

# Assessment of poisoning survivor cases at a tertiary care teaching hospital

Shakya A,<sup>1</sup> Acharya J,<sup>2</sup> Ranjitkar M,<sup>1</sup> Lama G,<sup>1</sup> Pandey AR,<sup>3</sup> K.C. A<sup>4</sup>

<sup>1</sup>Arbin Shakya; <sup>1</sup>Malshree Ranjitkar; <sup>1</sup>Geshu Lama, Lecturer; <sup>2</sup>Jenash Acharya, Associate Professor, Department of Forensic Medicine; <sup>3</sup>Anwit Raj Pandey, MBBS Graduate, Kathmandu Medical College Teaching Hospital, Sinamangal, Kathmandu, Nepal; <sup>4</sup>Aashish K.C., Junior Clinical Fellow, Kings College Hospital, NHS Trust, London, United Kingdom.

## Abstract

**Background:** Poisoning is one of the most common causes of increased morbidity and mortality worldwide and also one of the common causes of Emergency Department visits. It has now become a major public health issue.

**Objectives:** To assess the poisoning survivor cases and various associated parameters like most common poison, the circumstance of poisoning, age and gender distribution, and triggering factors.

**Methods:** A retrospective study was done in 94 cases of poisoning, from whom reliable history could be obtained, admitted to Kathmandu Medical College, over the period of 12 months, from April 2019 to March 2020. After obtaining ethical clearance secondary data were collected from the medicolegal examination reports. The data were entered and analysed in Statistical Package for Social Sciences (SPSS) v.18.

**Results:** Majority of the victims were females (9, 62.8%), mostly homemakers (31, 33%). The mean age of the population was  $30.35 \pm 13.48$  years and median age 26 years. Organophosphorus was the most frequent agent (44, 46.8%). The commonest triggering factor was a quarrel with family members (56, 65.1%) and in most cases the agent was already present in their home. The act of poisoning was impulsive in these cases.

**Conclusion:** In this study, the most common agent causing poisoning was still organophosphorus which was already present in their homes. Most poisoning cases were intentional. Females especially homemakers were the most common victims. Cases of poisoning can be reduced if the authorities properly monitor the buying and selling of these common agents of poisoning.

**Key words:** Agrochemical; Poisoning; Suicide.

## Access this article online

**Website:** [www.jkmc.com.np](http://www.jkmc.com.np)

**DOI:** <https://doi.org/10.3126/jkmc.v10i3.41207>

## HOW TO CITE

Shakya A, Acharya J, Ranjitkar M, Lama G, Pandey AR, K.C. A. Assessment of poisoning survivor cases at a tertiary care teaching hospital. *J Kathmandu Med Coll.* 2021;10(3):120-4.

## Address for correspondence

Dr. Arbin Shakya  
Lecturer, Department of Forensic Medicine,  
Kathmandu Medical College Teaching Hospital,  
Sinamangal, Kathmandu, Nepal.  
E-mail: [sakyarbin@gmail.com](mailto:sakyarbin@gmail.com)

Copyright © 2021 Journal of Kathmandu Medical College (JKMC)

ISSN: 2019-1785 (Print), 2091-1793 (Online)



This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.

## INTRODUCTION

“Poison is any substance which if introduced in a living body or brought into contact with any part thereof, will produce ill-health or death, by its constitutional or local effect or both.”<sup>1</sup> Poisoning is one of the most ancient methods used for homicide but due to advances in scientific techniques to detect these poisons its trend of use has now shifted to suicide.<sup>2</sup>

WHO estimates poisoning as one of the most common causes of increased morbidity and mortality worldwide and also a common cause of Emergency Department visits.<sup>3</sup> Cases of poisoning are also prevalent in Nepal.<sup>4-6</sup> It has now become major public health issue.<sup>4,7,8</sup>

Being an emergency condition, to reduce mortality and morbidity, early intervention is essential. There are legal duties of a doctor whenever cases of poisoning arrive at emergency department (informing police, taking

proper history, obtaining samples).<sup>19</sup> Unintentional use of poisons (accidental and homicidal) are rare in comparison to intentional use.<sup>10</sup>

This study aimed to assess the poisoning survivor cases, most common poisons, circumstance of poisoning, age and gender distribution, and triggering factors. These parameters can help define vulnerable groups, make authorities aware on monitoring the common substances used for poisoning and thus help in reducing cases of poisoning.

## METHODOLOGY

This is a retrospective study done on poisoning cases admitted at Kathmandu Medical College, Sinamangal over a period of 12 months from April 2019 to March 2020. The study included all the admitted poisoning cases who could provide reliable history (in cases of minor/children, history was taken from guardians). Unconscious and disoriented patients who did not improve with treatment or who died during the course of treatment were excluded from the study.

