Original Article

A Prospective Cohort Study on Factors of Mortality Due to Acute Organophosphate Poisoning

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ABSTRACT

OBJECTIVE: This study assessed the association of demographic characteristics, causes of poisoning, pre-hospital care, clinical manifestations, and treatment with outcomes of organophosphate poisoning.
METHODOLOGY: This prospective cohort study was conducted in the emergency department, medicine wards, and intensive care units of a tertiary care hospital in Sindh, Pakistan, from July 2023 to June 2024. The data were collected using a non-probability purposive sampling technique, as outlined in a questionnaire designed after reviewing the literature. IBM SPSS version 29 was used for analysis using various statistical tools. The categorical variables were presented as frequencies and percentages. A Chi-squared test (Fisher's exact test where required) was used to determine the association between variables.
RESULT: During the study period, 605 patients were enrolled. Organophosphate poisoning (OPP) was prevalent in males (57.2%). Majority of patients were uneducated (70.9%), belonged to rural areas (96.4%), and were aged ≤30 years (82%). Poisoning was mainly intentional (92.2%), through oral route (96.9%). Most common clinical manifestation was emesis (55.9%), and circulatory support was provided to 99.3% of patients as a therapeutic intervention. The majority of patients were mildly affected (84.0%) due to OPP, and the death rate was 5.5%. The vital signs, clinical manifestations, interventions, and hospital management had a significant impact on mortality, with $p < 0.05$.
CONCLUSION: This study's findings emphasize the necessity for healthcare providers to prioritize the rapid assessment and intervention of baseline vitals, typical OPP symptoms, intensive management, duration of hospital stay, and poisoning severity to achieve better outcomes in patients with OPP.

KEYWORDS: Poisoning, organophosphates, clinical manifestations, interventions, outcomes, pre-hospital care

INTRODUCTION

Organophosphates (OP) are a diverse group of neurotoxic compounds extensively employed as pesticides and in developing biological warfare agents[1]. OP compounds irreversibly inhibit acetylcholinesterase and cause severe cholinergic toxicity[2,3] after exposure through dermal contact, inhalation, or ingestion[4]. This causes overstimulation of nicotinic and muscarinic receptors, manifesting as a cholinergic crisis, which leads to clinical manifestations including lacrimation, bronchospasm, bronchorrhea, diarrhoea, abdominal pain, vomiting, arrhythmia, fasciculation, and respiratory failure[2,3,5].

OPs can cause significant pesticide-related illnesses and mortality in underdeveloped nations. Literature shows that pesticide exposure has significant deteriorating effects on human well-being. Acute OP poisoning results in death or a variety of chronic health disorders in humans[1].

OP poisoning (OPP) is diagnosed through a history of poisoning, signs, symptoms, characteristic odor, and laboratory evaluation of plasma cholinesterase levels[4]. Studies show that early recovery of acetylcholinesterase in OPP is associated with decreased morbidity and mortality. Furthermore, patients with altered mental status need 100% oxygen support and instant endotracheal intubation. Atropine is the mainstay treatment in cases of cholinergic toxicity, while the use of oxime therapy remains arguable[3]. The initial management includes cardio-respiratory stabilization, decontamination by removing clothes and washing the skin and eyes, and passing a nasogastric tube for gastric lavage in ingesting large quantities of OPs within 1 to 2 hours of ingestion[4,6].

The World Health Organization (WHO) has categorized OPs as highly toxic pesticides; however, developing nations often use these harmful chemicals because of easy accessibility and low cost. Frequently used OPs in agriculture include parathion,

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chlorpyrifos, dichlorvos, diazinon, fenitrothion, tetrachlorvinphos, and azinphos-methyl[7]. OPs are one of the chief causes of emergency department admissions[8]. In the past 30 years, research shows that pesticides, mainly OPs, have caused millions of admissions to hospitals because of intentional and unintentional poisoning[9], resulting in a death rate of 300,000 each year[2,3].

