



---

**STUDY OF PROFILE OF ORGANOPHOSPHORUS POISONING CASES IN  
A TERTIARY CARE HOSPITAL, NORTH KARNATAKA, BIDAR, INDIA.**

**DR PADMANABHA T S<sup>\*1</sup>, DR KASHINATH GUMMA<sup>2</sup> AND DR GAJANAN P KULKARNI<sup>3</sup>.**

<sup>\*1</sup>*Post Graduate student, Department of Pharmacology, BRIMS, Bidar, Karnataka.*

<sup>2</sup>*Associate Professor, Department of Pharmacology, BRIMS, Bidar, Karnataka.*

<sup>3</sup>*Assistant Professor, Department of Pharmacology, BRIMS, Bidar, Karnataka.*

**ABSTRACT**

A retrospective analysis of Organophosphorus(OP) poisoning cases admitted to emergency wards of BRIMS, Government Teaching Hospital, Bidar, Karnataka from July 2012 to Dec 2012 was done to study the profile of poisoning cases reported. Since Acute poisoning due to Organophosphorus compound is a common medical emergency and leads to morbidity and mortality in developing countries due easy accessibility and less cost of OP compounds in the market. Hence the present study is undertaken to know the poisoning pattern at BRIMS Teaching Hospital, Bidar. Objective of the study was to evaluate the pattern of OP poisoning and to study the socio-demographic profile of the same.

**KEYWORDS:** Organophosphorus, poisoning, sociodemographic, profile.



**DR PADMANABHA T S**

Post Graduate student, Department of Pharmacology, BRIMS, Bidar, Karnataka.

## INTRODUCTION

Poison is a substance that causes damage or injury to the body and endangers one's life due to its exposure by means of ingestion, inhalation or contact (Thomas et al., 2004)<sup>(1)</sup>. Poisoning is the fourth most common cause of death in India (Unikrishnan et al., 2005)<sup>(2)</sup>. It has been estimated that, in India five to six persons per lakh of population die due to acute poisoning every year (Narayana Reddy., 2010)<sup>(3)</sup>. Pattern of poisoning in a particular region depends on various factors like availability and access to the poison, socioeconomic status of an individual, educational status, knowledge on pesticides and their proper usage etc. Rapid industrialization and massive use of pesticides in agriculture has increased the incidence of poisoning. In India, as agriculture is the main occupation, insecticides are used to a greater extent and the poisoning with such products are more common (Aaron et al., 2004)<sup>(4)</sup>. According to various studies organophosphorus compound forms the commonest poisoning substance in Asia. (Jaiprakash et al., 2011; Vinay et al., 2008; Vivek et al., 2013; Suliman et al., 2006.)<sup>(5)(6)(7)(8)</sup>. A study by Thomas et al 2000<sup>(9)</sup> has shown an increasing trend of self poisoning among young adults. The commonest cause of poisoning in India and other developing countries is pesticides, the reasons being agriculture based economics, poverty unsafe practices, illiteracy, ignorance and lack of protective clothing and easy availability of highly toxic pesticides.

OP compounds inhibit acetylcholinesterase irreversibly resulting in accumulation of acetylcholine (Ach) and overstimulation of cholinergic synapses and produces muscarinic as well as nicotinic manifestations. Patients die mostly from respiratory failure and, the variability in the clinical features depends on nature of compounds, amount consumed, severity, time gap between exposure, and presentation in the hospital.<sup>(10)</sup>. Currently, a combination of an antimuscarinic agent (preferably atropine), and an AChE reactivator (called an oxime according to its chemical structure) is recommended for

the treatment of OP poisoning. Information regarding organophosphorus compound poisoning in a particular region will help in early diagnosis and treatment of cases, thus decreasing the mortality and morbidity rates. Information available in our region with regard to OP poisoning is limited. Hence this present study was carried out with the objective to find out the sociodemographic profile of organophosphorus poisoning in a tertiary care hospital, Bidar, Karnataka.

