

A TEN YEAR STUDY OF POISONING CASES IN A TERTIARY CARE HOSPITAL

Dr. Virendar Pal Singh, MBBS MD Demonstrator,

Dr. B. R. Sharma, MBBS MD Reader,

Dr. Dasari Harish, MBBS MD Reader,

Dr. Krishan Vij, MD LLB Prof & Head,

Dept. of Forensic Medicine & Toxicology Govt. Medical College Hospital (GMCH), Chandigarh

Correspondence: Dr. Virendar Pal Singh, #1202-C, Sector.32B, Chandigarh- 160030

E-Mail: vpsingh13@yahoo.co.in

Abstract

A 10 years' autopsy study (1994-2003) of deaths due to poisoning was carried out in the department of Forensic Medicine & Toxicology, GMCH Chandigarh. The objective of the study was to ascertain the various aspects of deaths due to poisoning and to find remedial measures to decrease the incidence of poisoning cases. The incidence of deaths due to poisoning was found to be persistently increasing. Maximum number of cases (49.07%) were observed in adolescents and young adults (age group: 15-25 years). Male-female ratio was 2.8: 1. Rural- urban ratio was 1.62:1. Among the male victims married outnumbered unmarried in rural population, while in urban population reverse was observed. Among the females married outnumbered unmarried in both rural and urban population. Aluminium phosphide (ALP) was found to be the 'Poison of choice for suicides and suicide was the most common (93.09%) mode of poisoning. Based on the conclusions of the study various suggestions have been put forward to decrease the incidence of poisoning.

Introduction

A poison is any substance, which when administered to the body through any route, produces ill health, disease or death. "Any poisonous substance", as per Sec. 284 of the Indian Penal Code, is that substance, which, if taken, will endanger human life, or will be likely to cause hurt or injury to any person. Law takes into cognizance mainly the intention of the person (mens rea) administering the poisonous substance. If the intention is to treat the person, it is not a crime, but if the intention is to cause hurt, disease or death of the person, it is a crime. In India, we have ample legislation in our statute books dealing with the poisons/ poisonous substances (Sections 273-78, 284, 324, 326 & 328 of Indian Penal Code deal with the offences relating to drugs and poisons.) However, the menace still is there to stay.

Acute poisoning is a medical emergency which poses a major health problem all over the world. Its type, associated morbidity and mortality varies from place to place and changes over a period of time. The incidence of poisoning is rising in India. More than 50,000 people die of poisoning every year¹. Easy availability of numerous poisonous substances due to rapid development in science & technology, vast growth in industrial & agricultural set up has tremendously increased the incidence of poisoning cases. A number of chemical substances, which were developed to save the agricultural products from rodents and pests so as to protect the human being from starvation are in fact themselves becoming man eaters².

Poisoning in pediatric age group usually occurs due to accidental ingestion of commercial & household poisonous products, but in adolescents and adults intentional self-poisoning is more common³. Knowledge of general pattern of poisoning in a particular region will help in early diagnosis and treatment of such cases, thus leading to a decrease in mortality and morbidity. In view of the foregoing observation a study was conducted with the following objectives: a) to ascertain the various aspects of poisoning, b) to analyze the various aspects of poisoning and c) find the remedial measures to decrease the incidence of poisoning.

Material & Methodology

A total number of 593 cases of poisoning deaths that were autopsied in the department of Forensic Medicine & Toxicology at Govt.

Medical College Hospital, Chandigarh during the period 1994 – 2003 were the subjects of our study. The test samples of body tissues, organs and fluids were properly preserved and forwarded to the Central Forensic Science Laboratory/Chemical Examiner for chemical analysis. Information regarding age, marital status, demographics and type and manner of poison consumed was collected from the Hospital records, relatives of the victim and the investigating officer at the time of autopsy. Type of the poison consumed was verified from the reports furnished by the Forensic Science Laboratory/Chemical Examiner.

Observations

Incidence (Table: 1)

Out of total number of 2898 cases of unnatural deaths studied, the number of poisoning cases were 593 (20.46%). There has been increase in incidence of poisoning from 30 (12.77 %) in 1994 to 71 (24.65 %) in 2003.

Age & Gender distribution (Table: 2)

Out of the total 593 poisoning cases 436 (73.52%) were males and 157 (26.48%) were females. The male-female ratio was 2.8:1. Adolescents & young adults (age group-15-25years) formed the majority, 291 (49.07%) of cases.

Marital status of cases and rural Vs urban distribution (Table3)

367 (61.89%) victims were from rural background. It was observed that more married men (61.28 %) were victims in the rural area, whereas in urban area higher incidence (54.84%) was observed among unmarried men. However among females, fatal poisoning was more in married, irrespective of rural (72.28%) or urban status (73.24%).

