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Profile of acute poisoning cases in a Tertiary care Hospital, Bogra, Bangladesh

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Abstract

Background and Objective: Acute poisoning is a medical emergency. It is an important public health problem causing significant morbidity and mortality throughout the world. Information available with regard to acute poisoning in Bangladesh is limited. It is important to know the nature, severity and outcome of acute poisoning cases in order to take up appropriate planning, prevention and management techniques. This study aimed to assess the pattern and outcome of acute poisoning cases in a tertiary care hospital in Bogra, Bangladesh. **Materials and Methods:** This is a retrospective hospital record-based study conducted in a tertiary care hospital attached to a medical college in Bogra. The study included 774 cases of acute poisoning due to drugs or chemicals and data regarding age, sex, circumstances of poisoning, name of the poisonous substance, chemical type, duration of hospitalization, and outcome were collected in the prestructured proforma. **Results:** Incidence was more common among males (66.28%) compared to females (33.78%) with male female ratio of 1.97 : 1. Most cases of acute poisoning presented among 20- to 29-year age group (39.15%) followed by 12- to 19-year age group (24.03%). A majority of poisoning cases (39.92%) were due to organophosphorus compound (OPC) followed by poisoning with unknown substance (19.76 %). Total mortality was found to be 10.08%. Mortality rate due to aluminium phosphide was significantly high (40.65%) compared to OPC poisoning (7.76%). Poisoning due to unknown substance and alcohol was found almost exclusively in males. Time lapse had a significant role on the mortality in cases of acute poisoning. **Conclusion:** Poisoning is more common in young males. The overall mortality is substantially high, mainly contributed by self-poisoning with aluminium phosphide and OPC. The incidence of poisoning and its morbidity and mortality can be reduced by developing and implementation of effective prevention strategies.

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 ¹. Acute poisoning is defined as acute exposure (less than 24hrs) to the toxic substance ². Acute poisoning is a major global health problem with significant morbidity and mortality affecting people of all age groups. Earlier reports demonstrated that everyday almost 700 people die from poisonings around the world and for every person that dies, several thousands more are affected by poisoning ^{3,4}. It is estimated that about

220000 people die every year as a result of poisoning particularly due to pesticide poisoning ⁴. The exact magnitude of the problem can be elucidated by country or region wise epidemiological studies. Some hospital-based studies and public health surveillance reports clearly indicated increasing incidence of poisoning due to medications and chemicals particularly pesticides ⁵⁻⁷. The pattern of poisoning varies from country to country and region to region depending on factors like geography, accessibility and availability of poison,

socio-economic conditions, cultural and religious influences. In high income countries such as Norway, benzodiazepines, ethanol and paracetamol are the most common causes of poisoning⁸. In Bangladesh, the majority of the population is employed in agriculture, so poisoning due to pesticides and agrochemical products is more common. Poisoning is a serious threat in Bangladesh as it comprises around 14% of all deaths among adult females, 8% of all deaths among adult males and around 8 to 10% of overall mortality in medical wards of tertiary healthcare settings⁹. In general accidental poisoning is more common in children and suicidal poisoning is more common in young adults. Common types of poisoning in this country are organophosphorus compound (OPC) poisoning, poisoning with unknown substances (stupefying poisoning) especially in commuter (travel-related) poisoning where patient cannot tell the name of poison or sign and symptoms does not indicate a specific poison; aluminium phosphide poisoning, poisoning with sedatives, corrosive agents, rodenticides, kerosene/petrol and alcohol, and snakebite^{9,10}. Of them, poisoning in commuters (commuter poisoning) has become a major toxicological issue in Bangladesh in the recent years¹¹. Some unusual forms of poisoning, such as copper sulfate and puffer fish poisoning are also occurred in some regions of the country^{9,12,13}. Epidemiological data on this important health issue are, however, scarce in northern part of Bangladesh. This study was carried out to describe the epidemiological profile of acute poisoning in part of northern Bangladesh and to evaluate the mortality rate.

