OPEN ACCESS
Scholars International Journal of Traditional and Complementary Medicine
Abbreviated Key Title: Sch Int J Tradit Complement Med
ISSN 2616-8634 (Print) |ISSN 2617-3891 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: http://saudijournals.com/sijtcm/

Original Research Article

A Retrospective Study of Death Due to Organophosphorus Poisoning In North Zone Area of Bangladesh

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| **Received:** 27.12.2018 | **Accepted:** 06.01.2019 | **Published:** 27.01.2019
DOI:10.21276/sijtcm.2019.2.1.1

Abstract

Every year 3 million cases of pesticide poisoning are estimated by World Health Organization. Acute poisoning is common and urgent medical problem is in both developed and developing countries all over the world. The aim of this study was to determine the relationship of age, sex and marital status of victims in case of death due to Organophosphorus poisoning. This retrospective study was conducted in Rajshahi medical college during from January 2012 - December 2014. A total of 1290 medico legal post mortems were performed during this study period, out of which 359(27.83%) were deaths due to Organophosphorus poisoning. The majority of the victim were females 232(64.62%) while males were 127(35.37%) in number. According to age group the maximum incidence of poisoning was found in 21- 30 years 41.50% gradually decreases and minimum were observed in age group ≥61 years. Acute poisoning was observed more in married group (77.56%) than unmarried group (22.44%). Pattern of various types of poison taken varies from country to country even society to society. So we should take preventive methods that may reduce mortality and morbidity due to Organophosphorus poisoning.

Keywords: Organophosphorous compound, age, sex, poisoning.

INTRODUCTION

Organophosphorous compounds are used as Insecticides, Pesticides, Herbicides, Fungicides, Rodenticides, Acaricides, Nematicides, Molluscicides and chemical warfare agents [1]. Poison would be appropriated to define 'poison' is a substance (solid, liquid, gaseous) which if administered in the living body or brought to a contact with any part thereof will produce ill health or death by its constitutional or local effects or both. The definition of poison is vague & unsatisfactory for (1) a substance which is harmless in small quantities may act as poison & cause death when take in large amount and (2) bacterial toxins are not regarded as poison [2]. Poisoning case can be in any nature- accidental, homicidal, suicidal, para-suicidal or self-inflicted. In young children, particularly below the age of 5 years they are virtually all accidental whereas in older groups the great majorities are intentional and self-inflicted or suicidal. Criminal homicidal poisonings by comparison are rare. Some populations are more vulnerable to pesticide poisoning. Organophosphorus pesticide exposure occurs through inhalation, ingestion and dermal contact because Organophosphorus pesticides disintegrate quickly in air and light, they have been considered relatively safe to consumers [3]. Poisoning also occurs from fruits and vegetables [4]. With massive ingestion or inhalation symptoms may begin within five minutes and are at maximum half an hour to eight hours. Death is caused by respiratory failure. There are nearly 3 million poisonings per year resulting in two hundred thousand deaths [5, 6]. In the United States, farm workers can be exposed via direct spray, drift, spills, direct contact with treated crops or soil, or defective or missing protective equipment [7]. World Health Organization (WHO) and several other studies have estimated that Organophosphorous pesticides were responsible for majority of self-attempted deaths in the developing world.

METHODOLOGY

This retrospective study was conducted in Rajshahi medical college during from January 2012 -

December 2014. A total of 1290 medico-legal autopsy cases were carried out during this period out of which 359 were deaths due to Organophosphorus poisoning all the cases were referred from 13 different police stations of Rajshahi which are under Rajshahi medical college. All information regarding study has been picked up from the departmental register book & some were our direct observation. Written permission for sample collection was obtained from the authority of Forensic medicine and toxicology department.

OBSERVATIONS AND RESULTS

After observation, collected data were analyzed. Data were analyzed by using SPSS software version 16.0. Observations and results were noted carefully. The results were presented in the forms of tables and chart. A total of 1290 medico legal post mortems were performed during this study period, out of which 359 (27.83%) were deaths due to Organophosphorus poisoning. The majority of the victim were females 232(64.62%) while males were 127(35.37%) in number (Table-1). According to age group the maximum incidence of poisoning was found in 21- 30 years 41.50% gradually decreases and minimum was observed in age group ≥61 years (Table-2 and chart). In the present study acute poisoning were observed more in more in married group (77.56%) than unmarried group (22.44%).

Table-1: Sex wise distribution

Sex	No. of Cases
Male	127 (35.37%)
Female	232 (64.62%)
Total	359 (100%)

Table-1 shows that in the present study, the majority of the victim females were 232(64.62%) while males were 127(35.37%) in number. Male and female ratio found to be 1:1.83.

