Original Research

"PROSPECTIVE OBSERVATIONAL STUDY OF PATTERN, SEVERITY AND OUTCOME OF DIFFERENT POISONING CASES IN TERTIARY CARE HOSPITAL OF EASTERN GUJARAT"

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ABSTRACT

Background: Acute poisoning is a major public health problem and a common cause of emergency hospital admissions in developing countries. The pattern, severity, and outcomes of poisoning vary according to geographical region, socioeconomic conditions, and accessibility of toxic substances. Understanding these factors is essential for improving preventive strategies and patient management.The aim of the present study is to evaluate the pattern, severity, and outcomes of different poisoning cases admitted to a tertiary care hospital in Eastern Gujarat.

Materials and Methods: A prospective observational study was conducted among 424 patients admitted with acute poisoning to a tertiary care hospital in Eastern Gujarat. Demographic characteristics, type and mode of poisoning, timing of exposure, severity at admission, duration of hospital stay, and clinical outcomes were recorded and analyzed using descriptive statistics.

Results: The majority of patients belonged to the 21–30 years age group (35.14%) and were male (73.11%). Most patients were married (59.43%), and suicidal poisoning was the predominant mode of poisoning (79.95%). Pesticides and organophosphorus compounds were the most common poisoning agents (34.43%), followed by drug poisoning/drug overdose (29.72%). Most poisoning incidents occurred during evening and night hours (54.71%), and 46.69% of patients presented within 2–6 hours of exposure. Mild poisoning was observed in 59.90% of cases, while moderate and severe poisoning accounted for 26.18% and 13.92%, respectively. The majority of patients (75.94%) required hospitalization for ≤3 days. Regarding outcomes, 65.56% of patients were discharged, 18.16% left against medical advice (DAMA), and 16.27% died.

Conclusion: Acute poisoning predominantly affected young adult males and was mainly associated with suicidal intent. Pesticides and organophosphorus compounds were the most common poisoning agents. Although most patients had mild poisoning and favorable outcomes, the substantial mortality observed highlights the need for improved poison prevention strategies, mental health interventions, early healthcare access, and prompt management to reduce poisoning-related morbidity and mortality.

Keywords: Acute Poisoning, Organophosphorus Poisoning, Pesticide Poisoning, Poison Severity, Clinical Outcome.

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INTRODUCTION

Acute poisoning is a significant public health problem worldwide and remains an important cause of morbidity, mortality, and emergency hospital admissions, particularly in developing countries. It is defined as exposure to a toxic substance through ingestion, inhalation, injection, or skin contact resulting in adverse health effects that require immediate medical attention [1]. According to the World Health Organization (WHO), poisoning

contributes substantially to the global burden of disease, with low- and middle-income countries accounting for the majority of poisoning-related deaths due to easy accessibility of toxic agents, inadequate regulation, and limited healthcare resources [2,3].

India bears a considerable burden of acute poisoning because of its predominantly agrarian economy and widespread use of pesticides. The pattern of poisoning varies across regions depending on socioeconomic conditions, occupational exposure, cultural practices, and availability of poisonous substances [4]. In rural areas, pesticides such as organophosphorus compounds, carbamates, pyrethroids, and rodenticides are commonly implicated, whereas pharmaceutical overdoses, household chemicals, and corrosive substances are more frequently encountered in urban settings [5,6].

Acute poisoning is a medical emergency in which the outcome depends on several factors including the type and quantity of poison consumed, route of exposure, time elapsed before treatment, severity at presentation, and availability of appropriate medical care [7]. Delayed hospital presentation has been consistently associated with increased complications, prolonged hospitalization, and higher mortality rates [8]. Early diagnosis and prompt management therefore play a crucial role in improving patient outcomes.

Several Indian studies have shown that poisoning is most common among young adults in the economically productive age group, with males and rural residents being disproportionately affected [4,5,9]. Suicidal poisoning constitutes the majority of cases and is often associated with psychosocial stressors, family conflicts, financial difficulties, and mental health issues [1,4]. Easy access to highly toxic pesticides further contributes to the high incidence of deliberate self-poisoning in agricultural communities [6].

