



A Study of the Clinical Profile of Acute Poisoning in Adults in a Rural Tertiary Healthcare Setup

Minchu S Murthy^{1*}, Periyapattana Gopinath Kumar², Suhas SV³

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ABSTRACT

Acute poisoning remains a major public health concern in rural India due to easy accessibility of toxic substances and limited mental health support. This retrospective observational study was conducted at a tertiary care teaching hospital in rural Bengaluru to evaluate the clinical and epidemiological profile of poisoning cases. Medical records of 100 patients admitted with acute poisoning over 1 year were analyzed.

The mean age of patients was 28 years, with the majority in the 21–30-year age group, and a female predominance (57%). Suicidal intent accounted for 85% of cases. Organophosphorus compounds were the most common agents, followed by drug overdoses and pyrethroid compounds. All exposures occurred via the oral route, and 74% of patients presented within 4 hours of ingestion. Vomiting was the most common presenting symptom, followed by abdominal pain and altered sensorium. Laboratory abnormalities included elevated liver enzymes and electrolyte disturbances. The mean duration of hospitalization was 4 days. No mortality was observed during the study period.

Acute poisoning in rural Bengaluru predominantly affects young adults and is largely associated with suicidal intent. Early presentation and prompt management contribute to favorable outcomes. Preventive strategies focusing on mental health support and the regulation of toxic substances are essential.

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all acute poisoning cases seen in hospitals, predominantly affecting individuals younger than 30 years.⁸

AIM

The aim is to study the clinical and social profile, laboratory parameters, and treatment outcome of acute poisoning patients.

OBJECTIVE

Periodic clinical and epidemiological studies are necessary to understand the trends of poisoning in society. These studies help in planning and providing good and fast healthcare facilities to reduce poisoning-related mortality. This study was designed to evaluate the pattern and outcomes of poisoning cases in a tertiary care hospital at Hoskote.

INTRODUCTION

Poisoning represents a critical health issue globally and is particularly prevalent in rural parts of India, where agricultural chemicals are easily available, and mental health services are limited. This study examines the spectrum of poisoning cases and associated clinical outcomes in patients treated at a tertiary care center in rural Bengaluru.

Suicide significantly impacts young populations and is currently the second most common cause of death among individuals aged 15–29 years globally. Despite variations between nations, nearly three-quarters of all suicides occur in low- and middle-income countries, contributing to approximately 75% of all cases.¹

Occupational health problems are common, as the use of personal protective equipment in humid tropical regions is often costly and impractical. Furthermore, safety labels are frequently written in languages unfamiliar to farmers, literacy levels are low, and the instructions are difficult to understand, while immediate washing after pesticide exposure is often impossible due to a lack of access to water.²

A large share of suicides results from intentional pesticide ingestion due to the high lethality of these highly toxic

substances. The case fatality rate for self-poisoning with pesticides is estimated to be between 10% and 20%, with even greater fatality observed for some WHO class I and II compounds.³

Nearly three-quarters of poisoning cases in the country are attributed to organophosphorus insecticides.⁴

Poisoning due to Celphos (aluminum phosphide) is a major yet under-recognized issue in the Indian subcontinent. Aluminum phosphide (ALP), commonly used as a fumigant for stored grains, is highly toxic when consumed from newly opened packaging.⁵

The pattern of poison usage varies globally and may differ within regions of the same country due to socioeconomic status and cultural influences.⁶

Knowledge of the trends in acute poisoning cases at our hospital, with emphasis on demographic, etiological, and clinical characteristics, can aid in improving early detection and management strategies.⁷

Organophosphorus compounds are widely available and commonly used as insecticides in agriculture as well as in households. While earlier reports indicated high mortality, improved intensive care management has resulted in a marked decline in death rates. Organophosphate insecticides constitute more than half of

MATERIALS AND METHODS

Study Design and Setting

This retrospective observational study was carried out at MVJ Hospital, a tertiary care teaching institution in rural Bengaluru. Medical records of 100 patients admitted with acute poisoning over a 1-year period were reviewed.

Methods

A retrospective observational study of 100 consecutive poisoning cases was conducted. Data were collected from hospital records, in casualty, inpatient, and outpatient settings, including demographics, type of poisoning, intent, clinical features, treatment, and outcome measures.

Inclusion Criteria

Data collected regarding age, sex, marital status, address, occupation, socioeconomic

¹Intern, Department of Medicine; ²Professor;

³Assistant Professor, Department of Medicine, MVJ Medical College and Research Hospital, Bengaluru, Karnataka, India; *Corresponding Author

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status, type of poisoning, route of administration, dosage administered, duration of time brought to the hospital, symptoms, duration of hospitalization, treatment, date of discharge, and recovery rate were included.

