

Content available at: <https://www.ipinnovative.com/open-access-journals>

Indian Journal of Forensic and Community Medicine

Journal homepage: <https://www.ijfcm.org/>

Original Research Article

Socio-demographic characteristics of poisoning cases admitted in a tertiary care level hospital of Amravati district of Maharashtra, India

Ajay Jawarkar¹, Vinod Wasnik^{1,*}, Himani Rathod¹, Manisha Chavan¹¹Dept. of Community Medicine, Dr. Panjabrao Deshmukh Memorial Medical College, Amravati, Maharashtra, India

ARTICLE INFO

Article history:

Received 24-06-2022

Accepted 07-07-2022

Available online 29-09-2022

Keywords:

Poisoning

Rural

Urban

Farmers

ABSTRACT

Introduction: Poisoning is an important health hazard and one of the leading causes of mortality and morbidity worldwide. The incidence of poisoning cases is increasing steadily with each passing year. Burden of poisoning is high but less authentic data is available on it as hospital records, population surveys and data registered by governmental authorities. With this background, present study is conducted to determine various socio-demographic factors responsible for poisoning in patients.

Material and Methods: It was an observational study, carried out in District Civil Hospital. All patients admitted with history of poisoning or suspected poisoning in District Civil Hospital who attended in casualty, ICU and ward during study period were included in study. Written informed consent was taken from the cases or relatives. Information was collected from his/her accompanying family members if condition of the case was found to be unfavorable to respond to questions.

Results: Majority of the cases were in the age group of 15-44 years (81.52%), Majority of poisoning cases 60.23% were married. The commonest poison to which cases were exposed was an organophosphorus compound which was seen in 61.36% cases. The most common cause for consuming poison was found to be domestic 324 (45.70%).

Conclusion: Present study showed that poisoning was commonly seen in the working age group. Males consumed/exposed to poison more as compared to females. Married males were affected more. Most commonly consumed/exposed poison was organophosphorus compounds.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

Poisoning is an important health hazard and one of the leading causes of mortality and morbidity worldwide.¹ The incidence of poisoning cases is increasing steadily with each passing year and spreading like a wild fire due to rapid development in science and technology and vast growth in the industrial and agricultural sectors.² "Any poisonous substance", as per Sec. 284 of the Indian Penal Code, is that substance, which, if taken, will endanger human life or likely to cause hurt injury to any person. Law takes into cognizance mainly the intention of the person 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 legislations 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.).³

The common poisons used for suicidal purpose are: potassium cyanide, hydrocyanic acid, opium, barbiturates, organophosphorus compounds and oleander. The poisons used for homicidal purpose are: arsenic, antimony, aconite, thallium, organophosphorus compounds, oleander, strychnine, powdered glass, rarely insulin and other drug

* Corresponding author.

E-mail address: wasnikv78@gmail.com (V. Wasnik).

and very rarely culture of germs causing disease. Accidental poisoning commonly takes place as a result of carelessness in storing poisonous and non-poisonous material together.

Organophosphorus (OP) compounds can produce significant pesticide related illnesses and death in developing countries, like India. The poisoning may be suicidal, accidental or homicidal. Accidental organophosphorus poisoning may occur through inhalation while spraying pesticides on crops.⁴

Acute poisoning is exposure to a poison on one occasion or during a short period of time. The exposure may be ingestion, inhalation, dermal or ophthalmic contact and parenteral injection. It is considered a real global health problem and is a frequent reason for admission to the hospital.⁵ According to WHO, in the year 2012 an estimated 1, 93,460 people died worldwide from unintentional poisoning.⁶ Poisoning is the fourth most common cause of death in India. It has been estimated that, five to six persons per lakh of population die due to acute poisoning every year.⁷

As agriculture is the main occupation in developing countries. Hundreds of organophosphates are currently available for use as pesticides. Self-poisoning with organophosphorus (OP) compounds is a major global problem associated with thousands of deaths every year.⁸

Organophosphorus compounds are the commonest cause of poisoning accounting for over 60% in Northern and Southern Indian states due to its easy availability as their overwhelming use pesticide in agriculture field.⁹ In some region the economy in rural areas is agriculture based where all kinds of pesticides are easily available.¹⁰

According to data available from National Poison Information Centre India, suicidal poisoning with household agents (Organophosphorus, carbamates, pyrethrinoids, organochlorine, zinc phosphide, carbolic acid etc.) are the most common modality of poisoning.¹¹

Burden of poisoning is high but less authentic data is available on it as hospital records, population surveys and data registered by governmental authorities are used in order to estimate the frequency of pesticides poisoning. With this background, present study is conducted to determine various socioepidemiological factors responsible for poisoning in patients admitted to District General Hospital.

