



**EPIDEMIOLOGICAL PROFILE OF POISONING IN A TERTIARY CARE CENTRE IN EASTERN INDIA**

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**ABSTRACT**

**Introduction:** Poisoning is one of the common causes of morbidity and mortality. Poisoning may be suicidal, homicidal or accidental. It is found in all age groups irrespective of male and female.

**Material & method:** This was an observational cross sectional study conducted in the Department of General Medicine, Calcutta National Medical College & Hospital in Kolkata, West Bengal, India. Duration of study was six months from June, 2019 to November, 2019. Total 150 patients were included in the study.

**Results:** Majority of the patients were in their 3<sup>rd</sup> decade with equal urban-rural distribution. 59% patients were females. Pesticides were the commonest poison (41.3%), followed by drugs and corrosive agents. Snake bite was another common cause of hospital admission. Social causes (45.3%) were the most common reason of poisoning followed by economic issues (20%).

**Conclusion:** With ever changing and stressful lifestyle incidence of poisoning is increasing. We should take proper care and our whole hearted efforts are required to prevent it from becoming a social disaster.

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**INTRODUCTION**

Poison is defined as, any substances (gaseous, liquid or solid) which if introduced in a living body or brought in contact with any part of it thereof will produce some ill health or death, by its constitutional or local effect or both. Poisoning is an age-old method of homicide and suicide. References of poisoning are found in oldest Egyptian, Babylonian, Hebrew and Greek records. Ancient Indian scriptures also contain references of poisoning of kings, doings of professional poisoners, organized poisoning events in prehistoric ages. Different 'shastras' of ancient India mentioned different poisons and their symptoms and antidotes in detail. [1]

Apart from homicidal and suicidal, accidental poisoning by snakes and other environmental agents are very common cases requiring hospital admission. While global incidence of poisoning is not known, it is estimated that up to half a million people die each year as a result of poisoning, due to pesticides and natural toxins.

A number of hospital-based retrospective studies in India have shown an increasing incidence of pesticide poisoning during the last decade.[2]

Organophosphates (OP), aluminum phosphide, over the counter pharmaceutical products and rodenticide are most often involved in such poisonings. Plant poisonings, snake envenomation and accidental kerosene poisoning in children are also common. Suicidal OP poisoning is estimated to kill around 200,000 people each year, largely in the Asia-Pacific region and the mortality rate varies from 10-20%. Poisoning is now the 4th leading cause of death in rural India. [3] Venomous snake bite is another common cause of morbidity and mortality especially in India. Most snakebite occurs in developing countries with temperate and tropical climates in which most populations live on agriculture and fishing. Recent estimates indicate that between 1.2 million and 5.5 million snakebites occur worldwide each year, with 421,000–1,841,000 envenomation and 20,000–94,000 deaths. [4]

Hence it is quite evident that poisoning is gradually taking a shape of social calamity especially in India. Our study aims to identify the incidence of poisoning in different population at risk in our society. We have to identify the people at risk and grow social awareness among them to protect them from the curse of poisoning. This requires strengthening of national capabilities for prevention, diagnosis and treatment of poisoning cases.

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**MATERIALS AND METHOD**

This was an observational cross sectional study conducted in the Department of General Medicine, Calcutta National Medical College & Hospital which is a tertiary care level hospital in Kolkata, West Bengal, India. Duration of study was six months from June, 2019 to November, 2019. Total 150 patients were included in the study. History was taken from patients, their family members or accompanying persons, proper physical examination and relevant investigations were done. Socioeconomic status was determined by modified Kuppaswamy scale.

**RESULT AND ANALYSIS**

Total 150 patients were included in the study. The mean age of patients was 28 years with majority of population belonged to age group of 20-29 years (39.3%) (Table 1). Female patients predominated in the study with 59% of the total study population. Study population was almost evenly distributed among rural and urban areas, with 50.67% belonged to rural area and 49.33% to urban area.

