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Spectrum of Acute Poisoning Presenting to the Emergency Department of a Tertiary Care Hospital in Tripura

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ABSTRACT

Background: Acute poisoning continues to represent a major medical emergency in India, particularly in North-Eastern states such as Tripura, where rapid urbanization, agricultural dependence, and easy availability of toxic substances contribute to its increasing incidence. Early identification, appropriate management, and continuous surveillance of poisoning trends are essential for improving outcomes and developing preventive strategies.

Methods: A retrospective observational study was conducted on 84 consecutive cases of acute poisoning reported to the Emergency Department. Data were collected from medical records, including age, sex, type of poison, route of exposure, intent, clinical management (gastric lavage, ICU admission, ventilatory support), toxicological findings, and outcome. Descriptive and inferential statistics were applied to evaluate the association between variables.

Results: Out of 84 cases, males predominated slightly over females, with the highest incidence among the 21–30-year age group. Organophosphorus compounds, rodenticides, and corrosives were the most common agents. Suicidal intent was the leading cause. Gastric lavage was performed in the majority, while ICU admission was necessary in a smaller fraction. Most patients recovered following prompt management, though a few cases resulted in mortality or left against medical advice (LAMA).

Conclusion: The study highlights that acute poisoning remains a significant health challenge in Tripura, predominantly affecting young adults and involving easily accessible toxic agents. Strengthening poison surveillance, public education, and early referral mechanisms can markedly improve patient outcomes.

Key-words: Acute poisoning, Organophosphorus, Toxicology, Emergency medicine, Tripura, Retrospective study

INTRODUCTION

Poisoning is a global health concern and remains one of the most common medical emergencies encountered in emergency departments, particularly in developing countries. It encompasses a spectrum of exposures, both intentional and unintentional, leading to morbidity and mortality of varying degrees depending on the nature, dose, and timing of toxic substance ingestion.[1]

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In India, acute poisoning constitutes a substantial proportion of emergency admissions, ranging from 5% to 10% of total hospital emergencies.[2] The burden is especially high in rural and semi-urban regions, where agricultural dependence and the ready availability of pesticides contribute significantly to the problem. [3]

Tripura, one of the north-eastern states of India, is primarily agrarian, with a large section of the population engaged in farming activities. The easy accessibility of organophosphorus insecticides, rodenticides, and household cleaning agents, along with social stressors such as financial hardship, academic pressure, and interpersonal conflicts, has made poisoning an important public health issue in this region. [4-6] Although isolated reports exist, comprehensive data on the epidemiological pattern of acute poisoning in Tripura are

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scarce, limiting the development of targeted prevention strategies.

Globally, the World Health Organization (WHO) estimates that around 193,000 deaths occur annually due to unintentional poisoning, with the South-East Asian region contributing a major share.[5] In India, studies have shown that organophosphate compounds, aluminium phosphide, phenol, and corrosives are among the most frequently implicated agents.[6-9] Moreover, intentional self-poisoning (suicidal ingestion) forms the dominant cause, particularly among young adults aged between 20 and 40 years.[10,11] The clinical profile of acute poisoning varies according to local availability of toxins, socio-economic conditions, and health-care access.[12] Therefore, regional studies are indispensable for understanding local trends and planning effective management protocols. The advent of toxicology screening and improved supportive care has enhanced outcomes, but early recognition and timely intervention remain critical determinants of survival.[13]

This retrospective observational study aims to elucidate the pattern of acute poisoning cases presenting to the Emergency Department of a tertiary care hospital in Tripura over eight months (December 2024 to July 2025). The study seeks to analyse demographic distribution, type of poison consumed, intent of poisoning, clinical management, and patient outcomes. The findings will not only provide insight into prevailing toxicological patterns but also assist in policy formulation for prevention and emergency response at regional and institutional levels.

MATERIALS AND METHODS

Study Design and Setting- This study was designed as a retrospective observational analysis conducted in the Emergency Department of a tertiary care hospital in Tripura. The hospital functions as a major referral centre for both urban and rural populations, receiving a wide range of medical emergencies, including toxicological cases. The study period extended from December 2024 to July 2025, encompassing 84 consecutive cases of acute poisoning that presented to the Emergency Department during this duration. All relevant information was extracted from patient medical records, admission registers, and toxicology reports.

Study Population and Sample size- The study population comprised all cases of poisoning or intoxication to the Department of Emergency Medicine during the study period. A total of 84 cases fulfilling the inclusion criteria were included in the study.

