

Clinical Profile of Acute Poisoning Cases and their Outcomes

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Abstract

Introduction: The present study was done to describe the incidence, nature, severity, and treatment outcome trends associated with acute poisoning cases presenting to our hospital.

Methodology: This prospective observational study was conducted by including patients who were admitted to the emergency department, Darbhanga Medical College, Laheriasarai, Darbhanga, Bihar, India with a clinical diagnosis of acute poisoning from January 2021 till June 2021. Their socio-demographic variables and poison consumed was noted.

Results: In the present study, 172 patients were included. Mean age of the patients was 27.45 years, ranging from 12 to 71 years. The sample consisted of 68% males and 32% were females. 61% were had an urban residence. Among all cases, 64% were suicidal cases and rest were accidental poisonings. Recovery and discharge were observed in 73%, 19% died (N=32) and 8% left against medical advice. The most common poison consumed was organophosphate (n=36). Next most common was methanol poisoning (n=27) and aluminium phosphide (n=22). Forty percent arrived at the hospital within 2 hours of poison consumption. It was observed that patients from older age group (p value < 0.05) and those presenting to the hospital after 4 to 6 hours (p value < 0.05) were found to be associated with poor outcomes.

Conclusions: Our study found that patients of older age group and those arriving late to the hospital were found to have significantly poor outcomes. Also, we observed high case fatality in poisonings with aluminium phosphide, organophosphate, phenyl and insecticides.

Keywords: Acute poisoning; corrosive; emergency department; prognosis.

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Introduction

Poison is a substance that causes injury to the body or causes death, when administered by any route. Acute poisoning refers to exposure to the poisonous substance within a period of less than 24 hours [1]. According to the World Health Organization (WHO) [1], nearly 200,000 people die globally from accidental poisoning and around 84% of them occur in low- and middle-income countries. However, the type, severity and mortality associated with different types of poisonings vary widely across countries, and often there are large regional disparities as well. In India, according to the National Crime Records Bureau reports, poisoning was estimated to contribute 4.6% of the 451,757 accidental deaths recorded in the country in the year 2014 and 6.3% of the 413,457 accidental deaths in the year 2015[2]. Knowledge about the pattern of acute poisoning cases in our hospital, especially with regard to their demographic, etiological, and clinical characteristics will provide us insights about early diagnosis and management of these cases. The present study was done to describe the incidence, nature, severity, and treatment outcome trends associated with acute poisoning cases presenting to our hospital.

Methodology

Study Design and Sample population

This prospective observational study was conducted by including patients who were admitted to the emergency department Darbhanga Medical College, Laheriasarai, Darbhanga, Bihar, India with a clinical diagnosis of acute poisoning. Patients were included from January 2021 till June 2021. We excluded cases who were diagnosed with food poisoning, animal bites, chronic drug or poisoning of chemicals and those who refused informed consent to participate in the study. The study was approved by the Institutional Ethics Committee and informed written consent was obtained

from the patients or their legal representatives.

Data Collection and Data Analysis

After obtained informed written consent, baseline demographic information like age, sex and residence was noted. Medical records of the patients were consulted, and the attendants of the patients were interviewed to collect detailed information. The circumstances in which the poison was consumed (accidental/suicidal), time from poisoning to hospital presentation and relevant past medical history were noted for all patients. The poisonous agent consumed was noted. The clinical outcome of the patients was noted as recovery, death or left against medical advice (LAMA). Since the final outcome of LAMA patients could not be ascertained, we classified death and LAMA as poor outcome and recovery as good outcome.

The data were compiled in Microsoft excel sheet and imported in SPSS software version 25 for analysis. Descriptive analysis included means and standard deviation for quantitative data and frequency distribution for qualitative data. Factors associated with good or poor outcomes were analysed using chi-square test. A p value less than 0.05 was considered statistically significant.

Results

In the present study, 172 patients were included. Table 1 describes the sociodemographic profile of the patients. Mean age of the patients was 27.45 years, ranging from 12 to 71 years. The sample consisted of 68% males and 61% were had an urban residence. Among all cases, 64% were suicidal cases and rest were accidental poisonings. From the medical records, we observed that 40% of the patients arrived at the hospital within 2 hours, 27% between 2 to 4 hours, 20% between 4 to 6 hours and 13% arrived in the hospital after 6 hours of poison consumption. Among 172 cases, 24% had a history of previous poisoning.

