ORIGINAL RESEARCH

Sociodemographic Profile and Outcome of the Acute Poisoning Adult Patients admitted to a Tertiary Care Hospital of Northern India

Anjali Sharma[1], Sukhpal Kaur[2]

Received on: 08 June 2022; *Accepted on:* 10 August 2022; *Published on:* xxxx

Abstract

Background: Poisoning is one of the most common medicolegal problems in India. It is the second most important cause of suicide, followed by hanging in India.

Aims and objectives: The current study is designed to determine the sociodemographic profile of the poisoning patients and their outcomes at a tertiary care hospital in Northern India.

Materials and methods: All the acute poisoning patients considering inclusion and exclusion criteria, were admitted to the medicine emergency of a tertiary care hospital during the period of June–November 2019 and were enrolled after prior permission from the Institute Ethics Committee. A structured pro forma was filled regarding the patient's demographic information, incidence of poisoning, cause and type of poisoning, clinical presentation of patients, duration of respiratory support, intensive care unit (ICU) stay, hospital stay, and final outcomes. Descriptive statistics were used to analyze the data.

Results: Maximum cases were observed in the age group of 21–30 (33.87%). The incidence of poison consumption was marginally higher in females (51.6%). Unemployed (22.6%), housewives (19.4%), and students (17.7%) were the distribution as per occupation. The majority (90.3%) of the patients in all the groups ingested poison with the intent to suicide. Overall, there was 61% pesticide poisoning. The highest mortality (38%) was seen amongst the patients with aluminum phosphide poisoning.

Conclusion: Pesticides were the major cause of poisoning in the Northern region. Based on these findings' preventive measures like rationed supply and restricted sale of poisonous agents, improvement of legislature, and provision of license to the sale persons is the need for the hour.

Keywords: Acute poisoning, Outcomes, Sociodemographic profile.

Journal of Postgraduate Medicine, Education and Research (2022): 10.5005/jp-journals-10028-1598

Introduction

Unnatural deaths following poisoning are not uncommon, and it carries the burden of high mortality and morbidity. It is a worldwide problem, affecting people of all age groups, both genders from all economic and ethnic groups. Poisoning results in approximately 7 lakh deaths annually. About 345,000 deaths occur from unintentional poisoning and >370,000 from suicidal causes.[1] National Crime Record Bureau of India reported that poisoning as a means to commit suicide was seen in 26% of cases.[2] The trends related to the incidence and type of poisoning have changed remarkably in the last 30–40 years. Suicide by consumption of pesticides in the year 2012–2014 was 14.7, 14.4, and 10.9%, respectively, and a higher number of deaths due to suicide were reported in the states of Tamil Nadu, West Bengal, Andhra Pradesh, Maharashtra, and Karnataka which together accounted for 56.2% of total suicides.[2] In the North region since 1982, aluminum phosphide is the most commonly seen poisoning in Haryana and organophosphosphorus (OPC) poisoning in Punjab.[3] In developed countries, the mortality rate due to poisoning is only 1–2%, while it accounts for 15–30% in developing countries like India.[1] However, in India, the exact incidence cannot be estimated as there is an under-reporting of cases of poisoning and also due to a lack of research in this area. So present study was designed to determine the various parameters of poisoning such as the type of poison consumed in the Northern region, vulnerable age group, gender and occupation, relationships between lag period, and outcome of patients. Efforts are made to broach certain remedial measures ahead to curb the jeopardy.

[1]Department of Nursing, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

[2]National Institute of Nursing Education (NINE), Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

Corresponding Author: Sukhpal Kaur, National Institute of Nursing Education (NINE), Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India, Phone: +91 9988675508, e-mail: drsukhpalkaur@gmail.com

How to cite this article: Sharma A, Kaur S. Sociodemographic Profile and Outcome of the Acute Poisoning Adult Patients Admitted to a Tertiary Care Hospital of Northern India. J Postgrad Med Edu Res 2022;xx(xx):1–5.

