

Pattern and Outcome of Acute Poisoning Cases in a Tertiary Care Hospital in Eastern Nepal

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ABSTRACT

Introduction: The global problem of acute poisoning has constantly increased over the last few years. It is a major cause of morbidity and mortality in developing countries. Appropriate preventive and management strategies can be developed if the incidence and pattern of acute poisoning is known. This study aimed to determine the profile and outcomes of acute poisoning patients admitted to the hospital through emergency department of a tertiary care hospital.

Material and Methods: A hospital based retrospective study was performed in the patients admitted to tertiary hospital with the history of poisoning for the period of one year. Several parameters were analyzed and compared with other studies.

Results: Seventy-nine patients were presented with acute poisoning during our study period. The age of the patient varied from 11 to 63 years. The mean age was 27.76±15.5%. Females (53.2%) were dominant over males (46.8%). Patients aged between 21 to 30 years were the most common age group involved with poisoning. Subjects were most commonly affected by organophosphorous poisoning followed by chemical poisoning.

Conclusion: Poisoning by agents like drugs (pesticides) and organophosphorus compounds are alarming situation and these occur mostly during adolescent period. Government regulations, educational awareness and poison information centres will help to decrease the growth of this public health problem

Keywords: Childhood Poisoning, Morbidity, Patterns of Poisoning, Tertiary Centre, Mortality

dosages, such as over-the-counter medications and alcohol. A poisoned response can also be caused by bacterial toxins such as food poisoning. Additionally there is also a way that a person can be poisoned is by being stung or bitten by an animal or insect, such as a snake or mosquito.²

Poisoning is a major factor for mortality, especially among the adolescent people in hospitals in Nepal. Use of poison is the main method of attempted suicide. Poisoning is one of the major public health problems in the country. For starting preventive measures, information on nature and extent of poisoning is required. Poison is a substance capable of producing harm or dysfunction in the body by its chemical activity. It can enter the body in many ways to produce general or local effects. Poisons are subtle and silent weapons, which can be easily used without violence and often without arousing suspicion. Poisoning is a urgent medical emergency and a patient is always immediately rushed to the hospital at the earliest possible moment, irrespective of the amount and nature of poison ingested.^{3,4}

According to the WHO Global Burden of Disease project, in 2004, an estimated 345 814 people of all ages died worldwide as a result of “accidental” poisoning. Most of these accidental poisonings were found to be among adults. The clinical profile and patterns of poisons vary in different parts of the world depending on various factors such as demography, education, socio-economic status, local beliefs and customs.^{1,2} Thus each country needs specific epidemiological surveillance to determine the extent and pattern of the problem to take preventive measures. Various

INTRODUCTION

Acute toxicity refers to those deleterious effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours. Acute poisoning is one of the urgent medical problem and a major causes of hospital admission through emergency. When a toxin or chemical interferes with normal bodily functions this is known as a poisonous response. These types of responses can be due to the intake of poison through swallowing, inhaling or absorption.¹

It was found that by inhaling or ingesting a product that was not meant to be for example shampoo or paint, can lead to poison the body. Various products are available that are not meant to be consumed and have presumably been done so by accident, although attempted suicide is sometimes a possibility. There are various chemicals that can be poisonous but which are meant to consume in limited

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cases of poisoning were admitted through emergency services where the safety of life of the patient is the most important issue for the doctor. Uncontrolled use of poisons in the developing countries has resulted in increased number of human fatalities every year.⁵

