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Original Article

Clinico-Demographic Profile and Outcome Analysis of Acute Poisoning Cases in a Tertiary Care Hospital

Dr Ravella Ranjith[1], Dr Shyam Kumar Kotni[2]

[1]Assistant Professor, Department of General Medicine, Mamata Medical College, Khammam
[2]Associate Professor, Department of General Medicine, Mamata Medical College, Khammam.

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Corresponding Author:

Dr Ravella Ranjith
Assistant Professor, Department of General Medicine, Mamata Medical College, Khammam

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ABSTRACT

Background: Acute poisoning is a major public health problem and an important cause of emergency hospital admissions, particularly in developing countries. The pattern of poisoning varies according to geographic region, socioeconomic status, and availability of toxic substances.Aim of the study was to evaluate the clinico-demographic profile and outcome of acute poisoning cases admitted to a tertiary care hospital.

Materials and Methods: This hospital-based observational study was conducted in the Department of General Medicine among 52 patients admitted with acute poisoning. Data regarding demographic profile, poisoning substance, route of exposure, presenting symptoms, ICU and ward stay, comorbidities, and outcomes were collected using a structured proforma. Data were analyzed using descriptive statistical methods and expressed as frequencies, percentages, mean, and standard deviation.

Results: Among the 52 patients, males constituted 67.31% and females 32.69% of cases. The mean age was 31.6 ± 11.42 years. Herbicides were the most common poisoning agents (34.62%), followed by insecticides (15.38%) and rat poison (11.54%). Oral liquid ingestion was the predominant route of exposure (69.23%). Vomiting was the most common presenting symptom (13.46%). Most patients required ICU stay for 2 days (40.38%). Survival was observed in 92.31% of patients, while mortality was noted in 7.69%.

Conclusion: Acute poisoning predominantly affects young adult males, with herbicides and pesticides being the common toxic agents. Early diagnosis, prompt intensive care management, and public awareness regarding safe handling of toxic substances are essential to reduce morbidity and mortality.

Keywords*: Acute poisoning; Herbicide poisoning; Pesticide poisoning; Clinical profile; Intensive care unit; Outcome analysis; Toxicology.*

INTRODUCTION

Acute poisoning is an important global public health problem associated with significant morbidity, mortality, and healthcare burden. Poisoning refers to exposure to toxic substances through ingestion, inhalation, injection, or dermal contact resulting in harmful physiological effects. Acute poisoning remains one of the most common medical emergencies encountered in emergency departments and intensive care units, particularly in developing countries where toxic agricultural chemicals are easily accessible. The World Health Organization has recognized poisoning as a major contributor to preventable deaths worldwide, especially among young adults and economically productive age groups [1]. Recent epidemiological studies have shown that pesticides, herbicides, insecticides, and pharmaceutical drugs constitute the major toxic agents responsible for poisoning-related hospital admissions [2].

The incidence and pattern of poisoning vary according to geographic region, socioeconomic conditions, occupation, literacy, and availability of toxic substances. In rural agricultural regions, herbicides and organophosphorus compounds are frequently implicated because of their unrestricted access and widespread domestic storage. Studies conducted in

tertiary care hospitals have demonstrated that young males are more commonly affected due to occupational exposure, psychosocial stress, substance abuse, and suicidal intent [2,3]. Clinical manifestations range from mild gastrointestinal symptoms such as nausea and vomiting to severe neurological and respiratory complications including seizures, respiratory failure, shock, and multiorgan dysfunction [4]. The route of poisoning is predominantly oral in most studies, reflecting intentional ingestion of toxic substances [5].

The severity and outcome of poisoning depend upon multiple factors including type of poison, quantity consumed, time interval between exposure and hospital presentation, presence of comorbidities, and availability of intensive care facilities. Early diagnosis, prompt resuscitation, decontamination procedures, antidote administration, and supportive care significantly improve survival outcomes. Despite advancements in toxicology and critical care management, poisoning-related mortality continues to remain substantial in resource-limited settings [3,4]. Several studies have shown that delayed hospitalization and severe poisoning are strongly associated with increased mortality and prolonged ICU stay [3]. Salem et al. reported that acute poisoning contributes significantly to emergency healthcare burden and increased treatment costs in tertiary care hospitals, emphasizing the need for effective preventive strategies and early intervention protocols [10].

