Section: General Medicine

Original Research Article

CLINICOEPIDEMIOLOGICAL PROFILE AND OUTCOMES OF ORGANOPHOSPHORUS VERSUS NON-ORGANOPHOSPHORUS POISONING IN A MEDICAL INTENSIVE CARE UNIT: A PROSPECTIVE COMPARATIVE STUDY

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ABSTRACT

Background: Acute poisoning is a major public-health problem in low- and middle-income countries. Organophosphorus (OP) compounds are among the commonest agents in South Asia, while non-organophosphorus (non-OP) poisons form a heterogeneous group with distinct toxicological profiles. Direct comparison of the clinico-epidemiological features and outcomes of these two categories in the intensive care setting remains limited.

Materials and Methods: A hospital-based, prospective, observational, comparative study was conducted over 18 months in the Medical Intensive Care Unit (MICU) of a tertiary-care teaching hospital. A total of 100 patients with acute poisoning fulfilling the inclusion criteria were enrolled and divided equally into an OP poisoning group (n = 50) and a non-OP poisoning group (n = 50). Demographic profile, clinical presentation, laboratory and arterial blood gas parameters, radiological findings, Glasgow Coma Scale (GCS), Sequential Organ Failure Assessment (SOFA) score, therapeutic interventions, length of hospital stay, and final outcome were compared between the groups using the Student's t-test/Mann-Whitney U test for continuous variables and the Chi-square/Fisher's exact test for categorical variables; $p < 0.05$ was considered significant.

Results: Patients with OP poisoning were slightly older (35.68 ± 13.74 vs 32.38 ± 17.11 years; $p = 0.04$) and more often male. Classical cholinergic manifestations - diarrhea, salivation, lacrimation, miosis, respiratory distress, and muscle spasm - were significantly more frequent in the OP group, whereas altered mental status and gastric cramps predominated in the non-OP group. The OP group showed more severe acidemia (pH 7.09 ± 0.12 vs 7.35 ± 0.13), lower GCS scores, higher SOFA categories, and significantly longer hospital stay (4-5 days in 54.0% vs 1-3 days in 56.0% of non-OP patients). Chlorpyriphos (38.0%) was the commonest OP agent and aluminium phosphide/Celphos (38.0%) the commonest non-OP agent. Intentional self-poisoning predominated in both groups (52.0% OP vs 90.0% non-OP; $p = 0.048$). Mortality was comparable between groups (26.0% OP vs 24.0% non-OP; $p = 0.050$).

Conclusion: Organophosphorus poisoning is associated with more pronounced cholinergic toxicity, greater neurological and metabolic derangement, and longer hospitalization than non-organophosphorus poisoning, although overall mortality is similar between the two groups. Early recognition, objective severity scoring using GCS and SOFA, and prompt intensive-care management remain central to improving outcomes in acute poisoning.

Keywords: Organophosphorus poisoning; Non-organophosphorus poisoning; Clinicoepidemiological profile; Intensive care unit; Glasgow Coma Scale; SOFA score; Outcome; Acute poisoning, India

INTRODUCTION

Poisoning is defined as the occurrence of harmful effects in the body following exposure to a toxic substance through ingestion, inhalation, dermal absorption, or injection. Acute poisoning is a major medical emergency and public-health problem worldwide, with the World Health Organization estimating over three million cases of intoxication annually and approximately 640,000 deaths, more than 90% of which occur in low- and middle-income countries.[1]

Globally, pesticide poisoning accounts for a large proportion of acute poisoning, with organophosphorus (OP), organochlorine, and aluminium phosphide compounds responsible for up to 300,000 deaths annually.[2] A systematic review estimated 385 million cases of unintentional acute pesticide poisoning worldwide each year, with organophosphorus compounds implicated in the majority of serious toxicities because of their mechanism of irreversible acetylcholinesterase inhibition and consequent cholinergic crisis.[2,3]