The nature of poison varies in different parts of the world and may vary even in different parts of the same country depending upon the socioeconomic factors and various other factors related to cultural diversity. Over the last few decades, agricultural pesticides have become common household items in the developing world, which are commonly used for self poisoning. Whether intentional or accidental, it is the easy access to these substances that significantly adds to the incidence. In Nepal, Narcotic Drug Control Act, 2038 (B.S) and Pesticide Act 2048 (B.S.), prohibits the misuse of narcotics and pesticides. However improper implementation of these has led to such problems. Usage of poison is the main method of attempted suicide. Insecticides are the major source of poisoning. The most common insecticide poisoning is the organophosphate poisoning. In our country, most of the insecticide poisonings is intentional in nature.⁶ Familial conflict, failed love affair, failure in examination and business, financial problems are usually the common causes of suicidal poisoning. Accidental and occupational over exposure to pesticides occurs mainly among agriculture workers, farmers and their family members. Organophosphate (OP) group of poisons produce their toxic effect by inhibiting the activity of the enzyme acetyl cholinesterase. This results in the formation of acetylcholine in the neuromuscular junction and may lead to cholinergic crisis. Organophosphates are absorbed across the lung, mucous membrane (including gut), skin and symptoms may appear within a few minutes which may last up to 12 hours. Drugs used for treatment are: atropine, pralidoxime (PAM), diazepam, dopamine and other for symptomatic treatment. Atropine, an anti-cholinergic compound is the mainstay of the treatment.⁷

Deliberate self-destruction towards life is a major public health problem in many developing countries including Nepal. Each year, 500,000 deaths occur in rural Asia due to suicidal attempts, and 200,000 of these deaths are due to self-organophosphates (OP) poisoning. The medical management of poisoning emergencies is quite difficult and, till date, there are no clear-cut evidence-based guidelines available for the management of OP poisoning. So far, various studies over poisoning have not undertaken here, hence there is a definite need for the study and there are not many studies available to know the definite and detailed epidemiological evidences of poisoning.⁸ This study aimed to investigate the pattern and outcome of acute poisoning cases in a tertiary care hospital in Eastern region of Nepal.

Materials and Methods

Sample Size and Design

This was a hospital based prospective study. Hospital records of patients with acute poisoning from 1st April year 2016 to 30th March 2017 were reviewed. Ethical clearance was taken

from the institutional ethics committee before initiation of this study. Firstly, the patients admitted with acute poisoning received first aid in the emergency wards and were further handled by shifting them to intensive care unit/wards depending on their condition. Relevant patient's information was gathered from different sources such as patient's case records, medication charts, laboratory data, medico legal case registers and by self-interviewing the victims who were in a state of providing response (one to one interview) followed by their caretaker/families regarding the past history, circumstances that led to poisoning and emotional disturbances along with information regarding contents of the poisoning agent, severity of the poisoning, treatment being provided from the health care professionals.

Data were collected regarding age, gender, type of poisoning and outcome of poisoning. This data contributed meaningfully and effectively towards the study and was documented by a trained investigator into the proforma and transcribed into a database created using Microsoft excel.

Inclusion criteria

- All patients between 11 to 65 years of age who came with history of poison consumption, irrespective of presence of signs and symptoms, accompanied or unaccompanied by container or poison.
- Patients with doubtful history of consumption of poison but with definite signs and symptoms of acute poisoning.
- The diagnosis of poisoning was based on history given by the patients and clinical examination or their entourage. Various types of poisons were categorized in different groups depending upon their usage and/or chemical classification.

Exclusion criteria

- Cases of Snake bite
- Idiosyncratic reactions to drugs
- Age <11 years.

STATISTICAL ANALYSIS

The collected data were analyzed with the help of Microsoft Excel 2010 software using simple manual analysis of frequency and percentage.

RESULTS

During the study period from December 2016 to December 2017, a total number of 79 patients (37 males, 42 females) (Table no. 1) were admitted to the hospital with acute poisoning accounting for 16% of ICU admissions. Age range was 11 years to 63 years with mean of 27 years and in different age groups those less than 21 years were (28, 35.4%), 21-30 years were (29, 36.7%), 31-40 years were (15, 19%), 41-50 years were (2, 2.5%), 51-60 years were (5.1%)

Gender	Frequency	Percentage
Male	37	46.8
Female	42	53.2
Total	79	100

Table-1: Shows gender-wise distribution among subjects of acute poisoning

Hospitalisation time after exposure	N (%)
Less than 60 minutes	31(39.2%)
More than 60 minutes	48(60.7%)
Total	79(100%)
Number of days in hospital	
<10days	46(58.2%)
>10 days	33(41.7%)
Total	79(100%)

