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**Original Research Article**

# Clinical patterns and outcome of acute poisoning at a tertiary care hospital in coastal Karnataka, India

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## ABSTRACT

**Background:** Periodic epidemiological studies are necessary to analyse the patterns of poisoning in each region. The aim of this study was to characterise the acute poisoning cases admitted to a tertiary care centre in coastal Karnataka.
**Methods:** All the adult patients admitted to the emergency department of the hospital during the past five years were included. Data was obtained from the hospital medical records and included socio-demographic characteristics, causative agents, mode of poisoning, route of poisoning, time of arrival to the hospital and factors determining mortality.
**Results:** Of the 169 patients admitted with acute poisoning, majority belonged to young age group (46.7%) and were females (50.9%). Poisoning was more common among the, married population (59.2%) and literates (62.7%). Clustering of cases were found during summer (36.7%) and monsoon (35.5%). Ingestion was the commonest route (98.2%) and the intention was suicidal (82.2%) in majority of the patients. Drug overdose (49.1%) was the commonest agent followed by pesticides (14.8%) and rodenticides (12.4%). Acetaminophen and antipsychotic drugs were the commonly used drugs. Psychiatric illness was found in a significant number of patients (37.9%). The most common symptom was nausea and vomiting (40.2%). Mortality was seen in 7.7% of the patients. Factors contributing to mortality were male gender, intake of pesticides, renal failure and Acute Respiratory Distress Syndrome (ARDS).
**Conclusions:** There is an increase in the number of cases abusing drugs and medications. There is an urgent need to address the susceptive young population and patients with underlying psychiatric illness to reduce the number of poisoning cases in this region.

**Keywords:** Acute poisoning, Drugs, Pesticides

## INTRODUCTION

Acute poisoning is a major global health problem leading to significant morbidity and mortality among all age groups. An estimated 84% of the deaths due to poisoning in the world occur in the less affluent countries.[1] According to the estimates, approximately half a million population die every year as a result of poisoning particularly due to pesticide poisoning.[2] As per the WHO estimates, more than 90% of fatal poisoning cases are seen in middle and low income countries i.e. the developing countries in general and agricultural countries in particular.[3] Acute pesticide poisoning accounts for significant morbidity and mortality worldwide, more so in developing countries.[4,5]

Several Indian studies have shown organophosphates to be the commonest agents of poisoning.[6,7] However, some

recent studies have shown changing trend of poisoning with increasing incidence of aluminium phosphide in northern and southern parts of India.[8,9] After pesticides, drugs were found to be the second most common agents in poisoning in India.[10,11]

There is a rising trend in poisoning cases day-by-day due to changes in lifestyle and social behaviour. The causes of poisoning could be civilian and industrial, accidental, and deliberate. The poison associated morbidity and mortality is variable from place to place and changes over a period with the use of new chemicals. In poisoning cases, several factors contribute to the mortality and morbidity, including the toxicity of the poison, the time interval between the exposure to the poison and the arrival to the hospital and the availability of effective medical treatment.[12]

India being a country having many states with diverse cultures, each state has its own poisoning patterns which exerts an impact on the management of the poisoned patients. The clinical features and complications are unique to certain poisons. In most of the cases, emergency department of the hospital is the first contact of the patient with the healthcare system. Therefore a comprehensive knowledge of the clinical presentation of poisoning is essential for emergency physicians to deliver appropriate management of the poisoned patient. Thus there is a deliberate need for generating regional clinico-epidemiological data on poisoning, which will help us in the rational use of available resources for the prevention and management of poisoning.

## METHODS

This is a cross-sectional study conducted at a tertiary care hospital in coastal Karnataka. The institutional ethical clearance was obtained prior to the study. The study included all confirmed cases of acute poisoning admitted during the past 5 years.

### *Inclusion criteria*

- All the patients >18 years admitted to hospital with acute poisoning.

### *Exclusion criteria*

- Acute Poisoning cases among patients aged <18 yrs.
- Patients with history of snake bite were excluded.

The clinical and, demographic parameters were recorded in a predesigned proforma. Complete medical record of all such cases which included demographic data, mode and route of poisoning, nature of the poison, cause of poisoning, symptoms and signs, complications, management and clinical outcome were retrieved from the patient's information reports.