OP poisoning is one of the significant public health issues in Asian countries[3]. Pakistan is the second most populous country in Southeast Asia and the fifth most populous country globally[10,] with a population of 241.49 million[11]. OPs are also the substances significantly involved in the poisoning in Pakistan[12]. Pakistan follows the regional trend in the choice of substance in suicides, as OP pesticides are more predominant in agriculture-based rural populations[12]. The issue of pesticide poisoning is not well understood in Pakistan, as national health statistics are not systematically collected and are based on regional research studies[10,12].

Patterns of poisoning vary from one region of the world to another and within different locations in the same country, affecting the outcomes[8]. Predicting outcomes in OPP is crucial for guiding clinical management and reducing mortality rates[13]. Knowledge of OP poisoning in a specific geographical area is beneficial for early diagnosis, treatment, and promising outcomes in resource-limited rural settings. Though some studies have been conducted in Pakistan, these studies are more urban-centred and cover only certain geographical areas. Moreover, the earlier studies were based on limited variables, and statistical associations were not evaluated. There have been no previous detailed studies in the current geographical location where this study has been conducted. So, there was a dire need to carry out a study to cover the research gaps. The objective of this study was to assess the association of demographic characteristics, causes of poisoning, pre-hospital care, clinical manifestations, and treatment with the outcomes of OP poisoning in rural population-dominated geographical areas.

METHODOLOGY

This was a prospective cohort study conducted at Peoples Medical College Hospital (PMCH), Shaheed Benazirabad, Sindh, Pakistan starting from July 2023 and ending in June 2024. It is a tertiary healthcare facility that provides 24-hour services for a wide range of illnesses. It functions as a referral hospital and has direct admissions of patients from a large catchment area. The data regarding the poisoning patients was collected from the emergency department, medicine wards, and intensive care units (ICU).

Study participants

The data were collected using the non-probability purposive sampling technique. During the data collection period, all consecutive patients suffering from acute OP poisoning (exposure within 24 hours) and coming through the emergency department were enrolled in the study. Patients who were not willing to participate in the survey, were dead on arrival, left against medical advice, and had comorbidities were not included in the study. The consent for participation in the study was received from the patients or attendants (in cases where the patient was unconscious or a child).

Variables

The variables in the study included demographics and poisoning characteristics, pre-hospital care, clinical manifestations, treatment, poisoning severity, and outcomes. The investigator personally completed the questionnaire to avoid problems with understanding questions, anomalies, and missing data.

Outcomes

The outcomes of poisoning were determined after 30 days of discharge from the hospital. If the death occurred during admission to the hospital, the duty doctor confirmed the death, and it was recorded in the patient's medical records. However, if the death occurred after discharge, the attendant confirmed the death on a phone call.

Survived: Patients who may have had specific toxic effects of OPP but were alive after 30 days of discharge from the hospital.

Died: Patients who could not survive during the treatment in the hospital or after 30 days of discharge from the hospital.

The Peradeniya Organophosphorus Poisoning Scale (POPS)

The severity of OP poisoning was determined through POPS[14]. This scale determines the severity of OP poisoning based on six parameters on a scale of 0, 1, and 2. The six parameters include pupil size, respiratory rate, heart rate, fasciculations, level of consciousness, and seizures. To determine the severity, the scores are added up. On a scale of 0-11, 0-3 indicates mild poisoning, 4-7 moderate poisoning, and 8-11 severe poisoning.

Data sources

The data were collected using a predesigned questionnaire adapted from the relevant literature[1,9,15]. The necessary changes were made to the study instrument based on socio-economic and local policies, following validation by three academic experts and a pretest conducted on 50 patients. The results of the pretest were excluded from the final data. The variables in the final study instrument included demographic characteristics (gender, marital status, education, residential area, age, and employment), poisoning characteristics (cause of poisoning, route and site of exposure,) pre-hospital care (type of admission, exposure to reporting time, local remedies, mode of arrival), baseline vitals and clinical manifestations, and clinical management (emergency management, decontamination procedures, therapeutic interventions, services used, duration of stay in hospital, poisoning severity and medical outcome).

