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Original Research Article

A Prospective Observational Assessment on Pattern of Acute Poisoning Cases with Drug Utilization and their Outcome in a Tertiary Care Hospital

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Abstract:

Introduction: Poisoning has become an important cause for concern not only in India but globally over the past few years. Pattern of poisoning varies depending upon geographical regions of the country. It is necessary to analyse epidemiologic data every year on acute poisoning cases at each medical setting for better handling and managing drug and antidote stockpiles.

Aim and Objectives: To estimate the incidence, nature, severity, pattern of acute poisoning cases with drug utilization and treatment outcome, including drug overdose and venomous snakebites and also to suggest strategies to reduce associated morbidity and mortality in a tertiary care setting.

Material and Method: A Prospective observational study was conducted on 362 patients of either of cases at CAIMS, a tertiary care teaching hospital, Karimnagar, for a period of one year starting from June 2022 to May 2023. Patients admitted with diagnosis of poisoning/animal bites in medical wards of hospital were enrolled in the study after obtaining informed consent and approval of Institutional ethical committee and following inclusion and exclusion criteria.

Results: Of the total Male to female ratio was 3:1, majority from age group Male to female ratio was 3:1. intentional poisoning cases for suicidal attempt were 70.42.% and 29.58% cases were due to accidental poisoning. Incidence of acute poisoning cases was more common among males. Pesticides were commonly used agents for poisoning followed by others.

Conclusion: From study we can conclude that, for the better management and prevention of poisoning cases, there should be need for a poison information centre. This study has managed to contribute significant additional information regarding the pattern and outcome of poisoning in a tertiary care hospital at a district level.

Keywords: Poisoning, venomous snakebites, Animal bites etc.

Introduction

Poison is a substance that causes damage or injury to the body and endangers one's life due to its exposure by means of ingestion, inhalation, or contact [1]. Poisoning has become an important cause for concern not only in India but globally over the past few years [2]. Universally various agents such as agrochemicals, drugs, or environmental agents are used as poisoning agents [3]. One of the most common causes of intentional deaths all over the world is acute pesticide poisoning is [4].

Earlier studies have disclosed that pesticides are the commonly used poisoning agents for intentional poisoning in India[5]. It is observed that agricultural or household pesticides and drugs are responsible for intentional poisoning, whereas intake of corrosives, kerosene as well as animal bites happen accidentally [6]. According to WHO data, 2012 it is estimated that intentional ingestion of pesticides caused 3,70,000 deaths and 1,93,460 people died globally from unintentional poisoning annually. Of these, 84% deaths occurred in low and middle-income nations. In the same year, unintentional poisoning caused the loss of over 10.7 million years of healthy life [7]. In developed nations, percentage of mortality due to acute poisonings constitute 2%, while in a developing nation like India, it is as high as 30% [8].

Major profession in the rural part of India being agriculture, farmers stock up the pesticides for

eradication of weeds and pests. As pesticides are easily available, they are commonly used by the individuals for suicide in stressful situations [9].

Previous studies revealed that pattern of poisoning in India vary according to socio-economic status, with higher rates of poisoning occurring in regions with low socio-economic status [10]. Easy availability of pesticides coupled with lack of knowledge regarding their poisonous properties contributes to an increased rate of poisoning in India [11]. Poisoning cases have increased due to availability of multiple medications at home and the ever-increasing sale of over-the-counter medicines which led to an increase in the rates of their over-dosing. [12]

Pattern of poisoning varies depending upon geographical regions of the country. Identification of risk factors facilitates understanding the geographical pattern of poisoning in a country. Together with the integration and implementation of preventive and promotive health services, may help reduce morbidity and mortality due to poisoning.[13]

Analysis of acute poisoning patterns of a particular region will assist in arriving towards a preliminary diagnosis of poisoning cases and also in managing their treatment plans. such information will also provide guidance in designing interventions like psychological counselling and educating those at risk [14]. It is essential that every medical institution to regularly evaluate drug utilization in different departments and review institutional therapeutic protocols to rationalize drug use and enhance patients' outcome in case of acute poisonings [15].

In India, less data is available about the type and outcome of treatment received or attempted identification of factors which can reduce morbidity and mortality in acute poisonings. It is necessary to analyse epidemiologic data every year on acute poisoning cases at each medical setting for better handling and managing drug and antidote stockpiles. The present study aims to estimate the incidence, nature, severity, pattern of acute poisoning cases with drug utilization and treatment outcome, including drug overdose and venomous snakebites and also to suggest strategies to reduce associated morbidity and mortality in a tertiary care setting.

Materials and Methods

A Prospective observational study was conducted at Chalmeda Anand Rao Institute of Medical sciences, a tertiary care teaching hospital, Karimnagar. The study was carried out for a period of one year starting from June 2022 to May 2023.

