

Original Article

Clinico-demographic profile and outcome of critically ill poisoning patient admitted in the ICU of the largest tertiary care government hospital in Dhaka, Bangladesh

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Abstract

Background: Acute poisoning is a common chief complaint leading to emergency department visits and hospital admissions in developing countries such as Bangladesh.

Aim: To study the demographic and clinical profiles of patients admitted to the ICU with acute poisoning and to study the factors that predict their mortality.

Methodology: This observational study recruited all eligible 74 poisoning patients admitted in the intensive care unit from 1st July 2019 to 30th June 2020. This study is conducted in the Intensive Care Unit of Dhaka Medical College Hospital, Dhaka, Bangladesh.

Result: Total 74 poisoning patients were admitted in the intensive care unit, of them female (55.54%) was more than male (44.59%). Among the patients 67 (90.54%) patient were Muslims and 43 (58.10%) were married. The highest incidence of poisoning 28 (37.83%) were observed in the age group 11 to 20 year and the mean age was 23.74 years. The majority of poisoning cases was suicidal intension (87.83%), accidental was 6.75% and homicidal or street poisoning was 5.40%. The most common type of poisoning was organophosphorus compound (52.70%) followed by Drug overdose (16.21%), Paraquat poisoning (9.45%), rat killer (5.4%), Insecticide poisoning (4.05%), Corrosive poisoning (2.74%). The most common route of poisoning was ingestion. Mechanical ventilation required 52.70% patients, majority of patients required shorter period (1 to 5 days) of mechanical ventilation and mean duration of mechanical ventilation is 6.33 days. 83% patient were shifted / discharged from the ICU within 1 to 5 days. Mean duration was 8.13 day in case of mechanical ventilated patients, but in non-ventilated patients, ICU stay was much less than ventilated patients. In this study, the mortality rate was 31%.

Conclusion: Early ICU admission and appropriate management of patients after ingestion of poisonous agent results in reduced morbidity and mortality.

Key words: Poisoning, Orgaophosphorous, Intensive care unit (ICU), Mechanical Ventilation, Mortality.

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Introduction

A poison administered by any route is capable to produce ill health, disease, or death¹. Acute poisoning is a major public health problem worldwide with significant morbidity and mortality in all age and sex groups. (is is more common in

the low- and middle-income countries due to socioeconomic factors, cultural diversity, development of agricultural activities, and the promotion of agrochemicals². Generally, children are more vulnerable to accidental poisoning, whereas the young adults are more committed to

suicidal poisoning attempts³. Pesticide self-poisoning is a major global health burden which is particularly prevalent in South East Asia. (there is a regional variation in the rate of suicides by pesticide self-poisoning from 0.9% in low- and middle-income countries in the European region to 48.3% in low- and middle-income countries in the Western Pacific region⁴. About 4.8 million healthy lives per annum are deceased by unintentional poisoning where pesticides play a significant role⁵. Bangladesh is one of the densely populated developing agriculture-based countries in South East Asia. There is increasing incidence of acute poisoning related to death and hospital admission in our country due to rapid development of agrochemicals and their easy availability in the community. Study has reported that pesticides are the commonest chemical agents used for acute poisoning in our country, whereas additive drugs are next to the insecticides⁶. Moreover, the commonly used substances for acute poisoning in our country are pesticides, insecticides, sedative drugs, copper sulphate, kerosene, rat killer, toilet cleaner, and nail polish. In self-poisoning, psychiatric illness plays a crucial role which always remains hidden during history documentation and management of poisoning cases. Patient's education and treatment of the underlying psychiatric illness may be a strategy which is scarcely discussed in acute poisoning where the psychiatrist may play a vital role to prevent further deliberating self-harm^{5,6}. The incidence of mortality and morbidity of acute poisoning depends on the several factors, but the early detection and prompt management of the critically ill poisoned patients are the key components. With the view of this concept, we have designed this observational study to assess the pattern, demographic characteristics, psychological aspect, and treatment outcome of different acute poisoning patient admitted in the intensive Care Unit, Dhaka Medical College Hospital, Dhaka, Bangladesh.