Source of support: Nil

Conflict of interest: None

Materials and Methods

The study was conducted on patients with acute poison ingestion, admitted to the medicine emergency of a tertiary care teaching hospital in the Northern region of India during the period of June–

November 2019. A total of 62 patients who met the inclusion and exclusion criteria were enrolled.

Inclusion Criteria

Patients of acute poison ingestion with age >12 years; admitted within 6 hours of poison consumption; patients/attendants willing to participate.

Exclusion Criteria

Patients with Corrosive and Hydrocarbon Poisoning

The study was approved by the Institute Ethics Committee. Written informed consent was obtained from all the patients or their legal representatives before enrolment into the study. Data was collected through structured pro forma, which was further divided into two parts; part A included the sociodemographic parameters of the patients, and part B was regarding the clinical profile of the patients related to poisoning. Data was also collected related to the final outcome, duration of respiratory support, ICU, and hospital stay. Statistical Package for the Social Sciences version 23.0 was used for data analysis.

Table 1: Sociodemographic profile of the study participants. N = 62

Variables	*f (%)*
Age groups (years)	
14–20	20 (32.2)
21–30	21 (33.9)
31–40	12 (19.3)
41–50	5 (08.1)
>50	4 (06.5)
Gender	
Male	30 (48.4)
Female	32 (51.6)
Residential distribution	
Punjab	28 (45.2)
Haryana	14 (22.6)
Himachal Pradesh	14 (22.6
Chandigarh	6 (9.7)
Religion	
Hindu	43 (69.4)
Sikh	19 (30.6)
Education	
Uneducated	11 (17.7)
Primary	12 (19.4)
Secondary	14 (22.6)
Senior secondary	18 (29.0)
Graduate and above	7 (11.3)
Occupation	
Student	11 (17.7)
Private Job	6 (9.7)
Self-employed	5 (8.1)
House wife	12 (19.4)
Unemployed	14 (22.6)
Farmer	3 (4.8)
Laborer	11 (17.7)
Marital status	
Married	30 (48.4)
Unmarried	32 (51.6)

Age (years): mean ± standard deviation (SD) (range) 28.2 ± 11.2 (14–62)

Results

Table 1 depicts that with respect to gender distribution, females (51.6%) outnumbered males (48.4%). Most of the cases were from Punjab (45.2%), and the majority were Hindu (67.7%) by religion. As per occupation, the majority of the patients were unemployed (22.6%). Unmarried (51.6%) were more affected. Maximum patients were in between the age group of 21 and 30 (33.87%), followed by 14–20 (32.25%).

Intentional (suicidal) poisoning accounted for 90.3%. The majority consumed insecticide poison (54.8%). Among all pesticides, OPC (44%) was the poison of choice. The main reason for the consumption of poison amongst the patients was family disputes (37%) related to poor financial conditions, extramarital affairs, and marital disharmony. Five (8.1%) patients had known underlying psychiatric illness and were on medications for depression and psychotic illness, and 15 (24.2%) indulged in alcohol and multiple substance abuse such as opioids (bhuki, heroin, and smack), cannabis, and nicotine (Table 2).

Table 3 depicts that the lag period between incidence and hospital presentation ranged from 9 to 344 minutes (177 ± 104). Only 11 (17.8%) patients reached tertiary care hospitals within the first hour of poison ingestion (golden hour). It was found that the

Table 2: Type of poison consumed by the study participants. N = 62

S. no.	*Scientific names of poisons consumed by the study participants*	*n (%)*
A	Pesticides	**34 (54.8%)**
1.	2,4-Diethyl ester	1 (1.6%)
2.	2,4-Dichlorophenoxyacetic acid	1 (1.6%)
3.	Carbamate	2 (3.2%)
4.	Chlorpyripos ethyl	04 (06.4%)
5.	Citronella grass	1 (1.6%)
6.	Cypermethrin 10%	7 (11.2%)
7.	Dichlorvos	9 (14.4%)
8.	Glyphosate	1 (1.6%)
9.	Imidacloprid	1 (1.6%)
10.	N, N′-dimethyl-4,4′-bipyridinium dichloride	1 (1.6%)
11.	Phorate or phorolik granules	5 (8.0%)
12.	Triazophos 35% + deltamethrin	1 (1.6%)
B	Herbicides	**2 (3.2%)**
13.	Amitraz	2(3.2%)
C	Rodenticides	**21 (33.8%)**
14.	Aluminum phosphide	19 (30.4%)
15.	Zinc phosphide	2 (3.2%)
D	Unknown substance	**5 (08.0%)**

