

## Profile and Prognosis of Poisoning Cases in a Tertiary Care Centre in Tripura, Northeast India

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### Abstract:

**Background:** Poisoning remains a major public health concern, particularly in developing regions such as India. Despite extensive research on poisoning patterns, data specific to Tripura is limited. This study aimed to assess the patterns and outcomes of poisoning cases in a tertiary care hospital in Tripura.

**Methods:** This hospital-based cross-sectional study was conducted at Tripura Medical College from February 2023 to July 2024. Seventy-five patients aged 18 years and older with suspected poisoning were included. Data on demographics, poisoning types, clinical outcomes, and hospital admission times were collected. Statistical analysis was conducted using SPSS version 26.0.

**Results:** The majority of cases (32.0%) were aged 21-30 years, with a mean age of  $30.4 \pm 11.8$  years. Males constituted 57.3% of cases. Organophosphorus poisoning was most common (65.3%). The average hospital stay was 5.44 days, and the overall mortality rate was 6.7%. All fatal cases involved organophosphorus poisoning. Delayed admission beyond four hours significantly increased mortality risk ( $p = 0.001$ ).

**Conclusion:** Organophosphorus poisoning is a prominent concern in Tripura, with delayed hospital admission being a key predictor of mortality. Enhanced public awareness and improved emergency response systems are crucial for better outcomes.

**Keywords:** Poisoning, Outcomes, Tertiary Care Hospital, North-East, India.

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### Introduction

Poisoning is a major global public health issue, with developing countries accounting for 90% of fatal poisoning cases. [1] Acute poisoning is one of the most frequent reasons for hospital admissions in emergency departments. It can result from intentional, accidental, or homicidal ingestion of toxic substances. The occurrence of deaths due to poisoning has been documented since ancient times. Poisoning remains a major global concern, often serving as a discreet method of harm without the use of physical violence.

In some cases, individuals consume toxic substances to end their lives in a seemingly peaceful manner rather than opting for methods like hanging or self-inflicted physical injuries. [2-4] The morbidity and mortality associated with poisoning vary depending on the type of toxic agent and regional factors. In

India, deaths caused by poisoning are classified as unnatural and are registered as medicolegal cases. Accidental poisoning frequently occurs due to a lack of awareness or information about toxic substances. Suicidal poisoning is more prevalent among young adults, whereas children are more commonly affected by accidental ingestion of harmful substances. [5-7]

With advancements in industrialization and agriculture, insecticides and other hazardous chemicals have become widely accessible, leading to an increased risk of severe toxic exposure. Although numerous studies have explored the patterns and outcomes of acute poisoning across different regions of India and the world, there is a lack of research focusing on Tripura. Therefore, this study aims to analyze the pattern and outcomes of poi-

soning cases among patients admitted to a tertiary care hospital in Tripura.

### Material and Methods:

This hospital-based observational cross-sectional study was conducted in the Department of Medicine at Tripura Medical College from February 2023 to July 2024. The study included patients aged 18 years and older with a history of alleged poisoning. A total of 75 cases were recruited based on predefined inclusion and exclusion criteria using non-probability (convenient) sampling. Relevant data, including demographic details (age and gender), time elapsed since ingestion, type and chemical classification of the poisonous substance, duration of hospitalization, clinical presentation, biochemical parameters, and patient outcomes, were systematically recorded using a semi-structured proforma.

The diagnosis of poisoning was determined based on the patient's history, the sample or substance provided by the patient's representatives, and the

clinical manifestations observed. The time elapsed was calculated from the moment of ingestion to the presentation at our institution.

Data analysis was performed using SPSS version 26.0. Categorical variables were summarized as frequencies and percentages, while continuous variables were expressed as means with standard deviations (SD). Results were interpreted to address the study objectives, with findings presented in tables and graphs.

### Results:

The majority (32.0%) were aged in the 21-30 age group, followed by 28.0% in  $\leq 20$  years, 18.7% in the 31-40 age group, 16.0% in the 41-50 age group, and 5.3% aged  $>50$  years. The mean age of 30.4 ( $\pm 11.8$ ) years, ranging from 18 to 55 years. In terms of gender distribution, 57.3% of the participants were male, while 42.7% were female. Majority of the participants were Hindu (81.3%) and from rural areas (50.7). Only two of the participants had pre-existing hypertension.

