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Original Article

DEMOGRAPHIC AND CLINICAL PROFILE OF ORGANOPHOSPHORUS POISONING CASES IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: To assess the demographic patterns, clinical manifestations, and prognosis of patients admitted for organophosphorus poisoning in a tertiary care institution.

Methods: A prospective observational study was conducted over a 12 mo period at a tertiary care institution. Data pertaining to patient demographics, presenting clinical features, and subsequent clinical outcomes were meticulously recorded and analyzed.

Results: A total of 161 patients with acute organophosphorus poisoning were studied. The majority 39.75% were aged 21–30 y, followed by 29.19% in below 20 y age group. Males accounted for 61.49% of cases, while females made up 38.51%. Most patients 77.64% were from rural areas. Clinical manifestations included miosis in 60.25%, nausea in 25.47%, vomiting in 20.50%, and diarrhea in 11.80% of cases. The overall mortality rate was 31.06%, with 68.94% of patients surviving.

Conclusion: The highest incidence of organophosphorus poisoning was observed in the 21–30 y age group. Males were predominantly affected, with a significantly higher number of cases reported in rural areas. Common symptoms included nausea and vomiting, while miosis was the most frequent clinical sign. The mortality rate was high, highlighting the importance of early recognition and timely management to improve patient outcomes.

Keywords: Organophosphorus, Demographics, Poisoning

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INTRODUCTION

The rapid progress across sectors like industry, healthcare, and agriculture has led to the development of numerous novel compounds, many of which serve as toxic agents. While organophosphorus compounds (OPCs) offer certain advantages, the incidence of acute organophosphate (OP) pesticide poisoning is escalating globally. These compounds inhibit acetylcholinesterase (AChE), an enzyme responsible for breaking down acetylcholine (ACh). This inhibition results in the accumulation of ACh at synaptic junctions, leading to overstimulation of muscarinic and nicotinic receptors, which can cause a range of toxic effects [1]. This overstimulation manifests in various clinical symptoms and signs, which can range from mild to life-threatening. Depending on the kind of OP ingested, there is a significant range in the clinical characteristics and onset period [2]. The most common form of poisoning, according to data from the National Poison Information Centre India, is suicidal poisoning with household agents (OPs, carbamates, pyrethrinoids, etc.). This is because these agents are inexpensive, extremely toxic, easily accessible and can be taken with food or drink [3]. Due to the high death rate associated with respiratory failure, which is a common consequence of organophosphorus poisoning, prompt and efficient treatment becomes essential for survival [4].

The objective of this study was to examine the clinical presentation, treatment outcomes, and demographic factors associated with organophosphorus (OP) poisoning in patients admitted to a tertiary care hospital in India. By identifying modifiable characteristics linked to mortality, the study aims to inform the development of targeted preventive strategies.

MATERIALS AND METHODS

Study design and setting

This prospective observational study was conducted at Gandhi Medical College and Hamidia Hospital, Bhopal, a tertiary care hospital located in Madhya Pradesh, India. The study was carried out over a period of one year from 29.01.2015 to 28.01.2016, during which 161 patients diagnosed with organophosphorus poisoning were analysed after obtaining informed consent.

Study population

Patients aged 12 y and above who were admitted with a history of organophosphorus (OP) poisoning during the study period were included. Diagnosis was based on clinical presentation, history of exposure to OP compounds, and characteristic symptoms such as miosis, excessive salivation etc.

Inclusion criteria

- Poisoning patient more than 12 y admitted to emergency department of Hamidia Hospital, Bhopal with history of OP poisoning.
- Patient presenting with history of consumption of an unknown compound, presenting with clinical features of organophosphorus poisoning.

Exclusion criteria

- Patients less than 12 y.
- Patient present with snake bite, insect bite and other poisonings.

Ethical approval

This study was approved by the Institutional Ethics Committee at Gandhi Medical College and Hamidia Hospital, Bhopal, M. P. approval number 13415-16/MC/7/2015, on 11.06.2015.

RESULTS

A total of 161 patients diagnosed with acute organophosphorus (OP) poisoning were included in the study, adhering to predefined inclusion and exclusion criteria. Table 1 shows majority of cases occurred in individuals aged 21–30 y (39.75%), followed by below 20 y age group (29.19%).

Table 1: Distribution of cases according to age

Age in years	Number of cases	Percentage (%)
<20	47	29.19
21--30	64	39.75
31-40	27	16.77
41-50	15	9.32
>50	8	4.97
Total	161	100

Table 2 shows, in the present study, 61.49% patients were males and 38.51% were females.