The burden of poisoning is unevenly distributed: fatality rates in high-income countries are approximately 1-2%, whereas case-fatality rates for acute poisoning in India may reach 20-30% in some hospital series, reflecting delayed presentation, limited critical-care resources, and easy availability of highly toxic compounds.[4] In South Asia, poisoning is frequently associated with deliberate self-harm; pesticide self-poisoning accounts for up to 20% of global suicide deaths, and at least 30% of the roughly 230,000 annual suicides in India involve pesticides.[5]

Non-organophosphorus (non-OP) poisoning constitutes a heterogeneous group, including aluminium phosphide, zinc phosphide, corrosives, paraquat, and other household or agricultural chemicals, each with distinct toxicokinetics and clinical manifestations.[6,7] Hospital-based studies from India consistently show that pesticides, and organophosphorus compounds in particular, form the largest single category of poisoning admissions to intensive care units, with mortality ranging from 12% to over 20% in various series.[1,6]

Although both OP and non-OP poisoning contribute substantially to intensive-care morbidity and mortality, few studies have directly compared their clinico-epidemiological profiles, severity indices, and outcomes within the same intensive-care setting. Such a comparison can help clinicians anticipate the likely clinical course, anticipate complications, and triage resources more effectively. The present study was therefore undertaken to compare the demographic profile, clinical presentation, laboratory and radiological findings, severity of illness (assessed by the Glasgow Coma Scale and the Sequential Organ Failure Assessment score), therapeutic interventions, and clinical outcome of patients with organophosphorus poisoning against those with non-organophosphorus poisoning admitted to the Medical Intensive Care Unit (MICU) of a tertiary-care teaching hospital in Uttarakhand, India.

Aim and Objectives

Aim: To conduct a comparative study of the clinicoepidemiological profile and outcome in organophosphorus poisoning and non-organophosphorus poisoning patients in a Medical Intensive Care Unit setting.

Objectives

1. To study the clinicoepidemiological profile of organophosphorus and non-organophosphorus poisoning patients in the Medical Intensive Care Unit.
2. To study intent, seasonal variation, precipitating factors, and catchment areas in organophosphorus and non-organophosphorus poisoning cases.
3. To evaluate the effectiveness of existing treatment protocols and interventions used for managing both categories of poisoning in the Medical Intensive Care Unit setting.
4. To study the outcome and indicators of adverse outcome in organophosphorus and non-organophosphorus poisoning cases.

MATERIALS AND METHODS

Study Design and Setting: This was a hospital-based, prospective, observational, comparative study conducted in the Medical Intensive Care Unit (MICU) of the study hospital to evaluate and compare the clinico-epidemiological profile, clinical course, and outcomes of patients admitted with organophosphorus (OP) poisoning and non-organophosphorus (non-OP) poisoning.

Study Period and Population: The study was conducted over 18 months from the date of acceptance of the study protocol by the Institutional Ethics Committee. All cases of suspected acute poisoning admitted to the MICU during the study period were screened, and those fulfilling the inclusion and exclusion criteria were enrolled. A total of 100 patients were enrolled and divided into two equal groups of 50 patients each - the OP poisoning group and the non-OP poisoning group.

Inclusion Criteria

- Patients admitted to the MICU with a diagnosis of either organophosphorus or non-organophosphorus poisoning;
- Age 16 years or older;
- Consent provided by the patient or legal guardian for participation.

Exclusion Criteria

- Patients transferred to the MICU more than 24 hours after initial hospital admission;
- Patients with co-existing critical illnesses that could confound outcome assessment (e.g., multi-organ failure unrelated to poisoning);
- Patients who declined to participate or withdrew consent;
- Patients admitted for a total hospital duration of less than 24 hours;
- Patients discharged, referred, who left against medical advice, or who died within 24 hours of ICU admission.

Ethical Considerations: Ethical approval was obtained from the Institutional Ethics Committee prior to commencement of the study. Written informed consent was obtained from each patient or, where the patient was unable to consent, from a close relative/legal guardian, prior to enrolment.

Study Methodology: Each case was documented using a pre-designed and pre-tested structured proforma capturing clinical history, presenting symptoms, laboratory results, and treatment outcomes. Data on demographics (age, gender, occupation, residential area), clinical characteristics (poisoning agent, route of exposure, time to presentation, presenting clinical features), and premorbid conditions were recorded from the patient or relatives. The specific poisoning agent was confirmed on the basis of clinical presentation, circumstantial evidence, and the container/packet of the substance brought by relatives where available.

