Original Research Article

Clinico-Epidemiological Study of Adult Acute Poisoning at Tertiary Care Centre in Hadoti Region: A Cross Sectional Study

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Abstract

Objective: To study Clinico-epidemiological parameters of adult acute poisoning at tertiary care centre in Hadoti region of Rajasthan.

Methodology: A prospective cross sectional was conducted on 50 patients, presenting to the Government medical college and associated group of hospitals of Kota, Rajasthan. The data about demography and laboratory parameters were collected after admission of the patient and analyzed.

Results: The mean age of patients was 28.4(13.0-58.0) years. The proportion of male was 62%. Most common mode of poisoning was ingestion(98%). suicidal circumstance was in 45 (90%) (Male : Female=2:1) and accidental in 5 (10%) patients (Male:Female=1:4). Most of the suicidal poisoning cases (34%) from the age group 20 to 29 years. Insecticidal poisoning was the most common poisoning. In drug poisoning most common from sedative group or benzodiazepine group, in corrosive poisoning most common was Phenyl. The most common symptom was Vomiting (90%). 48 patients were successfully discharged from ward or ICU and 2 were expired from ICU.

Conclusion: Study has provided a comprehensive overview of poisoning in Rajasthan, focusing on hospital data. The findings indicate that male gender and longer delays in seeking treatment at primary care facilities are associated with lower survival rates. The study highlights the need for increased public awareness about the importance of promptly transferring poisoning cases to hospitals, calling for attention from planners and policy-makers.

Keywords: Adult poisoning, Hadoti region

Take Home Message: The study highlights the need for increased awareness about the risks of poisoning, particularly among young adults, and the importance of prompt medical intervention in cases of poisoning.

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Introduction

A poison is defined as any substance that can cause harm to the body upon ingestion (consumption), inhalation (breathing), injection, or absorption through the skin. Throughout human history, poisons have been utilized for various purposes, with their most prevalent uses including weaponry, antidotes for venom, and medicinal applications.[1]

In recent decades, agricultural pesticides have become prevalent household items in rural regions of the developing world. Their widespread availability has led to their frequent utilization in deliberate cases of self-poisoning.[2]

Unintentional and deliberate poisoning constitutes a medical emergency with the potential for significant morbidity and mortality. Each year, numerous individuals lose their lives to suicide, with approximately twenty times as many attempting it.[3] The highest rates of suicide occur in low- and middle-income countries.[4]

Depending on the toxins involved, acute toxicity can present with diverse symptoms. Individuals experiencing organ failure require admission to the intensive care unit (ICU) for specialized care and organ support.[5] High mortality rates may arise due to various factors, including the type of toxin, timing of symptoms onset, and occurrence of multi-organ failure. Swift identification and prompt treatment in the emergency department (ED) and ICU are crucial to prevent hospital morbidity and mortality in poisoned patients.In rural regions of the developing world, agricultural pesticides have increasingly found their way into households over the past few decades. Their ready availability has led to their frequent utilization in deliberate cases of self-poisoning. According to estimates from the World Health Organization (WHO) in 1990 (World Health Organization 1990), approximately 3 million poisoning incidents resulting in 220,000 fatalities occur each year. Nearly all of these deaths, about 99%, transpire in developing nations.[6]

Only a limited number of studies have investigated the epidemiology and clinical characteristics of poisoning in Rajasthan.[7-14] The pattern of poisoning in the hadoti region of Rajasthan remains poorly understood. Consequently, there is a pressing need to gather regional clinical and epidemiological data on poisoning. These data will facilitate the optimal utilization of existing resources for the prevention and management of poisoning incidents. Therefore, this study aimed to assess clinical and epidemiological indicators for acute poisoning and outcomes among patients brought to the tertiary care facility.

Material and Methods

This was a single centre prospective cross sectional study done at government medical college and associated hospital, Kota (Tertiary care centre of Hadoti region) between13th July 2023 to 28th January 2024. A total of 50 patients were included in this study.