Exclusion Criteria

The patients in whom the poison was not positively identified were critically ill before poisoning, animal and snake bites, and those who had received initial treatment from some other healthcare facilities, and patients with idiosyncratic or adverse reactions to prescribed drugs were excluded from the study.

Background

Acute poisoning constitutes a major medical emergency, especially in rural India, where access to toxic agents is common. This study aimed to analyze the clinical profile, types, intent, and outcomes of poisoning cases presenting to a tertiary hospital in rural Bengaluru.

Results

Organophosphate compounds constituted the majority of poisoning cases, followed by benzodiazepines and pharmaceutical drug overdoses. Suicidal intent accounted for 85% of cases. Most patients (74%) presented within 4 hours of exposure. The average age was 28 years, and 57% were female. Vomiting and altered consciousness were the most frequent presenting symptoms. The mean duration of hospitalization was 4 days. Laboratory findings commonly showed elevated liver enzymes and electrolyte imbalances. No fatalities were recorded during the study period.

Conclusion

Suicidal poisoning using easily accessible agents like OP compounds remains a major concern in rural Bangalore. Early hospital presentation and appropriate treatment contributed to favorable outcomes. Preventive strategies, including better mental health support and stricter regulation of toxic substances, are needed.

DATA COLLECTION

Data included:

- Demographics: age, sex, occupation, marital status, and socioeconomic status.
- Poison characteristics: type, mode (suicidal, accidental), and route.
- Clinical profile: presenting symptoms, time to hospital, vital signs.
- Investigations: hematological and biochemical parameters.

- Treatment and outcomes: interventions, duration of hospitalization, mortality.

Data Analysis

Descriptive analysis was performed using means, percentages, and frequency distributions.

RESULTS

- Mean age: 28 years (range: 16–70).
- Predominant age group: 21–30 years (Fig. 1).
- Sex (Table 1 and Fig. 2).
- Marital status (Table 2 and Fig. 3).
- The majority of patients belonged to lower socioeconomic strata.
- Poisoning profile
- Most common poisons (Table 3 and Fig. 4).
- Intent (Table 4)
- Route: 100% oral.
- Time to hospital: 74% presented within 4 hours of ingestion (Fig. 5 and Table 5).
- Clinical features
 - Common symptoms (Table 6).
 - Organophosphorus poisoning: vomiting was the main symptom.
 - Cypermethrin: associated with giddiness.
 - Prallethrin and kerosene compounds are associated with abdominal pain.
 - Multidrug consumption is associated with drowsiness and abdominal pain.
- Gastric lavage report (Fig. 6 and Table 7).

- Laboratory findings:
 - Elevated SGPT/SGOT: 22% (Fig. 7).
 - Electrolyte imbalances: 15% (mostly hyponatremia and hyperkalemia).
 - Hematological abnormalities in isolated cases.
- Hospitalization and outcomes:
 - Mean duration: 4 days (range: 2–8).
 - No mortality was recorded during the study period.
 - All patients were discharged after clinical improvement.
- Sample size
 - The sample size was calculated using OpenEPI software version 2.3.1.
 - At 95% confidence level.
 - At 20%, relative precision.
 - The sample size estimated is 80.

Parameter	Value
Population size (for finite population correction factor or fpc) (N)	100
Hypothesized % frequency of outcome factor in the population (p)	50% ± 5
Confidence limits as % of 100 (absolute ± %) (d)	5%
Design effect (for cluster surveys—DEFF)	

Formula used $n = [DEFF \times Np(1-p)] / [(d^2 / Z^2_{1-\alpha/2}) \times (N-1) + p(1-p)]$

Table 2: Marital status ratio

Marital status	count
Married	66
Unmarried	34

Source: Adapted from Bhat BNM, Pattanshetty SG, Chandra D, et al. A study on clinical profile of cases with organophosphorus poisoning at a tertiary care hospital. Eur J Mol Clin Med 2022.

Table 1: Sex ratio

Female	57%
Male	43%

Source: Adapted from Bhat BNM, Pattanshetty SG, Chandra D, et al. A study on clinical profile of cases with organophosphorus poisoning at a tertiary care hospital. Eur J Mol Clin Med 2022.