Several recent studies have evaluated the clinical and epidemiological profile of poisoning cases. Aggarwal et al. reported that organophosphorus compounds and pesticides were the most common agents associated with poisoning, with young adults constituting the majority of affected patients [2]. Samaria et al. observed that poisoning cases were more common among males with a mean age of approximately 32 years, and oral ingestion was identified as the predominant route of exposure [5]. Hurtado et al. demonstrated that pesticides and medications accounted for the majority of poisoning cases, with ICU admission and mortality rates remaining considerable despite tertiary care management [6]. Similarly, Reda et al. and Waktola et al. highlighted that delayed presentation to hospital and severe toxic exposure were significantly associated with unfavorable outcomes in acute poisoning patients [3,4]. Aleid et al. also reported that poisoning continues to pose a major burden on emergency healthcare services due to increasing exposure to household and agricultural toxic agents [7].

Although multiple studies have been conducted worldwide, there remains considerable regional variation in poisoning patterns and outcomes. The changing trends in agricultural chemical usage, increasing availability of household toxic substances, and evolving socioeconomic stressors necessitate continuous local epidemiological assessment [6,7]. Many previous studies have focused primarily on specific toxic agents or pediatric populations, while comprehensive evaluation of clinico-demographic characteristics, ICU stay, ward stay, presenting symptoms, and survival outcomes among general poisoning patients remains limited [8]. Furthermore, there is inadequate recent data from tertiary care hospitals in many parts of India regarding the current trends of poisoning substances and associated clinical outcomes [2,5].

Understanding the demographic profile, commonly used toxic agents, routes of exposure, clinical manifestations, and treatment outcomes is essential for improving emergency management protocols and developing preventive public health strategies. Identification of high-risk groups may help in planning educational programs regarding safe storage and handling of toxic substances. Additionally, assessment of hospital stay duration and survival outcomes can assist healthcare administrators in resource allocation and strengthening intensive care services [9,10].

Hence, the present study titled “Clinico-Demographic Profile and Outcome Analysis of Acute Poisoning Cases in a Tertiary Care Hospital” was undertaken to evaluate the demographic characteristics, pattern of poisoning agents, routes of exposure, clinical presentation, duration of ICU and ward stay, associated comorbidities, and survival outcomes among patients admitted with acute poisoning in a tertiary care hospital.

MATERIALS AND METHODS

The present study was designed as a hospital-based observational descriptive study conducted to evaluate the clinico-demographic profile and outcome analysis of acute poisoning cases admitted to the Department of General Medicine. The study aimed to assess the demographic characteristics, type of poisoning substances, route of exposure, clinical presentation, duration of ICU and ward stay, associated comorbidities, and survival outcomes among patients presenting with acute poisoning. A total of 52 patients diagnosed with acute poisoning were included in the study. The study was conducted from January 2023 to December 2023.

Inclusion Criteria

Patients fulfilling the following criteria were included in the study:

1. Patients aged more than 16 years.
2. Patients admitted with history and clinical features suggestive of acute poisoning.
3. Patients with confirmed or suspected exposure to toxic substances through oral, inhalational, injectable, or other routes.

4. Patients willing to participate in the study.
5. Patients admitted to ICU or medical wards for management of poisoning.

Exclusion Criteria

The following patients were excluded from the study:

1. Patients with chronic poisoning exposure.
2. Patients with food poisoning or snake bite poisoning.
3. Patients with adverse drug reactions without toxic overdose.
4. Patients brought dead or who died before initial evaluation.
5. Patients with incomplete clinical records or unclear poisoning history.
6. Pediatric patients below 16 years of age.

