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Socio-Demographic, Clinical Profile and Outcomes of Acute Poisoning at a Tertiary Care Hospital

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ABSTRACT

Background: Acute poisoning is a significant global health problem, with varying patterns across different regions due to socio-economic, cultural, and geographical factors. This study aimed to analyse the socio-demographic characteristics, clinical profile, and outcomes of acute poisoning cases presenting to the Emergency Medicine Department of a tertiary care teaching hospital, to improve management strategies and inform preventive measures.

Methods: A prospective observational study was conducted over 6 months. All patients presenting with acute poisoning were included, resulting in a sample size of 50. Data on socio-demographic factors, poison type, clinical manifestations, treatment modalities, and outcomes were collected using a structured proforma. Descriptive statistics and Fisher's exact test were used for data analysis due to the small sample size.

Results: Among the 50 patients studied, the mean age was 30.2±13.5 years, with a slight male predominance (56%). Organophosphorus compounds were the most common poison (32%), followed by prescription drugs (24%) and household chemicals (22%). Intentional self-poisoning accounted for 70% of cases, with relationship conflicts (38%) and financial stress (28%) being the primary motivators. The most frequent clinical manifestations were nausea/vomiting (68%), altered consciousness (42%), and respiratory distress (28%). Gastric lavage was performed in 58% of cases, while 20% required mechanical ventilation.

Conclusion: This pilot study provides initial insights into the burden of acute poisoning in the region. Despite the limited sample size, it suggests the need for targeted preventive strategies, improved access to mental health services, and enhanced emergency care protocols.

Key-words: Poisoning, Emergency Service, Hospital, Socioeconomic Factors, Organophosphate Poisoning

INTRODUCTION

Acute poisoning represents a significant global health challenge, contributing substantially to morbidity and mortality worldwide [1].

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The World Health Organization estimates that poisoning is responsible for over 100,000 deaths annually, with a disproportionate impact on low- and middle-income countries [2]. The epidemiology of poisoning varies considerably across different regions, influenced by a complex interplay of socio-economic, cultural, and geographical factors [3].

In the context of emergency medicine, acute poisoning cases present unique challenges due to their diverse etiologies, ranging from accidental exposures to intentional self-harm [4]. The rapid identification of the toxic agent, assessment of severity, and initiation of

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appropriate treatment are crucial for improving patient outcomes [5]. However, the management of poisoning cases is often complicated by limited resources, lack of specific antidotes, and delayed presentation to healthcare facilities, particularly in developing countries [6].

Recent studies have highlighted the changing patterns of poisoning, with an increasing prevalence of prescription drug overdoses and household chemical exposures in urban areas, while agrochemical poisonings remain a significant concern in rural regions [7,8]. This shift in poisoning trends necessitates ongoing research to inform evidence-based management protocols and preventive strategies tailored to local contexts.

The socio-demographic profile of poisoning victims provides valuable insights into vulnerable populations and potential risk factors [9]. Understanding these characteristics is essential for developing targeted interventions and public health policies aimed at reducing the incidence of poisoning [10]. Moreover, analysing the clinical manifestations, treatment modalities, and outcomes of poisoning cases can help identify prognostic factors and optimize emergency care protocols [11].

Despite the importance of this topic, there is a paucity of comprehensive data on acute poisoning in many regions, including detailed analyses of socio-demographic factors, clinical profiles, and outcomes in tertiary care settings. This knowledge gap hampers the development of effective prevention strategies and the refinement of management guidelines [12].

In light of these considerations, this study aims to analyse the socio-demographic characteristics, clinical profile, and outcomes of acute poisoning cases presenting to the Emergency Medicine Department of a tertiary care teaching hospital. By providing a detailed examination of poisoning patterns, associated risk factors, and treatment outcomes, this research seeks to contribute valuable insights that can inform improved management strategies and guide the development of preventive measures.

Through this comprehensive analysis, we aim to enhance our understanding of acute poisoning in our local context and contribute to the broader body of knowledge in clinical toxicology and emergency medicine. The findings of this study have the potential to inform policy decisions, improve clinical practice, and ultimately reduce the burden of acute poisoning in our community.

MATERIALS AND METHODS

Research Design- This prospective observational study was carried out over six months in the Emergency Medicine Department of a tertiary care teaching hospital. Ethical clearance was obtained from the Institutional Ethics Committee, and informed consent was taken from all participants or their guardians. Patients presenting with acute poisoning, defined as exposure to a harmful substance within 24 hours requiring emergency care, were included. Cases of chronic poisoning, food poisoning, and envenomation were excluded. Based on these criteria, 50 patients were enrolled.

