

**A PROSPECTIVE STUDY OF VARIOUS TYPES OF ACUTE POISONING;
PHARMACOLOGICAL MANAGEMENT AND THEIR OUTCOME IN A TERTIARY
CARE HOSPITAL**

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Abstract

Introduction: A poison is a substance that is capable of causing illness or harm to living organisms on contact or upon introduction into the body and may be used deliberately with this intent. Toxins and venoms are poisons of biological origin, with the latter term usually reserved for those injected by the bite or sting of a poisonous animal.

Materials and methods: This Cross-sectional observational study was conducted at Department of Pharmacology, Kurnool Medical College and GGH, Kurnool. The study was carried out from January 2023 to December 2023. All patients of acute poisoning, admitted to emergency ward of Emergency Medicine and Medicine, Surgery and Pediatric inpatient departments of Govt General Hospital, Kurnool were included in the study. 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. Patients with uncertain diagnosis as well as those patients in which, it was not possible to take consent for participation were excluded from the study. Written informed consent was obtained from either the patient or their relatives if patient was not in a condition to give consent. In case of children below 13 years of age, assent was taken from parents. A written permission was taken from the respective heads of the emergency medicine, medicine, surgery and pediatric department.

Results: Out of 200 poisoning cases treated at SSG hospital, 131 (65.50%) were male and 69 (34.50%) were female. Male: Female ratio was 1.89:1. Most of the cases, i.e., 70 (35%) belonged to the age group of 21-30 years. In all, 9 poisoning cases below 13 years of age were admitted with diagnosis of acute poisoning in paediatric emergency. Paediatric poisoning contributed for 4.5% of total poisoning cases (9 of 200) during the study period. Mean±SD of age of all patients

was (30.30±13.79) years. Mean±SD of age of male and female patients were (30.34±13.82) years and (30.35±13.82) years respectively. Ingestion was the commonest route of poisoning in 138(69.25%) cases, followed by Dermal (in cases of animal bites) 62 (30.75%).

Conclusion: Pattern and magnitude of poisoning are multidimensional and demand multi-sectoral approach for facing this problem. Due to high incidence of snakebites, hospital stockpiles should be regularly checked for availability of antivenom. There is a need for stringent pesticide regulation laws, counseling and training programs to reduce incidence of poisonings and deaths due to it.

Key Words: poison, Toxins, venom, deaths, written informed consent.

INTRODUCTION

A poison is a substance that is capable of causing illness or harm to living organisms on contact or upon introduction into the body and may be used deliberately with this intent. Toxins and venoms are poisons of biological origin, with the latter term usually reserved for those injected by the bite or sting of a poisonous animal.¹

The severity and outcome in such cases are determined by a number of factors such as chemical and physical properties of the poison, amount consumed, mode of poisoning and individual characteristics like the functional reserve of the individual or target organ, which is further influenced by age and pre-existing disease.²

Among the various causes of poisonings, pesticides are the most common cause of self-poisoning worldwide, with the proportion ranging from 4% in the European region to over 50% in the Western Pacific region. Approximately 258,000 fatal cases of pesticide self-poisoning are reported globally each year, most from Asia, and the figure is greatly exceeded by the number of poisoned patients who seek treatment at health facilities.³ Data about the other kinds of poisonings are limited and are quite variable depending on the geographical area, socioeconomic factors and cultural diversity. In a previous retrospective study from South India, organophosphorus compounds (OPC) were reported as the most common cause of poisoning (36.0%) followed by snake bite (16.2%), drugs (11.0%), rat poison (7.3%) and others.^{4,5}

Another study from North India also reported OPC and celphos as the most common poisonings although a majority (76.60%) were unknown poisonings. Organophosphate compounds were also implicated in 68.7% of the total poisoning-related fatalities in another study.

The aim of the present study was to investigate the pattern of drug utilization, identifying poisoning agents and resulted outcome in patients with acute poisoning treated at a Govt General Hospital, Kurnool.

