

## Etiological Distribution and Patient Outcomes of Various Poisons Managed At a Rural Health Care Tertiary Teaching Hospital - A Crosssectional Study

Madhava Sai Sivapuram<sup>1</sup>, Ashok Yanamadala<sup>2</sup>, Battini Sriteja Reddy<sup>3</sup>.

<sup>1</sup>3rd year student, Dr. pinnamaneni Siddhartha institue of medical sciences and research foundation .India

<sup>2</sup>Associate professor of Anaesthesiology, Dr. pinnamaneni Siddhartha institue of medical sciences and research foundation. India

<sup>3</sup>3rd year student, Dr. pinnamaneni Siddhartha institue of medical sciences and research foundation .India

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### Abstract

**Introduction:** The rising incidences of Poisoning with prevalence of certain groups of poisons in this particular geographical area has prompted us to undertake this study to know the etiological patterns, epidemiological aspects & their outcomes. The observations of various other authors are compared in scientific discussion.

**Materials and methods:** This study is conducted and designed as retrospective study with 241 subjects, who came to our hospital in past 2 years.

**Results:** Among the 241 subjects males were more in number which is 61.8%. The most common poison consumed has been found to be organo phosphorous compounds which is 18.6% followed by other insecticides (14.1%). With respects to occupation farmers have been found to be more in number which is 25.3%. Recovery rate of drug over dose(24) and acid poisoning(10) are 100% and the mortality rate is seen to be more with Paraquat poisoning which is 54.50%. Accidental poisoning is seen in children below 10 years which is 5.4%. The mortality rate and recovery rate of all poisonings are 6.2% and 83.8% respectively.

**Conclusion:** The majority of poisonings were with organo phosphorous compounds, for suicidal purposes, in young age group, and in males. In our study, the three most common agents causing poisoning were organo phosphorous compounds, other insecticides and rodenticides.

**Keywords:** Organo phosphorous poisoning, Paraquat poisoning, Poisons.

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### I. Introduction

Poison is a substance that extinguishes life or impairs the functions of one or more organs in the body when exposed to sufficient quantities. In general, poisoning can be defined as " Any substance which produces ill health or death by its constituents when it is introduced in the body"[1]. The poison may be in form of liquid, solid or gas and it gives its effects when consumed (for solid and liquids) and when inhaled it (for gases). Due to development in various sectors such as Industrial, Agricultural, Scientific and Medical growth there has been increase in the availability and usage of substances which can be poisonous [2]. The WHO (world health organisation) also stated that, globally there are around 3 million cases of acute poisoning and deaths of about 220,000 due to poisoning annually (1999)[3]. Of these 99% of occurs in developing countries. In India around 5-6 persons per lack people die every year which is only a estimated value because many cases are not reported and the lack of data at the central level[1].

Poisoning may be accidental or Intentional. It is also seen that the mortality rate of Intentional poison consumption is much more higher than the accidental poisoning. It is also seen that the pattern of poison consumption depends on the region, occupation, availability of poison, socio-economic status of the person. So it is essential to keep a poisoning profile and take counter measures against possible risks and threats.

In this study our aim is to assess the etiological patterns, epidemiological aspects and their outcomes. The observations of various other authors are compared in scientific discussion.

### II. Materials And Methods

Our study included 241 subjects belonging to different age groups who were brought to the casualty of our tertiary care teaching hospital and diagnosed as cases of poison consumption by the department of medicine during the two year period i.e. from 01-01-2014 to 31-12-2015. The data was collected from the medical records. Food Poisoning and animal/snake bites were excluded in the study. The age, sex, type of poison consumed, occupation, outcome of the patient was recorded and the data has been entered in MS excel and analysed by SPSS (statistical package for social sciences) software. The numerical data is depicted graphically and in tables. Institutional Ethical Committee (IEC) clearance was taken.