The nature of poison/ agents involved was determined from the circumstantial evidence, reliable history, presentation of the container or packets from which the poison had been consumed and characteristic clinical feature. The poisons/ drugs were classified into different groups based on their characteristics.

### *Statistical analysis*

The data was analysed using SPSS 23 and was expressed as mean±SD and percentages. Univariate analysis was used to find out significant factors associated with mortality. A p value of <0.05 was considered as statistically significant.

## RESULTS

A total of 169 patients admitted with acute poisoning were included in the study. The socio-demographic characteristics of the patients. (Table 1).

**Table 1: Demographic details of study subjects (n=169).**

| Characteristics | | Number (n) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 83 | 49.1 |
| | Female | 86 | 50.9 |
| Age (in years) | ≤20 | 30 | 17.8 |
| | 21-30 | 79 | 46.7 |
| | 31-40 | 27 | 16 |
| | 41-50 | 20 | 11.8 |
| | ≥50 | 13 | 7.7 |
| Marital status | Married | 100 | 59.2 |
| | Unmarried | 69 | 40.8 |
| Socioeconomic status | Low | 117 | 69.2 |
| | Middle | 35 | 20.7 |
| | High | 17 | 10.1 |
| Place of residence | Rural | 154 | 91.1 |
| | Urban | 15 | 8.9 |
| Literacy | Literate | 106 | 62.7 |
| | Illiterate | 63 | 37.3 |
| Occupation | Student | 52 | 30.8 |
| | Housewife | 51 | 30.2 |
| | Farmer | 30 | 17.7 |
| | Carpenter | 10 | 5.9 |
| | Banker | 5 | 3 |
| | Beedi worker | 2 | 1.2 |
| | Driver | 3 | 1.8 |
| | Fisherman | 1 | 0.6 |
| | Manual labourer | 8 | 4.7 |
| | Salesman | 2 | 1.2 |
| | Shopkeeper | 2 | 1.2 |
| | Unknown | 3 | 1.8 |

Majority of the affected population were young and females outnumbered the males. Cases were more during summer (36.7%) and monsoon (35.5%). Month wise distribution of cases is given in Figure 1. Most of the affected were married (59.2%) and were literates (62.7%). Poisoning was more common among housewives, students and farmers. Majority belonged to low socioeconomic status.

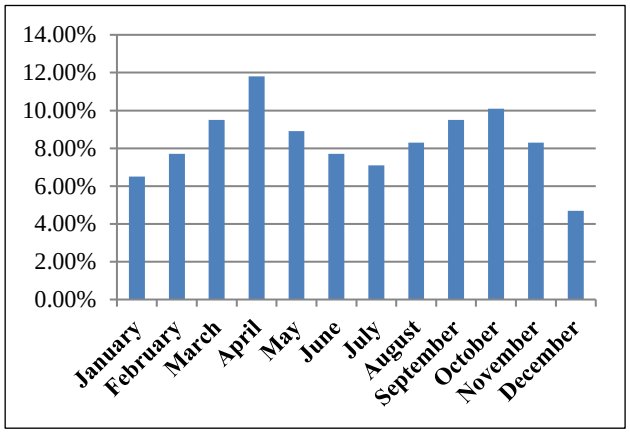


**Figure 1: Month wise distribution of cases.**

The various types of compounds are shown in Figure 2.

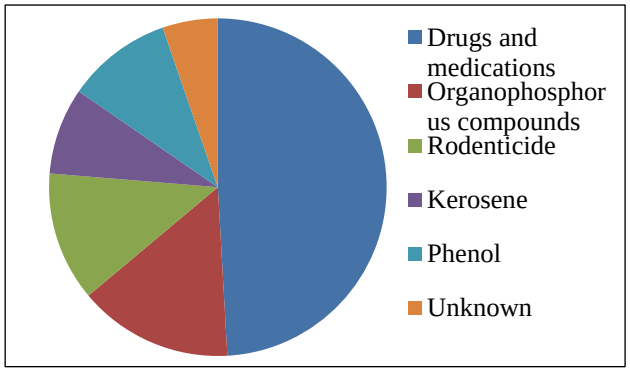


**Figure 2: Types of poison.**

The commonest compound was drugs followed by Organophosphates (OP) and rodenticides. The commonly ingested drugs were paracetamol and antipsychotic drugs. The various factors contributing to poisoning (Table 2).

