ASIA PACIFIC JOURNAL of MEDICAL TOXICOLOGY
APJMT 6;4 http://apjmt.mums.ac.ir December 2017

ORIGINAL ARTICLE

Prevalence of Organophosphate Poisoning In Batticaloa, Sri Lanka

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Abstract

Background: Deliberate self-harm (DSH) is a global problem which has steadily increased over the past few years in developing countries and has become as one of the major causes of morbidity and mortality in these countries. The aim of this prospective study was to analyze the prevalence of organophosphate poisoning among other acute DSH cases admitted to the medical ward at Batticaloa Teaching Hospital, Sri Lanka. We report the socio-demographic, and outcome of organophosphate poisoning.
Method: The prospective study comprises of 121 cases of acute poisoning admitted at Batticaloa Teaching Hospital (BTH), Sri Lanka. This study was conducted for a period of three months from April 12 through July 12, 2017.
Results: Among the subjects, 119 (98.34%) cases had intentional poisoning and only two cases (1.65%) accidental poisoning. Poisoning with organophosphate compounds (OP) 23 (19%) was the second leading type. There were 13 (56.5%) males and 10 (43.5%) females. Most of the patients were under the age group of 20-29 years old. 21 cases lived in rural areas and 2 in urban areas. Out of 23 patients, there were 2 (8.7%) deaths, 18 (78.3%) were discharged without any complications.
Conclusion: DSH in Sri Lanka is reported to be associated with interpersonal conflict, short premeditation, as well as alcohol misuse among males.

Keywords: Deliberate Self-Harm (DSH); Organophosphate Poisoning; Pesticide Poisoning

How to cite this article: Umakanth M. Prevalence of Organophosphate Poisoning In Batticaloa ,Sri Lanka. *Asia Pac J Med Toxicol* 2017;6(4):115-7.

INTRODUCTION

Poisoning, both unintentional and intentional, is a considerable contributor to mortality and morbidity throughout the world. Among all age groups and both sexes, it is seen everywhere and the incidence of poisoning with reference to insecticides, pesticides and rodenticides has become more common than others in the modern times because of their easy availability, low cost, efficacy of action and rapid death. Several studies have acknowledged pesticides (1) and yellow oleander seeds as the most commonly consumed poisons in Sri Lanka and reported case fatality rate ranges between 6.7% and 23.7% (2). Pesticide poisoning was listed as the 6 common causes of hospital deaths in Sri Lanka in 1990s.

In Sri Lanka, deliberate self-harm (DSH) was at peak in the middle of the 20th century, however this trend started to decline after the mid 1990s could be attributable to the policy thrusts initiated by the Presidential Taskforce on Suicide Prevention in 1997 (3).

Organophosphate (OP) poisoning continues to be a frequent reason for admission to hospitals and Intensive Care Units in developing countries. According to WHO, three million acute poisoning cases with 22,000 deaths occur in developing countries particularly among agricultural workers. This figure could be just the tip of the iceberg since most cases of poisoning actually go unreported, especially in the third-world countries. The pattern of poison varies from region to region depending on factors like geography, accessibility and availability of poison, socioeconomic condition, cultural and religious influence (4). Pesticide poisoning is often intentional with a motive of self-harm. Unfortunately, as pesticides are extremely toxic their ingestion carries a very high mortality (5). Moreover, the ingestion of yellow oleander (kaneru) is now known to cause high mortality in the North Central Province and in Hambantota District (6). Organophosphorus compounds are extensively used as pesticides in agriculture in Sri Lanka. Organophosphorus and yellow oleander seeds are the commonest cause of suicidal poisoning in SriLanka. The aim of the study is to assess the pattern of the organophosphate poisoning and make some recommendations for the treatment and prevention of the newer poisons on the rampage in this belt.

METHODS

The prospective cross-sectional study comprises of 121 cases of acute poisoning admitted at Batticaloa Teaching Hospital (BTH), Sri Lanka. This study was conducted for a period of three months from April 12 through July 12, 2017.

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Received 18 October 2017, Accepted 23 November 2017

Data regarding the age, gender, religion, socio-economic class, literacy, domicile, poisonous agent and route of exposure were collected according to the history given by patient or their relatives. The data collections were carried out by the investigator using a pretested, structured, interviewer administered questionnaire that comprehensively assessed clinical profiles, type of poison, clinical management, complications, and outcome following acute adult poisoning.

We included 12-year-olds or higher with deliberate self-harm (DSH), those who were admitted at the emergency department in Batticaloa Teaching Hospital. A total of 126 patients were admitted to the emergency department; however, 5 of them were excluded from the study either due to refusing to take part in the study or leaving against medical advice before the interrogation. Remaining 121 attempters gave their consent and constituted the study group. The data were then analyzed by descriptive statistical method using SPSS 19 software. Results are presented as frequency and percentage with charts and tables.

RESULTS

In the present study, 121 cases of poisoning were reviewed prospectively. Among them, 119 (98.34%) cases were of intentional poisoning and only two cases (1.65%) were of accidental poisoning. In all the cases, the route of exposure was oral. Females 83 (68.6%) outnumbered males 38 (31.4%) and the ratio was 2.1:1. Majority of the cases 89 (63.55%) were in the age group of 12-29 (Table 1). In the present study, the commonest poisoning agent was yellow oleander 33 (27. 3%). Poisoning with OP 23 (19%) was the second leading type followed by paracetamol overdose 22 (18.2%).

