

PROFILE OF POISONING CASES AT A NORTH INDIAN TERTIARY CARE HOSPITAL

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ABSTRACT

Poisoning is a major problem in developing countries. Recently, it is increased due to the frequent use of pesticides in agriculture and exposure to hazardous chemical compounds as a result of rapid industrialization. Profile of poisoning in an area depends upon the access and availability of poison, socio-economic status, cultural and religious influences. This study has been aimed to determine the various parameters of poisoning such as mode and type of poisoning, relation to sex, occupation, marital status, vulnerable age group, outcome of patients with poisoning, and to find out the most common type of poison used in the North Indian states. Data were collected from the cases admitted with acute poisoning in medical wards of Jawaharlal Nehru Medical College and Hospital, Aligarh, over a period of one year. 104 cases were taken and the type of poison consumed, age and sex, marital status, religion, social class, mode of poisoning, occupation and outcomes of the victims with poisoning were assessed. Maximum number of cases (n=59) were recorded in the 20-29 years age group. The frequency declined as the age advanced ($P<0.01$). Irrespective of sex, suicide was the most common mode of poisoning. Aluminium phosphide was the most common poison and with maximum mortality ($P=0.002$). Majority of the cases belonged to the middle socio-economic strata (Class III and IV). Organophosphates and aluminium phosphide constituted the majority of cases in rural areas (63%), while zinc phosphide, aluminium phosphide, sedatives and delirients accounted for majority of the urban cases (80%). The distribution pattern was statistically significant ($P<0.001$). Marital discord and family problems were important causes of poisoning. There is an alarming increase in the cases of poisoning mainly for suicidal purposes. Cases of aluminium phosphide poisoning are increasing in recent years in North India which causes mortality due to its high case fatality rate. Due to non-availability of specific antidote and ease of procurement, it will assume epidemic proportions in future. Strict legislative measures over the sale of poison and increase in public awareness about the seriousness of the problem through health education should be undertaken.

Key Words: Poisoning, Socio-demographic profile, Pesticides, Drugs, North India.

Massive use of pesticides in agriculture, introduction of a variety of newer drugs for treatment, exposure to hazardous chemical products due to rapid industrialization, unhealthy dietary habits and increase in alcohol consumption have led to a wide

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spectrum of toxic products to which people are exposed now as compared to the earlier days¹⁻⁵. Profile of poisoning in an area depends upon a variety of factors, ranging from access to and availability of poison, socio-economic status of the individual, cultural and religious influences, etc. Poisoning forms a major problem in developing countries, though the type of poison and the associated morbidity and mortality varies from one place to another and it may change over a period of time⁶. Easy availability and low cost of hazardous chemicals play a major role in suicidal, homicidal and accidental poisoning in developing countries^{7,8}. In developed countries, the rate of mortality from poisoning varies only from 1 to 2 per cent but in developing countries like India, it varies between 15 to 30 per cent and is the fourth most common cause of mortality specially in rural India^{9,10}. In North India, aluminium phosphide (ALP) and organophosphate poisonings (OPP) are common. These substances are widely used to control pests and insects and have become major contributors of deaths due to poisoning¹¹.

According to the World Health Organization (WHO), 99 per cent of the fatal poisoning cases occur in developing countries, predominantly among the farmers due to various kinds of poisoning, including poisonous toxins from natural products during handling^{8,11,12}. Therefore, early diagnosis, treatment and prevention are crucial in reducing the burden of poisoning related injury in any country. Very few studies have been done in North India regarding the epidemiology of poisoning as compared to South India. So, this study has been aimed to determine the various parameters of poisoning such as mode of poisoning, type of poison, relation to occupation, marital status, outcome of patients with poisoning, vulnerable age group and to find out the most common type of poison used in North India as compared to South India.

MATERIALS AND METHOD

This study was conducted during January-December 2009. Data were collected from all the poisoning cases admitted during this period to the emergency ward and medical wards in Jawaharlal Nehru Medical College and Hospital, Aligarh, Uttar Pradesh which is a large tertiary care teaching hospital in North India. A total of 104 poisoning cases were admitted during this period. Information was collected about the type of poison consumed, age and sex, marital status, religion, duration of hospitalization, whether they belonged to rural or urban areas, mode of poisoning, occupation of the patient and the outcomes of the victims of poisoning. Data were documented and statistically analyzed. Chi-square test was done and $P < 0.05$ was considered significant.

