Cruz C. Plan de intervención de enfermería para la atención a pacientes con intoxicación por órganos fosforados en el centro de salud de Chalhuahuacho del istrito de Chalhuahuacho [Tesis]. Universidad Nacional del Callao; 2022 [cited 21/10/2025]. Disponible en: https://repositorio.unac.edu.pe/item/5bab0b0f-bdbf-4ecf-bdb4-7c4a063193ed

10. Rodriguez R. Cuidados de enfermería en el manejo de intoxicación por organofosforados en pacientes del servicio de emergencia del centro de salud Acobamba. Tarma. 2019 [Tesis]. Universidad Nacional del Callao; 2021 [cited 21/10/2025]. Disponible en: https://repositorio.unac.edu.pe/item/d1aa39e3-7a56-4aba-8efe-b7a04530612a

11. Quispe F. Intervención de enfermería en pacientes con intoxicación por órganos fosforados que acuden a la emergencia del CMI Dema Puente Piedra [Tesis]. Universidad Nacional del Callao; 2022 [cited 21/10/2025]. Disponible en: https://alicia.concytec.gob.pe/vufind/index.php/Record/UNAC_e2e3580b991bcb8b13c58629a49956ec

12. Valarezo D. Abordaje de la intoxicación por organofosforados. Repositorio Digital de UTMACH. 2021.

13. Gamarra J. Factores asociados y formas de intoxicación por organofosforados en pacientes del servicio de emergencia de un hospital público [Tesis]. Lima – Perú; 2023 [cited 21/10/2025]. Disponible en: https://repositorio.uwiener.edu.pe/server/api/core/bitstreams/002dcc3c-d70f-4834-884b-80cac81830db/content

14. Vasquez M. Estrés oxidativo en la intoxicación por organofosforados [Tesis]. Cuenca-Ecuador. Universidad Católica de Cuenca; 2023 [cited 21/10/2025]. Disponible en: https://dspace.ucacue.edu.ec/items/8f008b41-f7c7-4981-a77e-6605abd2ec02