



ISSN: 2091-2749 (Print)
2091-2757 (Online)

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Submitted

25 Apr 2023

Accepted




26 May 2023

How to cite this article

Maharjan K, Tiwary A, Chhetri
Budhathoki A. Types and
outcome of patients with acute
poisoning presenting to the
emergency department of
Patan Hospital, Nepal. Journal
of Patan Academy of Health
Sciences. 2023Aug;10(2):43-49.

<https://doi.org/10.3126/jpahs.v10i2.59153>

Types and outcome of patients with acute poisoning presenting to emergency department of Patan Hospital, Nepal

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Abstract

Introduction: Poisoning poses major health and health related issues with the burden of mortality and morbidity in people. Pesticides ingestion poses major burden in our part of world whereas carbon monoxide, prescribed medication overdose is more common in developed regions. This study aimed at finding the type and outcome of patients with poisoning landing in emergency room of Patan Hospital.

Method: This is a retrospective observational study conducted at Patan Hospital. This study included data of patients with acute poisoning over a period of 3 years from Apr 2020 to Apr 2023, which was obtained from the nursing register books and record section. The data included information regarding demographic profile of the patient (age and sex), type of poison and outcome of the patient namely admission, referral and mortality.

Result: A total of 189 cases of acute poisoning were included in the study over a period of 3 y. Female outnumbered the male with female: male ratio of 1.14:1; 90(47.61%) were seen in age group between 18-29 y. Out of them 112(59.26%) were admitted whereas 70(37.04%) were referred and 7(3%) had mortality. Organophosphate poisoning was the most common form of poison used by the patients 116(61.38%).

Conclusion: Pesticides are the most common cause of acute poisoning. Most of the cases were admitted and managed in hospital, however it still poses risk of death. Early identification of the type of poisoning will help in prompt diagnosis, standard management and patient safety.

Keywords: outcome, pesticides, poisoning

Introduction

Theophrastus Bombastus Von Hohenheim (Paracelsus) popular as father of toxicology states that "All things are poison and nothing is without poison; only the dose makes a thing not a poison."¹ Poison can be defined as any agent that can injure, kill, or impair normal physiological function in humans, producing general or local damage or dysfunction in the body.² Poisoning poses major health and health related issues with the burden of mortality and morbidity in people. World Health Organization (WHO) estimates around 0.3 million deaths from poisoning worldwide. Among the causative agents, pesticides ingestion is seen as the major culprit for death.^{3,4} Agriculture being the major profession of people of South Asian countries, pesticides are easily available and hence pesticide poisoning is one of the common poisonings in our part of world. Opioids and other analgesics along with antidepressants and antipsychotic drug overdose are more common form of poisoning seen in developed nation.⁶ Nepal pesticide management act 2076 and Nepal Narcotic drug act 2033 states the misuse of pesticides and narcotic compounds punishable by law.^{7,8} Due to the lack of equitable health services and weak health regulations in developing countries, the outcome of poisoning is more dreadful in these areas.⁹ The knowledge about poisoning and its prognosis can improve our hospital's preparedness and help primary care physician manage those patients promptly and efficiently. This can in turn improve the prognosis. This study aimed at finding the type and outcome of patients with poisoning landing in emergency room of Patan Hospital.

Method

This was a retrospective observational study conducted at Emergency Medicine Department of Patan Hospital, Patan Academy of Health Sciences, Lalitpur, Nepal. It was conducted over a period of 3 years effective from Apr 2020 to Apr 2023. The study included the details of the patients

presenting with acute poisoning. Any patient who presented with either ingesting or inhaling or touching or injecting those substances which has been labelled as poison are termed as having acute poisoning. The intent of poisoning could be of any form; suicidal, homicidal or accidental. The investigators collected the preliminary data of the poisoning cases from the nursing register books. Three separate registers of admission, referral and mortality were reviewed. Three different variable types were studied in this study; firstly, demographical variable where age and sex of the patient were noted; secondly study variable was seen where type of poison consumed by the patient was noted and lastly outcome variable was noted where three different outcomes of the patients were observed, namely admission, referral and mortality. The data were retrieved by investigators during free hours. Patients above 18 years who presented to Emergency room with acute poisoning were included in the study. Those cases whose medical records were lost or incomplete were excluded. All the obtained data were entered in Microsoft excel. Mean and percentage of the variables were calculated. Ethical consideration was obtained from the Institutional Review Committee of Patan Academy of Health Sciences.