FINDINGS

A total of 104 patients [62 males (59.6%) and 42 females (40.4%)] were enrolled in the study. Most of the patients were young with the age and sex distribution as shown in the Table 1 below. Maximum number of cases ($n = 59$) were recorded in the age group of 20-29 years and the frequency declined as the age advanced ($p < 0.01$).

Mode of Poisoning: Table 1 also shows the mode of poisoning in different groups. There were 84 (80.8%) suicidal cases that included 52 males and 32 females, 16 (15.4%) accidental cases which included 9 males and 7 females and 4 (3.8%) homicidal attempts. Irrespective of sex, suicide was the most common mode of poisoning. Moreover, gender had no statistically significant effect on the mode of poisoning

(P=0.11). Figures in Table 2 indicate that aluminium phosphide was the most common poison for both homicidal and suicidal purposes while accidental poisoning occurred due to zinc phosphide (rat poison, 37.5%), acid ingestion (25%), sedatives (25%) and organophosphates (12.5%).

TABLE 1
DISTRIBUTION OF PATIENTS BY THEIR AGE, SEX AND MODE OF POISONING

Age (years)	Male			Female			Total
	Suicidal	Accidental	Homicidal	Suicidal	Accidental	Homicidal	
< 20	16	-	-	12	-	-	28 (26.9%)
20-29	23	9	1	16	7	3	59 (56.8%)
30-39	8	-	-	2	-	-	10 (9.6%)
> 40	5	-	-	2	-	-	7 (6.7%)
Total	52	9	1	32	7	3	104

TABLE 2
DISTRIBUTION OF PATIENTS BY THE TYPE AND MODE OF POISONING

Poison	Mode of Poisoning			Total
	Accidental	Homicidal	Suicidal	
Acid				
	4(25%)	-	-	4(3.8%)
ALP	-	4(100.0%)	28(33.3%)	32(30.8%)
Delirient	-	-	4(4.8%)	4(3.8%)
OPP	2(12.5%)	-	14(16.8%)	16(15.4%)
Rat poison (zinc phosphide)	6(37.5%)	-	18(21.4%)	24(23.1%)
Sedative	4(25%)	-	8(9.6%)	12(11.5%)
Unknown	-	-	12(14.3%)	12(11.5%)
Total	16	4	84	104

Nature of Poison Consumed and Outcome: Aluminium phosphide was the commonest poison consumed (30.8%) followed by zinc phosphide (rat poison, 23.1%) and organophosphorus compounds (15.4%). Other common poisons included sedatives (11.5%) and unknown poisons (11.8%) (Table 3). Overall mortality was 14.4 per cent (n=15) while 89 patients had a favourable outcome. Of those expired, maximum mortality was recorded in the aluminium phosphide group (37.5%) which was significantly different from other groups (Pearson Chi-square value 21.29, P=0.002). Late presentation, consumption of fresh and unexposed tablets and high poison dose were important causes associated with mortality.

TABLE 3
DISTRIBUTION OF PATIENTS BY THE TYPE OF POISONING, SEX AND OUTCOME

Type of Poison	Male		Female		Expired	
	Improved	Expired	Improved	Expired	Total	% Mortality
OPP	7	1	7	1	2/16	12.5
Zinc Phosphide	16	-	7	1	1/24	4.2
Acid	-	-	4	-	0/4	-
ALP	12	8	8	4	12/32	37.5
Sedatives	8	-	4	-	0/12	-
Delirient	4	-	-	-	0/4	-
Unknown	4	-	8	-	0/12	-

Socio-economic Pattern of Victims: The cases were classified into different social classes on the basis of Modified Prasad Classification¹³. As shown in Table 4, it was observed that majority of the cases belonged to middle and low socio-economic stratum irrespective of their urban-rural distribution. In fact, 60 victims belonged to middle socio-economic strata (Classes III and IV) and 34 to low socio-economic strata (Classes V and VI) while only 10 patients were in Classes I and II. A definite pattern of poisoning was observed on analysing by their urban versus rural distribution. Organophosphates and aluminium phosphide constituted the majority of cases in rural areas (63%) while zinc phosphide (rat poison), aluminium phosphide, sedatives and delirients accounted for majority of the urban cases of poisoning (80%). The distribution pattern attained statistical significance using Chi-square test ($P < 0.001$).