Table 3: Lag period between ingestion of poison and hospital presentation compared with outcomes. N = 62

Lag period (in hours)	*Number of patients f (%)*	*Expired f (%)*	*Discharged f (%)*
0–1	11 (17.8%)	1 (09.1)	10 (90.9)
1–2	14 (22.6%)	2 (14.2)	12 (85.8)
2–3	8 (13%)	3 (37.5)	5 (62.5)
3–4	11 (17.8%)	6 (54.6)	5 (45.4)
>4	18 (29.4%)	1 (05.6)	17 (94.4)

Table 4: Duration of respiratory support, ICU stay, hospitalization, and final outcome as per the type of poison. N = 62

Type of poisoning (n)	*Duration of respiratory support (days) mean ± SD range*	*Duration of ICU stay (days) mean ± SD range*	*Duration of hospitalization (days) mean ± SD range*	*Discharged f (%)*	*Expired f (%)*
Herbicides (*n* = 2) (paraquat)	0.5 ± 0.7 0–1	0	1.50 ± 0.7 1–2	1 (50)	1 (50)
Insecticides (*n* = 34) (OPC, carbamates, and amitraz)	3.2 ± 5.1 0–25	2.7 ± 5.8 0–28	6.6 ± 7.1 1–36	30 (88.2)	4 (11.8)
Rodenticides (*n* = 21) (aluminum and zinc phosphide)	0.48 ± 1.1 0–5	0	2.7 ± 3.7 1–18	13 (62.0)	8 (38.0)
Unknown (*n* = 05)	2.8 ± 3.1 0–7	0	5.4 ± 3.8 2–11	5 (100)	0
Overall poisoning cases (*n* = 62)	2.2 ± 4.1 0–25	1.5 ± 4.5 0–28	5.0 ± 6.0 1–36	49 (79.1)	13 (20.9)

patients who reached within the golden hour of poison ingestion had a 91% survival rate.

In the current study poison of choice was insecticides in 54.9% of the patients. The study showed that the duration of respiratory support, ICU stay, and hospitalization was also more in patients with OPC poisoning, that is, 0–25 days (3.2 ± 5.1), 0–28 days (2.7 ± 5.8), and 1–36 days (6.6 ± 7.1), respectively in comparison to other types of poisoning as shown in Table 4. Herbicide poison was consumed by the two patients, out of which one patient died. Rodenticides accounted for 38% of the deaths. Five patients were categorized under unknown poisoning, and a 100% survival rate was seen amongst these patients without any need for ICU stay. Overall, 13 (21%) patients expired, including all kinds of poisoning. Though the incidence of poison ingestion or suicidal attempts was more in females (51.6%), but fatality (26.7%) was seen more among males.

Discussion

The huge freight of poisoning cases are emergencies in different parts of the country and are encountered annually. Not only in India but in the Asian region also, agrochemicals are the poison of choice. Amongst those chemicals, pesticides are the most commonly used for intentional poisoning due to their easy availability and low-cost in stressful situations. Previous studies have shown that incidence is more amongst Hindus as compared to other religions; patient presentation in the hospital mostly occurs at night; males, unmarried, unemployed, and farmers are more prone to poisoning. The current study was conducted to rule out any changes in the sociodemographic and clinical profile of the poisoning patients and its comparison with outcome variables.