Inclusion criteria- All patients of any age and gender presenting with a clear history or clinical suspicion of poisoning were included.

Exclusion criteria- Patients with chronic exposure to toxins (e.g., occupational heavy metal exposure), Snakebite or envenomation cases, Incomplete or missing medical records.

Data Collection Procedure- Data were collected using a predesigned proforma and included the following variables like demographic details- age, gender, occupation, and intent of poisoning (suicidal, accidental, or addictive), type of poison as recorded in history or confirmed through toxicology, clinical management- gastric lavage, ICU admission, ventilatory support, and other therapeutic measures, laboratory findings- detection of poison through gastric lavage or urine toxicology screen, outcome- survival, mortality, or patients leaving against medical advice (LAMA). Each variable was cross-verified with hospital case records and toxicology reports from the laboratory database to ensure reliability and completeness.

Operational Definitions

Acute poisoning- exposure to a toxic substance through ingestion, inhalation, or dermal contact resulting in acute symptoms requiring hospitalisation.

Intentional poisoning- self-harm ingestion (suicidal) or use for euphoric purposes (addiction).

Accidental poisoning- unintentional ingestion, mostly among children or elderly individuals.

Statistical Analysis- Data were entered into Microsoft Excel and cleaned for duplicates or inconsistencies. Descriptive statistics were applied using percentage, mean, and standard deviation for quantitative variables. Categorical variables (such as sex, poison type, intent, and outcome) were expressed as frequencies and proportions. Inferential statistical tests, such as the Chi-

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square test, were used to explore the association between variables like type of poison and outcome, as well as between age group and intent of poisoning. A *p*-value of less than 0.05 was considered statistically significant.

Ethical Considerations- Institutional ethical clearance was obtained before data collection. As this was a retrospective study based on anonymised records, individual patient consent was waived. All personal identifiers were removed to maintain confidentiality.

RESULTS

A total of 84 cases of acute poisoning were recorded. The mean age of the patients was approximately 27.4 ± 11.2 years, with a range from 13 to 65 years. The majority of cases (41.6%) were within the 21–30-year age group, followed by the 31–40-year group (21.4%). A male predominance was observed, accounting for 54.8% (n = 46), while females constituted 45.2% (n = 38), giving a male-to-female ratio of 1.2:1 (Table 1).

Table 1: Age and Sex Distribution of Acute Poisoning Cases

Age Group (years)	Male (n)	Female (n)	Total (%)
< 10	1	0	1.2
11–20	8	9	20.2
21–30	20	15	41.6
31–40	9	9	21.4
41–50	5	3	9.5
> 50	3	2	6.0
Total	46	38	100

The analysis of toxic agents revealed that organophosphorus compounds were the most common (26.2%), followed by rat killers/rodenticides (19.0%), corrosives (14.3%), phenol (10.7%), and sedative drugs (8.3%). Less frequent agents included kerosene, alcohol, and opioids (Fig. 1).

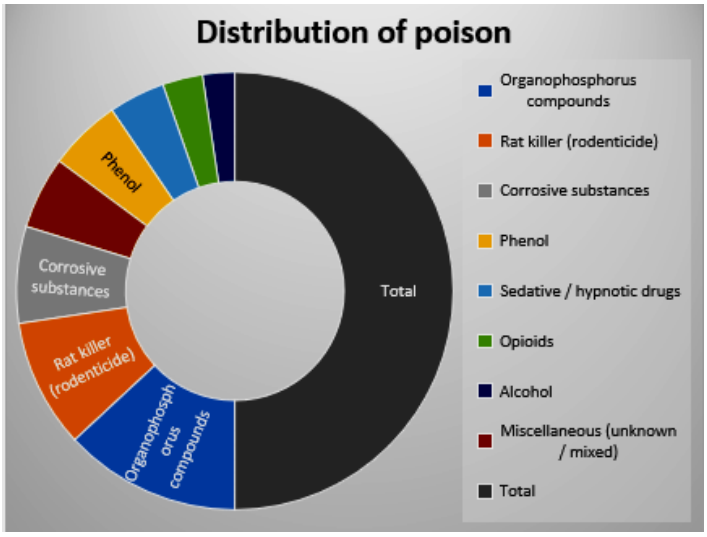

Fig. 1: Distribution of Poison Types among Cases

The intentional (suicidal) mode was predominant, accounting for 63.1% (n = 53) of cases. Accidental ingestion accounted for 27.4% (n = 23), while addiction-related poisoning formed 9.5% (n = 8). The majority of suicidal poisonings occurred among students and housewives, suggesting social and psychological stress as potential triggers (Table 2).

