International Journal of Forensic Medicine

E-ISSN: 2707-4455
P-ISSN: 2707-4447
IJFM 2020; 2(2): 33-37
Received: 06-07-2020
Accepted: 13-08-2020

Pusparaj Samantasinghar
Department of Forensic Medicine and Toxicology, IMS and SUM Hospital, Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, India

Corresponding Author:
Pusparaj Samantasinghar
Department of Forensic Medicine and Toxicology, IMS and SUM Hospital, Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, India

Profile of poisoning cases in a in a Tertiary Care Hospital in Bhubaneswar, India

Pusparaj Samantasinghar

DOI: https://doi.org/10.33545/27074447.2020.v2.i2a.74

Abstract
Poisoning is an important public health problem causing significant morbidity and mortality throughout the world. Information available with regard to acute poisoning in adults is limited at Bhubaneswar, Odisha. Hence this study was done with the above objective. It is a retrospective study conducted during Jan 20018-Jan 2019 in a tertiary care hospital. 150 cases of acute poisoning in adults due to drugs and chemicals were included. Data on age, sex, marital status, occupation, religion, locality, type of poison, time and month of intake, route of exposure, associated co-morbid conditions and outcome of poisoning were recorded and analyzed by descriptive method. Among 150 cases, 148 cases were of intentional poisoning and two cases were of accidental poisoning. In all the cases the route of exposure was oral. Males (92 cases) outnumbered females (58 cases) and 101 cases were married. Peak occurrence was in the age group of 21-30 years (47 cases). Occupation wise poisoning was commonly found among male laborers (18.66%) and farmers (13.33%) followed by house wives (28%) and students (16.66%). 147 cases (98%) were Hindus. More cases were reported during summer season (36%) and day time (80%). Organophosphorus was the commonest agent (58.66%). Associated co-morbid conditions were found in 16 cases. The incidence of poisoning and its morbidity and mortality can be reduced by developing and implementation of effective prevention strategies.

Keywords: Aluminium phosphide, endosulfan, organophosphorus, poisoning, Bhubaneswar

Introduction
Poison is a substance that causes damage or injury to the body and endangers one's life due to its exposure by means of ingestion, inhalation or contact (Thomas *et al*., 2004) [25]. Acute poisoning is defined as acute exposure (less than 24hrs) to the toxic substance (Klassen *et al*., 1986) [11]. Acute poisoning due to Accidental and suicidal exposure causes significant mortality and morbidity throughout the world. According to World Health Organization (WHO), globally more than three million of acute poisoning cases with 2, 20,000 deaths occur annually (WHO 1999) [29]. It has been estimated that, in India five to six persons per lakh of population die due to acute poisoning every year (Narayana Reddy, 2010) [14]. Poisoning is the fourth common cause of mortality in India (Unikrishnan *et al*., 2005) [26]. Pattern of poisoning in a region depends on various factors which include availability and access to the poison, socioeconomic status of an individual, cultural and religious influences, etc.

Rapid industrialization, introduction of newer range of drugs for treatment and massive use of pesticides in agriculture has increased the incidence of poisoning. In advanced countries, it has been observed that poisoning deaths are mainly due to cleansing agents, detergents, paracetamol, carbon monoxide and other cosmetic products (Gargi *et al*., 2008) [6]. In India, as agriculture is the main occupation, insecticides and other agrochemical fertilizers are used to a greater extent and the poisoning with such products are more common (Aaron *et al*., 2004) [1]. According to various studies organophosphate forms the commonest poisoning agent (Adalkha *et al*., 1988; Jaiprakash *et al*., 2011; Jesslin *et al*., 2010; Vinay *et al*., 2008; Ramesha *et al*., 2009) [2, 9, 10, 27, 16]. Recent study pertaining to poisoning statistics demonstrated considerable difference between North India and South India (Murari *et al*., 2008) [13]. Since 1995, it has been found that the incidence of aluminium phosphide poisoning is increasing in north India (Siwach *et al*., 1997; Sharma *et al*., 1995; Sinha *et al*., 1999) [23, 18, 22].