**Table 1: Basic characteristics of patients**

Age-group	Frequency	Percentage
$\leq 20$	21	28.0
21-30	24	32.0
31-40	14	18.7
41-50	12	16.0
$>50$	4	5.3
Total	75	100
Gender	Frequency	Percentage
Male	43	57.3
Female	32	42.7
Total	75	100
Religion	Frequency	Percentage
Hindu	61	81.3
Muslim	14	18.7
Total	75	100
Residence	Frequency	Percentage
Rural	38	50.7
Urban	37	49.3
Total	75	100

The analysis of poisoning cases reveals that organophosphorus compounds were the most frequently involved, accounting for 65.3% of cases. Both mosquito repellent and multidrug poisoning were reported in 6.7% of cases each, while unknown substances contributed to 5.3% of cases. Oleander seed and acid poisoning were observed in 4.0% of cases each. Clonazepam poisoning

accounted for 2.6%, and doxycycline poisoning was reported in 2.7% of cases.

Additionally, poisoning due to profenofos with cypermethrin and rodenticide was the least common, each contributing to 1.3% of cases (Figure 1).

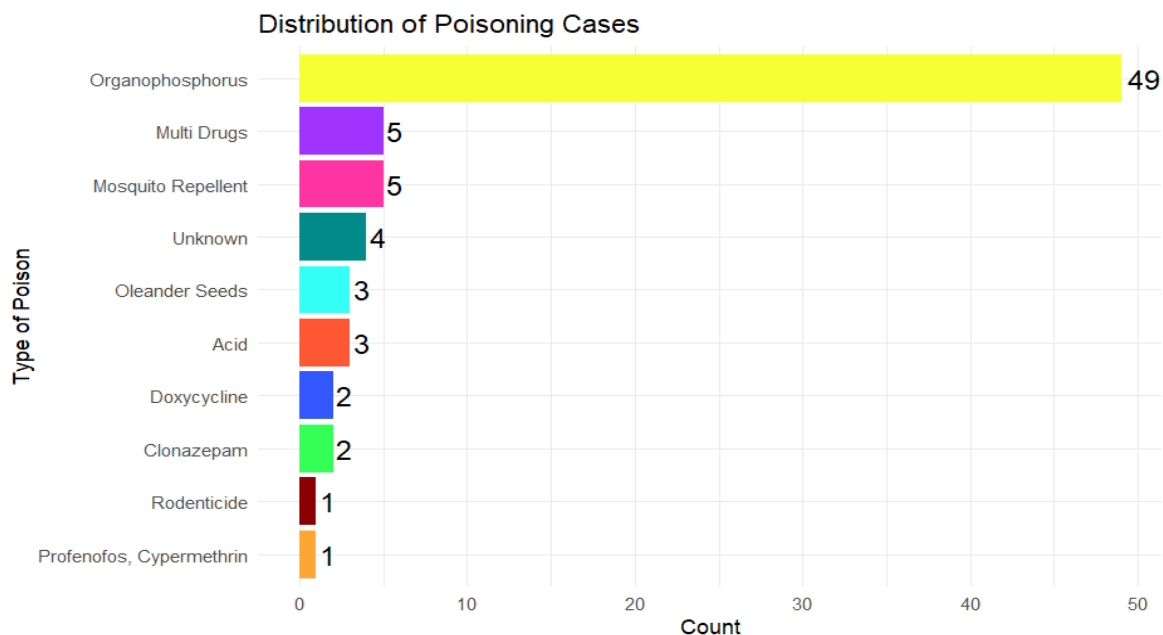


Figure 1: Distribution according to poisoning cases

The distribution of different types of poison among the cases analyzed shows that chemical poisoning was the most common, accounting for 72.0% of cases, followed by medicinal poisoning at 12.0%. Synthetic poisoning was reported in 6.7% of cases, while 5.3% involved an unknown type of poison. Additionally, plant-based poisoning was the least common, observed in 4.0% of cases (Figure 2).