Type of Poison (Table 4)

Aluminium phosphide was the poison responsible for maximum number of fatalities 327 (55.14%), followed by insecticides 145 (24.45 %).

Mode of Poisoning (Table 5)

Suicide was the most common mode of poisoning accounting for 552 (93.09%), followed by accidental poisoning in 33 (5.56%) cases.

Discussion

The incidence of poisoning, intentional or accidental is on the rise despite the best efforts of legislative, punitive, social and educational machinery to combat this menace. The popular notion that poisoning causes minimal suffering prior to death and that it is less grave a sin than causing death by violence, has only helped in rapid rise of incidence of poisoning cases⁴.

An increase in the percentage of deaths due to poisoning from 12.77% in 1994 to 24.65 % in 2003 and the maximum incidence in the age group of 15-25 years noticed in our study is in conformity with the reports of other workers.⁵⁻⁹ The younger age group is most susceptible to the lure of riches – the modern society's yardstick of success. Frustrations caused by the inability to cope with the highly competitive, indifferent & materialistic society have resulted in increased poisoning in younger generation. Some of the other important reasons are failure in exams or love affair, scolding / humiliation by peers and parents, inability to live up to the expectations of others etc.

61.89 % victims who, with lesser resources than their urban counter parts, find it more difficult to make their both ends meet were from rural background. This compounded by the usually large family size; high illiteracy, ignorance and superstitions complete dependence on the fate of their crop- both in the field and in the market etc are responsible for this trend.

An early marriage in the rural community, along with its added familial responsibilities, social customs, limited resources etc may be the factors responsible for married males (61.28 %) outnumbering unmarried males in the rural population. A continuous hunt for a suitable employment, it being a mandatory pre-requisite for marriage, the associated disillusionment and frustrations etc leading to depression may be responsible for the reverse trend in urban population i.e. unmarried males (54.84 %) outnumbering married.

In case of females percentage of married victims was almost the same in rural (72.28%) and urban (73,24%) in our study. This indicates that woes of the married female have no rural or urban barriers. Dowry, cruelty by the in-laws, family quarrels, mal-adjustments in married life, low level of education, infidelity, unemployment, dependence of the women on husband / in-laws etc are some of the important factors contributing towards the preponderance of married women in both the rural and urban communities.

Maximum numbers of deaths were due to ingestion of aluminium phosphide (55.14%). This compound has emerged as “Poison of choice” for suicides. The awareness in the general public of the almost painless death, unavailability of any antidote, the certainty of death by ingestion of just a single tablet has led to maximum deaths due to ALP poisoning. Our finding is in conformity with those of other workers⁹⁻¹¹

Suicide was the most common mode of poisoning (93.09%). This endorses our views that the inability to cope up with the demands put forth by the standards set by the materialistic modern society is the major culprit. Different workers in this field have also found similar results in their studies.¹⁰⁻¹²

Conclusion

To summarize, the following conclusions can be drawn:

- Poisoning deaths have doubled from 12.77% in 1994 to 24.65% in 2003.
- The age group most commonly affected was 15-25 years (49.07%).
- The male-female ratio was 2.8:1.
- The rural-urban ratio was 1.6:1.
- Among the male victims, married outnumbered the unmarried in the rural community, while the reverse was observed in the urban.
- Among the females, married outnumbered the unmarried in both rural and urban communities.
- Aluminium phosphide has acquired the dubious distinction of being the ‘Poison of choice’ for the suicides.
- Suicide was the most common mode of poisoning.

Suggestions:

- All the hospitals should have a separate toxicology unit dealing exclusively with the poison cases. These units should be directly under the supervision of Forensic- Medicine & Toxicology specialists.
- Poison Information/Control Centers on the pattern of AIIMS New Delhi and MGIMS Sevagram should be created throughout the country. These will be of immense benefit to the common man.
- The storage and sale of insecticides / pesticides particularly Aluminium phosphide, organo-phosphates, organo-chlorates etc should be controlled through strict regulations by the concerned authorities. ‘Over the counter’ sale of all these compounds should be banned.
- The Ministry of Agriculture, Govt. of India, constituted a “ Working group for laying down safety measures in the use of Aluminium phosphide,” in 1991. Its recommendations were :
 1. Some emetics should be incorporated in the formulation of the tablets.
 2. Each tablet should be dispensed in unbreakable, hard, perforated plastic pack.¹²

However, these recommendations will be of help only if strictly followed.

