

Demographic study of 100 cases of deaths due to organophosphorous compound poisoning

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Abstract

Organophosphorus compounds are extensively used as pesticides for soft bodied insects in agriculture. They have been imported in India since 1951, but very few knew the nature of these compounds as a virulent poison till the food poisoning tragedy in 1958 which claimed above 100 lives. This was due to inadvertent stocking of food packages in the same hold as food containers. In countries such as India and Nicaragua, organophosphates are easily accessible and, therefore, a source of both intentional and unintentional poisonings. The incidence of international organophosphate-related human exposures appears to be underestimated.⁽¹⁾ Over time organophosphorus compounds have become the no.1 poison of choice for the purpose of suicide in India and remain so till date. Hence this study was conducted to shed some light on the scenario of deaths due to organophosphorus compound poisoning.

Keywords: Organophosphorous compound poisoning.

Introduction

Organophosphorous (OP) compounds are a diverse group of chemicals used in both domestic and industrial settings. Examples of organophosphates include insecticides (malathion, parathion, diazinon, fenthion, dichlorvos, chlorpyrifos, ethion), nerve gases (soman, sarin, tabun, VX), ophthalmic agents (echothiophate, isofluorophate), and antihelmintics (trichlorfon). Herbicides (tribufos [DEF], merphos) are tricresyl phosphate-containing industrial chemicals.⁽²⁾

The desired use of pesticides is to kill unwanted organisms such as insects, fungi, weeds, and rodents. These substances cause thousands of death in Southern Asia, Africa and other developing countries. Humans are constantly at risk of exposure to these chemicals in a number of ways. Farmers and gardeners are exposed during spraying these pesticides on crops (operator exposure). Operators are also exposed to pesticides during treating the stock animals. Most important routes of poisoning are contact to skin and inhalation. To assess the level of exposure various bio-markers and electro-physiological biomarkers have been suggested, however these technologies elude the rural population in developing countries.

On a worldwide basis, pesticides are responsible for hundreds and thousands of cases of acute poisoning and many thousands of death each year. Vast majority of these deaths are result of suicidal consumption of organophosphorous compounds. Therefore this study will help us to gain some insight into deaths due to organophosphorous compound poisoning and make an objective assessment of cases with respect to the age at which there is maximum incidence, religious predominance.

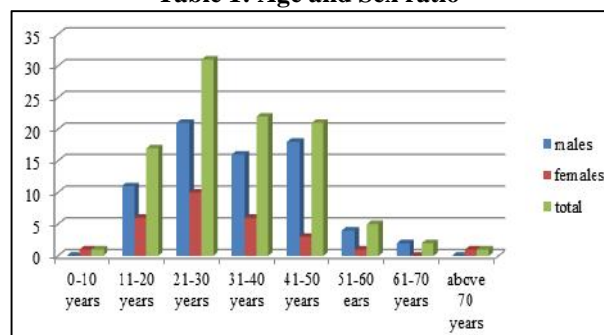
Materials and Methods

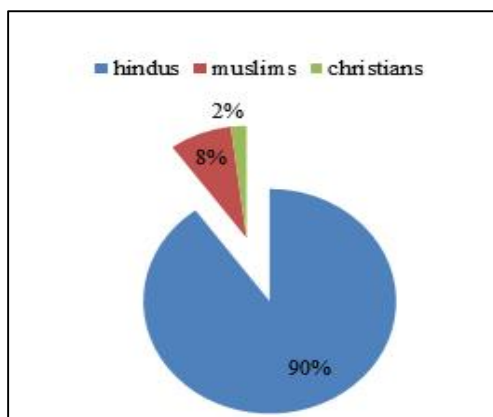
Cases of death due to alleged organophosphorus poisoning brought to Madras medical college with police memo were included in the study. Total of 100 cases of organophosphorous compound poisoning from August 2004 to July 2005 were taken for consideration in this study.

Cases in which the history from the relatives as well as the investigating officer was suggestive of organophosphorous compound consumption were included in the study. Information regarding the age, sex, religion and socioeconomic status of the deceased was documented and all 100 cases were subjected for toxicological analysis.