Recent studies from different parts of India have identified pesticides, organophosphorus compounds, aluminium phosphide, snakebite envenomation, drug overdoses, and household chemicals as major causes of poisoning admissions [4,5,9,10]. Mortality rates vary widely depending on the poison involved, severity at admission, and healthcare accessibility. Studies from Gujarat have reported pesticides as the leading agents of poisoning, with severe poisoning and delayed presentation being important predictors of poor outcomes [4,5].

Eastern Gujarat is characterized by a mixed rural–urban population, extensive agricultural activity, and increasing industrialization, all of which contribute to diverse poisoning exposures. However, prospective data regarding the pattern, severity, and outcomes of poisoning cases in this region remain limited. Understanding the epidemiological profile and clinical outcomes of poisoning cases is essential for developing preventive strategies, improving emergency care services, and reducing poisoning-related morbidity and mortality.

Therefore, the present study was undertaken to prospectively evaluate the pattern, severity, and outcomes of different poisoning cases admitted to a tertiary care hospital in Eastern Gujarat and to identify factors associated with patient prognosis.

MATERIALS AND METHODOLOGY

This hospital-based prospective observational study was conducted in the Department of General Medicine and Emergency Medicine at a tertiary care teaching hospital in Eastern Gujarat over a period of 18 months. The study included all eligible patients presenting with acute poisoning who were admitted to the emergency department, intensive care unit (ICU), or medical wards during the study period. Prior approval was obtained from the Institutional Ethics Committee before initiation of the study, and written informed consent was obtained from all participants or their legally authorized representatives.

Patients aged 18 years and above with a history and/or clinical diagnosis of acute poisoning due to pesticides, pharmaceuticals, household chemicals, corrosives, hydrocarbons, plant toxins, animal envenomation, or other toxic substances were included in the study. Patients with chronic poisoning, food poisoning, incomplete medical records, those brought dead to the hospital, and those unwilling to participate were excluded from the study.

All eligible patients were enrolled consecutively after fulfilling the inclusion criteria. Data were collected using a predesigned and prevalidated case record form. Information regarding demographic characteristics such as age, gender, residence, occupation, marital status, and socioeconomic status was recorded. Details related to poisoning including type of poison, manner of poisoning (suicidal, accidental, homicidal, or occupational), route of exposure, estimated quantity consumed, and time interval between exposure and hospital presentation were obtained from the patient, relatives, and available medical records. Clinical features at presentation, vital signs, laboratory investigations, and treatment details including gastric lavage, antidote administration, supportive care, ventilatory support, and intensive care management were documented.

The severity of poisoning was assessed at admission using the Poison Severity Score (PSS), which categorizes poisoning into none, minor, moderate, severe, and fatal grades.Neurological status was assessed using the Glasgow Coma Scale (GCS). Patients were followed throughout their hospital stay, and outcome measures such as duration of

hospitalization, recovery, discharge with complications, referral, and mortality were recorded. The primary objectives of the study were to evaluate the pattern of poisoning, assess the severity of poisoning at presentation, and determine clinical outcomes. Secondary objectives included identifying demographic and clinical factors associated with severity and outcome and evaluating predictors of morbidity and mortality.

The collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean ± standard deviation (SD) or median with interquartile range, while categorical variables were presented as frequencies and percentages. Associations between categorical variables were assessed using the Chi-square test or Fisher's exact test, whereas continuous variables were compared using Student's t-test or Mann–Whitney U test as appropriate. A p-value of less than 0.05 was considered statistically significant.

RESULT

The total number of patients included in the study was 424.Table 1 summarizes the demographic characteristics of the 424 patients included in the study. The majority of patients belonged to the 21–30 years age group (35.14%), followed by 11–20 years (21.70%) and 31–40 years (20.99%), indicating that poisoning predominantly affected young adults. Males constituted the majority of cases (73.11%), while females accounted for 26.65%.Most patients were married (59.43%), and the predominant religion was Hinduism (91.26%). Regarding educational status, the largest proportion of patients had high school/higher secondary education (25.23%), followed by illiterate individuals (21.93%) and those with primary education (21.70%).Occupationally, students (19.34%) formed the largest group, followed by labourers/daily wage workers (18.86%) and farmers (18.16%). With respect to the mode of poisoning, suicidal poisoning was the most common (79.95%), followed by accidental (16.75%) and homicidal poisoning (3.30%). These findings suggest that poisoning predominantly affected young, married males and was mainly associated with deliberate self-harm.

