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# Analysis of different types of poisoning in a tertiary care hospital in rural south india

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ABSTRACT

The global problem of acute poisoning has steadily increased over the past few years. It is an important cause of morbidity and mortality in developing countries. Better preventive and management strategies can be developed if the incidence and pattern of acute poisoning is known. The study aims at analyzing the pattern, cause and mortality rate of poisoning.

The study was conducted in a rural area in South India. This retrospective study was conducted from January 2003–December 2003. The data was analysed using descriptive statistics.

Out of the 225 cases 139 were males and 86 females. Poisoning was common in the age group of 21–30 years which was 84 cases and 11–20 years was 73 cases. The poisons consumed were as follows: Organophosphorous 135 cases, aluminum and zinc phosphide 50 cases, phenobarbitone 18 cases, benzodiazepines 7 cases, paracetamol 2 cases, miscellaneous 13 cases. 94% were suicides and 6% accidental. Mortality rate was 12.8%.

Establishment of strict policies against the sale and availability of pesticides and over the counter drugs is an effective way to control organophosphorous and drug poisoning.



## 1. Introduction

Poisoning constitutes an important entity among the seriously ill patients admitted in every hospital. The causes, pattern and outcome of poisoning in a particular community depends on a variety of factors such as easy availability of a particular poison, stress pattern and the standard of the emergency medical care (Senewirathane and Thambipillai, 1974). The easy availability of agricultural chemicals and over the counter drugs especially in developing countries may result in a pattern of poisoning different from that seen in western countries (Senewirathane and Thambipillai, 1974). These chemicals and drugs some of which are highly lethal and whose sale cannot be effectively controlled, are freely available in many rural areas. In addition, special units to deal with cases of poisoning are lacking in these areas.

Studies have suggested that there is an increase in the number of death in rural setup especially among the younger age group; agricultural poisons such as insecticides are largely responsible for this possibly due to easy access. In this study we intend that a survey of the problem would help to assess the scenario and the cause of poisoning and would determine what preventive steps could be taken to decrease the incidence of poisoning and its mortality.

### 1.1. Objectives

(1) To evaluate the pattern and cause of poisoning.
(2) To evaluate the mortality rate due to poisoning.

## 2. Methodology

This study was conducted by the departments of Pharmacology and Medicine at Sri R.L. Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Kolar. This is a tertiary care hospital situated in a rural area in Karnataka, South India. This was a retrospective study designed based on case series analysis. All patients admitted to the medicine department with history of poisoning during January 2003–December 2003 were included in this study and they constituted a sample of size of 225. The patients were analyzed for age, sex, socioeconomic status, education, cause, type of poisoning and the mortality rate. The data was collected in a proforma which was specially designed for the study. Statistical analysis was done using descriptive statistics.

## 3. Results

A total of 225 patients with poisoning were included in the study. Out of these 139 patients (62%) were males and 86(38%) were females (Table 3.1.1).

Among the 225 patients who had consumed the poison 78(35%) were married males and 61(27%) were unmarried males. Among

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**Table 3.1.1**
Sex distribution and marital status.

| Sex | Total patients (*n*-225) | Married | Unmarried |
|---|---|---|---|
| Males | 139(62%) | 78(35%) | 61(27%) |
| Females | 86(38%) | 52(23%) | 34(15%) |

**Table 3.2.1**
Educational qualification and socioeconomic status.

| Educational qualification | No of cases (%) | Socioeconomic status | No of cases (%) |
|---|---|---|---|
| Graduation | 15(7%) | Lower middle | 30(13%) |
| High school completion | 50(22%) | Upper middle | 195(87%) |
| Middle school completion | 59(26%) | | |
| Primary school completion | 67(30%) | | |
| Illiterate | 34(15%) | | |

the females, 52(23%) admitted were married and 34(15%) unmarried (Table 3.1.1).

Most of the patients belong to upper middle socioeconomic status i.e. 195 cases (87%). Sixty-seven cases (30%) in the study group had completed their primary education, followed by middle school and high school which is 59 cases (26%) and 50 cases (22%), respectively, (Table 3.2.1).

The study shows a majority of cases between the age group of 21–30 years i.e. 84 cases (37.3%) which was followed by 11–20 years i.e. 73 cases (32.4%) (Fig. 3.2.1).

