Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1918
Original Article

Pattern and Prevalence of Poisoning Cases Reported to a Tertiary Care Hospital: A Retrospective Cross-Sectional Study.

Dr. Tejasvi J[1], Dr. Krishna Murthy Kandagatla[2,*], Dr. Selvatkar Keerthi Manogna[3]
[1]Assistant Professor, Department of Forensic Medicine and Toxicology, Government Medical College, Bhadradri Kothagudem, Telangana, India.
[2]Assistant Professor, Department of Forensic Medicine and Toxicology, Government Medical College,Nagarkurnool, Telangana, India.
[3]Assistant Professor, Department of Forensic Medicine and Toxicology, Kakatiya Medical College, Hanumakonda, Telangana, India.

Abstract

Background

Poisoning remains a significant public health issue in developing countries, contributing to substantial morbidity and mortality. Identifying patterns and prevalent substances involved is essential for guiding preventive measures and clinical management.

Objective

To analyze the demographic profile, type, intent, clinical presentation, and outcomes of poisoning cases reported to a tertiary care hospital.

Methods

This retrospective cross-sectional observational study included 100 patients admitted with acute poisoning over a 12-month period. Data were collected from hospital records, including demographic details, type and intent of poisoning, presenting symptoms, time to hospital presentation, interventions, and outcomes. Descriptive statistics were used for data analysis.

Results

Most poisoning cases occurred in individuals aged 21–30 years (42%), followed by the 11–20 age group (28%). Males (58%) were more commonly affected than females (42%) (Table 1). The most frequent agents were organophosphorus compounds (35%), followed by non-OP pesticides (15%) and drug overdoses (14%) (Table 2). Suicidal intent was predominant (66%), while accidental ingestion accounted for 28% of cases (Table 3). Vomiting (72%) was the most common presenting symptom, with altered sensorium (34%) and respiratory distress (20%) also observed (Table 4). The majority of patients presented within 2–6 hours (44%) (Table 5). Gastric lavage was performed in 82% of cases; specific antidotes were administered in 38%. ICU admission was needed in 27% and 12% required ventilatory support. Complete recovery was observed in 85% of patients, with a mortality rate of 7% (Table 6).

Conclusion

Poisoning primarily affects young adults, with a high rate of suicidal intent and organophosphorus compound involvement. Early recognition, timely intervention, and psychiatric counseling are critical to improving outcomes.

Recommendations

Enhance public awareness, regulate toxic substances, strengthen rural healthcare, and integrate psychiatric support to prevent and manage poisoning cases

Keywords: *Poisoning, Organophosphates, Suicidal Ingestion, Retrospective Study, Tertiary Care, Clinical Profile, Antidote, Epidemiology*
Submitted: *2025-04-10* ***Accepted:*** *2025-06-02* ***Published:*** *2025-06-30*

Corresponding Author: *Dr. Krishna Murthy Kandagatla*
Email ID: ***drkkmbbs2k7@gmail.com***
Assistant Professor, Department of Forensic Medicine and Toxicology, Government Medical College,Nagarkurnool, Telangana, India.

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Introduction

Poisoning is a major global health concern and remains one of the leading causes of emergency department admissions, particularly in low- and middle-income countries like India. The World Health Organization (WHO) estimates that over 3 million poisoning cases and more than 200,000 deaths occur annually, with the majority reported from South-East Asia [1]. The high incidence of poisoning in India is often attributed to the widespread and unregulated access to agricultural chemicals, household toxins, and pharmaceuticals—substances frequently stored without proper safety measures [2].

In the Indian context, poisoning significantly contributes to morbidity and mortality, especially among young adults in the productive age group [2,3]. The reasons for poisoning vary and may be intentional—such as suicidal or homicidal acts—or unintentional, including accidental exposures. The pattern of poisoning often differs by region, influenced by socioeconomic, cultural, and occupational factors. Organophosphorus compounds, commonly used as pesticides in rural areas, remain the most prevalent agents of poisoning due to their accessibility and toxicity [2,4].

Prompt recognition of the toxic agent and timely initiation of appropriate medical treatment are vital for survival. However, treatment outcomes may be compromised by delays in hospital presentation, inadequate awareness, and limited availability of specific antidotes at peripheral healthcare centers [3,5]. Retrospective analyses of poisoning cases can provide crucial insights into local patterns and trends, allowing health systems to develop targeted strategies for prevention, early detection, and management of poisoning cases [1,4].