Methodology

Study Design and Duration: This observational study recruited all eligible 74 poisoning patients admitted in the intensive care unit from 1st July 2019 to 30th June 2020. This study is conducted in the Intensive Care Unit of Dhaka Medical College Hospital, Dhaka, Bangladesh.

Patient Selection Criteria: Patients with snake bite, electrocution, drowning, food poisoning, and allergic reaction due to drugs were excluded from the study. Patient's attendants who were unwilling to give informed written consent to use their data were also excluded from the study. Detailed history and relevant clinical examination data were collected from all the participated cases. The poisoning cases demonstrating on the basis of patient's statement, statement of the witness, smell of poisonous agents, and characteristics signs and symptoms of poisoning were recorded in the data sheet form.

Data Collection and Storage: A structured questionnaire was developed to collect the data from hospital admitted patients. The preformed data sheet included the following: (A) Demographic characteristics: age, sex, religion, marital status, residence, educational status, occupational status, and monthly income in BDT (B) Poison related: type of poisoning and intension of poisoning (C) Data related to suicidal attempts: causes of suicidal attempts, previous history of suicidal attempts, and previous history of documented psychiatric illness (D) Data related to management: treatment received prior to hospital admission (E) Patient require intubation and mechanical ventilation, duration of mechanical ventilation and duration of ICU stay (F) Outcome of treatment after admission in the Intensive Care Unit.

Management: After taking proper history and completion of physical examination, all the patients were treated with standard protocol. In some cases, relevant investigations such as complete blood count (CBC), random blood sugar (RBS), liver function test (LFT), renal function test (RFT), toxicology screening prothrombin time, international normalized ratio (INR), serum electrolytes, arterial blood gas analysis and chest X-ray were done to see the complications and prognosis of the patients.

Ethical Clearance: Prior to the commencement of this study, institutional approval was taken from the Ethical Review Committee of the Dhaka Medical College, Dhaka, Bangladesh. Informed consent was taken from each case before analysis. Personal information of patient's privacy was not disclosed to any third party. Informed written consent was taken from every case before analysis.

Statistical Analysis: Analysis was carried out using SPSS version 23. Categorical data were grouped as percentages and mean with standard deviation (SD) measured from continuous data.