Consumption of organophosphorous and organochloride compounds was common, which included 135 cases (60%) followed by aluminum and zinc phosphide which comprised of 50 cases (22%) and the least was paracetamol poisoning. Miscellaneous included antihistaminics, anti-inflammatory drugs, analgesics which constituted 13(6%) cases (Fig. 3.2.2).

We observed that 212(94%) cases were suicidal and 13(6%) accidental (Fig. 3.2.3). When the case records were retrieved it was found that according to the psychiatrist opinion the cause of suicide were one of the following which included poverty, unemployment, marital conflicts, financial problems and among the students it was stress due to exams.

The treatment administered for all patients with organophosphorous and organochloride was atropine, which was given by IV

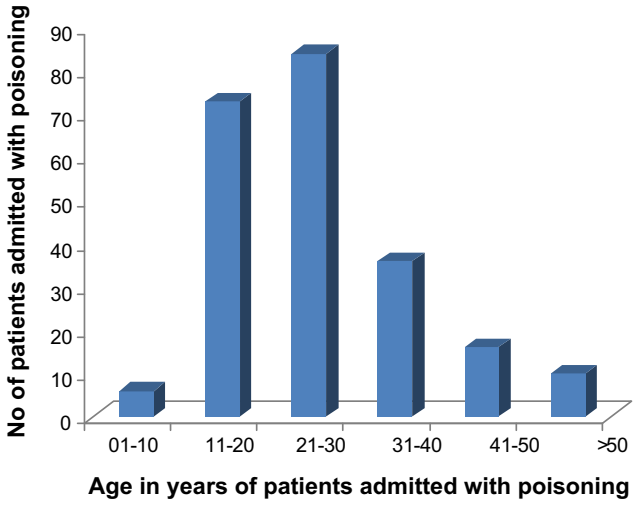


**Fig. 3.2.1.** Age distribution.

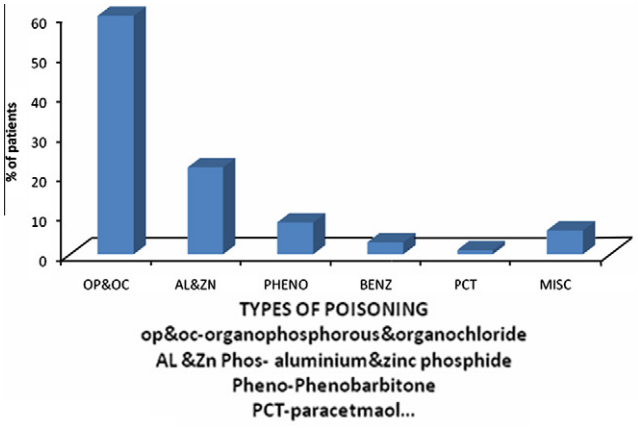


**Fig. 3.2.2.** Type of poisoning.

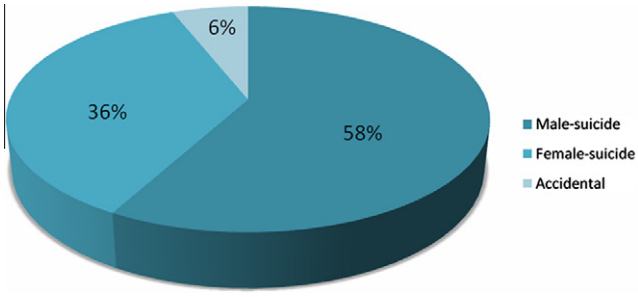


**Fig. 3.2.3.** Cause of consumption.

infusion till the muscarinic symptoms subsided. It was administered as soon as the patient was brought to the emergency department. Pralidoxime was given 1 g IV twice daily for three days to all patients irrespective of the time lag between commencement of treatment and the time of poisoning. In all other types of poisoning as there were no specific antidotes available, symptomatic treatment was administered. Thirty-seven cases (16.4%) required ventilator support.

We found a mortality rate of 29(12.8%) of which the highest were seen in patients with organophosphorous and organochloride poisoning i.e. 20 cases (9%) followed by aluminum and zinc phosphide i.e. 8 cases (3.5%) and miscellaneous i.e. 1 case (0.5%). The cause of death was either respiratory failure or cardiac arrest.