Immediately after admission, necessary therapeutic intervention was initiated following clinical examination to stabilize the patient; measures to limit further toxin absorption (gastric lavage, activated charcoal) were continued or initiated in patients presenting within 4 hours of poisoning. Specific antidotal therapy was administered where clinically indicated. The Sequential Organ Failure Assessment (SOFA) score was recorded at ICU admission to grade severity of illness, along with documentation of vasoactive drug requirement, acute renal failure requiring renal replacement therapy, hepatic failure, and coagulopathy.

Study Variables: Variables recorded and compared between the two groups included: demographic profile (age, gender, weight, height, occupation, socioeconomic class, hilly/non-hilly residence); clinical symptomatology (vomiting, diarrhea, salivation, lacrimation, urination, defecation, gastric cramps, respiratory distress, altered mental status, miosis, muscle spasm); clinical examination findings (blood pressure, heart rate, respiratory rate, temperature, oxygen saturation); laboratory parameters (hemoglobin, PCV, TLC, platelet count, urea, creatinine, bilirubin, sodium, potassium, PT, aPTT, INR); arterial blood gas parameters (pH, pCO_2, pO_2, HCO_3^-, Na^+, K^+); chest radiographic findings; specific poisoning agent; manner/intention of poisoning; level of consciousness (GCS); severity of illness (SOFA score); duration of hospital stay; therapeutic interventions (mechanical ventilation, IV fluids, vasopressors, dialysis, antibiotics); and final outcome (discharged, left against medical advice [LAMA], or death).

Statistical Analysis: Data were analyzed using SPSS (Statistical Package for the Social Sciences). Descriptive statistics were used to summarize demographic, clinical, and outcome data. Continuous variables were compared between groups using the Student's t-test or the Mann-Whitney U test, as appropriate, while categorical variables were analyzed using the Chi-square test or Fisher's exact test. Logistic regression analysis was used to identify factors independently associated with mortality and recovery, and multivariate analysis was used to adjust for confounders. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 100 patients with acute poisoning fulfilling the inclusion criteria were analyzed, equally divided into an organophosphorus (OP) poisoning group (n = 50) and a non-organophosphorus (non-OP) poisoning group (n = 50).

Both groups were equally represented (50 patients each), permitting a balanced comparison of clinico-epidemiological profile and outcome.

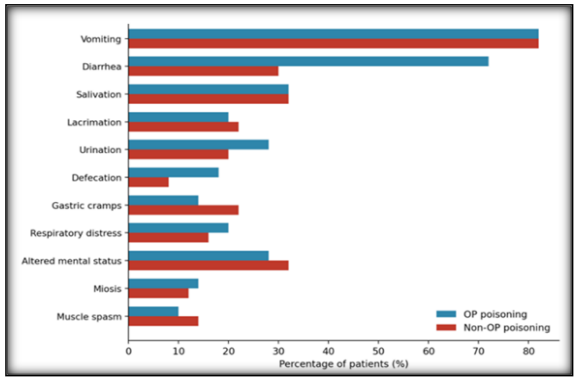

Figure 1: Symptomatology profile of the study population.

Table 1: Comparison of Demographic Characteristics (N = 100)

Variable	OP Poisoning (Mean ± SD / n %)	Non-OP Poisoning (Mean ± SD / n %)	p-value
Age (years)	35.68 ± 13.74	32.38 ± 17.11	0.04*
Male	30 (60.0%)	27 (54.0%)	0.69
Female	20 (40.0%)	23 (46.0%)	0.69
Weight (kg)	64.22 ± 9.23	62.47 ± 14.48	0.37
Height (cm)	163.92 ± 9.57	161.44 ± 8.97	0.13
Hilly area residence	14 (28.0%)	17 (34.0%)	0.02*

Patients with OP poisoning were significantly older than non-OP poisoning patients (35.68 ± 13.74 vs 32.38 ± 17.11 years; p = 0.04). Gender distribution, weight, and height were comparable between groups, while residence in a hilly area differed significantly (p = 0.02).