When the patient arrived at the emergency department, the physician diagnosed the patient, and if the OPP was confirmed, the patient was shifted to the medical ward after the first aid. If the patient was stabilized within 24 hours, the patient was discharged. However, in critical conditions, the patient was admitted to the medical ward or shifted to the ICU for extended periods. Follow-up with patients was made through phone calls after discharge. The questionnaire was administered at all these stages by interviewing the patient and/or attendant (if the patient was unconscious or a child), the physician, and the nursing staff, and by reviewing the patient's medical records. The follow-up with the patient was done through phone calls.

Sample size calculation

The sample size was calculated through Cochrane's formula, considering a significance level of 95% (z)=1.96 and sampling error (*e*) =0.05 (16).

$$n = \frac{z^2}{4e^2} = \frac{(1.96)^2}{4(0.05)^2} = 384.16$$

After acquiring the minimum sample size, the final sample size was calculated as 461, with a 20% dropout rate.

Statistical analysis

The data was coded and tabulated in IBM SPSS version 29 for analysis using various statistical tools. The categorical variables were presented as frequencies and percentages. A chi-squared test (Fisher's exact test where required) was used to determine the association between independent and dependent variables. To determine the associations with treatment outcomes (survived or died), a $p<0.05$ was considered statistically significant.

RESULTS

During the study period, 690 OPP patients arrived at the emergency department. Among them, 35 did not consent to participate in the study, eight had comorbidities, 11 left against medical advice, and follow-up could not be done for 31 patients. The final statistical analysis was done on 605 patients (Figure I). Among the study participants, OPP was more prevalent in males(57.2%) than in females (42.8%). Furthermore, it was found that there was not much difference in marital status, as 51.4% of patients were single and 48.6% were married. Most people exposed to the OPs were uneducated (70.9%), and only 29.1% were educated. The residential area of the majority of the patients participating in the study was rural (96.4%), and only 3.6% belonged to the urban area. Moreover, most of the younger population under the age of 30 years was involved in the poisoning (82.0%). Furthermore, most individuals were employed (59.3%), and 40.7% were unemployed.

It was found during the study that 92.2% of the poisoning cases were intentional, and only 7.8% were unintentional. The route of exposure in poisoning incidents was mainly ingestion (96.9%). It was found that most of the poisonings occurred at the home of the patient (91.4%), and the remaining at the workplace (6.6%) and public area (2.0%). Most patients arriving at the hospital were direct admissions (53.4%) to the study centre, while 46.6% were referred. Additionally, it was found that about two-thirds of patients (64.3%) arrived in the hospital after one hour of exposure to the poison, while only 35.7% arrived within one hour. It was further found that 11.4% of the patients were given local remedies at the exposure site. The most common mode of arrival for patients was non-ambulance 79.2%, and ambulance service was provided to only 20.8% of cases.

Table I gives information regarding demographics, poisoning, and pre-hospital care

Table I:
Demographics, poisoning, and pre-hospital care

Variable		N	%
Gender	Female	259	42.8
	Male	346	57.2
Marital status	Married	294	48.6
	Single	311	51.4
Education	Educated	176	29.1
	Uneducated	429	70.9
Residential area	Rural	583	96.4
	Urban	22	3.6
Age (years)	>30	109	18.0
	≤30	496	82.0
Employment	Employed	359	59.3
	Unemployed	246	40.7
Cause of poisoning	Intentional	558	92.2
	Unintentional	47	7.8
Route of exposure	Combination	7	1.2
	Ingestion	586	96.9
Site of Exposure	Inhalation	12	2.0
	Home	553	91.4
	Public area	12	2.0
	Workplace	40	6.6
Type of admission	Direct Admission	323	53.4
	Referral	282	46.6
Exposure to reporting time	>1 hour	389	64.3
	≤1 hour	216	35.7
Local remedies	No	536	88.6
	Yes	69	11.4
Mode of arrival	Non-ambulance	479	79.2
	Ambulance	126	20.8

Table II shows the baseline vitals and clinical manifestations of OPP patients. During the study period, the most common clinical manifestations among the OPP patients were due to typical OPP symptoms (diarrhea, urination, miosis, bradycardia, emesis, and lacrimation) and variations in baseline vitals. Emesis (55.9%) was the most common clinical manifestation, followed by abnormal respiratory rate (46.3%) and others.

