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CLINICAL PROFILE OF POISONING CASES IN SECONDARY REFERRAL HEALTHCARE SETTINGS OF ANDHRA PRADESH

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ABSTRACT

In developing countries like India, the farmer's dependency on agrochemicals increasing due to modernization of agriculture which may increase the availability, accessibility and prone to unsafe storage of toxic pesticides in rural households. As a result, self-poisoning with pesticides has Become a significant medium for self harm was estimated that, death by self poisoning, especially with pesticides, accounts for 30% of all suicides globally. The overall suicide rate was 71.4 per 1,00,000 populations with highest burden among men. India is estimated to have the highest snakebite mortality in the world. World Health Organization (WHO) estimates place the number of bites to be around 84,000 per annum with 11,000 deaths. The Knowledge on epidemiology of poisoning and its changes is important to both emergency physicians and public health practitioners, but the patters of poisoning varies from country to country, within the country and over time, sometimes rapidly. Therefore, regional epidemiological data on poisoning are very helpful in planning rational use of resources for the prevention and management of poisoning and in targeting research. Due to limited literature availability in Andhra Pradesh region we planned to perform a research study which assess the pattern of poisoning cases, trends in relation to the poisoning epidemiology and to identify population at risk in the rural settings of Andhra Pradesh.

KEYWORDS: Poisoning, Hospitalization, Rural development trust.

Abbreviations

WHO: World health organization RDT: Rural development trust ADR: Adverse Drug Reaction.

INTRODUCTION

Toxicology, the word is derived from Greek and Latin origins (L. *toxicum* = poison; Gr. *toxicom* = arrow poison; L. *logia* = science or study) and literally means a study of poisons on living organisms.

Toxicology has been defined as the study of the adverse effects of xenobiotics and thus is a borrowing science that has evolved from ancient prisoners.

In its broadest sense, the science of toxicology involves all aspects of the adverse effects of chemicals on biologic systems, including their mechanisms of harmful effects, conditions under which these harmful effects occur, socioeconomic considerations, and legal implications.

A toxicologist can be described as an individual who studies or works in the area of toxicology.

Modern toxicology goes beyond the study of the adverse effects of exogenous agents to the study of molecular biology, using toxicants as tools. Historically, toxicology formed the basis of therapeutics and experimental medicine. Toxicology in this century (1900 to the present) continues to develop and expand by assimilating knowledge and techniques from most branches of biology, chemistry, mathematics, and physics. A recent addition to the field of toxicology (1975 to the present) is the application of the discipline to safety evaluation and risk assessment.

The father of modem toxicology **Mathieu Joseph Bonaventura Orfila** (1787-1853), was a Spaniard who served as attending physician to Louis XVIII of France and taught at the University of Paris. During his early professional life, Orfila quickly realized the inadequacy of toxicology as a science. So, in 1815 he wrote the first book on general toxicology that was devoted to adverse effects of chemicals. Before that time, toxicology had been largely wide gaps of information open for broad and often erroneous interpretation. Intuitive hunches often served as the sole basis for determining the cause of a poisoning incident.

Orfila, concerned with legal implications of poisoning, pointed out the importance of chemical analysis in establishing a definitive cause of poisoning. He then devised analytical procedures, many of which are still in use today, for detecting.

Rating	Dose	Probable oral lethal dose (for average 70 kg adult)
Practically Non-Toxic	>15 g/kg	More than 1 quart
Slightly Toxic	5 - 15 g/kg	Between 1 pint and 1 quart
Moderately Toxic	0.5 - 5 g/kg	Between 1 ounce and 1 pint
Very Toxic	50 - 500 mg/kg	Between 1 teaspoonful and 1 ounce
Extremely Toxic	5 - 50 mg/kg	Between 7 drops and 1 teaspoonful
Super Toxic	< 5 mg/kg	A taste (< 7 drops)

Specific chemicals in body fluids and tissues. Orfila's text established the basis for future experimental and forensic toxicologic evaluations and subsequently was translated into several languages. He eventually supplemented his book with numerous monographs that discussed additional toxicological information in detail.

TOXICITY RATING: To assess and rate the toxicity of a drug, the Usual Fatal Dose (UFD) is taken into consideration which is derived from animal experimental data and statistics of human poisoning.

The UFD is based on the Minimum Lethal Dose (MLD) which is usually indicative of the lethal dose that is fata lto 50% of animals (LD50).

CLASSIFICATION

A. Based on Nature of Poison

I. *Corrosive* - a. Strong acids

1 Mineral or inorganic acids, e.g. H_2SO_4, HCl;

a. Organic acids, e.g. carbolic, acetic, oxalic acid.

b. Strong alkalis, e.g. sodium hydroxide

c. Metals, e.g. mercuric chloride, ferric chloride.