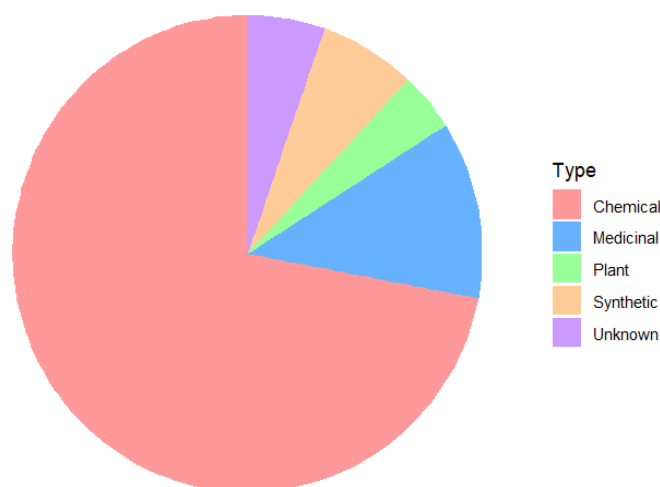


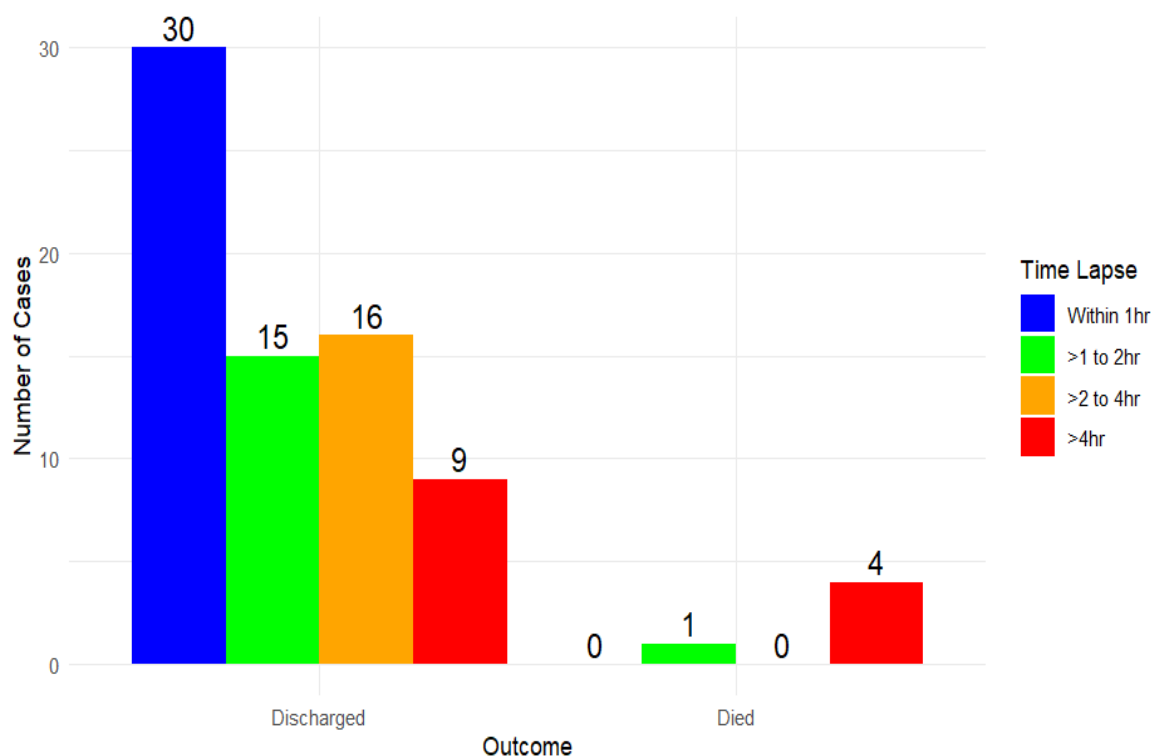
Figure 2: Distribution of type of poisons

Out of the total cases, 39 patients (52.0%) were referred, while 36 patients (48.0%) were admitted directly. The average hospital stay was 5.44 days ( $\pm 2.16$ ), ranging from 3 to 13 days. The majority of patients were successfully discharged, with 70 cases (93.3%), while 5 patients (6.7%) succumbed to poisoning. Notably, all fatal cases were due to organophosphorus poisoning. The analysis of time lapse before admission and outcomes reveals a strong correlation between delayed admission and mortality ( $p = 0.001$ ). Among patients admitted