Materials and Methods

This retrospective hospital record-based study was conducted in Shaheed Ziaur Rahman Medical College Hospital, Bogra, Bangladesh. The hospital medical records of all patients, aged 12 years and above with acute poisoning from 1st of December, 2015 to 31st May, 2016 were included. The record

books of medicine ward (one is maintained by in-charge staff nurse and another by assistant registrar) were used to collect the data's. Data were first taken

from staff nurse's record book, then verified following assistant registrar's record book. So, all the data's were double checked before entering into

analysis. Patients were categorized into six age groups (Gr.) including Gr. I, II, III, IV, V, & VI having age range of 12-19, 20-29, 30-39, 40-49, 50-59 and > 60 respectively and all groups were classified with male, female distinction. Underlying causes of poisoning were observed in total and separated

number of patients with male, female ratio and percentage. The study included 774 cases of various acute poisoning due to drugs and chemicals in people above the age of 12 years. Cases of snake bite were also included in the study. But cases with food poisoning and allergic reactions to drugs were not included in the study. Data regarding age, sex, circumstances of poisoning, name of poisonous substance, chemical type, duration of hospitalization, and outcome were collected in the prestructured proforma. Circumstantial evidences such as empty bottles and tablets were also collected from the patients. Data was collected for general physical examination and systemic examination of the patient. The data collected was entered in the computer database. Then the data were analyzed by descriptive statistical method by using STATA 11 software.

Results

A total of 774 patients of various poisoning cases were studied. Incidence was more common among males (66.28%) compared to females (33.72%) with a ratio of 1.97:1 (Table-1). Table-2 shows that most cases of acute poisoning presented within the age group between 20 and 29 years (39.15%)

followed by 12- to 19-year age group (24.03%). By occupation, 29.06% of the cases were manual laborers followed by housewives (19.37%), students (15.90 %), farmers (13.43%) and unemployed (12.53%) and businessmen (9.68%).

A majority of the poisoning cases (39.92%) were due to organophosphorus compound (OPC) followed by unknown substance (19.76%), aluminium phosphide (15.90%), sedatives (9.30%) and corrosives (7.75%). All patients with rat poison had jaundice secondary to hepatotoxicity, whereas only one patient with drug poisoning had hepatotoxicity. Corrosives were acids, herbicides and kerosene. Table-6 shows that total mortality was found to be 10.08% (78). Mortality rate was 40.65% among patients with aluminium phosphide poisoning

followed by a mortality of 7.76% in OPC. Patients who died due to OPC (24 cases) had respiratory arrest (16 cases), pneumonia and septicaemia (6 cases) and sudden cardiac arrest (2 case). Two patients had aspiration pneumonia and one had nosocomial pneumonia. Mortality in snake bite poisoning (1 cases) was because of respiratory paralysis (1 case). There was no mortality in organocarbamate and organochlorine compounds. Mortality rate due to aluminium phosphide was significantly high compared with OPC poisoning.

Table-1: Sex distribution

Sex	No. of patients	Percentage
Male	513	66.28%
Female	261	33.72 %

Male: Female = 1.97: 1

Table-2 : Age distribution

Age group (In years)	No. of patients	Percentage	Male	Female
12 -19	186	24.03%	120 (15.50%)	66 (8.53%)
20 -29	303	39.15%	203 (26.22%)	109 (14.08%)
30 -39	132	17.05%	94 (12.14%)	38 (4.90%)
40 -49	81	10.47%	50 (6.46%)	31 (4.0%)
50 -59	39	5.04%	30(3.87%)	09 (1.16%)
>60	24	3.10%	16 (2.06%)	08 (1.03%)