In general accidental poisoning is more common in children and suicidal poisoning is more common in young adults (Das *et al*., 2007) [4]. A study by Thomas *et al*, (2000) [24] has shown an increasing trend of self poisoning among young adults (the most productive group of the community). Knowledge of general pattern of poisoning in a particular region will help in early diagnosis and treatment of cases, thus decreasing the rate of mortality and morbidity. Information available in our locality with regard to acute poisoning in adults is limited. Hence this present study was carried out with the objective to find out the pattern of acute poisoning in adults in a tertiary care hospital, Bhubaneswar, Odisha.

Materials and Methods

The present study was a retrospective study conducted during January 20018-January 2019 in a tertiary care hospital, Bhubaneswar, Odisha. The study was conducted after obtaining Institutional Ethical clearance. The study included 150 cases of adults, with acute poisoning due to drugs and chemicals. Cases of snake bite, insect bite, food poisoning and allergic reaction to drugs were not included in the study. Data regarding age, sex, marital status, occupation, religion, locality, type of poison, time and month of intake, route of exposure, and outcome of poisoning and associated co-morbid conditions were collected from the hospital records and documented in the pre- structured proforma. Then the data were analyzed by descriptive statistical method by using SPSS 11 software.

Results: In the present study, 150 cases of poisoning were reviewed retrospectively. Among them, 148 cases (98.66%) were of intentional poisoning and only two cases (1.44%) were of accidental poisoning. In all the cases, the route of exposure was oral. Males (92 cases, 61.33%) outnumbered females (58 cases, 38.66%) and the ratio was 1.58:1 and 101 cases (67.33%) were married. Majority of the cases were in the age group of 11-30 years and among them 74 cases (49.33%) were in the age group of 21-30years. It was also found that the instances of poisoning decreased with increasing age (Table-1). Occupation wise (Table-2), poisoning was commonly found among male laborers (28 cases, 18.66%) and farmers (20cases, 13.33%) followed by house wives (42 cases, 28%) and students (25 cases, 16.66%). Religion wise (Table-3), maximum occurrence was found among Hindus (147 cases, 98%). More number of cases was reported during summer season (54 cases, 36%) (Table-4). In the present study, the commonest poisoning agent was organophosphorus compounds (88cases, 58.66%) followed by rat killer poison (17 cases, 11.33%). But the mortality rate was high with rat killer poison (6 cases out of 17) and endosulfan (2 cases out of 5) (Table-5). Regarding social back ground of the victims, 136 cases (90.66%) were reported from rural area and 14 cases (9.33%) were reported from urban area. Time of intake of poison in 120 cases (80%) was during day time and in only 30 cases (20%) it was during night time. Co-morbid conditions like adjustment disorder, moderate to severe depression, schizophrenia, mood disorders, alcohol dependence, etc., were found in 35 cases (23.33%).

Table 1: Age, marital status and sex-wise distribution of victims.

Age in Years	Male			Female		
	Married	Unmarried	No (%)	Married	Unmarried	No (%)
	No (%)	No (%)		No (%)	No (%)	
11-20	0	10(6.66)	10(6.66)	4(2.66)	12(8)	16(10.66)
21-30	19(12.66)	26(17.33)	45(30)	28(18.66)	1(0.66)	29(19.33)
31-40	12(8)	0	12(8)	7(4.66)	0	7(4.66)
41-50	10(6.66)	0	10(6.66)	3(2)	0	3(2)
51-60	12(8)	0	12(8)	2(1.33)	0	2(1.33)

Table 2: Occupation of the Victim.

S. No	Occupation	No	Percentage
1.	House wives	42	28
2.	Laborers	28	18.66
3.	Students	25	16.66
4.	Farmers	20	13.33
5.	Drivers	13	8.66
6.	Power loom operators	11	7.33
7.	Private job	9	6
8.	Others	2	1.33
	Total	150	100

Table 3: Religion based distribution of victims.

Sl. No	Religion	No of cases	Percentage
	Hindu	147	98
	Christian	2	1.33
	Muslim	1	0.66
	Total	150	

Table 4: Season wise distribution of poisoning cases.

