Incidence and Outcome of Acute Poisoning Cases in a Medical College Hospital in Jharkhand

K Karthik Iyer 1, AK biswas 2
1 Associate Professor, Department of Internal Medicine, Hazaribagh Medical College, Hazaribagh, Jharkhand, India
2 Associate Professor, Department of Pharmacology, , Hazaribagh Medical College, Hazaribagh, Jharkhand, India

Abstract
Background: Poison is one of the most common reason for admission to an emergency department with half a million death each year attributed to it. Hazaribagh owing to its open fields, and agriculture being the primary source of employment, has its local population exposed to a variety of poisonous agents, both chemical and environmental. Aims and Objective: The purpose of our study is to determine the epidemiology and outcome of the poisoning cases being admitted to our hospital. Study Design: This is a retrospective/prospective observational study over a period of 1 year from July, 2019 to June 2020. Setting: Department of General Medicine, Hazaribagh Medical College and Hospital, Jharkhand. Material and Method: A total of 1318 patients meeting the inclusion criteria were studied. Data was collected by direct interview and the reviewing of case records and entered in a proforma which was later analysed.

Result: Our cohort comprised of 37.2% males and 62.7% females with female: male ratio of 1.7:1. The majority were females between the ages of 21-30 years. Upon questioning, 63.5% had consumed poison intentionally versus only a 36.5% who were accidentally exposed. Among those with intentional poisoning, 69.1% were females. The incidence of accidental poison exposure on the other hand was similar for both genders 51.5% v/s 49.5%. Maximum incidence was noted to be pesticides and that among environmental agents was found to be snake bite. Among drugs and plants ingestions, sleeping pills and wild mushroom were most commonly seen. The average duration of hospital stay for cases admitted with poisoning was 2.13±1.2 days. 62.8% patients were treated successfully and discharged, 25.5% left against medical advice.

Conclusion: Intentional poisoning in the form of para suicide comprised the majority of our cohort closely followed by snake bites, both which were favoured by the geographical location of the study centre. A comprehensive approach targeting the problem at grass root level can lead to decreased in the incidence of such poisoning cases and also reduced the incurred burden on the health care system.

Keywords: Poisoning, Snake bite, Jharkhand, Pesticide.

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 [1]. It is also one of the most common reasons for admission to an emergency department. The massive expansion in the availability and use of chemicals, including pharmaceuticals in past few decades has led to increasing awareness of the risks to human health posed by their exposure. The global incidence of poisoning is unknown , but it is estimated that up to half a million people die each year as a result of various kinds of poisoning, including exposure to natural toxins [2].

Hazaribagh is a city and a municipal corporation in the state of Jharkhand and is famous for Hazaribag Wildlife Sanctuary and the tribal traditions associated. The city was originally a thick forest and is still surrounded by dense vegetation, which is currently been used as agricultural lands by the local population. The open fields, and agriculture being the primary source of employment, the local population is exposed to a variety of poisonous agents, both chemical and environmental, accounting for a large number of emergency room admissions.

The purpose of our study is to determine the epidemiology and outcome of the poisoning cases being admitted to our hospital. The resulting evaluation is key to formulating a plan for management to reduce morbidity and also to educate the local population of the prevailing poisons and measures to be taken to protect oneself.
MATERIAL AND METHOD
This is a retrospective/prospective observational study over a period of 1
year from July, 2019 to June 2020. All patients admitted with alleged
history of poisoning, bites and stings admitted to the department of
General Medicine and hospitalized for at least 24 hours constituted the
target of this study (n=1318). The study was conducted after obtaining
proper permission from respective authorities. Data was collected by
direct interview of patient and their attendant and recorded in a
proforma. Details of treatment, hospital course and outcome was
obtained using case files of the respective patients. The key
information included in the structured format are age, sex, name/type
of poisoning agent, reason and route of exposure, duration of hospital
stay and outcome of the treatment. These case proforma data were
finally analysed using descriptive statistics.

Statistical Analysis
Statistical testing has been conducted with the statistical package for
the social science software version SPSS 20.0. Continuous variables
were presented as mean ± SD. Categorical variables were expressed as
frequencies and percentages.

RESULT
During the study period a total of 1318 patients meeting the inclusion
criteria were admitted. 491(37.3%) were males and 827(62.7%) were
females with a female: male of 1.7:1. The age and gender distribution
is depicted in graph 1 below. As seen, the majority of cases are
comprised of females between the ages of 21-30 years. 837(63.5%)
cases had consumed the poison intentionally and the remaining
481(36.5%) were accidentally exposed. Among those with intentional
poison ingestion, there was a female preponderance with 579(69.1%)
and remaining 258(30.9%) being males. The incidence of accidental
poison exposure on the other hand were similar for both genders with
248(51.5%) being females and the rest 233(48.5%) being males.