In the present study, females (51.6%) slightly outnumbered males (48.4%). These findings were comparable to the findings of the study conducted by Gupta et al., in which females (58%) outnumbered males but contrary to the previous studies[4–17] conducted by Ravikumar[5], Kang et al.,[7] and Khosya and Meena[9] in which more incidence was found amongst the males. The reason for male predominance may be more exposure to stress, strain, and occupational hazards compared to females. In the present study reason for female dominance can be the availability of more female patients during the data collection, the increasing role of females in occupational activities, and decision-making. In the present study, the main reason for consuming poison was family disputes (37%) related to poor financial conditions, extramarital affairs, marital disharmony, adolescents scolded by parents or teachers because of poor performance in studies, refusal from the parents to fulfill the demands of children like buying a phone, etc., breakups, refusal of proposal from opposite gender which is in line with the other studies[5,13] in which the probable reasons for poison ingestion was increased occupational exposure, economic issues, family disturbances, and love failure. Reddy et al.[17] also stated that similar factors such as lower socioeconomic status, emotional disturbances, chronic diseases, distress due to loss of business, stress of examinations, unemployment, marital disharmony, and family problems could lead to poisoning.

In the present study majority of patients were unemployed (22.6%). It was followed by housewives (19.4%), students and laborers (17.7% each), and low socioeconomic conditions.[17] Similar results were found in the study conducted by Gupta et al.[14] that the exposure to poisoning was more in farmers (41.5%), housewives (31.2%), and students (18.8%). Another study by Gupta et al. reported[16] that a higher incidence of poisoning was found in people of lower socioeconomic class as they face more complex problems related to their employment. With respect to marital status, unmarried (51.6%) were more affected, and the results of the study were in line with the study conducted by Panda et al. [12] while contrary to the results noted by Gupta et al. [16] where married people outnumbered unmarried. Marital disharmony is probably the reason behind stress.

It was observed in the current study that 41 (66.12%) patients were from the age group of 14–30 years. These years of life undergo multiple stressors in the form of studies, career, marriage, childbearing, etc. Therefore, this group is considered to be more vulnerable to committing suicide, as found in multiple previous studies. A fall in the cases was seen as age progressed.[2,4,7–16] Similar findings were found in the different studies conducted by Kamath et al.,[4] Kang et al.,[7] Panda et al.,[12] etc.

Intentional poisoning to commit suicides accounted for 90.3% of the cases, which was also found in multiple studies worldwide.[17,18–22,24] The majority consumed insecticide poison (54.8%), and among all pesticides, OPC (44%) was the poison of choice because of its easy availability and low-cost, which is comparable to a number of previous studies.[2,4,7–16] The draft notification titled "Banning the Insecticides Order 2020," which prohibits the import, manufacture, sale, transport, and distribution

of 27 insecticides and pesticides, which are widely used in India, including chlorpyrifos, 2,4- Diethyl ester, atrazine, malathion, and others by 2020 was formed, but this order was opposed by the farmers and industrialists as these 27 chemicals give a total turnover of 12,000 crores annually.[23,24] Now, it is difficult to ban these chemicals completely, but there should be a provision of rationed supply, proof of the need of chemicals should be submitted, a license should be issued to shopkeepers and they should maintain proper records of sales, and supply to individuals >18 years of age.

In the current study, five (8.1%) patients had known underlying psychiatric illnesses and were on medications for depression and psychotic illnesses and 15 (24.2%) indulged in alcohol and multiple substance abuse, including opioids (bhuki, heroin, and smack), cannabis, nicotine, and amphetamines, they verbalized that they took poison under the influence of either alcohol or drugs. Gupta et al.[22] found depression as the second leading cause of suicide following family disputes. The major causes of depression were domestic problems and financial problems. Substance abuse, including alcohol, was a major cause of poisoning in the current study.

Lau[22] stated that the 1st hour of poison ingestion represents the "golden hour," and this is the best time to stabilize and treat potentially life-threatening poisoning. After 1 hour, the amount of poison removed from the body is decreased because of absorption in the gut mucosa and the entering of poison in the small bowel. Therefore, gastric lavage should be performed within the 1st hour, preferably. In the present study, only 11 (17.8%) patients reached tertiary care hospitals within the 1st hour of poison ingestion and had a 91% survival rate. Reddy et al.[18] also reported in their study that most of the patients with acute poison ingestion reached a tertiary care hospital after >1 hour. The reason behind this could be the unawareness of attendants related to poisoning, provision of first aid at home, or at peripheral health care centers in the form of salt water or antidotes. Comparative results were found in the study conducted by Kora et al.[10] that majority of the cases reached the hospital within 3–6 hours (37.16%), with a mean time interval of 4.27 hours. Panda et al.[12] reported that maximum patients were completely cured when the lag period was within 4 hours.

