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Demographic Characteristics, Clinical Manifestations, Treatment, and Outcomes of Organophosphate Poisoning at Abu Ali Sina Balkhi Regional Hospital, Afghanistan: A Retrospective Case Series

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ABSTRACT:

Background: Organophosphate poisoning is an important cause of acute pesticide toxicity and can result in cholinergic manifestations, respiratory failure, and death. Its clinical outcomes depend on the circumstances of exposure, severity of poisoning, timeliness of presentation, and availability of appropriate treatment.

Objective: To describe the demographic characteristics, clinical manifestations, treatment, and outcomes of patients with organophosphate poisoning admitted to Abu Ali Sina Balkhi Regional Hospital, Afghanistan, during the Afghan calendar year 1404 Solar Hijri.

Methods: A retrospective descriptive case series was conducted using 128 patient records supplied for analysis. The dataset included demographic information, type and route of exposure, reported circumstances of poisoning, clinical manifestations, antidote administration, mechanical ventilation, length of hospital stay, and treatment outcomes. Descriptive statistics were used to summarize the available data.

Results: The dataset contained 128 patients aged 18–80 years. The mean age was 27.1 years (standard deviation [SD], 11.0), and the median age was 25 years. Females accounted for 99 patients (77.3%) and males for 29 (22.7%). Fenitrothion-containing indoor

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insecticide powder was recorded in 124 cases (96.9%), while malathion agricultural insecticide was recorded in four cases (3.1%). Gastrointestinal exposure was recorded in 124 cases (96.9%), and dermal exposure in four (3.1%). Atropine and pralidoxime were documented for all patients. Four patients (3.1%) required mechanical ventilation. Three patients died in hospital, giving a recorded case-fatality proportion of 2.3%; 125 patients (97.7%) were recorded as having recovered. The calculated mean hospital stay was 6.9 days.

Conclusion: In this hospital-based series, most recorded cases involved gastrointestinal exposure to fenitrothion-containing insecticide powder, and most patients were young adults. The recorded in-hospital case-fatality proportion was 2.3%. These findings provide a preliminary description of organophosphate poisoning in this setting. Further investigation of poisoning circumstances, clinical severity, and treatment details are needed before broader conclusions can be drawn.

1. Introduction

Organophosphate compounds are widely used as agricultural and household insecticides. Human exposure may occur through ingestion, inhalation, or dermal absorption. Acute organophosphate poisoning is a potentially life-threatening condition because these compounds inhibit acetylcholinesterase, leading to acetylcholine accumulation at cholinergic synapses and excessive stimulation of muscarinic and nicotinic receptors.

The clinical manifestations of organophosphate poisoning vary in severity. Common features include nausea, vomiting, excessive salivation, bradycardia, bronchospasm, respiratory distress, muscle weakness, and altered consciousness. Severe poisoning may lead to respiratory failure and death. Respiratory complications are particularly important because they can result from excessive bronchial secretions, bronchoconstriction, impaired respiratory muscle function, and depression of consciousness.

Treatment generally involves appropriate resuscitation and supportive care, atropine to control clinically significant muscarinic effects, and consideration of an oxime such as pralidoxime. The need for airway management and mechanical ventilation depends on clinical severity and respiratory function. Early recognition and appropriate supportive treatment are therefore important components of management [4].

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Hospital-based research from different countries has demonstrated variation in the circumstances of poisoning, clinical presentation, treatment requirements, and outcomes. Noshad and colleagues reported on 80 patients with organophosphate insecticide poisoning in Tabriz, Iran. Ten patients required mechanical ventilation, and mortality was higher in this subgroup than among patients who did not require ventilation [1].

Khan and colleagues described eight patients admitted to an intensive care unit in Qatar during 2005. Seven cases were attributed to accidental exposure, and no deaths were recorded in that small series [2]. In India, Revankar and Vedavathi reviewed 120 patients and reported that organophosphate poisoning was more common among males, that muscarinic manifestations were frequent, and that the overall recovery rate was 93% [3].

Differences between these studies and other hospital series may reflect population characteristics, exposure circumstances, severity at presentation, access to healthcare, and study design. Findings from other countries should not automatically be generalized to Afghanistan.

