

Patterns and Characteristics of Poisoning in Patients Admitted to a Peripheral Tertiary Care Hospital in Eastern India: A Record-based Observational Study

Rajat K Goswami¹, Shambo S Samajdar², Shatavisa Mukherjee³

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ABSTRACT

Background: Poisoning represents a significant public health concern globally, with varying epidemiology based on regional socioeconomic conditions, cultural practices, and healthcare accessibility. This study aimed to elucidate the patterns, demographics, and outcomes of different types of poisoning in a peripheral tertiary care hospital in India.

Materials and methods: A retrospective, record-based observational study was conducted over 12 months, including 66 patients with poisoning, excluding drug abuse, insect, and snakebites. Demographics and clinical data were analyzed using SPSS, and confidentiality was maintained in line with ethical standards.

Results: The study found a female predominance in poisoning cases (77%), with a mean patient age of 28.2 years. Organophosphate (OP) poisoning was most common (45.45%), followed by kerosene (10.47%) and unidentified drug poisoning (9.30%). The overall mortality was 10.6 and 7.5% of patients were referred to a higher-level center for advanced care.

Conclusion: The prevalence of OP and kerosene poisoning underscores the need for increased public awareness and improved storage and handling practices. The higher incidence among females and significant referral rates to Tertiary Care Centers indicate a need for targeted preventive strategies and improved primary care management.

Keywords: Epidemiology, Organophosphate, Poisoning, Public health.

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INTRODUCTION

Poisoning remains a significant global public health challenge that manifests through a variety of agents capable of causing harm or death upon exposure or ingestion. Defined broadly, a poison is any substance that can cause illness or death to living organisms when introduced into the body, deliberately or accidentally. This includes toxins and venom, the latter typically delivered through the bites or stings of venomous fauna.¹

According to the World Health Organization (WHO), nearly 200,000 people die annually from accidental poisoning, with a disproportionate 84% of these fatalities occurring in low- and middle-income countries. Furthermore, poisoning leads to the loss of approximately 10.7 million disability-adjusted life years globally each year. Alarmingly, deliberate pesticide ingestion alone is responsible for around 370,000 deaths annually.¹ Snakebites also pose a serious health hazard, with estimates suggesting up to 2.5 million envenomation and 100,000 deaths each year.¹

The prevalence and nature of poisoning, including its intent and severity, vary significantly across different regions. This variability is even more pronounced within large nations where regional disparities in health outcomes can be extensive. In India, poisoning is a leading cause of accidental death, contributing to 4.6% of all accidental deaths in 2014 and 6.3% in 2015. Additionally, poisons were used in 26.0% of suicides in 2014 and 27.9% in 2015, with sleeping pills accounting for a further 0.5% in both years. Notably, in 2015, there were 1,624 deaths due to food poisoning and 8,554 from snakebites.²⁻⁴

Despite the severity of these statistics, most studies on poisoning and suicides in India have been retrospective, based

¹Department of General Medicine, ICARE Institute of Medical Sciences and Research and Dr. Bidan Chandra Roy Hospital, Haldia, West Bengal, India

²Department of Diabetes and Allergy-Asthma, Diabetes and Allergy-Asthma Therapeutics Clinic, Kolkata, West Bengal, India

³Department of Clinical and Experimental Pharmacology, School of Tropical Medicine, Kolkata, West Bengal, India

Corresponding Author: Shatavisa Mukherjee, Department of Clinical and Experimental Pharmacology, Calcutta School of Tropical Medicine, Kolkata, West Bengal, India, Phone: +91 9830529192, e-mail: shatavisa100@gmail.com

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on hospital or institutional records, and few have been conducted in eastern India.^{5,6} These studies often lack prospective data and do not adequately explore the types of poisoning, treatment outcomes, or the identification of factors that could reduce morbidity and mortality. To address these gaps, our study was designed as a descriptive longitudinal observational study to estimate the incidence, nature, severity, and treatment outcome trends associated with acute poisoning, including drug overdoses and venomous snakebites, in a Tertiary Care Teaching Hospital in West Bengal.

