Original Article

A Clinico-Epidemiological Study on Pesticide Poisoning

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Abstract

Contexts: Over the last few decades, agricultural pesticides have become a common household item in rural areas of the developing world. As a result of their easy availability, pesticides have also become commonly used for intentional self poisoning. World Health Organization (WHO) estimates, around 3 million poisoning cases with 220,000 deaths occur annually. About 99% of these deaths occur in developing countries. So, this study was aimed at to know the clinico-epidemiological aspects and to evaluate the immediate outcome of patients admitted with pesticide poisoning. **Methods:** This was a crosss-sectional observational study, carried out on 60 victims of pesticide poisoning admitted to one unit of medical indoor department of Dhaka Medical College Hospital, Dhaka. The diagnosis was based on history of pesticide ingestion and clinical features or with evidence of brought specimen. The age, sex, marital status, occupation, cause of intoxication, poison consumed, time elapsed between ingestion and admission to the hospital, signs and severity of intoxication on admission and treatment outcomes were recorded on a predesign case record form. **Results:** Among the 4378 patients admitted in the unit during this period, total number of poisoning was 796 (18.18%). Number of total deaths was 579 (13.23%), among them 37 deaths was due to poisoning (6.39%). Again, among the poisoning cases, 60 (7.53%) were due to pesticides, and no. of deaths was 13 (2%). Age range of the victims was 13-55 years (mean 23.38 ±1.16 years). Females were 60%, mostly rural (56.7%), married (51.7%) and students (35%). 60(8%) were caused by pesticide, 16(2%) by rodenticide and 8(1%) by fungicide and the rests 711(89%) were caused by other different types of poisoning. the cardinal clinical features of poising were nausea/vomiting (93.33%), myosis (88.33%) and increased sweating (80%) followed by increased salivation (58.33%), hypotension and urinary incontinence (each 51.67%). Majority (93.3%) of the poisoning cases had suicidal intention followed by accidental (5%) and homicidal (1.7%). The suicidal intention was not due to any prior psychiatric illness, rather due to various tripling issues amongst the family members. Nearly three-quarter (73.3%) of the patients recovered completely, 13 (21.7%) patients died of the condition and the rest 3 (5%) were absconded. **Conclusion:** It was a simple observational study and though scientific diagnostic measurement was not possible it may not reflect the total pesticide poisoning situation of Bangladesh and much work is needed to tackle the situation. Awareness of the doctors should be created by giving adequate importance of pesticide poisoning in undergraduate curriculum as well as by continued medical education might help to improve the crisis.

Indexing words: Clinical & epidemiological factors, Pesticide poisoning

Introduction:

Pesticides are a group of chemicals used predominantly in agriculture defines a pesticide as any substance or mixture of substances intended for preventing, destroying or controlling any pest[1]. Organophosphate pesticide poisoning is a major health problem worldwide and is a leading cause of morbidity and premature loss of life in many developing countries of the Asia-Pacific region[2].

Over the last few decades, agricultural pesticides have become a common household item in rural areas of the developing world.

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As a result of their easy availability, pesticides have also become commonly used for intentional self poisoning. It was estimated that, fourteen of all deaths amongst 10-50 year old women in Bangladesh were due to poisoning, the majority following suicidal ingestion of pesticides[3]. Bangladesh Health Bulletin under DGHS published in 1998, shows that there is increasing frequency of poisoning cases from 1988-1996 except in 1990 and 1993[4]. In attempted suicide, which is considerably more frequent than completed suicide, pesticide poisoning results in temporary or permanent disability. Intentional and unintentional pesticide poisoning has been acknowledged as a serious problem in many agricultural communities of low- and middle-income countries, including China, India, Sri Lanka, and Vietnam[5].

World Health Organization (WHO) estimates, around 3 million poisoning cases with 220,000 deaths occur annually. About 99% of these deaths occur in developing countries. Suicide is an important cause of premature mortality accounting for an estimated 849,000 deaths every year[6]. In many agricultural communities of low- and middle income countries pesticide self-poisoning accounts for many of these deaths[7]. In 1985, based on data from Sri Lanka, Jeyaratnam estimated there were approximately 2.9 million cases of acute pesticide poisoning, resulting in around 220,000 deaths each year in the developing world[8]. More recently, based on the finding that pesticide ingestion accounted for over 60% of suicides in many rural areas of China and South-East Asia, Gunnell & Eddleston (2003)[7] estimated that there may be as many as 300,000 deaths each year from intentional poisoning (i.e. suicide by ingestion of pesticides) in these regions alone. This makes it likely that pesticide poisoning is the most frequently used method of suicide worldwide.

