

# Retrospective Analysis of Poisoning Cases Admitted in a Tertiary Care Hospital

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## Research Article

**Abstract: Background:** Poisoning is a major public health problem worldwide, with thousands of deaths occurring every year, mainly in the developing countries. India, holding 70% of agricultural land, accounts for one third of pesticide poisoning cases in the third world, the farm workers being the worst affected. Most of the poisonings occur due to deliberate self ingestion of the poison. Organo-phosphorus (OP) compounds occupy the greatest burden of poisoning related morbidity and mortality. The present study was aimed to know the profile of various poisonings. **Objectives:** 1.To determine the socio-demographic profile of poisoning cases.2.To assess their pattern and outcome. **Methodology:** A record based retrospective study from December 2010-November 2011 was conducted in a tertiary care hospital and data regarding age, gender, residence, time elapsed after intake, type of poison, manner and route of poisoning, duration of hospitalization and outcome was collected in a pre-structured proforma. The data was analyzed using standard statistical methods. **Results:** Out of total 196 cases recorded, 52% were males and 48% females. Maximum cases among both genders occurred in the age group of 21-30years.67.3% cases were from rural areas. 76.2% patients died when the time lapse before hospitalization was >2hours.OP compounds account for 27% of cases and 61.9%(13) of deaths.29 (14.8%) cases of various poisonings were associated with alcohol intake along with the poison. The route of exposure was oral (97.4%) in majority of cases. Suicidal poisoning was the most common mode of poisoning(69.9%).Most of the suicidal cases was seen in patients with History of psychiatric disorders. Out of 196 cases, 21 died.20 out of 25 patients who were given ventilator support died. **Conclusion** Poisoning is more common in young males, suicidal being the most common mode. OP compounds are the commonly used poison. Time lapse has a significant role on the mortality in cases of acute poisoning. Early care in a tertiary care centre may help to reduce mortality due to poisonings.

**Keywords:** Organo-phosphorus, Pesticides, Suicidal poisoning, Psychiatric disorders, Hospitalization

## Introduction

Poisoning is a major public health problem worldwide, with thousands of deaths occurring every year, mainly in the developing countries. In the last few decades, owing to tremendous advances in the fields of agriculture, medical pharmacology and industrial technologies, there is a remarkable change in the profile of acute poisoning, where new poisonous substances have come to the forefront. In the developed world, household chemical

agents and prescribed drugs have been the most common poisoning agents, whereas in the developing countries, agro-chemicals, in spite of their invaluable contribution in increasing the food production and pest control, are the most common offenders. <sup>(1-4)</sup>There are more than 9 million natural and synthetic chemicals worldwide and the list keeps on growing inexorably. Pesticides are the commonest cause of poisoning and according to WHO estimates approximately 3 million pesticide poisoning occur annually worldwide causing more than 220000 deaths. India accounts for one third of pesticide poisoning cases in the third world and the worst affected are the farm workers who contribute nearly three quarters of the labour force. In general accidental poisoning is more common in children whereas suicidal poisoning is more common young adults. Most of the fatality rate is of intentional poisoning by OP (Organo-phosphorous) compounds, which has been reported in southern and central India. It is important to know the nature and severity of poisoning in order to take appropriate preventive measures. Studies of this nature will be a useful tool in planning and management of critically ill acute poisoning cases. The present study was conducted with the objective of determining the socio-demographic profile and assessing the pattern and outcome of poisoning cases admitted at a tertiary care hospital, over a period of one year.

## Materials and Methods

This Retrospective hospital record based study was conducted in a tertiary care hospital of western Maharashtra. Permission was obtained from the Dean of the hospital to allow us to access the information from the patients' case notes in the record section, strictly for purpose of this research. The study included 196 cases of various poisonings due to drugs and chemicals from Dec 2010 to Nov 2011. Cases of Snake bite, food poisoning and alcohol intoxication were excluded in the study. Cases where the patients were discharged against Medical Advice (DAMA) were excluded. Data regarding age,

gender, residence, time elapsed after intake, type of poison, manner and route of poisoning, duration of hospitalization and outcome was collected in a pre-structured proforma. The data was analyzed using standard statistical methods.

**Results**

**Table 1:** Gender distribution of poisoning cases.

Gender	Cases		Deaths	
	No.	%	No.	%
Male	102	52	15	71.4
Female	94	48	6	28.6
<b>Total</b>	<b>196</b>	<b>100</b>	<b>21</b>	<b>100</b>

Table 1 shows that out of 196 cases recorded, Males outnumbered Females (M = 52%,F = 48%).Out of 102 males, 15 died and out of 94 females 6 died.

