

Evaluation of Acute Poisoning In Emergency Department: A Clinico-Epidemiological Study in Tertiary Care Teaching Hospital of Gujarat

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Abstracts: **Background:** In our country acute poisoning is a condition that has a very large amount of susceptible population due to the existence and the ease of access of poisonous substances. Our study tried to analyse the specific antidotes used with respect to different poisonings, outcome and general drug therapy for the same. **Objectives:** To assess the different types of acute poisoning, effectiveness of the treatment provided, in terms of outcome & severity. **Methods:** This is a prospective, longitudinal, observational type of study; over the period of 3 months. The data was collected with the proper prior consent and was analysed on the basis of outcome with the use of 'Poisoning Severity Scale' and the 'Modified Snakebite Severity Score'. **Results:** Organophosphorus substances were the commonest cause of accidental poisoning whereas snake bite was the commonest cause due to the envenomation. All the patients of Organophosphorus poisoning and snake envenomation were treated with the primary treatment atropine and anti-snake venom respectively, ultimately resulting in low mortality rate (6%). **Conclusion:** Our study had very low mortality rate, which could be due to less number of cases of fatal poisoning and due to good transport facilities from rural to urban areas as well as early start of the specific treatment and management. [S Shah Natl J Integr Res Med, 2018; 9(1):20-25]

Key Words: Acute Poisoning, Organophosphorus compound, Snake bite.

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Introduction: According to W.H.O. estimate, more than 3 million cases of acute poisoning worldwide reported annually¹. The common causes of morbidity and mortality due to poisoning in our country includes exposure to chemicals like Organophosphorus pesticides (OPs), carbamates, pyrethroids, aluminium phosphide; ease with which the poisons or drugs can be obtained; over the counter (OTC) drug over dosage; and frequent occurrences of bites by snake and other venomous creatures². Acute poisoning account for 2-3 % of hospital admissions in India³.

Organophosphorus compounds are extensively used as pesticides in agriculture in India. They form the largest bulk of pesticide poisoning⁴. In parts of northern India; aluminium phosphide causes most deaths in an epidemic that started two decades ago⁵. Worldwide, more than 5 million persons per year are bitten by snakes, out of which approximately 100,000 develop severe sequelae^{6,7}. Some hospital-based studies and public health surveillance reports clearly indicate increasing incidence of poisoning due to medications and chemicals particularly pesticides⁸.

Ours being a tertiary care centre will reflect the entire spectrum of poisoning. Hence studies like this becomes worthwhile as it will give us fair idea about the types and natures of drug and nondrug poisoning in acute conditions and exposures.

Methods: This is a prospective, longitudinal, observational type of study; expanding over the period of 3 months from July to September 2016. A prior permission from the Institutional Ethics Committee and the Head of the Department of Emergency Medicine was obtained. All consecutive patients presenting in the emergency department of the hospital during the study period with history and clinical features of acute poisoning were considered eligible for participation in the study. Any type of accidental poisoning, poisoning residing in the environment of the direct contact of the population, Poisoning due to venomous creatures, Iatrogenic and/or accidental poisoning related with the overdose of any medicine; either in accordance to any current treatment and/or easily available and commonly used OTC (Over The Counter) drugs were included. The investigator visited the department daily and data was collected in the 'Case Record Form'. Informed consent was obtained from eligible patients/legally authorized representatives (if the patient was unconscious). Identification of a particular poison was done on the basis of statement of the patient/witness, smell of poisoning agents, brought specimen, and characteristic features of poisoning in majority of cases. Patient was followed up in the respective medical wards until discharge or otherwise.

The analysis of the study was carried out with special focus on:

- Demographic profile
- Causative agents
- Pattern and prevalence of acute poisoning
- Treatment and management
- Severity of outcome

For the purpose of standardization of the clinical symptoms and determination of presumptive outcome, the Poisoning Severity Scale⁹ was used to categorize the patients of Organophosphorus poisoning.

The severity grades are as following:

None (0): No symptoms or signs related to poisoning
 Minor (1): Mild, transient and spontaneously resolving symptoms
 Moderate (2): Pronounced or prolonged symptoms
 Severe (3): Severe or life-threatening symptoms
 Fatal (4): Death

The severity of snake bite was assessed using 'Modified Snakebite Severity Score' (SSS)¹⁰. The occurrence of the particular symptoms/signs were checked against the chart and graded accordingly.