The majority of patients in both groups belonged to the lower-middle socioeconomic class (68.0% OP vs 60.0% non-OP), and most patients resided in non-hilly areas, although a substantial minority in both groups were from hilly regions of Uttarakhand.

Vomiting was the commonest symptom in both groups (82.0% each; p = 0.39). Classical cholinergic manifestations - diarrhea (72.0% vs 30.0%; p = 0.02), salivation, lacrimation, urination, respiratory distress, miosis, and muscle spasm - were significantly more frequent among OP poisoning patients, whereas gastric cramps and altered mental status were more common among non-OP poisoning patients (p < 0.05 for all).

Table 2: Clinical Examination (Vital Parameters) Profile (N = 100)

Vital Parameter	OP (Mean ± SD)	Non-OP (Mean ± SD)	p-value
Systolic BP (mmHg)	126.58 ± 19.91	124.15 ± 19.49	0.40
Diastolic BP (mmHg)	80.46 ± 11.41	77.90 ± 10.77	0.04*
Heart rate (beats/min)	93.44 ± 22.77	91.54 ± 18.93	0.03*
Respiratory rate (per min)	18.4 ± 1.3	18.1 ± 1.3	0.07
Temperature (°F)	98.7 ± 1.2	98.5 ± 1.2	0.30
Oxygen saturation (%)	95.3 ± 7.6	94.77 ± 6.9	0.04*

Diastolic blood pressure, heart rate, and oxygen saturation differed significantly between groups (p < 0.05), while systolic blood pressure, respiratory rate, and temperature were comparable.

Table 3: Laboratory Profile of the Study Population & ABG (N = 100)

Laboratory Parameter	OP (Mean ± SD)	Non-OP (Mean ± SD)	p-value
Hemoglobin (g/dL)	11.78 ± 2.36	12.05 ± 2.80	0.55
Packed cell volume (%)	35.02 ± 6.49	38.18 ± 7.76	0.02*
Total leukocyte count (/mm³)	4321.93 ± 4587.00	3703 ± 4321.69	0.45
Platelet count (×10³/mm³)	136.68 ± 69.43	137.76 ± 67.97	0.09
Blood urea (mg/dL)	32.17 ± 12.17	29.35 ± 17.16	0.03*
Serum creatinine (mg/dL)	0.95 ± 0.55	1.14 ± 1.01	0.03*
Total bilirubin (mg/dL)	0.73 ± 1.16	1.24 ± 1.43	0.05*
Serum sodium (mmol/L)	138.76 ± 5.01	140.18 ± 4.54	0.05*
Serum potassium (mmol/L)	3.82 ± 0.57	3.55 ± 0.59	0.02*
Prothrombin time (s)	22.24 ± 12.46	21.47 ± 12.34	0.07
aPTT (s)	37.06 ± 11.91	32.58 ± 12.20	0.05*
INR	1.49 ± 1.01	1.52 ± 1.05	0.08
ABG / Electrolyte Parameter	OP (Mean ± SD)	Non-OP (Mean ± SD)	p-value
pH	7.09 ± 0.12	7.35 ± 0.13	0.030*
pCO□ (mmHg)	38.06 ± 13.84	35.86 ± 12.84	0.020*
pO□ (mmHg)	85.34 ± 28.76	77.12 ± 29.56	0.040*
HCO□□ (mmol/L)	19.21 ± 4.59	18.64 ± 5.28	0.045*
Sodium (mmol/L)	138.18 ± 4.39	139.10 ± 5.20	0.050*
Potassium (mmol/L)	3.50 ± 0.49	3.72 ± 0.59	0.020*

Packed cell volume, blood urea, serum creatinine, total bilirubin, serum sodium, serum potassium, and aPTT differed significantly between the OP and non-OP groups (p < 0.05), reflecting relatively greater renal, hepatic, and coagulation derangement associated with the specific toxic agents involved in each group.