**Table 1** Age distribution of patients

Age group(years)	Number of patients	Percentage
<20	37	24.7
20-29	59	39.3
30-39	25	16.7
≥40	29	19.3
Total	150	100

Poisoning was mostly suicidal (82.17%) and more frequent in people of lower socioeconomic status (55.33%) (Table 2). A startling fact we found that most affected persons were students (32%), followed by homemakers (19.3%), farmers (12.7%), and unemployed (12%). Notably there were one doctor and one nurse also.

**Table 2** Distribution of socio-economic status of the study population (n=150)

Socio-economic status	Number	Percentage
Low	83	55.33
Middle	56	37.33
High	11	7.33
Total	150	100

When we tried to find out the cause of poisoning, we found that majority of poisoning was due to some social causes (45.3%); like- rebuked by parents, not allowing to get married to dear ones, quarrelling between family members etc. Economic cause (20%) was second most common cause; like-inability to pay off the loan, unable to buy some recreational objects like mobile phone, bike etc.

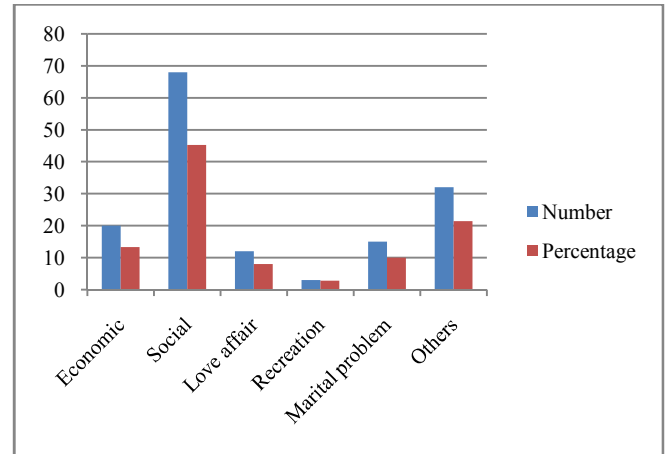
**Table 3** Occupation of the patients

Occupation	Number	Percentage
Farmer	19	12.7
Retired	3	2
Unemployed	18	12
Student	48	32
Office employee	6	4
Labourer	8	5.3
Homemaker	29	19.3
Others	19	12.7
Total	150	100

Among the poisoning compounds, pesticides (41.3%) were most commonly used. Out of them Organo-Phosphorus compounds (30%) were most common. Paraquat (5.3%) carbamates and cypermethrine were among other commonly

used pesticide compounds. Next was drug ingestion (16.7%) followed by corrosive ingestion (14%).

Snake bite comprised of 12.7% of all poisoning; neurotoxic being 6%, hematotoxic is 4% and rest was non-poisonous snakes. If we look at the source of poisoning compounds another astonishing finding was that patients got the poisons mostly from household substances (32.7%) followed by agricultural substances (30%).



**Fig 1** Causes of poisoning (n=150)

**Table 4** Types of poison

Types of poison	Number	Percentage
Pesticide	62	41.3
Corrosive	21	14
Volatile oil	9	6
Snake bite	19	12.7
Drugs	25	16.7
Copper sulphate	5	3.3
Others	9	6
Total	150	100

**DISCUSSION**

The trend of using poison is ever changing. In the past, common substances used were opium, arsenic, aconite, dhatura, yellow oleander etc. but due to rapid industrialization and use of pesticides during farming, organophosphorus group of poisons, many industrial materials, corrosive acids are now commonly used poison in India.[2]

Suicidal poisoning was more prevalent in young adult age-group. Recently the suicidal poisoning with pesticide has been steadily increasing in the young adult population. Kerosene (paraffin) was the commonest poison in children and plant poisons were also common [5]

In our study, the most vulnerable age group was 20-29 years. 39.3% of poisoning patients were from this group. In one study in AIIMS, highest incidence was in the range of 14-40 years [6]. Another study conducted by Tejas Prajapati *et al* in Ahmedabad, found that majority (45.08%) cases were among the age group of 21-30 years.[7] A study in Bangladesh found the similar results with most patients being in the age group of 20-30 years (46.3%).[8] Similar finding was noted in other studies also.[9,10] All these studies corroborate with our study. Female (57%) and married (52%) patients predominated in this study contrary to other studies conducted in All India Institute of Medical Sciences (AIIMS) and Gujarat, where most patients were males. In AIIMS, males were 57% [6] and in Gujarat 70.8% were males .[7] In Karnataka also, males predominated (75.4%) compared to females.[11,12] In Asian continent

female population are more vulnerable to commit suicide.[13] On the other hand there are other studies, which found married people predominating poisoning cases like our study.[7,11,12].