Table 2: Distribution of cases according to gender

Gender	Number of cases	Percentage (%)
Male	99	61.49
Female	62	38.51
Total	161	100

Table 3 Shows Rural residents accounted for 77.64% of the cases, while 22.36% were from urban areas.

Table 3: Distribution of cases according to domiciliary status

Domicile	Number of cases	Percentage (%)
Rural	125	77.64
Urban	36	22.36
Total	161	100

Table 4 Shows Clinical manifestations included miosis in 60.25% of cases, nausea in 25.47%, vomiting in 20.50%, and diarrhea in 11.80%.

Table 4: Distribution of cases according to clinical manifestation

Clinical manifestation	No. of cases	Percentage (%)
Nausea	41	25.47
Vomiting	33	20.50
Grimness	26	16.15
Salivation	27	16.77
Diarrhea	19	11.80
Pain in abdomen	24	14.91
Headache	17	10.56
Convulsions	1	0.62
Hallucinations	3	1.86
Miosis	97	60.25

Table 5 shows, the overall mortality rate was 31.06%, with 68.94% of patients surviving.

Table 5: Distribution of cases according to outcome

Outcome	Number of cases	Percentage (%)
Death	50	31.06
Discharge	111	68.94
Total	161	100

DISCUSSION

In our study, the majority of poisoning cases 68.94% occurred in individuals aged 0–30 y, with the 21–30 age group being the most affected 39.75%. This finding aligns with previous research conducted by Gannur DG *et al.* (2008), Nigam M *et al.* (2004), Kar SM *et al.* (2010), Karki P *et al.* (2001), and Sahin HA *et al.* (2003) [5–9] who also reported a higher incidence of poisoning in young adults within this age range. In our study, the incidence of organophosphorus (OP) poisoning was higher in males 61.49% compared to females 38.51%, indicating a higher predisposition among males towards OP compound consumption. This male preponderance aligns with findings from previous studies conducted by Gannur DG *et al.* (2008), Nigam M *et al.* (2004), Kar SM *et al.* (2010), Banday TH *et al.* (2015), and Jaga K *et al.* (2007) [5–7, 10, 11] who also reported a higher incidence of poisoning in males. In the present study, a significantly higher proportion of rural individuals 77.64% were found to have consumed organophosphorus (OP) compounds compared to their urban counterparts 22.36%. These findings are consistent with those reported by Pradhan M *et al.* (2018) and Gannur DG *et al.* (2016) [5, 12].

In our study, the most commonly reported clinical manifestation in cases of organophosphorus (OP) poisoning was nausea, observed in 25.47% of patients. This was followed by vomiting in 20.5% and diarrhea in 11.8% of cases. A notable physical sign, miosis, was present in 60.25% of the affected individuals. These findings are consistent with the classical cholinergic effects of OP compounds on the parasympathetic nervous system. Similar patterns of gastrointestinal and ocular sign have been documented in previous studies, including those by Pradhan M *et al.* (2018), Gannur DG *et al.* (2016), Peter JV *et al.* (2014), Kolli R *et al.* (2024), and Diwakar TN *et al.* (2023) [12–15].

In terms of overall outcomes, 31.06% of patients with organophosphorus poisoning succumbed to the toxic effects, while 68.94% survived. A similar pattern of outcomes was also reported by Pradhan M *et al.* (2018) [12].

CONCLUSION

The highest occurrence of organophosphorus poisoning was noted among young adults, particularly males. The condition was significantly more prevalent in rural populations compared to urban ones. Clinically, gastrointestinal symptoms such as nausea and vomiting were commonly reported, along with diarrhea in a smaller proportion of cases. Miosis was the most frequent clinical sign, consistent with the typical cholinergic effects of organophosphorus toxicity. The mortality rate was notably high, indicating that a significant proportion of patients did not survive despite treatment efforts, while a majority were discharged after recovery. These findings underscore the importance of targeted prevention efforts and strengthening healthcare services, especially in rural areas, to effectively manage and reduce the impact of organophosphorus poisoning.

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AUTHORS CONTRIBUTIONS

The author Dr. Sajjad Hussain and Dr. Shweta Saroj, was principal investigator of the study, and involved in the design, conduct, and analysis, and Dr. V Pal, was contributed in report writing, editing, and review of the manuscript.

CONFLICTS OF INTERESTS

The author declares that they have no conflicts of interest.

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