Study Tool

Data collection was performed using a predesigned and prestructured case record proforma prepared for the study. The study tool included the following parameters:

- Demographic details:
  - Age
  - Gender
- Poison-related details:
  - Type of poisoning substance
  - Route of exposure
  - Time of presentation
- Clinical evaluation:
  - Presenting signs and symptoms
  - Vital parameters
  - Systemic examination findings
- Past medical history:
  - Hypertension
  - Diabetes mellitus
  - COPD
  - Coronary artery disease
  - Other comorbidities
- Hospital course:
  - ICU stay duration
  - Ward stay duration
  - Treatment administered
  - Requirement of supportive care
- Outcome measures:
  - Survival
  - Mortality

Data collection was carried out in the following manner:

1. All patients admitted with acute poisoning were initially evaluated in the emergency department and medical wards.
2. Detailed history regarding type of poison consumed, route of exposure, duration since exposure, and intent of poisoning was obtained from patients or attendants.
3. Demographic information including age and gender was recorded.
4. Thorough clinical examination was performed and presenting symptoms such as vomiting, abdominal pain, respiratory distress, altered sensorium, seizures, and throat pain were documented.
5. Relevant laboratory investigations and monitoring parameters were carried out as per hospital protocol.
6. Patients were managed according to standard treatment guidelines including gastric lavage, antidotes, supportive therapy, ventilatory support, and ICU care wherever indicated.
7. Duration of ICU stay and ward stay were documented for all patients.
8. Final outcome of the patient in terms of survival or mortality was recorded.
9. All collected data were entered into Microsoft Excel and analyzed using appropriate statistical methods.

Statistical Analysis

The collected data were compiled and analyzed using Microsoft Excel and appropriate statistical software. Continuous variables such as age were expressed as mean, median, standard deviation, minimum, and maximum values. Categorical

variables such as gender, poisoning substance, route of exposure, clinical features, and outcomes were expressed as frequencies and percentages. Results were presented in the form of tables and charts wherever necessary.

Ethical Consideration

Institutional Ethical Committee approval was obtained prior to commencement of the study. Confidentiality of patient information was maintained throughout the study. Informed consent was obtained from patients or their attendants before inclusion in the study.

RESULTS

Table 1: Gender Distribution among Poisoning Cases (n = 52)

Gender	Frequency	Percentage (%)
Male	35	67.31
Female	17	32.69
Total	**52**	**100.0**

Table 1 shows the gender-wise distribution of poisoning cases included in the study. Out of the total 52 patients, males constituted the majority with 35 cases (67.31%), while females accounted for 17 cases (32.69%). The higher incidence among males may be attributed to increased occupational exposure to toxic agents, greater psychosocial stress, and higher risk-taking behavior. Similar male predominance has been reported in several poisoning studies conducted in rural and semi-urban settings. The findings indicate that poisoning remains more common among the productive male population. This highlights the importance of targeted awareness and preventive strategies among young adult males.

Table 2: Age Distribution Statistics among Poisoning Cases

Parameter	Value
Mean Age	31.6 years
Median Age	27.5 years
Minimum Age	17 years
Maximum Age	60 years
Standard Deviation	11.42

Table 2 summarizes the age distribution statistics of the study population. The mean age of patients was 31.6 years with a median age of 27.5 years, indicating that poisoning was more common among young adults. The youngest patient in the study was 17 years old, while the oldest was 60 years. The standard deviation of 11.42 years suggests moderate variability in age distribution. The predominance of younger individuals may reflect increased psychosocial stress, impulsive behavior, and occupational exposure in this age group. Similar findings have been reported in previous poisoning studies. Preventive mental health interventions and counseling services may help reduce poisoning incidence among young adults.