Majority of cases belonged to low socio-economic status (55.33%). This is supported by many other studies. [6,7,11] Rural people were affected the most (52%). Singh *et al* in their study in Mangalore found that rural population was mostly affected by suicidal pesticide ingestion.[14] Many other studies in India also showed similar kind of results.[6,9,12,14] 82.7% cases were found to be suicidal in this study, few were accidental (17.3%) corroborating with other studies. Many other studies had similar outcome. Suicidal poisoning predominate in adult population, whereas in children <5yr of age accidental poisoning are more.[5,12,14]

Most of the study population were students (32%), followed by homemakers (19.3%), farmer (12.7%), and unemployed (12%). Notably there were one doctor and one nurse also. One study in Aurangabad showed that farmers and other agricultural worker were most affected, followed by homemakers.[12] In Karnataka, manual labourers were mostly affected, followed by homemakers and students.[11]

In our study, pesticides (41.3%) were the most commonly used poison. Out of them Organo-phosphorus compounds (30%) were most common. It is also in consonance with some other studies. [7,14,15] Among other pesticides; Paraquat (5.3%) carbamates and cypermethrin compounds predominate. Paraquat is one of the commonly used herbicide in agriculture, also one of the most toxic compounds available.[16,17] Different types of drug ingestion (16.7%) were also common, mostly due to suicidal intent. Drugs include; sedatives (8%), anti-depressant, levothyroxine, beta-blocker, amlodipine, phenytoin and others. Corrosive ingestion (14%) was 3rd leading material of poisoning in our study. It includes muriatic acid, acetic acid, and phenyl. Snake bite was responsible for 12.7% of all poisoning; neurotoxic snake bite being 6%, hematotoxic snake bite 4% and rest was non-poisonous snake bites. This finding was contrary to some other studies in different parts of India.[18-20] In all those studies, there were preponderance of hematotoxic snake bite, while some other studies favour our findings.[21] 3.3% of cases were due to copper sulphate ingestion. This substrate is a common cause of poisoning especially in Indian subcontinent.[21,22] Few cases of poisoning by dhatura fruit, yellow oleander seeds and methanol were also found in our study.

## CONCLUSION

List of poison is a never ending one but the most horrified picture is that the most vulnerable age group is 3<sup>rd</sup> decade, the prime of youth. We all should think about it and pay due attention to our family to avert this threat of poisoning in this world of rat race where coping up with the changing life style is becoming difficult especially for the vulnerable.