2. Objectives

1. To study the sociodemographic factors related to poisoning.
2. To study various reasons of poisoning.
3. To suggest the recommendation based on study findings.

3. Materials and Methods

3.1. Study design

It was an observational study.

3.2. Study area

Study was carried out in District General Hospital.

3.3. Study participants

All patients admitted with history of poisoning or suspected poisoning in District General Hospital were attended in casualty, ICU and ward during study period.

3.4. Study duration

Study was carried out for a period of 1 year during 1st January 2015 to 31st December 2015.

3.5. Inclusion criteria

All cases of poisoning or suspected poisoning admitted in District General Hospital.

3.6. Exclusion criteria

1. Infective food poisoning
2. Insect/snake bite
3. Alcohol/opium intoxication
4. Patient or patient's relatives not willing to give consent
5. Patients who had absconded and LAMA from hospital
6. Patients brought dead to hospital

3.7. Data collection and processing

Written permission was taken from civil surgeon of District Hospital to conduct the study. Data for 709 poisoning cases was recorded during the period of 1 year between 1st January 2015 and 31st December 2015 at District General Hospital. Written informed consent was taken from the patients or relatives. Also informed consent from the heads of the institutions and assent from the selected adolescents was obtained, before initiation of the study in the respective Institutions.

Data was collected by conducting bed side interview of the patients. Information was collected from his/her accompanying family members if condition of the patient was found to be unfavorable to respond to questions.

A predesigned and pretested questionnaire was used for enrolment of all poisoning patients. Information about name, age, sex, occupation, date and time of admission, condition of patient, clinical presentation, identification of type of poisoning, treatment protocol in first aid and management were recorded.

Clinical findings were noted, and examination of container, if available, was done and quantity of poison was

recorded. Patients and the relatives were advised to seek hospital assistance after discharge, if any danger signs or symptoms occur.

3.8. Statistical methods

Data entry and statistical analysis were performed using the Statistical Package of Social Sciences (SPSS) windows version 16.0 software. Mean, Standard Deviation, Proportion and Chi-square test were used to analyze data.

4. Results

Majority of the cases were in the age group of 15-44 years (81.52%), followed by the age group 45-64 years (11.99%), age group < 14 years (4.09%) and more than 64 years (2.40%). It was found that the most commonly affected group was working age group i.e. 15-44 years (81.52%). Males were (64.03%) outnumbered females (35.97%). In present study it was found that males consumed or were exposed to poison were more (64.03%) as compared to females (35.97%). Majority of poisoning cases 60.23% were married where as 34.69% were unmarried, 0.28% was divorcee and 0.71% were widow or widower. The majority of poisoning cases belonged to Hindu religion 70.10% followed by Buddhist i.e. 23.55% and Muslims were 6.35%. (Table 1)

The highest number of cases were unskilled workers (39.49%) followed by farmers (30.04%), students (14.67%), housewives (7.19%) and children less than four years (2.26%) (Table 2).

According to Modified BG Prasad's Socioeconomic status classification, majority of the cases belonged to lower class 355 (50.07%), followed by upper lower socioeconomic class 309 (43.58%) which shows that as the socioeconomic status increases, number of poisoning cases decreases. (Table 3) The commonest poison to which victims were exposed was organophosphorus compounds which was seen in 435 (61.36%) cases, followed by zinc phosphide 146 (20.59%), organochlorine 48 (6.77%), kerosene 17 (2.40%) and carbolic acid 15 (2.12%) respectively. (Table 4) The most common cause for consuming poison was found to be domestic 324 (45.70%) followed by financial 137 (19.32%), failure in love 101 (14.25%), accidental exposure/consumption 73 (10.30%), examination phobia 31 (4.37%), unspecified 35 (4.94%) and others 8 (1.12%). (Table 5)