All patients admitted with alleged history of poisoning, bites and stings admitted to the department of General Medicine and hospitalized for at least 24 hours constituted the target of this study. Data was collected by direct interview of patient and their attendant and recorded in a proforma. A specially designed data collection form was used to collect the details of patients' demography, type of poisoning agents consumed, method of poisoning (oral, inhalation, dermal or eye exposure), name of the poison consumed, quantity consumed, route of exposure, first aid rendered, signs and symptoms, investigations done, treatment given, specific antidote given, complications developed, treatment outcomes and events of mortality and the reasons for the mortality. A total of 362 patients from 13 to 80 years belonging to either sex admitted with diagnosis of poisoning/animal bites in medical wards of hospital were enrolled in the study after obtaining informed consent and approval of Institutional ethical committee and following inclusion and exclusion criteria.

Inclusion Criteria

1. All patients of acute poisoning, admitted to General Medicine, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar were included in the study.
2. Diagnosis was made by the treating clinicians on the basis of history and clinical findings and in some cases through routine laboratory investigations, as well were included.

Exclusion Criteria

1. Patients with uncertain diagnosis.
2. Patients in which, it was not possible to take consent for participation were excluded from the study.

Statistical Analysis

All the data collected in the Proforma were compiled and analyzed statistically using SPSS software version 22.0. Continuous variables were presented as mean ± SD. Categorical variables were expressed as frequencies and percentages.

Observation and Results

A total of 362 patients from 13 to 80 years belonging to either sex admitted with diagnosis of poisoning/animal bites in medical wards of hospital were enrolled in the study, and their observation as given bellow.

Table 1: Demographic Profile distribution among study population

Parameters	Frequency	Percentage
Gender		
Males	262	72.4
Females	100	27.2
Age		
< 20 Years	104	28.7
21 - 30 Years	120	33.1
31-40 Years	62	17.1
41 - 50 Years	36	9.9
> 50 Years	40	11
Occupation		
Student	42	11.5
Housewives	51	14.2
Manual Labour	162	44.8
Businessman	58	16
Farmers and Unemployed	49	13.5

In the present study, intentional poisoning cases for suicidal attempt were 70.42. % and 29.58% cases were due to accidental poisoning. Incidence of acute poisoning cases was more common among males (72.4%) compared to females (27.6%).Male to female ratio was 3:1. Many cases of acute poisoning presented in the age group between 21 and 30 years (33.1%) followed by 13 to 19year age group (28.7%).By occupation, manual laborers (71) constitute 44.8% of the cases followed by housewives (14.2%), students (11.5%), farmers and unemployed (13.5%) and businessmen (16%). The most common route of exposure to poison was oral (70.1%) followed by dermal route (29.3%).

Table 2: Distribution of Type of poisoning and route of poisoning

Parameters	Frequency	Percentage
Type of Poisoning		
Intentional Poisoning	255	70.42
Accidental Poisoning	107	29.58
Route of Poisoning		
Oral Route	254	70.1
Dermal Route	108	29.9

Above table shows that, intentional poisoning cases for suicidal attempt were 70.42.% and 29.58% cases were due to accidental poisoning.

Table 3: Distribution of Causative agents among study population

Causative Agents	Frequency	Percentages
Pesticides	136	37.5
Poisonous Animal Bites	93	25.7
Phenyl	49	13.5
Unknown Compounds	42	11.5
Acids	14	3.9
Drugs	18	4.9
Kerosene	4	1
Others	7	2

Pesticides were commonly used agents for poisoning (37.5%) followed by poisonous animal bites (25.7%). Among the Pesticides (37.5%), the most commonly consumed were Organophosphates (18%), Insecticides (7.25%), Rat killing compounds (3.8%), Cotton spraying compounds (3.1%), Herbicides (2%) and Pyrethroid compounds (1.4%). Poisonous animal bites included Snake bites (86%), Scorpion bites (3.5%) and Unknown bites (11.5%). Phenyl & other compounds accounted for (13.5%) and (11.6%) cases respectively, followed by corrosives (4.9%), drugs (3.9%), Kerosene (0.9%) and miscellaneous agents (2%).

Table 4: Distribution of Causative agents among study population

Parameters	Frequency	Percentage
Symptoms		
Vomiting	186	51.25
Local Symptoms	112	31
Altered Sensorium	42	12.3
Nausea	22	5.45
Drug Used		
Nutritional Supplements	73	20.03
Antimicrobials	65	17.82
Proton Pump Inhibitors	59	16.35
Antiemetics	39	10.9
Atropine	18	5.1
Pralidoxime	15	4.2
Anti Snake Venom (ASV)	10	2.65
Glycopyrrolate	2	0.58
N-Acetyl Cysteine	1	0.13
Others	80	22.24
Antimicrobials		
Cephalosporins	113	31.3
Metronidazole	95	26.13
Amoxicillin	81	22.3

Most commonly observed symptoms among the acute cases of poisoning were: Vomiting in (51.25%) cases, local Symptoms (in cases of bites) in (31%), altered Sensorium in (12.3%) cases, Nausea in (5.45%) cases.