To know the clinico-epidemiological aspects and to evaluate the immediate outcome of patients admitted with pesticide poisoning.

Methods:

This was a crosss-sectional observational study, carried out over a period of one year between January 2004 and December 2004. Victims of pesticide poisoning admitted to one unit of medical indoor department of Dhaka Medical College Hospital, Dhaka were enrolled in this study. Proper ethical permission was taken from the authority of Dhaka Medical College Hospital.

The diagnosis was based on history of pesticide ingestion and clinical features or with evidence of brought specimen. Total sixty patients of pesticide poisoning were enrolled.

The age, sex, marital status, occupation, cause of intoxication, poison consumed, time elapsed between ingestion and admission to the hospital, signs and severity of intoxication on admission, treatment. Outcomes were recorded on a predesign case record form.

Results:

Table 1 shows the frequency of the poisoning patients among the other patients admitted in this unit at that period. Among the total 4378 patients, 18.18% patients were admitted due to poisoning. Among 13.23% deaths in this period, 6.39% was due to poisoning.

Table 1: Admission and death due to poisoning in one medical unit of DMCH in 2004

Hospital profile	Number	%
No. of patients admitted	4378	-
No. of total deaths	579	13.23
Total poisoning cases	796	18.18
Total death due to poisoning	37	6.39
Total pesticide poisoning	60	7.53
Total death due to pesticide poisoning	13	2

Table 2 shows the socio-demographic characteristics of the patients. It was observed that most of the victims were ≤20years. Mean age of the victims were 23.38±1.16 years. They were mostly female (60%) and students (35%).

Table 2: Socio-demographic characteristics of the patients

Demographic characteristics	Number	%
Age (yrs)		
≤20	31	51.7
≤ 21 – 30	19	31.7
31 – 40	08	13.2
41 – 50	01	1.7
> 50	01	1.7
Mean age = (23.38±1.16) years; range: (13–55) years		

Sex		
Male	24	40.0
Female	36	60.0
Residence		
Urban	26	43.3
Rural	34	56.7
Marital status		
Married	31	51.7
Unmarried	29	48.3
Occupation		
Student	21	35.0
House-wife	18	30.0
Businessmen	09	15.0
Farmer	04	6.7
Garment's worker	02	3.3
Maid-servant	03	5.0
Service-holder	01	1.7
Others	02	3.3

Total 796 poisoning cases attended in one medical unit ofθ DMCH, 60(8%) were caused by pesticide, 16(2%) by rodenticide and 8(1%) by fungicide and the rests 711(89%) were caused by other different types of poisoning.

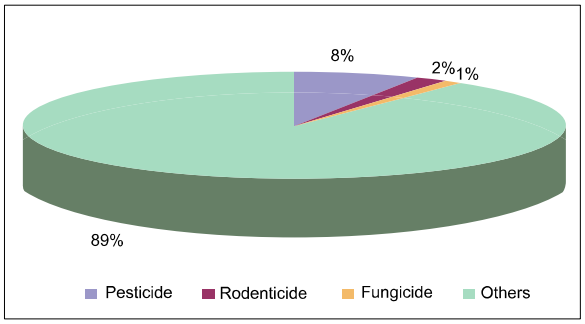


Figure 1: Pie chart showing types of material used for poisoning

Table 3 shows that the cardinal clinical features of poising were nausea/vomiting (93.33%), myosis (88.33%) and increased sweating (80%) followed by increased salivation (58.33%), hypotension and urinary incontinence (each 51.67%). Other clinical features were not very common.

Table 3: Clinical features of the organophosphorus compound poisoning cases (n= 60)

Clinical features	Number	%
Nausea / vomiting	56	91.33
Miosis	53	88.33
Blurred vision	27	45.0
Increased sweating	48	80.0
Increased salivation	35	58.33
Increased bronchial secretion	30	50.0
Bradycardia	18	30.0
Hypotension	16	26.67
Urinary incontinence	31	51.67
Abdominal pain	31	51.67
Muscle fasciculation	19	31.67
Headache	19	31.67
Drowsiness	10	16.67
Disturbance in speech	27	45.0
Seizure	5	8.33
Coma	11	18.33

Majority (93.3%) of the poisoning cases had suicidal intention followed by 5% accidental and 1.7% homicidal. The suicidal intention was not due to any prior psychiatric illness, rather due to various tripling issues amongst the family members.

