

THE PROFILE OF ORGANOPHOSPHORUS POISONING IN TERTIARY CARE HOSPITALNagabhushana S¹, Ranjith Kumar G. K², Ranganatha M³, Virupakshappa⁴**HOW TO CITE THIS ARTICLE:**

Nagabhushana S, Ranjith Kumar G. K, Ranganatha M, Virupakshappa. "The Profile of Organophosphorus Poisoning in Tertiary Care Hospital". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 69, August 27; Page: 11997-12005, DOI: 10.14260/jemds/2015/1731

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 chlorphyriphos. **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, Chlorphyrophos.

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 Gann 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.

ORIGINAL ARTICLE

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:

Sex	No. of Patients	Percentage
Male	33	44.59
Female	41	55.40

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.

Residence	No. of Patients	Percentage
Urban	29	39.18
Rural	45	60.81

Table 2: Showing Demographic Distribution

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

Education	No. of Patients	Percentage
Illiterate	36	48.64
Below graduation	33	44.59
Graduation and above	5	6.75

Table 3: Showing Education Status

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

Marital status	No. of Patients (Percentage)		Total (Percentage)
	Married	Unmarried	
Male	20(60.60)	13(39.40)	33(44.59)
female	30(73.17)	11(26.82)	41(55.40)
percentage	50(67.56)	24(32.43)	74(100)

Table 4: Showing Marital Status

The total percentage of the married cases was 67.56% and females were more in the married categories.

ORIGINAL ARTICLE

Age group	No. of Patients	Percentage
11-20	7	9.45
21-30	25	33.78
31-40	22	29.72
41-50	10	13.51
51-60	9	12.16
Above 60	1	1.35

Table 5: Showing Age Distribution

The highest number of cases (33.78%) was from the age group of 21 to 30 years.

Occupation	No. of Patients	Percentage
students	9	12.16
agriculture	22	29.72
House wife	25	33.78
Businessmen	10	13.51
Gove employees	7	9.45
coolie	1	1.35

Table 6: Showing Occupation

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

Time of consumption	No. of Patients	Percentage
9 am to 4pm	10	13.51
4 pm to 10 pm	23	31.08
10 pm to 9 am	41	55.40

Table 7: Showing Time of Consumption

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

Seasonal variation	No. of Patients	Percentage
Summer (Mar, Apr, May)	27	36.48
Rainy (Jun, Jul, Aug)	15	20.27
Spring (Sept, Oct, Nov)	25	33.78
Winter(Dec, Jan, Feb)	7	9.45

Table 8: Showing Seasonal Variation

The highest number of cases occurred mainly during summer (27 cases).

ORIGINAL ARTICLE

Economic status	No. of Patients	Percentage
Upper	3	4.05
Upper middle	10	13.51
Lower middle	25	33.78
Upper lower	30	40.54
Lower	6	8.10

Table 9: Showing Socioeconomic Status.⁴

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.

Duration of hospital stay	No. of Patients	Percentage In comparison to total no. of cases studied	Number of Deaths	Percentage of deaths. In comparison to total no of admission in that category/ total no of cases studied
Up to one hour	8	10.81	8	100/10.81
1 to 6 hr.	4	5.40	4	100/5.40
6 to 24 hr.	3	4.05	3	100/4.05
1 to 2 days	6	8.10	1	16.66/1.35
3 to 7 days	39	52.70	5	12.82/6.75
> one week	14	18.91	1	7.14/1.35
	74	100	22	--/29.72

Table 10: Showing Duration of Hospital Stay and Mortality

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.