**Table 2:**Age-wise frequency distribution of poisoning cases in both genders.

Age (yrs)	Male		Female		Total	
	No.	(%)	No.	(%)	No.	(%)
0-10	13	12.7	9	9.6	22	11.2
11-20	13	12.7	29	30.8	42	21.4
21-30	40	39.2	36	38.3	76	38.8
31-40	16	15.7	10	10.6	26	13.3
41-50	7	6.9	7	7.45	14	7.14
51-60	8	7.8	2	2.13	10	5.1
>60	5	4.9	1	1.06	6	3.1
<b>Total</b>	<b>102</b>	<b>100</b>	<b>94</b>	<b>100</b>	<b>196</b>	<b>100</b>

Table 2 shows that peak incidence was observed in the age group of 21-30 yrs ( 76 cases, 38.8%) in both genders (M=39.2%, F=38.3%) followed by the age group of 11-20 yrs ( 42 cases, 21.4%) and least in the age group of > 60 yrs(6 cases, 3.1%).The male preponderance was seen in all age groups except in 11-20 yrs. (M< F) and 41-50 yrs. (M=F).

**Table 3:** Seasonal variation in poisoning cases

Months	Total cases	
	No.	%
Dec – Mar	61	31.1%
Apr – Jul	66	33.7%
Aug – Nov	69	35.2%
<b>Total</b>	<b>196</b>	<b>100</b>

Table 3 shows the seasonal variation in occurrence of poisoning cases. Results indicate Maximum incidence of poisonings cases in the months from Aug-Nov (35.2%).

**Table 4.**Urban and Rural distribution of poisoning cases.

Residence	Cases		Deaths	
	No.	(%)	No.	%
Rural	132	67.35	15	71.4
Urban	64	32.65	6	28.6
<b>Total</b>	<b>196</b>	<b>100</b>	<b>21</b>	<b>100</b>

Table 4 shows that maximum cases were from rural areas (67.35%) and among them 15 died.

**Table 5:** Type of poisons.

Category	Patients		Deaths	
	No.	%	No.	%
Organo-phosphorus	53	27	13	61.9
Organo-chlorines	19	9.7	1	4.8
Carbamates	13	6.6	1	4.8
Corrosives	10	5.1	0	0
Kerosene	14	7.1	0	0
Rat poison	7	3.6	0	0
Tablet Overdose	17	8.7	0	0
Plant products	5	2.6	0	0
Miscellaneous	8	4.1	0	0
Unknown	50	25.5	6	28.6
<b>Total</b>	<b>196</b>	<b>100</b>	<b>21</b>	<b>100</b>

Table 5 shows that a majority of poisoning cases were due to OP compounds (27%), followed by unknown poisons (25.5%), Organo-chlorines (9.7%), Tablet consumption (8.7%), Kerosene (7.1%) and Carbamates (6.6%). Rest of the poisons used were corrosives, rat poison, plant products and Miscellaneous (eg. Naphthalene balls, mosquito repellants, Vicks vapourab, Zandubalm.etc.) Out of 196 poisoning cases, 26 had consumed alcohol along with the poison, and of them 6 died. Most of the deaths (61.9%) were due to OP compounds. Patients who died due to OP compounds (13 cases) had respiratory arrest, pneumonia and sudden cardiac arrest.

**Table 6:** Route of poisoning

Route	Patients		Deaths
	No.	%	No.
Oral	191	97.4	21 (100)
Inhalational	5	2.6	0(0)
<b>Total</b>	<b>196</b>	<b>100</b>	<b>21 (100)</b>

Numbers in parentheses represent percentages. The route of exposure was oral (97.4%) in majority of cases (Table 6).

**Table 7:** Manner of poisoning.

Manner	Male		Female		Total		Deaths	
	No.	%	No.	%	No.	%	No.	%
Accidental	28	27.5	28	29.8	56	28.6	5	23.8
Suicidal	72	70.6	65	69.1	137	69.9	16	76.2
Homicidal	2	1.9	1	1.1	3	1.5	0	0
<b>Total</b>	<b>102</b>	<b>100</b>	<b>94</b>	<b>100</b>	<b>196</b>	<b>100</b>	<b>21</b>	<b>100</b>

It was found that 69.9% (137) of cases were of suicidal poisoning (M=70.6%, F=69.1%) followed by Accidental (28.6%) and Homicidal (1.5%). 68% of patients were given psychiatric counseling and drug therapy. Reactive depression was seen in 80 (41%) patients secondary to failure in academic, social and financial areas and crisis in interpersonal adjustment. Other contributory factors were chronic alcoholism (26 cases), financial stress, psychotic disorder, impulsive disorder and anxiety. Most of the deaths were due to suicidal poisoning (16 deaths, 76.2%) and 5 deaths occurred following Accidental poisoning.