In the present study, duration of respiratory support, ICU stay, and hospitalization was more in patients with OPC poisoning, that is, 0–25 days (3.2 ± 5.1), 0–28 days (2.7 ± 5.8), and 1–36 days (6.6 ± 7.1), respectively in comparison to other types of poisoning such as in herbicides it was 0–1 day (0.5 ± 0.7), no ICU stay and duration of hospital stay was 1–2 days. In rodenticides, poisoning duration of respiratory support was 0–5 days, and both ICU and hospital stay was for 1–18 days. Kora et al.[10] found that the hospitalization time varied between 15 minutes and 30 days, with a mean hospitalization time of 5.17 days, and the majority (73.64%) of the cases had a hospital stay of 3–7 days. Results of the current study reported that the duration of hospitalization varied from 1 to 36 days, with a mean of 6.6 days.

Maximum deaths (38%) were reported with rodenticides (aluminum phosphide) poisoning because of the mechanism of action of poisonous substances, in which phosphine gas is released immediately as poison comes in contact with water or hydrochloric acid. The toxic action of this gas is so fast that patients hardly reach hospitals, and if they reach timely, even then, the prognosis is very poor.[23] Findings of the present study were comparable to the previous studies conducted by Subramanyam et al.[3] and Neki et al.[23] stated that the mortality rate with aluminum phosphide poisoning is that high that only 5% of patients can reach the tertiary care centers.

Conclusion

The current study found that the intent to consume poison was suicidal in maximum patients, so the risk-prone behavior needs to be identified to prevent such incidents. Preventive measures such as counseling to deal with stressors can be useful. There should be a provision of rationed supply of OPC compounds as they were found to be responsible for the long duration of respiratory support, ICU stay, and hospitalization. Survival rate was more amongst patients who reached hospitals within the golden hour of poison consumption, so our health system should be strengthened at the peripheral level so that the lag time between poison consumption and treatment can be minimized to prevent complications.

Limitations of the Study

- Small sample size and single-center study.

Orcid

Anjali Sharma https://orcid.org/0000-0002-8455-0880
Sukhpal Kaur https://orcid.org/0000-0002-7832-4916