Results

Total number patients: 74

Table I Sex

Sex	No. of patient	Percentage(%)
Male	33	44.59
Female	41	55.40

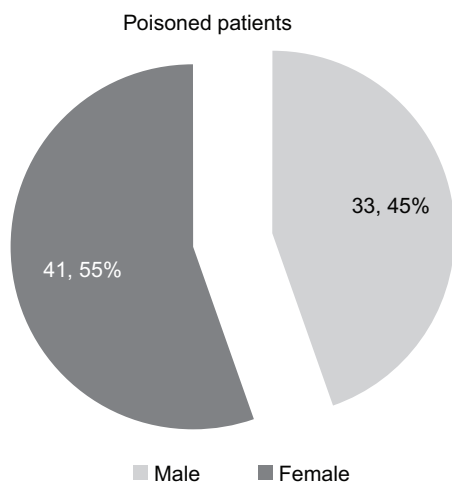


Table II Religion

Religion	No of patient	Percentage(%)
Muslim	67	90.54
Hindu	7	9.45

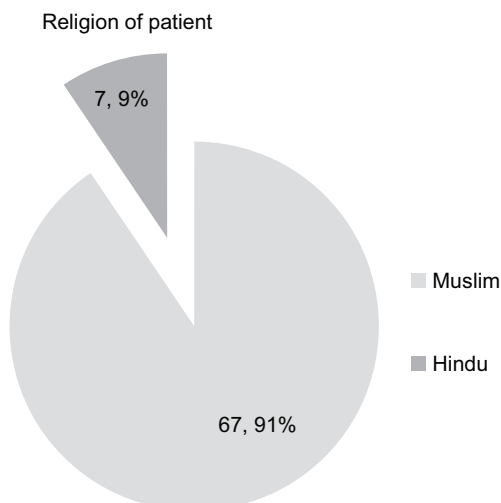


Table III Age distribution

Age	No of patient	Mean age	Percentage
0 to 10 year	5		6.75
11 to 20 year	28		37.83
21 to 30 year	25		33.78
31 to 40 year	8	23.74	10.81
41 to 50 year	7		9.45
51 to 60 year	1		1.35

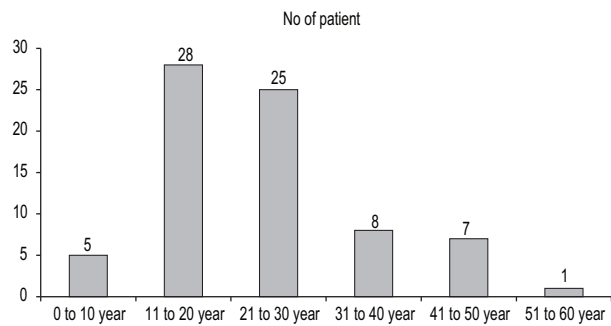


Table IV Marrital Status

	No patient	Percentage(%)
Single	31	41.83
Married	43	58.10

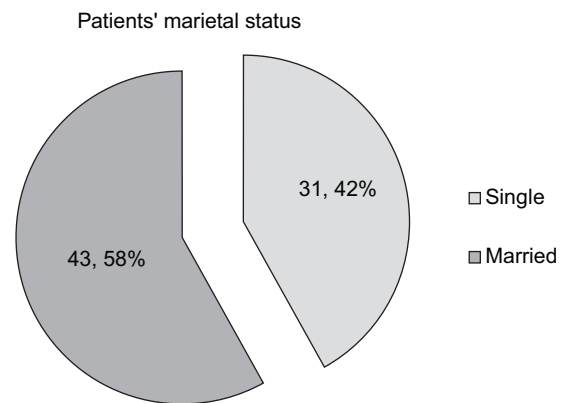


Table V Causes of poisoning

Cause	No. of patient	Percentage(%)
Suicidal	65	87.83
Accidental	5	6.75
Homicidal / Street poisoning	4	5.40

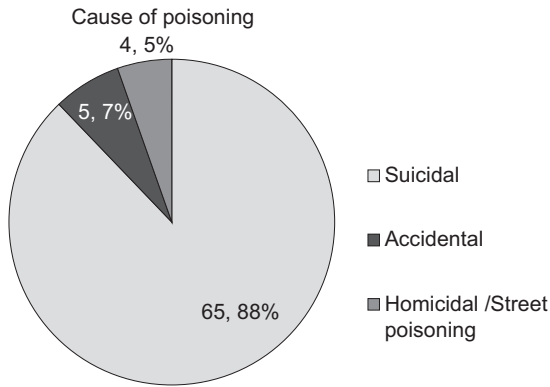


Table VI Types of poisons

Type	Sub-type	No of patients	Percentage (%)
Poisons	OPC	39	52.70
	Organochlorine	2	2.70
	Rat killer	4	5.40
	Coachroch killer	3	4.04
	Paraquate	7	9.45
	Insecticide	3	4.05
	Street poisoning	2	2.7
	Methanol	1	1.35
	Drugs	<i>Amitriptyline</i>	5
<i>Barbiturate</i>		2	
<i>Benzodiazepine</i>		2	
<i>Paracetamol</i>		2	
<i>Minoxidril</i>		1	
Corossive	<i>Savlon</i>	1	2.74
	<i>Herpic</i>	1	