Table 1. Demographic characteristics of patients involved in the study (n=424)

Demographic Detail		Number	Percentage
Age (Years)	0-10	7	1.65%
	11-20	92	21.70%
	21-30	149	35.14%
	31-40	89	20.99%
	41-50	42	9.91%
	51-60	27	6.36%
	>60	18	4.25%
Gender	Male	310	73.11%
	Female	113	26.65%
	Transgender	1	0.24%
Marital Status	Unmarried	172	40.57%
	Married	252	59.43%
Ethnicity	Hindu	387	91.26%
	Muslim	35	8.26%
	Christian	1	0.24%
	Sikh	1	0.24%
Education	Illiterate	93	21.93%
	Primary education	92	21.70%
	Secondary Education	83	19.58%
	High school/High Secondary	107	25.23%
	Graduate/Degree	49	11.56%
Occupation	Student	82	19.34%
	Labourer/daily wage worker	80	18.86%
	Farmer	77	18.16%
	Homemaker/housewives	59	13.92%
	Business	52	12.26%
	Unemployed	40	9.43%
	Service holder	34	8.01%
Mode of Poisoning	Suicidal	339	79.95%
	Accidental	71	16.75%

	Homicidal	14	3.30%

Table 2. Clinical and Circumstantial profile of Poising cases

Clinical and Circumstantial profile		Number	Percentage
Type of Poisoning	Pesticides/Organophosphorus compounds	146	34.43%
	Drug poisoning/Drug overdose	126	29.72%
	Corrosives	49	11.56%
	Rodenticides/Rat poison	67	15.8%
	Household chemicals/Hydrocarbons	30	7.08%
	Others/Unknown	6	1.42%
Timing of Poisoning	Morning/Day	192	45.28%
	Evening/Night	232	54.71%
Time Since Exposure	<2 hours	163	38.44%
	2 – 6 hours	198	46.69%
	> 6 hours	63	18.86%
Severity at admission	Mild	254	59.90%
	Moderate	111	26.18%
	Severe	59	13.92%
Duration of Hospital Stay	≤ 3days	322	75.94%
	4 - 7 days	71	16.74%
	> 7 days	31	7.32%
Outcome	Death	69	16.27%
	DAMA	77	18.16%
	Discharged	278	65.56%

Table 2 summarizes the clinical and circumstantial profile of the 424 poisoning cases included in the study. Pesticides and organophosphorus compounds were the most common poisoning agents, accounting for 146 (34.43%) cases, followed by drug poisoning/drug overdose in 126 (29.72%) cases. Rodenticides and rat poison constituted 67 (15.80%) cases, while corrosive substances and household chemicals/hydrocarbons accounted for 49 (11.56%) and 30 (7.08%) cases, respectively. Other or unknown poisoning agents were identified in only 6 (1.42%) cases.

With regard to the timing of poisoning, more than half of the incidents occurred during the evening or night hours [232 (54.71%)], whereas 192 (45.28%) cases occurred during the morning or daytime. Most patients presented to the hospital within 2–6 hours of exposure [198 (46.69%)], followed by 163 (38.44%) patients who presented within 2 hours. Delayed presentation beyond 6 hours was observed in 63 (14.86%) cases.

Assessment of severity at admission revealed that the majority of patients had mild poisoning [254 (59.90%)], while 111 (26.18%) and 59 (13.92%) patients presented with moderate and severe poisoning, respectively. Most patients required a hospital stay of ≤3 days [322 (75.94%)], whereas 71 (16.74%) remained hospitalized for 4–7 days and 31 (7.32%) required hospitalization for more than 7 days.

Regarding clinical outcomes, 278 (65.56%) patients were discharged following recovery, while 77 (18.16%) left against medical advice (DAMA). Mortality was observed in 69 (16.27%) patients. These findings indicate that pesticide-related poisoning, predominantly occurring during evening and night hours, constituted the major burden of poisoning cases, with most patients presenting with mild severity and achieving a favorable outcome following treatment.