More than half of the poisoning cases (51%) reached the hospital within 1 hour from the reported time of poisoning, while a very few (2%) took more than 24 hours for the same.

Drugs used for symptomatic treatment were Nutritional Supplements (20.03%), Antimicrobials (17.82%), Proton Pump Inhibitors (PPIs) (16.35%) and Antiemetics (10.9%). Average number of drugs per case was 8.41. For specific management specific antidotes, Atropine in (5.1%) cases, Pralidoxime (PAM) in (4.23%) cases, Anti Snake Venom (ASV) in (2.65%) cases, Glycopyrrolate in (0.58%) cases and N-acetyl cysteine in (0.13%) cases were prescribed. Other prescribed drugs include inotropic agents, vasopressor agents, analgesics, tetanus toxoid, benzodiazepines, glucocorticoids and anticoagulants. In all 362 cases, antimicrobial agents were prescribed in 304 (83.9%) cases, while the remaining 58 (16.1%) cases did not require any antibiotic.

Third generation cephalosporins (31.3%) were the most frequently prescribed antimicrobials followed by Metronidazole (26.13%) and Amoxicillin (22.3%). In the study, (69.57%) drugs were prescribed by generic name remaining (30.43%) drugs were prescribed by their proprietary name.

Complete recovery was recorded in 198 (54%) of cases. Out of 41 patients (11.3%) who expired, 9(21.95%) were secondary to accidental poisoning and the remaining 32 (78.04%) were secondary to intentional poisoning. Median hospital stay was 4.3 days. Only 18 patients (4.97%) stayed in the hospital for more than 20 days.

Table 5: Distribution of time to reach hospital and outcomes among study population.

Time Interval	Frequency	Percentage
Time to reach Hospital		
< 2 Hours	185	51
2 - 6 Hours	123	34
6 - 24 Hours	47	13
> 24 Hours	7	2
Outcome		
Complete Recovery	321	88.7
Expired	41	11.3

Discussion

Poisoning is a significant method of deliberated self-harm and carries an important impact on morbidity and mortality.

The magnitude and pattern of poisoning are thus multidimensional and require multi-sectoral approach to overcome this problem. Awareness and education about the potential harmfulness of

commonly used pesticides and drugs may help in reducing the burden of acute poisoning. In the present study, assessment of causative agents, clinical presentation, pharmacological management and outcome of acute poisoning cases of different age groups in terms of morbidity and mortality was evaluated. The reporting of 362 cases of acute poisoning cases in a single tertiary care hospital over a period of one year highlights the seriousness of the problem of acute poisoning prevalent in this area. In the present study, most of the cases were seen in males and in the age groups 21-29 years. Similar results of 57.58% male predominance was reported in the study done by Prashant Gupta et al. in a rural tertiary care center in Northern India [16]. Pesticide poisoning was the most common method of poisoning and thus repercussing a positive association between impulsive suicidal behavior and easy availability of pesticides in the region. Important saddening fact is that most of the cases involve literate group of people, it's the youth who are committing large number of suicides due to various triggering factors in the age group between 21–39 years. This indicates that poisoning is more of a psychological issue to manage, and preventive measures should be developed accordingly.

Farmers continue to commit suicide due to financial problems and weather problems, a long-standing problem of farmers which is a tough burden to resolve and requires combined efforts from the government and doctors to reduce this burden. Animal and insect bite accident cases in fields are also increasing due to inadequate protective measures and lack of proper knowledge which has to be repressed. Delay in admission to hospital, improper management of the poisoned patient, lack of information regarding the poison agent and its antidote are probable reasons observed for the mortality in poisoned patients. Following steps such as having a centralized poison information centre, availability of standard management protocols for treating various poisons, and educational programs for rural people may be more appropriate to bring down the poison induced morbidity and mortality. Drug overdose constitutes about 3.9% of cases of poisoning in India and may probably be due to easy availability of drugs and alcohol. Many prescription drugs are available over the counter in India.[17]

Conclusion

Rigorous pesticide regulation laws, counselling and training programs are necessary to decrease the incidence of acute poisonings and deaths due to it. Hospital stockpiles should be regularly monitored for availability of antivenom to combat high incidence of snakebites. Prompt transport and intervention of all critically ill cases is required to prevent the mortality among poisoned patients.

For the better management and prevention of poisoning cases, the study highlights the need for a poison information center. Present study has managed to contribute significant additional information regarding the pattern and outcome of poisoning in a tertiary care hospital at a district level.

An integrated approach towards the problem at root level can lead to decline in the incidence of such poisoning cases and also lessen the sustained burden on the health care system.

A multicenteric study for a longer duration is advocated to achieve an extensive pattern of acute poisonings occurring in south India.

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