Financial reason of poisoning was more common amongst males (26.65%) as compared to females (6.27%). Females (17.27%) consumed poisoning for failure in love as compared to males (12.56%). Accidental poisoning was seen more commonly in males (12.23%). Exam phobia was common amongst females (9.02%) as compared to males (1.76%). This difference was found to be statistically highly significant ($p < 0.001$). (Table 6)

Table 1: Distribution of poisoning cases according to Sociodemographic factors

Sociodemographic factors	Number of cases n-709	Percentage
Age (Years)		
1	6	0.85
1-4	10	1.41
5-14	13	1.83
15-44	578	81.52
45-64	85	11.99
>64	17	2.40
Gender		
Male	454	64.03
Female	255	35.97
Marital Status		
Married	427	60.23
Unmarried	246	34.69
Divorcee	02	0.28
Widow/widower	05	0.71
Not applicable	29	4.09
Religion		
Hindu	497	70.10
Buddhist	167	23.55
Muslim	45	6.35

Table 2: Occupation wise distribution of poisoning cases

Occupation	Number of cases	Percentage
Unskilled workers	280	39.49
Farmers	213	30.04
Students	104	14.67
Housewives	51	7.19
Professionals	23	3.24
Semiskilled workers	14	1.98
Skilled workers	08	1.13
*Not applicable	16	2.26
Total	709	100

Table 3: Socioeconomic status of poisoning cases

Socioeconomic status	Number of cases	Percentage
I (upper)	11	1.55
II (upper middle)	10	1.41
III (lower middle)	24	3.39
IV (upper lower)	309	43.58
V (lower)	355	50.07
Total	709	100

Table 4: Type of substance responsible for poisoning

S.No	Type of substance responsible for poisoning	Number of cases	Percentage
1.	Drug	22	3.10
2.	Non drug		
2.1	Organophosphorus compounds	435	61.36
2.2	Zinc phosphide	146	20.59
2.3	Organochlorine compounds	48	6.77
2.4	Kerosene	17	2.40
2.5	Carbolic acid	15	2.12
3	Unspecified	14	1.97
4	Others	12	1.69
	Total	709	100

Table 5: Distribution of cases according to reason of poisoning stated by victims or their relatives

Reason of poisoning	Number of cases	Percentage
Domestic	324	45.70
Financial	137	19.32
Failure in love	101	14.25
Accidental	73	10.30
Exam phobia	31	4.37
Unspecified	35	4.94
Other	08	1.12
Total	709	100

Table 6: Sex wise distribution of cases according to reasons stated for poisoning

Reason of poisoning	Male	Female	Total
Domestic	184(40.53)	140(54.90)	324(45.69)
Financial	121(26.65)	16(6.27)	137(19.33)
Failure in love	57(12.56)	44(17.25)	101(14.25)
Accidental	56(12.33)	17(6.67)	73(10.30)
Examination phobia	08(1.76)	23(9.02)	31(4.37)
Unspecified/other	28(6.17)	15(5.88)	43(6.06)
Total	454(100)	255(100)	709(100)

Chi square =69.79 df =5 p=0.00001

5. Discussion

Poisoning is an important public health problem in our country. It was found that the most commonly affected group was working age group 15-44 years (81.52%). Study conducted by Somasundaram et al,¹² showed that 81.54% cases of poisoning were seen in the age group of 16-45 years. Kharat RD et al,¹³ showed majority of cases in the age group of 11-40 years 91.94%. The males consumed or were exposed to poison more (64.03%) as compared to females (35.97%). Similar findings were seen in studies

done by Rajanandh MG et al,¹⁴ Male: 63% Female: 37% and Maharani B et al,¹⁵ Male: 61.33% Female: 38.67%.

The present study showed that 60.23% victims were married, Similar findings were reported by Gupta BD et al,¹⁶ where 57.6% victims were married and 42.6% victims were unmarried.. Other study done by Dash SK et al,¹⁷ it was observed that 67% were married and 33% were unmarried cases. The majority of poisoning cases were observed in Hindus (70.10%) followed by Buddhists (23.55%) and Muslims (6.35%). In study reported by Koulapur V et al¹⁸ showed 90.20% and 89% cases of Hindu religion.

