

## Original Article

# Clinico-epidemiological Profile of Acute Poisoning Cases : A Hospital Based Study in North Eastern India

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**Background :** Poisoning, both accidental and suicidal, contributes to significant mortality and morbidity. Poisoning refers to the development of dose related adverse effects following exposure to chemicals, drugs and other xenobiotics, although individual responses to a given dose may vary because of genetic polymorphism, enzymatic induction or inhibition in the presence of other xenobiotics, or acquired tolerance.

**Aims and Objectives :** To study the epidemiological and clinical profile of acute poisoning cases admitted in Department of Medicine.

**Materials and Methods :** A total of 300 cases admitted in the Department of Medicine, Silchar Medical College and Hospital, from 1st July, 2017 to 30th June, 2018, with diagnosis of acute poisoning and satisfying the inclusion and exclusion criteria were taken up for evaluation after obtaining informed written consent.

**Results :** Males and females represented 52% and 48% of the total cases and 58.33% of them were in the age group 20-29 years. Married persons and rural inhabitants contributed to 73.67% and 66% respectively. Clinical presentations were varied based on the type, nature, amount and toxicological status of the compound ingested. Poisoning with pesticides was most common occurrence and 74% attempts were suicidal. The overall mortality rates were 13%.

**Conclusion :** It is of utmost importance to generate awareness among the general population about the harmful effects of various chemicals. Education, self-employment, small family size and psychological counselling should be encouraged.

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**Key words :** Accidental, Morbidity, Xenobiotics, Pesticides, Psychological Counselling.

Poisoning refers to the development of dose related adverse effects following exposure to chemicals, drugs and other xenobiotics<sup>1</sup>. The word poison is derived from the latin word *potio* that means deadly draught<sup>2</sup>. Poisoning occurs by the absorption of any physical, chemical or organic substances via gastrointestinal tract, skin, mucosa, respiratory tract or parenteral route that causes damage to cells, tissue organ and organ system. Individual responses to a given poison or dose may vary and depends on route of exposure, chemical and physical properties of poison, mechanism of action and enzyme induction and inhibition in presence of other xenobiotics. The effect of a particular poison may also depend on individual parameters like status of hepatic and renal function, genetic polymorphism, or acquired tolerance<sup>1,3</sup>.

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### Editor's Comment :

- It is important to create awareness among the general population on safe agricultural practices and use of protective wear at workplaces and emphasize the importance of education, gender equality and social harmony to help the flatten the curve of rising cases of poisoning.
- At the same time, upgradation of emergency care services is required to reduce the burden of morbidity and mortality associated with the same.

Poisoning has emerged as a major medico- social problem all over the world that may relate to determinants like social and emotional disturbances, unemployment, work dissatisfaction, chronic disease states etc. According to WHO, approximately three million acute poisoning cases with 2, 20,000 deaths occur every year. Out of this, 90% of fatal poisoning occur in developing countries<sup>4</sup>. Although most of the poisoning are unintentional in children, suicidal mode of poisoning accounts for majority among adults. The epidemiological pattern of poisoning varies from region to region because of varying social structure, religious influence, economic status, educational level, awareness among general population and availability

of drugs<sup>5</sup>.

This study was conducted to bring in light the clinico-epidemiological profile of acute poisoning cases prevailing in North-eastern part of the country and thereby to uplift the emergency care management, level of education and awareness and psycho-social support to reduce the burden of the same.

**AIMS**

To evaluate the epidemiological and clinical profile of acute poisoning cases admitted in Department of Medicine, of a tertiary care teaching hospital of North-eastern India.

**METHODS AND METHODOLOGY**

This is a single centered hospital based observational study conducted over a period of 1 year, from 1st July, 2017 to 30th June, 2018, in a tertiary care teaching hospital in North-eastern India.

All the cases satisfying the inclusion and exclusion criteria for the study were taken after obtaining informed and written consent from the patient/ guardian.

**Inclusion Criteria :**

Patients with acute poisoning aged >12 years.

**Exclusion Criteria :**

1. Patients with chronic exposure to a particular poison, alcohol intoxication, bee sting, snake bite.
2. Patients who were brought dead to hospital.

A through history and physical examination were done for a total of 300 cases included in the study. All routine blood investigations, urine examinations, chest X-ray and ECG were done and patients were evaluated during their hospital stay. The data obtained were recorded in a preformed proforma. Psychiatric consultation was also taken for the patients where possible. The results for each parameter were represented in numbers, percentages and average (mean, standard deviation). The t test and Chi-square ( $\chi^2$ ) test were used to compare mean and proportion respectively. Data were analyzed using Microsoft Excel 2016 and SPSS version 21.0 and  $p < 0.05$  was taken as statistically significant.

