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Dr. Roshan Perera
Department of Forensic Medicine, Institute of Forensic Medicine & Toxicology, Colombo, Sri Lanka

Corresponding Author:
Dr. Roshan Perera
Department of Forensic Medicine, Institute of Forensic Medicine & Toxicology, Colombo, Sri Lanka

Evaluation of cases of organophosphorous poisoning in population

Dr. Roshan Perera

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Abstract
Background: Organophosphorus pesticide self-poisoning is a major clinical and public-health problem across much of rural Asia. The present study was conducted to assess the organophosphorous poisoning in population.
Materials & methods: The present study was conducted in department of forensic medicine. It comprised of 138 cases of organophosphorous poisoning of both genders. Parameters such as manner of poisoning, occupation and clinical findings were recorded.
Results: Out of 138 patients of OP poisoning, males were 78 and females were 60. Age group 0-10 years had 13 patients, 11-20 years had 38 patients, age group 21-30 years had 45 patients, age group 31-40 years had 28 patients 40-50 years had 10 and >50 years had 4 patients. The difference was significant (P-0.01). 42% were farmers, 27% were labourer, 20% were housewives, 6% were students and 5% were businessmen. Common symptoms were nausea/ vomiting (62%), excessive secretions (50%), muscular weakness (40%), diarrhea (34%), abdominal pain (46%), drowsiness (12%), crackles (68%), tachycardia (24%), bradycardia (17%) and hypotension (8%).
Conclusion: Organophosphate (OP) compounds lead to serious complication when consumed accidently, homicidal or suicidal.

Keywords: Organophosphorous, poisoning, tachycardia

Introduction
Organophosphorus pesticide self-poisoning is a major clinical and public-health problem across much of rural Asia. Of the estimated 500000 deaths from self-harm in the region each year, about 60% are due to pesticide poisoning. Many studies estimate that organophosphorous pesticides are responsible for around two-thirds of these deaths-a total of 200 000 a year. Deaths from unintentional organophosphorus poisoning are less common than those from intentional poisoning and seem to be more common in regions where highly toxic organophosphorus pesticides are available [1].
Human deaths following poisoning are a matter of great concern. It has high mortality and morbidity. It is a global matter occurring all over the world involving people of all age groups, both sex, from all economic and ethnic groups. The reason for poisoning can be accidental or intentional. It results into approximately 7 lacs death annually. About 345,000 occur from unintentional poisoning, and more than 370,000 from suicidal causes [2, 3].
WHO in year 2012 reported that more than 90% of fatal poisoning cases are seen in middle and low income countries i.e. the developing countries in general and agricultural countries in particular [4]. Acute organophosphorus poisoning occurs after dermal, respiratory, or oral exposure to either low volatility pesticides such as chlorpyrifos, dimethoate or high volatility nerve agents like sarin and tabun. Inhibition of acetylcholinesterase at synapses results in accumulation of acetylcholine and over activation of acetylcholine receptors at the neuromuscular junction and in the autonomic and central nervous systems [5]. The present study was conducted to assess the organophosphorous poisoning in population.

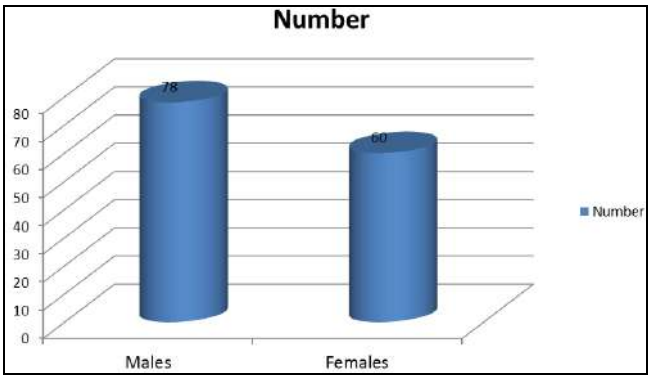
Materials & methods
The present study was conducted in department of forensic medicine. It comprised of 138 cases of organophosphorous poisoning of both genders. A proforma was made and information such as name, age, gender, education status etc. was recorded. Parameters such as Manner of poisoning, occupation and clinical findings were recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients

Total-138		
Gender	**Male**	**Female**
Number	78	60

Table 1 shows that out of 138 patients of OP poisoning, males were 78 and females were 60.