Table 3: Distribution of Poisoning Substances among Study Population (n = 52)

Substance	Frequency	Percentage (%)
Herbicide	18	34.62
Insecticide	8	15.38
Rat poison	6	11.54
OP insecticide	6	11.54
Tablets	3	5.77
Pesticide	2	3.85
Disinfectant	2	3.85
Plant protector	1	1.92
Repellent	1	1.92
Bio pesticide	1	1.92
Polytablets	1	1.92
Insecticide + Fungicide	1	1.92
Rat poison (other entry)	1	1.92
Organic pesticide	1	1.92
Total	**52**	**100.0**

Table 3 depicts the distribution of toxic substances consumed by the patients. Herbicides were the most common poisoning agents accounting for 18 cases (34.62%), followed by insecticides in 8 cases (15.38%). Rat poison and organophosphorus insecticide poisoning each contributed 6 cases (11.54%). Tablet poisoning was observed in 3 patients (5.77%), while pesticides and disinfectants were responsible for 2 cases each (3.85%). Less commonly encountered

substances included repellents, bio-pesticides, fungicide combinations, and organic pesticides. The predominance of agricultural chemicals indicates easy accessibility of toxic compounds in rural settings. These findings emphasize the need for stricter regulation and safe storage practices for agrochemical agents.

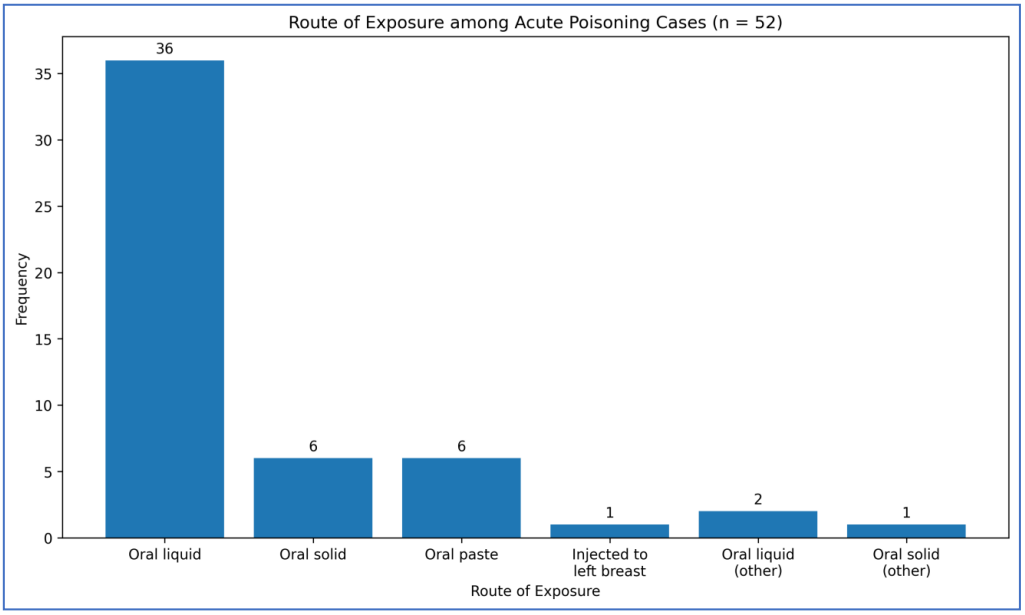

Figure 1: Route of Poison Exposure among Study Population (n = 52)

Figure 1 illustrates the routes of poison administration among the study participants. Oral liquid ingestion was the most common route, observed in 36 patients (69.23%). Oral solid consumption and oral paste ingestion were noted in 6 patients each (11.54%). One unusual case involved injection of poison into the left breast accounting for 1.92% of cases. A few additional entries represented variations in documentation of oral liquid and oral solid intake. The predominance of oral ingestion reflects the intentional consumption pattern seen in poisoning cases. Easy household and agricultural access to liquid toxic agents may explain this observation. Early gastric decontamination and supportive management remain important in such cases.