## MATERIALS AND METHODS

The present study was a retrospective study conducted for six months duration from July 2012 to Dec 2012 in a tertiary care hospital (BRIMS Teaching Hospital, attached to the District Government Hospital), Bidar in north Karnataka, a region of Southern India. The study was conducted after obtaining Institutional Ethical clearance. The study included 285 cases of poisoning due to OP compounds. Cases of snake bite, rat poisoning, insect bite, food poisoning and allergic reaction to drugs were not included in the study. Data regarding socio-demographic profile and outcome of poisoning were collected from the hospital records and documented in the pre- structured proforma.

## RESULTS

Out of a total of 644 cases of poisoning, 285 cases (63.8%) were of OP poisoning, 215 (76.42%) were males and 70 (23.57 %) were females, with a female to male ratio of 1:3.07. Most of the cases were from the rural areas (275 cases -96.49%). The total percentage of OP poisoning cases with married status was 75.09% and males were more in both the married(55.44%) and unmarried(20%) categories. The highest number of cases (41.05%) was from the age group of 21 to 30 years. The OP poisoning occurred mainly during the later part of the day i.e., in afternoon

(45.26%). The commonest route of poisoning was oral in the suicidal cases and followed by accidental poison either due to ingestion or inhalational of OP poisoning. The time which elapsed between the poison intake and the start of the treatment, varied from 30 minutes to one day or more and a majority of the cases reached the hospital within 1 to 3 hours

(45.61%), with a mean time interval of 5.01 Hours. The mean hospital stay was 3.45 Days, with a majority of the cases staying for 1 to 3 days in the hospital (61.40%). The mortality in the present study was 8.77% (twenty five cases). Most common type of OP compound consumed was Chlorpyrifos.

**Table 1**  
***Incidence of sex and Domiciliary distribution of cases.***

| Category        | No. of cases | Percentage (%) |
|-----------------|--------------|----------------|
| <b>Sex</b>      |              |                |
| Male            | 215          | 76.42%         |
| Female          | 70           | 23.57%         |
| <b>Domicile</b> |              |                |
| Rural           | 275          | 96.49%         |
| Urban           | 10           | 3.50%          |

**Table 2**  
***Marital status of cases.***

| Status  | male | %     | female | %     | total | %     |
|---------|------|-------|--------|-------|-------|-------|
| Married | 158  | 55.44 | 56     | 19.65 | 214   | 75.09 |
| Single  | 57   | 20    | 14     | 4.91  | 71    | 24.91 |
| Total   | 215  |       | 70     |       | 285   | 100   |

**Table 3**  
***Age wise distribution of cases.***

| Age group(in years) | No. of cases | Percentage (%) |
|---------------------|--------------|----------------|
| 0-10                | 5            | 1.75           |
| 11-20               | 50           | 17.54          |
| 21-30               | 117          | 41.05          |
| 31-40               | 63           | 22.11          |
| 41-50               | 26           | 9.12           |
| 51-60               | 19           | 6.67           |
| 60 -80              | 5            | 1.75           |
| Total               | 285          | 100            |

**Table 4**  
***Time of consumption of poison.***

| Time of consumption | No. of cases | Percentage (%) |
|---------------------|--------------|----------------|
| 6am to 12 noon      | 60           | 21.05          |
| 12 noon to 6pm      | 129          | 45.26          |
| 6pm to midnight     | 84           | 29.47          |
| Midnight to 6 am    | 12           | 4.21           |

**Table 5**  
***Interval between poisoning and hospitalization.***

| <b>Time lapse in hours</b> | <b>No. of cases</b> | <b>Percentage (%)</b> |
|----------------------------|---------------------|-----------------------|
| Less than 1 hour           | 21                  | 7.37                  |
| 1 to 3 hours               | 130                 | 45.61                 |
| 3 to 6 hours               | 93                  | 32.63                 |
| 6 to 12 hours              | 21                  | 7.37                  |
| 12 to 24 hours             | 6                   | 2.11                  |
| More than 24 hours         | 12                  | 4.21                  |
| Not known                  | 2                   | 0.70                  |