Table 2: Intent of Poisoning According to Occupation

Occupation	Suicidal (%)	Accidental (%)	Addiction (%)	Total (%)
Student	28.6	7.1	3.6	39.3
Housewife	14.3	4.8	0.0	19.1
Farmer	9.5	8.3	0.0	17.8
Labourer	4.8	2.4	0.0	7.2
Others	6.0	4.8	5.9	16.6
Total	63.1	27.4	9.5	100

Gastric lavage was performed in 69.0% (n = 58) of cases, and urine toxicology screening was conducted in 31.0% (n = 26). Among the screened samples, toxic agents were confirmed in 42.3% (Table 3).

Out of 84 cases, 62 (73.8%) were admitted to the general ward, 18 (21.4%) required ICU care, and 4 (4.8%) received ventilatory support. The mean hospital stay was 2.8 ± 1.6 days. Most patients received supportive care along with specific antidotes wherever indicated — such as atropine and pralidoxime for organophosphorus poisoning, and proton-pump inhibitors for corrosive ingestion (Table 4).

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Table 3: Detection of Poison through Diagnostic Tests

Diagnostic Test	Done (%)	Positive (%)	Negative (%)
Gastric Lavage	69.0	38.0	31.0
Urine Tox Screen	31.0	13.1	17.9

Table 4: Distribution of Patients According to Management Modality

Management Type	No. of Cases (n)	Percentage (%)
Gastric lavage	58	69.0
ICU admission	18	21.4
Ventilatory support	4	4.8
Antidote given	30	35.7
General ward only	62	73.8

The overall recovery rate was 78.6% (n = 66). 6 patients (7.1%) expired, while 12 (14.3%) left against medical advice (LAMA). Mortality was highest among those exposed to organophosphorus compounds and corrosives (Fig. 2).

A Chi-square test showed a statistically significant association ($p < 0.05$) between the type of poison and clinical outcome, indicating that specific agents (notably organophosphorus and corrosives) carried a higher risk of mortality.

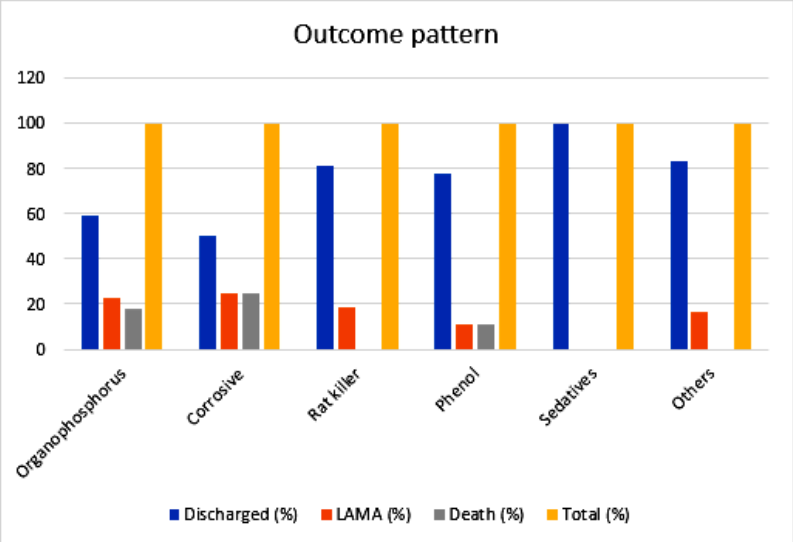

Fig. 2: Outcome Pattern among Patients with Acute Poisoning

DISCUSSION

The present retrospective observational study was conducted to determine the epidemiological profile, clinical spectrum, and outcomes of acute poisoning cases admitted to the Emergency Department of a tertiary care hospital in Tripura over an eight-month period. A total of 84 cases were analysed, revealing that the young adults between 21–30 years constituted the most affected group, with a slight male predominance (M: F = 1.2:1).

The majority of cases were suicidal in nature, involving organophosphorus compounds, rodenticides, and corrosives as the principal agents. The predominance of poisoning among young adults aligns with multiple previous studies conducted across India**.** Singh *et al.* [1] in Punjab and Guntheti *et al.* [2] in Andhra Pradesh both reported that individuals aged between 20 and 30 years are most vulnerable. This trend may be attributed to psychosocial factors such as academic failure,

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unemployment, relationship stress, and financial burden challenges, particularly pronounced in this age bracket.