Data were collected using a structured proforma covering socio-demographic details such as age, gender, occupation, education, and socioeconomic status. Information on the poisoning event, including the type of poison, route of exposure, intent (intentional or accidental), and time to hospital presentation, was documented. Clinical findings, including presenting symptoms, vital signs, and examination findings, were recorded. The severity of poisoning was assessed using the Poison Severity Score (PSS) by the European Association of Poisons Centres and Clinical Toxicologists.

Laboratory investigations such as complete blood count, renal and liver function tests, and arterial blood gas analysis were conducted as per departmental protocol. Treatment details, including gastric lavage, activated charcoal, antidotes, supportive therapy, and advanced interventions (mechanical ventilation or haemodialysis), were noted. Patients were followed until outcome, categorized as discharged, referred, left against medical advice, or died.

Inclusion Criteria

- All patients presenting to the Emergency Medicine Department with acute poisoning during the study period.
- Acute poisoning is defined as exposure to any toxic substance causing harm and leading to emergency medical care within 24 hours of exposure.

Exclusion Criteria

- Chronic poisoning cases**.**

- Food poisoning cases**.**
- Envenomation

Statistical analysis- Data were analyzed using SPSS version-25.0. Descriptive statistics summarized socio-demographic and clinical characteristics. Continuous variables were expressed as mean±SD or median with interquartile range, while categorical variables were presented as frequencies and percentages. Fisher's exact test was applied to assess associations due to small sample size, with $p<0.05$ considered significant. The study followed STROBE guidelines for reporting observational studies, and limitations such as its single-centre design and small sample size were acknowledged.

RESULTS

Table 1 presents the demographic characteristics and poisoning types observed in the study population of 50 patients. The mean age of 30.2±13.5 years indicates that most patients were young adults. There was a slight predominance of male patients (56%) compared to females (44%). Regarding the types of poisons involved, organophosphorus compounds were the most common, accounting for 32% of cases. This was followed by prescription drugs (24%) and household chemicals (22%), with other types of poisons making up the remaining 22% of cases. This distribution highlights the diverse nature of poisoning agents encountered in the emergency setting and the significant role of agricultural and household chemicals in acute poisoning incidents.

Table 1: Demographic Characteristics and Poisoning Types (N=50)

Characteristic		Value
Age (years), Mean±SD		30.2±13.5
Gender, n (%)	Males	28 (56%)
	Females	22 (44%)
Poison Type, n (%)	Organophosphorus compounds	16 (32%)
	Prescription drugs	12 (24%)
	Household chemicals	11 (22%)
	Others	11 (22%)

Table 2 focuses on the circumstances and motivating factors behind the poisoning events. A striking 70% of cases were identified as intentional self-poisoning, while 30% were accidental. This high proportion of intentional cases underscores the significant role of mental health issues and psychosocial stressors in acute poisoning. Among those who intentionally self-poisoned, relationship conflicts were the primary motivating factor, accounting for 38% of cases, followed by financial stress at 28%. The remaining 34% were attributed to other or unknown factors. These findings highlight the complex interplay of personal and social factors contributing to self-harm behaviours.

Table 2: Circumstances and Motivating Factors of Poisoning (N=50)

Characteristic		n (%)
Circumstance	Intentional self-poisoning	35 (70%)
	Accidental	15 (30%)
Motivating Factors for Intentional Self-Poisoning (N=35)	Relationship conflicts	13 (38%)
	Financial stress	10 (28%)
	Other/Unknown	12 (34%)

The clinical manifestations and treatment modalities are presented in Table 3. Nausea and vomiting were the most common clinical manifestations, observed in 68% of patients. This was followed by altered consciousness in 42% of cases and respiratory distress in 28%. These symptoms reflect the diverse physiological effects of different poisons and underscore the need for comprehensive clinical assessment in poisoning cases. Regarding treatment, gastric lavage was performed in 58% of cases, indicating its frequent use as a decontamination method. Notably, 20% of patients required mechanical ventilation, suggesting a significant proportion of severe cases necessitate advanced life support.

Table 3: Clinical Manifestations and Treatment (N=50)

Characteristic		n (%)
Clinical Manifestations	Nausea/Vomiting	34 (68%)
	Altered consciousness	21 (42%)
	Respiratory distress	14 (28%)
Treatment Modalities	Gastric lavage	29 (58%)
	Mechanical ventilation	10 (20%)

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Table 4 presents the outcomes and factors associated with poor prognosis. The study recorded a 90% survival rate, with 5 out of 50 patients (10%) succumbing to the effects of poisoning. This mortality rate underscores the potential lethality of acute poisoning and the critical importance of prompt and effective emergency care. The analysis identified three factors significantly associated with poor outcomes: delayed presentation to the hospital (p=0.042), severity of poisoning (p=0.035), and need for mechanical ventilation (p=0.028). These findings highlight key areas for potential intervention to improve patient outcomes in acute poisoning cases.

