

# Comprehensive analysis of postmortem cases due to poisoning: A retrospective study

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## Abstract

**Background:** Poisoning is a major epidemic of non-communicable disease in the present century. Poisoning is common in the world including India but modes of poisoning varies as it may result from the attempt of suicide, homicide and accidents. Present retrospective study was aimed to analyse deaths due to poisoning at a tertiary care hospital.

**Material and Methods:** Present study was retrospective study, conducted with medical & case-records of victims of poisoning whose body was autopsied in the mortuary of tertiary care hospital.

**Results:** In this study, of the total of 3275 cases of postmortem, poisoning constituted 433 cases amounting to 13.22%. Most of cases were from the age group of 21-30 yrs (27.48%) followed by 31-40 yrs (25.17%) & 41-50 yrs (16.4%). Most of cases were males (66.74%) as compared to females (33.26%). Most of cases survived for less than 1 day period (54.73%) & had manner of death as suicidal (94.46%). In present study, most common poison used were organo-phosphorous compounds (64.43%), aluminium phosphide (5.77%), zinc phosphide (5.77%), corrosive acid poison (5.08%) & carbonates (4.62%). In present study, negative chemical analysis report (50.35%) were more common than positive chemical analysis report (49.65%). In present study, common reason for intake of poison were physical illness (41.11%), marital dispute (20.32%), economic crisis (13.16%), love failure (6.47%) & accidental (5.54%). Other less common causes were conflict with parents (3.46%), family dispute (3.46%), mental illness (3%) & academic failure (2.77%).

**Conclusion:** We noted that male sex, age group from second to fourth decade of their life, married, low socioeconomic status are at high risk for poisoning.

**Keywords:** Poisoning, sex, age, socioeconomic status, suicidal, organophosphate, aluminium phosphide

## Introduction

Poisoning is a major epidemic of non-communicable disease in the present century. Among the unnatural deaths, deaths due to poisoning come next only to road traffic accident deaths. Poisoning is common in the world including India but modes of poisoning varies i.e. it may results from the attempt of suicide, homicide and accidents<sup>[1]</sup>.

Suicidal poisoning defines as the self-infliction by poison with the intention of committing

suicide. Availability of poisons in house or the working place is one of the factor which promote suicidal poisoning like, cyanide, pesticides are mostly available with farming communities, thiopental sodium nitrite in dyeing industries etc.<sup>[2]</sup>.

Poisoning is a problem of the society which should be considered seriously from all aspects. Early diagnosis, treatment and prevention are crucial in reducing the burden of poisoning-related injury in any country. An understanding of acute poisoning patterns of a particular region will assist in arriving towards a preliminary diagnosis of poisoning cases and also in devising their effective treatment plans. Present retrospective study was aimed to analyse deaths due to poisoning at a tertiary care hospital.

### Material and Methods

Present study was retrospective study, conducted in department of Forensic Medicine and Toxicology, in a tertiary care hospital. Study duration was of 1 year. Study was approved by institutional ethical committee.

### Inclusion criteria

- Those victims of poisoning whose body was autopsied in the mortuary of tertiary care hospital.

### Exclusion criteria

- Among the bodies of the deceased examined by post mortem, the study did not include bodies pertaining to homicidal cases, unknown and decomposed bodies.

The subjects of the study were the 433 poisoning victims whose autopsy was done in the mortuary of the tertiary care hospital.

The detailed history regarding the poisoning cases that were brought dead was obtained from the inquest report from the relevant investigating police officer and also the relatives of the deceased.

The various internal and external findings that were observed during the procedure were noted and the necessary specimen were sent for the chemical analysis to Regional Forensic Science Laboratory (RFSL). Findings were entered in Microsoft excel sheet & statistical analysis was done using descriptive statistics.

### Results

A total of 3275 cases were autopsied and poisoning constituted 433 cases amounting to 13.22% during this study period. Majority of cases were from 21-30 yrs (27.48%) followed by 31-40 yrs (25.17%) & 41-50 yrs (16.4%). Majority of cases were males (66.74%) as compared to females (33.26%).

**Table 1:** General characteristics

Characteristics	No. of cases	Percentage
<b>Age (years)</b>		
0 – 10	8	1.85
11 - 20	46	10.62
21 - 30	119	27.48
31 - 40	109	25.17
41 - 50	71	16.40
51 - 60	49	11.32

61 - 70	26	6.00
>70	5	1.15
<b>Gender</b>		
Male	289	66.74
Female	144	33.26

Majority cases survived for less than 1 day period (54.73%) & had manner of death suicidal (94.46%).

**Table 2:** Other characteristics

Characteristics	No. of cases	Percentage
<b>Survival period</b>		
<1 day	237	54.73
1 day to 1 week	146	33.72
> 1 week	50	11.55
<b>Manner of death</b>		
Suicidal	409	94.46
Accidental	24	5.56

In present study, most common poison used were organo-phosphorous compounds (64.43%), aluminium phosphide (5.77%), zinc phosphide (5.77%), corrosive acid poison (5.08%) & carbonates (4.62%).

**Table 3:** Suspected poison

Suspected poison	No. of cases	Percentage
Organo-phosphorous compounds	279	64.43
Aluminium phosphide	25	5.77
Zinc phosphide	25	5.77
Corrosive acid poison	22	5.08
Carbonates	20	4.62
Super vasmol	9	2.08
Others	35	8.08

In present study, negative chemical analysis report (50.35%) were more common than positive chemical analysis report (49.65%).

**Table 4:** Incidence of Poison detection by chemical analysis

Chemical analysis report	No. of cases	Percentage
Positive	215	49.65
Negative	218	50.35

In present study, common reason for intake of poison were physical illness (41.11%), marital dispute (20.32%), economic crisis (13.16%), love failure (6.47%) & accidental (5.54%). Other less common causes were conflict with parents (3.46%), family dispute (3.46%), mental illness (3%) & academic failure (2.77%).

**Table 5:** Reason for intake of poison

Reasons for intake of poison	No. of cases	Percentage
Physical Illness	178	41.11
Marital Dispute	88	20.32

Economic Crisis	57	13.16
Love Failure	28	6.47
Accidental	24	5.54
Conflict with Parents	15	3.46
Family Dispute	15	3.46
Mental Illness	13	3
Academic Failure	12	2.77
Others	3	0.69

## Discussion

An overall look at the autopsies of the cases of poisoning led to the conclusion that the people were more prone to consume poison from the second to fourth decade of their life when they are at their maximum productivity and hence the most stressed. Similar findings were observed in the studies conducted by Adarsh Kumar *et al.*,<sup>[4]</sup> Dhalbir Singh *et al.*,<sup>[5]</sup> Karamjit Singh *et al.*,<sup>[6]</sup> and B.R.Sharma *et al.*,<sup>[7]</sup>.

Among the study population males dominated in number thus reiterating the stress factor and hence seeing poison as a way out. Similar findings were observed by Dalbir Singh *et al.*,<sup>[5]</sup> J Gargi *et al.*,<sup>[8]</sup> B.R.Sharma *et al.*,<sup>[9]</sup> Murari Atul<sup>[9]</sup> & S.K.Dhattarwal<sup>[10]</sup>.

The majority of victims of poisoning did not survive the poison more than a day. Many others were dead within a week. The notoriety of poison was thus very clearly seen. This finding is deviant from that of the study done by Anil Kohli *et al.*,<sup>[11]</sup>. The reason for maximum deaths within 24 hours can be attributed to the delay in detection, toxic nature of poison consumed, the individual's body response to the poison, any pre-existing illness in the victim.

Suicide was the dominant manner of death in almost all deceased. Very few accident cases were seen, although it was a pristine fact that most people intentionally consume poison as a way out of their worries and problems. A full enumeration of the various reasons claimed for the individual to consume poison, the collection of history revealed that most people poisoned themselves due to a physical illness. However people turning to poison due to marital dispute or an economic crisis was also a common occurrence.

Organophosphorus compounds were the poison of choice for most individuals thus claiming a colossal number of lives among the subject population. In present study, most common poison used were organo-phosphorous compounds (64.43%), aluminium phosphide (5.77%), zinc phosphide (5.77%), corrosive acid poison (5.08%) & carbonates (4.62%). A Similar Result was obtained by B. Maharani<sup>[12]</sup>, Sanjeev Kumar *et al.*,<sup>[14]</sup> and Akhilesh Pathak *et al.*,<sup>[13]</sup>.

The reason for Organo-Phosphorous being the preferred poison is due to the high exposure of individuals to the chemical which is very easily available and accessible owing to the extensive agricultural background of our region. Aluminum phosphide has been observed to be a poison consumed on the rise. Plant poison such as oleander. (3.46%) is also easily available in Villages. Corrosive acid poisoning (5.08%) is also an easily available poison among households. Supervasmol (2.08%) is another commonly found poison in this region yet rare in other areas.

In present study, negative chemical analysis report (50.35%) were more common than positive chemical analysis report (49.65%). This study was akin to that conducted by SK Dhattarwal<sup>[10]</sup>. Adarsh Kumar *et al.*,<sup>[4]</sup> and SK Sharma *et al.*,<sup>[15]</sup>.

The Near balanced margin of chemical analysis reports is usually due to the extensive awareness for the need of emetics in a case of acute poisoning even among illiterates. The near all-time availability of medical practitioners warrants a quick stomach wash or even the administration of activated charcoal. Since Organo-phosphorous compounds are the most common poison in this region, the fatalities result not usually from the immediate effects of poisoning but from sequelae such as respiratory depression and infection, days later after the poisoning is treated.

In present study, common reason for intake of poison were physical illness (41.11%), marital dispute (20.32%), economic crisis (13.16%), love failure (6.47%) and accidental (5.54%). Other less common causes were conflict with parents (3.46%), family dispute (3.46%), mental illness (3%) and academic failure (2.77%).

The reason for physical illness to be touted as the main reason as obtained from the police reports for poisoning can be assumed that it is because of the relatives of the deceased reporting that they would have allegedly consumed poison due to their unfounded fear of police enquiry or the tainting of family honor. Marital dispute and economic dispute is more a rampant reason for suicides. The situation nowadays is as such couples in a marriage or individuals in a financial crisis fail to resolve the issues on their long term disputes and are rather prone to look for a short term solution and thus they turn towards suicide.<sup>16</sup> Deaths due to academic failure and conflict with parents are mostly committed by youngsters in a moment of frustration and close to the occurrence of these incidents are the accidental poisoning in children due to their ignorance.

### Conclusion

We noted that males sex in the age group between second and fourth decade of their life, married status, with low socioeconomic status are the high risk factors for poisoning. Commonest manners of poisoning were suicidal poisonings. Organophosphate's involvement as the most common agent involved in acute poisoning, to be remembered to help manage poisoning cases.

**Conflict of Interest:** None to declare.

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