During the time period 94 cases presented with the alleged history of poisoning which were later confirmed clinically and with laboratory investigations.

Ethical clearance was obtained from Institutional Review Committee of same institute, before starting the study (Ref. 0404202004). Secondary data were collected from the medicolegal reports present in the department of Forensic Medicine from cases who presented with poisoning during the time period of 12 months.

A detailed history that was taken from patients or their relatives in *Compos Mentis* was recorded in the proforma developed for the study. The records of physical examination performed and details were documented. These were also a part of routine medicolegal examination and documentation process. Study variables like age, sex, occupation, education level, address, the poison used, circumstance, place of ingestion, co-ingestion, previous self-harm were collected in a proforma during data collection. The data were then entered into Statistical Package for Social Sciences (SPSS) Statistics for Windows, version 18.0 (SPSS Inc., Chicago, Ill., USA) and analysed. The quantitative variables were expressed as means and standard deviations and quantitative values as percentages.

## RESULTS

Out of 94 cases, the study consisted of 35 (37.2%) males and 59 (62.8%) females (Table 1). The female to male

ratio was 1.68:1. The mean age of the population was  $30.35 \pm 13.48$  years and median age being 26 years. The age distribution of the sample population was between 14 years and 74 years. Most of the victims belonged to the age range of 16-25 years (41, 43.6%).

The most common type of poisoning was due to organophosphorus compound (44, 46.8%), which was followed by ingestion of multiple pharmaceutical agents (1, 11.7%) and zinc phosphide poisoning was seen in 10 (10.6%) cases. The remaining 25 (26.6%) cases of poisoning were due to other substances like single pharmaceutical agent, dhatura, carbolic acid, urea, aluminum phosphide, corrosive agents, and sodium hypochlorite and in 4 (4.3%) cases were due to unknown substances.

Paracetamol was the most widely used pharmaceutical agent with 12 (12.8%) participants of this study using the same either as an isolated drug (4, 4.3%) or in combination with other drugs (8, 8.5%). Other pharmaceutical agents used for poisoning include amitriptyline, olanzapine, clonazepam, codeine, ibuprofen, antibiotics (amoxicillin, metronidazole), antihypertensives (amlodipine, atenolol), thyroxine (Table 2).

Among organophosphorus compounds, most contained cypermethrin and chlorpyrifos in combination (19, 43.2%) followed by dichlorvos (9, 20.4%). In six (13.7%) cases of organophosphorus poisoning the compound was unknown (Table 3).

From the study sample, most of the victims of poisoning were homemakers (31, 33%), followed by students (25, 26.6%), and farmers (11, 11.7%) (Table 4).

Most of the victims of poisoning were from urban areas (66, 70.2%) and 28 (29.8%) cases belonged to rural locations. Some of the victims of poisoning had co-ingested other recreational substances before ingesting the poison among which 19 (20.2%) had consumed alcohol.

Among the victims of poisoning, 86 (91.5%) cases were with suicidal intention or intention of self-harm, while eight (8.5%) were accidental poisoning. Of patients who attempted suicide, nine (10.5%) gave history of previous attempts to commit suicide. A majority of patients, (77, 89.5%) did not give similar history. Similarly, examination revealed that 10 (11.6%) cases had findings suggestive of additional self-harm like cutting of wrist (mostly superficial), whereas 76 (88.4%) cases did not reveal such findings which further confirm their suicidal intention.

Among suicidal poisoning, the most common reason for ingestion of poison was due to unrest among family members (Table 5). The majority of patients (56, 65.1%) gave a history of having dispute with one of the family members, either the husband, wife, father, son, mother, etc. This was followed by financial issues (7, 8.1%), study-related stress (6, 7.0%), and work-related issues (5, 5.8%).

Most of the cases had easy access to these poisons as they were already present in their homes (70, 74.5%). In only 24 (25.5%) cases the poisons were recently bought from local pharmacies or agro shops. The poisons were consumed at their own residence/home by 81 (86.2%) cases while 13 (13.8%) cases consumed the poison in an outdoor location.

Majority of cases of poisoning had no formal education or had up to secondary school level education (28, 29.8%, in both cases), followed by higher secondary level (15, 16.0%) and Bachelors level (14, 14.9%) education. The least number of poisoning cases were seen in people with Masters level education (2, 2.1%).