## 4. Discussion

The occurrence of 225 cases of poisoning in a single hospital over a period of one year with a mortality rate of 12.8% emphasizes the seriousness of the problem of poisoning in rural areas. We observed that the percentage of males consuming poison largely outnumbered the females. This observation is in concordance with other studies who observed a male predominance (Kanchan and Menezes, 2008; Singh and Unnikrishnan, 2006; Bhattarai et al., 2006).

Studies conducted in south India shows that maximum case of poisoning where seen in the third decade of life (Kanchan and Menezes, 2008; Singh and Unnikrishnan, 2006). Studies done by Bhattarai et al. and Yurumez et al. in Nepal and Turkey respectively showed that the third decade of life was the most vulnerable time for suicide (Bhattarai et al., 2006; Yurumez et al., 2007). In our study we found that the maximum number of cases was in the

age group of 21–30 years, followed by those between 11 and 20 years. Retrospective review, in a rural scenario it was found that the average age for marriage was between 21 and 30 years, this further could indicate this group are prone to have stress due to increased interpersonal marital conflicts. The second most common reason cited was increased prevalence of unemployment and lastly by student population who have to face a constant peer pressure. All these can lead to increase in the stress level.

In our study we found that most of the patients came from upper middle socioeconomic status. The educational qualification was not more than high school in majority of the cases. This could be due to the fact that the study was conducted in a rural area where the majority of the population belongs to the lower or upper middle socioeconomic status. As farming was the main occupation in this area, the patients were not well qualified and the importance of education was not well understood.

Our study showed that the number of cases of suicidal poison consumption was high among married males than females which were in concordance with other studies (Bhattarai et al., 2006; Kiran et al., 2008). The finding could be related to the fact that men were prone to stress due to unemployment, as majority of them are the sole bread winners of the family especially among the rural population.

Three studies conducted in turkey showed drugs to be the common cause of poisoning (Satar and Seydaoglu, 2005; Seydaoglu et al., 2005; Satar et al., 2009). Study conducted in Nepal by bhattarai et al. revealed organophosphorous compounds as the frequently encountered poisoning (Bhattarai et al., 2006). Other studies in India also showed the same results (Kanchan and Menezes, 2008; Singh and Unnikrishnan, 2006). This is in concordance to our study where we observed organ phosphorus compounds to be the primary cause. We could attribute this to the fact that the study was conducted in a rural area where farming is the main occupation. Thus organophosphorous compounds are easily accessible as pesticides for crops. Poisoning with aluminum phosphide and zinc phosphide is due to easy accessibility to rat poisons. Over the counter drugs is also one of the important issues to be dealt with in India.

Studies conducted by Unnikrishanna et al. and Jayarathnam suggested that in developed countries the mortality rate due to poisoning is only 1–2%, but in developing countries like India it varied between 15% and 30% .They also found that it was the fourth common cause of mortality especially in rural India (Unnikrishnan et al., 2005; Jayarathnam, 1990). The mortality rate in our study was 12.8% with highest seen with organophosphorous compounds. The reason could be that the amount of poison ingested was more as it is was cheap, easily accessible, and delay in hospitalization; however other studies have shown a mortality rate between 3% and 34% (Shreemanta et al., 2005; Singh et al., 1984; Gulati, 1995; Nirmal and Laxman, 1988; Dhattarwal and Dalal, 1995; Gupta and vaghela, 2005; Zine and Mohanthy, 1998).

In our study all the cases of suicide were referred to psychiatric consultation and all the patients were counseled. Consultation by the psychiatrist is one of the important modalities of treatment in a case of suicidal poisoning as it helps an individual to assess himself and prevent such episodes in future.

We, in this study reemphasize that the frequency of poisoning cases are still set at an alarming rate, mainly due to lack of policies guiding the sale of such dangerous chemicals in the market. In today's scenario, where the younger generation is under tremendous stress to perform and fulfill their responsibility the health care industry should contribute to spare more attention in rehabilitating this vulnerable group to aid in the betterment of the individual in particular and the country as a whole.

## 5. Conclusion

Stringent rules and regulations have to be implemented against the use of pesticides and over the counter drugs. Young adults should be educated about the hazards in the use of these chemicals. Establishing a counseling centre in each hospital would give an opportunity for the risk group to be counseled thereby addressing the root cause. Separate toxicology units may be set up in all hospitals to deal with these emergencies. This enables quick and efficient treatment for the patients. All the primary health centers and community health centers should be fully equipped to handle emergencies due to poisoning.

## Conflict of Interest

The authors declare that there is no conflict of interest.

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