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Original Research Article

# Clinical Profile and outcome of poisoning cases admitted to ICU in a tertiary care hospital

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**Abstract:** Study of the nature and magnitude of poisoning cases, early diagnosis and prompt treatment is essential for introducing the new and evaluating the old preventive measures. Clinical profile of poisoning cases admitted to a hospital present with varied complications and their treatment in ICU is a challenge. Survival mostly depends upon type and quantity of poison and delay in admission. We have tried to correlate the type of poison and the time lag between poison exposure and admission with mortality. An analysis of the risk factors associated with high mortality has been attempted. Details of age, gender, occupation, type of poison, time lag for admission, and outcome were collected from records of poisoning cases admitted to ICU over a period of one year from hospital records section, patients' case notes, treatment charts and discharge summaries. About 38.57% cases of poisoning required ICU admission .Most cases were between 21-40 years. Farmers and housewives were more prone to poisoning; Organophosphorus being most common. Most cases were brought to hospital within six hours of exposure .In our study the survival rate was 67.9%. A definite correlation was observed between time lag before receiving medical care and mortality. Pesticides and medicines were the most common poison noted. Young age, and farmers can be identified as risk factors for poisoning. Positive co-relation between types of poison, age, time lag in receiving medical care and mortality was found. Poisoning is a preventable event and developing effective poisoning prevention strategies can reduce the incidence.
**Keywords:** Poisoning, outcome, risk factors, organophosphorus compounds

## INTRODUCTION

Poison is any substance which when administered, inhaled, ingested is capable of acting deleteriously on human body [1]. Acute poisoning is an important medical emergency. The nature of poison used varies in different parts of the world usually depending on the socioeconomic factors and cultural multiplicity. The commonest cause of poisoning in India and other developing countries is pesticides, the reason being agriculture based economy. To add to this problem poverty, unreliable weather conditions, illiteracy, ignorance, unsafe use of pesticides, and easy availability of highly toxic pesticides contribute to high rate of poisoning cases. First aid is usually administered by some close relative living with the patient. Transportation time and referral from some other hospital are mainly responsible for delay in reaching the hospital. Receiving immediate first aid can significantly decrease the duration of hospitalisation in poisoning cases, thereby focusing on the need of early treatment in these cases. The delay in reaching the hospital has a direct correlation with the duration of hospital stay leading to further financial burden on the patient. Early access to treatment, increasing community health awareness and counselling can prove to be useful steps in this direction [2]. However most of the poisoning cases are presented in the hospital in critical stages usually with fatal outcome. Management of these critically ill patients will improve to a great extent if the common causes of poisoning are properly defined [3].

Although poisoning can mimic other illnesses, the correct diagnosis can usually be established by the history, physical examination, routine and toxicological laboratory evaluations. The history should include the time, route, duration, intent of exposure; the name and amount of each ingredient involved; the time of onset, nature, and severity of symptoms; the time and type of first-aid measures provided; and the medical and psychiatric history [4]. In this study we have attempted to relate the age of the patient, type of poison, time lag that occurs between the exposure to poison, and the outcome.

## MATERIALS AND METHOD

The data of Patients presenting with any type of poisoning from 1 st July 2012 to 1st July 2013 fulfilling the inclusion and exclusion criteria were taken for the study. The outcome was recorded as discharge from ICU or death. Since the study is hospital based, retrospective, noninvasive in nature, an assurance of confidentiality was given to the head of the institution. The study was conducted after getting approval from Institute Ethics Committee.

**Inclusion criteria:**

All cases with alleged history of poisoning from 1 st July 2012 to 1st July 2013. Criteria for Admission to Medical ICU:

1. Consumption of larger doses of toxin with marked deranged vital parameters.
2. Patients requiring close monitoring of level of consciousness in view of altered sensorium due to consumption of poison.
3. Patients requiring specialized procedure like intubation, mechanical ventilation, transvenous pacing, hemodialysis, etc.

**Exclusion criteria:**

1. The patients who were brought dead or died immediately upon arrival before receiving any indoor treatment were excluded
2. Animal and snake bite cases excluded.
3. Patients with physical injuries excluded.

