THE PROFILE OF ORGANOPHOSPHORUS POISONING IN TERTIARY CARE HOSPITAL
Nagabhushana S¹, Ranjith Kumar G. K², Ranganatha M³, Virupakshappa⁴

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ABSTRACT: BACKGROUND: Organophosphates exposures are a global health problem especially in India. Although extensive data is available regarding the pattern of OP poisoning in India, there is only little information regarding the victim profiles and the factors which influence mortality in southern India. The present study aimed to analyze the patterns, the social factors and the clinical outcomes of OP poisoning in this region. MATERIAL AND METHODS: This study carried out in Medicine department, SIMS, Shimoga from July 1st, 2014 to Dec. 31st, 2014. A total of 74 cases of OP poisoning were studied. The diagnosis of the OP compound poisoning is done by history, examination and pseudo cholinesterase level estimation. RESULT: Out of a total of 74 cases of poisoning, 33 (44.59%) were males and 41 (55.40 %) were females. Most of the cases were from the rural areas (45 cases-60.81%). Incidence is highest in illiterate (48.64%), the total percentage of the married cases was 67.56%, the highest number of cases (33.78%) was from the age group of 21 to 30 years. The OP poisoning occurred mainly during night (55.40%) highest in summer season (27 cases), the mean hospital stay was 4.25 days, with a majority of the cases staying for 3 to 7 days in the hospital (52.70%). The mortality in the present study was 29.72% (22 cases). The commonest OP compound poison consumed is chlorpyrophos. CONCLUSION: organ phosphorus poisoning is a major health hazard in the community. It needs to be managed rapidly with upgradation of treatment at PHC level. These findings demand a swing in emphasis in community education towards hazardous of the poisoning and design appropriate health education programme to reduce both mortality and morbidity.

KEYWORDS: Organophosphorus compounds, Housewives, Younger age group, Chlorpyrophos.

INTRODUCTION: Organophosphate insecticides/pesticides are used widely throughout the world. Organophosphates from occupational, accidental and intentional exposures are a global health problem especially in India.¹ Acute OP poisoning is a medical emergency and the patients are invariably admitted to the hospital through emergency services. Because the OP compounds are readily available and relatively cheap and have a rapidly lethal action even in smaller doses, they are widely used as suicidal poisons.²

   The incidence of poisoning in India is uncertain due to lack of data at central level. Although extensive data is available regarding the pattern of OP poisoning in India, there is only little information regarding the victim profiles and the factors which influence mortality in southern India³. The present study aimed to analyze the patterns, the social factors and the clinical outcomes of OP poisoning in this region.

MATERIALS AND METHODS: This study reviewed all the acute OP poisoning cases who were admitted to the Mc Gan Hospital attached to Shimoga Institute of Medical Sciences, Shimoga. From July 1st, 2014 to Dec. 31st, 2014. A total of 74 cases of OP poisoning were studied.
The diagnosis of the poison which was consumed was based on reliable information from the victim, his/her relatives and friends and also from the police. Examination of the container from which the poison had been consumed and the clinical findings which are present either with signs of muscarinic involvement, or signs of nicotinic involvement; we also noted serum pseudo cholinesterase levels to confirm the diagnosis and to aid in the management of the patients. We excluded those patients in whom organ phosphorus poisoning was doubtful and patients who have consumed more than one poison.

RESULTS:

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>33</td>
<td>44.59</td>
</tr>
<tr>
<td>Female</td>
<td>41</td>
<td>55.40</td>
</tr>
</tbody>
</table>

Table 1: Showing Sex Distribution

Out of a total of 74 cases of poisoning, 33 (44.59%) were males and 41 (55.40%) were females, with a male to female ratio of 1:1.32.

<table>
<thead>
<tr>
<th>Residence</th>
<th>No. of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>29</td>
<td>39.18</td>
</tr>
<tr>
<td>Rural</td>
<td>45</td>
<td>60.81</td>
</tr>
</tbody>
</table>

Table 2: Showing Demographic Distribution

Most of the cases were from the rural areas (45 cases - 60.81%)

<table>
<thead>
<tr>
<th>Education</th>
<th>No. of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>36</td>
<td>48.64</td>
</tr>
<tr>
<td>Below graduation</td>
<td>33</td>
<td>44.59</td>
</tr>
<tr>
<td>Graduation and above</td>
<td>5</td>
<td>6.75</td>
</tr>
</tbody>
</table>

Table 3: Showing Education Status

Incidence is highest in Illiterate (48.64%), 44.59% in Undergraduates, 6.75% in above Graduate.

<table>
<thead>
<tr>
<th>Marital status</th>
<th>No. of Patients (Percentage)</th>
<th>Total (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Married</td>
<td>Unmarried</td>
</tr>
<tr>
<td>Male</td>
<td>20(60.60)</td>
<td>13(39.40)</td>
</tr>
<tr>
<td>female</td>
<td>30(73.17)</td>
<td>11(26.82)</td>
</tr>
<tr>
<td>percentage</td>
<td>50(67.56)</td>
<td>24(32.43)</td>
</tr>
</tbody>
</table>

Table 4: Showing Marital Status

The total percentage of the married cases was 67.56% and females were more in the married categories.
The highest number of cases (33.78%) was from the age group of 21 to 30 years.

Housewives topped the list with reported incidence of 25 cases (33.78%).

The OP poisoning occurred mainly during night (55.40%).

The highest number of cases occurred mainly during summer (27 cases).
Highest number is seen in upper lower class with 40.54% incidence.

The average approximate volume of organ phosphorus poison consumed was 60 ± 55 ml.