within 1 hour, 30 cases (42.9%) were discharged, with no deaths. In the 1 to 2-hour window, 15 cases (21.4%) were discharged, while 1 patient (20.0%) died. For admissions between 2 to 4 hours, 16 cases (22.9%) were discharged, with no reported deaths. However, a notable increase in mortality was observed for admissions beyond 4 hours, where only 9 cases (12.9%) were discharged, while 4 cases (80.0%) resulted in death. A comparison of patient outcomes based on admission type showed that among referred cases, 36 patients (51.43%)

were discharged, while 3 patients (60.0%) died. In contrast, among direct admissions, 34 patients (48.57%) were discharged, and 2 patients (40.0%) died. A chi-square test revealed no statistically significant association between admission type and

patient outcomes ( $p = 0.711$ ). These findings suggest that while referral status does not impact outcomes significantly, delayed hospital admission greatly increases the risk of mortality in poisoning cases.



**Figure 3: Outcome of cases by time lapse between ingestion and admission**

### Discussion:

The findings of this study offer significant insights into the epidemiology, clinical outcomes, and determinants of mortality in acute poisoning cases at a tertiary care hospital in Tripura. The demographic analysis indicates that younger individuals, particularly those aged 30 years or younger, constitute the majority of poisoning cases. The mean age of affected individuals was  $30.4 \pm 11.8$  years, with an age range of 18 to 55 years. The age distribution observed in this study aligns with findings from previous literature, though slight variations exist. For instance, Mittal et al. reported a mean age of  $29 \pm 10.53$  years, while Ahuja et al. documented a median age of 29 years (range: 15–76 years). [8,9] Similarly, Sharma et al. reported a mean age of  $28.43 \pm 14$  years, with cases ranging from 1 to 84 years, noting the highest incidence within the 21–30-year age group. [2]

This age group represents a critical period in an individual's life, characterized by higher education, career establishment, and the assumption of familial and social responsibilities. The challenges associated with this phase, such as professional stress, financial burdens, marital adjustments, and social expectations, can contribute to psychological dis-

stress. In individuals with limited coping mechanisms or underlying personality vulnerabilities, these stressors may lead to self-harm or suicidal behavior. [3] Addressing mental health support, stress management, and early intervention strategies within this demographic could play a crucial role in reducing the incidence of poisoning cases.

A significant male predominance was observed in poisoning cases, consistent with prior studies by Sharma et al. and Ahuja et al., which reported that men are at higher risk of poisoning due to greater occupational exposure, risk-taking behaviours, and access to toxic substances. [2,9] In contrast, poisoning in females has been more commonly linked to domestic stressors and self-harm attempts. [10] While male predominance in poisoning cases is widely reported, some regional studies have noted variations based on socioeconomic and cultural factors. [11–14]

The study identified organophosphorus compounds as the most common toxic agents involved in poisoning cases, a finding that aligns with previous research in India and other developing nations. [2,9,13,15,16] Studies by Sharma et al. and Unnikrishnan et al. have consistently reported that organophosphorus poisoning accounts for a signifi-

cant proportion of poisoning-related morbidity and mortality. [2,5] The widespread availability of these pesticides, combined with their high toxicity, makes them a major concern in poisoning management. Notably, in the present study, all fatal cases involved organophosphorus poisoning, reinforcing the urgent need for stricter pesticide regulations and public awareness programs. The association between time to hospital admission and patient outcomes was a critical aspect of this study. A significant increase in mortality was observed among patients admitted beyond four hours after poisoning, with an 80% fatality rate. This trend is in agreement with previous studies which highlighted that early hospital intervention is a key determinant of survival in poisoning cases. [2,16–18] This pattern suggests that timely medical intervention plays a crucial role in reducing mortality among poisoning cases, emphasizing the importance of early hospital admission for better patient outcomes. Delays in seeking medical attention, often due to logistical challenges, unawareness, or referral delays, contribute to poorer outcomes. These findings emphasize the importance of strengthening pre-hospital emergency response systems to reduce admission delays and improve survival rates.

### Conclusion

This study highlights organophosphorus compounds as the predominant cause of poisoning in Tripura, contributing significantly to morbidity and mortality. The findings underscore the critical impact of delayed hospital admission, with mortality rates rising sharply when medical intervention occurs more than four hours post-ingestion. Strengthening public awareness campaigns, enforcing stricter pesticide regulations, and improving emergency response systems are essential to reducing poisoning-related fatalities. Timely medical intervention can significantly improve survival rates, emphasizing the need for community education and streamlined referral processes to mitigate delays in poisoning cases.