Poisoning cases were identified from the medico-legal case register. Relevant data was collected from the patients' case notes, treatment charts, nursing notes, laboratory reports, discharge summaries, patient's relatives or care takers, and healthcare professionals as appropriate. The data retrieved thus was collected in a pre-designed form for uniformity. (Annexure1)

## OBSERVATIONS

Statistical significance was found using chi square test. Figure I show the number of Poisoning cases admitted to ICU. Total patients of poisoning, admitted in hospital during study period was 210. Out of this 81 were admitted in ICU. Total patient admitted in ICU during study period was 2240.

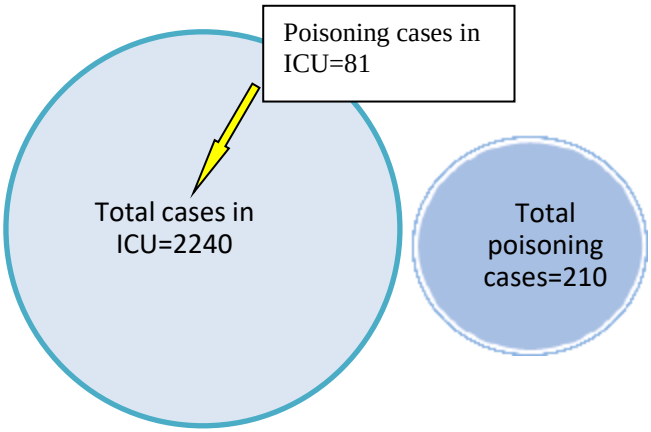


**Fig I: The poisoning cases admitted to ICU as a part of total ICU admissions**

Total 81 cases were studied. They were categorised based on the age, gender, marital status and occupation. According to present study more incidence of poisoning was seen in the age group 31-50(55.26%) in men while in women the incidence in the age group 21-30 and 31-50 was identical.

**Table 1: Age and marital status of poisoning cases admitted in ICU**

| category | Age in years | | | | Marital status | |
|---|---|---|---|---|---|---|
| gender | <20 | 21-30 | 31-50 | >50 | married | unmarried |
| men | 7 | 13 | 23 | 5 | 33 | 15 |
| women | 1 | 17 | 15 | 0 | 21 | 12 |
| total | 8 | 30 | 38 | 5 | 54 | 27 |

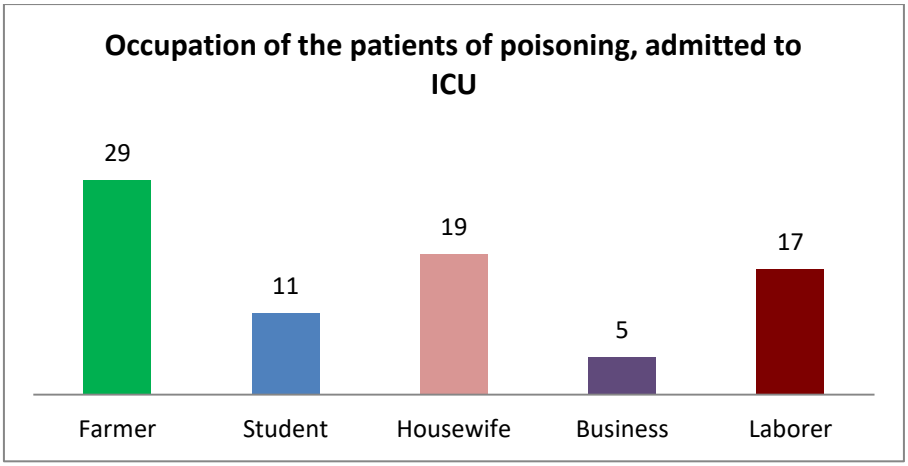


**Fig 2: Occupation of patients of poisoning admitted to ICU**

Poisoning cases were observed more in farmers (35.8%) followed by housewives (23.46%), and labourers (20.99%) Percentage of students and business people was less. (Figure II). The relation between mortality and the time elapsed between the exposure of poison and admission in the hospital is shown in table 2.