Result

A total of 189 cases of acute poisoning were included in the study. Female patients with poisoning outnumbered the male with female:male ratio of 1.14:1, Table 1. Our study found that 90(47.61%) patients were in the age group between 18-29 y, Table 2. Out of total patients presenting to the Emergency, 112(59.26%) patients were admitted whereas 70(37.04%) were referred and 7(3%) had mortality. Organophosphate poisoning was the most common form of poison used by the patients 116(61.38%) followed by multiple substance 16(8.47%) and paracetamol overdose 13(6.80%).

Table 1. Sex variation of patients with poisoning

Sex	N(%)
Male	88(46.56%)
Female	101(53.44%)

Table 2. Age of patients with poisoning

Age Category	N(%)
18-29 y	90(47.61%)
30-39 y	43(22.75%)
40-49 y	27(14.28%)
50-59 y	15(7.93%)
>60 y	14(7.40%)

Table 3. Outcome of patients with poisoning

Outcome	N(%)
Admission	112(59.26%)
Referral	70(37.04%)
Mortality	7(3.70%)

Table 4. Types of poison consumed by patients with poisoning

Types of Poison	N(%)
Organophosphate	116(61.38)
Paracetamol	13(6.88%)
Zinc Phosphide	12(6.35%)
Aluminium Phosphide	3(1.58%)
Opioids	0(0%)
Antidepressants	0(0%)
Antipsychotics	5(2.6%)
Multiple substance	16(8.47%)
Others	24(12.7%)

Discussion

This study analyzed the demographic profile (age and sex), type of poison and outcome of the patients with acute poisoning presenting to the emergency department of Patan Hospital. Our study analyzed a total of 189 patients with acute poisoning who met the inclusion criteria over a period of 3 years. Acute poisoning is an emergency situation which poses significant mortality and morbidity. Poisoning has always been a global health issue that causes major burden towards draining health resources and global economy.¹⁰⁻¹² Prompt diagnoses, appropriate treatment aiming at prevention of complications are very crucial in reducing the

burden of poisoning related health problems.¹¹

Upon analyzing, this study revealed that 88(46.56%) of the patients were male and 101(53.4%) of the patients were female, with the female to male ratio 1.14:1. A similar study done at Western Regional hospital of Nepal showed female to male ratio of 1.25:1.¹³ Another study showed results similar to our study where female to male ratio was 1.29:1.¹⁴ Another study done at Ethiopia showed results similar to our study where female to male ratio was 1.2:1.¹⁵ On contrary to our study, a study done at Kathmandu Medical College and Teaching Hospital showed male to female ratio of 1.05:1.¹⁶ Similar study done at India showed

male to female ratio of 1.3:1 and 1.5:1 respectively.^{17,18} Another study done at China shows results contrary to our study where male outnumbered female patients in poisoning cases.¹⁹ Looking upon the results from this study as well as various studies from around the globe, female and male both are exposed to the poison and both can present with features with acute poisoning.

The age group of 18-29 years was the highest in number in our study which was 90(47.61%) as shown in Table 2. In a study conducted at Nepal, results were similar to our study where 40.5% of the cases was between 21-30 years.¹⁶ Another study showed that 66% of the cases were between age group of 21-30 years.¹⁷ Similar results were seen in studies where 44.2% of the cases were between age of 21-30 years and where 40% of the cases were between ages 21-30 years.^{15,18} A study done in China also showed results similar to our study where 52.7% of the cases were between ages 20-39 years.¹⁹ Another study done showed result different to our study where maximum number of cases was seen between 10-20 years.¹³ Adolescents and young adults are generally prone to stress and could be vulnerable to poisoning. Major cause of poisoning in this age group could be attributed to the psycho-emotional problems which are common to this age group including academic failure, unemployment, financial difficulties, failed romantic relationships, domestic pressure, and others. Such problems could possibly lead to negativism on the person which can be positively correlated with suicidal attempts.²⁰