Table II: Baseline vitals and Clinical manifestations in the OPP patients

Variable	N	%
Emesis	338	55.9
Abnormal respiratory rate	280	46.3
Abnormal pulse rate	219	36.2
Abnormal pupil size	217	35.9
Abnormal blood pressure	202	33.4
Epigastric pain	192	31.7
Salivation	133	22.0
Abnormal consciousness	118	19.5
Bronchorrhea	117	19.3
Lacrimation	103	17.0
Abnormal temperature	93	15.4
Fasciculations	80	13.2
Diarrhea	63	10.4
Urination	57	9.4
Lethargy	43	7.1
Dyspnea	40	6.6
Irritable	36	6
Frothing	30	5
Pale color	27	4.5
Diaphoresis	26	4.3
Bronchospasm	26	4.3
Abdominal pain	21	3.5
Vertigo	20	3.3
Drowsy	19	3.1
Nausea	19	3.1
Seizure	18	3
Headache	16	2.6
Dehydration	10	1.7
Other*	23	3.8

**Edema, pain, itching, cyanosis, blurred vision, dizziness, confusion, laryngeal edema, cough, hematemesis*

When the patients arrived at the hospital, as part of emergency management, most patients were provided with circulatory support (99.3%). In decontamination procedures, most patients underwent gastric lavage (95.9%), followed by skin and eye wash (15.2%), and single-dose charcoal administration (0.7%). Furthermore, it was observed that the symptomatic treatment (98.2%) was the most common therapeutic intervention. After the initial management at the emergency department, 99.2% of patients were shifted to the ward, and 19.2% were also moved to the ICUs. Moreover, most patients (75.2%) stayed at the hospital for just one day, while the remaining (24.8%) stayed for more than one day. Furthermore, while determining the severity of OP poisoning through POPS, it was found that the majority (84.0%) were mildly affected, and only 0.5% were severely affected. The study found that 5.5% (n=33) of patients died because of exposure to the Ops. The majority of these deaths occurred during the stay at the hospital (n=30), and only three at home **(Table III)**. **Table IV** provides detailed insight into hospital patient handling and medical management.

Table III: Patient handling and medical management in the hospital

Variable		N	%
Emergency management	Circulatory support	601	99.3
	Airway support	114	18.8
	Catheterization	120	19.8
Decontamination procedure	Gastric lavage	580	95.9
	Skin and eye decontamination	92	15.2
	Single-dose activated charcoal	4	0.7
Therapeutic interventions	Symptomatic treatment	594	98.2
	Antidote administration	587	97.0
	Ventilator support	36	6.0
	Tracheostomy	4	0.6
	Suctioning	38	6.3
Services used	Emergency department	605	100.0
	Ward	600	99.2
	Intensive care unit	116	19.2
	Observation unit	5	0.8
Duration of stay in hospital	>1 day	150	24.8
	1 day	455	75.2
Poisoning severity	Mild	508	84.0
	Moderate	94	15.5
	Severe	3	0.5
Medical outcome	Died	33	5.5
	Survived	572	94.5

Statistical association

While analyzing the association of medical outcomes with demographics, poisoning characteristics, and pre-hospital care, no significant association was found among variables. However, a significant association was found with vital signs such as abnormal blood pressure, abnormal pulse rate, abnormal respiratory rate, and consciousness and clinical manifestations such as emesis, abnormal pupil size, salivation, bronchorrhea, lacrimation, diarrhea, urination, dyspnea, irritability, frothing, bronchospasm, and seizure with $p<0.05$. Moreover, while analyzing the association between medical outcomes and the treatment provided and medical management, a significant relationship was found with airway support, catheterization, skin and eye decontamination, ventilator support, tracheostomy, suctioning, ICU admission, duration of hospital stay, and poisoning severity, with $p<0.05$.

