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# A Cross-Sectional Study of Acute Poisoning Cases Admitted in a Tertiary Care Hospital in Mangaluru, Karnataka, India

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## ABSTRACT

**Introduction:** A poison is a substance that causes serious illness and endangers the life of a person when ingested in a relatively small quantity. Poisoning is one of the most common problems encountered in day-to-day clinical practice. Poisoning causes morbidity and mortality which can be prevented and managed if clinicians are sensitized with adequate knowledge of common poisons. Therefore, this study was conducted to know the profile of acute poisoning cases admitted in a tertiary care hospital in Mangaluru. **Materials and Methods:** 100 patients admitted in the intensive care units and wards of the General Medicine department, Kasturba Medical College, Mangaluru, and Government Wenlock District Hospital, Mangaluru with various poisoning were evaluated for various factors like the distribution of poisoning cases according to age, gender, intention of poisoning, nature of poisons consumed and the nature of treatment received at another hospital before getting admitted. **Results:** Most of the cases of poisoning occurred in the age group between 21-30 years of age (38%). The majority of the patients in the study were males (60%) and females formed 40% of the study population. The majority of patients in this study (99%) consumed poison with suicidal intention. 77% of patients received first-aid treatment in a peripheral hospital before getting admitted to our hospital. **Conclusion:** This study shows that the peak incidence of acute poisoning cases was seen in the age group of 21 to 30 years with male predominance. The pattern of poisoning was suicidal in the majority of the patients.

**KEYWORDS:** Acute Poisoning, Toxicology, Suicidal Intent, Pesticides, Agriculture

## INTRODUCTION

A poison is a substance that causes serious illness and endangers a person's life when ingested in relatively small quantities. The World Health Organization (WHO) has stated that more than 3 million poisoning cases are reported worldwide each year, with 99% of these cases occurring in developing countries. [1] The use of pesticides in agriculture is a significant contributing factor to the easy availability of poisons among farmers in these regions. The mortality rate from poisoning in many developing countries is around 1%–2%, compared to India, where the mortality rate is approximately 30%. [2] In India, five to six persons per lakh of the population succumb to poisoning annually.

Poisoning is one of the most common problems encountered in day-to-day clinical practice, and its incidence continues to rise due to the easy access to poisonous substances and their low cost. [3] It is a major public health problem, particularly among people in productive age groups, leading to significant morbidity and mortality. This can result in financial distress for families and negatively impact the nation's economy. [4]

Poisoning is a leading method of suicide in low- and middle-income countries, where suicide rates are high. In addition to pesticides, drugs are also frequently used for self-poisoning. Psychiatric illness is a significant contributing factor to suicide. [5] Acute poisoning is a medical emergency, and patients should be taken immediately to a hospital for treatment. [6]

In India, there is very limited information available on poisoning. In addition to suicidal poisoning, accidental poisoning is also common, particularly among children, who are more prone to accidental exposure. [7] Poisoning causes preventable morbidity and mortality, which can be effectively managed if clinicians are adequately informed

about common poisons in their locality. Therefore, this study was conducted to profile acute poisoning cases admitted to a tertiary care hospital in Mangaluru.

## MATERIALS AND METHODS

**Study Design and Setting:** This cross-sectional study was conducted in the intensive care units (ICUs) and wards of the Department of General Medicine at Kasturba Medical College, Mangaluru, and Government Wenlock District Hospital, Mangaluru. The study aimed to evaluate the profile of acute poisoning cases admitted to these hospitals.

**Ethical Considerations:** Ethical clearance was obtained from the Institutional Ethics Committee (IEC) of Kasturba Medical College, Mangaluru, prior to the initiation of the study. Informed consent was obtained from all participants or their legal guardians before their inclusion in the study.

**Study Population:** A total of 100 patients who were admitted to the ICUs and general medicine wards of the above-mentioned hospitals with a diagnosis of poisoning were included in this study. These patients were observed and evaluated based on the study criteria.

**Inclusion criteria:** Patients who were admitted with different types of poisonings like, organophosphate, organochlorine, carbamates, rodenticides, any other drugs, copper sulphate, kerosene or other petroleum products, and heavy metals were included in this study.