The aim of this study was to analyze the distribution and frequency of poisoning cases presenting to a tertiary care hospital, focusing on identifying the predominant age groups affected, frequently involved toxic substances, characteristic clinical features, and patient outcomes following medical intervention. The findings may help strengthen hospital preparedness, guide community awareness programs, and inform public health policies for poison control.

Methodology

Study Design

This study was designed as a retrospective cross-sectional observational study, aimed at analyzing the demographic patterns, types, clinical presentations, and outcomes of acute poisoning cases admitted to a tertiary care hospital over a one-year period. Data were obtained from hospital medical records without any intervention.

Study Setting

The study was conducted at the Government General Hospital, Bhadradri Kothagudem, Telangana, India, which is a tertiary care teaching hospital affiliated with Government Medical College, Bhadradri Kothagudem. The hospital serves as a primary referral center catering to the rural and semi-urban population of Bhadradri Kothagudem district and adjoining areas, with a significant proportion of agricultural workers who are at risk of exposure to toxic substances.

All patients presenting to the emergency department or inpatient wards with a confirmed diagnosis of acute poisoning during the study period were included. Data were collected from hospital medical records, case sheets, and admission registers. A total of 100 cases were included based on the inclusion and exclusion criteria.

Inclusion Criteria

Patients of all ages and both sexes with a confirmed history or clinical diagnosis of acute poisoning.

Cases admitted during the study period with complete documentation of clinical details, treatment given, and outcome.

Exclusion Criteria

Patients with chronic poisoning.

Cases with incomplete medical records or uncertain diagnosis.

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Snakebite and scorpion sting cases requiring antivenom were excluded unless classified under venomous poisoning.

Bias

To minimize selection bias, all consecutive cases of acute poisoning admitted during the study period were included, provided they met the inclusion criteria. Efforts were made to avoid information bias by cross-verifying clinical records, admission registers, and discharge summaries. Cases with incomplete documentation or uncertain diagnosis were excluded to maintain data accuracy. Although retrospective in nature, a standardized data extraction proforma was used to ensure consistency and reduce observer bias.

Data Collection

A predesigned structured proforma was used to collect the following data:

Demographic details (age, gender)

Type and intent of poisoning

Time interval between poisoning and hospital presentation

Clinical features at admission

Management protocols (e.g., gastric lavage, antidotes, ICU care)

Treatment outcome (recovery, mortality, DAMA)

Data Analysis

The collected data were entered into Microsoft Excel and analyzed using descriptive statistics. Frequencies and percentages were used to summarize categorical variables such as age distribution, type of poison, and outcomes. Results were presented in tabular form for clarity.

Ethical Considerations

Ethical clearance for the study was obtained from the Institutional Ethics Committee of Government Medical College, Bhadradri Kothagudem.

Results

A total of 100 poisoning cases were analyzed over the study period. The demographic characteristics are shown in Table 1.

The majority of cases (42%) occurred in the age group of 21–30 years, followed by 11–20 years (28%). Males comprised a slightly higher proportion (58%) of the cases compared to females (42%).
The distribution of poisoning types is summarized in Table 2.

Table 1: Demographic Profile of Poisoning Cases (n=100)

Category	Frequency (n)	Percentage (%)
Age 11–20	28	28%
Age 21–30	42	42%
Age 31–40	15	15%
Age >40	15	15%
Male	58	58%
Female	42	42%

Table 2: Type of Poisoning Observed (n=100)

Type of Poison	Frequency (n)	Percentage (%)
Organophosphorus compounds	35	35%
Pesticides (non-OP)	15	15%
Drug overdose	14	14%
Household agents (e.g., phenol)	12	12%
Snakebite/Venomous bites	8	8%
Food poisoning	6	6%
Unknown substances	10	10%

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Organophosphorus compound ingestion was the most common type of poisoning (35%), followed by non-organophosphorus pesticide exposure (15%), drug overdoses (14%), and household agents (12%). Snakebites and food poisoning contributed to 8% and 6% of the cases respectively, while in 10% of cases, the specific poison could not be identified.

With regard to the intent of poisoning, suicidal ingestion was the predominant cause, accounting for 66% of cases, while accidental ingestion constituted 28%. Only 2% of cases were classified as homicidal, and the intent remained unclear in 4% of cases (Table 3).