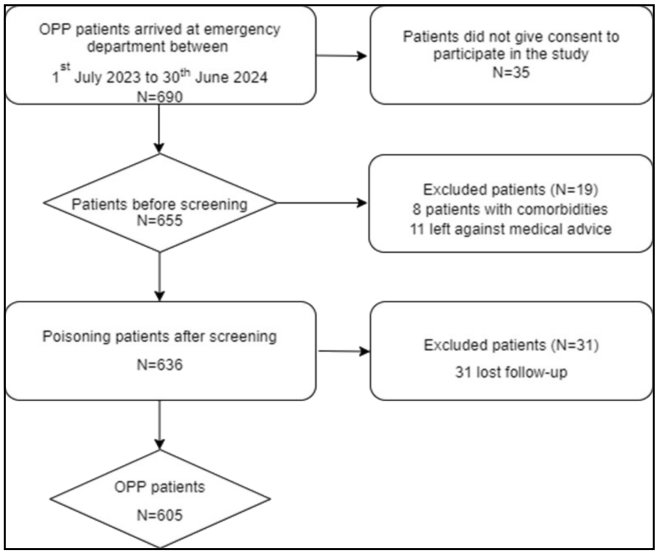
Table IV: Association of demographics, poisoning characteristics, pre-hospital care, baseline vitals, clinical manifestations, patient handling, and medical management with medical outcome

Variable		Died	Survived	P-value
Demographics, poisoning characteristics, and pre-hospital care				
Gender	Female	18	241	0.161
	Male	15	331	
Marital status	Married	16	278	0.990
	Single	17	294	
Education	Educated	11	165	0.581
	Uneducated	22	407	
Residential area	Rural	32	551	1.000*
	Urban	1	21	
Age (years)	>30	8	101	0.339
	≤30	25	471	
Employment	Employed	16	343	0.192
	Unemployed	17	229	
Cause of poisoning	Intentional	32	526	0.502*
	Unintentional	1	46	
Route of exposure	Combination	0	7	0.568
	Ingestion	33	553	
	Inhalation	0	12	
Site of Exposure	Home	31	522	0.639
	Public area	1	11	
	Workplace	1	39	
Type of admission	Direct Admission	17	306	0.824
	Referral	16	266	
Exposure to reporting time	>1	22	367	0.770
	≤1	11	205	
Local remedies	No	27	509	0.208
	Yes	6	63	
Mode of arrival	Non-ambulance	23	456	0.168
	Ambulance	10	116	
Baseline vitals and clinical manifestations				
Emesis		26	312	0.006
Abnormal respiratory rate		21	259	0.040
Abnormal pulse rate		18	201	0.024
Abnormal pupil size		20	197	0.002
Abnormal blood pressure		18	184	0.008
Epigastric pain		6	186	0.085
Salivation		16	117	<0.001
Abnormal consciousness		9	478	<0.001
Bronchorrhea		21	96	<0.001
Lacrimation		12	91	0.002
Abnormal temperature		9	84	0.051
Fasciculations		8	72	0.055
Diarrhea		9	54	0.001
Urination		12	45	<0.001
Lethargy		0	43	0.158*
Dyspnea		11	29	<0.001
Irritability		10	26	<0.001
Frothing		6	24	<0.001
Pale color		1	26	1.000*
Diaphoresis		3	23	0.163*
Bronchospasm		6	20	<0.001
Abdominal pain		1	20	1.000*
Vertigo		0	20	0.618*
Drowsy		0	19	0.617*
Nausea		0	19	0.617*
Seizure		4	14	0.013*
Headache		0	16	1.000
Dehydration		1	9	0.432*
Other**		1	22	1.000*
Patient handling and medical management in the hospital				
Emergency management	Circulatory support	33	568	1.000*
	Airway support	22	92	<0.001
	Catheterization	21	99	<0.001
Decontamination procedure	Gastric lavage	31	549	0.640*
	Skin and eye decontamination	10	82	0.013
	Singe-dose activated charcoal	0	4	1.000*