The time which elapsed between the poison intake and the start of the treatment, varied from 30 minutes to one day and a majority of the cases reached the hospital within 4 hours, the mean hospital stay was 4.25 days, with a majority of the cases staying for 3 to 7 days in the hospital (52.70%).

The mortality in the present study was 29.72% (22 cases), with 4 patients (5.40%) being on the ventilator for respiratory paralysis.
The commonest OP compound poison consumed is Chlorpyriphos followed by Malathion and Lamda Cyhalothrin. Highest mortality is seen with Malathion 6 cases (8.10%)
DISCUSSION: OP Poisoning is common in India, as ours is an agriculturally based society and as the OP compounds are easily available at a cheap rate. Organophosphates are the commonest class of pesticides which have been implicated in cases of poisoning (in the present study, it was 63.8%).5,6

The present study had more number of OP poisoning cases from the rural areas (60.81%) similar to other studies in which it varied from 40.7 to 75.80%,6,7 because these compounds are easily available in the rural areas used for agricultural purposes and is kept in most of the houses in rural area. This hospital caters to more rural population and tertiary setup is not available in nearby vicinity to these villages other than over institute.

The present study had more number of illiterate (48.64%), and below graduate patients (44.59%) compared to educated patients (6.75%). Incidence is highest in illiterates and below graduates similar to study done by Subhash Chanda Joshi et al.8 Which showed illiterate rate of 60.21%, educated up to high school 28.22% and in well-educated 2.95%. This could be explained on the basis of more poverty among less educated people increasing the financial stress in the modern world.

A majority of the victims were in the age group of 21-30 years (in the present study, it was 33.78%), which is similar to that in other studies.3,7,8,9 In which it varied from 33.65% to 68%. This age group was the most active one, physically, mentally and socially and also stress of marriage life and family responsibility, so they are more prone to stress during life.

Most of the studies from India.3,8,9,10,11 and from other countries,6,12,13 showed that suicide (in the present study, it was 90.12%) was the commonest reason for the non-accidental poisoning. The suicides may be due to various stress factors coming from financial, social, family problems, low level of education, immaturity and many more aspects of life.14

The reasons for the suicide in males may include lack of employment, poverty, urbanization and various other stress related factors. In females, it may be due to marital disharmony.

The married males (60.60%) and females (73.17%) were mostly affected in the present study, similar to findings of studies.3,9 This could be explained by the reason that responsibility of male increases after marriage, which increases both financial burden and psychological stress on male. In India, when a woman gets married, she has to leave her home and join an entirely new family with different traditions, rituals and customs.8

In southern part of India, the husband’s family was the first place where a woman faced violence and ill treatment,14 which correlated with the findings of our study, where out of 41 females, 25 (33.78%) were housewives. In other studies it varied from 27.68% to 37.76%,3,8

In the present study, the victims who were more prone to the OP poisoning were housewives (33.78%), farmers (29.72%), businessmen (13.51%) and students (12.16%), which correlated with the findings of other studies.15 the OP poisoning was the commonest way for suicide for the public at large from all the categories of life.

In this study, a majority of the cases consumed OP during the night i.e. 10pm to 9am (55.40%), which correlated well with the findings of other studies.3,10,16

Season-wise, here the cases were distributed more in summer (36.48%). This is similar to study done by Shreemanta Kumar Dash et al.17 which showed summer (February to may) incidence of 31.7%. In other studies also the commonest season was summer. This could be explained on the basis pre harvesting season where farmers need more money to recover from his debt and to start harvesting. The preservation of grains starts from March, which is related directly to the overall use of pesticides and variety of chemicals.
Therefore the sudden rise of cases from February to March is mainly due to this fact, while the succeeding months are the time of school, college examination and results followed by admissions in new classes. The failure in any of these things may increase the tendency to commit suicide.

The time interval between the intake of the poison and the attendance by a doctor was 4 hours, which was the same in other studies. Which showed interval <6hrs. The hospitalization time varied between 30 min to 1 day, with a mean hospitalization time of 4.25 days, which was similar to the findings of other studies.

The volume of Organo Phosphorus poison consumed was 60±55ml, which correlate with study done by Girish Thunga et al, which showed volume of 48.9±52.5ml.

The mortality rate in the present study was 29.72%, which correlated with the study of Palimar V et al, which showed 25.8% mortality. In other studies it varied from 4.72% to 36%; It has been observed that incidence of death was found to be significantly more in those patients in whom a greater time interval had elapsed between consumption of the poison and hospitalization.

The commonest OP compound poison consumed is chlorpyriphos (20.27%) followed by malathion and lambda cyhalothrin. However different studies has shown different distribution of poison types. This can be explained by nature of availability of poisons in different localities and knowledge of people regarding these poisons.

Highest mortality seen with malathion consumption (43%). Although pure malathion is regarded as one of the safest organophosphate insecticides, this observation underlines the possibility of severe complications after exposure to a preparation which has been stored for a long period of time similar to study done by Diva et al.

**CONCLUSION:** This study has highlighted that Pesticides are the major chemical agents, which pose a health threat particularly to young people, house wives and farm workers. So this serious condition needs rapid diagnosis, early and effective treatment and up gradation of the primary health centre facilities to render immediate management of Organophosphorus compound poisoning, this study also highlighted that early admission to hospital decreases mortality.

These findings demand a swing in emphasis in community education towards hazardous of the poisoning and design appropriate health education programme for prevention of both suicidal and accidental poisoning for the benefit of the public at large. This could go a long way in helping to reduce both mortality and morbidity due to Organophosphorus compound poisoning.

**BIBLIOGRAPHY:**

## ORIGINAL ARTICLE

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