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Spectrum of poisoning in Bundelkhand region

Aparna Shankwar[1], Ankur Kumar[2]

[1]Assistant Professor, Department of General Medicine, Autonomous State Medical College, Auraiya, Uttar Pradesh, India, [2]Assistant Professor, Department of General Medicine, Government Institute of Medical Science, Greater Noida, Uttar Pradesh, India

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ABSTRACT

Background: In Bundelkhand region, 15–18% patients who are attended in the emergency setting comprises poisoning and 60–70% of which are agriculture-based poisons due to its easy accessibility. **Aims and Objectives:** The aim of this study was to see spectrum of poisoning in Bundelkhand region. **Materials and Methods:** The prospective non-randomized study was done in Maharani Laxmi Bai Medical College, Jhansi, between December 2020 and October 2022, including 500 patients applied for treatment of different poisoning. **Results:** In our study, total 500 cases of poisoning were taken. As per found data, majority of patients were found in 17–30 years of age group 202 (40.4%) followed by 31–40 years of age group 157 (31.4%). Minimum 19 (3.8%) cases were found in 61–70 years of age group and 0 case in >70 years of age group. Majority of patients were found male, i.e., 281 (56.2%) and the rest 219 (43.8%) were females. According to finding of our study, maximum mortality rate was found due to Stone hair dye, i.e., 100% followed by Celphos 35.54%, Insecticidal 26.92%, and Alcoholic intoxication 22.22%. As per our study, major cause of taking poison, maximum number of patients were found in marital discord 108 (21.6%) followed by family problems, i.e., 75 (15%), which is similar to separation/death of family member, that is, 74 (14.8%). **Conclusion:** Concerned authorities should think about substitute of aluminum phosphide, which would be less toxic for human being and concerned authority should ban availability of aluminum phosphide (Celphos) in market.

Key words: Poisons; Toxicology; Hair dye poisoning

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INTRODUCTION

Poison is a substance that is harmful to the body when administrated by means of ingestion, inhalation, injection, or absorption through the skin. Poisons have always been utilized for suicidal as well as homicidal purposes. However, the trend of poisoning primarily depends upon the availability of poison in that particular region for any purport. During the 16th century (1493–1541), a famous medico of Europe, Paracelsus rightly expressed that "All things are poison and nothing is without poison; only the dose makes the poison." In recent times, poisoning with agricultural chemicals, either fortuitous or suicidal, has become prevalent due to their facile availability and low cost.[1]

There is really no demarcating level between a medicine and poison, for a medicine in a toxic dose a poison, and a poison in a small dose may be a medicine. In law, the real difference between a medicine and poison is the intent with which it is given. If the substance is given with an intension to save life, it is medicine, but if it is given with the intension to cause bodily harm, it is poison.[2]

The objective of this study is to identify the severity and outcome of poisoning cases is determined by multiple factors including poison characteristics, mode and amount of poisoning as well as treatment opportunities on reviewing of literature; we find that Bundelkhand region is geographical and cultural region divided between states of Uttar Pradesh and Madhya Pradesh of central India. Bundelkhand region involves 13 districts which are Jalaun, Datia, Jhansi, Hamirpur, Mahoba, Banda, Tikamgarh, Lalitpur, Chhatarpur, Chitrakoot, Sagar, Panna, and Damoh among which Jhansi is only big city and tertiary health-care center.

Address for Correspondence:
Dr. Ankur Kumar, Junior Resident, Department of Medicine, M.L.B. Medical College, Jhansi - 284 128, Uttar Pradesh, India.
Mobile: +91-9917994923. **E-mail:** drankur46@gmail.com

Aims and objectives

The objectives of the study are as follows:

1. To see spectrum of poisoning in the Bundelkhand region
2. To see mortality and morbidity due to poisoning
3. Look into the basic cause of suicidal poisoning/accidental poisoning.

MATERIALS AND METHODS

Ethical

Ethical Committee approval will be duly taken. Data were collected in the Department of General Medicine from the bedside tickets of the patients after taking a short history and informed consent from the patient.

Source of data

The prospective non-randomized study was done in Maharani Laxmi Bai Medical College, Jhansi between December 2020 and October 2022 including 500 patients were applied for treatment of different poisoning.