References

1. Sharma BK, Harish D, Sharma V, et al. The epidemiology of poisoning: an Indian view point. J Forensic Med Toxicol 2002;19(2):5–11.
2. National Crime Records Bureau Accidental Deaths and Suicide in India. New Delhi: Government of India. 2012. p. 20, 214. Available from: http://www.ncrb.nic.in/cd-adsi 2012. Pdf.
3. Subramanyam A, Singh S, Bhalla A. A prospective study of cardiac evaluation of patients with acute anticholinesterase poisoning. [Theses MD, IM]. Chandigarh: Postgraduate Institute of Medical Education and Research; 2007.
4. Kamath A, Shah SN, Nadkar MY. Association of Physicians of India Textbook of Medicine. 11th ed. (2) CBS publication: 2019. P. 2249-50. ISSN : 0971-1929.
5. Ravikumar P. A profile of poisoning cases attending to Pondicherry Institute of Medical Sciences, Puducherry. Asian Pac J Health Sci 2018;5(1):70–73. DOI: 10.21276/apjhs.2018.5.1.15
6. World Health Organization. Poisoning prevention and management. http://www.who.int/ipcs/poison/en/. (Accessed on 20th July 2018).
7. Kang EJ, Seok SJ, Lee KH, et al. Factors for determining survival in acute organophosphate poisoning. Korean J Intern Med 2009;24(4):362–367. DOI: 10.3904/kjim.2009.24.4.362
8. Dash SK, Raju AS, Mohanty MK, et al. Sociodemographic profile of poisoning cases. JIAFM 2005;27(3):133–138. ISSN 0971-0973.
9. Khosya S, Meena SR. Current trends of poisoning: an experience at a tertiary care hospital Hadoti region, Rajasthan, India. J Clinic Toxicol 2016;6(3):1–7. DOI: 10.4172/2161-0495.1000298
10. Kora SA, Doddamani GB, Halagali GR, et al. Sociodemographic profile of the organophosphorus poisoning cases. J Clin Diagn Res 2011;5(5):953–956. DOI: 10.7860/JCDR/2011/.1526
11. Asawari R, Atmaram P, Bhagwan K, et al. Toxicological pattern of poisoning in urban hospitals of Western India. J Young Pharm 2017;9(3):315–320. DOI: 10.5530/jyp.2017.9.63
12. Panda BB, Hansda MK, Mishra K, et al. Study of poisoning cases in an Indian tertiary care teaching hospital. J Indian Acad Forensic Med 2015;37(2):165–168. DOI : 10.5958/0974-0848.2015.00040.8
13. Nair PK, Revi NG. One-year study on pattern of acute pharmaceutical and chemical poisoning cases admitted to a tertiary care hospital in Thrissur, India. Asia Pac J Med Toxicol 2015;4(2):79–82. DOI: 10.22038/apjmt.2015.5088
14. Gupta P, Kumar P, Singh SP, et al. Pattern of cases of acute poisoning in a rural tertiary care center in Northern India. Nat J Community Med 2016;7(4):307–310. pISSN 0976 3325, eISSN 2229 6816.

15. Sharma R, Neelanjana, Rawat N, et al. Mortality and morbidity associated with acute poisoning cases in North-East India: a retrospective study. J Family Med Prim Care 2019;8(6):2068–2072. DOI: 10.4103/jfmpc.jfmpc_237_19
16. Gupta A, Kumar A, Joshi A. Sociodemographic profile of poisoning cases in a tertiary care teaching hospital of Uttarakhand. Ann Int Med Den Res 2017;3(4):1–3. DOI: 10.21276/AIMDR.2017.3.4.ME1
17. Sharma A, Kaur S, Bhalla A, et al. First aid practices followed for poisoning patients and its impact on patient's outcome. Nursing & Midwifery Research Journal 2021;17(2):92–100. DOI: 10.33698/NRF0337
18. Reddy S, Revathi D, Prasanna VL, et al. Sociodemographic profile of patients with acute poisoning in the emergency wards of a tertiary care hospital. Int J Pharm Pharm Sci 2018;10(6):50–56. DOI: 10.22159/ijpps.2018v10i6.25653
19. Mugadlimath A, Bagali MM, Ingale DI, et al. Study of sociodemographic profile of poisoning cases. Int J Curr Pharma Rev Res 2012;4(20):80–84. Retrieved from: www.researchgate.net › publication › 265301252_ Study. Retrieved on 20 Jan, 2020.
20. Singh D, Singh A, Sharma SK, et al. Extent and determinants of costs of acute poisoning in tricity of Chandigarh: an exploratory study. J Forensic Res 2015;6(5):40. Online ISSN : 0974-0848.
21. Joshi SC, Prakash C, Joshi A, et al. Profile of organophosphorus poisoning at tertiary care hospital in Uttarakhand. J Indian Acad Forensic Med 2013;35(4):346–348. DOI: 10.4172/2157-7145.C1.017
22. Lau FL. Emergency management of poisoning in Hong Kong. Hong Kong Med J 2000;6(3):288–292. PMID: 11025848.
23. Neki NS, Shergill GS, Singh A, et al. Recent advances in management of aluminium phosphide poisoning. Int J Curr Res Med Sci 2017;3(4):73–76. DOI: 10.22192/ijcrms.2017.03.04.011
24. Gadgil M. Chemical and fertilizer ministry, farmers' organizations oppose banning of 27 insecticides and pesticides. Mumbai Mirror: Main. 2020 June 12:1