### **III. Observations And Results**

A total of 241 subjects were brought to the casualty of our tertiary care teaching hospital and admitted for poison consumption during the period between 01-01-2014 and 31-12-2015. Of these 241 subjects 38.1% (n=92) were females and 61.8% (n=149) were males which is represented in Graph 1. The graph reveals that males outnumbered females. When compared according to age group, younger age group (21-30y) outnumbered the rest of the subjects with 42.3% (n=102). Graph 2 shows the distribution of age with number of subjects with a sudden increase (seen between 11-20y and 21-30y age group), followed by a sudden fall (seen between 21-30y and 31-40y age group) and a progressive fall as age progresses. Least cases of poison consumption is seen in 81-90 age with 0.4% (n=1). Most subjects recovered (R) by appropriate treatment which is around 83.8% (n=202), expired (E) in around 6.2% (n=15) as shown in the Graph 3. There were a few subjects who left the hospital in between the treatment and have been termed "left against medical advice"(LAMA) which is 9.9% (n=24). Mortality and Recovery rate when compared with different age group shows that the percentage of recovery rate is more in 51-60y age group and least is found to be in <10y which are 91.7% and 69.2% respectively where the percentage of mortality rate is more among the age group 61-70y which is 27.3%. A complete analysis and detailing of mortality and recovery rate of different age groups is given in Table 1. Graph 4 shows distribution of subjects according to type of poison consumed.

It is observed from graph 4 that Organophosphorous (OP) compounds is the most common poison consumed which is 18.6% (n=45) followed by other insecticides which is 14.1% (n=34). Type of poison compared with gender is shown in Graph 5. The graph reveals that female cases are seen more with drug overdose (n=16) followed by OP compounds (n=13) and other insecticides(n=13) unlikely, male cases are seen more with OP compounds (n=32) followed by rodenticides (n=22) and other insecticides (n=21). Recovery rate is 100% in drug over dose (n=24) and acid (n=10) consumption followed by chemical poison consumption (n=18) which is 94.7%. Expiry rate is more in cases of paraquat poison consumption (n=6) which is 54.5%. In the Table 2 the complete analysis of mortality and recovery rate when compared to type of poison is shown. When subjects are compared with their occupation, it is revealed that agricultural workers (n=61) are more in number followed by students (n=43). Graph 6 shows the comparison between the number of subjects and their respective occupation. While comparing the subjects with occupation children <10y are excluded. Among the females the most of the subjects are house wives. Most of the poison consumption are intentional which account for around 90% (n=217) where as the remaining 10% (n=24) account for accidental poison consumption which can be seen in Graph 7. It is clearly seen that most of the accidental poison consumption is <10y of age group i.e. children are most vulnerable and the most common type of poison used is kerosene.

### **IV. Discussion**

There are many cases of poison consumption being reported in India due to increase in use of chemicals in agriculture, industries and in domestic practices. A steady incline in poison consumption is being seen not only in developed countries but also in developing countries such as India, Sri Lanka, Philippines and In the present study, it is seen that males are more in number with 61.8% and the ratio of male to female is 1.6:1 which is almost similar the study conducted by Karthik P et al in Ahmedabad where males percentage was 65.39% and male to female ratio is 1.8:1[1]. The ratio of males to females is 1.3:1 in a study conducted by Celine TM et al in Kerala which also clearly shows that males outnumber females [4]. The incidence of poison consumption is more in males attributed to the fact that males are more exposed to stress and strain due to their rural background where males run the house [1].

The incidence of poison consumption in our study is more in an age group of 21-30y i.e. young age group (42.3%), when compared with a similar study conducted by Gargi. J et al in Northern region of Punjab where the high incidence is seen in 20-30y age group which is around 37.6%[5]. The poison consumption is more in young age group which indicates that they could not cope up with the stress and strain.

Among the poisons consumed the Organo Phosphorous(OP) compound which constitutes around 18.6% in our study. When it is compared with a study conducted by Linto MT et al in Chennai showed a similar result of high OP compound with 27.83% and even Shivaramu MG et al conducted study in Karnataka which also showed a similar result of high OP compound poison consumption [3,6]. Even in OP compound poison consumption males are higher in number which is around 71.1% which is similar to study conducted by Chautat J in Nepal where males are more in number with 58.7%[7]. OP compound has been more widely used for poison consumption due to its easy availability to the community which is the major cause of more cases of OP compound poisoning.