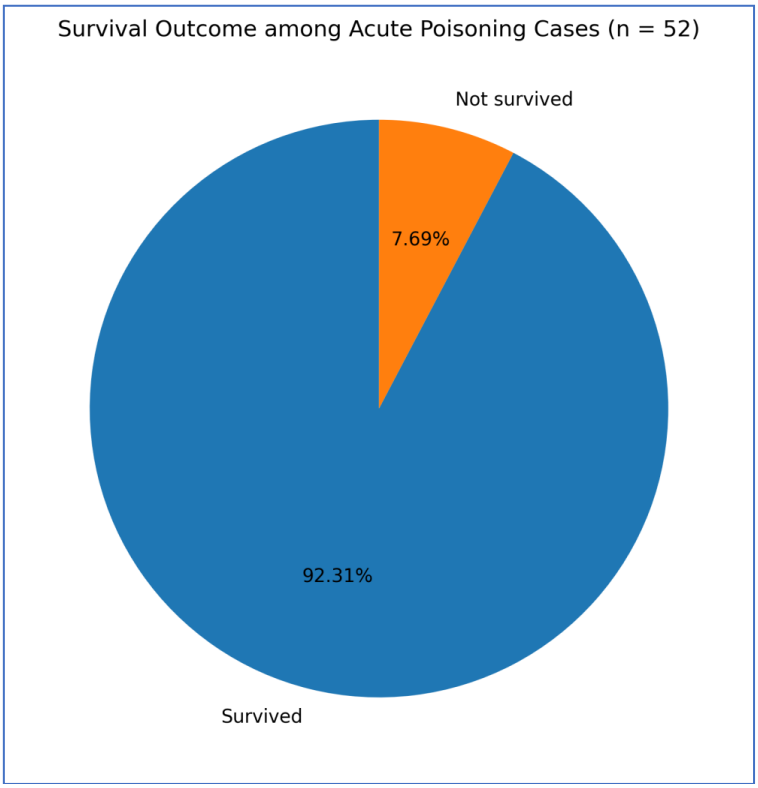

Figure 2: Survival Outcome among Poisoning Cases (n = 52)

Figure 2 presents the survival outcomes of poisoning patients included in the study. The majority of patients survived, accounting for 48 cases (92.31%), while mortality was observed in 4 patients (7.69%). The high survival rate may be attributed to timely hospital admission, early diagnosis, and appropriate intensive care management. Despite advances in emergency care, poisoning-related mortality continues to be a significant concern, especially with highly toxic compounds such as herbicides and organophosphorus agents. The mortality observed in the present study underscores the need for rapid intervention and critical care support. Strengthening poison control services and public awareness can further reduce mortality rates.

Table 4: Distribution of Past History/Comorbidities among Poisoning Cases (n = 52)

Signs / Symptoms	Number of Cases (n=52)	Percentage (%)
Vomiting	20	38.5
Abdominal pain	10	19.2
Nausea	5	9.6
Throat pain	5	9.6
Shortness of breath (SOB)	4	7.7
Loose stools / loose motions	3	5.8
Irritability	2	3.8
Gasping state	2	3.8
Drowsy but arousable	2	3.8
Abdominal discomfort	2	3.8
Decreased response	1	1.9
Frothing	1	1.9
Weakness of legs	1	1.9
Dryness of mouth	1	1.9
Chest burn	1	1.9
Seizures (1 episode)	1	1.9
Giddiness	1	1.9
Hiccups	1	1.9
Throat burn	1	1.9
Headache	1	1.9
Burning sensation	1	1.9
Stuttering of speech	1	1.9
Chills	1	1.9
Altered behaviour	1	1.9

Among the 52 study participants, vomiting was the most common presenting symptom, observed in 20 cases (38.5%), followed by abdominal pain in 10 cases (19.2%). Nausea and throat pain were each reported in 5 patients (9.6%). Shortness of breath (SOB) was noted in 4 cases (7.7%), while loose stools/loose motions were present in 3 patients (5.8%). Symptoms such as irritability, gasping state, drowsiness but arousable condition, and abdominal discomfort were each observed in 2 cases (3.8%). Several less common manifestations, each occurring in 1 patient (1.9%), included decreased response, frothing, weakness of legs, dryness of mouth, chest burn, seizures, giddiness, hiccups, throat burn, headache, burning sensation, stuttering of speech, chills, and altered behaviour. Overall, gastrointestinal symptoms predominated, with respiratory and neurological manifestations occurring less frequently.