Table-3 : Occupation

Occupation	Total no. of patient	Percentage	Male	Female
Labour	225	29.06%	215 (27.78%)	10 (1.30%)
House wife	150	19.37%	0 (0%)	150(19.37%)
Farmer	104	13.43%	104 (13.43%)	0 (0%)
Student	123	15.90%	53(6.85%)	70(9.04%)
Businessman	75	9.68%	75 (9.68%)	0 (0%)
Unemployed	97	12.53%	69 (8.91%)	28(3.62%)

Table 4: Type of poison

Toxic agents	No. of patients	Percentage %	Male	Female
OPC	309	39.92 %	174 (22.48%)	135(17.44%)
Unknown substance	153	19.76 %	150(19.38%)	3(0.38%)
Corrosive	60	7.75 %	18(2.32%)	42(5.42%)
Aluminium phosphide	123	15.90 %	78(10.07%)	45(5.81%)
Sedative	72	9.30 %	51(6.59%)	21(2.71%)
Snake bite	21	2.71 %	15(1.94%)	6(0.75%)
Alcohol	6	.78 %	6(.78%)	0(0%)
Rat killer	18	2.32 %	12(1.55%)	6(0.78%)
Multidrug	12	1.56 %	9(1.16%)	3(0.39%)

Table-4 elaborates the pattern of poisoning with male, female distinction. There was variation between the various types of poisons according to sex groups. Male were found mostly affected in majority type of poisoning except corrosives. In this study OPC was the most significant agent of poisoning both in male & female. Unknown causes of poisoning (second leading cause) were also high in male (29.24%) probably because of their habit of traveling. Unfortunately no cases paracetamol poisoning was found during the study period.

Table-5: Mortality

Total no of patients	Total death	Percentage of death	Death among male	Death among female
774	78	10.08 %	9.33%	11.49 %

Table- 6: Case fatality according to toxic agents.

Toxic agents	Total cases	Hospital death	Case fatality rate	Male death	Female death
OPC	309	24	7.76%	15 (4.85%)	10(3.23%)
Unknown substance	153	2	1.30%	2 (1.30%)	0(0%)
Corrosive	60	1	1.66 %	0(0%)	1 (1.66 %)
Aluminium phosphide	123	50	40.65 %	32 (26.01%)	18 (14.63%)
Sedative	72	0	0%	0(0%)	0(0%)
Snake bite	21	1	4.76%	1 (4.76%)	0(0%)
Alcohol	6	0	0%	0(0%)	0(0%)
Rat killer	18	0	0%	0(0%)	0(0%)
Multidrug	12	0	0%	0(0%)	0(0%)

Table-7: Mode of poisoning

Mode of poisoning	No of patients	percentage	Male	Female
Suicidal	515	66.53%	301(38.89%)	214 (27.64%)
Accidental	106	13.69%	72 (9.30%)	44 (5.68%)
Stupefying	153	19.76%	150 (19.37%)	3(0.39%)

It was found that 66.53% (515) of cases were of intentional poisoning for suicidal attempt and 13.69% (106) of cases had accidental poisoning and 19.76% (153) stupefying poisoning of unknown chemicals(Table-6). Males were more victims of stupefying poisoning mostly by unknown toxic agents which usually occurred in the streets because of frequent traveling. Table-8 shows the duration of hospital stay was 3 to 5 days for most of the patients (60.46%) followed by less than 3 days (28.94%) and 5 to 10 days (8.01%)

Table-8: Duration of hospital stay

Hospital stay	No. of patients	percentage
< 3 Days	224	28.94%
3-5 Days	468	60.46%
5-10 Days	62	8.01%
>10 Days	20	2.58%

Eighty-one patients (60%) underwent psychiatric workup and were given psychiatric counseling and drug therapy. Reactive depression was seen in 48 (35%) patients secondary to failure in academic, social and financial areas and crisis in interpersonal adjustment. Other contributory factors were chronic alcoholism (21, 16%), financial stress (7, 6%) and manic depressive psychosis (5, 4%). Patients without psychiatric assessment were those who expired, were discharged at request or against medical advice.