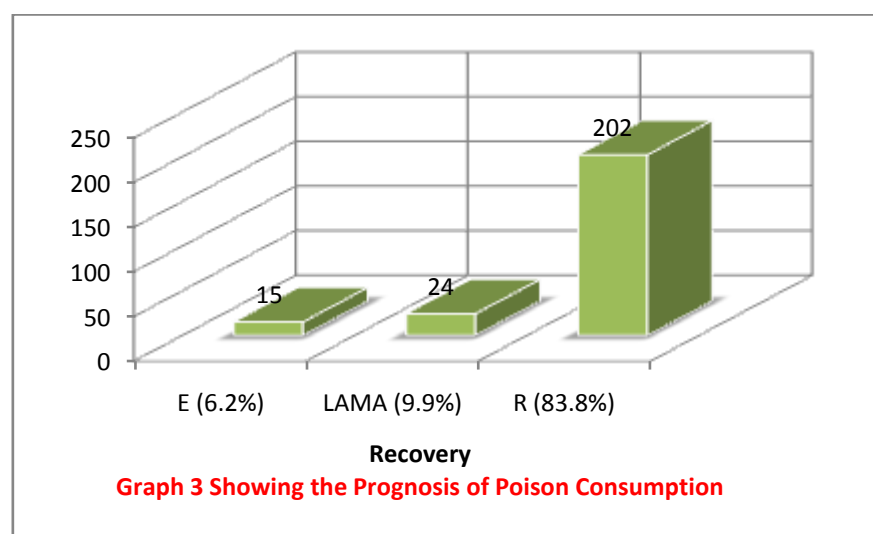
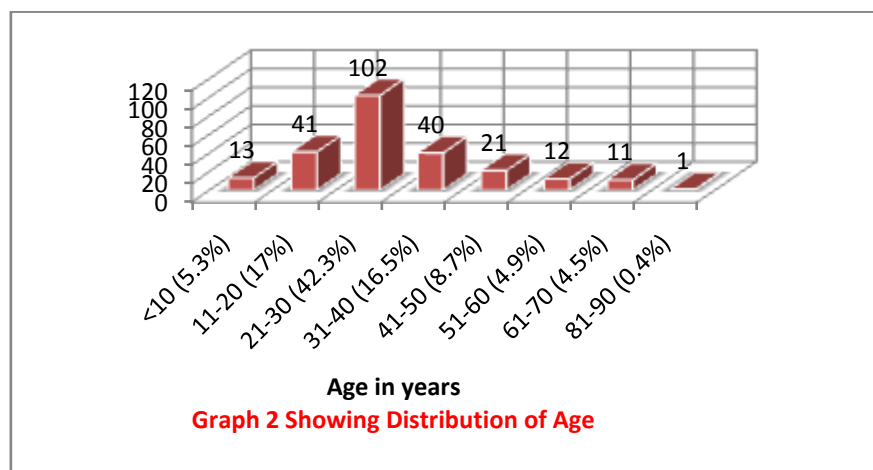
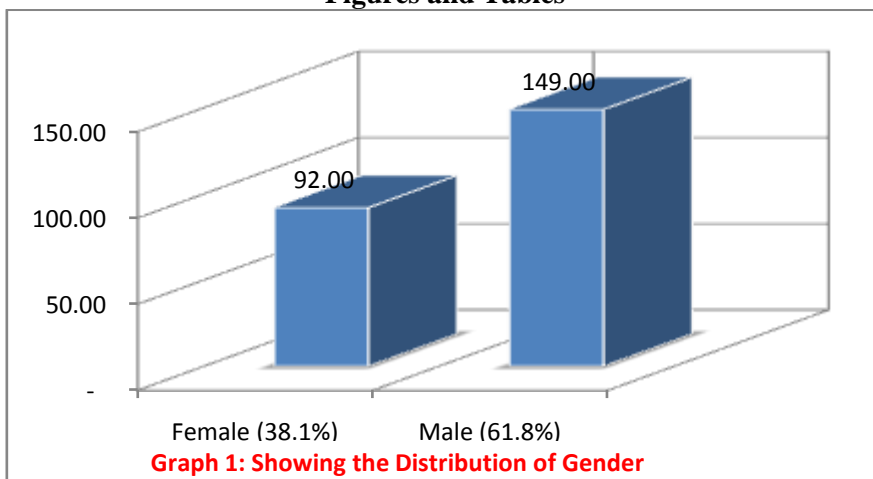
Among the 241 cases of poison consumption 90% of the cases with Intentional attempt which is similar to a study conducted by Ebran Z et al which is around 89% with intentional attempt [8].