Therapeutic interventions	Symptomatic treatment	33	561	1.000*
	Antidote administration	33	554	0.616
	Ventilator support	12	24	<0.001
	Tracheostomy	2	2	0.016*
	Suctioning	12	26	<0.001
Services used	Emergency department	33	572	-------***
	Ward	33	567	1.000
	Intensive care unit	22	94	<0.001
	Observation unit	0	5	1.000
Duration of stay in hospital	>1 days	16	134	0.001
	1 day	17	438	
Poisoning severity	Mild	12	496	<0.001
	Moderate	18	76	
	Severe	3	0	

Fisher's exact test, **Edema, pain, itching, cyanosis, blurred vision, dizziness, confusion, laryngeal edema, cough, hematemesis, * Does not meet test assumption*

Figure I: Screening of the patients



DISCUSSION

This study provides valuable insights into the sociodemographic and clinical characteristics of poisoning cases, revealing critical patterns and their implications for prevention and management. A male predominance (57.2%) was observed, consistent with prior studies. These higher poisoning rates among males may be due to occupational hazards and risk-taking behaviors[17,18]. The nearly balanced marital status distribution, with 48.6% married and 51.4% single, suggests that poisoning affects individuals across these groups. This is due to different types of pressures on both groups. Previous research similarly highlights marital discord and socio-economic pressures as significant contributors to intentional poisoning, especially among single and unemployed individuals[19-21].

Additionally, the high proportion of uneducated participants (70.9%) and those residing in rural areas (96.4%) highlights the importance of education and accessibility in preventing poisoning. Education plays a vital role in influencing a person's behavior and providing knowledge about the safe use and storage of pesticides. This lack of knowledge significantly increases the rate of poisoning cases[1,22,23]. Most cases involved young adults aged ≤30 years (82.0%), consistent with other studies[24,25]. This may be due to the stress of adulthood, including difficulties maintaining a relationship, unemployment, and economic pressures[26]. Though the majority of patients were uneducated, a significant proportion were employed individuals (59.3%) as they are mostly farmers by profession in rural areas. This increases vulnerability among these groups due to easy accessibility to pesticides[27,29].

Furthermore, it was found that the poisoning was mainly intentional (92.2%), consistent with the studies carried out in other parts of the world[30.31]. As discussed earlier, this may be due to the inability to handle stressful situations in both genders, especially in the young population. The route of exposure in most cases was ingestion (96.9%), which is consistent with other studies as well[30,32]. This is because the majority of poisoning cases are intentional, and they tend to ingest poisons. It was found that most of the poisonings occurred at the home of the patient (91.4%), and this is consistent with other studies[31,33]. This may be because the majority of the poisoning cases are intentional and are influenced by family disharmony and marital and financial issues[30]. Timely arrival at the healthcare facility has been shown to lead to better healthcare outcomes. However, most patients in this study had arrived after one hour of exposure, which is contrary to a study conducted in Saudi Arabia[15]. Furthermore, although this study reported that only 20.8% of patients were transported to the study centre by ambulance, the percentage is higher than that of a multicenter study conducted in 2010-11 in Pakistan, which reported that only 7.0% of patients were transported[34].

Among the physiological variables, most patients were normotensive (66.6%). These findings align with prior research indicating that most poisoning cases present with stable blood pressure, though specific toxins can induce hypertensive or hypotensive states depending on their cardiovascular effects[35]. Respiratory parameters showed that 53.7% of patients had normal respiratory rates, while abnormal respiratory rates (46.3%) were also common, reflecting the respiratory distress often associated with poisoning. This is consistent with earlier findings where the abnormal

respiratory rate was frequently linked to OPP due to cholinergic stimulation. Similarly, 84.6% of patients were normothermic, suggesting that significant temperature deviations occur only in specific poisoning types, such as salicylates or alcohol[36]. The vital signs also demonstrated significant associations with medical outcomes. Abnormal blood pressure, pulse rate, respiratory rate, and consciousness exhibited associations with the mortality rates with $p<0.05$, emphasizing the prognostic importance of baseline vital parameters. These findings align with studies that identify hemodynamic instability and altered mental states as indicators of severe toxicity and poor prognosis[37-39].