The slight male predominance observed in our study is consistent with findings from Mahajan *et al.* [3] and Dash *et al.* [4], who noted that males tend to undertake higher-risk behaviour and have greater access to toxic substances due to occupational exposure and social mobility. However, the narrowing gender difference suggests an increasing psychological and social burden among women, particularly housewives. [15]

Organophosphorus compounds (26.2%) emerged as the leading cause of poisoning, corroborating data from most Indian and South Asian studies [16]. These compounds are widely used in agriculture and are easily available without stringent regulation, making them a frequent agent for suicidal ingestion. Similar dominance of organophosphorus poisoning was reported by Sharma *et al.* [5] in Rajasthan and Sood *et al.* [6] in Himachal Pradesh. Rodenticides formed the second most common group (19.0%), particularly aluminium phosphide and zinc phosphide preparations, both known for their high lethality and easy availability. The increasing use of corrosives (14.3%) and phenol (10.7%) as household cleaning agents was also evident, matching the observations of Ramesh *et al.* [7] and Khan *et al.* [8]. These substances, although primarily accidental, can also be ingested intentionally due to their accessibility. The relatively smaller proportion of drug overdoses (sedatives, opioids, and alcohol) reflects local patterns of substance abuse in Tripura, where such cases are emerging but still limited compared to industrial or metropolitan centres.[17]

In the present study, 63.1% of cases were suicidal, 27.4% accidental, and 9.5% addiction-related. These results reinforce that self-poisoning remains the most dominant mode of poisoning in India, as previously reported by Kumar *et al.* [9] and Patel *et al.* [10]. The high proportion of suicides among students and housewives underlines the interplay between mental health and socio-economic stressors in rural and semi-urban settings.[18] In contrast, accidental poisoning was more common among farmers and labourers, consistent with unintentional exposure to pesticides or improper storage of chemicals at home.

The majority of patients (69%) underwent gastric lavage, while 21.4% required ICU admission and 4.8% needed ventilatory support. These findings indicate that although most poisoning cases were of moderate severity, a substantial proportion required advanced care. Similar ICU admission rates have been reported by Reddy *et al.* [11] and Meena *et al.* [12]. The timely institution of specific antidotes, especially atropine and pralidoxime for organophosphorus poisoning, contributed significantly to survival rates. The mean hospital stay of around 3 days reflects effective emergency management and shorter duration of toxicity compared to older series, possibly due to earlier presentation and improved resuscitative measures. [19]

The overall survival rate (78.6%) in our study was comparable to those reported in similar tertiary-care-based investigations.[20,21] Mortality (7.1%) was mainly associated with ingestion of organophosphorus compounds and corrosives, consistent with their known toxicokinetics and systemic impact. [22] Statistical analysis revealed a significant association ($p < 0.05$) between the type of poison and outcome, reaffirming that certain agents inherently pose a higher mortality risk.

Studies by Jayashree *et al.* [13] and Bhatia *et al.* [14] have similarly emphasised that early gastric decontamination and prompt ICU referral are critical determinants of survival. In contrast, late presentation and inadequate pre-hospital management contribute heavily to poor outcomes.

Although data from the North-Eastern region of India are limited, our results mirror smaller series from Assam and Manipur, where organophosphorus compounds were also predominant, followed by rodenticides and corrosives.[23,24] However, in metropolitan regions like Delhi and Mumbai, sedative drug overdoses and mixed chemical ingestion have been reported more frequently.[25] This suggests that poisoning patterns are strongly influenced by local economy, occupational structure, and accessibility of toxic agents.

CONCLUSIONS

This retrospective observational study provides an overview of acute poisoning cases presenting to the Emergency Department of a tertiary care hospital in Tripura from December 2024 to July 2025. Among 84 analyzed cases, most patients were young adults aged 21–30 years, with a slight male predominance and suicidal intent as the major cause. Organophosphorus compounds were the most frequently implicated agents, followed by rodenticides and corrosives, reflecting easy access to agricultural and household toxic substances.

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Prompt management, including gastric lavage and antidotal therapy, resulted in a favorable survival rate; however, mortality remained evident in highly toxic exposures. The findings emphasize the need for stricter regulation of pesticide availability, public awareness regarding poison prevention, strengthening mental health services, and improving early diagnosis and treatment facilities. Establishment of regional poison control centers and enhanced healthcare preparedness may further reduce poisoning-related morbidity and mortality.