TABLE 4
POISONING TYPE BY SOCIO-ECONOMIC (SE) CLASS
BASED ON MODIFIED PRASAD CLASSIFICATION

Social Class	Upper High (Class I)	High (Class II)	Upper Middle (Class III)	Lower Middle (Class IV)	Poor (Class V)	Below Poverty Line (Class VI)	Total (%)
OPP	-	-	8	4	2	2	16 (15.4%)
Zinc Phosphide	-	4	8	8	2	2	24 (23.1%)
Acid	-	-	2	-	2	-	4 (3.8%)
ALP	-	-	8	8	9	7	32 (30.8%)
Sedatives	2	-	4	2	4	-	12 (11.5%)
Delirients	2	-	2	-	-	-	4 (3.8%)
Unknown	-	2	4	2	-	4	12 (11.5%)
Total (%)	4 (3.8%)	6 (5.8%)	36 (34.6%)	24 (23.1%)	19 (18.3%)	15 (14.4%)	104

Married versus Unmarried: The study found that the number of married subjects were 67.3% ($n = 70$) while only 32.7% ($n = 34$) patients were unmarried.

TABLE 5
DISTRIBUTION OF PATIENTS ACCORDING TO MARITAL STATUS

	Male	Female	Total
Married	44	26	70 (67.3%)
Unmarried	20	14	34 (32.7%)

Distribution of Cases by Religion: Majority of the patients (63.5%) were Hindus (n = 66) followed by 35.6 per cent Muslim patients (n = 37) and only one Sikh patient.

TABLE 6
DISTRIBUTION OF CASES BY RELIGION

Religion	No. (N = 104)	%
Hindu	66	63.5
Muslim	37	35.6
Sikh	01	0.96

Cause of Poisoning due to Suicide and Homicide: There were 88 cases of poisoning due to suicide (n = 84) and homicide (n = 4). In these 88 cases the reason for poisoning has been shown in Table 6. It was observed that important reasons of poisoning in males were discord with parents, financial difficulties, loss of Job and marital discord. Important causes of poisoning in females were marital discord, failure in examination and problems in the family. Among these causes, marital discord and family problems were related to all the homicides.

TABLE 7
DISTRIBUTION OF PATIENTS BY THEIR SEX AND CAUSE OF POISONING DUE TO SUICIDE AND HOMICIDE

	Marital Discord	Financial Difficulties	Failure in Exam	Family Problems	Discord with Parents	Separation/ Death of Boy Friend/ Girl Friend	Loss of Job	Others	Total
Male	7	9	5	5	17	2	8	-	53
Female	10	3	7	5	5	4	-	1	35
Total	17	12	12	10	22	6	8	1	88

DISCUSSION

Most of the patients in this study were in the young age group and maximum number of patients (56.8%) was in the age group of 20–29 years followed by 26.9 per cent in below 20 years age group. Since most of the cases were suicidal in nature, the distribution pattern shows the mental vulnerability and impulsiveness of our youth. Similar patterns have been reported from other regions of India as well^{2,3,14,15}. The present study indicates that there was more number of male poisoning cases (59.6%) which is similar to the results found in other studies done in Eastern Uttar Pradesh and

Rohtak of Haryana^{16,17}. The high incidence in case of males may be because they are more exposed to stress and strain due to financial difficulties, loss of job, discord at home and work place, etc. There were more Hindus (63.4%) than Muslims (35.7%). Similar results have been observed in another study¹⁴. Aligarh and its adjoining areas have comparatively higher Muslim population as compared to other areas of North India still Muslim victims in this study were lesser than Hindus. One important reason could be that Islam teaches that taking one's life (suicide) is a big sin and therefore, Muslims seem to commit suicide less than people of other religions.