Locally generated hospital data can help describe the patients who receive treatment, identify commonly documented manifestations, and assess recorded outcomes. Such information may also support improvements in clinical documentation, recognition of severe poisoning, and prevention strategies.

This study describes the demographic characteristics, clinical manifestations, treatment, and outcomes of patients with organophosphate poisoning at Abu Ali Sina Balkhi Regional Hospital in Afghanistan during the year 1404 Solar Hijri.

2. Research question

What are the demographic characteristics, clinical manifestations, treatment approaches, and clinical outcomes of patients with organophosphate poisoning admitted to Abu Ali Sina Balkhi Regional Hospital during the Afghan calendar year 1404 Solar Hijri?

3. Objectives

3.1 General objective

To describe the demographic characteristics, clinical manifestations, treatment, and outcomes of patients with organophosphate poisoning admitted to Abu Ali Sina Balkhi Regional Hospital during the year 1404 Solar Hijri.

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3.2 Specific objectives

1. To describe the age distribution of patients with organophosphate poisoning.
2. To determine the sex distribution of patients.
3. To describe the recorded marital status, causes, and routes of exposure.
4. To identify the types of organophosphate compounds documented in the records.
5. To describe the clinical manifestations recorded among patients.
6. To describe the time between exposure and hospital presentation.
7. To determine the proportions of patients who received atropine and pralidoxime.
8. To determine the proportion of patients requiring mechanical ventilation.
9. To describe the length of hospital stay.
10. To determine the recorded treatment outcomes and in-hospital case-fatality proportion.

4. Materials and methods

4.1 Study design

This study used a retrospective descriptive case-series design based on hospital patient records.

4.2 Study setting

The study setting was Abu Ali Sina Balkhi Regional Hospital in Afghanistan. The original proposal specified patients admitted to the Internal Medicine Department.

4.3 Study period

The proposed study period was from 1 Hamal 1404 to 29 Hoot 1404 Solar Hijri, according to the Afghan calendar.

4.4 Study population and sample size

The dataset supplied for this manuscript contained 128 patient records. The intended sampling approach was total population sampling, including all eligible adult patients diagnosed with organophosphate poisoning during the specified period.

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4.5 Inclusion criteria

The proposal specified the following criteria:

- Age 18 years or older.
- Confirmed diagnosis of organophosphate poisoning.
- Admission to Abu Ali Sina Balkhi Regional Hospital during the study period.

4.6 Exclusion criteria

- Age <18 years.
- Unconfirmed organophosphate poisoning.
- Records without sufficient information for the variables included in the study.

4.7 Study variables

The variables supplied for analysis included age, sex, marital status, type of compound, cause of poisoning, route of exposure, time to hospital presentation, signs and symptoms, atropine administration, pralidoxime administration, mechanical ventilation, length of hospital stay, and treatment outcome.

4.8 Data collection

Data were extracted retrospectively from patient medical records using a structured data collection form corresponding to the variables specified in the research proposal.

4.9 Statistical analysis

Data were coded and analyzed descriptively using MS Excel program. Categorical variables were summarized as frequencies and percentages. Age was summarized using the mean, standard deviation, median, and range. Length of stay was summarized from the recorded values.

4.10 Ethical considerations

Patient confidentiality was maintained throughout the study. No patient names or personal identifiers were included in the research dataset. The data were used exclusively for scientific purposes, and institutional approval was to be obtained according to the hospital's research protocols.

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5. Results

5.1 Demographic characteristics

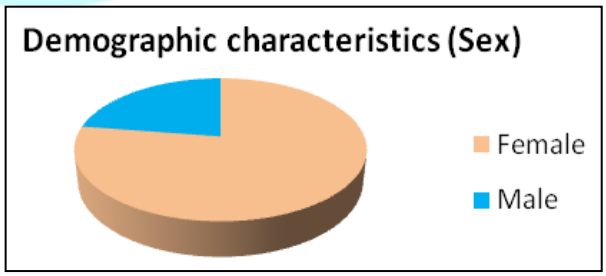
The dataset contained 128 patients aged 18–80 years. The mean age was 27.1 years (SD, 11.0), and the median age was 25 years. Most patients were young adults: 88 (68.8%) were aged 18–29 years, 32 (25.0%) were aged 30–44 years, four (3.1%) were aged 45–59 years, and four (3.1%) were aged 60 years or older.