Among the affected, 64 patients (37.9%) had underlying psychiatric illness, Pattern of clinical presentation. (Table 3). The commonest symptom was nausea and vomiting. There were few complications in the study which included jaundice, bleeding, ARDS and renal failure. The mean values of various laboratory parameters (Table 4).

Mortality was seen in 13 patients (7.7%). Statistically significant variables contributing to ICU mortality included male gender, consumption of OP compound, presence of renal failure and ARDS (Table 5).

**Table 2: Characteristics of poisoning in study subjects (N=169).**

| Characteristics | | Number (n) | Percentage (%) |
|---|---|---|---|
| Route of poisoning | Oral | 166 | 98.2 |
| | Inhalational | 3 | 1.8 |
| Mode of poisoning | Accidental | 30 | 17.8 |
| | Suicidal | 139 | 82.2 |
| Time interval for arrival at hospital (in hours) | <1 | 25 | 14.8 |
| | 1-4 | 80 | 47.3 |
| | 4-8 | 30 | 17.8 |
| | 8-12 | 22 | 13 |
| | >12 | 12 | 7.1 |
| Cause for poisoning | Marital conflict | 4 | 2.4 |
| | Financial difficulties | 7 | 4.1 |
| | Failure in examinations | 9 | 5.3 |
| | Family problems | 60 | 35.5 |
| | Discordance with parents | 16 | 9.5 |
| | Love affairs | 6 | 3.6 |
| | Loss of job | 3 | 1.8 |
| | Psychiatric illness | 64 | 37.9 |
| Outcome | Recovered | 156 | 92.3 |
| | Expired | 13 | 7.7 |

**Table 3: Clinical presentation in study subjects with poisoning (N=169).**

| Signs and symptoms | Number (n) | Percentage (%) |
|---|---|---|
| Nausea and vomiting | 68 | 40.2 |
| Pain abdomen | 25 | 14.8 |
| Diarrhoea | 2 | 1.2 |
| Jaundice | 2 | 1.2 |
| Dyspnoea | 6 | 3.6 |
| Acute renal failure | 1 | 0.6 |
| Bleeding | 3 | 1.8 |
| Seizures | 1 | 0.6 |
| Altered sensorium | 65 | 38.5 |
| Fever | 1 | 0.6 |
| Pallor | 6 | 3.6 |
| Edema | 1 | 0.6 |
| Crepitations | 18 | 10.7 |
| Rhonchi | 1 | 0.6 |
| Bradycardia | 4 | 2.4 |
| Tachycardia | 2 | 1.2 |
| Epigastric tenderness | 10 | 5.9 |
| Hepatomegaly | 1 | 0.6 |
| Ataxia | 2 | 1.2 |
| Constricted pupil | 1 | 0.6 |
| Dilated pupil | 2 | 1.2 |
| ARDS | 2 | 1.2 |
| Consolidation | 2 | 1.2 |

**Table 4: Laboratory parameters in study subjects after poisoning (N=169).**

| Laboratory parameter | Mean±SD |
|---|---|
| Hemoglobin | 13.03±2.16 |
| Total leucocyte count | 10578.46±8151.04 |
| ESR | 11.15±9.59 |
| Random blood sugar | 131.45±64.92 |
| Serum creatinine | 0.9±0.64 |
| Blood urea | 21.21±17.19 |
| Sodium | 138.24±4.69 |
| Potassium | 3.87±0.4 |
| Direct bilirubin | 0.45±1.26 |
| Indirect bilirubin | 0.49±0.84 |
| Total bilirubin | 0.94±2.02 |
| Total protein | 7.61±0.86 |
| Serum albumin | 4.54±0.6 |
| Globulin | 3.08±0.75 |
| AST | 67.08±227.49 |
| ALT | 52.92±155.82 |
| ALP | 84.11±34.88 |