Maximum incidence was seen in rainy season in the months of June,
July and August with 434(32.9%), followed by 370(28%) in autumn in
the months of September to November. 282(21.4%) and 232 (17.7%)
cases presented in winter (December to February) and summer (March
to May) respectively. Graph 2 represents the seasonal incidence of
accidental and intentional poisoning cases. As noted, the incidence of
both accidental and intentional poisoning cases are lowest in the
summer months, but that of accidental is maximum during the rainy
reason, predominantly owing to higher incidences of snake bite during
these months.

Ingestion was the predominant route of poisoning in our cohort with
850(64.5%) cases, 446(33.9%) cases had animal bites and 22(1.6%)
were stung. Upon analysing the poisoning agents, household and
agricultural agents including pesticides comprised the majority with
825(62.5%) cases. 470(35.7%), 6(0.5%), 13(0.9%) and 4(0.4%) cases
were classified as animal bites or stings, drug and wild plant ingestion
and unknown poisons respectively. Graph 3 and Graph 4 respectively
shows the various agents among household and environmental agents
encountered in our study. Other substances commonly ingested were
mainly sleeping pills and wild mushroom.

The average duration of hospital stay for cases admitted with poisoning
was 2.13±1.2 days. 827(62.8%) patients were treated successfully and
discharged, 337(25.5%) left against medical advice, 134(10.2%) cases
were referred to Rajendra Institute of Medical Sciences, Ranchi due to
complications and lack of available necessary treatment modalities at
our setup and 20(1.5%) died. Among those who died 18 had intentional
consumption of pesticides and all were females. Among the 2
remaining, 1 was affected by accidental ingestion of unknown poison
and the other succumbed to snake bite.

DISCUSSION
The Incidence of intentional and accidental poisoning in our study was
similar to another study from southern India with 63.5% v/s 68% for
intentional poisoning and 36.5% v/s 31.6% for accidental exposure. [3]
Srihari et At from Chennai documented up to 85.8% patients
presenting to emergency with alleged history of poisoning to have
intentionally consumed it. [4] Considering the demographics, maximum
proportion of cases in our study aged between 21-30 years was also
similar to past studies. [5] We also noted a higher incidence among
females which was contradicting to previous studies from various parts
of the country were higher incidence among males were noted [6-9].

Peak incidence of poisoning cases was in monsoon season between
June to August, which was similar to a study by Chittamanchi et al. [10]
Considering the agent of poisoning, we noted pesticides most
commonly implicated, which was different from various other studies
from eastern India where snake bite comprised the majority of the
cases. [11] WHO in 2016 estimates 5 million snake-bites occur each
year, resulting in up to 2.5 million envenoming, at least 100,000 deaths
and around three times as many amputations and other permanent
disabilities [12]. Jayawardane et.al from Sri Lanka observed medicinal
pills to be the most commonly substance ingested for intentional
poisoning, which was contradicting to our study where pesticides
were commonly implicated. [13] Other studies from Sri Lanka and India
found pesticides to be the most commonly abused substance for
intentional poisoning. [14, 15] Study comparing the trends in South
East Asian countries has found tremendous rise in pesticide poisoning
cases due to its easy availability for crop protection. [16]

We documented a shorter hospital course (2.13 days v/s 12.53 days)
and a lower mortality (1.5% v/s 8.31%) in comparison to various
studies from different parts of the country. [7, 17, 18] Shorter hospital
course could be attributed to early referral of complicated course as
well as a significant number of patients who left against medical
advice. The lower mortality can also be attributed to the above cause
and cannot be taken as a true reflection of the situation in the
community.

As noted above, each region has its unique toxico-epidemiology of
poisoning owing to its geographical condition and population
awareness. A detailed knowledge of the local poisoning patterns helps
the physician formulate a plan for management and also aim at
primary prevention. Studies from Eastern India are few and especially
Jharkhand which is primarily and agriculture driven economy is lacking.
Through our study we have tried to provide a comprehensive view of
the current situation in our region.
GRAPH 1: Bar Graph Illustrating the Age and Gender Distribution of the Cohort

The incidence was maximum in the age range of 21-30 years with 34%, closely followed by those between 11-20 years with 31.4%. 18.6%, 7.7%, 5%, 2.2% and 0.5% belonged to ranges 31-40 years, 41-50 years, 51-60 years, 61-70 years and more than 70 years respectively.

GRAPH 2: Seasonal Distribution of Accidental and Intentional Poisoning Cases

Line diagram depicting the seasonal incidence of poisoning. Lower incidence is noticed in the summer months between March and May, while higher incidence especially of accidental exposure was found in rainy season in the months of June to August.
CONCLUSION

Intentional poisoning in the form of para suicide comprised the majority of our cohort closely followed by snake bites. Both these were favoured by the geographical location of the study centre. Illiteracy and lack of awareness were deemed to be the major contributing factors. The morbidity and mortality due to poisoning can be reduced by making specific antidotes available in adequate quantity, especially anti snake venom, conducting educational programs targeting rural areas and providing counselling services and poison information to those in need. A comprehensive approach targeting the problem at grass root level can lead to decreased in the incidence of such poisoning cases and also reduced the incurred burden on the health care system.