Detailed history regarding Demographic data, clinical manifestations, comorbidities, past history of suicidal attempts and psychiatric treatment were taken after taking informed consent to patients or their relatives after admission of the patient in hospital. History taken from either relatives or patient. Type of poison and route of exposure, intention of poisoning identified weather it was intentional/suicidal or accidental and time taken to reach at tertiary care centre were duly noted.If poison was ingested, gastric lavage done if not contraindicated in emergency.

Explicit treatment was administered to the cases and managed with antidotes when deemed necessary. Patient decontamination was conducted if required following initial stabilization. Subsequent to an initial evaluation, care, and a brief observation phase, the patient's course of action was decided based on the observed level of toxicity and anticipated progression. Factors such as the need for vasopressors, ICU admission, mechanical ventilation were evaluated. Patients were monitored until their discharge or demise.

Venous sample drawn within 24 hours of admission for Complete blood count, Renal function test (Blood urea and Serum creatinine). Complete

blood count measured by an automated hematology analyzer (sysmax XS-800i, Japan) in central laboratory of Government medical college, kota. And manually corrected by pathologist to overcome any technical error. Routine biochemical test - Renal function test, performed by automated biochemistry analyzer (Erba mannheim EM-200 or Erba mannheim XL-640) in central laboratory of Government medical college, kota.

Inclusion criteria: All adult patients presented in emergency due to acute poisoning during the period from 13th July 2023 to 28th January 2024 were included.

Exclusion criteria: Age less than 10 years were excluded.

Statistical analysis: The SPSS IBM program version 25 (IBM SPSS Advanced Statistics, Chicago, IL, USA) was used to input and analyze data. Frequency and percentages were used to characterize nominal data, and the Chi-squared or Fisher's exact test was used to compare these data. Continuous data were reported using mean +/- SD and compared using an unpaired t-test. The median and interquartile range (IQR) were used to characterize and compare non-normally distributed data and compared using the Mann–Whitney U test. P value < 0.05 was deemed statistically significant. The association between two variables was measured by the Spearman rank-order correlation coefficient

Results

During the research period, 50 patients with acute poisoning admitted from the emergency room. The mean age of patients was 28.4(13.0-58.0) years. The proportion of male patients was 62%. Out of the 50 patients, a maximum number (n = 13) was from the 20-30 years of age group. One male patient in the study population had previously been diagnosed with psychiatric illness. Depression was the psychiatric illness. Three patients had past history of poisoning.(Table-1)

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Table-1: Epidemiological features of adult acute poisoning.

PARAMETER	N =50	%
Age (years)		
Mean age ±SD	28.4 ±10.58	
Range	13-58	
10-19	12	24
20-29	18	36
30-39	11	22
40-49	6	12
50-59	3	6
Gender		
Male	31	62
Female	19	38
H/o psychiatry treatment		
Yes	1	2
No	49	98
Past history of poisoning		
Yes	3	6
NO	47	94

The Ingestion route was the most common mode of poisoning. The Dermal or exposural route of poisoning was seen in only one (2%) patient. The one case of dermal poison was male and from aerosols and fumes of organophosphate poison. The most common circumstance of poisoning was suicidal (Male-female ratio was 2:1) and accidental in 10% patients (male-female ratio was 1:4). In males the suicidal poisoning was 96.77% and in females 78.94%. The accidental poisoning in males was 2.7% and in females it was 21.05%.(Table-2)

Table-2: Comparison between male and female in term of route of poisoning and circumstances.

PARAMETER	MALE n (%)	FEMALE n (%)
Route of poisoning		
Ingestion	30 (60%)	19 (38%)
Dermal	1 (2%)	0
Circumstance of poisoning		
Suicidal	30 (60%)	15 (30%)
Accidental	1 (2%)	4 (8%)

Table-3: Comparison of circumstances and gender in different age groups.