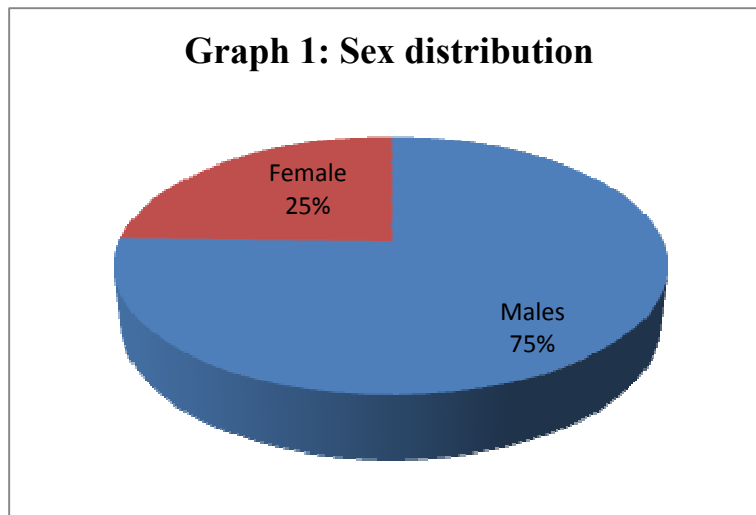
**Table 6**  
***Duration of Hospitalization:***

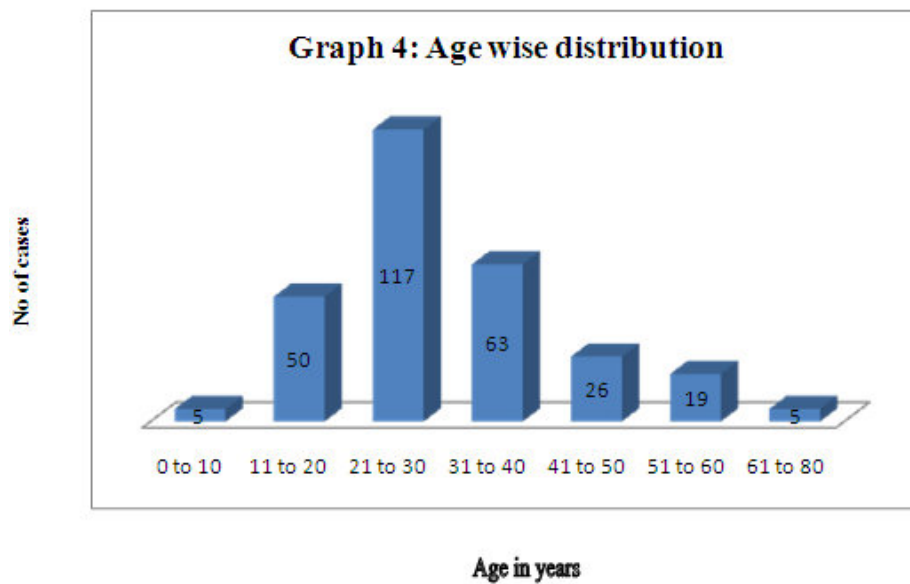
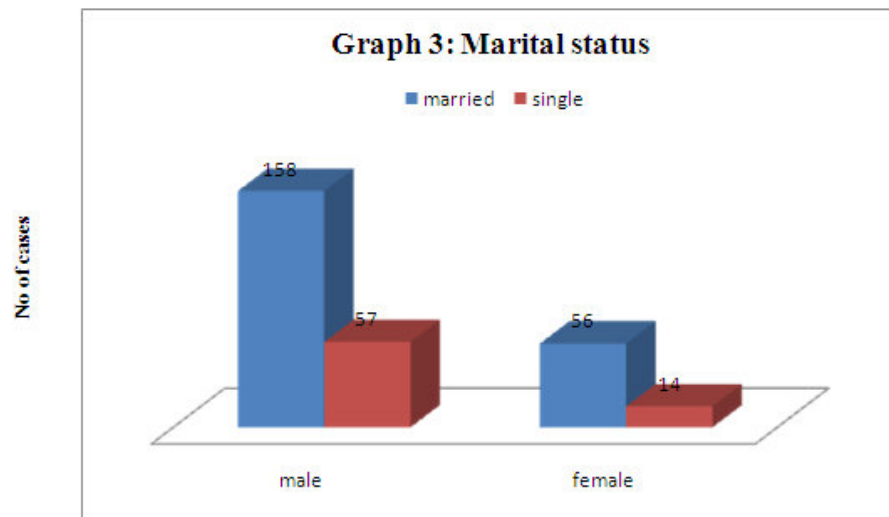
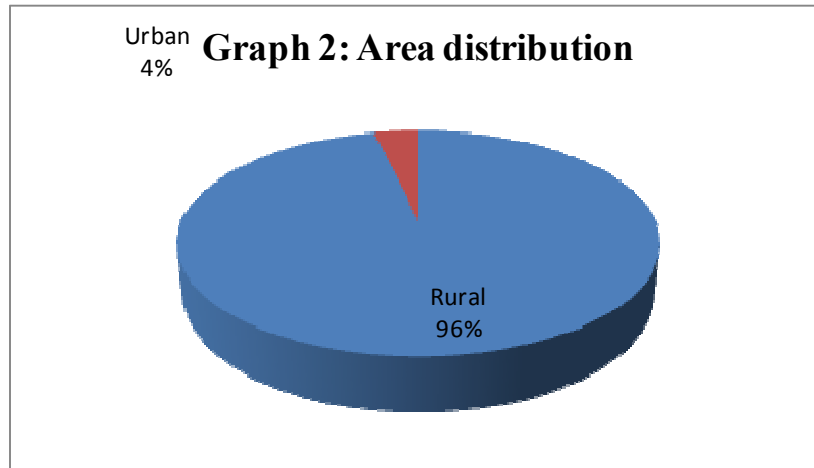
| <b>Duration of stay in hospital</b> | <b>No. of cases</b> | <b>Percentage (%)</b> |
|-------------------------------------|---------------------|-----------------------|
| Up to 1 day                         | 23                  | 8.07                  |
| 1 to 3 days                         | 175                 | 61.40                 |
| 3 to 7 days                         | 76                  | 26.67                 |
| 7 to 15 days                        | 9                   | 3.16                  |
| 15 to 30 days                       | 2                   | 0.70                  |