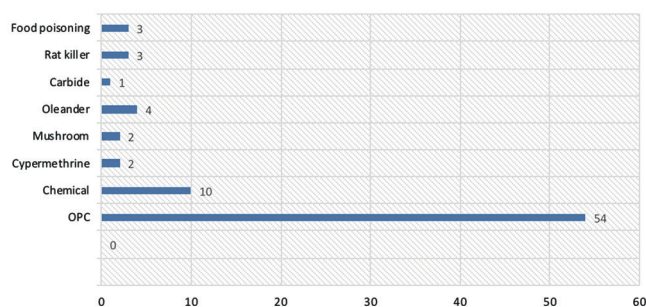
Table-2: Shows hospital admission characteristics among subjects of acute poisoning

Type of Poison	Frequency	Percent
OPC	54	68.4
Chemical	10	12.7
Cypermethrine	2	2.5
Mushroom	2	2.5
Oleander	4	5.1
Carbide	1	1.3
Rat killer	3	3.8
Food poisoning	3	3.8
Total	79	100.0

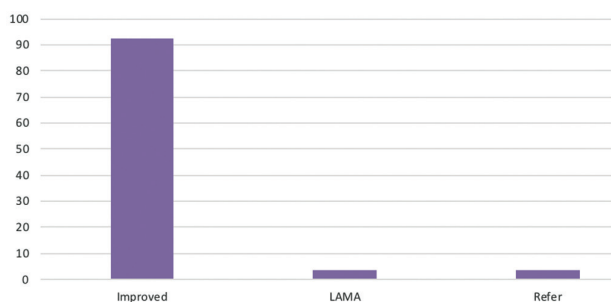
Table-3: Showing type of poisoning among subjects of acute poisoning

Status	Frequency	Percent
Improved	73	92.4
LAMA	3	3.8
Refer	3	3.8
Total	79	100.0

Table-4: Showing outcomes of poisoning, *LAMA: Leave Against Medical Advise



Graph-1: Showing types of poisoning among subjects of Acute Poisoning



Graph-2: Showing outcomes of poisoning among subjects of Acute Poisoning

and more than 60 years were (1.3%). Hospital stays ranged from <10 days with mean hospital

stay of 10 days (Table 2). Patients with OPC poisoning (54, 68.4%), chemical(10, 12.7%), cypermethrine (2, 2.5%), mushroom (2, 2.5%), Oleander (4, 5.1%), Carbide (1, 1.3%), rat killer (3, 3.8%), and food poisoning (3, 3.8%) were found (Table 3). 73 patients (92.4%) improved and were discharged, 3(3.8%) left against medical advice and 3(3.8%) were referred (Table 4) to better centre for further management.

Gastric lavage was performed for all patients approximately in emergency room immediately with in 30min-1hour before ICU admission. When monitoring of vital signs showed hypotension or shock, intravenous fluids were administered according to the central venous pressure, which was combined along with dopamine or dobutamine infusion to maintain the systolic blood pressure above 80 mmHg. Oxygen was given immediately with the monitoring of clinical respiratory effort of poisons pulse oximetry and arterial blood gas if respiratory distress was present. We used atropine and other supportive drugs as needed, alkalization was used if severe metabolic acidosis was present.

DISCUSSION

Poisoning is one of the leading causes of morbidity and mortality in Nepal and also a major public health problem. In 2002, World Health Organization (WHO) estimated that there were 873,000 suicides globally which made suicide a major cause of premature mortality across the world. The WHO reports that pesticides are now the most common method of suicide worldwide. In Nepal, the development of applied chemistry in industry, agriculture and household use has been given more attention than the development of child safety, worker protection and environmental health concerns.^{1,9}

Acute poisoning is a major clinical emergency and early diagnosis, treatment and prevention are crucial in decreasing the burden of poisoning related injury in any country. A thorough review of the risk factors helps to reduce the rate of incidence and mortality. In spite of advanced medical treatment and awareness, the harmful outcome from exposure (inhalation, skin contacts and ingestion) to the chemicals of agricultural and domestic usage is increasing day by day. Easily available drugs, extensive usage and low cost of the chemicals, all have made the population more vulnerable for accidental as well as suicidal poisoning.

