

A Retrospective Study of Organophosphorus Poisoning in Chengalpattu Region

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Abstract

Background: Organophosphates are chemicals in insecticide used extensively in agriculture. When people, such as agricultural workers, are exposed to large quantities of organophosphates, these chemicals can be harmful. When a person develops an illness as a result of organophosphate exposure, it is known as organophosphate poisoning. Organophosphorus pesticides are frequently used group in agriculture, forestry and public health and hence they are easily accessible. The study was therefore undertaken to evaluate in depth the various trends of acute organophosphorus poisoning cases and to evaluate the influencing factors and precipitating factors. This study which was made in Government Chengalpattu Medical College, Chengalpattu, for the year 2021, deciphers the various individual compounds belonging to Organophosphorus group in accordance with the chemical analysis done in Forensic Science laboratory of Medicolegal Institute Chengalpattu.

Key Words: Organophosphorus, Cypermethrin, Pyrethroids.

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Introduction

The incidence of organophosphorus poisoning has steadily increased in recent past and has reached a level where it can be called “a Social Calamity”. Though these substances have been in market only for few decades in our country, they have created many serious problems since these compounds are been preferred in most suicides because of their rapid action, ready availability and knowledge of lethal potency. So, this study was undertaken to know the Epidemiological factors in relation to poisoning. Organophosphorus compound as such is not a single compound rather a broad category of compounds with LD 50 ranges from 1 to 5000 + mg/kg. This suggests that compounds having high LD 50 might not be fatal indicating that magnitude of Organophosphorus poisoning faced by autopsy surgeon is only a tip of iceberg.

Globally, the mortality rate after exposure to organophosphate varies from 2–25%, but this will depend on various factors, including the degree and type of exposure and the level of healthcare available. The most common cause of death is respiratory failure.

Material And Method

This study is an autopsy-based study of 128 cases of Organophosphorus Poisoning brought to the mortuary of in Government Chengalpattu Medical College, Chengalpattu, in the year 2021.

Following procedure was adopted:

1. Relevant history taken from police & relatives - Detailed information of each case was recorded on the pre-coded proforma.
2. Procedure of taking samples in Mortuary.
3. Results from Toxicology Laboratory.

Observations

A statistical observation made during the study has been represented in the form of pictorial diagrams.

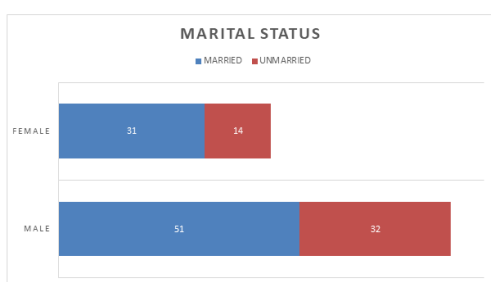


Figure 1

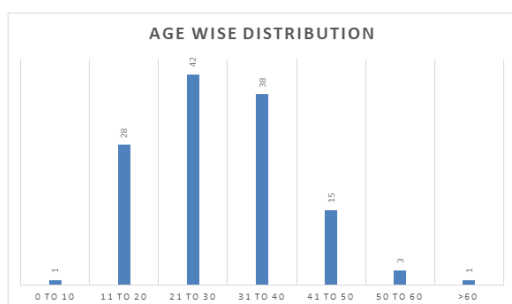


Figure 2

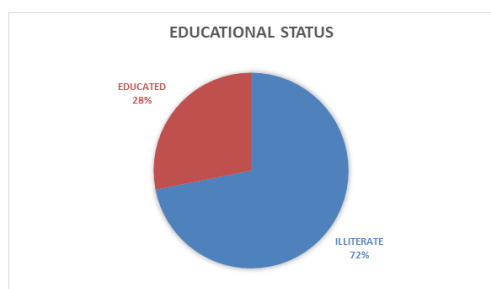
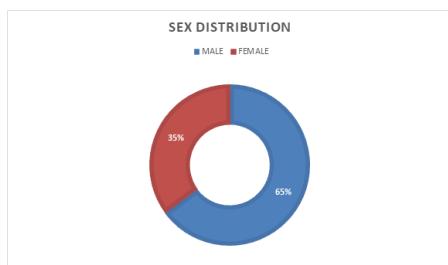