Table 5: Duration of ICU Stay among Poisoning Cases (n = 52)

ICU Stay Duration	Frequency	Percentage (%)
2 days	21	40.38
1 day	7	13.46
3 days	6	11.54
4 days	5	9.62
5 days	5	9.62
6 days	4	7.69
7 days	1	1.92
9 days	1	1.92
15 days	1	1.92
16 days	1	1.92
Total	**52**	**100.0**

Table 5 depicts the duration of ICU stay among poisoning patients. The majority of patients required ICU admission for 2 days, accounting for 21 cases (40.38%). One-day ICU stay was observed in 7 patients (13.46%), while 3-day stay was

seen in 6 patients (11.54%). Longer ICU stays ranging from 7 to 16 days were noted in a few severely affected cases. Prolonged ICU admission may indicate severe toxicity, respiratory compromise, or multiorgan involvement. Most patients recovered with short-term intensive care support, reflecting effective management and early intervention. ICU monitoring remains crucial in poisoning cases to prevent complications and improve survival outcomes.

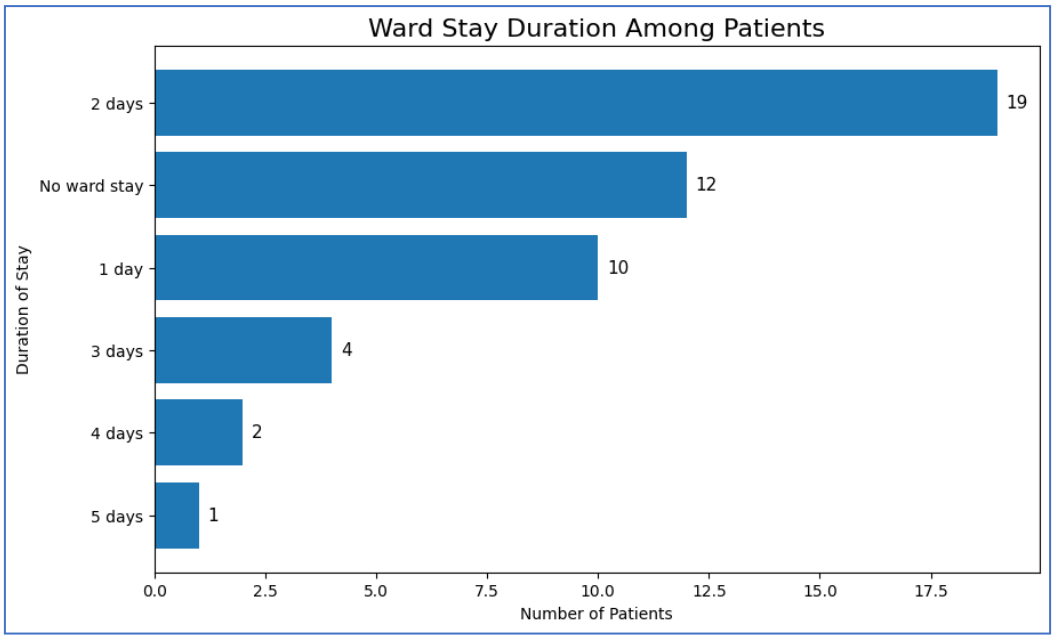

Figure 3: Duration of Ward Stay among Poisoning Cases (n = 48)

Figure 3 shows the duration of ward stay among poisoning patients after initial stabilization. The most common duration was 2 days seen in 19 patients (39.58%). Twelve patients (25.0%) did not require ward admission following ICU care or emergency treatment. A one-day ward stay was observed in 10 patients (20.83%), while only a few patients required hospitalization beyond 3 days. Shorter ward stays suggest rapid clinical improvement following supportive treatment and antidote administration where indicated. Patients with prolonged stay may have experienced complications or delayed recovery. Efficient inpatient management contributed to favorable outcomes in the majority of cases.