Table 3: Intent of Poisoning (n=100)

Intent	Frequency (n)	Percentage (%)
Suicidal	66	66%
Accidental	28	28%
Homicidal	2	2%
Unknown	4	4%

Table 4: Clinical Presentation at Admission (n=100)

Symptom	Frequency (n)	Percentage (%)
Vomiting	72	72%
Altered sensorium	34	34%
Respiratory distress	20	20%
Seizures	5	5%

The clinical presentation at admission varied, with vomiting being the most common symptom (72%), followed by altered sensorium (34%), respiratory distress (20%), and seizures (5%) (Table 4).

The majority of patients (44%) presented within 2–6 hours of exposure, while 38% presented within 2 hours and 18% after more than 6 hours (Table 5).

Table 5: Time to Hospital Presentation (n=100)

Time Interval	Frequency (n)	Percentage (%)
<2 hours	38	38%
2–6 hours	44	44%
>6 hours	18	18%

Management approaches and patient outcomes are detailed in Table 6. Gastric lavage was performed in 82% of patients, while 38% received specific antidotes (e.g., atropine or antivenom). ICU admission was necessary in 27% of cases, and 12% required ventilatory support. The overall mortality rate was 7%, while 85% of patients recovered completely. A small fraction (8%) left the hospital against medical advice (DAMA).

Table 6: Management and Outcomes (n=100)

Outcome/Intervention	Frequency (n)	Percentage (%)
Gastric lavage	82	82%
Specific antidote given	38	38%
ICU admission	27	27%
Ventilatory support	12	12%
Mortality	7	7%
Complete recovery	85	85%
Discharged AMA	8	8%

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These findings highlight that young adults are particularly vulnerable to poisoning, with a predominant trend toward intentional (suicidal) ingestion, emphasizing the need for both preventive strategies and timely intervention.

Discussion

This retrospective cross-sectional study evaluated the demographic and clinical profile of acute poisoning cases reported at a tertiary care hospital over a one-year period. The findings revealed that young adults aged 21–30 years were the most affected group (42%), highlighting the vulnerability of individuals in their productive years to poisoning incidents [6,7]. A notable male predominance (58%) was observed, which could be attributed to occupational exposure, societal pressures, and risk-taking behaviors more common among men in rural and semi-urban populations [8,9].

Organophosphorus compounds (OPCs) emerged as the predominant toxic agents, accounting for 35% of cases, followed by non-organophosphorus pesticides, drug overdoses, and household chemicals. The widespread availability of OPCs, coupled with inadequate regulatory enforcement, facilitates their misuse, particularly in deliberate self-harm scenarios [11,12]. Suicidal ingestion was identified as the leading cause of poisoning in this cohort, constituting 66% of cases. This underscores a pressing need for mental health support systems, community-based interventions, and stringent regulation of toxic substances to address the underlying psychosocial determinants [6,9].

Clinically, vomiting was the most frequent presenting symptom (72%), followed by altered sensorium and respiratory distress, which are characteristic of cholinergic toxidrome seen in organophosphorus poisoning [8,12]. Timely medical attention played a crucial role in improving patient outcomes, with 82% of patients receiving gastric lavage and 38% receiving specific antidotes. Notably, 44% of patients presented within 2–6 hours of exposure, which correlated with the high recovery rate observed (85%). However, 12% required ventilatory support, and the overall mortality rate stood at 7%, reflecting the severity associated with delayed presentation and inadequate initial management [6,10].

Overall, our study reinforces the urgent need for better poison control systems, public awareness regarding safe storage of chemicals, and prompt medical access. Training of healthcare workers at peripheral levels and enforcement of pesticide regulation can significantly mitigate poisoning-related morbidity and mortality [7,11].

Generalizability

The study's findings primarily reflect the poisoning patterns prevalent in rural and semi-urban regions of Telangana, where agricultural chemical exposure is common. While these results provide valuable insights for similar socio-demographic settings in India, extrapolation to urban populations or regions with different toxicological profiles should be done cautiously. Multi-center studies involving diverse geographic locations and larger sample sizes are warranted to enhance external validity and better represent nationwide poisoning trends.