CONTRIBUTION OF AUTHORS

Research concept- Dr. Shauni Gope, Dr. Shirshendu Dhar, Dr. Santanu Das

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Final approval- Dr. Shauni Gope, Dr. Shirshendu Dhar, Dr. Santanu Das

REFERENCES

[1] Singh S, Sharma BK, Wahi PL. Spectrum of acute poisoning in adults (10 years' experience). J Assoc Physicians India, 1994; 32(7): 561–63.

[2] Guntheti BK, Singh PP. Organophosphorus poisoning: incidence and outcome in a tertiary care hospital. Indian J Forensic Med Toxicol., 2011; 5(2): 91–93.

[3] Mahajan A, Verma R, Tandon VR, et al. Pattern of acute poisoning in adults: a hospital-based study. JK Sci., 2013; 15(4): 178–82.

[4] Dash SK, Raju AS, Mohanty MK. Sociodemographic profile of poisoning cases in a tertiary care hospital. J Indian Acad Forensic Med., 2005; 27(3): 133–38.

[5] Sharma BR, Harish D, Sharma V, Vij K. The epidemiology of poisoning: an Indian view. J Clin Forensic Med., 2002; 9(1): 14–18.

[6] Sood AK, Mahajan A, Sharma V, et al. Poisoning trends in Himachal Pradesh: a hospital-based study. J Assoc Physicians India, 2016; 64(7): 24–28.

[7] Ramesh R, Kumar A, Kumar R. Clinical profile of acute poisoning in a tertiary care hospital. J Assoc Physicians India, 2018; 66(5): 60–65.

[8] Khan A, Gupta S, Bhatnagar S. Corrosive ingestion: pattern and outcomes. Indian J Gastroenterol., 2019; 38(2): 102–107.

[9] Kumar SV, Ravikanth K, Kumar RN. Trends of poisoning in South India. J Forensic Leg Med., 2012; 19(7): 407–11.

[10] Patel MM, Patel MJ. Profile of acute poisoning cases in tertiary care hospital. Natl J Community Med., 2012; 3(2): 265–68.

[11] Reddy KS, Kumar GM, Singh J. Clinical outcome of organophosphate poisoning. J Assoc Physicians India, 2013; 61(6): 387–92.

[12] Meena BL, et al. Acute poisoning in a teaching hospital in Rajasthan: profile and outcome. Int J Med Res Rev., 2016; 4(9): 1600–06.

[13] Jayashree M, Singhi S. Changing trends and predictors of outcome in poisoning. Indian Pediatr., 2011; 48(11): 953–956.

[14] Bhatia H, Puri S, et al. Acute pesticide poisoning: clinical pattern and outcome. J Emerg Trauma Shock, 2015; 8(3): 163–67.

[15] Pandey S, et al. Organophosphorus poisoning: demographic and clinical profile. Asia Pac J Med Toxicol., 2014; 3(2): 68–72.

[16] Tandon N, Sagar R, et al. Mental health correlates of suicide attempts in India. Indian J Psychiatry, 2020; 62(2): 127–35.

[17] Sharma R, et al. Analysis of poisoning cases in a tertiary hospital. J Indian Acad Forensic Med., 2018; 40(3): 216–20.

[18] Choudhury S, Deka D, et al. Profile of acute poisoning in Assam: a hospital-based study. J Evidence Based Med Healthc., 2019; 6(40): 2683–87.

[19] Longo DL, et al. Pesticide exposure and suicide in developing countries. Lancet Glob Health, 2017; 5(7): 676–e77.

doi: 10.21276/SSR-IIJLS.2026.12.3.35

[20]Thakur A, et al. Clinical outcome and prognosis in acute poisoning: a North Indian perspective. J Family Med Prim Care, 2020; 9(12): 6308–31.

[21]Rao NR, et al. Organophosphate poisoning and management protocols. Indian J Crit Care Med., 2019; 23(10): 468–74.

[22]Gupta S, et al. Predictors of mortality in acute poisoning. Indian J Anaesth., 2020; 64(8): 667–73.

[23]Tripathi CB, et al. Epidemiology of poisoning cases in India. J Assoc Physicians India, 2021; 69(3): 41–46.

[24]WHO. Poisoning prevention and management: World Health Organization guidelines. Geneva: WHO; 2019.

[25]National Crime Records Bureau (NCRB). Accidental Deaths and Suicides in India, 2023. New Delhi: Ministry of Home Affairs, Government of India; 2024.

[26]Tripura Health Department Annual Bulletin, 2025. State Poison Control Data. Agartala: Directorate of Health Services. Available at: https://health.tripura.gov.in/.