Suicide was the most common mode of poisoning in this study and is comparable to other studies¹⁸ and suggests that suicide by using poisons has increased because of their easy availability in the market and also there is a general belief that poison terminates life with minimal suffering^{19,20}. Aluminium phosphide was the most common type of poison consumed for both homicidal and suicidal purposes. Studies from other parts of India have reported organophosphates² and other pesticides³ as common causes of poisoning. Recently, there has been an increasing trend in the incidence of aluminium phosphide poisoning in North India, may be due to its easy availability, absence of specific antidote and high fatality rate³. In an earlier study, aluminium phosphide was found to be the most common cause of acute poisoning in India⁴. Overall mortality in the present study was 14.4 per cent. This finding is similar to the reported mortality rates in some other Indian studies^{14,17,21,22}. Most of the cases of poisoning belonged to the middle and low socio-economic group signifying the fact that financial and social problems may have an important bearing in the daily lives of these groups. Based on the predominant agricultural background of the study population, a significant use of insecticides and rodenticides as poisons is not unusual in both urban and rural set ups. Poisoning was more common in the married group irrespective of the sex. This is consistent with studies from Orissa² and Chandigarh¹¹, and shows that married persons may become victims of greater stress than single individuals in their day-to-day lives. The different causes of the stress culminating in poisoning ranged widely from marital and family discords to financial and job related problems to educational and other matters.

CONCLUSION

It has been observed that there is an alarming increase in cases of poisoning mainly for suicidal purposes. North India is a predominantly agricultural region and therefore, aluminium phosphide (pesticide) was found to be the most common cause for acute poisoning with high mortality, due to its high fatality rate. It might assume epidemic proportions in future, specially because of the non-availability of specific anti-dote and easy procurement. This calls for urgent research to find a specific anti-dote and strict legislative measures over sale and purchase of the fumigant. The same applies for other poisons and drugs which are common agents used for poisoning whether for suicidal, homicidal or accidental. Above all, increase in public awareness about the seriousness of problem through health education and efforts to distress and develop a healthy outlook towards life should be undertaken.