Sl. No	Season	No of cases	Percentage
1.	Winter	17	11.33

2.	Summer	54	36
3.	Rainy	47	31.33
4.	Spring	32	21.33
	Total	150	

Table 5: Type of poison.

Type of poison	No. of cases (%	No. of Deaths (%)	*Mortality rate %
Drugs(alprazolm, nitrazepam, paracetamol, phenobarbitone)	6(4)	0	0
Rat killer (aluminium phosphate, zinc phosphate)	17(11.33)	6(4)	35.29%
Ant killer (dimethyl parathion)	1(0.66)	0	0
Plant poison(oduvanthalai leaves, oleander seeds, azadirachta seeds)	15(10)	3(2)	20%
Toilet cleaning agents(harpic, bleaching powder, phenol)	3(2)	0	0
Organochlorine(endosulfan)	5(3.33)	2(1.33)	40%
Herbicide(glyphoside, paraqut)	9(6)	1(0.66)	11.11%
Organophosphorus	88(58.66)	6(4)	6.81%
Mosquito repellants(pyrethroids)	6(4)	0	0
Total	150	18(11.99)	

*Mortality rate = (No of deaths/no of cases) X 100

Discussion

In the present study the commonest poisoning agent was organophosphorus compounds. Married males outnumbered females. Most of the cases were in the age group of 21-30 years.

Acute poisoning was commonly seen among male laborers, farmers, house wives and students. More cases were reported during summer season and day time.

Among 150 cases, intentional poisoning was found among 148cases (98.66%) and accidental poisoning was found in only two cases (1.44%). Various national and international studies have projected an increase in the incidence of intentional poisoning. The findings are similar to the study done by Das *et al* 2007 [4]. In all the cases the commonest route of exposure was oral. Majority of cases were in the age group of 11-30 years and maximum cases were found between 21-30 years (74 cases, 49.33%) which can be explained by the fact that the persons of this age group are suffering from stress of the modern lifestyles, failure in love, family problems, nuclear family concept etc. Higher suicidal rate was found among males (92 cases, 61.33%) than females (58 cases, 38.66%) which were similar with other studies done by Sharma *et al* (2002) [19] and others (Dash *et al*., 2005; Singh *et al*., 1984) [5, 20] but contradict the study done by Pokhrel *et al* (2008) [15] in which incidence was high among females. An early marriage in the rural community along with its added familial responsibilities, social custom, limited resources etc., may be the factors responsible for married males (56 cases, 37.33%) outnumbering unmarried males and this fact is evident from our study and also from other studies (Dash *et al*., 2005; Singh *et al*., 1984) [5, 20].

Occupationally, many cases were found among male laborers (28 cases, 18.66%), farmers (20 cases, 13.33%) and house wives (42 cases, 28%) as these groups are more vulnerable groups and easily exposed to the poisoning agents. Poverty, inadequate income to run the family, monsoon failure was responsible for higher incidence of poisoning among laborers and farmers (Vinay *et al*., 2008) [27]. Factors like dowry, cruelty by the in-laws, family quarrels, maladjustment in married life and dependence of women on husband are responsible for the higher incidence of poisoningamong house wives (Virendar *et al*., 2004) [28]. Failure in the exams or inability to cope up the high expectation from parents and teachers has increased the incidence of poisoning among students.

As Agriculture is the main occupation of the people and organophosphorus were commonly used pesticide in this locality, the most commonly used agent for poisoning was organophosphorus (88 cases, 58.66%) followed by rat killer poison and other agents. This is evident from other studies done in south India (Adalkha *et al*., 1988; Jaiprakash *et al*., 2011; Jesslin *et al*., 2010; Vinay *et al*., 2008; Ramesha *et al*., 2009) [2, 9, 10, 27, 16]. In contrast, the incidence of aluminium phosphide was found to be high in north Indian studies done by Bajaj *et al* (1988) [3] and others (Sagar *et al*., 1993; Lall *et al*., 1994; Singh *et al*., 2004) [17, 12, 21]. High toxicity and non availability of any specific antidote is responsible for higher mortality with rat killer poison (six out of 17 cases) and endosulfan poison (two out of five cases) than organophosphate poisoning (six out of 88) (Gurjar *et al*., 2011; Haddad 1998) [7, 8].