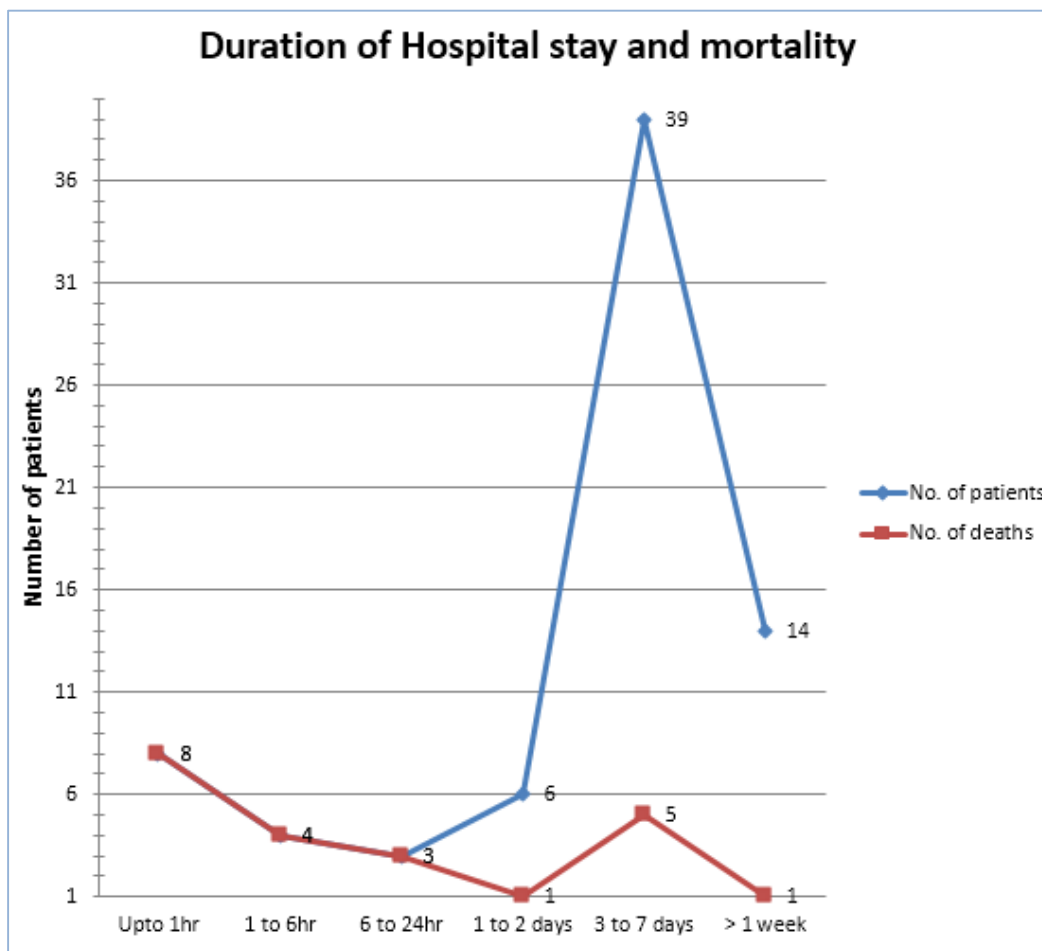


Chart 1: Showing Duration of Hospital Stay and Mortality

Type of Organ Phosphorus Compound	No. of Patients	Percentage
Malathion	14	18.91
Chlorphyriphos	15	20.27
Dichlorphos	8	10.81
Phorate	7	9.45
Lamdacyhalothrin	12	16.21
Imdidachlopride	6	8.10
Monochrotophos	4	5.40
Dimethoate	3	4.05
Quinalphos	5	6.75

Table 11: Showing Types of Organ Phosphorus Compound Poisons

The commonest OP compound poison consumed is Chlorphyriphos followed by Malathion and Lamda Cyhalothrin. Highest mortality is seen with Malathion 6 cases (8.10%)

ORIGINAL ARTICLE

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 house wives. 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.

ORIGINAL ARTICLE

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.^{3,18} 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.^{3,10,11,13}

The volume of Organo Phosphorus poison consumed was 60±55ml, which correlate with study done by Girish Thunga et al,¹⁹ 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,² which showed 25.8% mortality. In other studies it varied from 4.72% to 36%.^{3,6,8,12,13,20} 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.²⁰

The commonest OP compound poison consumed is chlorpyrifos (20.27%) followed by malathion and lambda cyhalothrin. However different studies has shown different distribution of poison types.^{8,14,18} 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.²¹

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:

1. Ecobishon DJ. Toxic effects of pesticides. In: Klaassen CD, ed. Casarett and Doull's Toxicology: The Basic Science of Poisons. Fifth edn. New York: McGraw-Hill, 1996:643±66.
2. Palimar V, Saralaya KM, Arun M, Mohanty MK, Singh B. The profile of methyl parathion poisoning in Manipal, India. *J. Ind. Soc. Toxicol.* 2005; 1(2):35–37.
3. Kora S.A. et al; Sociodemographic Profile of the Organophosphorus Poisoning Cases in Southern India: *Journal of Clinical and Diagnostic Research.* 2011 October, Vol-5(5): 953-956.
4. Mohan Bairwa et al: Modified Kuppuswamy's Socioeconomic Scale: Social Researcher Should Include Updated Income Criteria, 2012; *Indian J Community Med.* 2013 Jul-Sep; 38(3): 185–186.

