

Prospective Surveillance of Emerging Chemical Poisoning and its impact on health in a South Indian Tertiary Hospital

Jayasutha Jayram^{1*}, Vaishnavi K¹, Shreedevi G²

¹Department of Pharmacy Practice, Sri Ramachandra Faculty of Pharmacy, Sri Ramachandra Institute of Higher Education and Research, (Deemed to be University), Porur, Chennai - 600116, Tamil Nadu, India

²Department of Emergency Medicine, Sri Ramachandra Medical College and Research Institute, Sri Ramachandra Institute of Higher Education and Research (Deemed to be University), Porur, Chennai-600116, Tamil Nadu, India

INTRODUCTION & AIM

Emerging chemicals—including pharmaceuticals, pesticides, and household agents—are increasingly recognized as environmental contaminants with potential for adverse health effects. Human poisoning events serve as sentinel indicators of exposure.

In India, poisoning is a major public health problem, with pesticide and pharmaceutical overdoses being the most common causes. However, most studies focus on clinical outcomes without explicitly linking them to environmental sources. Prospective data collection allows real-time characterization of exposure patterns and can inform both clinical management and environmental interventions.

This prospective study **aimed to evaluate the pattern, environmental sources, and acute health outcomes of poisoning by emerging chemicals in a tertiary care hospital in South India.**

METHOD

Design: Prospective observational study

Setting: Emergency Department, Sri Ramachandra Tertiary Hospital, Sri Ramachandra Institute of Higher Education and Research (DU), Chennai, Tamilnadu, India

Duration: January 2020 – July 2023 (3.5 years)

Ethics: Approved by Institutional Ethics Committee

Consent: Informed consent obtained from all patients or legal guardians

Population: Consecutive patients of all ages presenting with acute poisoning

Inclusion criteria: All acute poisoning cases evaluated in emergency department

Exclusion criteria: Patients who died before clinical evaluation, those discharged against medical advice, and those with incomplete data were excluded.

Sample Size: 81 patients enrolled prospectively

Data Collection: Standardized form covering demographic characteristics, poisoning agent, exposure route, time to presentation, clinical management, and outcomes

Analysis: Descriptive statistics using IBM SPSS version 29.0

RESULTS & DISCUSSION

Among 81 prospectively enrolled patients, pharmaceutical overdose was the most frequent exposure (34.6%), followed by organophosphorus pesticides (18.5%) and rat killer (13.6%). Intentional ingestion accounted for 67.9% of cases. Most patients (76.5%) arrived within 4 hours of exposure. Activated charcoal was administered in 39.5% of cases; specific antidotes included N-acetylcysteine (18.5%) and atropine (8.6%). All patients recovered fully, with no mortality in the prospective cohort.

RESULTS & DISCUSSION

Parameter	Category	N (%)	
Age Group (most affected)	21–30 years	23 (28.4%)	
	Gender (most affected)	Female	43 (53.1%)
	Poisoning Agent	Pharmaceutical overdose	28 (34.6%)
		Organophosphorus pesticides	15 (18.5%)
		Rat killer (rodenticide)	11 (13.6%)
Hydrocarbon		5 (6.2%)	
	Others*	22 (27.1%)	
Circumstance	Intentional	55 (67.9%)	
	Accidental	26 (32.1%)	
Time to Hospitalization	< 4 hours	62 (76.5%)	
	4–8 hours	13 (16.0%)	
	> 8 hours	6 (7.5%)	
Antidotes/Treatments	Activated charcoal	32 (39.5%)	
	N-acetylcysteine	15 (18.5%)	
	Atropine	7 (8.6%)	
	Vitamin K	5 (6.2%)	
Outcome	Recovered fully	81 (100%)	
	Mortality	0 (0%)	

The findings highlight that **pharmaceuticals and pesticides** are the predominant agents, with a substantial proportion of intentional ingestions. High intentional poisoning rate highlights link between environmental availability and mental health.

CONCLUSION

Prospective surveillance reveals that pharmaceuticals and pesticides are the predominant emerging chemicals causing acute poisoning in this region. The high proportion of intentional ingestion highlights the intersection of environmental availability and mental health. Reducing the burden requires integrated strategies: safe medication disposal, stricter pesticide regulation, and community education.

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