**RESULTS**

Total number of study subjects were 300, with 156 (52%) male and 144 (48%) female. Most common age group affected with acute poisoning was 20-29 years accounting for 58.33%. Only 1.33% of the study subjects aged more than 60 years. Rural and urban population were 66% and 34% respectively. Poisoning was commonest among married individuals accounting for 73.67% (79.86% female and 67.94% male). Out of 300 patients, 38% of the population were housewives, 35.67% were students, 20% were farmers and 6.33%

were businessmen (Table 1). Muslim religion predominated comprising 57.69% and 58.33% among male and female respectively followed by Hindu religion (42.30% male and 40.27% female) and Christian religion (1.38% male) (Fig 1).

Mode of poisoning was suicidal, accidental and homicidal in 74%, 20% and 6% of respectively. The various poisons in the study were pesticides 39.67%, phenol 20.67%, kerosene 15%, sleeping pills 12.33%, rat kill 7.67%, iron tablets 2.67% and yellow oleander 2% (Table 2).

In the present study, 55% of the cases presented with gastrointestinal signs and symptoms (nausea, vomiting, pain abdomen, diarrhea), 27% presented with neurological manifestations (dizziness, headache, drowsiness, altered sensorium), 8% presented with respiratory signs and symptoms (breathlessness, cough, coarse crepitations), 1% with cardiovascular manifestations (tachycardia, arrhythmia) and 9% with others (frothing, burning eyes, increased lacrimation) (Fig 2). GCS on presentation was <8 in 47 cases and  $\geq 8$  in 252 cases.

After appropriate evaluation and treatment 67% of the study subjects were discharged, 20% absconded and 13% expired. A psychiatric evaluation was done in possible 231 cases on 2nd and 3rd day of the hospital stay and reactive depression, financial stress

Gender :	
Male	156 (52%)
Female	144 (48%)
Age Group (In Years) :	
10-19	59 (19.67%)
20-29	175 (58.33%)
30-39	39 (13%)
40-49	18 (6%)
50-59	5 (1.67%)
60 And Above	4 (1.33%)
Occupation :	
Housewife	114 (38%)
Student	107 (35.67%)
Farmer	60 (20%)
Buisnessman	19 (6.33%)
Inhabitation :	
Urban	102 (34%)
Rural	198 (66%)
Marital Status :	
Married	Total 221 (73.67%), Male 106 (67.94%), Female 115 (70.86%)
Ummarried	Total 79 (26.33%), Male 50 (32.05%), Female 29 (20.13%)

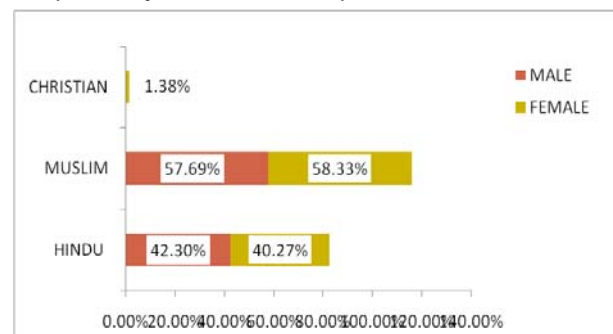


Fig 1 — Religious Distribution of Cases

and manic depression were found in 49.78%, 30.30% and 19.91% of the cases respectively (Table 3).

After thorough analysis it has been observed that male gender, poisoning with pesticides, GCS $\leq$ 8 on presentation and suicidal mode of poisoning contributed significantly to mortality (Fig 3).

**Discussion**

Poisoning has emerged as a significant cause of emergency care hospitalization. Although in developed countries mortality due to poisoning is 1-2%, low level of education and awareness, delayed presentation and resource poor emergency care settings contributes to a large proportion of cases in developing and under-developed countries. In India mortality attributable to poisoning varies from 15-30%<sup>6,7</sup>.