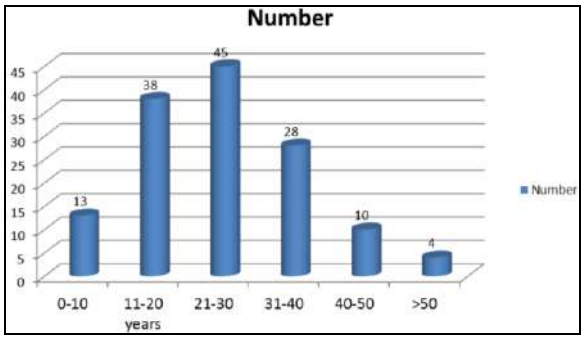


Graph 1: Distribution of patients

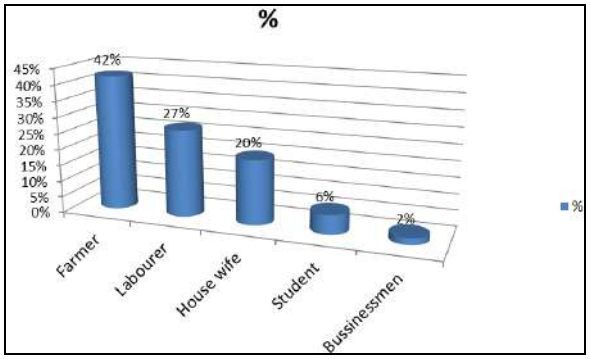
Table 2: Age wise distribution of patients

Age group (years)	Number	P value
0-10	13	0.01
11-20	38	
21-30	45	
31-40	28	
40-50	10	
>50	4	

Table 2, graph 2 shows that age group 0-10 years had 13 patients, 11-20 years had 38 patients, age group 21-30 years had 45 patients, age group 31-40 years had 28 patients 40-50 years had 10 and >50 years had 4 patients. The difference was significant (P-0.01).

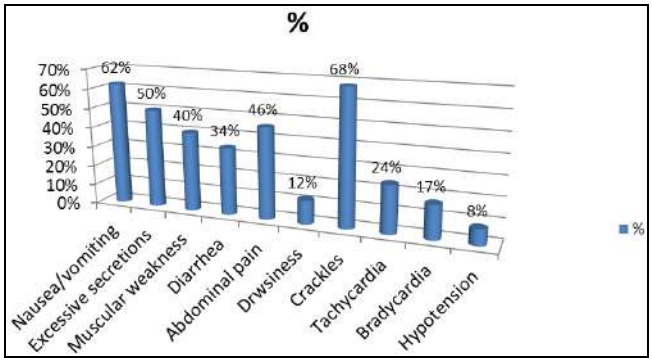


Graph 2: Age wise distribution



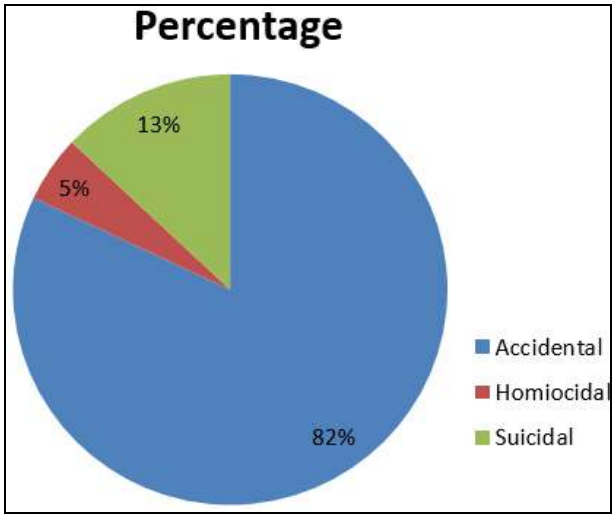
Graph 3: Occupation of patients

Graph 3 shows that 42% were farmers, 27% were labourer, 20% were housewives, 6% were students and 5% were businessmen.