Table-2: Age wise distribution

Age Group(yrs)	No. of cases	Percentage
11-20	74	20.61%
21-30	149	41.50%
31-40	102	28.41%
41-50	11	3.06%
51-60	16	4.45%
61-70	04	1.11%
71-80	03	0.83%
80- rest	00	0.00%
Total	359	100%

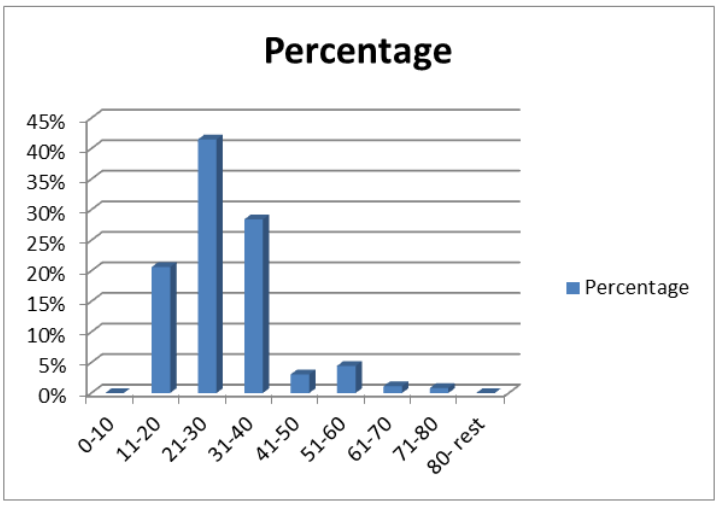

Table-2 and chart shows that according to age group the maximum incidence of poisoning was found in 21- 30 years 41.50% gradually decreases and minimum was observed in age group ≥61 years.

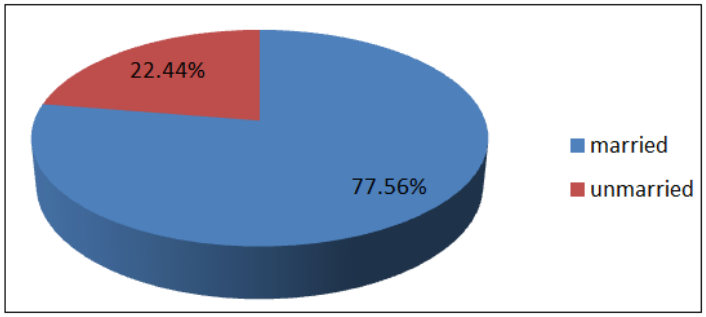

Fig-1: Pie chart shows that maximum poisoning victims were from married group 77.56% and minimum 22.44% were unmarried group

DISCUSSION

Organophosphate pesticides are one of the top causes of poisoning worldwide with an annual incidence of poisonings among agricultural workers varying from 3-10% per country [8]. Organophosphate poisoning occurs most commonly as a suicide attempt in farming areas of the developing world and less commonly by accident. Exposure can be from drinking, breathing in the vapors or skin exposure [9]. Availability & cheapest of Organophosphorous compound's are responsible for increasing incidences of pesticide poisoning and it being a major cause of morbidity & mortality that poses public health problem in developing countries. The International Agency for Research on Cancer (IARC), found that organophosphates may possibly increased cancer risk [10]. Prenatal exposure has been linked to impaired fetal growth and development. The effects of Organophosphorous compound's exposure on infants and children are at this time currently being researched to come to a conclusive finding [11, 12]. Evidence of Organophosphorous compound's exposure in pregnant mothers is linked to several health effects in the fetus. Some of these effects include delayed mental development, pervasive developmental disorder (PDD) and morphological abnormalities [13].

A study performed by Islam & Islam [14] at Sir Salimullah Medical College from January 1988 to December 1997. A total 2534 medico-legal autopsy cases were carried out during this period and 273 deaths by poisoning. Organophosphorus poisoning was the commonest one 37.7%. In the study of Rahman *et al.*, [15] from July 2005 to May 2006 showed that death due to Organophosphorous poisoning were 28%. From the previous study we observed that the death due to Organophosphorus poisoning gradually reduced year by year due to may be social awareness & consciousness. Another study at Dhamrai Thana Health Complex performed from January 1993 to December 1997 showed that males 61.30% were predominant than females 38.70% in poisoning case. Acute poisoning was observed more in married group (68.64%) than unmarried group (31.36%) [16]. In a study of khan *et al.*, [17] total 67 cases were selected as study population. Among the cases 38 (57%) were male and 29 (43%) were female. Majority victims were male which is similar to the findings of Ahamed *et al.*, [18] in the serious of Faiz *et al.*, [19] & karim *et al.*, [20] but in north zone area by the findings of present study death occurs predominantly in female than male and maximum poisoning victims were from married group. This may be due to variation in place to place, racial to racial.

In the present series young adult patients 21-30 years are mostly suffered from Organophosphorous poisoning. Faiz *et al.*, [19] in their study reported it among 11-30 years of age group76%. Ahmed *et al.*, [18] & Khan *et al.*, [21] showed highest incidences of Organophosphorous poisoning among 10-30 years of age 88.3%. And in the study of Islam *et al.*, [22] indicate the highest victims also the age group 16-35 years of age. Our findings are more or less similar to the findings of others.

In densely populated and developing country like Bangladesh poverty, less source of job, familial stress, failure to love, quarrel between family members, unsatisfied working environment, property distributions are the mentionable cause of poisoning. During our study we found those causes were the motives behind poisoning. Very much possible steps should to reduce the incidence of Organophosphorus poisoning related mortality include immediate shifting of the victim to a well-equipped and well-staffed hospital, careful resuscitation improvement in medical management, and provision of antidotes, intensive care beds, awareness, and education.

CONCLUSION

Rapid diagnosis & treatment of Oragnophosphorus poisoning patient is needed urgently. In our study we found females were more victims than male 1:1.83 in north zone area. Instant recognition, careful monitoring and appropriate management will decrease the complications as well as mortality rate. Awareness buildup of the local people should be made through mass media also needed immediately.

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