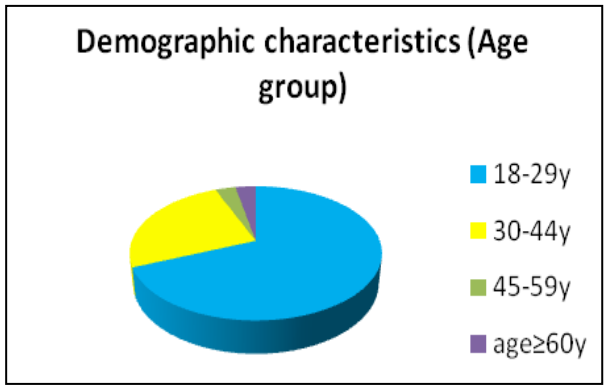
Females accounted for 99 patients (77.3%), while males accounted for 29 (22.7%). The female-to-male ratio was approximately 3.4:1.

Table 1. Demographic characteristics of patients

Characteristic	Number	Percentage
Total patients	128	100.0
Age 18–29 years	88	68.8
Age 30–44 years	32	25.0
Age 45–59 years	4	3.1
Age ≥60 years	4	3.1
Female	99	77.3
Male	29	22.7

Percentages may not sum to exactly 100.0 because of rounding.





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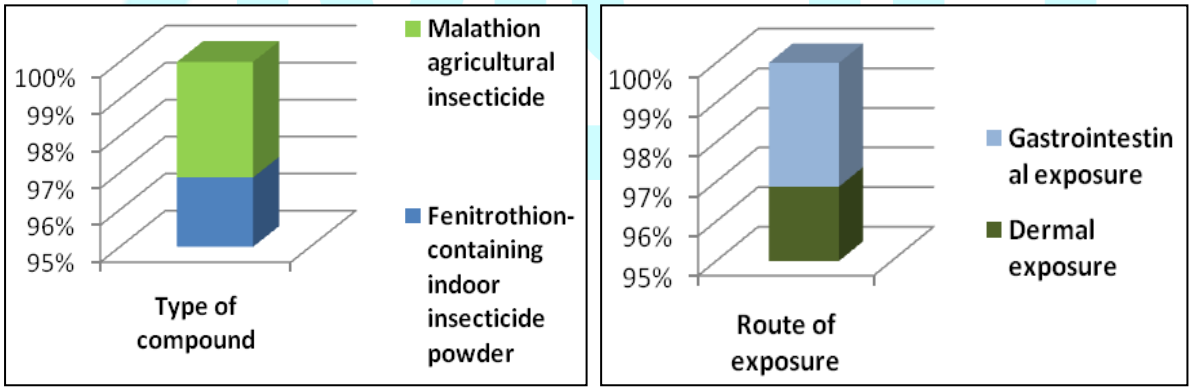
5.2 Type of compound and route of exposure

Fenitrothion-containing indoor insecticide powder was documented in 124 cases (96.9%). Malathion agricultural insecticide was recorded in four cases (3.1%). Gastrointestinal exposure was documented in 124 patients (96.9%), whereas dermal exposure was recorded in four (3.1%).

The recorded compound and route categories corresponded in the supplied data: the fenitrothion-containing product was associated with gastrointestinal exposure, and the malathion agricultural insecticide was associated with dermal exposure.

Table 2. Recorded compound and route of exposure

Variable	Number	Percentage
Fenitrothion-containing indoor insecticide powder	124	96.9
Malathion agricultural insecticide	4	3.1
Gastrointestinal exposure	124	96.9
Dermal exposure	4	3.1



5.3 Circumstances of poisoning and time to presentation

The four cases involving malathion were recorded as accidental exposures. The remaining 124 cases involving the fenitrothion-containing product were described as intentional. Many were documented as involving a small amount taken to threaten family members, while other entries were classified as intentional without a more specific explanation. Several records explicitly identified a suicide attempt.

The records should therefore not be interpreted as indicating that every intentional exposure was a suicide attempt.