**Table 2: Time lag between poison consumption and initiation of treatment and its relation to mortality**

| Time lag | N=81 | Mortality | P value |
|---|---|---|---|
| **0-1 hour** | 3(3.7%) | 0(0%) | p=0.03 |
| **2-6 hour** | 40(49.38%) | 8(20%) | |
| **7-10 hour** | 25(30.86%) | 13(52%) | |
| **>10 hour** | 13(16.05%) | 5(38.46%) | |

It was observed that 49.38% of the cases were brought to the hospital between 2-6 hours while 46 .91% cases were brought to the hospital beyond six hours of poison exposure. Between 7-10 hours the mortality was 52% and beyond 10 hours it was 38.46 %. The overall mortality of all patients studied was 32.09 %

Figure III shows the relation between age, gender and mortality. Mortality was more in age group above 50 years of age.

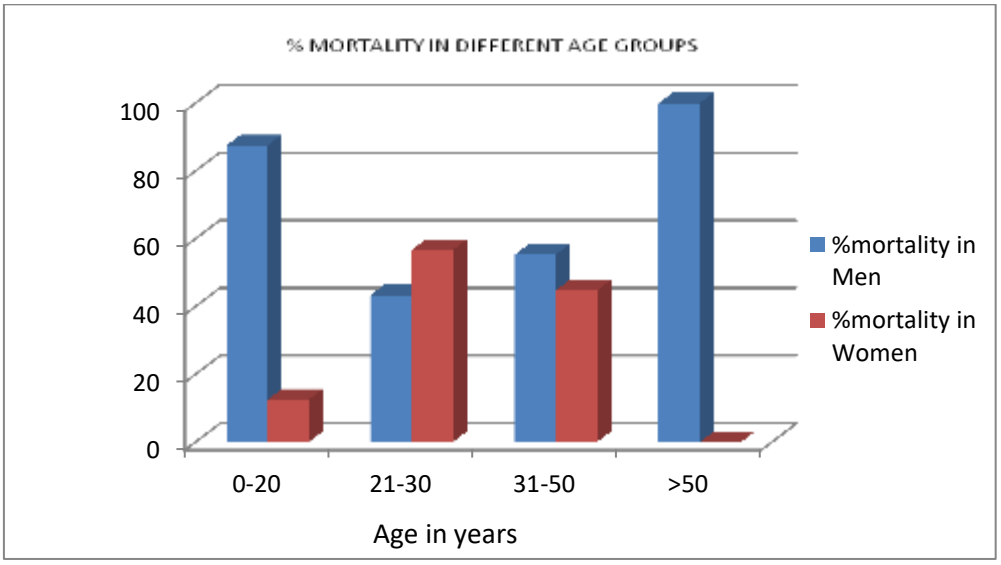


**Fig 3: Relation of Age, gender and mortality in poisoning cases admitted in ICU**

It was observed that varied types of poisons were consumed, the commonest being the organophosphorus compounds followed by rat poison. Some unusual types found were hair dye, oleander and Naphthalene balls. Medicines like paracetamol, metoprolol, and alprazolam were also used as poisons.

**Table 3: Type of poison, lag time, days spent in ICU and outcome of patients admitted in ICU**

| poison | No.Of pts | Av. time elapsed before treatment in hrs | Av. Days in ICU | Survival rate in % |
|---|---|---|---|---|
| Organophosphorus | 35 | 6.6 | 6.5 | 62.86 |
| rat poison | 4 | 7 | 6 | 0 |
| acid | 5 | 2.2 | 3.2 | 100 |
| al. Phosphide | 5 | 6.4 | 8.4 | 40 |
| dhatura | 5 | 11.5 | 3.2 | 100 |
| phenol | 5 | 4.8 | 1.2 | 100 |
| paracetamol | 2 | 4 | 2.5 | 0 |
| vasmol hair dye | 4 | 9.9 | 5.5 | 75 |
| naphthalene | 3 | 5 | 2.33 | 100 |
| alcohol | 3 | 20 | 5 | 100 |
| others | 10 | 7.33 | 3.44 | 70 |

In Rat poisoning and Paracetamol ingestion, the survival rate was zero while in Acid exposure there was 100% survival rate and the time lag was minimum at 2.2 hours. Maximum time lag was seen in Dhatura poisoning but with 100% survival and Vasmol hair dye with 75% survival. No correlation was observed in the days spent in ICU and the outcome.