DISCUSSION

Acute poisoning remains a major public health problem in developing countries, with its pattern and outcomes varying according to geographical, socioeconomic, occupational, and cultural factors. Continuous assessment of poisoning trends is essential for understanding regional epidemiology and improving prevention and management strategies. The present prospective study provides valuable insights into the pattern, severity, and outcomes of poisoning cases in Eastern Gujarat, contributing important data for enhancing clinical care and public health interventions.

The majority of poisoning cases in the present study occurred among individuals aged 21–30 years (35.14%), followed by those aged 11–20 years (21.70%). Similar findings were reported by Nadeem et al. (52% aged 18–30 years) [9], Churi et al. (54.7% aged 18–28 years) [7], and Ramesha et al. (31.2% aged 20–29 years) [10], indicating that poisoning predominantly affects young adults due to psychosocial, academic, occupational, and financial stressors.

A marked male predominance was observed (73.11%), which is comparable to findings reported

by Ramesha et al. (75.4%) [10], Nadeem et al. (58%) [9], and Aggarwal et al. (59.5%) [2]. Males are generally more exposed to occupational hazards and toxic substances, particularly in agricultural settings.
Married individuals constituted 59.43% of cases in the present study, similar to findings reported by Nadeem et al. (71%) [9], Maheswari et al. (54.4%) [11], and Aggarwal et al. (55.2%) [2]. The higher incidence among married individuals may be related to greater family responsibilities and socioeconomic stress.
Patients with high school/higher secondary education formed the largest educational group (25.23%), comparable to the findings of Vanishree et al. (26.1%) [6]. Students (19.34%), labourers (18.86%), and farmers (18.16%) were the most commonly affected occupational groups, which is in agreement with reports by Sherpa et al. [1] and Vanishree et al. [6].
Suicidal poisoning was the predominant mode of poisoning (79.95%), consistent with studies by Churi et al. (84%) [7], Nadeem et al. (79%) [9], and Sherpa et al. (83.2%) [1], highlighting the major contribution of deliberate self-harm to poisoning-related hospital admissions.
Pesticides and organophosphorus compounds were the most common poisoning agents (34.43%), followed by drug poisoning (29.72%). Similar observations were reported by Churi et al. [7], Nadeem et al. [9], and Prajapati et al. [4], reflecting the widespread availability of pesticides in agricultural communities and increasing access to pharmaceutical agents.
More than half of the poisoning incidents occurred during the evening and night hours (54.71%), which is comparable to the findings of Prajapati et al. (67.3%) [4]. Most patients presented within 2–6 hours of exposure (46.69%), while 38.44% reached the hospital within 2 hours, similar to observations by Nadeem et al. [9] and Prajapati et al. [4]. Early presentation is an important determinant of improved clinical outcomes.
The majority of patients had mild poisoning at admission (59.90%), followed by moderate (26.18%) and severe poisoning (13.92%). Comparable findings were reported by Churi et al. [7] and Prajapati et al. [4], suggesting that many patients received timely medical attention before the development of severe toxicity.
Most patients (75.94%) required hospitalization for three days or less, which is comparable to findings reported by Nadeem et al. (77%) [9] and Maheswari et al. [11]. Shorter hospital stays generally reflect milder poisoning and favorable response to treatment.
Regarding outcomes, 65.56% of patients were discharged, 18.16% left against medical advice (DAMA), and 16.27% died. The discharge rate was lower and mortality rate higher than those reported by Prajapati et al. (80% discharged, 6.8% mortality) [4] and Churi et al. (96.2% improved, 1.8% mortality) [7]. These differences may be attributed to variations in poisoning severity, toxic agents involved, referral patterns, and delays in presentation to the tertiary care center.

CONCLUSION

Poisoning remains a major public health concern in Eastern Gujarat, predominantly affecting young adult males and occurring mainly as a result of suicidal intent. Pesticides and organophosphorus compounds were the most common poisoning agents. Most patients presented within 2–6 hours of exposure and had mild poisoning at admission, resulting in favorable outcomes in the majority of cases. However, the observed mortality rate highlights the need for improved poison prevention measures, mental health interventions, early hospital presentation, and prompt medical management to reduce poisoning-related morbidity and mortality.

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