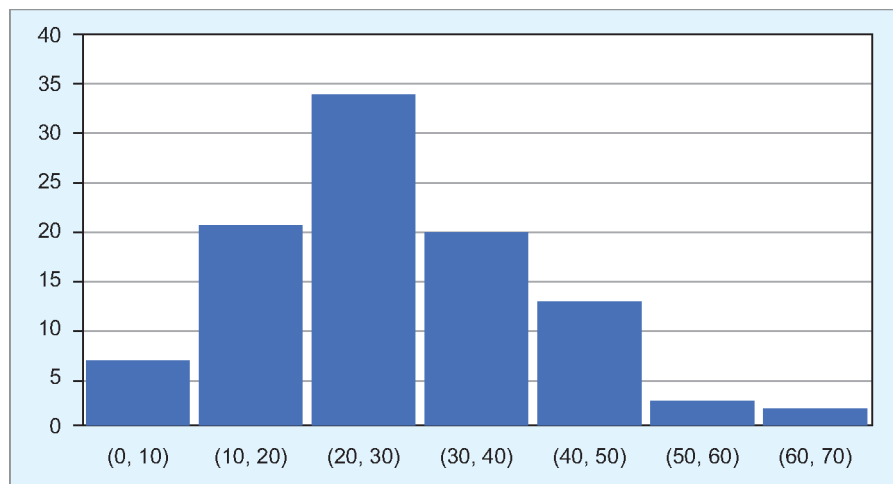


Fig. 1: Distribution of age group in the study

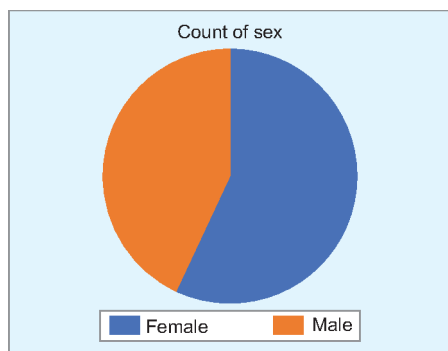


Fig. 2: Distribution of sex ratio

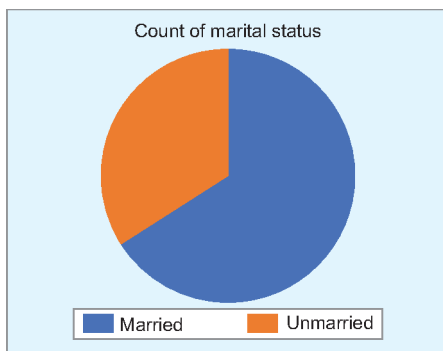


Fig. 3: Distribution of marital status

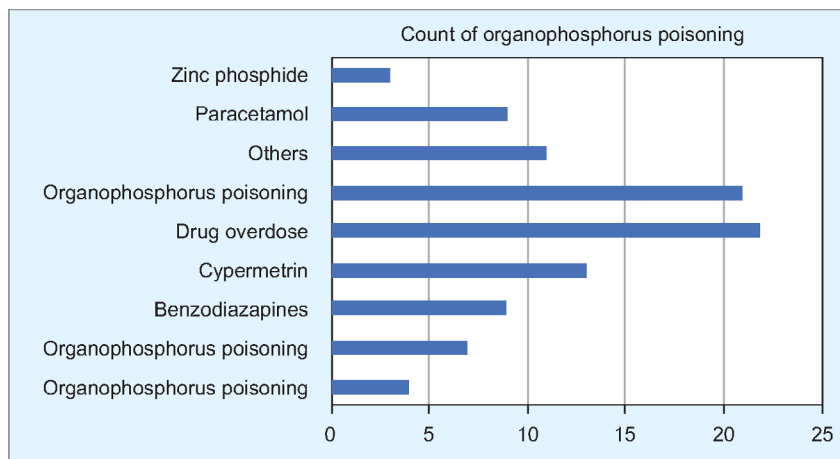


Fig. 4: Distribution of poisoning in the study

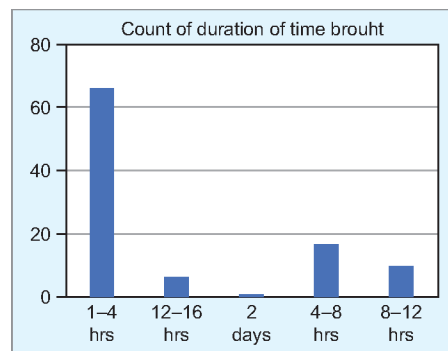


Fig. 5: Distribution of duration of time brought to the hospital

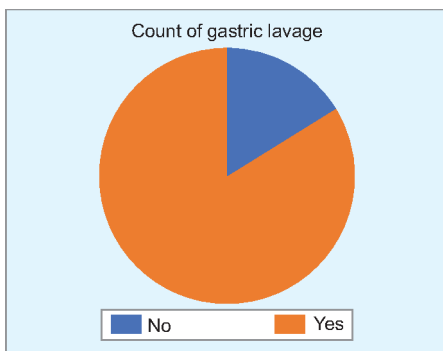


Fig. 6: Distribution of gastric lavage done

Data Collected

Record-based study on patients admitted as poisoning cases in the hospital casualty, inpatient, and outpatient departments under the department of general medicine. Data collected from the record department in MVJ Medical College and Research Hospital.

DISCUSSION

The study confirms that poisoning remains a major health concern in rural India, especially among young adults with suicidal intent. The dominance of OP compounds reflects the rural agrarian setting. Early hospital arrival

and prompt treatment likely contributed to the absence of fatalities.