## References

1. Dr. K. S. Narayan Reddy; Textbook of Forensic and State medicine & Toxicology; 7th edition, Kurnool, AP, K. Sulagna Devi, 1983, chapter 24, General Consideration of Toxicology
2. Dr. N. J. Modi; Textbook of Medical Jurisprudence and Toxicology; 20th edition, Bombay; N.M. tripathy Pvt Ltd, 1977, chapter 21; Poisons and their Medico-Legal aspects
3. Narinder pal Singh, Gurleen Kaur; API Textbook of Medicine; 10<sup>th</sup> edition; vol 2, part 26; Poisoning: Basic considerations and epidemiology
4. Mark B. Mycyk, Poisoning and Drug Overdose, Dennis L. Casper, Stephen L Hauser, J Larry Jameson, Anthony S. Fauci, Joseph Loscalzo, Dan L. Longo; , Harrison's Principles of Internal Medicine; 19th edition; new delhi, McGraw Hill Education, 2015
5. Thomas M. Anandam.S, Kuruvilla PJ; Profile of Hospital Admission in a Major teaching Institute of South India following Acute poisoning; adverse drug reation toxicology rev-2000, 19;313-319
6. Srivastava A. et al; an Epidemiological study of poisoning incidence reported in national poison information centre, All Indain Institute of Medical Sciences, New Delhi; hum exp toxicology,2005, june-24(6).279-285
7. Tejas Prajapati, Kartik Prajapati, R.N.Tandon, Saumil Merchant; A study of Acute Poisoning Cases Excluding Animal Bites at Civil Hospital, Ahmedabad; J Indian Acad Forensic Med. April-June 2013, Vol. 35, No. 2
8. Khan NA, Rahman A, Sumon SM, Haque MF, Hasan I, Sutradhar SR, Barman TK, Rahman S, Ferdous J, Miah AH, Alam MK, Debnath CR, Islam MZ, Miah OF; Pattern of poisoning in a tertiary level hospital; Mymensingh Med J. 2013 Apr;22(2):241-7
9. Rathod S. N., (2000) "Study of acute poisoning cases admitted at Govt. Medical College and Hospital, Aurangabad
10. Subash Vijaya Kumar, B. Venkateswarlu, M. Sasikala, and G. Vijay Kumar; A study on poisoning cases in a tertiary care hospital; J Nat Sci Biol Med. 2010 Jul-Dec; 1(1): 35-39
11. Ramesha KN, Rao KB, Kumar GS ; Pattern and outcome of acute poisoning cases in a tertiary care hospital in Karnataka, India;. Indian J Crit Care Med. 2009 Jul-Sep;13(3):152-5.
12. Navinkumar M. Varma, S.D.Kalele; J Indian Acad Forensic Med. October- December 2011, Vol. 33, No. 4 ISSN 0971-0973,313; Study of Profile of Deaths due to Poisoning in Bhavnagar Region
13. Canetto SS; Women and suicidal behaviour: a cultural analysis.; Am J Orthopsychiatry. 2008 Apr;78(2):259-66
14. Singh, B. Unnikrishnan; A profile of acute poisoning at Mangalore (south India); Journal of Clinical Forensic Medicine, Vol.13 (3), Pg 112.
15. Kavya S.T, Srinivas V, Chandana, Madhumati R. Clinical Profile of Patients with Organophosphorus poisoning in an intensive care unit in a tertiary hospital. International Journal of Clinical cases and investigations 2012 Vol 4 (issue 3), 24:31.
16. Kanchan T, Bakkannavar SM, Acharya PR; Paraquat Poisoning: Analysis of an Uncommon Cause of Fatal Poisoning from Manipal, South India; Toxicol Int. 2015 Jan-Apr;22(1):30-4.
17. Kavitha Saravu, Sonal Sekhar, Ananth Pai, Ananthakrishna Shastry Barkur, V. Rajeshand Jagadeswara Rao Earla; Paraquat - A deadly poison: Report of a case and review; Indian J Crit Care Med. 2013 May-Jun; 17(3): 182-184.

18. Gaurav Bhalla, Dhanesh Mhaskar, and Anubhav Agarwal; A Study of Clinical Profile of Snake Bite at a Tertiary Care Centre; *Toxicol Int.* 2014 May-Aug; 21(2): 203–208; doi: 10.4103/ 0971-6580. 139811 PMID: PMC4170564
19. Kshirsagar VY, Ahmed M, Colaco SM; Clinical profile of snake bite in children in rural India; *Iran J Pediatr.* 2013 Dec;23(6):632-6
20. B.R.H. *et al*; A study on the clinico-epidemiological profile and the outcome of snake bite victims in a tertiary care centre in southern India; *J Clin Diagn Res.* 2013 Jan;7(1):122-6. doi: 10.7860/JCDR/2012/4842. 2685. Epub 2012 Sep 14
21. Bhattacharya P, Chakraborty A. Neurotoxic snake bite with respiratory failure. *Indian J Crit Care Med* 2007;11:161-4
22. Champika SSK Gamakaranage *et al*; Complications and management of acute copper sulphate poisoning; a case discussion; *J Occup Med Toxicol.* 2011; 6: 34. 2011 Dec 19.

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