The highest numbers of cases were unskilled workers (39.49%). Study conducted by Parmar P et al,¹⁹ it was found that laborers (46.71%) were affected more followed by service class (16.05%), housewives (10.21%) and students (7.29%). This may be because of unemployment, financial constraints, crop failure and easy availability of harmful compounds and handling them without protective devices is more amongst this group.

In the present study the majority of the cases belonged to upper lower class 58.67%, study done by Sharma Y et al²⁰ showed that the lower class 58.76%.

The commonest poison to which victims were exposed was organophosphorus compounds (61.35%). The study by Gupta R et al²¹ found that most common type of poisoning was organophosphorus compound, contributing to almost one fourth of the total cases (23.2%). Easy availability of poisonous substances without any restriction in market, low cost, indiscriminate handling, poor storage facilities and lack of knowledge about the serious consequences, first aid after exposure and antidote for poison are the contributing factors for exposure to those poisons.

In our study most common reason for consuming poison was domestic cause (45.70%). In study conducted by Parmar P et al,¹⁹ it was noted that most common reason for poisoning was domestic cause (37.22%). Domestic cause of poisoning is the commonest reason for poisoning seen in above studies. This may be due to stress and strain in day to day life, family disputes, quarrels, unemployment, humiliations from spouse, burden of household liabilities etc.

The commonest reasons stated for poisoning in males were 1) domestic 2) financial 3) failure in love 4) accidental 5) examination phobia 6) unspecified and other. Commonest reason stated on poisoning in females were 1) domestic 2) failure in love 3) examination phobia 4) accidental 5) financial 6) unspecified and other. Domestic reason of poisoning was more common amongst females (54.90%) as compared to males (40.53%). Financial reason of poisoning was more common amongst males (26.65%) as compared to females (6.27%). Females (17.27%) consumed poisoning for failure in love as compared to males (12.56%). Accidental poisoning was seen more commonly in males

(12.23%). Exam phobia was common amongst females (9.02%) as compared to males (1.76%). This difference was found to be statistically highly significant ($p < 0.001$) (Table 6)

6. Conclusion

1. Our study showed that poisoning was commonly seen in the working age group 15-44 years. Male population consumed/exposed to poison more as compared to females.
2. Married males were affected more as compared to married females whereas unmarried females, divorcee females and widow were commonly affected than males.
3. Most commonly consumed/exposed poison was organophosphorus compounds and then zinc phosphide. It was responsible for suicidal death in majority of the cases.
4. Overall, domestic cause was the most common reason stated for poisoning. Females consumed poison because of domestic reasons whereas males consumed poison more because of financial reasons.

7. Recommendations

1. Newer concepts of organic farming and natural garden pest control can be implemented to avoid use of organophosphorus compounds.
2. Primary health centre should be upgraded to provide immediate effective treatment to poisoning as most of the cases are referred to district hospital but poisoning is common in rural area and medical and paramedical staff should be given training.
3. Safety and precautionary camp should be taken by the insecticide manufacturer or agricultural department as part of outreach education to farmers.
4. Further research is needed to introduce safer pesticides or organic pesticide with minimal harm to the humans.

8. Ethical Approval

The study protocol was submitted to the Institutional Ethical Committee and clearance was obtained. Written informed consent from the heads of the institutions and assent from the selected adolescents was also obtained, before initiation of the study in the respective Institutions.

9. Source of Funding

None.

10. Conflicts of Interest

There does not exist any conflict of interest what so ever.

11. Author Contribution

Conception and design, acquisition of data done by Dr. Manisha Chavan & Dr. Himani Rathod. Analysis and interpretation of data and drafting the article done by Dr. Vinod Wasnik & revising it critically for important intellectual content has been done by the author Dr. Ajay Jawarkar.

12. Acknowledgement

The Civil surgeon of civil hospital is thankfully acknowledged for his permission to carry out research in district civil hospital. Our thanks go to Staff of civil hospital for their continuous support. Also our appreciation is extended to respected Dean of Dr. Panjabrao Deshmukh Medical College and Management for giving us permission to carry out study. Also we are sincerely indebted to all the participants who made this study possible.