In the present series poisoning was more prevalent in males (52%) as compared to females (48%) and most common age group was 20-29 years that comprised of 58.33% of the cases. These findings were similar to study conducted by Surendra Khosya *et al*<sup>6</sup> where males (61.7%) were more commonly affected than

Table 2 — Mode of Poisoning and Poisonous Agents

Mode of Poisoning :	
Suicidal	74%
Accidental	20%
Homicidal	6%
Poisonous Agents :	
Pesticides	39.67%
Phenol	20.67%
Sleeping Pills	12.33%
Kerosene	15%
Rat Kill	7.67%
Iron Tablets	2.67%
Tellow Oleander	2%

females (38.27%) and 42.92% of the study subjects were in 21-30 years age group. In the present series, 66% of the cases were inhabitants of

Table 3 — Psychiatric Evaluation and Outcome of Patients

Psychiatric Evaluation	
Reactive Depression	115 (49.78%)
Financial Stress	70 (30.30%)
Manic Depression	46 (19.91%)
Outcome	
Patients Discharged	201 (67%)
Patients Expired	39 (13%)
Patients Absconded	60 (20%)

rural area and 34% of the cases were from urban area. In the study conducted by Subash Vijaya Kumar *et al*<sup>8</sup> 65% and 35% were rural and urban inhabitants respectively. In the present study, 73.67% of the cases were married and this finding corroborated to the study conducted by Acharya *et al*<sup>9</sup> where 71% of the cases were married. Among the married population, poisoning predominated in females and this may relate to low level of education, social disharmony and early marriage.

In the index study maximum number of cases were housewives (38%) followed by students (35.67%), farmer (20%) and businessman (6.33%). Whereas, in the study of Sandesh Datir *et al*<sup>10</sup>, maximum cases of acute poisoning were in farm owners, clerical and shop owners (25.68%) followed by students and housewives each contributing 21.18% and 08.98% were among unemployed population. Of all the cases Muslim religion predominated with 58%, Hindu religion 41.33% and Christian 1.38% where as in the study of Mukul Joshi *et al*<sup>11</sup>, Hindu religion contributed to 94.2%, Muslim and Sikh were 3.3 % and 2.5 % respectively. The discrepancy observed may be due to a predominance of Muslim religion in the region, large family size, ignorance, lack of protective clothing and unsafe practices at work places.

In this study suicidal mode of poisoning contributed to 74%, accidental 20% and homicidal 6% of the total cases and most of them were due to pesticides (39.67%) followed by phenol (20.67%). Whereas, Vaddadi Srinivas *et al*<sup>12</sup> in their study found 70% had suicidal intention, 19% had accidental ingestion and 11% were unknown. Prashant Gupta *et al*<sup>13</sup> in their study found that 57.1% of the cases were due to organophosphorus. In another study conducted by J Jesslin *et al*<sup>14</sup> 39.5 % were due to pesticides, 26.1% due to medicines, 22.1% were due to household products, 12.1 % were environmental and 0.2 % were due to heavy metals.

In the present series, 55% of the cases presented with nausea, vomiting, abdominal pain and diarrhea, 27% presented with neurological manifestations

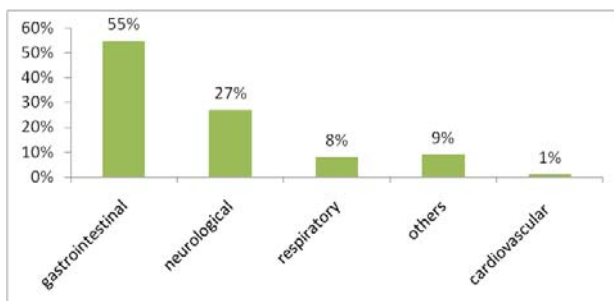


Fig 2 — Symptomatology of Patients

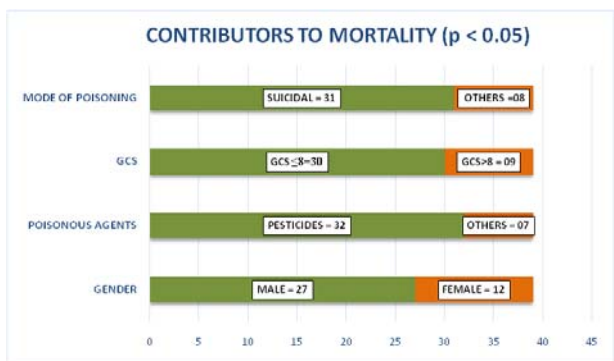


Fig 3 — Contributors to Mortality

(dizziness, headache, drowsiness, altered sensorium), 8% presented with respiratory signs and symptoms (breathlessness, cough, coarse crepitations), 1% with cardiovascular manifestations (tachycardia, arrhythmia) and 9% with others (frothing, burning eyes, increased lacrimation). Amit Patil *et al*<sup>15</sup> had observed that 64.8% of the cases presented with neurological manifestations whereas gastrointestinal manifestations were present in 37% of the study subjects. The prevalence of gastrointestinal manifestations was more in the index study when compared to observation made by Amit Patil *et al*<sup>15</sup>. A mortality of 13% was observed in this study whereas J Lavanya *et al*<sup>16</sup> in their study observed 5% mortality. Majority of those who expired presented to the hospital late. The various parameters that contributed significantly to mortality in the present series were male gender, poisoning with pesticides, suicidal mode of poisoning and GCS <8 on presentation. The other factors on which light could be shed for a better outcome may be the time of presentation to hospital, amount of a particular substance taken and various comorbid conditions.