Table VII Mechanical Ventilation Requirement

	No of patient	Percentage(%)
On ventilation	39	52.70
Non Ventilation	35	47.29

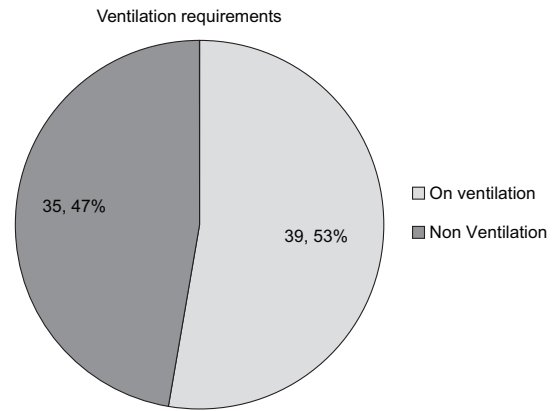


Table VIII Duration of Mechanical ventilation

Duration (Days)	Number of patients (39)	Mean duration (days)	Percentage (%)
1-5	24		61.53
6-10	9		23.07
11-15	2	6.33	5.12
16-20	3		7.69
21-25	1		2.56

Table IX Duration ICU Stay

Duration (Days)	Number of Ventilated patients(39)	Mean duration in ICU (days)	Percentage (%)	Number of non-ventilated patients (35)	Percentage (%)
1 - 5	20		51.28	29	74.35
6 - 10	9		23.07	5	12.82
11 - 15	4	8.13	10.25	1	2.56
16 - 20	3		7.69		
21 - 25	1		2.56		
26 - 30	2		5.55		

Table X Outcome

	No. of patient	Percentage(%)
Survive	5168	
Death	23	31

Total 74 poisoning patients were admitted in the intensive care unit, of them 41(55.54%) were female and 33(44.59%) were male. Among the patients 67(90.54 %) patient were Muslim and 43(58.10%) were married. The highest incidence of poisoning

28 (37.83%) were observed in the age group 11 to 20 year, next incidence group 25(33.78%) were in the age group 21 to 30 years, the mean age was 23.74 years. The majority of poisoning cases 65 (87.83%) was suicidal intension, accidental was 6.75% and homicidal or street poisoning was 5.40%.The most common type of poisoning was organophosphorus compound (52.70%) followed by Drug overdose (16.21%), Paraquat poisoning (9.45%), rat killer(5.4%),Insecticide poisoning (4.05%),Corrosive poisoning (2.74%).The most common route of poisoning was ingestion. Table 9 Describes 39 (52.70%) patients required mechanical ventilation, majority of patients required shorter period (1 to 5 days) of mechanical ventilation and mean duration of mechanical ventilation is 6.33 days. Table IX illustrate the duration of ICU stay . Majority of the patient in the study had shorter stay in the ICU (83%) patient were shifted /discharged from the ICU within 1 to 5 days. Mean duration was 8.13 day in case of mechanical ventilated patients. But in non ventilated patients, ICU stay was much less than ventilated patients. Table 10 illustrates that 51 (68%) were survived and 23(31%) were died in the ICU.

Discussion

Acute poisoning is one of the most common causes of emergency hospital admission, whereas the patients with minor symptoms and asymptomatic cases may not seek the health care service from the hospital and they might be missed in the statistics. In Bangladesh, all the poisoning patients are remarked as a police case during their admission in the government hospital. So, the poisoning patients from the affluent family may seek their necessary treatment from the private health care settings. Therefore, the exact incidence of acute poisoning may not be found. The last census of Bangladesh was conducted in 2011, so we have calculated our incidence according to the census 2011 in Bangladesh. This result could not be compared to other studies from Bangladesh due to lack of regarding data, but the incidence rate of acute poisoning is very high in Srilanka⁷ and (Thailand⁸. We have conducted the study among all age groups with the mean age of our participants being 23.74 year. In our study, most of the acute poisoning cases (331, 68%) come from