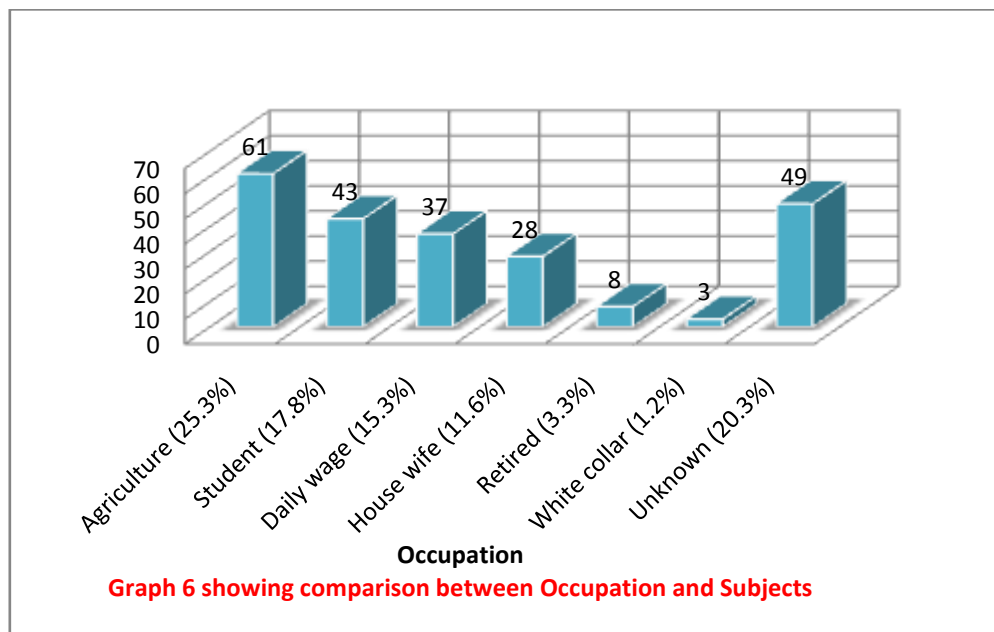
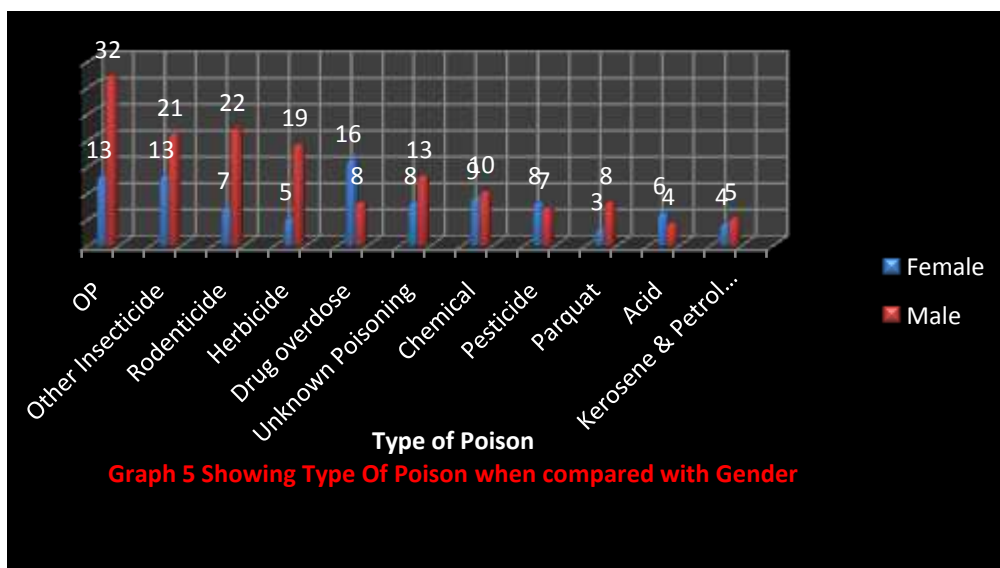
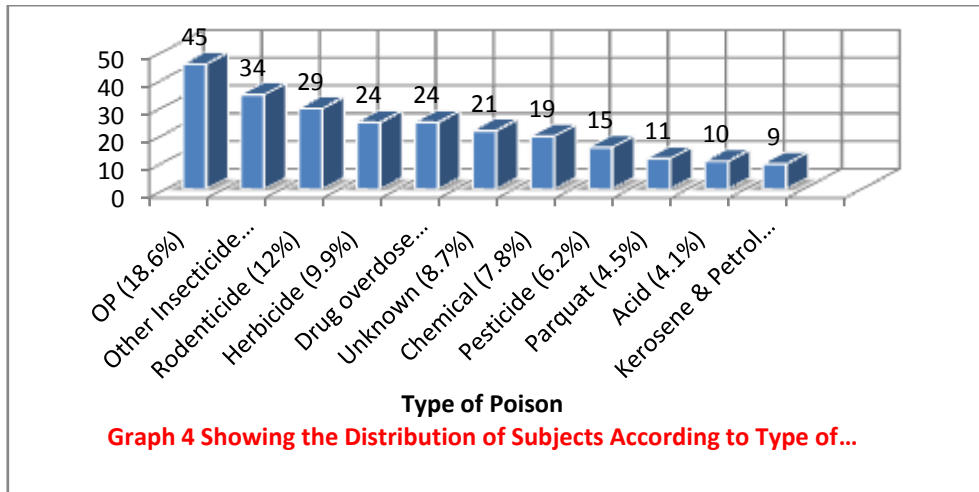
With regards to occupation agriculture stand 1st in our study with which is 25.3% unlikely to a study conducted by Maharani et al in Tamil Nadu where House wives are more in affected with a proportion of