Of the sample, 73% recovered and were discharged from the hospital, 19% died (N=32) and 8% left against medical advice. The various poisons consumed are listed in table 2. This table also describes the number of patients who consumed that poison and the case fatality rate of each poison consumed. The most common poison consumed was organophosphate. It was consumed by 36/172 patients, of which 9 died (CFR = 25%). Next most common poison consumed was methanol, however no deaths occurred from it. Next common poison consumed was Aluminium phosphide and it resulted in 41% mortality. Overdose with sedatives was the next common poisoning, and it resulted in 11% case fatality. Harpic consumption was

associated with 20% mortality. Overdose with NSAIDS was observed in 11/172 cases and was not associated with any mortality. Other less commonly consumed poisons were phenyl (n=12), insecticides (n=6), anti-epileptics (n=5), bhang (n=2), dhatura (n=2), kerosine (n=2), marijuana (n=1), opium (n=1), acetic acid (n=1) and carbon tetrachloride (n=1). Combination of ethanol with sedative (n=2), ethanol with organophosphate (n=1) and ethanol with phenyl (n=1) was also reported. Furthermore, it was observed that patients from older age group (p value < 0.05) and those presenting to the hospital after 4 to 6hours (p value < 0.05) were found to be associated with poor outcomes (Table 3).

Table 1. Baseline socio-demographic characteristics of the patients included

Variables	Frequency	Percent
Age groups (years)		
Less than 20	73	42%
21 to 40	44	26%
41 to 60	37	22%
More than 60	18	10%
Gender		
Female	55	32%
Male	117	68%
Residence		
Urban	105	61%
Rural	67	39%
Circumstance		
Accidental	62	36%
Suicidal	110	64%

Time of presentation to hospital after poison consumption (hours)		
Less than 2	68	40%
2 to 4	46	27%
4 to 6	35	20%
> 6	23	13%
History of previous poisoning		
Yes	42	24%
No	130	76%
Outcome		
Recovered	126	73%
Died	32	19%
Left against medical advice	14	8%

Table 2. Distribution of patients according to the poison consumed

Group of poison	Agent	Number of cases	Deaths	Case fatality
Pesticides	Organophosphates	36	9	25%
	Aluminium phosphide	22	9	41%
Household cleaners	Phenyl	12	4	33%
	Harpic	15	3	20%
	Insecticides	6	1	17%
Drug overdose	Sedatives	18	2	11%
	NSAIDS	11	0	0%
	Antipsychotics	6	0	0%
	Antiepileptics	5	0	0%
Methanol		27	0	0%
Psychotropic drugs	Bhang	2	1	50%

	Dhatura	2	0	0%
	Marijuana	1	0	0%
	Opium	1	0	0%
Corrosives	Kerosine	2	1	50%
	Acetic acid	1	0	0%
	Carbon tetrachloride	1	1	100%
Combination agents	Ethanol + sedative	2	1	50%
	Ethanol + organophosphate	1	0	0%
	Ethanol + phenyl	1	0	0%
Total		172	32	19%

Table 3. Factors associated with poor outcome

Variable	Outcome		Total	p value*
	Good (n=126)	Poor (n=46)		
Age groups (years)				
Less than 20	65	8	73	
21 to 40	26	18	44	< 0.05
41 to 60	25	12	37	
More than 60	10	8	18	
Gender				
Female	41	14	55	0.44
Male	85	32	117	
Residence				
Urban	74	31	105	0.71
Rural	52	15	67	
Circumstance				
Accidental	45	17	62	

Suicidal	81	29	110	
Time of presentation to hospital after poison consumption (hours)				
Less than 2	57	11	68	
2 to 4	37	9	46	< 0.05
4 to 6	21	14	35	
> 6	11	12	23	
History of previous poisoning				
Yes	31	11	42	0.67
No	95	35	130	
*Analysed using chi-square test				

Discussion

Majority of our patients were young, males and from urban residences. In addition, patients of older age group in our study were found to have significantly poor outcomes as compared to younger patients. In a recent study, Chatterjee et al included 592 cases of acute poisonings[3]. In their study, the median age was 22 years with 57.09% males and 52.20% coming from rural background. The authors reported that the mortality rate increased from 6% for age group 1 to 10 years to 40% for age group 71 to 80 years. Also, males had a mortality rate of 63%, while females had a mortality rate of 26%. Patients from rural residence had a mortality rate of 41%, while it was 5% for patients from urban residence. Anand Bhaskar et al reported that majority of the cases were females (n=161, 58.5%), and most of them were in the age group of 21 to 30 years (n=88, 32%)[4]. In the study by Mathew et al, out of 200 cases, 19 (9.5%) were children below the age of 15 years with 15 (79%) cases being below the age of 5 years and approximately, 60% were males[5].