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Most entries recorded presentation within one hour of exposure. A smaller number documented presentation after approximately two to three hours.

5.4 Clinical manifestations

The recorded symptoms included nausea, vomiting, dyspnea, bradycardia, urinary incontinence, and hypersalivation. Dyspnea was frequently documented, either alone or in combination with gastrointestinal symptoms. Some patients had a broader cluster of symptoms that included nausea, vomiting, bradycardia, dyspnea, urinary incontinence, and hypersalivation.

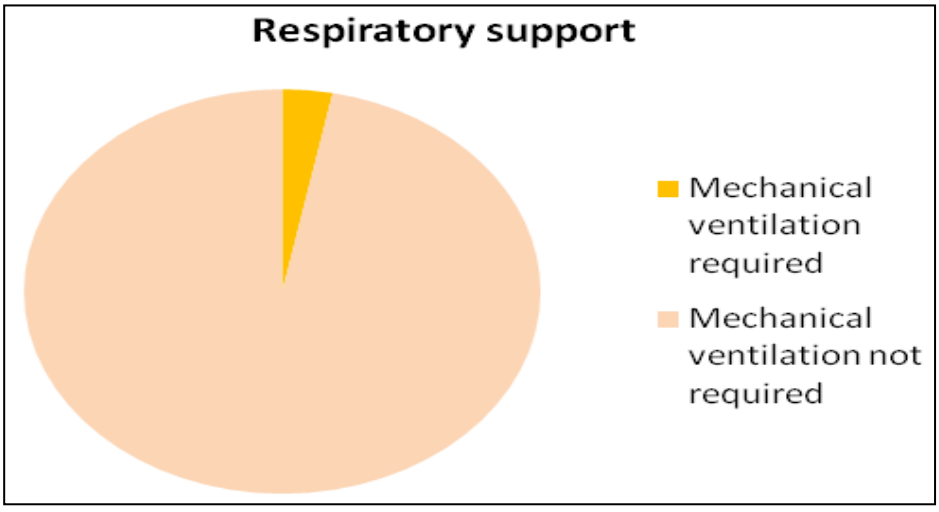
5.5 Treatment and mechanical ventilation

Atropine administration was recorded in all 128 patients (100.0%). Pralidoxime administration was also recorded in all 128 patients (100.0%).

Four patients (3.1%) required mechanical ventilation, while 124 (96.9%) were recorded as not requiring it.

Table 3. Recorded treatment and respiratory support

Variable	Number	Percentage
Atropine administered	128	100.0
Pralidoxime administered	128	100.0
Mechanical ventilation required	4	3.1
Mechanical ventilation not required	124	96.9



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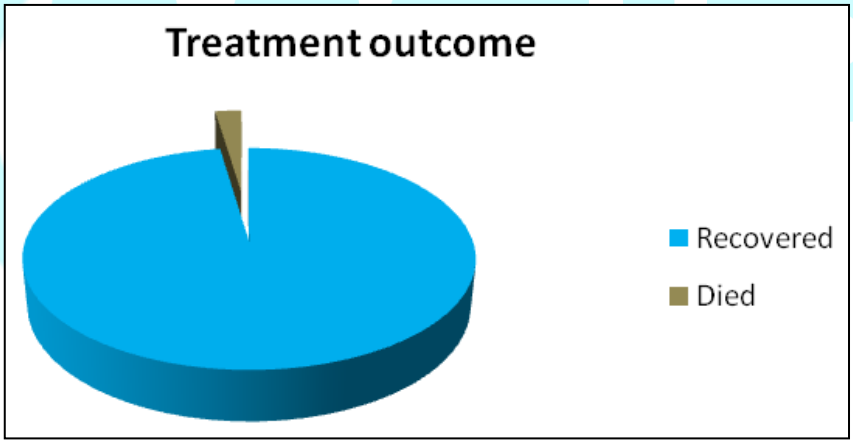
5.6 Treatment outcomes and mortality

Three patients died during hospitalization, giving a recorded in-hospital case-fatality proportion of 2.3% (3/128). The remaining 125 patients (97.7%) were recorded as having recovered.

