Clinico-epidemiological profile of poisoned patients in emergency department: A two and half year’s single hospital experience

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ABSTRACT

Context: Poisoning is a common cause for attending emergency department of hospitals.

Aims: To explore the epidemiological characteristics and clinical profile of patients presenting with poisoning in emergency department.

Settings and Design: Prospective, cross-sectional, hospital-based study.

Materials and Methods: Relevant epidemiological and clinical data from patients, presenting with history/clinical features of poisoning in emergency department of a tertiary care district hospital in India, were collected and analyzed.

Statistical Analysis: Data analysis was done by using descriptive and inferential statistical methods: Frequency, percentage, mean, and standard deviation (SD). A two-tailed $P < 0.05$ was considered to be statistically significant.

Results: A total of 4,432 patients with history and/clinical features of poisoning were included in the study. The females clearly outnumbered male patients. Poisoning with suicidal intent was more frequent (81.08%) than accidental (18.92%) ($P < 0.0001$). Majority of the patients were housewives followed by farmers, businessmen, laborers, and students. The mean time interval between poison consumption and admission to hospital was 6.4 hours (Mean ± SD: 6.4 ± 2.29). Snakebite (31.90%) was the most common cause of poisoning followed by organophosphorus compounds (21.84%), rodenticide (16.49%), alcohol (13.80%), chemicals (9.04%), and drugs (2.3%). The mean GCS (Glasgow Coma Scale) score of the poisoned patients at presentation was 6.85 ± 1.62. Of all the patients included in the study, 3,712 patients (83.76%) survived and 720 patients (16.24%) expired.

Conclusions: The current piece of work suggests that most of the poisoning cases involved young age group particularly females. Snakebite and organophosphorus compounds contributed most of the poisoning cases which calls for urgent government initiatives for improvement in proper lighting of the district to prevent snakebite and controlled use of pesticides.

Key Words: Clinico-epidemiological features, emergency department, poisoning

INTRODUCTION

Poisoning is a global health problem and has been considered as one of the common causes for attending emergency department (ED) of hospitals. According to World Health Organization (WHO) estimates, in 2004, 346,000 people died worldwide from unintentional poisoning of which 91% occurred in developing countries.[1] Recent data from National Crime Bureau of India shows poisoning accounted for 7.50% of all causes of un-natural deaths in the year 2007.[2] However, due to under reporting of poisoning cases and lack of updated database like Toxic Exposure Surveillance System (TESS)[3] in India, the abovementioned figure may be considered as tip of an iceberg.
In poisoning cases, several factors contribute to the mortality and morbidity, including the toxic potential of the poison, the speed with which the person seeks clinical attention following exposure to poison, and the availability of effective medical treatment. In this context, knowledge of the clinical features of poisoning is important to both emergency physicians and public health practitioners. India being a large country, different states have their own poisoning patterns which exert an impact on the management of the poisoned patients. In majority of the cases, emergency department of the hospital is the first contact of the patient with the healthcare system. In this regard, a comprehensive knowledge of clinical features of poisoning is essential for emergency physicians to render appropriate management of the poisoned patient. Hence, there is a pressing need for generating regional clinico-epidemiological data on poisoning, which will be helpful in planning rational use of available resources for the prevention and management of poisoning. A literature search was conducted which consisted of a Medical Literature Analysis and Retrieval System Online (MEDLINE) database search and a World Wide Web search (Search engine: Google) using the following keywords: “Poisoning, clinico-epidemiological features, emergency department”. The search revealed that only a few studies have considered the clinical characteristics and epidemiological features of poisoning patients presenting in the emergency department. In this backdrop, the present study was conducted to explore the clinical features and epidemiological characteristics of patients presenting with poisoning. 

MATERIALS AND METHODS

Study design and setting
A prospective, cross-sectional study was conducted in the emergency department of a tertiary care hospital between January 1, 2008 and June 30, 2010. The hospital was the only government-run tertiary care hospital in a district of West Bengal and catered a population of about 6,919,698 as per census data. The study proposal was reviewed and approved by the institutional ethics committee of the hospital.