AGE GROUP (Years)	CIRCUMSTANCE			
	SUICIDAL		ACCIDENTAL	
	Male	Female	Male	Female
10-19	5(10%)	6(12%)	-	1(2%)
20-29	13(26%)	4(8%)	-	1(2%)
30-39	6(12%)	4(8%)	1(2%)	-
40-49	4(8%)	1(2%)	-	1(2%)
50-59	2(4%)	-	-	1(2%)

Among the all cases Insecticidal poisoning was the most common poisoning presenting to emergency seen in 30%, among in insecticidal poisoning organophosphate poisoning was most common seen in 9 (18%) patients.(Table-4)

Table-4: Categories of poison

CATEGORY OF POISON	N= 50	%
Insecticides	15	30
Unknown	11	22
Rat killer	6	12
Drugs	6	12
Corrosive	5	10
Celphos	4	8
Herbicidal	1	2
Fertilizer	1	2
Ratanjot	1	2

In the category of drug poisoning most common drug used from sedative group or benzodiazepine groups (66.66%) followed by paracetamol and cetrimide lotion. And in category of corrosive poisoning most common corrosive product used was Phenyl (40%) followed by sulphuric acid , hydrochloric acid and glutaraldehyde.

All patients were symptomatic. The most common symptom at the time of presentation was Vomiting(90%) followed by nausea(88%), abdominal pain(30%), hypotension(16%),altered consciousne ss(14%),sedation(8%), burning sensation(8%) and convulsion(2%). (Figure-1)

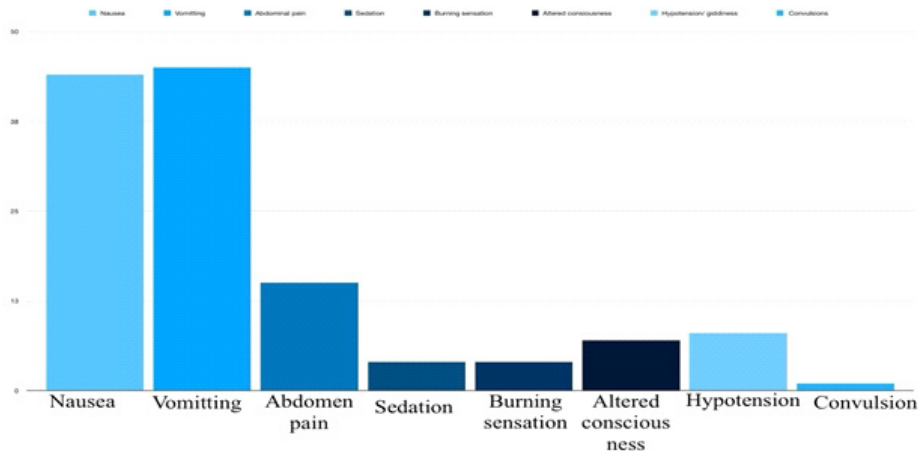

Figure-1: Clinical manifestations in adult acute poisoning.

ECG was Abnormal in 2 patients (4%), one case had changes of LBBB and one had ST-depression. Chest X-ray was Abnormal in 3 patients (6%), all of them had findings of Aspiration Pneumonitis. Elevated blood urea was seen in 16% and serum creatinine in 8%. Leucocytosis was seen in 22%, Thrombocytopenia in 6% cases.

33 patients (66%) were reached in emergency within 3 hours after took poison. After admission in emergency Gastric lavage were not done in corrosive

poisoning cases. vasopressor support was mostly needed in aluminum phosphide poisoning. Ventilator support was needed in aluminum phosphide and organophosphate group poisoning. Two patients were expired from ICU, both were male and one patient died due to unknown poisoning and one died due to organophosphate poisoning.(Table-5)

Table-5: Management of acute poisoning patients.

PARAMETER	n	%
Gastric Lavage		
Done	45	90
Not Done	5	10
Vasopressor Support		
Required	7	14
Not Required	43	86
Ventilation support		
Required	5	10
Not Required	45	90
Outcome		
Discharge	48	96
Mortality	2	4

Discussion

The present study addresses Clinico-epidemiological profile of patients presenting to the emergency department of our institution at Kota, Rajasthan. Various studies were conducted on poisoning pattern in Rajasthan.[7-14]There is only one study in the literature evaluating on fatal poisoning pattern of 799 patients in Kota region done during 2009-2011.[10] Ours is the most recent study involving 50 patients Kota.Singh *et al.*[15]showed that the majority (36%) of the cases of poisoning belonged to the age group 21-30 years.