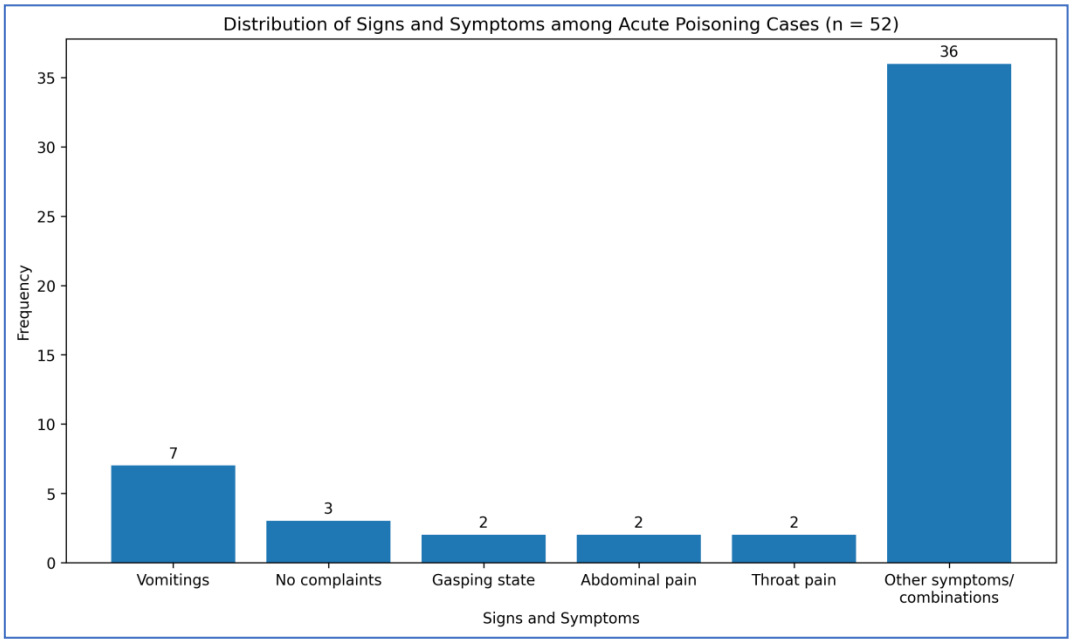

Figure 4: Distribution of Presenting Signs and Symptoms among Poisoning Cases (n = 52)

Figure 4 summarizes the presenting clinical features among poisoning patients. Vomiting was the most common symptom observed in 7 patients (13.46%), followed by gasping state, abdominal pain, and throat pain in 2 patients each (3.85%). A small proportion of patients presented without significant complaints at admission. Several patients exhibited mixed symptom complexes including nausea, loose stools, respiratory distress, irritability, altered behavior, seizures, and

drowsiness. Gastrointestinal manifestations were the predominant presentation in the present study. Respiratory and neurological symptoms were more common in severe poisoning cases. Prompt recognition of presenting symptoms plays a vital role in early diagnosis and appropriate management of poisoning cases.

DISCUSSION

The present study was conducted to evaluate the clinico-demographic profile and outcomes of acute poisoning cases admitted to the Department of General Medicine in a tertiary care hospital. A total of 52 poisoning cases were analyzed with respect to demographic characteristics, type of poison, route of exposure, presenting symptoms, ICU and ward stay, associated comorbidities, and survival outcomes. Acute poisoning continues to be an important medical emergency associated with significant morbidity and mortality, especially in developing countries where agricultural and household toxic substances are easily accessible [11,12]. The findings of the present study provide insight into the prevailing pattern of poisoning and its clinical outcome in the study region.

In the present study, males constituted the majority of poisoning cases accounting for 67.31%, while females comprised 32.69% of cases. Similar male predominance was reported by Aggarwal et al. [11], Samaria et al. [12], and Gupta et al. [13], where young adult males were more frequently affected. This higher incidence among males may be attributed to increased occupational exposure to pesticides and herbicides, psychosocial stress, substance abuse, and greater impulsive behavior. The predominance of poisoning among males also reflects the increased exposure of economically productive age groups to toxic substances.

The mean age observed in the present study was 31.6 years, with most patients belonging to the younger age group. Similar findings were reported by Samaria et al. [12], who observed a mean age of approximately 32 years among poisoning patients. Muhammad et al. [14] also demonstrated that acute poisoning commonly affects young adults because of emotional instability, occupational stress, financial burden, and suicidal tendencies. Young adults are particularly vulnerable because of easy accessibility to toxic agents and impulsive self-harm behavior.