Grade 0: No Symptoms or Signs
 Grade 1: Mild, Transient or Spontaneously Resolving Symptoms or Signs
 Grade 2: Moderate, Pronounced or Prolonged Symptoms or Signs
 Grade 3: Severe or Life Threatening Symptoms or Signs

Data was entered into Microsoft excel 2013 and percentage was calculated.

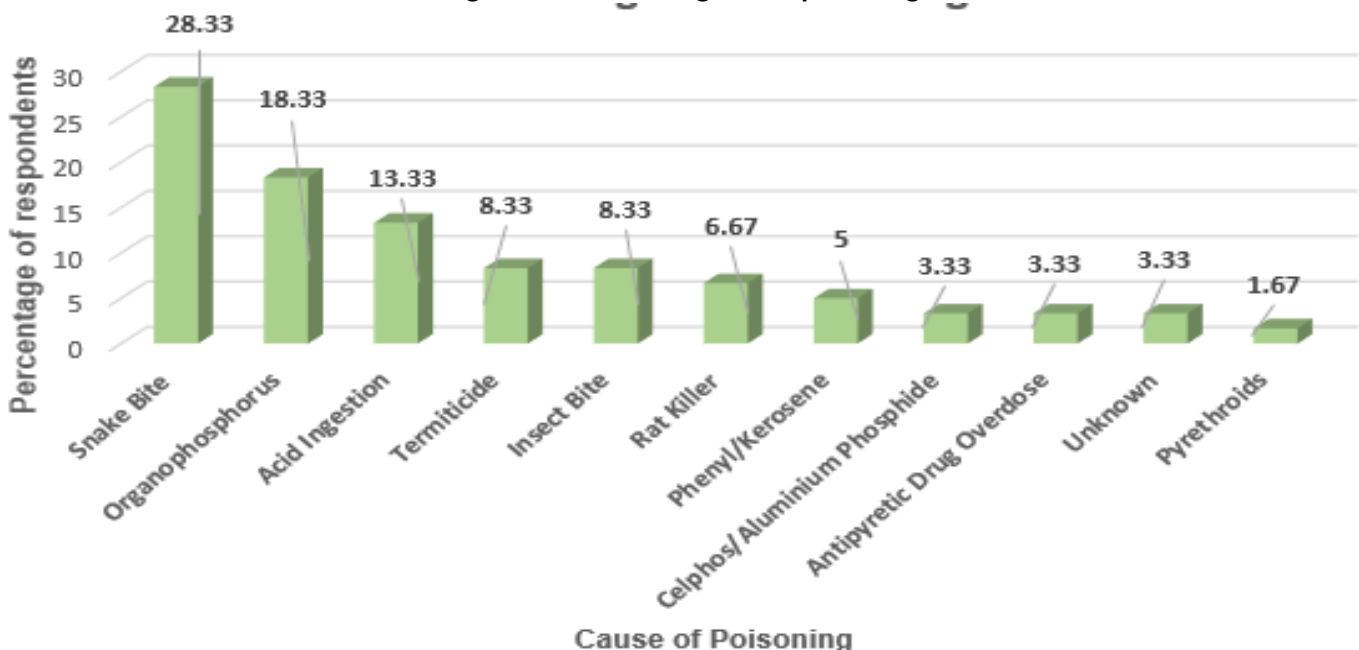
Result: Out of the total cases presented (n=60), most of the patients belonged to the age group of 21-40 years (68%), with male (78%) dominating over females (22%).

The Major population group exposed to acute poisoning belonged to rural area (55%) and the major occupation was farming and farming related occupation. The cause of poisoning in 38 patients was accidental (63%) and in 22 patients was evenenomation (37%).The route of poisoning administration in most of the patients (n=36) was oral followed by other like Cutaneous and inhaled.

Most of the patients were brought to the hospital, within 24 hours of poisoning exposure (78.33%); 15% of them were brought within 1-6 days and 6.7% were brought after a week.

Majority of patients presented with snake bite (28.33%) followed by OP poisoning (18.33%) and acid ingestion (13.33%).Other common causes of accidental poisoning were household acid, Termiticide, rat killer, phenyl/kerosene in decreasing order of frequency. [Fig-1]