## DISCUSSION

From our observations, we find that poisoning is more in men in the age group 31-50. Overall mortality with poisoning in our finding was 32.09 %. Mortality was 100% in men above the age of 50 years. Bhattacharjee J *et al.;* [5] reported 35% of poisoning deaths in 30-39 years age group. According to Batra AK *et al.;* [6] the most affected age group is 21-30 years in both genders. K.N.Ramesha [7] and B. Maharani *et al.;* [8] also found maximum poisoning incidence in the age group 20-29. J. Jesslin *et al.;* [9] have reported majority of the poisoning incidences in age group between 18-29 years. The maximum poisonings are observed in comparatively younger age groups, which may be explained on the basis that it is the most active period of life. The possible reasons for increased intentional poisoning in this age group may be because of financial problems in family, education, marital issues, and employment which are the prime stress inducers.

From our study we found that farmers were more affected (35.8%) followed by housewives (23.46%)labourers (20.99%)and students(13.58%).The most frequent poison encountered in our study was organophosphorus compounds(OPC), followed by Rat poison, and acid. In a previous retrospective study from South India[7], organophosphorus compounds were reported as the most common cause of poisoning (36.0%) followed by snake bite (16.2%), drugs (11.0%), rat poison (7.3%) and others. Shobha Churi *et al.;* [10] and B. Maharani [8] too have reported OPC as the most common poisoning agent. The high incidence of organophosphorus compounds and high incidence of poisoning in farmers is quite logical because of their free access and/or exposure to the pesticides, ignorance and lack of protective measures.

According to present study there is definite correlation between type of toxin and mortality. ($p = 0.014$). Most common poison was organophosphorus compounds with a mortality rate of 37.8 %. This is in accordance with the study by AK Batra *et al.;* [5] who found that: Organophosphorus group of insecticides leads both, total number of hospital admissions (23%) and total number of deaths (43.4%). In our study about 50% of cases were brought to the hospital between 2-6 hours of poisoning and only a small 3 % are presented within the first hour where the mortality was zero. The mortality was maximum with cases brought to the hospital between a time lag of 7-10 hours. Similar findings were observed by Ramesha K N *et al.;* [7] who have reported that maximum patients expired when there was a delay in admission to hospital by more than 8 hours after ingestion. Patients admitted within 2 hours of ingestion had the least mortality. Time lapse had a significant role in the mortality in cases of acute poisoning ($\chi 2 = 10.9$, $P = 0.01$). Overall mortality with poisoning in our finding was 32.1%. With highest mortality (100%) in rat poisoning and Paracetamol ingestion. According to J. Jesslin *et al.;* [9] mortality rate was 4% while Niti Mittal [2] have reported 18.6%, Maskey [11] 6.8%, M shoaib Zaheer [12] 14.4%, and Unnikrishnan B have reported 17.3% [13]. Our findings report a higher rate of mortality which could be due to the delayed presentation of the cases at the hospital. More light could be shed if the details of the amount of poison intake, first aid measures given and co-morbid factors are taken into account.

## CONCLUSION:

In conclusion we can say that pesticides and medicines were found to be the most common poisoning agents. There is a positive co-relation between "type of toxin and mortality", and time lag in receiving medical care and mortality. Poisoning is a preventable non-random event and developing effective poisoning prevention strategies can effectively reduce its impact on the health of the general population. Early hospitalization after poisoning ingestion has better prognosis. Primary health centre should be suitably equipped to provide immediate effective treatment to poisoning. Availability of standard treatment protocols for managing various poisons, and educational programs for rural people may prove more effective for better management and positive outcome.

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