References

1. Kanchan T, Menezes RG. Suicidal poisoning in Southern India: gender differences. *J Forensic Leg Med.* 2008;15(1):7–14.
2. Varma NM, Kalele SD. Study of profile of death due to poisoning in Bhavanagar region. *J Indian Acad Forensic Med.* 2011;33(4):313–8.
3. Harish D, Sharma B, Chavali K, Sharma A. Poisoning mortality in Chandigarh: An overview. *J Indian Acad Forensic Med.* 2006;28(3):971–73.
4. Kora S, Doddamani G, Halagali G, Vijayamahantesh S, Boke U. Sociodemographic profile of the organophosphorus poisoning cases in southern India. *J Clin Diagn Res.* 2011;5(5):953–56.
5. Jesslin J, Adepu R, Churi S. Assessment of prevalence and mortality incidences due to poisoning in a south Indian tertiary care teaching hospital. *Indian J Pharm Sci.* 2010;72(5):587–91.
6. Interorganization programme for the sound management of chemicals. Poisoning prevention and management: International programme on chemical safety. Geneva: World health organization; 2001.
7. Raghu K, Shreevani P, Kumar SS, Gopal S, Shaik MV, Ahammed B. Incidence and outcome of poisoning patients in tertiary care technical hospital. *Asian J Pharmacol Toxicol.* 2015;03(07):23–6.
8. Hundekari IA, Surykar AN, Dongre NN, Rathi DB. Acute poisoning with organophosphorus pesticide. *J Krishna Inst Med Sci Univ.* 2012;1(1):38–47.
9. Chendake MB, Mohote VR. Study of organophosphorus compound poisoning in hospitalized subjects. *Indian J Sci Res.* 2013;4(2):49–59.
10. Gedam AD, Bhandarkar MR, Chutake NL. Reported poisoning cases profile in Vidharbha region. *World J Pharm Pharm Sci.* 2015;4(7):761–6.
11. Banerjee I, Tripathi SK, Roy AS. Clinico-epidemiological characteristics of patients presenting with organophosphorus poisoning. *N Am J Med Sci Mar.* 2012;4(3):147–50.
12. Somasundaram KV, Patil A, Sukla SK. Epidemiological profile of OP poisoning cases treated at pravara hospital. *Indian J Prev Soc Med.* 2009;40(3):185–8.
13. Kharat RD, Chaudhary VA. Study of profile of pesticide poisoning cases in a tertiary care hospital, Mumbai, India. *J Med Chem Drug Discov.* 2015;1:1–12.
14. Rajanandh G, Santosh S. Retrospective assessment of poisoning cases in multispecialty hospital in Tamilnadu. *J Pharmacol Toxicol.* 2014;9(2):105–9.
15. Maharani B, Vijayakumari N. Profile of poisoning cases in a tertiary care hospital. *Int J Pharm Sci.* 2013;3(01):91–4.
16. Gupta BD, Vaghela PC. Profile of fatal poisoning in and around Jamnagar. *J Indian Acad Forensic Med.* 2005;27(3):91–3.

17. Dash SK, Raju AS, Mohanti MK, Patnaik KK, Mohanti S. Sociodemographic profile of poisoning cases. *J Indian Acad Forensic Med.* 2005;27(3):971–3.
18. Koulapur V, Pujar S, Honnunar R, Jirli P, Patil S. Epidemiological profile of pesticide poisoning cases in Bijapur Karnataka in Southwest India; a retrospective study. *Int J Med Toxicol Forensic Med.* 2015;5(4):180–4.
19. Parmar P, Rathod GB, Rathod S, Parikh A. Organophosphorus compound poisoning demographic profile in Gandhinagar, Gujarat. *J Forensic Toxicol Pharmacol.* 2014;3(3):1–4.
20. Sharma Y, Singh R. Current trends of poisoning in Bikaner region. *Int Res Pub Med Sci.* 2016;2(1):395–9.
21. Gupta R, Baghel PK, Gupta H, Jain MK, Khadanga S, Tagore PK, et al. Changing epidemiology of poisoning in central India: shifting poles from male farmers to young house wives. *Int J Med Res Rev.* 2016;4(4):575–81.

Author biography

Ajay Jawarkar, Professor & Head

Vinod Wasnik, Professor

Himani Rathod, Assistant Professor

Manisha Chavan, Junior Resident

Cite this article: Jawarkar A, Wasnik V, Rathod H, Chavan M. Socio-demographic characteristics of poisoning cases admitted in a tertiary care level hospital of Amravati district of Maharashtra, India. *Indian J Forensic Community Med* 2022;9(3):102-107.