**Table 7**  
***Outcome of cases.***

| <b>Outcome</b> | <b>No of cases.</b> |
|----------------|---------------------|
| Survived       | 260                 |
| Died           | 25                  |

**GRAPHS:**





## DISCUSSION

OP Poisoning is common in India, as ours is an agriculturally based society and as the OP compounds are easily available in the market. Easy availability and low cost of hazardous chemicals plays a major role in both accidental and suicidal poisoning in developing countries like India, Srilanka, South Africa etc.<sup>(11)(12)(13)(14)</sup> In the present study Organophosphates compound was the commonest poisoning agent which accounts for 44.25%, similar to studies by Dash et al; Sinha et al<sup>(15)(16)</sup>. The present study incidence OP cases from the rural areas were more (96.49%), Dhaval et al<sup>(17)</sup> study had shown incidence upto 82% from rural area. Vinay et al<sup>(6)</sup> study reported Poverty, socio-economic status, monsoon failure was some of the reasons for higher incidence of OP compound poisoning among farmers. Also improper knowledge regarding use and handle of pesticides as well as poor precautions can be major factor for poisoning. Majority of the cases were in the group of 11 to 40 years. Among them majority of the victims were in the age group of 21-30 years (in the present study, it was 41.05%), which is similar to that in other studies Dash et al; Sahin et al<sup>(15)(18)</sup>. Because this age group was the most active one, physically, mentally and socially and so, it was more prone to stress during life, also for family problems, love failure, unemployment, failure in examination, nuclear family concept, improper knowledge regarding pesticides. The five cases which were seen under the age of 10 in this study were accidental. Suicidal rates were higher than accidental poisoning and suicidal nature was higher among males when compared to females, which was similar to other studies done by Dash et al 2005; Sharma et al 2002; Singh et al 1984.<sup>(15)(20)(21)</sup>

Incidence of OP poisoning was more in males (76.42), similar to Dhaval et al<sup>(17)</sup> study with male predominance. In both males and females poisoning tendency was more common in married individuals(75.09%), among them males(55.44%) outnumbered female gender(19.65%) which was in comparable with