### References

1. The public health impact of chemicals: knowns and unknowns - data addendum for 2016 [Internet]. [Cited 2025 Mar 10]. Available from: <https://www.who.int/publications/i/item/WHO-CED-PHE-EPE-18.09>
2. Sharma R, Neelanjana, Rawat N, Panwar N. Mortality and morbidity associated with acute poisoning cases in north-east India: A retrospective study. *J Family Med Prim Care*. 2019; 8:2068–72.
3. Dash SK, Raju AS, Mohanty MK, Patnaik KK, Mohanty S. Sociodemographic Profile of Poisoning Cases. *Journal of Indian Academy of Forensic Medicine*. 2005; 27:133–8.
4. Bamathy B, Punnagai K, Amritha CA, Chelathai DD. Incidence and Patterns of Acute Poisoning Cases in an Emergency Department of A Tertiary Care Hospital in Chennai. *Bio-medical and Pharmacology Journal*. 2017; 10:1285–91.
5. Unnikrishnan B, Singh B, Rajeev A. Trends of acute poisoning in south Karnataka. *Kathmandu Univ Med J (KUMJ)*. 2005; 3:149–54.
6. Das R. Epidemiology of Insecticide poisoning at AIIMS Emergency Services and role of its detection by gas liquid chromatography in diagnosis. *Medico-Legal Updat Int J*. 2007; 7:49–60.
7. Srivastava A, Peshin SS, Kaleekal T, Gupta SK. An epidemiological study of poisoning cases reported to the National Poisons Information Centre, All India Institute of Medical Sciences, New Delhi. *Hum Exp Toxicol*. 2005; 24:279–85.
8. Mittal N, Shafiq N, Bhalla A, Pandhi P, Malhotra S. A prospective observational study on different poisoning cases and their outcomes in a tertiary care hospital. *SAGE Open Med*. 2013; 1:2050312113504213.
9. Ahuja H, Mathai AS, Pannu A, Arora R. Acute Poisonings Admitted to a Tertiary Level Intensive Care Unit in Northern India: Patient Profile and Outcomes. *J Clin Diagn Res*. 2015; 9:UC01–4.
10. Shoib S, Khan S, Baiou A, Chandradasa M, Swed S, Turan S, et al. Exposure to violence and the presence of suicidal and self-harm behaviour predominantly in Asian females: scoping review. *Middle East Current Psychiatry*. 2022; 29:62.
11. Sulaj Z, Prifti E, Demiraj A, Strakosha A. Early Clinical Outcome of Acute Poisoning Cases Treated in Intensive Care Unit. *Med Arch*. 2015; 69:400–4.
12. Rehiman S, Lohani SP, Bhattarai MC. Correlation of serum cholinesterase level, clinical score at presentation and severity of organophosphorous poisoning. *JNMA J Nepal Med Assoc*. 2008; 47:47–52.
13. Adinew GM, Woredikal AT, DeVos EL, Birru EM, Abdulwahib MB. Poisoning cases and their management in emergency centres of government hospitals in northwest Ethiopia. *Afr J Emerg Med*. 2017; 7:74–8.
14. Yurumez Y, Durukan P, Yavuz Y, Ikizceli I, Avsarogullari L, Ozkan S, et al. Acute organophosphate poisoning in university hospital emergency room patients. *Intern Med*. 2007; 46:965–9.
15. Gupta P, Kumar A, Singh SP, Prakash M, Gupta M, Kumar P. Pattern Of Cases Of Acute Poisoning In A Rural Tertiary Care Center In Northern India. 2016; 7.

16. Ramesha KN, Rao KBH, Kumar GS. Pattern and outcome of acute poisoning cases in a tertiary care hospital in Karnataka, India. *Indian J Crit Care Med.* 2009; 13:152–5.
17. Patel DJ, Tekade PR. Profile of Organophosphorus Poisoning at Maharani Hospital, Jagdalpur, Chhattisgarh: A Three Years Study. *Journal of Indian Academy of Forensic Medicine.* 2011; 33:8–11.
18. Kora SA, Doddamani GB, Halagali GR, Vijayamahantesh SN, Umakanth B. Sociodemographic profile of the organophosphorus poisoning cases in southern India. *Journal of clinical and diagnostic research.* 2011; 5:953–6.