The incidences are increasing day by day. Hospital based studies from five major hospitals in Nepal in 1990 – 2000 showed that organophosphates compounds were the most common form of poisoning comprising 52% of total cases. It is found that in Nepal, the most common poisons are organophosphates which is found to be 68.4% in the present study however it is gradually overcome by the use of phosphides and similar rodenticides, due to their rapid and more effective action which is in concordance with the studies conducted by Singh et al.¹⁰

In the present study, higher incidence in the third decade could be due to an increased level of stress exerted on an individual with exposure to different social, economical,

domestic and occupational pressures. It was observed from the previous findings that in the second decade, pressure might be due to immature thoughts, competition in education, early marriages and inability to cope with the post marital pressures especially among rural areas. There is no such change between males and females in the incidence of poisoning.¹¹

The National Survey on Drug Use and Health (2009-2014) data indicated that 18-25 years old had higher percentages of suicidal thoughts and attempts compared to middle-aged adults (45-to 64-year olds). In this study also, younger subjects were most commonly affected with age range of 21-30 years.¹²

The time elapsed between the intake of poison and arrival of the victim to the hospital was observed to be >1 hour (60.7%) concurrent to the findings by Ahmed et al., while a study conducted in Nepal had more than one-third of the patients arriving within an hour of exposure.¹³ Delay in the admission to the hospital can be attributed to traffic-related issues, lack of ambulance facilities, and a referral from other centres, insufficient knowledge regarding the incident of poisoning and responding to the victim in trouble as soon as possible. The early arrival of the patient to the hospital diagnosis and can reduce the chances of mortality.

In this study, it was found that morbidity and mortality due to poisoning depends on factors like age, toxicity of the poison, amount consumed, health of the patient, early hospitalization and proper management. Most of the patients consumed relatively less toxic and non-fatal dosage of the poison. These factors might have contributed to non-fatality seen in these cases. Similar outcomes were also noted in a research done in Brazil which indicated that household products were the most common cause of poisoning.^{14,15}

Nausea, vomiting, diarrhoea, respiratory discomfort, and fluctuations in the blood pressure and heart rate were the most commonly observed symptoms in patients. It was seen that patients diagnosed as poisoning cases were initially brought to emergency department of our hospital. Treatment was started immediately at the emergency department follows as on protocol. Gastric lavage with distilled water and normal saline was administered. Oxygen was started in most of the patients. The patients were shifted to ICU for further management. Atropine 1-2 mg bolus intravenously was administered intermittently as needed to 54 cases till atropinization sign seen in Organophosphorous poisoning followed by pralidoxime 1gm IV infusion bolus to 54 patients. Glycopyrolate 1gm IV infusion bolus was given to 13 patients in severe conditions. This was followed by adjuvant therapy.^{16,17}

In OP poisoning first aid was given in the form of - gastric lavage was done for all OP patients and antidote like atropine, glycopyrolate and acetylcysteine were commonly used for paracetamol poisoning and followed by drugs like antibiotics, anti-ulcer and antiemetics. Then adjuvant therapy was given based on history of exposure. The study suggested the fact that the prevention and treatment of poisoning should be set at a higher level in the healthcare of the local population.¹⁸

Limitation of the study was the smaller sample size and short duration which might be the main limitation factors affecting the results. Most of the cases were diagnosed on the basis of patient's history and clinical examination.

No bio-chemical analysis of gastric lavage was done in any patients due to lack of facility.

CONCLUSION

Poisoning remains an important method of deliberated self-destruction (DSH) and carries a significant impact on morbidity and mortality. The intensity and severity of poisoning are thus multidimensional and demand multi-sectoral approach for facing this problem. Awareness and education about the potential toxicity of commonly used pesticides and drugs may help in reducing the burden of poisoning. The present study indicates that younger age patients (less than 21 years), low educational level, intra familial conflicts (with parents) and domestic violence were significant risk factors associated with self-destructive behaviour. Public education against domestic violence and timely psychosocial management of the vulnerable cases through a protracted community based mental health program may help to reduce morbidity and mortality.

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