Advanced age (>60 years) was also significantly linked to higher mortality, likely due to decreased physiological reserves and a greater burden of comorbidities, which increase susceptibility to the toxic effects of poisons. Socioeconomic status may affect mortality through multiple pathways, including delayed access to medical care, suboptimal nutritional status, and greater exposure to toxic substances in residential or occupational settings. These observations are in line with national suicide surveillance, which demonstrates a social gradient in poisoning-related suicides, and with epidemiological data from Indian hospitals

Table 3: Type of compound consumed

Organophosphorus poisoning	30%
Drug overdose	22%
Cypermethrin	16%
Paracetamol	9%
Benzodiazepines	9%
Zinc phosphide	3%
Others	11%

Source: Adapted from Bhat BNM, Pattanshetty SG, Chandra D, et al. A study on clinical profile of cases with organophosphorus poisoning at a tertiary care hospital. Eur J Mol Clin Med 2022.

Table 4: Risk of suicidal or accidental

Suicidal	85%
Accidental	10%
Unknown	5%

Source: Adapted from Bhat BNM, Pattanshetty SG, Chandra D, et al. A study on clinical profile of cases with organophosphorus poisoning at a tertiary care hospital. Eur J Mol Clin Med 2022.

Table 5: Number of patients brought in during that time duration

Duration of time brought	Count of the duration of time brought
1-4 hours	66
12-16 hours	6
2 days	1
4-8 hours	17
8-12 hours	10

Source: Adapted from Zaveri D, Quraishi SS, Rai S. Clinical profile, management, and outcome of acute poisoning in a tertiary care hospital: a hospital-based observational study. J Contemp Clin Pract 2025.

Table 6: Clinical symptoms

Vomiting	75%
Abdominal pain	30%
Drowsiness	20%
Seizures	5%

Source: Adapted from Bhat BNM, Pattanshetty SG, Chandra D, et al. A study on clinical profile of cases with organophosphorus poisoning at a tertiary care hospital. Eur J Mol Clin Med 2022.

Table 7: Gastric lavage was done or not

Yes	84
No	16

Source: Adapted from Zaveri D, Quraishi SS, Rai S. Clinical profile, management, and outcome of acute poisoning in a tertiary care hospital: a hospital-based observational study. J Contemp Clin Pract 2025

showing that severe poisoning cases are predominantly observed among rural, low-income populations.⁹



Fig. 7: Distribution of SGOT and SGPT in the study population

The present study demonstrated that organophosphate pesticides were the most common agents of self-poisoning in South India, contrasting with findings from North India, where aluminum phosphide predominates. The rising incidence of self-poisoning may be attributed to multiple factors, including increasing unemployment, urbanization, weakening of family support systems, and economic instability. Suicide attempts among adults, particularly those aged 21–30 years, may result from unemployment, breakdown of familial support, failed romantic relationships, personal frustrations, inability to cope with immediate challenges, impulsive behavior, and stress related to work or family responsibilities.¹⁰

CONCLUSION

Acute poisoning, predominantly with suicidal intent, affects young adults in rural Bengaluru. Organophosphate compounds were the most common agents. The study highlights the critical role of early

intervention and emphasizes the necessity of preventive public health measures.

LIMITATIONS

This study has certain limitations that should be considered while interpreting the findings. As a single-center study conducted at a tertiary care hospital in a rural setting, the results may not be fully generalizable to other rural regions, urban populations, or different healthcare systems. The hospital-based nature of the study, which included only admitted patients, may have introduced selection bias, as milder cases managed at primary or secondary healthcare facilities and individuals who did not seek medical attention were not represented. In the case of a retrospective design may have led to incomplete or missing data. Referral bias is also likely, given that tertiary care centers predominantly manage more severe and complicated cases, potentially resulting in an overestimation of disease severity. Furthermore, the absence of long-term follow-up restricts the assessment of

outcomes and prognosis. Socioeconomic, environmental, and behavioral determinants may not have been fully evaluated.

AUTHOR CONTRIBUTIONS

All authors made substantial contributions to the conception and design of the study. Dr. Minchu S Murthy was responsible for data collection, data analysis, and drafting of the manuscript. Dr. Suhas V contributed to study design, data interpretation, and critical revision of the manuscript for important intellectual content. Dr. Periyapattana Kumar supervised the study and provided overall guidance. All authors reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee of MWJ Medical College and Research Hospital (approval number IEC/104/2023, dated 05/08/2023). The

requirement for informed consent was waived due to the retrospective nature of the study.

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SOURCE OF SUPPORT

None.

CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

ORCID

Minchu S Murthy <https://orcid.org/0009-0005-6947-804X>

Periyapattana Gopinath Kumar <https://orcid.org/0000-0003-0232-6656>

Suhas SV <https://orcid.org/0009-0008-2182-3600>

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