With regard to the poisoning substances, herbicides were the most common toxic agents in the present study accounting for 34.62% of cases, followed by insecticides (15.38%), rat poison (11.54%), and organophosphorus insecticides (11.54%). Similar observations were made by Krishnasamy et al. [15], where insecticides and rat poison were among the common poisoning agents. Studies by Aggarwal et al. [11] and Muhammad et al. [14] also identified pesticides and agricultural chemicals as the leading causes of poisoning in rural populations. The predominance of herbicide and pesticide poisoning in the present study may be explained by the agricultural background of the study population and unrestricted availability of agrochemical compounds.

The route of poisoning was predominantly oral liquid ingestion in 69.23% of cases in the present study. Oral exposure remains the most common route in poisoning studies because intentional self-poisoning is frequently carried out through ingestion of liquid toxic agents. Similar findings were reported by Samaria et al. [12] and Al-Mahbashi et al. [16], where oral ingestion was the principal route of exposure. Easy accessibility and rapid consumption of liquid poisons may explain this observation.

In the current study, vomiting was the most common presenting symptom observed in 13.46% of patients, followed by abdominal pain, throat pain, respiratory symptoms, and neurological manifestations. Similar findings were observed in studies conducted by Chatterjee et al. [17] and Gupta et al. [13], where gastrointestinal symptoms predominated among poisoning patients. Vomiting is often the earliest manifestation following ingestion of toxic substances due to direct gastrointestinal irritation. Neurological symptoms such as drowsiness, altered behavior, seizures, and decreased responsiveness observed in the present study may be related to organophosphorus and neurotoxic poison exposure.

Most patients in the present study required short-term ICU admission, with 40.38% staying for two days in the ICU. Ward stay was also relatively short in the majority of patients. Similar findings were reported by Salem et al. [18], who observed that timely hospitalization and early intensive care management significantly reduced morbidity and duration of hospital stay. Early stabilization, gastric decontamination, antidote therapy, and supportive management contribute substantially to favorable outcomes in poisoning patients.

The survival rate in the present study was 92.31%, while mortality was observed in 7.69% of cases. Comparable findings were reported by Aggarwal et al. [11], where the majority of patients survived following early intervention and critical care management. However, mortality in poisoning studies largely depends on the type of poison consumed, delay in hospital presentation, quantity of poison, and availability of intensive care facilities. Herbicides and organophosphorus compounds are particularly associated with high mortality because of severe respiratory and multiorgan toxicity [15]. The relatively high survival rate observed in the present study may be due to prompt medical intervention and appropriate ICU care.

In the present study, most patients had no significant comorbidities, with 88.46% having no prior medical illness. Similar findings were observed in other studies where poisoning was more common among otherwise healthy young individuals [12,14]. However, underlying diseases such as hypertension, diabetes mellitus, COPD, and coronary artery disease may worsen prognosis by reducing physiological reserve and complicating treatment.

The findings of the present study emphasize that poisoning remains a major preventable health problem in developing countries. Easy accessibility of pesticides, herbicides, and household toxic substances contributes significantly to poisoning incidence. Public awareness programs regarding safe storage and handling of toxic compounds, restriction of over-the-counter sale of highly hazardous chemicals, and strengthening poison control services may help reduce poisoning-related morbidity and mortality. Furthermore, early referral and prompt intensive care management remain essential in improving patient outcomes.

CONCLUSION

The present study concludes that acute poisoning is a significant medical emergency predominantly affecting young adult males. Herbicides and insecticides were identified as the most common poisoning agents, with oral ingestion being the predominant route of exposure. Gastrointestinal symptoms such as vomiting and abdominal pain were the most frequent clinical manifestations. Most patients required short-term ICU and ward admission, and the majority survived following timely medical intervention and supportive care. The study highlights the importance of early diagnosis, prompt treatment, and critical care support in reducing mortality associated with poisoning. Increased public awareness, regulation of toxic substance availability, and strengthening of emergency toxicology services are essential to reduce the burden of acute poisoning.

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