Inclusion criteria

The following criteria were included in the study:

- Patient of age ≥17 years with a history or characteristics of clinical feature of acute poisoning
- Cases were included from the general medicine ward and emergency cases were being selected for the study as there many cases of different poisonings being admitted for the treatment of poison with various comorbid conditions
- The patients included in the study who had undergone exposure to poison either by household or agricultural pesticides, industrial toxins, toxic plants, drugs, or miscellaneous products
- All cases of poisoning, irrespective of age, sex, type and mode of poisoning, ingredients of poisons, and the status of patients after poisoning were recorded in the pro forma prescribed by the WHO guidelines.

Exclusion criteria

The following criteria were excluded from the study:

- Snake bite/sting bite.

Investigation

1. Complete blood count
2. Renal function test (KFT):
   - Sr. Creatinine
   - Blood urea
   - Urine –
     - Routine,
     - Microscopy
   - Myoglobin in urine
3. LFT:
   - S. Bilirubin
     - Total
     - Direct
     - Indirect
   - SGOT, SGPT
   - ALP
4. S. electrolyte
   - S.Na^+
   - S K^+
5. S.CPK level

Specific investigation

6. S.Calcium:
   - Total
   - Ionic

Test description result
Unit Reference
Range
Serum Calcium (total)* mg/dL 8.8–10.6
Method: Ion Exchange electrode

7. Serum Albumin*
   Method: Bromocresol Green g/dL 3.2–5.2
   [Corrected calcium: S. calcium (mg/dl)+0.8*{4- s. albumin (g/)}]
8. Serum phosphorous* mg/dL 2.5–4.5
   Method: Ammonium Molybdate UV
   (*Machines Used: Beckman Coulter AU480)
9. Arterial blood gas analysis
10. ECG

RESULTS

In our study, a total of 500 cases of poisoning were taken. As per found data, majority of patients were found in 17–30 years of age group 202 (40.4%) followed by 31–40 years of age group 157 (31.4%). Minimum 19 (3.8%) cases were found in 61–70 years of age group and 0 case in >70 years of age group (Table 1).

Table 1: Age-wise distribution of cases

Age group (in years)	No. of patients	%
17–30	202	40.4
31–40	157	31.4
41–50	70	14
51–60	52	10.4
61–70	19	3.8
>70	0	0

Table 2: Distribution of cases according to their sex

Sex	No. of patients	%
Male	281	56.2
Female	219	43.8

Table 3: Type of poisoning and mortality

Type of poisoning	Discharged	%	Death	%	Total no. of patients	%
Celphos	78	64.46	43	35.54	121	24.2
Hair dye	93	86.11	15	13.89	108	21.6
Insecticidal	57	73.08	21	26.92	78	15.6
Rat killer	34	82.93	7	17.07	41	8.2
Phenyl	30	93.75	2	6.25	32	6.4
Sedative	23	88.46	3	11.54	26	5.2
Weedicide	23	85.19	4	14.81	27	5.4
Alcoholic intoxication	7	77.78	2	22.22	9	1.8
Sprit	3	100.00	0	0.00	3	0.6
Naphthalene	2	100.00	0	0.00	2	0.4
Stone hair dye	0	0.00	2	100.00	2	0.4
Unknown poison	40	78.43	11	21.57	51	10.2

Majority of patients were found male, that is, 281 (56.2%) and the rest 219 (43.8%) were females (Table 2).

According to the findings of our study, the maximum mortality rate was found due to Stone hair dye, that is, 100%, followed by Celphos 35.54%, Insecticidal 26.92%, and Alcoholic intoxication 22.22% (Table 3).

As per our study, major cause of taking poison, the maximum number of patients were found in Marital discord 108 (21.6%) followed by having family problems, that is, 75 (15%), which is similar to separation/death of family member, that is, 74 (14.8%) (Table 4).

The maximum number of poisoning cases were would in lower socio economic status, that is, 197 (39.4%) followed by lower middle case respondents, that is, 143 (28.6%). Minimum cases were found in Upper middle Socioeconomic status patients, that is, 68 (13.6%) (Table 5).