Patients with OP poisoning showed markedly greater acidemia (pH 7.09 ± 0.12 vs 7.35 ± 0.13) and more pronounced derangement of pCO_2, pO_2, and HCO_3^- compared with the non-OP group, consistent with more severe respiratory and metabolic compromise in organophosphorus poisoning.

Table 4: Radiological Findings on Chest X-ray (N = 100)

Chest X-ray Finding	OP n (%)	Non-OP n (%)	p-value
Consolidation	2 (4.0%)	5 (10.0%)	0.04*
Pleural effusion	4 (8.0%)	2 (4.0%)	0.00*
Pneumothorax	1 (2.0%)	1 (2.0%)	0.05*
Pulmonary edema	2 (4.0%)	8 (16.0%)	0.01*
Cardiomegaly	3 (6.0%)	2 (4.0%)	0.01*

Pulmonary edema and consolidation were more frequent in the non-OP group, whereas pleural effusion and cardiomegaly were relatively more common in the OP group; all differences were statistically significant.

Table 5: Distribution of Specific Poisoning Agents

Top Poisoning Agents	OP n (%)	Top Non-OP Agents (n %)
Chlorpyriphos 40%	19 (38.0%)	Aluminium phosphide / Celphos - 19 (38.0%)
Unknown compound	10 (20.0%)	Unknown - 13 (26.0%)
Dichlorvos preparations	3 (6.0%)	Zinc phosphide - 6 (12.0%)
Monocrotophos 36% SL	2 (4.0%)	Phenyl - 3 (6.0%)
Chlorpyriphos + Cypermethrin mixes	2 (4.0%)	Paraquat dichloride - 2 (4.0%)
Other single OP agents	14 (28.0%)	Other single agents (amitraz, battery acid, imidacloprid, wild plant/mushroom, etc.) - 7 (14.0%)

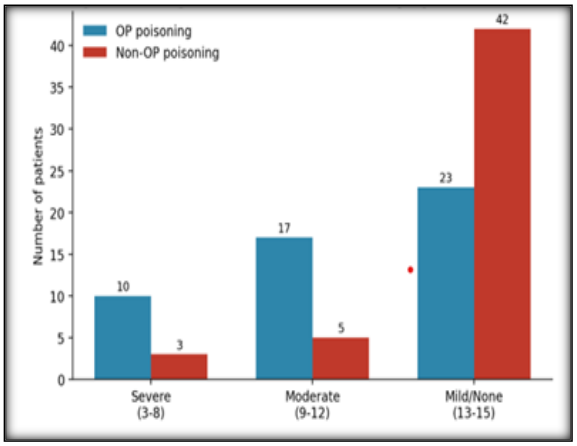

Figure 2: Glasgow Coma Scale (GCS) category at presentation.

Chlorpyriphos-based formulations were the predominant OP agents (38.0%), while aluminium phosphide (Celphos) was the leading non-OP agent (38.0%), followed by zinc phosphide (12.0%). A substantial proportion of cases in both groups involved an agent that could not be definitively identified at presentation.

Intentional self-poisoning was the predominant mode of exposure in both groups and was significantly more frequent in the non-OP group (90.0% vs 52.0%; p = 0.048). The reason for poisoning could not be established in 46.0% of OP cases, reflecting frequent inability to obtain a reliable history in this group.

A significantly higher proportion of OP poisoning patients presented with severe (20.0% vs 6.0%) or moderate (34.0% vs 10.0%) impairment of consciousness compared with non-OP patients, indicating greater neurological involvement in organophosphorus poisoning.

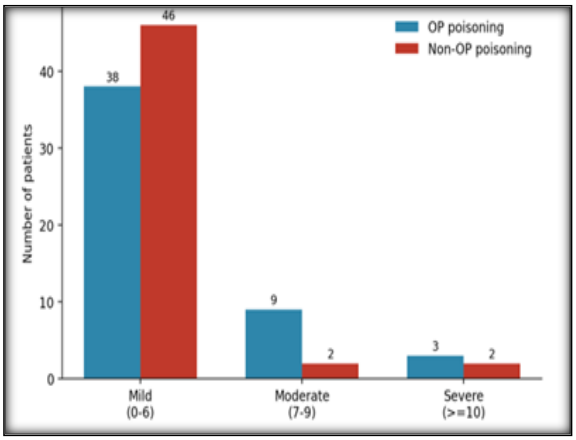

Figure 3: SOFA score category at ICU admission.