Selection of the study population, data collection, and processing
All consecutive patients presenting in the emergency department of the hospital during the study period with history and clinical features of poisoning were considered eligible for participation in the study. Cases diagnosed as food poisoning were excluded from the study. Poisoning was defined as exposure to drugs or any environmental substance resulting in an emergency department visit. Patients attending the emergency department of the hospital with history of suspected exposure to poison underwent clinical evaluation and resuscitation by the treating physician. Informed consent was obtained from eligible patients/legally authorized representatives (if the patient was unconscious). After completing the medico-legal formalities, a thorough history was taken from the patients/legally authorized representatives (in case the patient was unconscious) and clinical examination was carried out to determine the clinical features of poisoning. Identification of a particular poison was done on the basis of statement of the patient/witness, smell of poisoning agents, brought specimen, and characteristic features of poisoning in majority of cases. A data collection form was developed to capture information regarding demographic data, exposure agent, time of exposure, history of suicide attempts, psychiatric diseases, substance abuse or major systemic disease; presenting symptoms and signs including Glasgow Coma Scale (GCS) score, final outcome, and laboratory data. Poisoning report forms were completed for all enrolled patients.

Outcome measures
All patients enrolled in the study were tracked throughout the hospitalization period and during follow-up to document final outcome in terms of survival or poisoning-related fatality, the latter being defined as death during hospitalization or after discharge that could be reasonably attributable to the poisoning episode.

Statistical analysis
Data collected were analyzed in computer by using the Statistical Package for Social Sciences (SPSS) program version 10. Data analysis was done by using descriptive and inferential statistical methods: Frequency, percentage, means, standard deviation (S.D.). A two-tailed P < 0.05 was considered to be statistically significant.

RESULTS
A total of 4,432 patients visiting the emergency department of the hospital during the study period with history and clinical features of poisoning were considered in the study. Majority of the patients were of young age. The age of poisoned patients ranged between 1 years and 76 years with a mean ± S.D. age of 36.32 ± 7.78 years. The females (n = 2864) clearly outnumbered male patients (n = 1568) with male: Female ratio of 1:1.83. Poisoning with suicidal intent was more common (81.08%) than the accidental one (18.92%) (P-value < 0.0001). Majority of the patients were housewives followed by farmers, businessmen, laborers, and students. The mean interval between poison consumption and admission to hospital was 6.4 hours (Mean ± SD: 6.42 ± 2.29). Regarding the etiology of poisoning, snakebite (31.90%) was the most common one, followed by organophosphorus compounds (21.84%), rodenticide (16.49%), alcohol (13.80%), chemicals (9.04%), and drugs (2.3%). In 208 cases (4.63%), the exact cause
of poisoning could not be determined. The mean GCS score of the patients at presentation was 6.85 ± 1.62. Of all the patients included in the study, 3,712 patients (83.76%) survived and 720 patients (16.24%) expired. The mean GCS (at presentation) of the patients who survived was 7.78 ± 1.43 as compared to 4.12 ± 1.18 in patients who died ($P < 0.01$). The details of the results are provided in Table 1.

**DISCUSSION**

In our study, the total number of patients considered was 4,432 which was higher than earlier studies conducted with similar intent [Nepal (54 patients), Hong Kong (2867 patients), Andhra Pradesh (2,226 patients)]. This was primarily because the hospital being the only medical college of the district catered a huge population of 6,919,698 people. The longer duration (two and a half years) of the present study also rendered a contributory effect in this regard. Majority of the patients in the present study were of young age with a mean ± SD of 36.32 ± 7.78 years. Similar results were obtained in the studies conducted in Hong Kong, Andhra Pradesh. However, in the study conducted in Nepal majority of the patients were greater than 40 years of age. The females clearly outnumbered male patients with male: Female ratio of 1:1.83 in the present study. Similar finding was obtained in the study done in Nepal (M:F = 1:1.35), Turkey (M: F = 1:3.5). In contrary, in the study conducted in Andhra Pradesh and Tamil Nadu (M:F = 1.58:1), males preponderated over female patients.

Poisoning with suicidal intent was more common (81.08%) than the accidental one (18.92%) ($P$ value < 0.0001), which was in concordance with the study conducted in Hong Kong, Andhra Pradesh, Nepal, Tamil Nadu, and Turkey. In the present study, majority of the patients were housewives followed by farmers, businessmen, laborers, and students. Similar findings were observed in the study conducted in Tamil Nadu where majority of the poisoned patients were housewives (28%), laborers (18.66%), students, and farmers.