ORIGINAL ARTICLE

5. Singh SS, Sharma BK, Wahi PL. Spectrum of acute poisoning in adults. JAPI 1984;32(7):561±3.
6. Eddleston M. Patterns and problems of deliberate self-poisoning in the developing world. QJM 2000; 93: 715-731.
7. Srinivasa V et al. Profile of poisoning in a tertiary care hospital. International journal of basic medical science. 2015 April; 6(1): ISSN 0976-3554.
8. Subhash chanda joshi et al. Profile of Organophosphorus Poisoning at Tertiary Care Hospital in Uttarakhand. J Indian Acad Forensic Med. October-December 2013; 35(4):346-48.
9. Gupta SK. Study of Organo Phosphorus Poisoning in Surat, India. JIAFM, 2006: 28 (3):83-7.
10. Siwach SB et al. The profile of acute poisonings in Harayana-Rohtak Study. J Assoc Physicians India. 1995 Nov; 43(11):756-9.
11. Karki P. A clinico-epidemiological study of organophosphorus poisoning at a rural-based teaching hospital in eastern Nepal. Trop Doct. 2001 Jan; 31(1):32-4.
12. Pyar Ali et al. Clinical Pattern and Outcome of Organo Phosphorus Poisoning. JLUMHS January-April 2012; 11(01):15-18.
13. Alina Weissmann-Brenner MD et al. Organophosphate Poisoning: A Multihospital Survey. IMAJ. 2002 July; 4:573-76.
14. Gupta BD, Vaghela PC. The profile of fatal poisoning in and around Jamnagar. J. Ind. Acad. Forensic Med. 2005; 27(3):145-48.
15. Dong X, Simon MA. The epidemiology of organophosphate poisoning in urban Zimbabwe from 1995 to 2000. Int. J. Occup. Environ. Health 2001; 7(4):333-38.
16. Emerson GM, Gray NM, Jelinek GA, Mountain D, Mead HJ. Organophosphate poisoning in Perth, Western Australia, 1987-1996. J. Emerg. Med.1999; 17(2): 273-77.
17. Shreemanta Kumar Dash et al. SOCIODEMOGRAPHIC PROFILE OF POISONING CASES. JIAFM, 2005; 27 (3):133-38.
18. Shivakumar S et al. ORGANOPHOSPHORUS POISONING – A STUDY OF 165 CASES FROM CHENNAI, INDIA. Dr. Shivakumar's Academy. Researchgate publication/235724234. FEBRUARY 2013:1-23.
19. Girish Thunga et al. Evaluation of incidence, clinical characteristics and management in organophosphorus poisoning patients in a tertiary care hospital. J. Toxicol. Environ. Health Sc. October 2010;2(5):73-76,
20. Kavya S.T, Srinivas V et al. Clinical Profile of patients with Organophosphorus Poisoning in an Intensive Care Unit in a tertiary hospital. International Journal of Clinical Cases and Investigations October 2012; 4(3):24-31.
21. Dive a et al. Unusual manifestations after Malathion poisoning. Hum Exp Toxicol. 1994 Apr; 13(4):271-4.

ORIGINAL ARTICLE

AUTHORS:

1. Nagabhushana S.
2. Ranjith Kumar G. K.
3. Ranganatha M.
4. Virupakshappa

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of General Medicine, Shimoga Institute of Medical Sciences, Shimoga.
2. Junior Resident, Department of General Medicine, Shimoga Institute of Medical Sciences, Shimoga.
3. Assistant Professor, Department of General Medicine, Shimoga Institute of Medical Sciences, Shimoga.

FINANCIAL OR OTHER

COMPETING INTERESTS: None

4. Professor and HOD, Department of General Medicine, Shimoga Institute of Medical Sciences, Shimoga.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Nagabhushana S,
Near GK School,
Jenukalleshwari Krupa,
Aashok Nagar 2nd Cross,
Shimoga-577201.
E-mail: sn_bhushan@yahoo.co.in

Date of Submission: 12/08/2015.
Date of Peer Review: 13/08/2015.
Date of Acceptance: 24/08/2015.
Date of Publishing: 26/08/2015.