Table 4: Major cause of consumption of poison

Manner of poisoning	No. of case	%
Marital discord	108	21.6
Failure in examination	64	12.8
Family problems	75	15
Financial difficulties	68	13.6
Discord with parents	41	8.2
Separation/death of family member	74	14.8
Loss of job	53	10.6
Others	17	3.4

Table 5: Relation between socioeconomic status and poisoning case

Socioeconomic status	No. of case	%
Lower	197	39.4
Lower middle	143	28.6
Upper lower	92	18.4
Upper middle	68	13.6
Total	500	100

DISCUSSION

Poisoning exposure was grouped into more than 11 toxic substances. Males were affected – more (52.57%). The high incidence of poisoning in males may be due to the high exposure to stress and strain and occupational poisoning occurs due to inappropriate handling and spraying with high concentrations of chemicals.

The sign and symptoms occur on the basis of the poison consumed and the time interval between consumption to hospital arrival.

The mortality/morbidity in any case of acute poisoning depends on a number of factors such as the nature of the poison, dose consumed, level of available medical facilities, and time interval between intake of poison and arrival at the hospital.

The majority of incidence in males was from age group 17–30 years.

The male preponderance appears to be due to more exposure to occupational hazards and stress or strain as compared with females.

The present study revealed that the maximum number of poisoning cases are due to suicidal followed by accidental similar observation was made by Yadav et al.[3]

An increase in the number of self-poisoning may be due to many factors such as an increase in unemployment, urbanization, break up in our family support system, failure of love affairs, an individually frustrations, inadequacy to cope with some immediate situations, impulsive behavior, stress due to job and family, etc. In our study, hair dye poisoning is more common in females than males like Jain et al.[4]

In our study, maximum number of mortality is due to Celphos (aluminum phosphide) similar to the study done by Yadav et al.,[3] and the majority of cause belong to 17–30.

The main victims were females and laborers followed by student.

Maximum victims of suicidal poisoning mortalities were in their 3rd decade like in a study done by Kanchan and Menezes.[5]

Preferences for organophosphate were relatively more common in males when compared to females, who preferred hair dye, zinc phosphide, carbamate, and medicinal agents.

Limitations of the study

The study performed was a single-centered study.

CONCLUSION

- The majority of poisoning cases were from 17 to 30 years and minimum from age 70 years and above.
- Bundelkhand is agriculture-based region so the availability of insecticide is common at fields and hair dye is easily available at market.
- Concerned authorities should think about substituting aluminum phosphide, which would be less toxic for human beings and concerned authorities should ban the availability of aluminum phosphide (Celphos) in market.

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REFERENCES

1. Unnikrishnan B, Singh B and Rajeev A. Trends of acute poisoning in south Karnataka. Kathmandu Univ Med J (KUMJ). 2005;3(10):149-154.
2. Parikh CK. Toxicology. In: Parikh CK, editor. Parikh's Text Book of Medical Jurisprudence and Toxicology. 5th ed. Bombay: CBS Publisher; 1990. p. 660-690.
3. Yadav VK, Nigam K, Srivastava A and Yadav MM. Statistical evaluation of poisoning trends in Bundelkhand Region. Int J Res Anal Rev. 2018;5:378-388.
4. Jain PK, Sharma AK, Agarwal N, Sengar NS, Siddiqui MZ, Singh AK, et al. A prospective clinical study of myocarditis in cases of paraphenylenediamine (hair dye) poisoning in Northern India. J Clin Med Res. 2012;4(7):106-116.
5. Kanchan T and Menezes RG. Suicidal poisoning in Southern India: Gender differences. J Forensic Leg Med. 2008;15(1):7-14. https://doi.org/10.1016/j.jflm.2007.05.006

Authors Contribution:
AS, AK- Definition of intellectual content, literature survey, prepared the first draft of the manuscript, implementation of the study protocol, data collection, data analysis, manuscript preparation and submission of article, concept, design, clinical protocol, editing, and manuscript revision, design of the study, statistical analysis and interpretation, review manuscript, literature survey, and coordination

Work attributed to:
M. L. B. Medical College, Jhansi - 284 128, Uttar Pradesh, India.

Orcid ID:
Aparna Shankwar - https://orcid.org/0009-0009-3826-0792
Ankur Kumar - https://orcid.org/0009-0005-8553-6051

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