Seasonal variation also alters poisoning statistics. More number of cases were reported during summer season (54 cases, 36%) followed by rainy and spring season. This was similar to other study done by Jesslin *et al*. (2010) [10]. But the incidence was high during the rainy season in a study by Pokhrey *et al*. Water scarcity during summer leads to crop failure and financial loses which indirectly increases the incidence of suicide. And also grains are preserved during summer season for which pesticides are procured, that increases the availability of poison and indirectly it leads to rise in the incidence during summer. Out of 150 cases, 120 cases (80%) consumed poison during day time. It was against the results of Pokhrey *et al* in which the incidence was high during night time. The main reason for selecting day time may be isolation of victims when the family members go out for work or kids to school. Associated co-morbid conditions like schizophrenia, depression, adjustment disorder and alcoholism were found in 35 cases (23.33%). Physical and mental disorders motivate such persons to consume poison.

Data on acute poisoning in adults is scarce in our locality. We observed, poisoning was common among productive age group (20-30 years) that produces a huge socioeconomic burden on the society. This study adds information to the existing data which help to develop prevention strategies.

Poison prevention strategies can be implemented at various levels as follows:

- Strict implementation of pesticide act, so that import,

manufacture, sale, transport, distribution and use of pesticides can be under the supervision of the government.
- Controlling access to dangerous pesticides and follow secure storage practice.
- Poison information centre should be created in each district throughout the country. It will benefit the common man in timely diagnosis and treatment.
- All the hospitals should have separate toxicological unit exclusively dealing with clinical poisoning cases.
- Primary health centre should be upgraded to provide immediate effective treatment to poisoning.
- Educating NGO's, village head and other volunteers about the first aid treatment of poisoning at household level.
- Persons with psychosocial problems should be identified at the earliest and should be referred for psychiatric counseling.
- Health education to adolescents at school and college level about poisoning and its first aid treatment.
- Strict implementation of anti dowry law, marriage counseling and women empowerment will help in decreasing the day to day tension in married life and decrease the incidence of poisoning among house wives.
- Proper and correct implementation of social and economic projects aimed for upliftment of rural poor and downtrodden.
- Further research is needed to introduce safer pesticides with minimal harm to the humans.

Conclusion

The commonest poisoning agent was Organophosphorus. The occurrence was high among married males and in the age group of 21-30 years. Maximum number of cases was reported during summer season and day time. The incidence of poisoning and its morbidity and mortality can be reduced by developing and implementation of effective prevention strategies.