II. *Irritants*

a. Inorganic: Non-metal, e.g. phosphorus, iodine;

Metal, e.g. arsenic, lead etc.

b. Organic: Animal, e.g. snake, scorpion,

Plant or vegetable, e.g. castor, calatropis etc.

c. Mechanical, e.g. chopped hair, metal pieces etc.

III. *Systemic*

a. Cerebral poisons: Somniferous, Inebriants, Stimulants, Deliriant, Depressant, Psychotropics.

b. Spinal poisons, e.g. strychnine

c. Peripheral nerve poison, e.g. curare

d. Cardiac poison or cardio-toxic, e.g. aconite

e. Asphyxiants, e.g. carbon monoxide

f. Nephrotoxic, e.g. mercury

g. Hepatotoxic, e.g. phosphorus

IV. *Miscellaneous*, e.g. food poisoning

B. Based on Manner of Use

1. Homicidal poisons
2. Suicidal poisons
3. Accidental poisons
4. Abortifaciant poisons
5. Stupefying poisons
6. Cattle poisons
7. Arrow poisons
8. Use to fabricate injury or malingering
9. Use to cause injury
10. Use for torture

C. Based on Source of Poison

1. Domestic or house-hold poisons
2. Agricultural poisons
3. Environmental poisons
4. Industrial poisons
5. Food and drinks poisons
6. Drugs and medicines

POISONING SEVERITY SCORE

The European Association of Clinical Poison Centers and Clinical Toxicologists has proposed a guide for scoring poisoning severity, applicable to cases of acute poisoning in both adults and children. As per this system, there are basically 4 grades of severity:

None (0): Nil/Minimal signs or symptoms

Minor (1): Mild, transient and spontaneously resolving symptoms.

Moderate: Pronounced or prolonged symptoms

Severe: Severe or life-threatening symptoms

In minor poisoning, symptomatic and supportive treatmentis generally not required, whereas this normally is the case formoderate poisoning. In severe poisoning, advanced symptomatic and supportive treatment is always necessary.

Toxicity rating chart for chemicals in general

GENERAL MANAGEMENT PRINCIPLES: The initial approach to the poisoned patient should focus on six major areas: Resuscitation and stabilization;

(1) History and physical examination, including evaluation for a specific toxidrome

(2) Appropriate decontamination of the gastrointestinal tract, skin, and eyes;

(3) Judicious use of laboratory tests, electrocardiograms, and radiographic studies;

(4) Administration of specific antidotes, if indicated; and

Utilization of enhanced elimination techniques for selected toxins **Usual Fatal Dose of Common Toxic Agents.**

SPECTRUM OF UNDESIRED EFFECTS

Inclusion Criteria

- People who had Pesticide poisoning, food poisoning, toxic or particular reaction to prescribed drugs, snake bites were included in to the study.

People who attempted suicide with various substances like sanitary chemical.

Central Nervous System	**Cardiovascular System**
• Grading of coma • Patient drowsy, deliriant or in coma • Convulsions • Tremors	• Pulse-tachycardia/bradycardia • Hypotension/hypertension • Arrhythmias • Circulatory collapse • Vasoconstriction

• Neuropathy • Movement disorder • Paralysis • Headache • Paresthesia • Gait • Delirium • Encephalopathy • Tingling • Ataxia • Psychosis	**Respiratory System** • Dyspnoea • Pulmonary edema • Respiratory distress • Cough • Laryngospasm • Bronchitis • Emphysema
Gastrointestinal System • Vomiting • Diarrhea • Constipation • Gastroenteritis • Melena • Abdominal pain • Abdominal distension • Ileus • Thirst • Dysphagia • Odynophagia • Pancreatitis	**Genitourinary System** • Colour of urine • Albuminuria • Hemoglobinuria • Glycosuria • Hematuria • Porphyrinuria • Oliguria • Polyuria • Dysuria
Musculoskeletal System: • Myopathy • Myalgia • Rhabdomyolysis • Fasciculation • Smooth muscle depressant/stimulant	**Blood Manifestations:** • Anemia • Blood dyscrasia • Thrombocytopenia • Leukocytosis • Leukopenia • Pancytopenia • Polycythemia • Stippling • Bone marrow depression • Hemolysis • Methemoglobin formation • Sulfhemoglobinemia

Central Nervous System • Grading of coma • Patient drowsy, deliriant or in coma • Convulsions • Tremors	**Cardiovascular System** • Pulse-tachycardia/bradycardia • Hypotension/hypertension • Arrhythmias • Circulatory collapse • Vasoconstriction

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- Prescribed/OTC medications, cosmeceuticals etc. were included.