Figure 1: Causative agents of poisoning



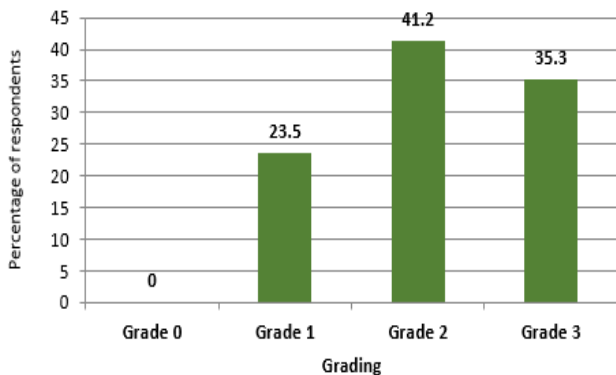
General protocol of the hospital, some interventions were conducted as per the condition and the cause of poisoning of a patient¹¹. Gastric Lavage was performed in half of the patients, followed by ventilator support provided in 18.33% of the patients. About the same percentage of samples were sent for acetyl cholinesterase levels in the patients suspected with Organophosphorus poisoning. 5% sent for urine toxic screening and 1.67% undergone tracheostomy. The management and treatment of the envenomation followed the standard protocol, according to which Anti Snake venom was given to all the identified and suspected snake bite cases. Other supportive treatment including antiemetic, proton pump inhibitor, antimicrobials, Neostigmine etc. were given according to the symptomatic presentation of the patient.

According to the standard treatment protocol atropine was administered in virtually all the cases with OP poisoning. The patients seriously affected by the OP poisoning received extensive atropinisation; adjusted according to the heart rate, consciousness and bronchial secretions for more than 3 days.

Other symptomatic or supportive treatment in the form of antiemetic, proton pump inhibitor, antimicrobial was also provided. 45% of the patients of OP poisoning were also treated with the specific cholinesterase reactivator, Oximes.

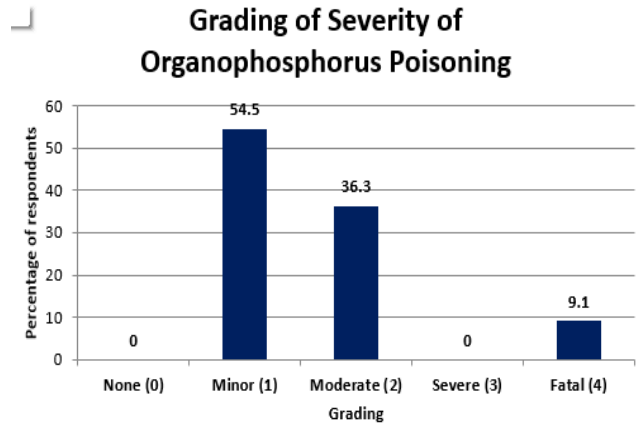
The severity of snake bite poisoning was determined according to the 'Modified Snakebite Severity Score' (SSS), in which patients assigned as Grade 2 (Moderate) were found to be maximum (41.2%). [Fig-2] Two cases of snake bite also turned fatal which could be due to delay in their reaching to the hospital.

Figure 2: Grading of Severity of Snake Bite Poisoning



According to the poisoning severity scale for OP poisoning most of the patients 54% were in Grade 1 (Minor) severity. [Fig-3]

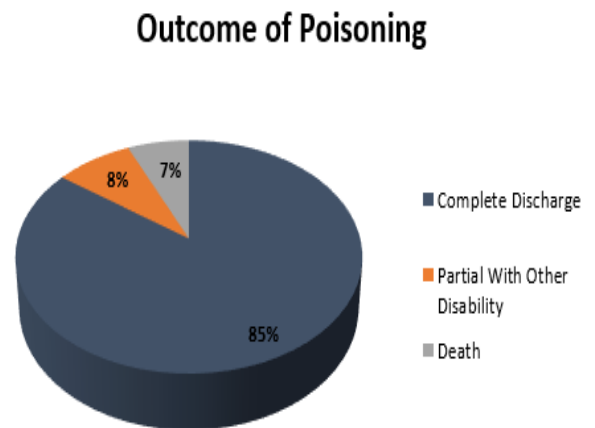
Figure 3: Grading and Severity of OP Poisoning



All the enrolled patients presenting to the emergency medicine department were followed up into the respective wards till discharge, and amongst them 63.33% recovered completely, 30% required referral to other departments, whereas 18.33% had to be managed for their disability.