References

1. Aaron R, Joseph A, Abraham S, Muliyil J, George K, Prasad J, *et al*. Suicides in young people in rural southern India. Lancet. 2004;363:1117-1118.
2. Adalkha A, Philip PJ, Dhar KL. Organophosphorus and carbamate poisoning in Punjab. Assoc Physician India. 1988;36:210.
3. Bajaj R, Wasir HS. Epidemic of Aluminium phosphide poisoning in northern India. Lancet. 1988;11:820.
4. Das RK. Epidemiology of insecticide poisoning at A.I.I.M.S. Emergency service and role of its detection by gas liquid chromatography in diagnosis. Medico legal update. 2007;7:49-60.
5. Dash SK, Mohanty MK. Sociodemographic profile of poisoning cases. Journal of indian academy of forensic medicine. 2005;27(3):133-138.
6. Gargi J, Tejpal H R. A Retrospective autopsy study of poisoning in the northern region of Punjab. Journal of Punjab Academy of forensic medicine and Toxicology; c2008, 2(17-20).
7. Gurjar, Mohan, Azim, Afzal, Baronia, Arvind K, *et al*. Managing Aluminium phosphide poisonings. Journal of Emergency Medicine, Trauma and shock. 2011;4(3):378-384.
8. Haddad. The Emergency management of poisoning. In: Haddad, Shannon, Winchester. Clinical management of poisoning and drug over dosage Philadelphia: W.B. Saunders, Inc; c1998. p. 841-842.
9. Jaiprakash H, Sarala N, Venkatarathnamma PN, Kumar TN. Analysis of different types of poisoning in a tertiary care hospital in rural south India. Food Chem Toxicol. 2011;49(1):248-250.
10. Jesslin J, Adepu R, Churi S. Assessment of prevalence and mortality incidence due to poisoning in a south Indian tertiary care teaching hospital. Indian Journal of Pharmaceutical Science. 2010(sepoct);72(5):587-591.
11. Klassen CD, Andur MO, Doull J. Casarett and Doull's Toxicology. Macmillan, New York; c1986. p. 10-17.
12. Lall SB, Peshin SS, Seth SS. Acute poisoning. A ten year retrospective hospital based study. Ann. Natl. Acad. Med. Sci (India). 1994;30(1):35-44.
13. Murari A, Sharma GK. A Comparative study of poisoning cases autopsied in LHMC New Delhi and JIPMER. Journal of forensic medicine and toxicology. 2008;19:19-21.
14. Narayana Reddy KS. Toxicology, General consideration. In: Narayana Reddy K S. Essentials of Forensic Medicine and Toxicology. Suguna Devi: Hyderabad, Inc; c2010. p. 446-465.
15. Pokhrel D, Sirjanapant, Pradhan A, Mansoor. A Comparative retrospective study of poisoning cases in central, zonal and district hospitals. Kathmandu University Journal of Science, Engineering and technology. 2008;1(5):40-48.
16. Ramesha KN, Moorthy K, Rao BH, Kumar G. Pattern and outcome of acute poisoning cases in a tertiary care hospital in Karnataka, India. Indian Journal of critical care Medicine. 2009;13(3):152-155.
17. Sagar MS, Sharma RK, Dogra TD. Analysis of changing patterns of unnatural fatalities in south Delhi. Journal of forensic medicine and toxicology. 1993;10(1&2):21-25.
18. Sharma A. Oral Aluminium Phosphide poisoning. Indian Journal of paediatrics. 1995;32:339-342.
19. Sharma BK, Harish D, Sharma V, Vij K. The epidemiology of poisoning: An Indian view point. Journal of forensic Medicine and Toxicology. 2002;19:5-11.
20. Singh S, Shama BK, Wahi P, Anand BS, Chugh KS. Spectrum of acute poisoning in adults(10 year experiences). Journal Assoc. Physician India. 1984;32:561-563.
21. Singh VP, Sharma BR, Harish D, Vij K. A Ten year study of poisoning cases in a tertiary care hospital. Indian internet journal of forensic medicine and toxicology; c2004, 2(1)
22. Sinha US, Kapoor AK, Agnihotri AK, Srivastava P. A profile of poisoning cases admitted in SRN Hospital, Allahabad with special reference to aluminium phosphide poisoning. Journal of forensic Medicine and Toxicology. 1999;16(1):43.
23. Siwach SB. Recent trends in the management of acute aluminium phosphide poisoning. Post grad Med. 1997;11:411-413.
24. Thomas M, Anandan S, Kuruvilla PS, Singh PR, David S. Profile of hospital admission following acute poisoning experiences from a major teaching hospital in south India. Adverse drug reaction and toxicology

review. 2000;19:313-317.
25. Thomas WF, John HD, Willium RH. Stedman's medical dictionary. 28th edition. Lippincott William and wikins, Newyork. (2007); c2004.
26. Unikrishnan B, Singh B, Rajeev A. Trends of acute poisoning in south Karnataka. Katmandu University Medical Journal. 2005;3(2):149-154.
27. Vinay BS, Gurudatta S, Pawar, Inamadaa PI. Profile of poisoning cases in district and medical college hospitals of north Karnataka. Indian journal of forensic medicine and toxicology. 2008;2(2):07-12.
28. Virendar PS, Sharma BR, Dasari H, Krishnan V. A ten year study of poisoning cases in a tertiary care hospital. Indian Internet Journal of Forensic Medicine & Toxicology; c2004, 2(1)
29. World Health Organization. Guidelines for poison control Bulletin Geneva: World Health Organisation; c1999.