**Exclusion criteria:** Patients who presented with snake bite poisoning, scorpion bite poisoning, and the patients who were brought dead to the hospital were excluded from the study.

**Data Collection:** The patients were evaluated for various factors like the age distribution of poisoning cases, gender, the intention of poisoning, the nature of poisons consumed, and the nature of treatment received at another hospital before getting admitted. The nature of poisons consumed was found based on clinical history and symptoms.

**Data Analysis:** The collected data were entered into IBM SPSS Statistics software (version 20) for analysis. Descriptive statistics were used to summarize the data. The demographic characteristics of the patients, including age and gender distribution, were analyzed and presented as numbers and percentages. The types of poisons consumed were categorized, and their frequencies and percentages were calculated.

## RESULTS

**Distribution of Poisoning Cases According to Age:** The majority of poisoning cases occurred in the age group of 21–30 years, accounting for 38% of the study population. The minimum age of the patients was 16 years, while the maximum age was 75 years (Figure 1 ).

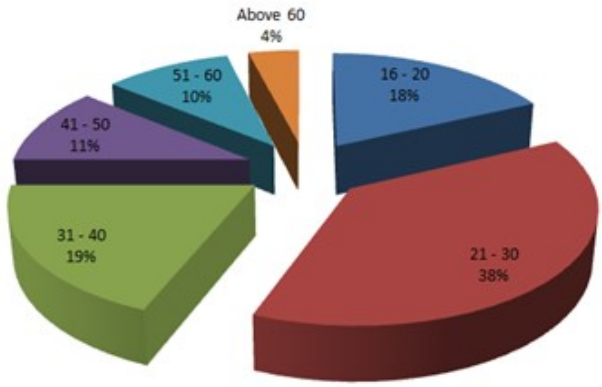


**Figure 1: Distribution of cases according to age**

**Sex Ratio:** Out of the total study population, 60% were male, and 40% were female, resulting in a male-to-female ratio of 3:2.

**Intention of Poisoning:** A significant proportion of the patients (99%) consumed poison with suicidal intent, while only one case (1%) was due to accidental poisoning.

**Nature of Poisons Consumed:** The most commonly consumed poison was organophosphate compounds, accounting for 54% of the cases, followed by rodenticides (12%), drugs (9%), copper sulfate (8%), and other miscellaneous compounds (Table 1). The overall mortality rate was 20%, with paraquat poisoning having the highest mortality, followed by rodenticides. Notably, there were no deaths associated with drug-related poisoning.

**Nature of Treatment Received at Another Hospital:** The majority of patients (77%) received first-aid treatment at a peripheral hospital before being admitted to our facility (Table 2).

Regarding the duration of hospital stay, 51% of patients stayed in the hospital for 1 week, 25% for 4–5 days, and 18% for 2 weeks. Only 6% of patients had a hospital stay exceeding 2 weeks.

## DISCUSSION

Age and Sex:In the present study, the incidence of poisoning was higher among males than females (60% vs. 40%). A previous study demonstrated a slightly higher male preponderance (52.9%) compared to females (47.1%). [8] Similar findings were observed by Singh et al., who reported that males constituted 67.4% of all poisoning cases. [9] However, Lawson and Mitchell found a female preponderance in their study. [10] Another study also reported a higher incidence of poisoning among females. Suicide is a significant cause of morbidity and mortality among young girls aged 15 to 19 years. Factors such as socioeconomic status, cultural influences, and easy availability of drugs contribute to the etiology of poisoning in this demographic. [11]

| Types of Poisons | 16-20 | 21-30 | 31-40 | 41-50 | 51-60 | > 60 | Total |
|---|---|---|---|---|---|---|---|
| Organophosphate | 10 | 19 | 11 | 7 | 6 | 1 | 54 |
| Rodenticides | 5 | 6 | 1 | 0 | 0 | 0 | 12 |
| Copper Sulphate | 1 | 0 | 4 | 2 | 1 | 0 | 8 |
| Carbamates | 0 | 2 | 0 | 0 | 1 | 0 | 3 |
| Organochlorine | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| Drugs | 0 | 5 | 3 | 1 | 0 | 0 | 9 |
| Kerosene | 0 | 1 | 0 | 0 | 1 | 2 | 4 |
| Diesel | 1 | 0 | 0 | 0 | 0 | 1 | 2 |
| Petrol | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| Paraquat | 0 | 1 | 0 | 1 | 0 | 0 | 2 |
| Phenol | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Miscellaneous | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Total | 18 | 38 | 19 | 11 | 10 | 4 | 100 |