All three recorded deaths occurred among the four patients who required mechanical ventilation. The fourth ventilated patient was recorded as having recovered. Thus, the recorded case-fatality proportion among ventilated patients was 75.0% (3/4), compared with no recorded deaths among the 124 patients who did not require ventilation.

Table 4. Recorded outcomes according to mechanical ventilation status

Outcome	Required ventilation (n=4)	Did not require ventilation (n=124)	Total (n=128)
Recovered	1	124	125
Died	3	0	3
Total	4	124	128



5.7 Length of hospital stay

The recorded length of hospital stay was seven days for 125 patients. The three patients who died had recorded stays of one, two, and three days, respectively. Using these entries, the calculated mean length of stay was approximately 6.9 days.

6. Discussion

This retrospective case series describes 128 patients recorded as having organophosphate poisoning at Abu Ali Sina Balkhi Regional Hospital. The principal findings were the

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predominance of fenitrothion-containing indoor insecticide exposure, a higher proportion of female patients, frequent documentation of dyspnea and gastrointestinal symptoms, universal recording of atropine and pralidoxime administration, and a recorded in-hospital case-fatality proportion of 2.3%.

6.1 Demographic characteristics

Young adults constituted the majority of the dataset, with 68.8% of patients aged 18–29 years. Females accounted for 77.3% of recorded cases. This differs from the male predominance described in the Indian study by Revankar and Vedavathi [3]. The difference may reflect local patterns of product availability, exposure circumstances, referral patterns, or other population-specific factors.

6.2 Compound and exposure route

The overwhelming predominance of recorded fenitrothion-containing indoor insecticide powder suggests that this product was important among the cases included in the dataset. Four patients were recorded as having dermal exposure to malathion agricultural insecticide.

These findings may help identify locally relevant exposure-prevention priorities, but they cannot establish the prevalence of poisoning from these products in the wider community.

6.3 Clinical manifestations and respiratory complications

The documented symptoms included nausea, vomiting, dyspnea, bradycardia, urinary incontinence, and hypersalivation. These manifestations are compatible with the clinical features commonly associated with acute cholinergic toxicity.

Respiratory compromise is a recognized cause of severe outcomes in organophosphate poisoning. Noshad and colleagues reported substantially higher mortality among patients requiring mechanical ventilation than among those who did not require it [1]. In the present series, all three deaths occurred among the four patients recorded as requiring ventilation.

6.4 Treatment and outcomes

All 128 records documented atropine and pralidoxime administration. The recorded recovery proportion was 97.7%, and the recorded case-fatality proportion was 2.3%.

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Khan and colleagues reported no deaths in their series of eight intensive-care patients in Qatar [2], while Revankar and Vedavathi reported a recovery rate of 93% in their Indian series [3]. These figures should not be compared as if they came from equivalent populations. Differences in sample size, severity, exposure, treatment setting, and outcome documentation may explain some of the variation.

7. Limitations

1. **Retrospective data:** The results depend on the accuracy and completeness of existing records.
2. **Limited clinical variables:** Laboratory findings, physiological measurements, antidote doses, and standardized severity scores were unavailable.
3. **No comparative treatment analysis:** All records documented both atropine and pralidoxime, so treatment effectiveness cannot be evaluated from this dataset.

8. Conclusion

In this retrospective series of 128 patients, organophosphate poisoning was predominantly recorded among young adults and females. Fenitrothion-containing indoor insecticide powder and gastrointestinal exposure accounted for most documented cases. Atropine and pralidoxime administration were recorded for all patients, four required mechanical ventilation, and three died during hospitalization, yielding a recorded in-hospital case-fatality proportion of 2.3%.The findings provide preliminary hospital-based data on organophosphate poisoning in northern Afghanistan and may serve as a baseline for future multicenter studies with larger samples and more detailed clinical information.

9. Recommendations

1. Strengthen standardized documentation of the specific pesticide, route of exposure, circumstances of poisoning, time to presentation, clinical signs, treatment, and outcome.
2. Record the dose, timing, and duration of atropine and pralidoxime administration whenever available.

DOI: *10.5281/zenodo.23882508*

3. Promote safe storage, handling, and restricted access to hazardous pesticides where appropriate.

4. Conduct multicenter studies with standardized variables and larger samples to investigate factors associated with severe poisoning and mortality.

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