Thapa *et al.*[16]showed that the most common age group in poisoning cases was 21-30 years. In our study, the maximum number of patients was from the age group of 20-29 years (36%), followed by age groups of 10-19 years (20.3%). The mean age of the patients in our study was 28.4 ±10.58 years, compared with the above studies. This can be attributed to increased work stress, family issues, financial strain, and other life-settling issues in this age group.

In a study by Patel *et al.*[17], 59.2% of patients with poisoning were male. Similarly, in our study of 50 participants, 31 (62%) were males. The male predominance of poisoning might be due to their greater exposure to stress in everyday life and work dangers compared to females.

As per Shah *et al.*[18] the most common route of exposure was oral ingestion (71.4%) of poison, followed by dermal and inhalation routes.

In a study by Pannu *et al.*[19] ingestion for self-harm remained the predominant method of poisoning. And the ratio of intentional self-harm to unintentional exposure was 4:1. Also showed that about two-thirds of the poisoning cases included pesticides, with organophosphate (22.6%), aluminum phosphide (18.9%), and paraquat (4.7%) being the most prevalent substances. Similarly, in our study, the most common route of ingestion was by oral route (98%) and insecticide was the most common cause of poisoning in 15 patients (30%).

Teklemariam *et al.*[20] observed that the common presenting symptom in patients with poisoning was diarrhea and vomiting (49.5%), which was followed by altered consciousness (16.5%) and epigastric discomfort (13.6%). In our study, vomiting were the most common symptoms seen in 90% of patients, followed by nausea in 88% of patients, followed by abdomen pain in 30% of patients.

According to a study by Mathai *et al.*[21] patients with hemodynamic instability who presented late had early signs of organ failure, had acidosis, and required vasoactive medications had a poor prognosis. In the same research, patients who required mechanical ventilation and vasoactive support also had a greater mortality rate.

Rajbanshi *et al.*[22] showed that 16.5% of survivors of poisoning had acute renal failure. In our study, 8 patients (16%) had elevated blood urea and 4 (8%) had increased serum creatinine, patients with non-organophosphorus poisoning had 1.6 times more ICU mortality. In our study, mortality rate in patients with poisoning was 4%. Unknown poisoning (2%) and OPC poisoning (2%) has the highest mortality rate.

Limitation

This study has certain limitations. It was conducted in a single center. The epidemiological data do not incorporate socioeconomic conditions, cultural and religious information, or occupational data, which might have given further insight into the clinical spectrum of poisoning. Because our hospital is a tertiary care center, individuals with poisoning might have appeared late after obtaining first aid at the local level, thus missing the precise identification of toxins. As the institute of this study is located in an urban area, the patients are more likely to reach from urban area leading to a Selection Bias (Berkson's Bias). We did not include patients with snakes or unknown bites. Multicenter studies with larger sample sizes are required in the future for the generalizability of our results.

Conclusion(s)

We can say that our study has contributed a large prospective profile on poisoning in India, albeit from a hospital perspective. Male gender and longer event-to-treatment latency at primary care levels had a negative impact on survival. The study reveals some issues that require attention from planners and policy-makers such as greater awareness among the public regarding the importance of prompt transfer to hospital for all poisoning cases, measures to expedite the transfer of serious patients to tertiary care centers, and setting up of specialized poison units in secondary and tertiary care hospitals. Field studies on poisoning are difficult to organize but if conducted in the light of these hospital-based results will clarify some issues that have not been addressed such as the underlying reasons that lead to the poisonings, reasons for delay in seeking treatment, and the extent of ignorance regarding the safe use of pesticides.

CONFLICT OF INTEREST: Nil

SOURCE OF FUNDING: No Source

ETHICAL CLEARANCE: Ethical Clearance taken from INSTITUTIONAL ETHICAL COMMITTEE, GOVERNMENT MEDICAL COLLEGE , KOTA on 10 July 2023 (Reference no. is not available)

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