*Age Groups (in years)

**Table 1: Age* Distribution of Poisoning Cases by Type of Substance Consumed**

| Treatment | Number of cases |
|---|---|
| No treatment received | 23 |
| Atropine | 1 |
| Atropine + Pralidoxime | 1 |
| Stomach wash | 27 |
| Stomach wash + Atropine | 30 |
| Stomach wash + Atropine + Pralidoxime | 10 |
| Stomach wash + d-penicillamine | 2 |
| Stomach wash +Fresh frozen plasma +Vitamin k | 2 |
| Stomach wash +ICU care | 2 |
| Stomach wash+ Proton pump inhibitors | 1 |
| Stomach wash +Vitamin K | 1 |

**Table 2: Treatment received at another hospital**

The most common age group affected in our study was 21–30 years, accounting for 38% of the cases. The study population's age ranged from 16 to 75 years, with a mean age of 32.9 years. A previous study found that acute poisoning is most prevalent in the productive age group of 20–30 years, which imposes a burden on the socioeconomic status of society. [12] The younger generation is increasingly becoming victims of poisoning, with the numbers rising annually. Contributing factors include financial worries, unemployment, and marital discord, which increase stress in this vulnerable age group. [11] Males are particularly affected due to work-related stress and a statistically higher prevalence of alcohol abuse. Additionally, men have greater professional exposure to poisons. [13] A study conducted on army personnel indicated that young soldiers are prone to alcohol-related poisoning. [14]

Intention:In the present study, 99% of the poisoning cases were due to suicidal intent, with only one case attributed to accidental poisoning. Poisoning can be classified as accidental, suicidal, or homicidal. Accidental poisoning is more common in children due to their inability to read drug labels. In adults, accidental poisoning often results from ingesting contaminated food or from animal bites or stings. Homicidal poisoning is also common, as it allows the perpetrator time to escape without arousing suspicion. Ideal homicidal poisons are tasteless, odorless, and easily mixable with food and drinks. Financial, personal, and psychological factors may contribute to homicidal poisoning. The availability of poisons in workplaces, such as cyanides in electroplating units or thiopental sodium nitrate in dyeing industries, can contribute to suicidal poisoning. Pesticides are readily accessible in farming communities, and drugs like barbiturates and benzodiazepines are used by educated individuals for suicidal poisoning. Cases of ketamine or thiopental sodium poisoning have also been observed among healthcare professionals. [15]

Nature of Treatment Received at Another Hospital:In our study, 77% of patients received first-aid management before being admitted to our hospital, with the majority undergoing gastric lavage as the initial treatment. Patients with organophosphate poisoning were also administered atropine. Managing poisoning cases in resource-poor areas is particularly challenging due to the lack of resuscitation devices and antidotes, which significantly impacts the prognosis. [16] Initial management of poisoning includes supportive care, such as airway management, respiratory support, and hemodynamic stabilization. Subsequent decontamination procedures include gastric lavage and whole bowel irrigation. Toxin elimination methods such as multidose-activated charcoal, urine alkalinization, and extracorporeal toxin removal may also be employed. The administration of antidotes is the final step in the management of poisoning. [17]

## CONCLUSION

This study shows that the peak incidence of acute poisoning cases was seen in the age group of 21 to 30 years with male predominance. The pattern of poisoning was suicidal in the majority of the patients. Organophosphorus compounds are found to be the commonest poison substance used by the patients in the present study followed by rodenticides, copper sulphate, and other miscellaneous compounds. The majority of the patients received first aid management at another hospital before getting admitted to our hospital.

## LIMITATIONS OF THE STUDY

Different types of poisons were enumerated after taking detailed clinical history only. Toxicological screening for identifying the poisons was not conducted.

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