The time interval between exposure to the poison and presentation in the hospital has been considered very crucial for appropriate management of the patient. In the present study, the mean interval between poison consumption and admission to hospital was 6.4 hours (Mean ± SD: 6.4 ± 2.29) as compared to the study in Andhra Pradesh where it was 3.6 hours. This difference could be attributed to the fact that the medical college, where the present study was conducted, catered the entire district. People visited the hospital from remote areas of the district for seeking healthcare.

Regarding the etiology of poisoning, snakebite (31.90%) was the most common one, followed by organophosphorus compounds (21.84%), rodenticide (16.49%), alcohol (13.80%), chemicals (9.04%), and drugs (2.3%). In 208 cases (4.63%), the exact cause of poisoning could not be determined. In the study conducted in Nepal, organophosphorus poisoning constitute the commonest cause (74.07%), followed by antidepressant drug, zinc phosphide, benzodiazepines, and alcohol. The findings of the study conducted in Andhra Pradesh suggested that poisoning with organophosphorus compounds was the most common followed by drug overdose. The high incidence of the snakebite cases in the present study could be explained by the fact that the hospital was located in a rural district of West Bengal where incidence of snakebite is high. An earlier study conducted in the district gives an annual incidence of 1.63% snakebite cases. Snakebite is otherwise a widely prevalent problem in India. According to data provided by Government of India, there were only 1,364 reported snakebite deaths in 2008, which was seemed to be an under-report as many victims of snakebite choose village-based traditional therapists (ojhas) and die outside government hospitals. This was evidenced by some community-based surveys in localities which have shown much higher annual mortality rates, 16.4 deaths/100,000 in West Bengal. The number of poisoning due to pesticides was also high, which was in concordance with earlier studies. The hospital was located in an agricultural area, making pesticides easily accessible for the people, and appropriate storage practices were not followed. Another factor may be a lack of awareness amongst the general public about the risks and hazards of these chemicals. In addition to the measures that have been taken by authorities, including banning

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**Table 1: Baseline demographic data and clinical characteristics of enrolled patients**

| Baseline characteristics | Number |
|--------------------------|--------|
| Age (in years)           |        |
| <18 years                | 489    |
| 18-65 year               | 3,220  |
| >65 year                 | 723    |
| Mean ± SD                | 36.32 ± 7.78 |
| Sex                      |        |
| Female                   | 2,864  |
| Male                     | 1,568  |
| Time of presentation since exposure (in hours) |        |
| <6 h                     | 1,037  |
| 6-12 h                   | 2,212  |
| >12 h                    | 1,183  |
| Mean ± SD                | 6.42 ± 2.29 |
| Nature of poison consumed|        |
| Snake bite               | 1,414  |
| Organophosphorus compounds| 968    |
| Rodenticide (Rat poison) | 731    |
| Alcohol                  | 612    |
| Chemicals (Phenyl, Copper sulfate etc.) | 401    |
| Drugs (Benzodiazepines, etc)| 102    |
| Unknown                  | 208    |
| GCS score of patients at presentation |        |
| 13-15                    | 462    |
| 9-12                     | 801    |
| <8                       | 3,169  |

SD: Standard deviation
some of the most toxic pesticides (e.g., endosulfan and parathion) and promoting less use of pesticides, there is a need for greater efforts aimed at reducing the number of deaths caused by pesticide poisoning. In the present study, a total of 720 patients died following admission in the hospital, thus the overall mortality rate was 16.24% which was higher than studies conducted with similar intent (Andhra Pradesh 8.3%,[3] Hong Kong 1.43%.[6]). The higher mortality rate can be attributed to late presentation of patients in the hospital and low GCS score of the patients on admission.

CONCLUSION

The current piece of work demonstrated that most of the poisoning cases involved young age group particularly females. Snakebite and organophosphorus compounds contributed most of the poisoning cases. This calls for urgent government initiatives for improvement in proper lighting of the district to prevent snakebite and controlled use of pesticides. However, a multicentric nationwide study could address the study objective in a more meaningful way.

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