Exclusion Criteria

- Participants showing no willingness were excluded from the study.
- Cases with ticks and mite bites were excluded.

Poisoning due to consumption of illicit/spuriousliquor.

Study Procedure

- The informed consent was obtained from participants who are satisfying the inclusion criteria after their willingness towards the study.
- Then Merits and demerits of the study were explained to the patient/patient attendants while taking the informed consent from participants.
- Patient's demographic information's along with social, occupational history was collected by using data collection form.
- Information regarding poisonings like nature of exposure, types of substance and amount of substance, duration of exposure and any first-aid was done were collected from patient and/or patient attendants.

RESULTS

During six months of prospective observational study a total of 42 poisoned cases were reported to emergency department of RDT Hospital from different rural setups in Anantapur.

Table 1: Demographic details of study participants.

Variable	Male	Female	Total
	Number (%)	Number (%)	
Age (Years)			
11 - 20 Years	03 (7.14%)	07 (16.6%)	10 (23.80%)
21 - 30 Years	09 (21.42%)	06 (14.28%)	15 (35.71%)
31 - 40 Years	01 (02.38%)	07 (16.66%)	08 (19.04%)
41 - 50 Years	02 (04.76%)	03 (07.14%)	05 (11.90%)
51 - 60 Years	00 (00%)	00 (00%)	00 (00%)
61 - 70 Years	02 (04.76%)	01 (02.38%)	03 (07.14%)
71 - 80 Years	01 (02.38%)	00 (00%)	01 (02.38%)
Gender	**18 (42.85%)**	**24 (57.14%)**	**42**
Education			
Illiterate	05 (11.90%)	09 (21.42%)	14 (33.33%)
SSC/10th Class	03 (07.14%)	03 (07.14%)	06 (14.28%)
Intermediate	02 (04.76%)	06 (14.28%)	08 (19.04%)
Graduation	08 (19.04%)	06 (14.28%)	14 (33.33%)
Marital Status			
Married	09 (21.42%)	15 (35.71%)	24 (57.14%)
Unmarried	09 (21.42%)	09 (21.42%)	18 (42.85%)
Variable	Male	Female	Total
	Number (%)	Number (%)	
Smoking			
Yes	10 (23.80%)	-	
No	08 (19.04%)	-	
Alcohol			
Yes	06 (14.28%)	-	
No	12 (28.57%)	-	

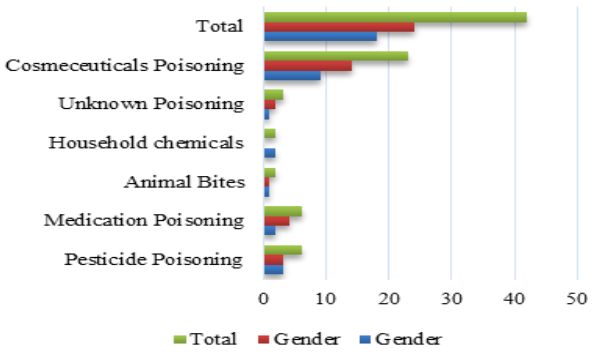

Figure 1: Nature of poisoning.

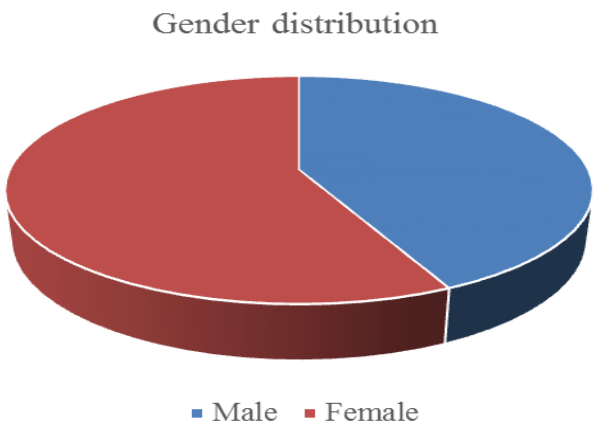

Figure 2: Age distribution of poison cases.