ESR- Erythrocyte Sedimentation Rate, AST- Aspartate Transaminase, ALT- Alanine Transaminase, ALP- Alkaline Phosphatase

**Table 5: Factors associated with death in study subjects (N=169).**

| Factor | Chi square test/ fishers exact test (p value) |
|---|---|
| Male gender | 0.017 |
| Type of poison - OP compounds | 0.001 |
| Creatinine >1.4 | 0.003 |
| Abnormal chest x-ray | 0.026 |
| ARDS | 0.000 |

OP compounds- Organophosphorus compounds
ARDS- Acute Respiratory Distress Syndrome

## DISCUSSION

Acute poisoning related morbidity and morbidity is a worldwide phenomenon with enormous medical, legal and social significance. It is a common medical emergency in India where the population has an easy access to pesticides and insecticides. Early, accurate diagnosis and timely management is crucial for better outcome. However, this may be complicated by the diverse patterns of poisoning which depends on factors such as geographical area, age, literacy, socioeconomic status and underlying comorbidities.[13] Majority of the affected population was in the age group of 21-30 years (46.7%) which is comparable with a recent study done South India and also a study done in Nepal by Lalit Kumar.[14,15] The reason for this young age group to indulge in self poisoning could be due to the fact that this age group has a lot of personal and social stress and responsibilities related to career goals, studies, love affairs and parental expectations.

This study had a female preponderance similar to a study done in Nepal.[15] This can be explained by the fact that females are easily affected mentally and emotionally by factors such as domestic violence and love affair failures.[16,17] This study showed that most of the patients were literates which is in accordance with study done by Lalit kumar et al.[15] The poisoning was common among married population which is in accordance with other studies.[18,19] The reason could be due to the reaction to marital conflicts, increased stress and responsibilities in the married population. However, author finding is contrasting to a study done in Mumbai where most of the population was unmarried.[20] The reason could be due to the inclusion of pediatric age group in the Mumbai study.

In the present study, majority of the patients presented to the hospital within 4 hours of the poison consumption (62%). This could be because of the location of author's hospital and easy access to the population. This is similar to a study done in Mumbai.[20] The commonest route of poisoning was ingestion (98.2%) and the mode was suicidal (82.2%). This is similar to study done by Ahuja et al, and Padmanabha et al.[21,22]

In this study drug overdose was the commonest poison (49.1%) followed by pesticides (25%). As agriculture being the main occupation in India, OP compounds are easily available and many studies have found pesticides to be the commonest poison.[6,7,15] In contrast, this study showed drugs to be the most common agents of poisoning. This could be due to higher percentage of patients having psychiatric illness as compared to other studies and antipsychotics were among the common drugs consumed. Another reason could be due to the fact that majority of the patients were students and housewives. This is in accordance with a study done by Omender Singh et al, where drugs constituted 46% of cases of acute poisoning.[13] This reflects changing patterns of poisoning over time. The most common symptom was nausea and vomiting (40.2%) which is comparable to a study done by Amit Patil in Mumbai.[20] Altered sensorium was present in a significant number of patients (38.5%) which is in accordance with a study done in Pakistan.[11]

Mortality was seen in 13 patients (7.7%) which is comparable to a study done in Kerala and lower compared to another study done by Lalit et al.[14,15] and Ahuja et al.[21] The lower mortality in this study could be due to timely arrival to hospital, lesser number of cases of pesticide poisoning and early treatment. Statistically significant variables contributing to mortality included male gender, nature of the poison (OP compound), presence of ARDS and renal failure. Age and time of arrival to hospital did not have a statistically significant correlation. This is in contrast to another study where advanced age, delayed presentation and hepatic failure were strong predictors of mortality.[15] The difference

could be due to the change in the pattern of poisoning in this study as compared to other studies.

Limitations was this is a retrospective study, the information available is limited. The long term outcome could not be assessed as there was no follow up of the patients. As the study is done in a single center, the results cannot be generalized to the population.

## CONCLUSION

Drug overdose was the commonest cause of poisoning. Acetaminophen and antipsychotic drugs were among the common drugs consumed. Male gender, ingestion of pesticides, renal failure and ARDS were significant factors contributing to mortality. The study signifies changing trend in the pattern of poisoning over the years.

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