Figure 3



Figure

Discussion

The characteristic signs and symptoms of acute OP intoxication are generally thought to arise from the inhibition of acetylcholinesterase (AChE) and the ensuing cholinergic crisis. Atropine is suitable to counteract the muscarinic effects of excess acetylcholine, as bronchospasm, bronchorrhea and pulmonary oedema. But it is ineffective at nicotinic receptor sites, e.g., at respiratory muscles. To cope with the respiratory problems, antidotes reactivating inhibited AChE have been developed. Their clinical effectiveness, however, is still a matter of controversy. The reason for this uncertainty is caused by the difficulty in clearly assessing oxime effects due to both the high complexity of the various microscopic reactions involved and problems in recording the distinct clinical changes in sedated and artificially ventilated patients during cholinergic crisis.

Recent developments concerning Pyrethroids are quite remarkable. They are fast becoming the most potent group of synthetic insecticide ever to enter in the market. With the modification of both alcohol and acid sides, they are also becoming stable enough to be used for agricultural purposes. Cyano-groups at a - position of alcohol moiety increases insecticidal activity of Cypermethrin. This trend however varies with the area concerned and easy accessibility, like studies carried out at metropolitan cities like Chennai, Pune, and Mumbai; showed household insecticides like TIK-20 (Diazinon), a common offending agent. Similarly, a study at Aurangabad revealed a highest trend of Monocil, Thimate, Endosulphan and Rogar (Dimethoate) in decreasing frequency. In Sri Lanka most agents are Dimethoate, Methamidophos, Malathion, Monocrotophos and Fenthion. Death from pesticides poisoning in England and Wales suggest that although Paraquat poisoning has decreased but still is the commonest compound detected. 42 cases out of the total 128 cases belong to 3rd decade of life (21 to 30 Years) i.e., 32.81 %. Next in frequency is the age group 31-40 age i.e., 29.69 % and then 11- 20 years i.e. 21.87 %.

Moreover, stress related with problem of life does not seem to have mounted over their innocent and careless attitude. The common risk factors associated with 2nd decade of life are stresses of school work, bullying, failure at school, unsuccessful in love affairs, conflicts with parents etc. In group associated with 3rd decade is the most active group physically, mentally and socially and hence highest number of suicides is seen in this section of population. According to a study made in Ahmedabad about half of the cases belonged to 3rd decade of life. According to Siwach et al 70 % of poisoning is seen in age group between 15 – 30 years. Similarly, Gupta & Patel et al & Vishwanathan & Shrinivasan et al had highest incidence in 3rd decade of life. Males significantly outnumbering the females, indicating a high turmoil in them due to their direct touch with changing values of society & life and scientifically proved less patience and resistance becoming an ideal victim of some evil mind. Similar results were projected in various studies like - Mutalik et al, Mehta et al, etc. Most of the victims are either partly educated or illiterate, which coincides with the 65 JIAFM, 2004; 26(2). ISSN 0971-0973 studies made by Aggarwal S B et al and De and Chatterjee et al.

Conclusions

The most common compound involved in this time span of 24 month was Cypermethrin. Males outnumbered females in Organophosphorus Poisoning. Male to female ratio in Chengalpattu region was 1.84: 1. Married candidates were more affected than Unmarried candidate. Married female committing suicides by Organophosphorus Poisoning were above three times the unmarried females. Most common age group involved in Organophosphorus Poisoning in Chengalpattu region was 21 - 30 years, which form 32.81 % of total study case. Most of the cases belong to the age group between 14 years to 40 years accounting for 70.3 % cases. Most of the cases illiterates accounting 65 %.

Recommendation

1. Proper education of vulnerable groups.
2. Awareness programmes must be conducted from time to time among the population who work with organophosphorus compounds.
3. Early treatment should be started by maintaining a improved referral and ambulation methods.
4. Organic farming must be encouraged.
5. Use of high LD 50 organophosphorus compounds must be encouraged.
6. Strict sales and distribution of organophosphorus compounds must be employed.

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