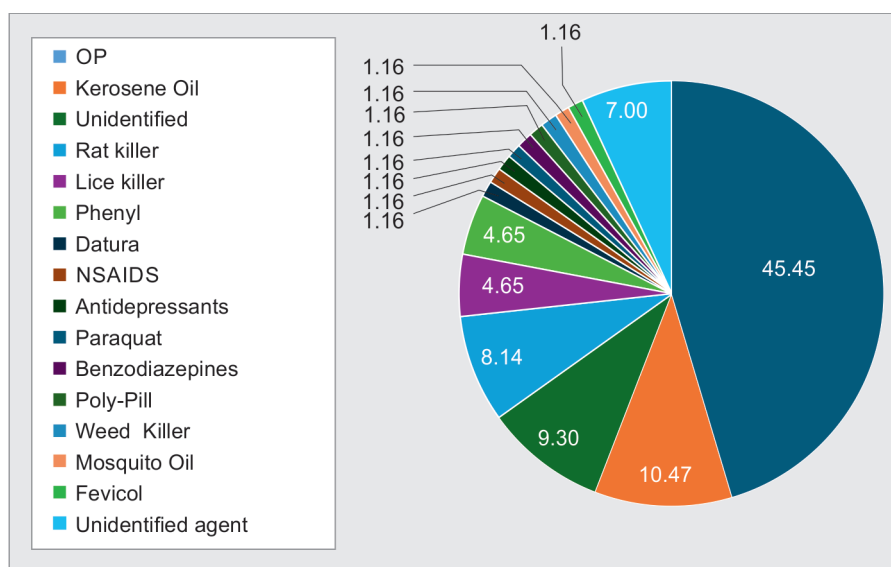


Fig. 1: Pie chart depicting percentage distribution of different poisoning cases

MATERIALS AND METHODS

A record-based observational study was conducted at a peripheral Tertiary Care Hospital to assess the incidence and characteristics of poisoning cases admitted over 1 year. The study population comprised 66 patients admitted with poisoning, encompassing all age groups and both genders. We excluded cases involving drug abuse, insect bites, or snakebites. Additionally, patients with incomplete medical records were omitted from the analysis.

Data collection involved reviewing hospital medical records to extract demographic information (age and gender) and clinical data (duration of hospital stay and type of poisoning). The types of poisoning were classified into distinct categories as per the medical records. Data confidentiality was upheld by storing information on a password-protected computer, and personal identifiers were removed to maintain patient anonymity.

Statistical analyses were performed using SPSS version 25.0. Descriptive statistics included the calculation of mean, standard deviation (SD), and 95% confidence intervals (CI) for continuous variables such as age and duration of hospital stay. Categorical data, such as types of poisoning, were expressed as frequencies and percentages.

This study received approval from the Institutional Ethics Committee and complied with the ethical standards of the Declaration of Helsinki. Given the record-based nature of this observational study, informed consent was deemed unnecessary. All data collection methods were designed to preserve the confidentiality and integrity of patient information.

RESULTS

Our observational study encompassed 66 patients who were admitted with a diagnosis of poisoning over 12 months. The average age of these individuals was 28.2 years, with a SD of 13.83 years. The age distribution CI at 95% was between 24.7 and 31.7 years. Predominantly affected were females, constituting 77% of the total cases, with males representing the remaining 23%. The duration of hospital stay averaged 2.89 days, with an SD of 1.61 days, and the 95% CI for the duration ranged from 2.474 to 3.306 days.

Analyzing the etiological factors, organophosphate (OP) poisoning emerged as the most prevalent, being responsible for 45.45% of the incidents. This was followed by kerosene oil poisoning at 10.47%, and unidentified single drug poisonings at 9.30%. The study also noted cases of rat killer (8.14%), lice killer (4.65%), and phenyl poisonings (4.65%). Other identified causes, including Datura, non-steroidal anti-inflammatory drugs (NSAIDs), antidepressants, paraquat, benzodiazepines (BZDs), poly-pill, weed killer, mosquito oil, and fevicol, were each implicated in 1.16% of cases. Cases where the poisoning agent remained unidentified accounted for 7% of the cohort.