Out of 23 (19%) OP poisoning, 13 (56.5%) were males and 10 (43.5%) were females. Among them, 21 cases lived in rural areas and 2 in urban areas. 21 (91.3%) cases were Tamils, 1 (4.3%) was Muslim and 1 (4.3%) was Sinhalese. The most common reasons for DSH among OP poisoning was family dispute which was 15 (65%), followed by other reasons including financial problems. Unfortunately, 2(8.7%) were died, and 18 (78.3%) were discharged without any complications, 2 (8.7%) developed respiratory failure and 1 (4.3%) had aspiration pneumonia.

Table 1. Age and sex distribution of DSH

Age	Male	Female	Total
12-19	7	35	42 (34.71%)
20-29	14	33	47 (38.84%)
30-39	9	9	18 (14.87%)
40-49	7	4	11 (9.09%)
>50	1	2	3 (2.47%)
Total	38 (31.4%)	83 (68.6%)	121 (100%)

Table 2. Type of poison, reason for DSH and outcome of OP poisoning

Type of poison	Frequency	Percent (%)
Yellow oleander	33	27.3
Organophosphate (OP)	23	19
Paracetamol	22	18.2
Drug	11	9.1
Pesticide other than OP	9	7.4
Cerebral manga	6	5
Run rat	6	5
Others	5	4.1
Kerosene	3	2.5
Multi drug	2	1.7
Iron tablet	1	0.8
Total	121	100
Reason for DSH among OP poisoning		
Quarrel with father	3	13
Quarrel with mother	1	4.3
Quarrel with husband or wife	9	39.1
Financial problems	7	30.4
Failure in exam	1	4.3
Quarrel with sibling	1	4.3
Love affair	1	4.3
Total	23	100
Outcome of OP poisoning		
Discharge	18	78.3
Aspiration pneumonia	1	4.3
Respiratory failure	2	8.7
Death	2	8.7
Total	23	100

DISCUSSION

Among 121 cases of poisoning, 33 (27.3%) cases had yellow oleander poisoning and 23 (19%) cases organophosphate poisoning. In the eastern part of Sri Lanka, organophosphate insecticides are used extensively in agriculture (7). Because of their easy availability, organophosphate pesticides are a significant cause of morbidity and mortality. The study done by Sheikh M.I. et al. during the year 1999 in India showed that the incidence of OP poisoning was 43.16% (8). This percentage is higher than that of the present study. In a similar study conducted in Bangladesh, organophosphate compounds (OPC) were the most commonly used toxic agents (73.5%) (9). In the present study, maximum cases of OP poisoning were in the age group 12-29 years. In a parallel study conducted in Sri Lanka, the majority of poisoning cases are self-inflicted and 2/3 of the cases are in the age range of 11-30 years (10).

In the present study, all cases of DSH females 83 (68.6%) outnumber the males 38 (31.4%), however in the case of OP poisoning males 13 (56.5%) outnumber the females 10 (43.5%). A comparable pattern has been observed in a study conducted by Maharani B. et al. in India (11). The reason for the higher rate of DSH among males in Sri Lanka is not clear.

One possible prompting factor is the pattern of alcohol consumption in this country (12). In addition to that, another possible explanation could be that men living and working in rural agricultural areas have easy access to pesticides stored in the fields or gardens (13). However, a study conducted by Thilini Rajapakse et al. revealed that non-fatal self-poisoning are more common among females (12). Moreover, in most of the studies, we could clearly see female preponderance among non-fatal self-poisonings, and that the type of poison most frequently ingested was medicinal overdoses and plant poisons rather than pesticides (14).

In this study, the most common associated trigger for OP poisoning in Sri Lanka was interpersonal conflict 14 (60.7%), most commonly with a close family member. Interestingly, similar pattern of interpersonal conflict has been reported to be the acute trigger associated with more than 60% of DSH in India (15). However, a similar study conducted in southern India showed that 14.3% had attempted suicide due to interpersonal conflict (16).

A diverse ethnic difference is seen in the susceptibility to suicides amongst Sri Lankan people. The suicides rates were highest among the Sinhalese until around the year 2000; following which, the suicide rates of Sri Lankan Tamils became the highest (3). As we conducted this study in the east part of Sri Lanka, majority of the population were Tamils followed by moors and lastly Sinhalese. In this study, 21 (91.3%) cases were Tamils, 1 (4.3%) was Muslim and 1 (4.3%) was Sinhalese.

In this study, two out of twenty-three organophosphate poisoning cases (8.7%) died. However, 18 (78.3%) cases were discharged without any complication. Most of the time, deaths occur because of acute respiratory failure soon after ingestion (due to loss of central respiratory drive, neuromuscular dysfunction and direct effects on the lung) exacerbated by hypotension and bradycardia (17). A study conducted by Bari MS in Bangladesh showed that even though 5.1% of mortality was observed among all DSHs, OP poisoning was the leading one (18). However, a similar study in Bangladesh shows that mortality was 9.2% (19).

CONCLUSION

The commonest cause of poisoning in Sri Lanka and other developing countries is pesticide, the reasons being agriculture-based economy. In Sri Lanka, organophosphates form the largest bulk of pesticide poisoning. The work-related poisoning due to pesticides is also common in developing countries, due to unsafe practices, illiteracy, ignorance and lack of protective clothing. It is estimated that half a million population die every year as a result of pesticides poisoning. Periodic epidemiological and clinical studies are necessary to understand the pattern of poisoning in each region. It is important to know the nature and severity of poisoning in order to take proper preventive measures. The poison involved was determined from the circumstantial evidence, reliable history, presentation of remaining stuff/container from which the poison had been consumed and suggestive clinical features.

DSH in Sri Lanka is reported to be associated with interpersonal conflict, short premeditation, as well as alcohol misuse among males.

Conflict of interest: None to be declared.
Funding and support: None

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