Table 6: SOFA Severity Score Category (N = 100)

SOFA Score Category	OP n (%)	Non-OP n (%)	p-value
Mild (0-6)	38 (76.0%)	46 (92.0%)	0.035*
Moderate (7-9)	9 (18.0%)	2 (4.0%)	0.040*
Severe (≥10)	3 (6.0%)	2 (4.0%)	0.020*

Moderate (18.0% vs 4.0%) and severe (6.0% vs 4.0%) organ dysfunction was more frequent among OP poisoning patients, suggesting greater multisystem involvement in this group.

OP poisoning patients had significantly longer hospital stays; 54.0% remained hospitalized for 4-5 days compared with 36.0% of non-OP patients, and only OP patients required stays exceeding 10 days (4.0%).

Table 7: Need for Medical Intervention (N = 100)

Intervention	OP n (%)	Non-OP n (%)	p-value
Mechanical ventilation	8 (16.0%)	7 (14.0%)	0.05*
IV fluids	42 (84.0%)	42 (84.0%)	0.20
Vasopressors	13 (26.0%)	14 (28.0%)	0.04*
Dialysis	3 (6.0%)	6 (12.0%)	0.035*
Broad-spectrum antibiotics	25 (50.0%)	14 (28.0%)	0.002*

Intravenous fluid therapy was the most frequently used intervention in both groups (84.0% each). Broad-spectrum antibiotics were used significantly more often in OP poisoning (50.0% vs 28.0%; p = 0.002), while dialysis was more frequently required in the non-OP group (12.0% vs 6.0%; p = 0.035).

Discharge was the commonest outcome among OP poisoning patients (46.0% vs 30.0%; p = 0.025), whereas a greater proportion of non-OP poisoning patients left against medical advice (46.0% vs 28.0%; p = 0.002). Mortality was comparable between the two groups (26.0% OP vs 24.0% non-OP; p = 0.050),

indicating a substantial and similar burden of fatal outcome irrespective of poison category.

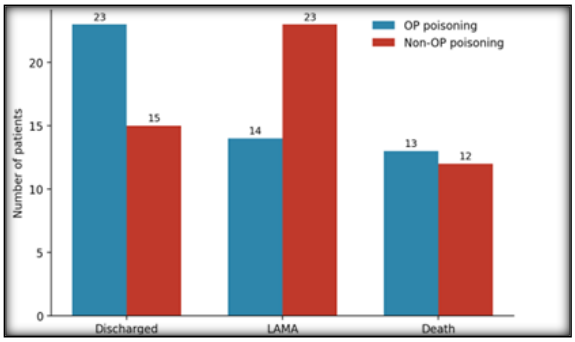

Figure 4: Clinical outcome of the study population.

DISCUSSION

Poisoning remains an important public-health problem worldwide and a major cause of emergency and intensive-care admissions, particularly in developing countries where agricultural pesticides, household chemicals, and rodenticides are easily accessible. The present study compared 50 patients with organophosphorus (OP) poisoning against 50 patients with non-organophosphorus (non-OP) poisoning admitted to the same MICU, allowing a balanced, direct comparison of clinico-epidemiological profile, severity, and outcome.

Patients with OP poisoning were slightly but significantly older than non-OP poisoning patients (35.68 ± 13.74 vs 32.38 ± 17.11 years; p = 0.04), consistent with Eddleston et al,[7] who reported that pesticide poisoning predominantly affects economically productive individuals in low- and middle-income countries; similar age patterns have been described by Dash et al,[8] Peter et al,[9] and Banerjee et al.[10] Both groups showed a male predominance, in agreement with several Indian series,[5] generally attributed to greater occupational exposure to pesticides and outdoor agricultural work among men. Most patients in both groups belonged to the lower-middle socioeconomic class, comparable with the observations of Gunnell et al,[3] Buckley et al,[11] who linked pesticide poisoning to financial stress, agricultural dependence, and easy availability of toxic compounds among lower-income groups. The significant association between hilly residence and poisoning type reflects the geography of the study region (Uttarakhand), where both plains and hill populations are referred to the same tertiary centre, an effect also noted in other studies from northern India.[12]