the second and third decade age groups and the result is very similar to the other studies^{7, 9, 10,21,22,27,28}. The female gender has been more victimized from acute poisoning than that of the male group, and the younger women are affected more in this study.The possible reasons behind this are due to emotional liability, cultural belief, and social circumstances. Some studies have reported female preponderance of deliberated self-poisoning in Srilanka and Zimbabwe similar to our finding^{7,11,21,22,26,27}. Generally, many studies have shown the male domination of acute poisoning in their analysis, which is similar to this observation^{9,10,12,13}. Acute poisoning cases have got themselves admitted in the ICU through the 24 hours emergency department and medicine department of Dhaka Medical College Hospital during our time frame recruited in the present study.. The most common type of poisoning was organophosphorus compound (52.70%) followed by Drug overdose (16.21%), Paraquat poisoning (9.45%), rat killer (5.4%),Insecticide poisoning (4.05%),Corrosive poisoning (2.74%). The most common route of poisoning was ingestion. There are many studies that have reported that organophosphorus compounds occupy the leading cause of acute poisoning^{4,5,7,9,14,21,22,26,27}. This is due to easy availability of OPC in our society of agriculture-based country; even WHO has reported previously that use of pesticides is the most popular way of deliberating selfpoisoning worldwide, and it is estimated about one-third of the global suicides is resulting from the pesticides selfpoisoning¹⁵. The majority of poisoning cases 65 (87.83%) was suicidal intension, accidental was 6.75% and homicidal or street poisoning was 5.40%. (the common motive of acute poisoning in our study is due to suicidal intention which constituted 87.83%, whereas the accidental and stupefying /homicidal intention fills the rest of the intention.The same result of suicidal intention in the acute poisoning has been reported by others study conducted in Kathmandu, Nepal¹⁶ and Bangladesh^{21,22,27}.

In our study, suicidal intention is more among the females than that of the males. This result is supported by the other analysis conducted in India and Ilam Province of West Iran^{17,18}. In our study 52.70% patients required mechanical ventilation, majority of patients required shorter period (1 to 5 days) of mechanical ventilation and mean

duration of mechanical ventilation is 6.33 days . Table 9 illustrate the duration of ICU stay. Majority of the patient in the study had shorter stay in the ICU (83%) patient were shifted /discharged from the ICU within 1 to 5 days. Mean duration was 8.13 day in case of mechanical ventilated patients. But in non ventilated patients, ICU stay was much less than ventilated patients.

In this study the survival rate is 68% and the mortality rate is 31%. Hemani Ahuja et al study showed, out of 67 patients, 43 had required mechanical ventilation for an average of 3.81 days In their study, the mean duration of mechanical ventilation was $3.81 \pm SD 4.36$ days and the mean ICU stay was 3.9 ± 0.544 days. The overall ICU mortality was 18%²³. Easnem et al also showed Ventilator support was given in 48.80% cases and 51.2% cases were managed with oxygen support. Mean duration of ventilatory support was 2–14 days and mortality rate was 2.8%²⁶ Mehrpour et al ,showed their study (41.2%) were intubated, and the mean duration of 8.53 ± 8.99 days, 17.6% died and 23.6% survived²⁷. Aravind *et al.* also showed their study that 78% of the patients admitted to the ICU recovered and were discharged²⁸.

Limitation

This prospective observational study was conducted in a single centre government tertiary hospital in the centre of the capital of Bangladesh hence, the results cannot be generalized. It is a short duration of study, only 12 month study.

Conclusion

Acute poisoning is a medical emergency which require quick diagnosis and fast treatment. Early identification of type of poisoning, close observation, and standard management can reduce the complication and mortality rate. In present study a high proportion of male and young adults was found. In the majority of patients, OPC was ingested deliberately for committing suicide. we recommend limiting its use with caution. Timely initiation of medical management in the Intensive Care Unit can save the life in acute poisoning cases and reduces the mortality and morbidity rate.

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