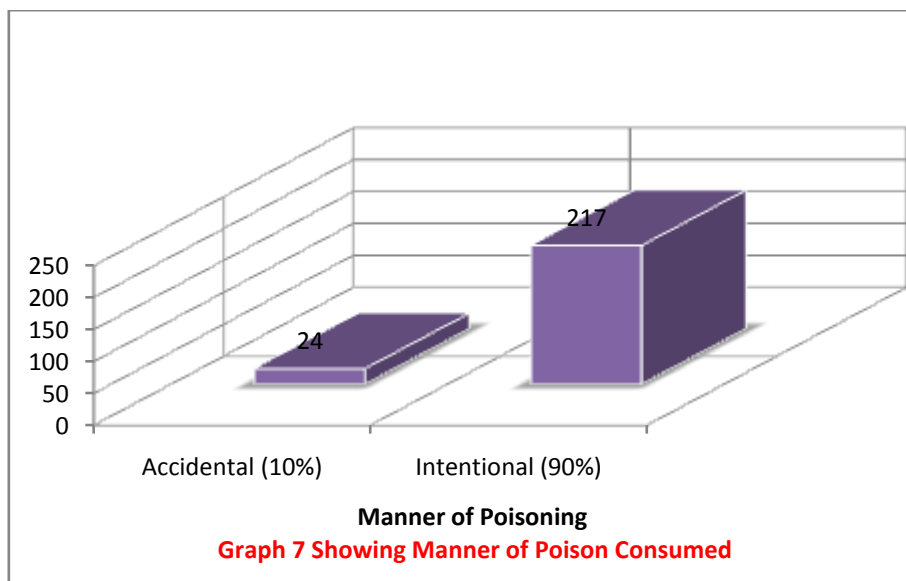
28%<sup>9</sup>. But similar to our study, one conducted by Vivekanandan K et al showed agricultural workers are more in number with 32.3% [10].