Table 4: Outcomes and Associated Factors (N=50)

Characteristic		Value
Outcome, n (%)	Survived	45 (90%)
	Died	5 (10%)
Factors Associated with Poor Outcomes	Delayed presentation to hospital	0.042*
	Severity of poisoning	0.035*
	Need for mechanical ventilation	0.028*

**p-value*

DISCUSSION

This study provides valuable insights into the patterns of acute poisoning presenting to a tertiary care emergency department, highlighting important socio-demographic factors, clinical profiles, and outcomes. The findings have significant implications for both clinical practice and public health interventions.

The demographic profile of our study population, with a mean age of 30.2 years and a slight male predominance, aligns with several other studies conducted in similar settings. For instance, Ahmadi *et al*. [13] reported a mean age of 27.1 years in their study of acute poisoning in Iran, while Karki *et al.* [14] found a male-to-female ratio of 1.3:1 in Nepal. This consistency suggests that young adults, particularly males, may be at higher risk for acute poisoning events across different geographical regions.

The predominance of organophosphorus compounds as the most common poison (32%) in our study is a finding echoed in many developing countries. Eddleston *et al.* [15] highlighted the significant burden of organophosphate poisoning in rural Asia, attributing it to the easy availability of agricultural pesticides. However, the substantial proportion of cases involving prescription drugs (24%) and household chemicals (22%) in our study indicates a shift towards a more urban poisoning pattern. This trend has been observed in other emerging economies, as noted by Patel *et al.* [16] in their review of poisoning patterns in India.

The high rate of intentional self-poisoning (70%) observed in our study is alarming but not unprecedented. Rajapakse *et al*. [17] reported similar findings in Sri Lanka, where 82.4% of poisoning cases were intentional. The identification of relationship conflicts and financial stress as primary motivators for self-harm aligns with the findings of Knipe *et al.* [18], who emphasized the role of interpersonal conflict in self-poisoning events in South Asia. These findings underscore the urgent need for improved mental health services and social support systems.

The clinical manifestations observed in our study, particularly the high incidence of gastrointestinal symptoms and altered consciousness, are consistent with the toxidrome patterns described by Boyle *et al*. [5] in their review of critical care management of poisoned patients. The requirement for mechanical ventilation in 20% of our cases highlights the potential severity of acute poisoning. It aligns with the findings of Lee *et al.* [11], who reported that 13.8% of poisoning patients in their study needed intensive care.

Our overall mortality rate of 10% is concerning and slightly higher than some reported figures. For example, Ahuja *et al*. [19] found a mortality rate of 7.1% in their study of poisoning cases in North India. The identification of delayed presentation, poisoning severity, and need for mechanical ventilation as factors associated with poor outcomes corroborates the findings of Sam *et al*. [20], who emphasized the importance of early intervention in poisoning cases.

The frequent use of gastric lavage (58% of cases) in our study reflects a common practice in many emergency departments. However, this high-rate warrants review considering current recommendations. The American Academy of Clinical Toxicology and European Association of Poison Centres and Clinical Toxicologists [21] suggest that gastric lavage should not be employed routinely and its use should be considered only in specific circumstances.

LIMITATIONS

While our study provides valuable insights, it has

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limitations. The single-centre design and relatively small sample size may limit the generalizability of our findings. Furthermore, the short duration of the study may not capture seasonal variations in poisoning patterns.

RECOMMENDATIONS

These findings collectively highlight several key areas for intervention. There is a need for stricter regulation and safer storage of pesticides and household chemicals to reduce easy access. Enhanced mental health services and community support programs should be developed to address the high rate of intentional self-poisoning. Public education on the dangers of self-medication and proper storage of prescription drugs is essential. In addition, improved emergency response systems are required to minimize delays in hospital presentation. Continuous training of healthcare professionals in the management of acute poisoning cases, along with periodic review and updating of poisoning management protocols in line with international guidelines, is strongly recommended.

CONCLUSIONS

In conclusion, this study underscores the significant burden of acute poisoning and highlights the complex interplay of socio-demographic factors, poison types, and clinical management in determining outcomes. Future research should focus on larger, multi-centre studies to validate these findings and explore targeted interventions to reduce the morbidity and mortality associated with acute poisoning.

CONTRIBUTION OF AUTHORS

Research concept – Dr. Chetan, Dr. Sudha B R
Research design – Dr. Chetan, Dr. Savio Pereira
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Data collection – Dr. Chetan, Dr. Sudha B R
Data analysis and interpretation – Dr. Savio Pereira
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Final approval – Dr. Savio Pereira

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