Dash et al 2005; Singh et al 1984 studies.<sup>(15)(21)</sup> Among unmarried individuals again male gender(males-20%; females-4.91%) were affected more in the present study and was evident from Dash et al 2005; Singh et al 1984 studies.<sup>(15)(21)</sup> But was contrast to the study done by Kora et al 2011; Pokhrel et al 2008.<sup>(22)(24)</sup> where unmarried female incidence was high. In present study married females were affected more compared to unmarried females. Virender et al 2004 study<sup>(25)</sup> reported that Woman factors like Dowry, family quarrels, maladjustment in family and total dependence on husband are responsible for the higher incidence among married females. The studies from India<sup>(15)(20)</sup> and from other countries<sup>(16)(23)</sup> showed that suicide (in the present study, it was 85.96%) was the commonest reason for the non-accidental poisoning. In present study suicide rate due to non-accidental poisoning was higher than accidental poisoning.

Out of 285 cases, 189(66.34%) cases were intoxicated with OP compound during daytime with more cases in afternoon between 12pm to 6pm(129 cases; 45.26%), which was similar to studies done by Sinha et al; Emerson et al; Maharani et al<sup>(16)(23)(26)</sup>. But contradictory to study done by Pokhrel et al<sup>(24)</sup> in which the incidence was high during night time. The time interval between the intake of the poison and the attendance by a doctor was 5.01 hours, which was the almost similar in Sahin et al 2003; Kora et al; Dash et al 2008<sup>(18)(22)(27)</sup>. The duration of hospital stay varied between less than a day to 30 days, with a mean hospitalization time of 3.45 days, which was less compared to Kora et al(5.17 days)<sup>(22)</sup> and was comparable with Sahin et al 2003; Dash et al 2008<sup>(18)(27)</sup>. The mortality rate in the present study was 8.77%, which was higher when compared to Sahin et al; Kora et al studies.<sup>(18)(22)</sup> The mortality rate directly depended on the time at which the patient received the treatment. Most common type of OP compound consumed was Chlorpyrifos, which was in

contrast to Banerjee et al<sup>(28)</sup> study in which Methyl parathion was the most common type.

## CONCLUSION

From the present study we come to conclusion that, it is the younger generation who are becoming the victims of OP poisoning, with the number of cases increasing every year and individuals from rural area being more affected. It is essential to strengthen the legislature on the availability (marketing) of the OP compounds and it is also more essential to strengthen the preventive measures like educating people through drug awareness programmes,

promoting poison information centers, introducing separate toxicological units in hospitals and upgrading the peripheral health centers to manage the cases of OP poisoning in an emergency, labeling precautions on the container. So, from the above facts we conclude that it is important to frame an appropriate health education programme and Poison Information Center for the prevention of both suicidal and accidental OP poisoning for the benefit of the public at large. And providing counseling for family issues may also help in reducing the incidence of exposure to poisonous substances.

## REFERENCES

1. Thomas W F, John H D, William R H. Stedman's medical dictionary. 28th edition. Lippincott William and Wilkins, New York. (2007) 2004
2. Unnikrishnan B, Singh B, Rajeev A. Trends of acute poisoning in south Karnataka. Katmandu University Medical journal. 2005; 3(2): 149-154
3. Narayana Reddy K S (2010). Toxicology, General consideration. In: Narayana Reddy K S. Essentials of Forensic Medicine and Toxicology (pp. 446-465).
4. Aaron R, Joseph A, Abraham S, Muliylil J, George K, Prasad J et al. Suicides in young people in rural southern India. Lancet. 2004; 363: 1117-1118
5. Jaiprakash H, Sarala N, Venkatarathnamma P N, Kumar T N. Analysis of different types of poisoning in a tertiary care hospital in rural south India. Food Chem Toxicol. 2011; 49(1): 248-250
6. Vinay B S, Gurudatta S, Pawar, Inamadaa P I. Profile of poisoning cases in district and medical college hospitals of north Karnataka. Indian journal of forensic medicine and toxicology. 2008; 2(2):07-12
7. Vivek A. Chiddarwar, Vandana V. Chiddarwar, Jinendra M. Jain, Santosh Kumar, Smita S. Singhania. Study of clinical profile of household and agricultural insecticide poisoning patients with reference to serum Cholinesterase levels. Int J Pharm Bio Sci 2013 Jan; 4(1): (P) 781 – 788
8. Suliman MI, Jibrán R, Rai M. The analysis of organophosphorus poisoning cases treated at Bahawalpur Victoria Hospital, Bahawalpur in 2000- 2003. Pak J med Sci 2006; 244-49.
9. Thomas M, Anandan S, Kuruvilla P S, Singh P R, David S. Profile of hospital admission following acute poisoning experiences from a major teaching hospital in south India. Adverse drug reaction and toxicology review. 2000; 19: 313-317.
10. Eddleston M. The pathophysiology of organophosphorus pesticide self-poisoning is not so simple. Neth J Med 2008; 66:146-8.
11. Singh.D.P, Aacharya R.P. Pattern of poisoning cases in Bir Hospital. Journal of Institute of Medicine, 2006; 28:1:3-6.
12. Shreemanta Kumar Dash, Manoj Kumar Mohanty, Kiran Kumar Patnaik, Sachidananda Mohanty. Sociodemographic profile of poisoning cases. JIAFM, 2005; 27 (3): 133-138.
13. Eddleston M. Patterns and problems of deliberate selfpoisoning in the developing world. Q J Med 2000; 93: 715- 731.