Majority of the patients (85%) were discharged uneventfully without any other complications, while 8% of total patients developed other complications and disability related or unrelated to their primary condition and for the remaining 7% of the patients the condition turned out to be fatal. [Fig-4]

Figure 4: Outcome of Poisoning



Our study had very low mortality rate to the extent of 6%, which could be due to less number of cases of fatal poisoning such as Celphos and Aluminium phosphide. [Table-5]

Table 5: Mortality in Different Poisoning

Causative Agent	No. of Patients	No. of Deaths	Mortality Rate (%)
Snake Bite	17	2	11.8
Organophosphorus	11	1	9.1
Acid Ingestion	8	0	0
Termiticide	5	0	0
Insect Bite	5	0	0
Rat Killer	4	0	0
Phenyl/Kerosene	3	0	0
Celphos/Aluminium Phosphide	2	1	50
Drug Overdose	2	0	0
Unknown	2	0	0
Pyrethroids	1	0	0
Total	60	4	6.67

Discussion: In the present study the epidemiological profile of acute poisoning in total of 60 patients was studied in the western region. Among the cases 2/3 were male patients significantly outnumbering the females, similar to the studies done by Datir et al¹² and contradicted the findings of Kavalci c et al¹³ conducted in a foreign country. The findings could be due to the fact that males in our country are the breadwinners and they need to venture out of the house which increases their vulnerability towards the exposure to poisoning.

The maximum numbers of cases observed belonged to the age group of 21-40 years, bearing similarity with a study done by Maharani et al¹⁴ and also by Datir et al¹². This can be explained by the fact that this age group is the working productive population and is most likely to be exposed to the occupational hazards. The population highest exposed to the acute poisoning belonged to the rural area and indulged into the farming and related labouring, which is also supported by the study done by Gupta et al¹⁵. Farmers are exposed to various pesticides and his agricultural and outdoor habits that make them more prone to accidental poisoning.

The most common route involved in poisoning was oral in 60% cases. This can be compared with the study done by Datir et al¹² which also observed oral route of poisoning in about 65% of the patients.

In this study the highest frequency of poisoning was accidental followed by envenomation. Among accidental, Organophosphorus compounds showed

the highest frequency of 18.33%, which is similar to the results of the study done by Datir et al¹². Since ours is an agricultural based country, Organophosphorus compounds are easily available. And thus it is the most common class involved in acute poisoning. Therefore agrochemicals and pesticides should not have such an easy accessibility and also the farmers should be educated regarding the protective measures needed to minimize this poisoning.

As far as the treatment and management of Organophosphorus poisoning is concerned, the specific antidote atropine was given in all the cases and oximes in the form of Pralidoxime were given in 50% patients of suspected Organophosphorus poisoning.

Envenomation due to snake bite and other insect bite was the second most common cause after accidental ingestion in the study. The incidence of snake bites and stings is rampant and more frequent in the rural areas due to poor housing conditions, sleeping in the open farms and also due to labourers staying at the construction sites. Anti-snake venom is the mainstay of the treatment in poisoning due to envenomation. It is effective against six common species of snakes. All the cases were administered the dose of anti-snake venom according to the Indian guidelines and protocol^{16,17}.

As far as the duration elapsed between poisoning and the patient being brought to the emergency medicine department is concerned, majority of the patients (78%) were brought to within 24 hours of poisoning. This is a favourable happening as the resuscitative measures and management of poisoning shows a favourable outcome if the patient is brought early to the hospital.

As far as the outcome of the poisoning is concerned, 85% of the patients were discharged uneventfully and about 8% of the patients had partial recovery with disability.

In our study, most of the patients with snake bite belonged to the Grade 2 (41.2%) and Grade 3 (35.3%), which is partly in line with the study done by K Sam et al¹⁰, in which also the most of the cases of snake bite belonged to Grade 2 and Grade 3 severity where the maximum cases being of Grade 3 severity.

In our study the standardized scale for grading the severity of outcome of Organophosphorus poisoning⁹ was used, the most patients showed the minor (Grade 1) which was 54.5% in contrast to the study done by Davies Jo et al¹⁸ where most of the patients with OP poisoning were having moderate severity of symptomatology (Grade 2).

Death was observed in total of 4 cases with the mortality rate of 6.67%. Celphos poisoning had the highest fatality rate as it doesn't have any specific antidote.

The total mortality rate was found in our study was 6.67% which is in accordance with the study done by Kumar SV et al¹⁹ that is 8.3% of all the cases.

Conclusion: In our country farmers are the most prone to be exposed to the OP poisoning, therefore it is the most common cause of accidental poisoning followed by envenomation due to snake bite. Regarding the outcome of these poisoning, the most patients of snake bite were of Grade 2 (Moderate) severity and of Grade 1 (Minor) severity with the OP poisoning. Majority of patients were brought or presented to the hospital within the 24 hours of the poisoning exposure. This shows availability of fast modes of transport between the rural and the urban areas. Our study had very low mortality rate to the extent of 6%, which could be due to less number of cases of fatal poisoning (ex. Celphos and Aluminium Phosphide).

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