Objectives were to study the drug utilization pattern of acute poisoning cases, to study the types of causative agents and mode of poisoning, to study the age and gender wise distribution of acute

poisoning cases and to study the availability of drugs as per National list of essential medicines (NLEM)-2022 and to study the outcome of cases in terms of morbidity and mortality.

MATERIALS AND METHODS

Study design, Site and Duration: This Cross-sectional observational study was conducted at Department of Pharmacology, Kurnool Medical College and GGH, Kurnool. The study was carried out from January 2023 to December 2023.

Inclusion criteria: All patients of acute poisoning, admitted to emergency ward of Emergency Medicine and Medicine, Surgery and Pediatric inpatient departments of Govt General Hospital, Kurnool were included in the study. 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: Patients with uncertain diagnosis as well as those patients in which, it was not possible to take consent for participation were excluded from the study.

Informed consent process: Written informed consent was obtained from either the patient or their relatives if patient was not in a condition to give consent. In case of children below 13 years of age, consent was taken from parents. A written permission was taken from the respective heads of the emergency medicine, medicine, surgery and pediatric department.

Data collection procedure:

All the inpatients diagnosed for acute poisoning were screened and data comprising of total 200 cases was collected and entered in a case record form. The confidentiality of patients' personal information was maintained. These cases were evaluated and observed in the Emergency wards, Intensive Care Units (ICUs) and Unit wards of respective departments and followed up till their outcome.

RESULTS

Out of 200 poisoning cases treated at SSG hospital, 131 (65.50%) were male and 69 (34.50%) were female. Male: Female ratio was 1.89:1. Most of the cases, i.e., 70 (35%) belonged to the age group of 21-30 years. In all, 9 poisoning cases below 13 years of age were admitted with diagnosis of acute poisoning in paediatric emergency. Paediatric poisoning contributed for 4.5% of total poisoning cases (9 of 200) during the study period. Mean±SD of age of all patients was (30.30±13.79) years. Mean±SD of age of male and female patients were (30.34±13.82) years and (30.35±13.82) years respectively. Ingestion was the commonest route of poisoning in 138(69.25%) cases, followed by Dermal (in cases of animal bites) 62 (30.75%).

Causative agents	N (%)
Pesticides	66 (33)
Poisonous Animal Bites	62 (30.75)
Phenyl	23 (11.75)
Unknown compounds	22 (11)
Acid	10 (5)
Drugs	8 (4)
Kerosene	1 (0.75)
Miscellaneous	6 (3.25)

Table 1: Causative agents in poisoning cases

Drugs	N (%)
Nutritional Supplements	332 (19.03)
Antimicrobials	290 (16.62)
PPIs	277 (15.85)
Antiemetics	194 (11.10)
IV Fluids	163 (9.33)
Analgesic	85 (4.86)
Glucocorticoids	29 (1.66)
Vasopressor/Inotropic agents	27 (1.55)
Tetanus toxoid (TT)	23 (1.34)
Neostigmine	7 (0.43)
Calcium	6 (0.34)
Benzodiazepines	4 (0.20)
Anticoagulants	3 (0.17)
Others	84 (4.81)

Table 2: Drugs used for symptomatic treatment of poisoning cases

Drugs	N (%)
Atropine	84 (4.81)
PAM (Pralidoxime)	78 (4.46)
Anti-snake venom (ASV)	49 (2.80)
Glycopyrrolate	8 (0.49)
N-acetyl cysteine (NAC)	2 (0.11)

Table 3: Drugs used as specific antidote in poisoning cases

Antimicrobials	N (%)
Metronidazole	87 (30.12)
Penicillin	86 (29.60)
Amoxicillin+Clavulanic Acid	62 (21.15)
Piperacillin + Tazobactam	23 (8.09)
Cephalosporins	72 (24.96)
Ceftriaxone	41 (14.29)
Cefotaxime	24 (8.26)
Cefixime	7 (2.41)