Vomiting was the commonest presenting symptom in both groups (82.0% each), consistent with Eddleston et al,[4] Peter et al,[9] and Ramesha et al,[5] reflecting direct gastrointestinal irritation and chemoreceptor trigger-zone stimulation common to most poisons. Classical cholinergic manifestations - diarrhea, salivation, lacrimation, urination, miosis, and muscle spasm - were significantly more frequent among OP poisoning patients, in keeping with the well-established pathophysiology of acetylcholinesterase inhibition described by Karalliedde and Senanayake,[13] and Bardin et al.[14] Respiratory distress was likewise more frequent in the OP group, consistent with Munidasa et al,[15] and Eddleston et al,[4] who identified respiratory compromise - arising from bronchorrhea, bronchospasm, respiratory muscle weakness, and central respiratory depression - as a major determinant of severity in organophosphorus poisoning. In contrast, altered mental status and gastric cramps were more frequent in the non-OP group, likely reflecting the heterogeneous toxicological mechanisms of aluminium phosphide, corrosives, and other non-OP agents, as also observed by Churi et al,[16] and Siwach et al.[17]

Laboratory and arterial blood gas findings demonstrated more pronounced metabolic and physiological derangement in the OP group, including significantly lower packed cell volume, higher blood urea, altered electrolytes, longer aPTT, and markedly greater acidemia (pH 7.09 ± 0.12 vs 7.35 ± 0.13). These findings mirror reports by Liu et al,[18] De Silva et al,[19] and Lee et al,[20] who described metabolic acidosis and renal/electrolyte disturbance as markers of severity in acute organophosphate poisoning. Radiological findings differed by group, with pulmonary edema and consolidation more common in non-OP poisoning and pleural effusion/cardiomegaly more common in OP poisoning, suggesting agent-specific patterns of cardiopulmonary involvement.

Chlorpyriphos was the leading OP agent identified, in line with its widespread agricultural use in the region, while aluminium phosphide (Celphos) was the predominant non-OP poison, consistent with its recognized lethality and easy availability as a stored-grain fumigant.[17] Intentional self-poisoning predominated in both groups, and was significantly more frequent among non-OP poisoning patients (90.0% vs 52.0%), corroborating the well-documented link between pesticide/rodenticide accessibility and deliberate self-harm in South Asia.[3,5] The high proportion of OP cases with an unknown or undocumented motive (46.0%) likely reflects the depressed sensorium frequently seen at presentation in these patients, limiting reliable history-taking.

Severity assessment showed that OP poisoning patients presented with significantly lower GCS scores and higher SOFA categories than non-OP poisoning patients, indicating greater neurological impairment and multisystem organ dysfunction, in agreement with previous reports linking cholinergic crisis to depressed consciousness and respiratory failure.[4] Intravenous fluid therapy was the most common intervention in both groups; broad-spectrum antibiotics were used more often in OP poisoning, likely reflecting the higher burden of aspiration and respiratory complications in this group, while dialysis was required more often in non-OP poisoning,

consistent with the nephrotoxic potential of agents such as aluminium phosphide and paraquat.[20]

OP poisoning patients had significantly longer hospital stays than non-OP poisoning patients, with over half requiring 4-5 days of hospitalization and a small proportion requiring more than 10 days, whereas the majority of non-OP patients were discharged within 3 days - reflecting either more protracted cholinergic toxicity requiring supportive care, or, conversely, the higher early mortality/LAMA rate that shortens hospital stay in some non-OP poisonings (e.g., rapidly fatal aluminium phosphide toxicity). Discharge was the commonest outcome among OP poisoning patients, while a higher proportion of non-OP poisoning patients left against medical advice, possibly reflecting poorer perceived prognosis, particularly with aluminium phosphide poisoning, for which effective antidotal therapy is limited. Importantly, overall mortality was comparable between the two groups (26.0% vs 24.0%), underscoring that both categories of poisoning carry a substantial and broadly similar risk of fatal outcome despite differing clinical trajectories - a finding consistent with hospital-based Indian series reporting overall poisoning mortality in the range of 12-26%.[1,6]