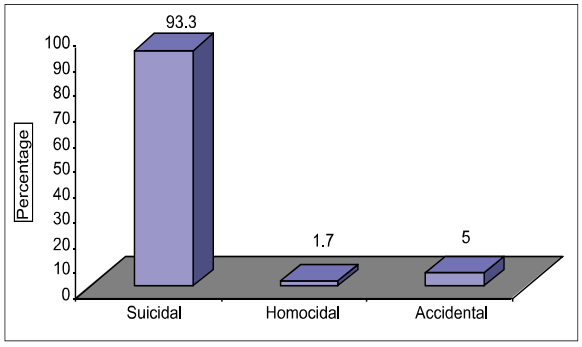


Figure 2: Showing intension of poisoning

Nearly three-quarter (73.3%) of the patients recovered completely, 13 (21.7%) patients died of the condition and the rest 3 (5%) were absconded.

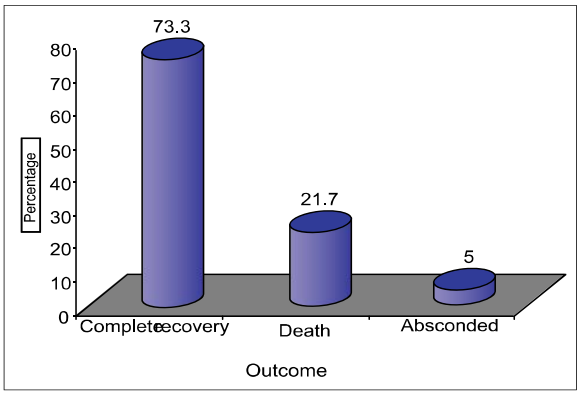


Figure 3: Showing outcome of treatment

Discussion:

Acute pesticide poisoning by organophosphorus compound has been found as a major clinical problem with 8% of poisoning with 22% mortality in an adult medicine unit in Dhaka Medical College Hospital, Dhaka, Bangladesh. In this study, most of the patients were 20 or below 20 years of age (31, 51.7%), 19(31.7%) patients were in between 21-30 years. The study shows that the incidence of pesticide poisoning was highest among the students (21, 35%), the next common group were housewives (18, 30%). Other occupations were businessmen (9, 15%), farmer (4, 6.7%), garment's worker (2, 3.3%), maid servant (3, 5%) and others 5%. The different source of collection of pesticide in this study shows purchase beforehand for household use 28(46.7%), self purchased poison over the counter 22(36.7%) and left over sample 9(15%). This finding indicates that pesticides are easily available and widely used in our country. The provision of safety handing of pesticide in the community is urgently required for prevention of pesticide poisoning. 98% of our patients were normal, healthy population and only 2% had known prior psychiatric illness. This finding suggests that pesticide poisoning is more common among normal population than population with mental disorders in Bangladesh. On the other hand poisoning by drugs are common in the west having prior mental illness[9]. In absence of diagnostic laboratory facility for poison detection visual inspection and identification was made in this study. The offending pesticide was brought by requesting the accompanying person to bring the container left in the vicinity of the occurrence or by requesting the victim to bring a similar agent used for the poisoning after recovery. Our study shows that the cause of death was acute cholinergic crisis in 8(62%) cases and respiratory paralysis in 5(38%) cases. The situation could be improved by introducing ICU care to OP poisoning cases.

Conclusion:

It is a simple observational study and though scientific diagnostic measurement was not possible it may not reflect the total pesticide poisoning situation of Bangladesh and much work is needed to tackle the situation like this. Survey in the community is necessary to assess the magnitude of pesticide poisoning in Bangladesh. National guideline about treatment should be introduced. Awareness of the public should be created for its prevention, for immediate first aid measures and quick hospital admission. Awareness of the doctors should be created by giving adequate importance of pesticide poisoning in undergraduate curriculum as well as by continued medical education. Monitoring and providing immediate prompt advice to physicians and patients.

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