In our study out of 241 cases of poison consumption, around 6.2% of people have been expired which is more similar to study conducted by Deepak P et al where the expiry rate is around 4.8%[11]. Also the expiry rate is more in Paraquat poisoning unlikely to Saxena V et al where the expiry rate is more in OP compound poisoning [2].

**Figures and Tables**







| Age in Years | Recovery    |              |              |
|--------------|-------------|--------------|--------------|
|              | E           | LAMA         | R            |
| <10          | 0<br>0.00%  | 4<br>30.80%  | 9<br>69.20%  |
| 11-20        | 2<br>4.90%  | 5<br>12.20%  | 34<br>82.90% |
| 21-30        | 4<br>3.90%  | 10<br>9.80%  | 88<br>86.30% |
| 31-40        | 1<br>2.40%  | 3<br>7.30%   | 37<br>90.20% |
| 41-50        | 4<br>19.00% | 1<br>4.80%   | 16<br>76.20% |
| 51-60        | 1<br>8.30%  | 0<br>0.00%   | 11<br>91.70% |
| 61-70        | 3<br>27.30% | 0<br>0.00%   | 8<br>72.70%  |
| 81-90        | 0<br>0.00%  | 1<br>100.00% | 0<br>0.00%   |

**Table 1 Showing Mortality and Recovery rate with different age groups**

| Poison                     | Recovery    |             |               |
|----------------------------|-------------|-------------|---------------|
|                            | E           | LAMA        | R             |
| OP                         | 2<br>4.40%  | 4<br>8.90%  | 39<br>86.70%  |
| Other Insecticide          | 2<br>5.90%  | 1<br>2.90%  | 31<br>91.20%  |
| Rodenticide                | 3<br>10.30% | 6<br>20.70% | 20<br>69.00%  |
| Herbicide                  | 0<br>0.00%  | 2<br>8.30%  | 22<br>91.70%  |
| Drug overdose              | 0<br>0.00%  | 0<br>0.00%  | 24<br>100.00% |
| Unknown Poisoning          | 2<br>13.30% | 6<br>25.00% | 13<br>6.40%   |
| Chemical                   | 0<br>0.00%  | 1<br>5.30%  | 18<br>94.70%  |
| Pesticide                  | 0<br>0.00%  | 1<br>6.70%  | 14<br>93.30%  |
| Parquat                    | 6<br>54.50% | 0<br>0.00%  | 5<br>45.50%   |
| Acid                       | 0<br>0.00%  | 0<br>0.00%  | 10<br>100.00% |
| Kerosene & Petrol products | 0<br>0.00%  | 3<br>33.30% | 6<br>66.70%   |

**Table 2 Showing Mortality and Recovery rate with Type of Poison**

## V. Conclusion

From our data it is seen that men with in young age group (21-30y) are more susceptible than women and poison consumption is mostly seen as intentional. Among the cases of poison consumption OP compound consumption is most common and among the OP compounds males outnumber females. Agricultural workers stand first with regard to occupation.

The mortality rate is 6.2%. The three poisons which constitute around 44.7% are OP compounds, Other Insecticides and Rodenticides. There is diversity with respect to occupation in different regions which is also a indicative for maintaining the poison profile to avoid possible threats. We believe that our results would be a useful guide for preventive measures and public education for intentional and accidental poison consumption cases to minimise the mortality rate.

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