Summary: This prospective, observational, comparative study evaluated 100 patients with acute poisoning admitted to a Medical Intensive Care Unit, equally divided into organophosphorus (n = 50) and non-organophosphorus (n = 50) poisoning groups. Most patients in both groups were young adults of lower-middle socioeconomic status, with a male predominance, from a mixed hilly and non-hilly catchment area typical of the Uttarakhand region. Classical cholinergic manifestations, greater acid-base and electrolyte derangement, lower GCS scores, higher SOFA categories, and longer hospital stay characterized the OP poisoning group, whereas altered mental status, gastric cramps, and a higher rate of intentional self-poisoning and treatment discontinuation (LAMA) characterized the non-OP poisoning group. Chlorpyriphos and aluminium phosphide (Celphos) were the leading agents in the respective groups. Intravenous fluids were the mainstay of treatment in both groups, with antibiotics used more often in OP poisoning and dialysis used more often in non-OP poisoning. Overall mortality was comparable between the two groups at approximately one-quarter of patients.

CONCLUSION

1. Organophosphorus poisoning predominantly affected young adult males from rural/agricultural backgrounds and remained an important cause of acute poisoning in this setting.
2. Chlorpyriphos was the commonest organophosphorus agent, whereas aluminium phosphide (Celphos) was the most common non-organophosphorus agent.
3. Intentional self-poisoning was the predominant mode of poisoning in both groups, particularly among non-organophosphorus poisoning patients.
4. Organophosphorus poisoning patients exhibited more severe cholinergic manifestations, greater physiological disturbance, and more pronounced biochemical and arterial blood gas abnormalities than non-organophosphorus poisoning patients.
5. Organophosphorus poisoning patients presented with significantly lower GCS scores and higher SOFA scores, indicating greater neurological impairment and organ dysfunction.
6. Intravenous fluid therapy was the most frequently administered treatment in both groups; broad-spectrum antibiotics were more often required in organophosphorus poisoning, and dialysis was more often required in non-organophosphorus poisoning.
7. Organophosphorus poisoning patients required significantly longer hospitalization than non-organophosphorus poisoning patients.
8. Overall mortality was comparable between the two groups, indicating that both organophosphorus and non-organophosphorus poisoning are associated with substantial morbidity and mortality.
9. Early diagnosis, prompt resuscitation, timely antidotal and supportive therapy, careful monitoring for organ dysfunction, and intensive-care management remain essential to improving outcomes in acute poisoning.

Strengths and Limitations

Strengths: This study provides a direct, contemporaneous comparison between organophosphorus and non-organophosphorus poisoning patients managed at the same tertiary-care centre, with comprehensive evaluation of demographic profile, clinical features, laboratory and radiological findings, standardized severity scoring (GCS and SOFA), therapeutic interventions, and clinically relevant outcome measures.

Limitations: The study was conducted at a single tertiary-care centre with a relatively modest sample size, limiting generalizability. Serum cholinesterase levels and other specific toxicological investigations were not available for all patients, limiting objective confirmation of poisoning severity. Long-term follow-up after discharge was not performed, so delayed complications and long-term outcomes could not be assessed. The exact poisoning agent or intent could not be established in a proportion of patients because of inadequate history or altered sensorium at presentation.

Recommendations: Larger multicentric studies with longer follow-up are warranted to validate and extend these findings. Early assessment using GCS and SOFA scores should be incorporated into routine evaluation of acute poisoning patients to facilitate prompt risk stratification. Public-health measures restricting easy access to highly hazardous pesticides and rodenticides, together with public awareness on

safe storage and handling, should be strengthened. Establishment of dedicated poison-information services and strengthening of emergency and critical-care facilities may further improve outcomes in acute poisoning.

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