The most common type of poisoning case observed in this study was organophosphate poisoning which was seen in 116(61.38%) patients. The next common was multiple substance which was 16(8.47%) followed by paracetamol overdose which was 13(6.8%) and Zinc phosphide which was 12(6.35%). In a similar study done in Nepal, organophosphate was the most common type of poisoning noted.¹³ The findings are coherent with the findings from a study done at Nepal, where organophosphates are a major compound for

poisoning.¹⁶ Another study done in China showed results different to our study where therapeutic drugs are found be the leading cause of poisoning and pesticides poisoning is at second number.¹⁹ A study done in North India found that corrosives were the leading poisoning cases reported which accounts for 27% of the total poisoning case whereas pesticides poisoning accounts for only 10% of the case.¹⁸ On contrary to our study, pesticides poisoning falls in the tenth number in acute poisoning cases in United States. Drug overdose of the prescribed medicine, carbon monoxide, alcohol are the top leading cause of mortality and morbidity attributed to poisoning in these areas.²¹ Pesticides are used domestically and commercially to control weeds, insects and other organisms in the agriculture and horticulture that will help in increasing the quality and quantity of the products. The term pesticide includes many types of products and chemicals. More than 16,000 pesticide products exist, comprising about 600 active ingredients.²² Pesticide products and chemicals are subdivided based on their target pest and application methods. They include insecticides, herbicides, fumigants, and fungicides, among others. As our country is agriculture dependent and farming is a major occupation of the Nepalese people, most of them are exposed to these compounds. Also, as the regulations and health legislature of the country is not that strong regarding these compounds, these are easily available round the clock in every corner of the country.

Our study showed that 59.26% cases were admitted, 37.04% of the cases were referred to other center due to unavailability of Intensive Care Unit (ICU) bed and 3.7% of the patients expired in the Emergency room. None of the cases were discharged from the emergency room. Every case was admitted for observation and management from either ICU or ward. Different from our study, a study done in Kathmandu medical college and teaching hospital showed 37.3% of the poisoning cases were discharged from Emergency room after emergency management and observation for few hours,

50.7% cases were admitted to ICU/medical ward and one patient (1.5%) died in emergency while undergoing treatment.²³ A similar study done at Nepal medical college also showed that 37.5% cases were shifted to ICU, 12.5% were referred to other center and 50% left against medical advice. However, mortality was not mentioned in the study.²⁴

The prevalence, types and outcome of patients with acute poisoning vary significantly from countries which mostly rely on socioeconomic background and cultural practices along with local industrial and agricultural activities. Household chemical agents and overdose of the prescription drugs are most common poisoning agents in the developed part of the world whereas agrochemicals are the usual poisoning agents in developing countries.²⁵ Effects of the poisoning is worse in the developing countries mostly because of vulnerable rules and limited healthcare services and resources. Pesticides are the maximum common chemical substances used to self-harm in developing countries.²⁶

It is important to recognize the type of poison, its character and severity in order to take appropriate measures to save lives and decrease morbidity and mortality.²⁶

The major limitation of this study is that it does not show the overall prevalence of poisoning cases at the emergency department during three years' period due to poor maintenance of registration of emergency cases. All the records of the patient could not be extracted. Additionally, as all the poisoning patients could not be included in the study due to unavailability of the records, it may affect the representativeness of the results. This study does not show the exact data of the referral as referral register of 9 months' duration could not be retrieved. Also, outcome of the patients who were referred to other centers in need of ICU facility could not be properly traced due to lack of proper health system networking in our country.

Strict legislation to restrict the easy access to these poisons can certainly decrease the poison-related morbidity and mortality. Proper health recording system and networking system of the hospitals should be established to maintain health records from which proper and accurate data can be extracted and analysed which can be used in proper planning for safety of the people from poisoning exposure and its complications.

Conclusion

The poisoning was seen mostly in female population in the age group between 18-29 years. The commonly available pesticides, insecticides and rodenticides were the most common cause of acute poisoning.

Acknowledgement

We are thankful to the nursing staff of Emergency medicine department for providing us with the required register and charts. We would also like to acknowledge staffs from the record section for providing us required patients record files. We would like to thank Assoc. Prof. Dr. Samita Acharya, Chair of General Practice and Emergency Medicine department for providing us with continuous support and guidance to conduct the study.

Conflict of Interest

None

Funding

None

Author Contribution

Concept, design, planning: KM, AT; Literature review: KM, AT, ACB; Data collection: ACB; Data analysis: KM, AT, ACB; Draft manuscript: KM, AT; Revision of draft: AT, ACB; Final manuscript: KM, AT, ACB; Accountability of the work: KM, AT, ACB.

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