- Help lines should be set up with the active cooperation of Governmental and Non–Governmental Organizations (NGOs) so that help in the form of counseling etc can be provided to prevent the suicidal poisoning among the younger generation.
- Promoting education among the general public to annul the myths & superstitions. Age-old requirement of a male child has already destroyed many families and the lives of many individuals. Educating the society about the equal status of a girl child is the only solution. Effective cooperation between NGOs, voluntary and law enforcing agencies, is a must to enable women to enjoy equal rights, instill confidence self respect in them and to make them economically independent.
- Strict implementation of anti dowry laws, discouraging costly & ostentatious marriage rituals, marriage counseling may help in decreasing the day to day tensions of married life.

References

1. Aggarwal P, Handa R, Walia JP. Common poisoning in India. JFMT 1998; 15 (1): 73
2. Sharma BR, Harish D, Singh S, Vij K. Poisoning scenario in Northern India-Challenges and Sugeestions, JMGIMS 2002; 7 (I): 37-42
3. Sinha US, Kapoor AK, Agnihotri AK, Srivastava PC. A profile of Poisoning cases admitted in SRN Hospital, Allahabad with special reference to Aluminium phosphide poisoning. JFMT 1999; 16 (1): 40 - 43.
4. Sharma BR ,Harish D, Sharma V, Vij K. The epidemiology of Poisoning: An Indian view point. JFMT 2002; 19 (2): 5-11.
5. Bhullar, D.S., Oberoi S.S., Aggarwal O.P., Tuli. H. Profile of Unnatural deaths (between 18-30 yrs. of age) in Govt. Medical College/Rajendra Hospital, Patiala (India) JFMT 1996; 13 (3&4): 5-8.
6. Meena, H.S., Murty O.P., Bose S., Bhatia S., Dogra T.D. Aluminium Phosphide Poisoning JFMT 1994; 11 (3&4): 19-30.
7. Singh D. Changing trends in Acute poisoning, Amer. JFMP 1999; 20 (2): 203-210.
8. Sharma B. R. Trends of Poisons/Drugs abused in Jammu. JFMT 1996; 13 (2): 7-12.
9. Bajaj R. and Wasir H.S. Epidemic Aluminium Phosphide poisoning in Northern India. Lancet1988; 11: 820.
10. Sagar M.S, Sharma R.K, Dogra T.D. Analysis of Changing patterns of Unnatural Fatalities in South Delhi (comparative study of 1977-80 & 1988-91) JFMT 1993; 10 (1 & 2): 21-25.
11. Lall SB, Peshin SS, Seth SS Acute poisoning: a ten years retrospective hospital based study; Ann Natl Acad Med Sci (India) 1994; 30 (1): 35-44.
12. Singh D., Dewan I, Vashista R.K., Tyagi S.: Aluminium Phosphide Poisoning – Autopsy and Histopathological Findings. JFMT 1995; 12 (1 & 2): 16-20.

Table – 1: Yearly incidence of Poisoning in relation to total number of autopsies

Year	Total Autopsies		Cases of Poisoning	
	No.		No.	%
1994	235		30	12.77
1995	218		34	15.60
1996	225		42	18.67
1997	266		49	18.42
1998	286		53	18.53
1999	303		58	19.14
2000	352		67	19.03
2001	387		100	25.84
2002	338		89	26.33
2003	288		71	24.65
Total	2898		593	20.46

Table – 2: Age and Sex-wise distribution of cases

Age Group in Years	Total		Males		Females	
	No.	%	No.	%	No.	%
Below 15	10	01.69	04	00.92	06	03.82
15-20	122	20.57	73	16.74	49	31.21
21-25	169	28.50	120	27.52	49	31.21
26-30	88	14.84	63	14.45	25	15.92
31-40	91	15.35	79	18.12	12	07.64
41-50	80	13.49	66	15.14	14	08.92
51-60	28	04.72	27	06.19	01	00.64
Above 60	05	00.84	04	00.92	01	00.64
Total	593	100	436	100	157	100

Table – 3: Marital status of fatal poisoning cases in Rural and Urban Areas.

Sex	Rural			Urban			Total
	Married	Unmarried	Total	Married	Unmarried	Total	
Males, No.	163	103	266	70	85	155	421
%	61.28	38.72		45.16	54.84		
Females, No.	73	28	101	52	19	71	172
%	72.28	27.72		73.24	26.76		
Total, No.	236	131	367	122	104	226	593
%	64.31	35.69		53.98	46.02		

Table – 4: Most commonly used poisons during 1994-2003

Poison	Number	Percentage
Aluminium Phosphide	327	55.14
Insecticides	145	24.45
Alcohol	48	08.09
Corrosives/Irritants	05	00.84
Nitrobenzene	02	00.34
Diazepam	03	00.51
Potassium Cyanide	02	00.34
No Poison detected	61	10.29
Total	593	100.00

Table – 5: Mode of poisoning.

	SUICIDE	ACCIDENT	HOMICIDE	TOTAL
Number	552	33	08	593
Percentage	93.09	05.56	01.35	100