Approximately two thirds of the poisonings reported in our study were suicidal.

Chatterjee et al reported accidental poisonings in 61%, suicidal poisonings in 39% and homicidal poisonings in one case. In another study by Anand Bhaskar and colleagues from Tamil Nadu, there was a high preponderance of suicidal cases (n=207, 75.3%) compared to accidental cases (n=68, 24.7%). Of the 207 suicidal cases, only 8 (3.9%) had a history of previous suicidal attempts. Similarly, Mathew et al observed that majority of the poisonings were suicidal 115 (57%), while accidental poisonings were seen in 68 (34%) cases.

Large variations are expected in the poisonous substances which are consumed according to the geographical location[6]. In our study the most common poison consumed were organophosphates, methanol, aluminium phosphide and sedatives. A study from Karnataka[7] reported pesticides to account for 62.8% of the patients, while another study from Kerala[8] found 45% of their acute poisoning cases to have consumed pesticides. In our study, high case fatality was observed in poisonings with Aluminium phosphide (41%), organophosphate (25%), phenyl (33%) and insecticides (17%). There was one case of

carbon tetrachloride poisoning, and that patient did not survive. Chatterjee et al reported that snakebite comprised the largest fraction of cases (44.6%), followed by corrosives (13.68%), sedatives/hypnotics (13.18%), and pesticides (12.16%). In the category "others," there were 46 cases who had ingested any of the following: mosquito repellents, rat or lice killers, copper sulphate, nail polish remover, petrol, heroin, and chloroxylenol-based antiseptic solutions. In their study, pesticides had a mortality rate of 25%, while corrosives had a mortality rate of 13%. Anandbhaskar et al reported that insecticide consumption was the most common (n=79, 31%), followed by household agents (n=77, 30.2%); rodenticides (n=42, 16.5%); plant seeds (n=28, 11%); drugs (n=27, 10.6%); and herbicides and fungicide (each n=1, 0.4%). Mathew et al reported that major types of poisoning included corrosives (26.5%), drugs (13.5%), rodenticides (10.5%), organophosphates (10%), and snakebite (8%).

It should be noted that the mortality rates do not vary purely based on the type of poison consumed, but also on the accessibility and level of healthcare available. This is especially true for a country like India, where there is widespread inequity in the availability of healthcare services. It is felt that similar studies are needed from different parts of the country, so as to obtain a fair estimate of the outcomes of various types of acute poisonings. Overall, mortality rate was 19% in our study. This correlates well with previous studies from India. Chatterjee and colleagues reported mortality rate of 15%. A similar study from Mangalore[9] reported mortality rate of 15.4% and one reported 17.3%[10].

We observe that patients who arrived late to the hospital, had poor outcomes. Though not studied by other investigators, Mathew et al observed a median time for point of first medical contact after exposure for a patient coming directly to our institute and those going to other hospitals to be 60

minutes. They observed that patients who had to travel more than 30 km had higher odds of poor outcome. Chatterjee and colleagues observed that the median time interval between poisoning event and arrival at the health center was 1 hour.

There are a few limitations of this study. This is a single centre study, and the results of the present study might not be generalizable to other geographical locations. Second, a modest sample size was included and multi-centric studies with larger sample are required to support our findings.

Conclusion

Our study found that patients of older age group and those arriving late to the hospital were found to have significantly poor outcomes. This would mean that high risk cases need to be identified early and treated promptly. Easier and quicker access to a healthcare facility would require changes in public health policy and action from lawmakers. Also, we observed high case fatality in poisonings with aluminium phosphide, organophosphate, phenyl and insecticides. Setting up specialized poisoning care centres and prompt referrals to higher centres would help in reducing the mortality. In addition, identifying psychosocial factors associated with suicidal poisonings would help in reducing the burden of acute poisonings.

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