The mortality rate within our study population was 10.6%, with seven deaths recorded. Four fatalities were attributed to OP poisoning, two to unknown drug poisonings, and one to weed killer ingestion. A subset of 7.5% of patients required referral to a higher-level tertiary care center for further management.

Figure 1 presents a pie chart illustration of the percentage distribution of the various poisoning agents encountered in this study. These findings underscore the diverse spectrum of toxicological emergencies presented at our institution and highlight the need for tailored preventative and therapeutic approaches to manage such cases effectively.

DISCUSSION

This observational study, which surveyed 66 cases of poisoning, reflects the demographic distribution and etiology of poisoning in a peripheral tertiary care hospital over a year. Notably, most patients were females (77%), which is a divergence from the traditional male dominance seen in poisoning cases in previous Indian studies.⁷⁻¹⁰ This suggests a potential shift in exposure and risk factors that may be specific to the region served by our hospital and warrants further investigation into gender-related differences in the context of poisoning. The mean age of the patients (28.2 years) aligns with the age group most affected in previous regional studies, which generally report a higher incidence of poisoning among young adults.⁷⁻¹⁰ This is a critical age range, often associated with occupational hazards

and psychosocial stressors, that could increase the risk of both accidental and intentional poisonings.

The predominance of OP poisoning, constituting over a third of the cases, mirrors the findings from other areas in India and emphasizes the ongoing issue of OP pesticides' availability and use in domestic and agricultural settings. The significant representation of kerosene and unidentified single-drug poisonings further indicates the need for targeted public health interventions to prevent such poisonings.

Our data revealed a mortality rate of 10.6%, which, while within the range of other Indian studies, underscores the severity of poisoning as a clinical entity. Particularly, the fatality rate associated with OP poisoning necessitates a review of the accessibility of these substances and the timeliness and effectiveness of the treatment provided. The referral of 7.5% of patients to a higher-level Tertiary Care Center may reflect the complexity of cases that a peripheral hospital encounters and the importance of an efficient referral system. This aspect of healthcare delivery is crucial in optimizing patient outcomes and underscores the need for strong inter-hospital communication and transport infrastructure.

Seasonality, as evidenced by other studies, also plays a role in the incidence of poisoning. Our study's timeline did not permit a thorough examination of this factor, but previous research suggests that seasonal variations in agricultural practices and natural events like monsoons can influence the pattern of poisonings.

The findings of another comprehensive prospective study provide critical insights into the epidemiology of poisoning in eastern India, particularly highlighting the predominance of snakebite cases and the implications of delayed healthcare access on patient outcomes. That study underscores the need for targeted interventions aimed at reducing the time to treatment, especially in rural areas, and enhancing the availability and use of specific antidotes to improve survival rates.¹¹

The cases of unidentified poisoning agents (7%) present a challenge to clinicians and toxicologists, stressing the importance of improved diagnostic tools and protocols in the management of poisoning cases.

Considering the observed demographics, etiology, and outcomes, it is paramount to develop comprehensive strategies for prevention, including community education, safe storage practices, and regulation of hazardous substances. Furthermore, enhancing the capability of primary healthcare centers to manage acute poisonings could decrease the need for referrals and potentially improve clinical outcomes.

Future research should aim to explore the specific reasons behind the high incidence of poisoning among females in our setting and investigate the psychosocial and economic factors influencing the pattern of poisonings. Additionally, examining the latency in treatment and its impact on patient outcomes could yield valuable information for improving emergency services.

CONCLUSION

The study highlights a notable prevalence of OP and kerosene oil poisoning among patients, with a significant representation of

females, indicating a need for focused preventive and educational measures. The mortality rate points to the critical necessity for improved clinical management and rapid treatment protocols. This research provides a foundation for future public health strategies to address the specific needs and challenges in the management of poisoning in India.

Take-home Messages

The high prevalence of OP and kerosene poisoning, female predominance, and the crucial nature of timely hospital care form the focal points for public health strategies and clinical management optimization in acute poisoning cases.

ORCID

Shambo S Samajdar  <https://orcid.org/0000-0002-9199-0905>

Shatavisa Mukherjee  <https://orcid.org/0000-0001-9524-1525>

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