Amikacin	18 (6.2)
Meropenem	16 (5.68)
Azithromycin	7 (2.41)
Linezolid	1 (0.17)
Colistin	1 (0.17)
Tigecycline	1 (0.17)
Doxycycline	1 (0.17)
Cefosulbactam (Cefoperazone+Sulbactam)	1 (0.17)
Sulfamethoxazole+Trimethoprim	1 (0.17)

Table 4: Prescribing frequency of different antimicrobials

Complete recovery was recorded in 104(52%) of cases. Death was recorded in 26 (13.25%) cases, in which, 19 (14.34%) were due to Suicidal poisoning and 7 (11.19%) were due to Accidental poisoning. The causative agents in these death cases were organophosphate compounds-12 (39.06%) deaths, Snake bite-7 (12.38%) deaths, Unknown compounds-3(13.64%) deaths, Herbicides-1 (25%) deaths, Cotton spraying compounds-1 (16.67%) deaths, Acid-1 (4.76%) death, Scorpion bite-1 (20%) death, Insecticides-1 (3.57%) death, Rat killing Compounds-1 (5.56%) death and Unknown bite-1 (7.69%) death.

DISCUSSION

In the current study, evaluation of causative agents, clinical presentation, pharmacological management and outcome of acute poisoning cases of different age groups in terms of morbidity and mortality was analyzed. The reporting of 200 cases of acute poisoning in a single hospital over a period of 8 months emphasizes the seriousness of the problem of acute poisoning prevalent in this area. In the current study, most of the acute poisoning cases were between 11-40 years of age 75.75%, from which 35% patients belonged to 21-30 years of age group.⁶

A similar trend 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. Khan et al also observed highest incidence 41% of acute poisoning in 21-30 year age group in their study. This conclusion can be rationalized from the certitude that the age group of 21-30 year is the critical interval of life.⁷

These people are more prone to traumatic affairs, career, unemployment, relationship turmoil, loneliness, financial crisis, fear of failure or failure itself, life settlement factors, etc. These are few of the various triggers that particularly makes this age group vulnerable to commit suicide impromptu. In this study, majority of patients were male 65.5%. A study on toxicological pattern of poisoning in urban hospitals of Western India done by Raut Asawari et al. also reported male predominance of 56.24% and a male to female ratio of 1.3:1 in acute poisoning cases.⁸

In many other studies also, male predominance was observed in acute poisonings. This trend may be due to increased occupational hazards and exposure of men to stress as they are in majority of the cases, the only earning members of the family. The commonest mode of

poisoning was suicidal 66.25%, followed by accidental 33.5% and homicidal 0.25%. On the same lines, the study done by Maheshwari et al. reported that 79.2% of the cases were of suicidal poisoning and 20.8% cases were of accidental poisoning. Similarly, a study conducted in the age group of 15-65 years at Kathmandu reported that 97% of the poisoning cases admitted in the hospital were due to suicide attempts.⁹

In this study, the most common poisoning agents were pesticides 33.25%, followed by Poisonous animal bites 30.75%. India being an agricultural nation, handling of pesticides is a routine practice by farmers and their family members. Increased number of cases due to pesticide poisoning can be due to the easy availability of these agents and lack of knowledge to support their safe residential use. Among pesticides, organophosphorus compounds were the most common pesticides 16%, followed by Insecticides 6.25%, Rat killing compounds 4.5%, Cotton spraying compounds 3%, Herbicides 2% and Pyrethroid compounds 1.5%, respectively.¹⁰

CONCLUSION

Pattern and magnitude of poisoning are multidimensional and demand multi-sectoral approach for facing this problem. Due to high incidence of snakebites, hospital stockpiles should be regularly checked for availability of antivenom. There is a need for stringent pesticide regulation laws, counselling and training programs to reduce incidence of poisonings and deaths due to it.

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