Graph 4: Clinical findings

Graph 4 shows common symptoms were nausea/ vomiting (62%), excessive secretions (50%), muscular weakness (40%), and diarrhea (34%), abdominal pain (46%), and drowsiness (12%), crackles (68%), tachycardia (24%), bradycardia (17%) and hypotension (8%).



Graph 5: Manner of poisoning

Graph V shows that manner of poisoning was accidental in 82%, suicidal in 13% and homocidal in 5%.

Discussion

Organophosphate (OP) compounds are a diverse group of chemicals used in both domestic and industrial settings. Pesticide poisoning from occupational, accidental and intentional exposure is a major developing world health problem. Millions of people are exposed to danger by hazardous occupational practices and unsafe storage [6].

OP compounds inhibit acetylcholinesterase at neuromuscular junction, in autonomic and central nervous system resulting in accumulation of acetylcholine (ACh) and over stimulation of ACh receptors resulting in acute cholinergic crisis which is characterized by bradycardia, bronchorrhoea, miosis, sweating, salivation, lacrimation, defecation, urination and hypotension [7]. In addition, there occurs muscle weakness and fasciculations. The CNS involvement results in alteration in sensorium and seizures. Following resolution of cholinergic crisis, some patients may develop intermediate syndrome i.e. cranial nerve

palsies, proximal muscle weakness, respiratory muscle weakness [8]. The present study was conducted to assess the organophosphorous poisoning in adult population.

In present study, out of 138 patients of OP poisoning, males were 78 and females were 60 age group 0-10 years had 13 patients, 11-20 years had 38 patients, age group 21-30 years had 45 patients, age group 31-40 years had 28 patients 40-50 years had 10 and >50 years had 4 patients.

Subhash *et al* [9] found that a total of 47 patients of OP poisoning, 22 (46.8%) cases were male and 25(53.2%) were female. The maximum number of patients was between the age of 20-40 (33-70.2%). Married patients outnumbered the unmarried (35/74.5% vs 12/25.5%). The most common motive for poisoning was suicidal, 41 cases (87.2%). Metacid (methyl-parathion) was the most commonly used OP compounds in 32 (68%) patients. Interpersonal marital relationship seemed to be the commonest predisposing factor, 23 cases (48.9%).The commonest time of presentation was between 6 pm-12 midnight. 7(57.4%) cases presented within 2 hours of ingestion of the poison. Serum cholinesterase level measured after full atropinisation was >50% of normal level in 17 cases (36.2%). 10 cases (21.3%) required respiratory support. Intermediate syndrome (IMS) was observed in 3 cases. Overall mortality occurred in 3cases (6.4%).

We found that 42% were farmers, 27% were labourer, 20% were housewives, 6% were students and 5% were businessmen. Common symptoms were nausea/ vomiting (62%), excessive secretions (50%), muscular weakness (40%), diarrhea (34%), abdominal pain (46%), drowsiness (12%), crackles (68%), tachycardia (24%), bradycardia (17%) and hypotension (8%). The manner of poisoning was accidental in 82%, suicidal in 13% and homocidal in 5%.

Mild poisoning is defined as depression in cholinesterase activity to 20-50% of normal. Moderate poisoning occurs when activity is 10-20% of normal. Severe poisoning occurs at less than 10% of cholinesterase enzyme activity. Small short-term exposures can depress cholinesterase activity to very low levels with minimal symptoms. Levels do not always correlate with clinical illness. The level of cholinesterase activity is relative and is based on population estimates. Neonates and infants have baseline levels that are lower than those in adults.[10] However, most patients do not know their baseline level, the diagnosis can be confirmed by observing a progressive increase in the cholinesterase value until the values plateau over time.

Conclusion

Organophosphate (OP) compounds lead to serious complication when consumed accidently, homicidal or suicidal.

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