14. Srinivas Rao C H, Venkateswarlu V, Surender T, Eddleston M and Nick A Buckley. Pesticide Poisoning in South India- Opportunities for prevention and improved medical management. Trop Med Int Health. June 2005; 10(6):581- 588.
15. Dash SK, Mohanty MK, Patnaik KK, Mohanty S. The sociodemographic profile of the poisoning cases. J. Ind.Acad. Forensic med. 2005; 3:133–38.
16. Sinha US, Kapoor AK, Agnihotri AK, Srivastava PC. A profile of the poisoning cases which were admitted to the SRN Hospital, Allahabad, with a special reference to aluminium phosphide poisoning. J. Forensic Med. Toxicol.1999; 16(1):40–43.
17. Dhaval J. Patel, Pawan R. Tekade. Profile of Organophosphorus Poisoning at Maharani Hospital, Jagdalpur, Chhattisgarh: A Three Years Study. J Indian Acad Forensic Med. April-June 2011, Vol. 33, No. 2 , 102
18. Sahin HA, Sahin I, Arabaci F. Sociodemographic factors in organophosphorus poisoning: a prospective study. Hum. Exp. Toxicol. 2003; 22(7):349–53.
19. Nigam M, Jain AK, Dubey BP, Sharma VK. Trends of organophosphorus poisoning an autopsy based study. J. Ind. Acad. Forensic Med. 2004; 26(2):62–65.
20. Sharma B K, Harish D, Sharma V and Vij K. The epidemiology of poisoning: An Indian view point. Journ Forensic Med Toxicol 2002; 19: 5-11.
21. Singh S, Sharma B K, Wahi P L, Anand B S and Chugh K S. Spectrum of acute poisoning in adults (10 years experiences). J Assoc Physic India. 1984; 32: 561- 563.
22. Kora S.A., Doddamani G.B., Halagali G.R., Vijayamahantesh S.N., Boke Umakanth Sociodemographic Profile of the Organophosphorus poisoning Cases in southern india. Journal of clinical and diagnostic research. 2011 october, Vol-5(5): 953-956
23. 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.
24. Pokhrel D, Sirjanapant, Pradhan A, Mansoor. A Comparative retrospective study of poisoning cases in central, zonal and district hospitals. Kathmandu university Journal of science, Engineering and technology. 2008;1(V): 40-48
25. Virendar P S, Sharma B R, Dasari H, Krishnan V. A ten year study of poisoning cases in a tertiary care hospital. Indian Internet Journal of Forensic Medicine & Toxicology. 2004; 2(1)
26. B. Maharani and N. Vijayakumari., Profile of poisoning cases in a Tertiary care Hospital, Tamil Nadu, India. J App Pharm Sci. 2013; 3 (01): 091-094.
27. Dash SK, Mohanty MK, Mohanty S. Organophosphorus poisoning: A victim specific analysis of mortality and morbidity. Medi Sci Law 2008; 48(3):241-45.
28. Banerjee I, Tripathi SK, Roy AS. Clinico-epidemiological characteristics of patients presenting with organophosphorus poisoning. North Am J Med Sci 2012;4:147-50.