Conflicts of interest/competing interests:

The authors declare that they have no competing interests.

Author’s contribution

AKB conducted the patient interviews. Both AKB and KKI compiled the data. KKI conducted the statistical analysis and wrote the manuscript. All authors reviewed the final manuscript.

REFERENCE

1. WFT, HDJ, RH W. Stedman’s Medical Dictionary. 28th ed. New York: Lippincott William and Wilkins; 2007. 2004.
2. International Programme on Chemical Safety: Guidelines for poison control [Internet]. World Health Organization; Available from: https://www.who.int/ipcs/publications/training_poisons/guidelines_poison_control/en/
3. 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 Oct;72(5):587–91.

4. Srihari DrC, Ramakrishnan DrTV, Aditya DrM. Epidemiological profile of poisoning patients in the emergency department of a tertiary care teaching hospital in South India. Int J Med Res. 2017;5(3):212–22.

5. Vijay Kumar S, Venkateswarlu S, G. Vijay. A study on poisoning cases in a tertiary care hospital. J Nat Sci Biol Med. 2010 Dec;11(1):35–9.

6. TH I, Raja D, Ponnusankar S. Toxicoepidemiology of acute poisoning cases in a secondary care hospital in rural South India: A five-year analysis. J Postgrad Med. 2015;61(3):159–62.

7. Sharma R, Neelanjana, Rawat N, Panwar N. Mortality and morbidity associated with acute poisoning cases in north-east India: A retrospective study. J Fam Med Prim Care. 2019;8(6):2068.

8. Sharma B, Harish D, Sharma V, Vij K. The epidemiology of poisoning: An Indian view point. J Forensic Med Toxicol. 2002 Jul 1;19:5–11.

9. Ramesha KN, Rao KBH, Kumar GS. Pattern and outcome of acute poisoning cases in a tertiary care hospital in Karnataka, India. Indian J Crit Care Med. 2009 Sep;13(3):152–5.

10. Consultant and Adjunct Professor (Research), Department of Emergency Medicine, Sri Ramachandra Medical College and Research Institute, Chennai. T.N. India, Srihari DrC, Ramakrishnan DrTV, Professor and Head of the Department, Department of Emergency Medicine, Sri Ramachandra Medical College and Research Institute, Chennai. T.N. India, Aditya DrM, Consultant, Department of Emergency Medicine, Sri Ramachandra Medical College and Research Institute, Chennai. T.N. India. Epidemiological profile of poisoning patients in the emergency department of a tertiary care teaching hospital in South India. Int J Med Res Rev. 2017 Mar 31;5(3):212–22.

11. Chatterjee S, Verma V, Hazra A, Pal J. An observational study on acute poisoning in a tertiary care hospital in West Bengal, India. Perspect Clin Res. 2020;11(2):75.

12. World Health Organization. World Health Statistics 2016: Monitoring Health for the SDGs Sustainable Development Goals. World Health Organization. 2016.

13. Jayaratne SD TK. Pattern of Acute Adult Poisoning at a Tertiary Care Hospital in the Western Province Sri Lanka: A Retrospective Study. Fam Med Med Sci Res [Internet]. 2015 [cited 2020 Aug 5];04(02). Available from: http://www.omicsgroup.org/journals/pattern-of-acute-adult-poisoning-at-a-tertiary-care-hospital-in-the-western-province-sri-lanka-a-retrospective-study-2327-4972-1000163.php?aid=50200

14. Manuel C, Gunnell DJ, van der Hoek W, Dawson A, Wijeratne IK, Konradsen F. Self-poisoning in rural Sri Lanka: small-area variations in incidence. BMC Public Health. 2008 Dec;8(1):26.

15. Khosya S, Meena S. Current Trends of Poisoning: An Experience at a Tertiary Care Hospital Hadoti Region, Rajasthan, India. J Clin Toxicol [Internet]. 2016 [cited 2020 Aug 5];6(3). Available from: https://www.omicsonline.org/open-access/current-trends-of-poisoning-an-experience-at-a-tertiary-care-hospitalhadoti-region-rajasthan-india-2161-0495-1000298.php?aid=74588

16. Kulkarni K. Trends of poisoning in India. Souvenir XVII Th Silver Jubil Annu Conf Medico Leg Assoc Maharashtra Mahabaleshwar. 2014 Feb 22;1:92–100.

17. Asawari R, Atmaram P, Bhagwan K, Priti D, Kavya S, Jabeen GA. Toxicological Pattern of Poisoning in Urban Hospitals of Western India. J Young Pharm. 2017 Jul 1;9(3):315–20.

18. Kumar S, Venkateswarlu B, Sasikala M, Kumar G. A study on poisoning cases in a tertiary care hospital. J Nat Sci Biol Med. 2010 Jul 1;1(1):35–9.