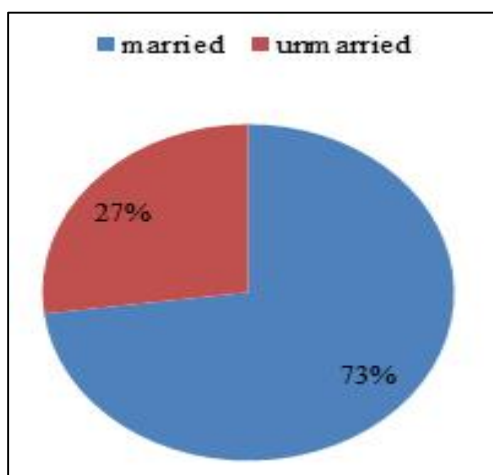
Results

Table 1: Age and Sex ratio





Pie chart 1: Religious predominance among the cases studied



Pie chart 2: Marital status of the cases studied

Of the 100 cases the age ranged from 4 years to 75 years and so the cases were grouped under various age group categories of 10 years interval (01-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70 and above 70) for analytical purpose.

It was observed that the maximum number of cases were from the age group of 21-30 years which comprised of 31% of the total cases this was followed by 31-40 years and 41-50 years age group which comprised 22% and 21% of the cases respectively. However there was only one case each in the age groups 01-10 years and above 70 years

Of the 100 cases included in the study 72% were male and 28% were female. Maximum number of males (21) and females (10) were both in the age group of 21-30 years. The age groups 0-10 years and above 70 years did not contribute any male cases and likewise no female cases were reported in the age group of 60-70 years. (Table 1: Age and Sex ratio.)

Among the 100 cases 30% of the cases were brought dead to the hospital while the remaining 70% cases were hospitalized and died subsequently.

90% of the total cases belonged to Hindu religion. Rest of the cases belonged to Muslims and Christians

contributing 8% and 2% respectively (Pie chart 1). 73% of the deceased were married while the remaining 27% were unmarried. (Pie chart 2)

Toxicological analysis detected organophosphorous compound from the viscera samples of all the 100 cases.

Discussion

The data regarding the extent of pesticide poisoning globally were first published in 1990 by the World Health Organization.⁽³⁾ It was estimated that 3 million cases of pesticide poisonings occurred worldwide annually with 220,000 deaths. Today poisoning has emerged as the commonest method of suicide in rural Asia, almost accounting for over 60% of all deaths.⁽⁴⁻⁶⁾

Deaths due to accidental pesticide poisoning are not unheard of. In 2005, 15 victims were poisoned after accidentally ingesting ethion-contaminated food in a social ceremony in Magrawa, India.

In our study most of the cases belonged to the age group of 21-30 years which is similar to the study conducted by Singh A et al.⁽⁷⁾ In a country like India this is the age group where the youth have to shoulder the responsibilities of the family. However some cannot cope with this burden and hence this age group contributes for maximum deaths due to poisoning.

In our study, males and females comprised 72% and 28% of the cases respectively. This male predominance was also seen in the study by Singh A et al.⁽⁷⁾ In our society males are seen as a dependable figure. However not all can match the desired expectation and end up inflicting fatal self-harm.

73% of the deceased were married and 27% were unmarried. Hindu community which formed 90% of the cases can be explained by India being a Hindu predominated country.

The effects of Organophosphates (OPs) on children are not very evident from this study. However there is ample awareness among researchers in this regard and more work in this area are in progress and should help identify the true risk potential.⁽⁸⁾

Conclusion

Deaths due to poisoning more so suicidal deaths among the youth of nation imposes a huge social, and economic burden on the society which in turn causes obstacles in the course of development of our nation. Organophosphorous compounds, till date remain the poison of choice for suicide more so plaguing the rural India. The availability of good medical facilities in the cities has brought down the number of deaths significantly however the larger rural areas of our nation are still equipped with only basic medical facilities. Apart from improving the medical facilities we need to analyze the various reasons which are driving the youth towards suicide and appropriate counseling and preventive measures should be put in

place. It's our firm belief that we can win this battle against poisoning by strengthening both our social and medical fronts.

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