During the study period, the most common clinical manifestation among the OPP patients was emesis (55.9%). This finding is consistent with other studies[33,40] and is attributed to the cholinergic symptoms of Ops[2]. Clinical manifestations were also strongly associated with mortality. Symptoms such as emesis, miosis, salivation, bronchorrhea, and dyspnea were significantly linked to higher mortality with $p<0.05$. This aligns with literature emphasizing the role of OPP symptoms and respiratory complications in predicting adverse outcomes[41,42].

The most common pharmacological treatment in the study was circulatory support (99.3%), consistent with other studies[26,30]. In decontamination procedures, most patients underwent gastric lavage (95.9%). The gastric lavage was performed excessively, as most patients (64.3%) arrived at the hospital after one hour. The guidelines suggest that gastric lavage should be done an hour after exposure to the poison and/or in large quantities of intake situations or if an antidote is unavailable[32]. Moreover, most patients (75.2%) stayed at the hospital for only one day, which is contrary to studies conducted in other parts of the world[4,30]. While determining the severity of OP poisoning through POPS, it was found that the majority (84.0%) were mildly affected, which is concordant with another study in Karachi, Pakistan[14]. Though the majority of the patients in this study were mildly affected, the mortality was much higher as 33 deaths at a rate of 5.5% occurred. However, this death rate is much lower than that of a study conducted in Ethiopia[9] and another study in Pakistan[43].

This study found that interventions and hospital management had a significant impact on outcomes. Procedures such as airway support, catheterization, and ventilator support with $p<0.05$ were associated with mortality, likely reflecting the severity of poisoning in these patients. ICU admission and extended hospital stays ($p=0.001$) with $p<0.05$ were also linked to higher mortality, supporting findings that critical care requirements often indicate severe poisoning. Notably, the severity of poisoning was significantly associated with outcomes ($p < 0.001$), corroborating evidence that clinical grading of poisoning severity is a reliable predictor of prognosis[4,44].

This study identifies various factors associated with mortality due to OPP. The regulatory authorities should take concrete measures to control the easy accessibility of the poison to the public. People should be educated about the safe use and storage of poisons and pre-hospital care at sites of exposure. Further research should be conducted on the prevalence of intentional pesticide poisoning and its associated factors to reduce these incidents. Future research should focus on strengthening emergency response protocols, enhancing critical care capacities, and raising awareness about effective poisoning management to reduce mortality and improve patient outcomes.

The strengths of this study include its prospective nature, which avoids the chances of missing or incorrect data associated with retrospective studies. The study centre had manual patient records linked with missing patient files, which was also a problem with retrospective studies. A large sample size was achieved during the study by registering consecutive poisoning patients.

This study has some limitations. This study was conducted in a single centre, and the results cannot be generalized to other regions of Pakistan or the world. Poisoning cases from both children and adults were registered in the study. However, adults and children may have different effects and outcomes of poisoning.

CONCLUSION

This study highlights the critical role of clinical parameters, patient management, and hospital interventions in determining the medical outcomes of poisoning cases. It did not find any association between demographic and poisoning characteristics and pre-hospital care. However, baseline vitals, typical OPP symptoms, intensive management, duration of stay in hospital, and poisoning severity were significantly associated with survival. These findings emphasize the need for healthcare providers to prioritize the rapid assessment and intervention of these variables for better outcomes in OPP patients.

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AUTHOR CONTRIBUTION

Muhammad S: Study concept, literature review,

methodology, data collection, and drafting
Almani KF: Critical analysis, expert opinion, final reviews
Mughal UR: Revisions of the initial idea
Khaskheli MS: Data collection logistics
Tabassum R: Data collections and methodology
Ahmad R: Drafting and revising the work for important intellectual content
Kumar N: Statistical analysis

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