REFERENCES

1. YANKO I., VALENTIN A. & IVAN D. (2001): Acute Poisoning Mortality Rate in Plovdiv Region, Bulgaria; *Arh Hig Rada Toksikol*, 52: 307-313.
2. SENANAYAKE N. & PETRIS H. (1995): Mortality due to Poisoning in a Developing and Agricultural Country- Trends over 20 years; *Hum Exp Toxicology*, 14: 808-811.
3. SINGH S., WIG N., CHAUDHARY D, SOOD N.K. & SHARMA B.K. (1997): Changing Pattern of Acute Poisoning in Adults: Experience of a Large North-West Indian Hospital (1970- 1989); *J Assoc Physicians India*, 45 (3): 194-197.
4. SIWACH S.B. & GUPTA A. (1995): The Profile of Acute Poisonings in Rohtak, Haryana- A Study; *J Assoc Physicians India*, 43 (11): 756-759.
5. FLEMMING K., WIM VAN DER HOEK, DONALD C. COLE, GERARD H., HUBERT D., SURJIT S. & MICHAEL E. (2003): Reducing Acute Poisoning in Developing Countries- Options for Restricting the Availability of Pesticides, *Toxicology*, 192: 249-261.
6. SHARMA B.R., HARISH D. SHARMA & VIVEK VIJ K. (2002): Poisoning in Northern India: Changing Trends, Causes and Prevention Thereof, *Med Sci Law*, 42 (3): 251-255.
7. EDDLESTON M. (2000): Patterns and Problems of Deliberate Self-Poisoning in the Developing World. *Q J Med*, 93: 715- 731.
8. BATRA A.K., KEOLIYA A.N. & JADHAV G.U. (2003): Poisoning: An Unnatural Cause of Morbidity and Mortality in Rural India; *J Assoc Physicians India*, 51: 955-959.
9. TARUNI N.G., BIJOY T.H. & MOMONCHAND A. (2001): A Profile of Poisoning Cases Admitted to RIMS Hospital, Imphal; *J Forensic Med Toxicol*, 18: 31-33.
10. PILLAY V.V. (2001): In: MKR Krishna's Hand Book of Forensic Medicine and Toxicology, 12th Ed., Paras Publications, Hyderabad, p 276-299.
11. SHARMA B.R., HARISH D., SHARMA V. et al (2001): The Epidemiology of Poisoning: An Indian View point; *J Forensic Med Toxicol*, 18: 31-33.
12. World Health Organisation Bulletin (1999): Guidelines for Poison Control, WHO, Geneva.
13. AGARWAL A.K. (2008): Social Classification: The Need to Update in the Present Scenario; *Indian J of Community Medicine*, January, 33 (1): 50-51.
14. KIRAN N., SHOBA RANI R.H., JAI PRAKASH V. et al (2008): Pattern of Poisoning Reported in a South Indian Tertiary Care Hospital; *Indian J Forensic Med and Toxicology*, July-December, 2 (2): 17-19.
15. JAISWAL S., VERMA R.K., TEWARI N. (2009): Alumunium Phosphide Poisoning: Effect of Correction of Severe Metabolic Acidosis on Patient Outcome; *Ind Jour Critical Care Medicine*, Jan.-Mar., 13 (1): 21-24.
16. AGARWAL R., BARTHWAL S.P., NIGAM D.K. et al (1995): Changing Pattern of Acute Poisoning in an Eastern UP Hospital-based Study; *J Assoc Physicians India*, 43: 907.
17. DHATTARWAL S.K. & SINGH H. (2001): Profile of Deaths due to Poisoning in Rohtak, Haryana; *J Forensic Med Toxicol*, 18: 28-29.
18. SRINIVAS RAO C.H., VENKATESWARLU V., SURENDER T. et al (2005) : Pesticide Poisoning in South India– Opportunities for Prevention and Improved Medical Management; *Tropical Med Int Health*, June, 10 (6): 581-588.
19. UNNIKRISHNAN B., SINGH B. & RAJEEV A. (2005): Trends of Acute Poisoning in South Karnataka; *Kathmandu University Medical Journal*, 3 (2) 10: 149-154.

20. HANSEN A.C. (1991): Deaths due to Poisoning in Denmark in 1983-1987; *Ugeshlarger*, 153: 496-500.
21. NIMAL S. & LAXMAN K. (1988): Pattern of Acute Poisoning in a Medical Unit in Central Sri Lanka; *For Sci Int*, 36: 101-104.
22. GUPTA B.D. & VAGHELA P. (2005): Profile of Fatal Poisoning in and around Jamnagar; *JIAFM*, 27 (3): 145-148.

Home » survey on pattern of snake bite cases admitted in south indian tertiary care hospitals. Survey on pattern of snake bite cases admitted in south indian tertiary care hospitals. HTML Full Text. Hospital records fall far short of the actual number of snakebite cases, owing to depend on the traditional healers and practitioners. It has been reported that in most developing countries, up to 80% of individuals bitten by snakes first consult traditional practitioners before visiting a medical center. Inamdar IF, Aswar NR, Ubaidulla M, Dalvi SD; Snakebite: admissions at a tertiary health care centre in Maharashtra, India. S Afr Med J., 2010; 100(7): 456-458. A Study of Socio-Demographic Profile and Outcome of Poisoning Cases Reported at Tertiary Care Teaching Hospital of Northern India. Brijender Singh, Latika, Sukhbir Singh, Vivek Kumar, Ashok Chauhan. Published: 1 January 2014. Keywords: Care Teaching / Poisoning Cases / demographic profile / tertiary care / Northern India / teaching hospital. Cases of aluminium phosphide poisoning are increasing in recent years in North India which causes mortality due to its high case fatality rate. Due to non-availability of specific antidote and ease of procurement, it will assume epidemic proportions in future. Strict legislative measures over the sale of poison and increase in public awareness about the seriousness of the problem through health education should be undertaken.