#### Limitations of the Study :

The present study is a single centered one, with a small sample size in a fixed geographical area and undertaken for a short duration of time. A multicentric study covering a wider geographical area and among different ethnic groups for an extended period of time would have been more beneficial.

#### CONCLUSION

As poisoning is growing in magnitude in this developing world of increased emotional and social stress, it is of immense importance to uplift the management protocols not only in tertiary care centres but also in primary care centres. Hand in hand education, self-employment, psychosocial counseling should be provided to the society to reduce the overall burden.

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**Conflict of Interest : None**

#### REFERENCES

- 1 Mycyk MB — Poisoning and Drug Overdose. Chap- 449. In: Jameson JL, Fauci AS, Kasper DL, et al, eds. Harrison's Principles of Internal Medicine, 20th edn. New York: McGraw-Hill Education 2018: 3300 - 3313.
- 2 Maheswari E, Abraham L, Chacko CS, *et al* — Assessment of Pattern, Severity and Outcome of Poisoning in Emergency Care Unit. Journal of Applied Pharmaceutical Science. 2016 December; **6(12)**:178-83.
- 3 Preston RJ, Hoffmann GR — Genetic Toxicology. Chap- 9. In: Klaassen CD eds. Casarett and Doull's Toxicology. The Basic Science of Poisons. 8th edn. New York: McGraw-Hill Education 2013; 445-80.
- 4 Murat S, Guiven M — Intensive care management of organophosphate insecticide poisoning. *Crit Care* 2001; **5(4)**: 211-5.
- 5 Khosya S, Meena SR — Current Trends of Poisoning: An Experience at a Tertiary Care Hospital Hadoti Region, Rajasthan, India. *J Clin Toxicol* 2015; **6(2)**: 298.
- 6 Pillay VV — Introduction. Chap- 1. Modern Medical Toxicology. 4th edn. New Delhi. JAYPEE 2013:3-6.
- 7 Taruni NG, Bijoy TH, Momonchanda A. A profile of poisoning cases admitted to RIMS Hospital Imphal. *Jour Forensic Med Toxicol* 2001; **18**: 31-3.
- 8 Kumar SV, Venkateswarlu B, Sasikala M, *et al* — A study on poisoning cases in a tertiary care hospital. *J Nat Sci Biol Med* 2010 Jul-Dec; **1(1)**: 35-9.
- 9 Acharya S, Lakshminarayana K, Sharanappa — Assessment of poisoning cases in a tertiary care hospital. *IJBR* 2014; **5(9)**: 578-81.
- 10 Dattir S, Petkar M, Farooqui J, *et al* — Profile of Acute Poisoning Cases at Pravara Rural Hospital, Loni. *J Indian Acad Forensic Med* 2015 October- December; **37(4)**: 400-4.
- 11 Joshi M, Patel DV — A Study on Clinical Profile of Patients with Acute Poisoning; *GCSMC J Med Sci* 2015 July- December; **IV(II)**: 97-100.
- 12 Srinivas V, Srinivas VR — A clinical profile of acute poisoning; *JEMDS* 2015 April; **4(29)**: 4923-5.
- 13 Gupta P, Kumar A, Singh SP, *et al* — Pattern of Cases of Acute Poisoning in a Rural Tertiary Care Center in Northern India. *Ntl J Community Med* 2016; **7(4)**: 307-10.
- 14 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.
- 15 Patil A, Peddawad R, Verma VCS, *et al* — Profile of Acute Poisoning Cases Treated in a Tertiary Care Hospital: A Study in Navi Mumbai. *APJMT* 2014 March; **3(1)**: 36-40.
- 16 Lavanya J, Sivaranjani V, Arshiya BS, *et al* — A Retrospective Analysis of Patterns, Severity and Clinical Outcome of Different Poisoning Cases in A Tertiary Care Teaching Hospital. *IOSR Journal of Pharmacy and Biological sciences* 2018 Jan - Feb; **13(1)**: 09-15.