Discussion

In the present study the commonest poisoning agent was organophosphorus compounds. Males outnumbered females that was similar to findings of other

Studies conducted in the subcontinent 14,15,16,17. This can be due to the fact that men are more exposed to stress and dangerous environmental conditions. The present study shows that the highest number of patients belonged to the age

group of 20 to 29 years with a secondary peak seen in the age group of

12-19 years and 30 to 39 years that resembles the age pattern of poisoning which was found by other researchers 14,15,18,19 .Acute poisoning was commonly seen among male laborers, farmers, house wives and students. Pesticides poisoning from occupational, accidental and intentional exposure is a major public health problem in developing world 20. In 1990, Jeyaratnam estimated that self-harm resulted in two million cases of poisoning in each year with 200000 deaths globally20. In contrast accidental and occupational exposure was estimated to cause one million cases poisoning with 20000deaths per year20. This study showed, OPC as the predominant cause of poisoning (39.92%) . The findings is almost similar (28.5%) with the baseline survey done in 2007 throughout the country and another pilot study recently done in different categories of hospital in Bangladesh21,22. The mortality was found much

higher in few studies of India where it was around 40%²³. But the rate was much lower in America, Eastern Mediterranean region and in Europe which was 11%, 7% and 5% respectively^{24,25}. Travel related poisoning came across as the second highest (19.76%) cause in northern part of Bangladesh where the case load is gradually rising in number. The agents used for travel related poisoning has been changing over time from 'dhutura' (opiates) to unknown cocktail of stupefying agents. Majumder et al showed that between 2004 to 2006, this type of poisoning increased from 6.1 to 9.5% of all admissions and representing 46.6 to 55.7% of all admitted poisoning cases at Dhaka medical college hospital (DMCH)²⁶. Urine analysis of those victims showed benzodiazepine compounds (highest with lorazepam) as main offending agent²⁶. The case load differ greatly from our study, possibly because the later done in the highly populated capital city of Bangladesh where frequent short and long distance travel goes on. Aluminium phosphide was the third leading (15.90%) cause of poisoning particularly reported in our study area with male predominance (61%). Studies from the developed Countries suggested analgesics, particularly paracetamol as the most common cause of deliberate poisonings in adults^{27,28}. In the UK, paracetamol accounts for 43% of all acute poisoning emergencies followed by opioids (15%) and benzodiazepines (15%)²⁸. Different forms of sedatives were also found as important agent (9.30%) in our study too, though cases due to paracetamol were not found. The country wide baseline survey reported, sedatives as the leading agent (37.1%) after including travel related poisonings under this group²¹. Snake bite is another important issue in Bangladesh. Recently Rahman et al, found the estimated incidence density of snake bite is around 623.4/ 100 000 person years²⁹. In our study snakebite was responsible for 2.71% of poisonings with case fatality rate of 4.76%.

Suicidal attempts comprised 62.21% with a female

to male ratio of 1.13:1 which is quite high compared to baseline survey (41.7%)²¹. This study revealed 10.08% overall mortality which is also high compared to national baseline data (4.1%)²¹. Studies done in Sri Lanka and India (community based) showed 3.7% and 137.1/100,000 death respectively^{23,30}. The data used here was a bit old which might be the limitation of the study. But the result can be used as baseline for further comparison in both regionally and nationally. Again, it was a retrospective study using hospital records where marital status & other demographic data could not be evaluated. The clinical features at admission & treatment given during hospital stay also could not be assessed. In this study like other regional and national studies, pesticides came across as the most commonly used agents of poisoning but restricting pesticides might not be practical in an agro based country like Bangladesh rather proper labeling and strict regulation & monitoring of storage and sale in open market can be a better solution.

Conclusion

Prospectively designed country wide multicenter studies and community based surveillance need to conduct immediately to understand the disease burden and epidemiological properties of poisonings which would be very valuable for the determination of preventive measures.

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