**Table 8:** Time elapsed from exposure to hospital arrival.

Time Lapse (in hrs)	Cases survived		Deaths		Total cases	
	No.	%	No.	%	No.	%
≤2 hrs	86	49	5	23.8	91	46.4
>2 hrs	89	51	16	76.2	105	53.6
Total	196	100	21	100	196	100

According to Table 8 majority of patients were admitted after a delay of >2 hrs following the exposure and most of the deaths (76.2%) occurred when the time lapse was >2 hrs. 5 deaths (23.8%) occurred in cases with the time lapse of < 2 hrs (86 cases). Time lapse had a significant role in mortality in case of acute poisoning ( $\chi^2=5.22$ ,  $p<0.05$ ). (Table 8)

**Table 9:** Effect of hospital stay, ICU care and Ventilatory support on Outcome of patient.

Parameters	Cases		Death	
	No.	%	No.	%
Hospital Stay (in days)				
1 – 4	140	71.4	17	80.9
5 – 8	42	21.4	3	14.3
9 - 12	14	7.1	1	4.8
Total	196	100	21	100
ICU Care				
Yes	78	39.8	20	95.2
No	118	60.2	1	4.8
Total	196	100	21	100
Ventilatory support				
Given	25	12.8	20	95.2
Not Given	171	87.2	1	4.8
Total	196	100	21	100

Mean duration of hospital stay was  $3.9 \pm 2.4$  days. Most of the patients had a hospital stay of 1-4 days (71.4%) and of them 17 died. Out of 78 patients who were given ICU care 20 died, while only 1 patient died of those who were not given ICU care. Among 25 patients who received ventilator support, 20 died. (Table 9).

## Discussion

The extent of poisoning morbidity and mortality in a society reflects the socio-economic as well as the mental state of the society. Pesticide poisoning from occupational, accidental and intentional exposure is a major problem in developing countries. Since our study was hospital based and not population based, we could not make conclusions about the incidence of acute poisoning. It is possible that some patients with minor poisoning were treated in the primary health centres, and never presented in our hospital. In the present study, 196 poisoning cases were recorded over a period of one year. There was a higher incidence of poisoning in males (52%) as compared to females (48%) which was comparable with other studies and most of the poisonings were in the age group of 21-30 yrs (38.8%), followed by 21.4% in 11-20 year age group. In study by Srinivas Rao et al<sup>(5)</sup> men outnumbered women (57% vs. 43%) with all

pesticide types with two thirds of patients being aged less than 30 while in another study by Purnanand Nagappa<sup>(6)</sup>, males (79.48%) predominated females (20.51%) with majority (41.02%) belonging to 41-50 yrs age group. In a study in Northern India<sup>(7)</sup>, 63% cases were among males and 21-25 year age group accounted for maximum number of cases. In study by KN Ramesha<sup>(8)</sup>, incidence was more common among males (75.4%) compared to females (24.3%) and most cases of acute poisoning presented between 20 – 29 years age group (31.2%), followed by 12- 19 year age group. In this study, the manner of poisoning encountered was mainly suicidal (69.9%) followed by accidental ingestion (28.6%) in concordance with other reports. The suicidal mode was found in 96 % and 79.48% cases in studies by Srinivas Rao et al<sup>(5)</sup> and Purnanand Nagappa<sup>(6)</sup>, respectively. As increasing trend of suicidal mode in males as compared to females was noticed, as reported in other studies. Low socio-economic status, rapid urbanization, unemployment and other frustrations could probably be contributing factors for higher suicide rates among men. In the present study, the route of exposure was oral (97.4%) in the majority of cases, followed by inhalation (2.6%). Also in the study of Northern India<sup>(7)</sup>, 90% of poisons were consumed by ingestion, followed by parenteral route (7%). In the present study, the commonest poison observed was organo-phosphorous compounds (27%), with 61.9% deaths. Also in the study by Purnan and Nagappa<sup>(6)</sup>, the commonest poison observed was the organophosphorus compounds (48.71%) and least encountered was the phenol. In study by KN Ramesha<sup>(8)</sup>, majority of poisoning cases (36%) were due to organophosphorus compounds. Time lapse had a significant role in mortality in case of acute poisoning similar to the study by KN Ramesha. Most of the poisoning cases were from rural areas (67.3%), possibly due to illiteracy and poverty of the agricultural farmers residing in these parts. They solely depend on agricultural income for their livelihood. Due to some reason (i.e. either lack of water or flood) if they are not able to generate the required income for their day to day living and commitments, they may get frustrated and resort to suicide by these agricultural insecticides, pesticides or weed killers which are available to them. Pesticides have also previously been implicated as possible poisoning agents in India. Ignorance about proper storage in households and easy availability of pesticides could be mainly responsible for both suicidal and accidental poisoning. The incidence, trends of poisoning, the morbidity and mortality due to poisoning can be possibly curtailed by following: a. Strict vigilance over the sale and distribution of insecticides/pesticides. b. Educating the users regarding the safety measures. c. Good

treatment facilities (i.e. antidotes etc) at rural areas like P H C's and P H U's. d. Establishing poison information centers. e. Proper and correct implementation of social and economic projects aimed for upliftment of the rural poor and downtrodden.

### Conclusion

The study clearly highlights the profile of poisoning cases admitted to GMC, Miraj over a period of one year (Dec 2010-Nov 2011), showing that males of 21-30 yr age group are the major victims followed closely by females in the same age group. It also points towards the commonest poison used i.e. OP compounds with suicidal intention being the most common manner of poisoning.

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