Conclusion

This study highlights the significant burden of acute poisoning cases in a tertiary care setting, with young adults being the most commonly affected group. Organophosphorus compounds were the predominant toxic agents, and suicidal intent emerged as the leading cause. Early presentation to the hospital and prompt medical intervention contributed to a high recovery rate, though mortality and the need for intensive care remain concerns. The findings underscore the urgent need for public awareness, strict regulation of toxic substances, and integration of psychiatric evaluation into poisoning management. Preventive strategies, rural health strengthening, and poison information services are essential to reduce poisoning-related morbidity and mortality in vulnerable populations.

Limitations

This study was limited by its retrospective design and reliance on medical record accuracy, which may have led to incomplete data capture. The single-center setting restricts the generalizability of the findings. Additionally, psychological factors contributing to suicidal intent were not explored, warranting further prospective, multi-center research.

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Recommendations

To effectively reduce the burden of poisoning cases, public awareness campaigns emphasizing safe storage and handling of toxic substances, especially pesticides and household chemicals, are essential. Strengthening regulations on the sale and distribution of hazardous substances is equally important. Improving access to timely medical care in rural areas, training healthcare providers in poisoning management, and integrating psychiatric evaluation and counseling services can significantly contribute to early intervention, prevention of self-harm, and better clinical outcomes in poisoning cases

Acknowledgements

The authors express their sincere gratitude to the Department of General Medicine, Government General Hospital, Bhadradri Kothagudem, Telangana, for their invaluable support and access to medical records for this study. We also extend our appreciation to the hospital staff and medical officers who contributed to patient care and data collection. Special thanks to the Institutional Ethics Committee for their guidance and to all healthcare professionals involved in the management of poisoning cases that formed the basis of this research.

List of abbreviations

OPC – Organophosphorus Compounds

ICU – Intensive Care Unit

DAMA – Discharge Against Medical Advice

WHO – World Health Organization

Source of funding

The study had no funding.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

TJ-Concept and design of the study, results interpretation, review of literature and preparing first draft of manuscript. Statistical analysis and interpretation, revision of manuscript. **KMK**-Concept and design of the study, results interpretation, review of literature and preparing first draft of manuscript, revision of manuscript. **SKM**-Review of literature and preparing first draft of manuscript. Statistical analysis and interpretation.

Data availability

Data Available on request

Author Biography

Dr. Tejasvi J is currently working as an Assistant Professor in the Department of Forensic Medicine and Toxicology at Government Medical College, Bhadradri Kothagudem, Telangana, India. She completed her MBBS from Rajiv Gandhi Institute of Medical Sciences, Kadapa, Andhra Pradesh, and obtained her MD in Forensic Medicine and Toxicology from Osmania Medical College, Hyderabad. With over three years of teaching experience, she has successfully mentored undergraduate students for ICMR-funded research projects. She has one research publication in a reputed journal focusing on forensic medicine. Her research interests include medico-legal case management, toxicology, and forensic pathology.ORCID iD: https://orcid.org/0009-0008-7009-5056

Dr. Krishna Murthy Kandagatla is currently working as an Assistant Professor in the Department of Forensic Medicine and Toxicology at Government Medical College, Nagarkurnool, Telangana, India, since 22nd May 2023 on a regular basis. He completed his MD in Forensic Medicine and Toxicology from Gandhi Medical College, Hyderabad (2016–2019). Prior to his current role, he served on a contractual basis at Government Medical College, Nalgonda from 2020 to 2023. He has over five years of post-MD teaching experience and is actively involved in both academic and medico-legal work. ORCID iD: https://orcid.org/0009-0009-7360-7210

Dr. Selvatkar Keerthi Manogna is currently working as an Assistant Professor in the Department of Forensic Medicine and Toxicology at Kakatiya

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Medical College, Hanumakonda, Telangana, India. She completed her MBBS from Malla Reddy Institute of Medical Sciences, Suraram, Hyderabad, and pursued her MD in Forensic Medicine and Toxicology from Kakatiya Medical College, Hanumakonda. With over one year of teaching experience, she has successfully mentored undergraduate students for ICMR-funded research projects and has published one research paper in a reputed journal focusing on forensic medicine. Her academic interests include medico-legal case management, toxicology, and forensic pathology. ORCID iD: https://orcid.org/0009-0003-5712-766X

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https://doi.org/10.51168/sjhrafrica.v6i6.1918
Original Article

PUBLISHER DETAILS

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa