

# A study of profile of medicolegal autopsy cases due to poisoning

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## Abstract

**Background:** Acute poisoning by pesticides is becoming a serious global problem. Knowledge of general pattern of poisoning in a particular region can hopefully lead to early diagnosis and control of poisoning crises, thereby bringing down the morbidity and mortality to minimum. Present study was an attempt to find out some epidemiological factors, pattern and other significant features of poisoning among poisoning cases at a tertiary care hospital.

**Material and Methods:** The present study was a retrospective study conducted in cases of medicolegal autopsy with history of poisoning and in cases that were diagnosed as poisoning after post mortem examination.

**Results:** Of the total 3275 cases of postmortem, poisoning constituted 433 cases amounting to 13.22% during this study period. Majority of cases were from 21-40 yrs (52.66%) followed by 41-60 yrs (27.71%). Majority of cases were males (66.74%) as compared to females (33.26%). Majority were illiterate (62.59%) as compared to literate (36.26%). In present study, majority were married (64.9%), from nuclear family (95.38%), from low socioeconomic class (81.29%). Majority 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%), aluminum phosphide (5.77%), zinc phosphide (5.77%), corrosive acid poison (5.08%) & carbonates (4.62%).

**Conclusion:** An overall look at the autopsies of the cases of poisoning led to the conclusion that the people were more prone to consume poison in the second to fourth decade of their life & suicide was the dominant manner of death in most of the cases.

**Keywords:** Poisoning, male sex, young age, low socioeconomic status, suicidal, organophosphate

## Introduction

Acute poisoning by pesticides is becoming a serious global problem. Pesticide poisoning account for an estimated three million cases of severe poisoning worldwide in each year, with approximately 200,000 deaths. More than 90% of these cases are reported from developing countries, such as India<sup>[1, 2]</sup>.

In India, due to the relative ease with which poisons are available, naturally or in the market, cases of human poisoning are commoner than they are in the West<sup>2013</sup><sup>[3]</sup>. Exposure to agrochemicals, medicines and environmental agents are the major causes of poisoning. It is

also seen that most of these pesticides poisoning and subsequent deaths happened in developing countries following a deliberate self-ingestion of the poison and easy

availability<sup>[4]</sup>.

Knowledge of general pattern of poisoning in a particular region can hopefully lead to early diagnosis and control of poisoning crises, thereby bringing down the morbidity and mortality to minimum<sup>[5]</sup>. Present study was an attempt to find out some epidemiological factors, pattern and other significant features of poisoning among poisoning cases at a tertiary care hospital.

### Material and Methods

The present study was a retrospective study conducted in the 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

- Medicolegal autopsy with history of poisoning and cases that were diagnosed as poisoning after post mortem examination

### Exclusion criteria

- The cases of food poisoning, snake bite and any other insect bite envenomation and deaths due to idiosyncratic reaction to the drugs were excluded from the study group.

Strict confidentiality was kept for identity & medicolegal data of autopsy cases. In all cases of poisoning the detailed history and information was collected from the autopsy reports, inquest reports and post mortem findings were analyzed with the chemical analysis reports from Forensic Science Laboratory for Chemical analysis and report.

A detailed information regarding the age, sex, time of consumption of poison, type of poison, mode of transport to the hospital, reason for poisoning, amount of poison taken, route of entry into the body, time interval between the consumption and hospitalization, outcome and other parameters were noted in study proforma. Data was collected and compiled using Microsoft Excel, statistical analysis was done using descriptive statistics.

### Results

Of the total 3275 cases of postmortem, poisoning constituted 433 cases amounting to 13.22% during this study period. Majority of cases were from 21-40 yrs (52.66%) followed by 41-60 yrs (27.71%). Majority of cases were males (66.74%) as compared to females (33.26%). Majority were illiterate (62.59%) as compared to literate (36.26%). In present study, majority were married (64.9%), from nuclear family (95.38%) and from low socioeconomic class (81.29%).

**Table 1:** General characteristics

Characteristics	No. of cases	Percentage
Age (years)		
≤ 20	54	12.47%
21 - 40	228	52.66%
41 - 60	120	27.71%
≥ 61	31	7.16%

Gender		
Male	289	66.74
Female	144	33.26
Educational qualification		
Literate	157	36.26
Illiterate	271	62.59
Marital status		
Married	281	64.90
Un married	101	23.32
Widow/widower	30	6.93
Separated	19	4.39
Divorcee	2	0.46
Family pattern		
Nuclear	413	95.38
Joint	20	4.62
Social economic status		
Low	352	81.29
Medium	68	15.70
High	13	3.00

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

**Table 2:** Other characteristics

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

In present study, most common poison used were organo-phosphorous compounds (64.43%), aluminum 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

## Discussion

In present study, majority of cases were from 21-40 yrs (52.66%) followed by 41-60 yrs (27.71%). Similar findings were observed in the studies conducted by Adarsh Kumar *et al.*,<sup>[6]</sup>. Dhalbir Singh *et al.*,<sup>[7]</sup>. Karamjit Singh *et al.*,<sup>[8]</sup> & B.R.Sharma *et al.*,<sup>[9]</sup>. While, above observation was against the studies done by Tharuni Ng *et al.*,<sup>[10]</sup>.

The reason for the most people consuming poison in the age of 21-30yrs can be cited varying from academic pressure, differences of opinion between a couple, unemployment, love failure, conflict with parents, improper judgment. The individual is in the pressure and increasing demand to establish themselves and hence they are prone to take a brazen route to most problems and thus eventually commit suicide when failure of motives are imminent. The most trivial reasons however have been observed in the age group 11-20(10%)<sup>[7, 8]</sup>.

Majority of cases were males (66.74%) as compared to females (33.26%). Similar findings were observed by Dalbir Singh *et al.*,<sup>[7]</sup>. J Gargi *et al.*,<sup>[11]</sup>. BRSharma *et al.*,<sup>[9]</sup>. Murari Atul<sup>[12]</sup> & SKDhattarwal<sup>[13]</sup>. While our observation was in disagreement of the studies done by Tharuni Ng v.,<sup>[10]</sup>. And Karamjit Singh V.,<sup>[8]</sup>. The reason for this can inferred that male, being the sole breadwinner in majority of the families are under more duress both emotionally and economically, thus being more prone to searching a means to end it all.

Majority were illiterate (62.59%) as compared to literate (36.26%). This study was in accordance with that of Karamjit Singh *et al.*,<sup>[8]</sup>. And is contrary to that of SKDhattarwal<sup>[13]</sup>. The reason for illiterate people turning towards poisoning can be attributed to unemployment or underemployment, getting daily wages presumably leaves them financially constrained after holidays or bouts of sickness, the lack of proper judgemental skills in a tough situation thus leaving them in a state of helplessness.

In present study, majority were married (64.9%), while least were divorcee (0.46%). The study done by Dalbir Singh *et al.*,<sup>[7]</sup>, Karamjit *et al.*,<sup>[8]</sup>. SK Dhattarwal,<sup>[13]</sup> & J Gargi *et al.*,<sup>[11]</sup>. Shows similar findings, however BR Sharma *et al.*,<sup>[9]</sup>. Observed the other way round. The reason for the married people consuming poison more commonly than single individuals can be enumerated from trivial to serious<sup>[8]</sup>. The married males usually consume poison due to marital disharmony, financial problems and unemployment. The married females though turn to poison due to cruelty of In-laws, dowry tortures, quarrel with husbands and excessive dependency on their spouses<sup>[7]</sup>.

In present study, majority were from nuclear family (95.38%) as compared to joint family (4.62%). BR Sharma *et al.*,<sup>[9]</sup>. Has also come to a similar conclusion from his study of poisoning patterns. The reason cited is that the individuals in a nuclear family do not have any support from family elders or lack thereof to share their family problems and thus lacking in proper guidance.

In present study, majority were from low socioeconomic class (81.29%) as compared to higher socioeconomic status (3.00%). The same observation has been made by SK Dhattarwal<sup>[13]</sup>. The opposing results have been obtained in the studies of Rahul Jain. The reason mainly being a deficit in finances both long term and short term. The deprivation of even basic amenities drive them to extreme conditions of stress. Lack of proper education also is a driving factor towards poison consumption.

Majority cases survived for less than 1 day period (54.73%) as compared to those survived for than 1 week period (11.55%). This finding is deviant from that of the study done by Anil Kohli *et al.*,<sup>[14]</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.

In present study, majority had manner of death as suicidal (94.46%) as compared to accidental manner of death (5.56%). Dalbir Singh *et al.*,<sup>[7]</sup> Karamjit Singh *et al.*,<sup>[8]</sup> SK Dhattarwal,<sup>[13]</sup> Taruni Ng *et al.*,<sup>[10]</sup> And Anil Kohli *et al.*,<sup>[14]</sup> Have made studies along the similar subjects and have come up with similar information regarding the manner of deaths of the victims.

A death from poisoning has been ruled suicidal due to the history, suicide note and other such Circumstantial evidences. Adults have been found to be the greatest number of cases in suicidal poisoning and children have been found mostly to be the victims of accidental poisoning. The accidental poisoning is mainly due to the ignorance of the parents keeping the poison within the reach of children, misinterpretation of the chemical by children and sometimes even by adults under intoxication.

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>[15]</sup>, Sanjeev Kumar *et al.*,<sup>[16]</sup> And Akhilesh Pathak *et al.*,<sup>[17]</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. Organo-phosphorous compounds give off a Kerosene like smell. 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>[13]</sup> Adarsh Kumar *et al.*,<sup>[6]</sup> & SK Sharma *et al.*,<sup>[18]</sup>. 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.

## Conclusion

An overall look at the autopsies of the cases of poisoning led to the conclusion that the people were more prone to consume poison in the second to fourth decade of their life when they are at their maximum productivity and hence the most stressed. 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. Organophosphorous compounds were the poison of choice for most individuals thus claiming a colossal number of lives among the subject population. Suicide was the dominant manner of death in almost all deceased.

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## References

1. Pillay V. Comprehensive Medical Toxicology. Paras Medical Publisher 2nd Edition, 2008, 263-8.

2. Kora SA. Socio-demographic Profile of the Organophosphorus Poisoning, Journal of Clinical & Diagnostic Research. 2011;5(5):953-6.
3. Dogra TD, Rudra A. editors. Lyon's Medical Jurisprudence & Toxicology. 11<sup>th</sup> edition; Delhi(India): Delhi Law House. 2007;1065-1079.
4. Vaghela PC, Gupta BD, Profile of fatal poisoning in and around Jamnagar. Journal of Indian Academy of Forensic Medicine, 2005, 27(3).
5. Koulapur VV, Pujar SS, Honnungar SR, Jirli SP, Patil S. Epidemiological Profile of Pesticide Poisoning Cases in Bijapur, Karnataka in Southwest India: a Retrospective Study. International Journal of Medical Toxicology and Forensic Medicine. 2015;5(4):180-4.
6. Adarsh Kumar, Krishan Vij. Trends of Poisoning in Chandigarh-A six Year Autopsy Study. Journal of Forensic Medicine and Toxicology. 2001;18(1):8-11.
7. Dalbir Singh, Jit I, Seema Tyagi. Changing Trends in Acute Poisoning in Chandigarh Zone. The American Journal of Forensic Medicine and Pathology. 1999;20(2):203-210.
8. Karamjit Singh, Oberoi SS, Bhullar DS. Poisoning Trends in the Malwa Region of Punjab. Journal of Punjab Academy of Forensic Medicine and Toxicology. 2003;3:26-29.
9. Sharma, B Relhan, Nidhi Gupta, Neha Singh, Harshabad. Trends of Fatal Poisoning in Northern India: A Ten-year Autopsy Analysis. Journal of Pharmacology and Toxicology. 2007;2:350-358.
10. Taruni Ng, Bijoy, Th. Momonchand A. A profile of poisoning cases admitted in Rims hospital, Imphal. Journal of Forensic Medicine and Toxicology. 2001;18:31-33.
11. Gargi J, Rai H, Chanana A, Rai G, Sharma G, Bagga IJ. Current trend of poisoning hospital profile. J Indian Med Assoc. 2006 Feb;104(2):72-3, 94.
12. Murari Atul, Sharma GK. A comparative study of poisoning cases autopsied in LHMC, New Delhi and JIPMER, Journal of Forensic Medicine and Toxicology. 2002;19(1):18-20.
13. Dhattarwal SK, Singh Harnam. Profile of deaths due to poisoning in Rohtak, Haryana. 2001;18:28-29.
14. Anil Kohli, *et al.*, Medicolegal aspects of female forticide. J Forensic Med & Tox, 13(3-4), 12-14.
15. Maharani B. Profile of poisoning cases in a Tertiary care Hospital, Tamil Nadu, India. Journal of Applied Pharmaceutical Science. 2013;3:10.
16. Akhilesh K Pathak. Death rates of snakebites in Vadodara, mid-Gujarat: a 3-year study. Int. J Med Sci. Public Health. 2015;4(3):339-341.
17. Kumar S, Mangal HM, Pathak A. Trends of fatal poisoning in Saurashtra region of Gujarat a prospective study. JIAFM. 2011 Sep;33(3):197-9.
18. Sharma SK. Current scenario of poisoning in rural India. Proceedings of workshop on Practical & Emergency Toxicology New Delhi, AIIMS, 1998, 19-24.