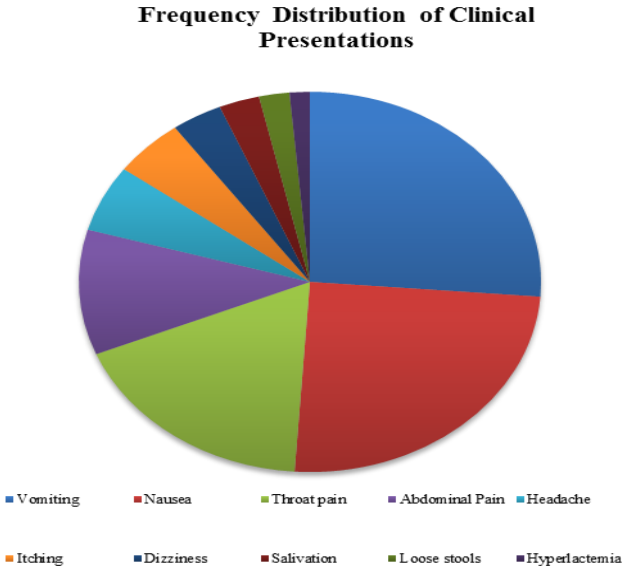

Figure 3: Gender distribution of poison cases.

Table 3: Frequency distribution of Nature of poisoning cases.

Nature of Poisoning	Age groups			Gender		Total
	Children	Adults	Elderly	Male	Female	
Pesticide Poisoning	01	02	03	03 (07.14%)	03 (07.14%)	06 (14.28%)
Medication Poisoning	00	06	00	02 (04.76%)	04 (09.52%)	06 (14.28%)
Animal Bites	00	01	01	01 (02.38%)	01 (02.38%)	02 (04.76%)
Household chemicals	00	02	00	02 (04.76%)	00 (00%)	02 (04.76%)
Unknown Poisoning	00	03	00	01 (02.38%)	02 (04.76%)	03 (07.14%)
Cosmeceuticals Poisoning	05	17	01	09 (21.42%)	14 (33.33%)	23 (54.76%)
Total	06	31	05	18 (42.85%)	24 (57.14%)	42 (100%)

DISCUSSION

- Poisoning is the common medico social problem now days all over the world.
- It consumes the valuable health services, resources and causes considerable mortality and morbidity to the population.
- Many factors affect the outcome including the degree to which poisons toxicity is understood, the speed at which patient comes to the clinical attention & availability of effective medical treatment.
- 42 cases of poisoning were admitted during the six months study period.
- The socio-demographic variables are described in Table 1. Poisoning was more frequently observed in younger age groups (21-30 years, 35.71%) than older age groups (11.90%).
- The mean age of the study group was 32.57 ± 15.61 years. This was similar to the findings of *Suraj et al, 2017, Maheswari et al, 2016* with mean age of poisoned patients was 27.60 ± 12.66 years.
- A similar results were found by study conducted by *Githa Kishore et al, 2014* with majority of the poisoning cases belonging to young age groups (21-30) with 43.6% of total cases.
- A Slovenian study by *Grizinic et al, 2009* reported ore number of poisoning cases in same age groups with mean age of 33.4 ± 16 years.
- Study by *Marahatta SiB et a*l, 2009 at Kathmandu also revealed that poisoning was most common in the age group between 21 to 30 years with 40.5%. This age group was most active, physically, mentally, socially therefore these people are more prone to stress during life.

- There were 18 (42.85%) male, 24 female (57.14%) with a male to female ratio of 0.75:1. This findings indicates that female population are more vulnerable than male towards poisoning.
- These findings contradicting with a study conducted at KIMS Hospital Bangalore by *Githa Kishore et al*, 2014, a study conducted by *Dhanya S.P et al, 2009* at medical college at Calicut, where the results showed that male were vulnerable than females to poisoning.
- In this study it was observed that prevalence of poisoning cases in literate and illiterate was equal in distribution. Which correlates with a study by *Marahatta SiB et al, 2009*.

The hospitalization time for the poisoning cases varied between 01 to 06 days with 57.14% showing a mean duration of hospitalization of 01 to 03 days.

- In this study, it was remarkable that most of the poisoning cases were due to cosmeceuticals-Supervasmol ingestion accounting for 23 cases of total poisoning 54.76%, followed by other types of poisoning, 06 medication poisoning (14.28%), 06 Pesticide poisoning (14.28%), 02 household chemical poisoning (04.76%), 02animal bites (04.76%), and 03 unknown poisoning (7.14%).
- Among 42 cases, 41 were suicidal poisoning cases and one is accidental poisoning case.

In this study 42 patients were recovered and there were no deaths occurred due to poisoning during the study period.

CONCLUSION

Poisoning is an important method for deliberated self harm (DSH). The present study indicates that younger age group (21-30), female sex, low educational level, intra familial conflicts are significant risk factors for self-harm behavior. Supervasmol was the most common method of DSH poisoning in this study, reflecting the positive link between suicidal behavior and easy availability, intentional misuse of cosmeceuticals in this region.

This high incidence rate can be minimized by multi sectorial approach involving creating awareness, public education and timely psychosocial management of vulnerable cases through long term community based mental health program.

CONFLICT OF INTEREST: The authors have no conflict of interest to disclose.

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