**Table 1: Distribution of poisoning cases according to age groups**

Age range(years)	Male	Female	n (%)
Less than 15	2	2	4 (4.3)
16-25	14	27	41 (43.4)
26-35	7	15	22 (23.4)
36-45	4	11	15 (16.0)
46-55	4	1	5 (5.3)
56-65	3	2	5 (5.3)
More than 65	1	1	2 (2.1)
<b>Total</b>	<b>35</b>	<b>59</b>	<b>94 (100)</b>

**Table 2: Various agents used for poisoning**

Agent used	n (%)
Organophosphorus	44 (46.8)
Ingestion of multiple pharmaceutical agents	11 (11.7)
Zinc phosphide	10 (10.6)
Tramadol	3 (3.2)
Paracetamol	4 (4.3)
Dhatura	3 (3.2)
Unknown	4 (4.3)
Others	14 (15.9)
<b>Total</b>	<b>94 (100)</b>

**Table 3: Compounds present in organophosphorus**

Compound	n (%)
Cypermethrin5, Chlorpyriphos 50	19 (43.2)
Dichlorvos	9 (20.4)
Cypermethrin	4 (9.1)
Methyl Parathion	3 (6.8)
Baygon (Carbamic acid, and others)	2 (4.5)
Dimethoate	1 (2.3)
Unknown	6 (13.7)
<b>Total</b>	<b>44 (100)</b>

**Table 4: Occupation of the victims of poisoning**

Occupation	n (%)
Homemakers	31 (33)
Students	25 (26.6)
Farmers	11 (11.7)
White collar job	10 (10.6)
Shopkeeper	7 (7.4)
Labour	4 (4.3)
Cook	1 (1.1)
Dependent	5 (5.3)
<b>Total</b>	<b>94 (100)</b>

**Table 5: Reasons for suicidal poisoning**

Reasons	n (%)
Dispute with family members	56 (65.1)
Financial issue	7 (8.1)
Study-related issue/stress	6 (7)
Work-related issue/stress	5 (5.8)
Depressive thoughts	2 (2.3)
Did not disclose	9 (10.6)
Hallucination	1 (1.1)
<b>Total</b>	<b>86 (100)</b>

## DISCUSSION

The majority of victims of poisoning were females in comparison to males, with a female to male ratio of 1.68:1. This is consistent with studies done by other authors.<sup>3,6,7,11,12</sup> A study done in Saudi Arabia showed male predominance with 73.6%.<sup>13</sup>

The study also compared the occupation of the victims of poisoning. Most of the victims of poisoning in this study were homemakers (31, 33%), followed by students (25, 26.6%), which again emphasises the fact that the females are a vulnerable group for poisoning. One of the reasons being, females are considered emotionally fragile and also mostly subject to violence by their

partners. This result was in contrast with the study done at Kavrepalanchok district, which showed that the majority of the victims were farmers (40.74%) followed by homemakers (31.49%).<sup>14</sup> It maybe because this study was done in the capital city (Kathmandu district), where the number of farmers are less in comparison to people in Kavrepalanchok district where a majority of the people are farmers. In this study farmers were the third common victim.

The median age of the patients who consumed poison was 26 years. Most of the victims of poisoning were below 45 years and were in the age range of 16-25 years. This result is consistent with the other studies done in the western region of Nepal.<sup>7,15</sup> This signifies that most of the victims belong to active age group of people and these groups of people are vulnerable to committing risk-taking behaviours.<sup>3,7</sup> A similar age group was also found to be victims of poisoning in a study done in Saudi Arabia.<sup>13</sup>

In this study, only eight (8.5%) cases were reported to be accidental, among which three (3.2%) were from the same family who accidentally consumed dhatura after cooking, confusing it with some green leafy vegetables. Rest five (5.3%) cases consumed the agents under the influence of alcohol. The remaining were all intentional poisoning (80, 87.9%) for a suicide attempt. There were no reported cases of homicidal poisoning in this study. The result was similar to a study done in Nepal which also reported a similar incidence of accidental and intentional poisoning.<sup>7,14</sup> In a study done in Ethiopia in 1990, it was estimated that 6,00,000 deaths in developing countries were due to intentional self-harm (including both intentional poisoning and self-inflicted injuries).<sup>3</sup> Another study done in the western region of Nepal showed a slightly higher incidence of accidental poisoning (29.33%)<sup>6</sup> and a study done in Bir Hospital, Kathmandu<sup>16</sup> showed the lowest incidence of accidental poisoning (only 2%). In a study done in Saudi Arabia, accidental poisoning was more common (64.6%) than intentional poisoning and this was because a large number of poisoning cases were due to animal envenomation.<sup>13</sup>

In the study done by Shakya et al., the authors found that domestic quarrel was the most common reason for intentional poisoning (30, 65.2%).<sup>6</sup> A systematic review of observational study done by Chelkeba et al. in Ethiopia also found that quarrel with family members was one of the common reasons for poisoning.<sup>3</sup> These findings were similar to this study. Quarrels with family members mostly resulted in an impulsive act of consuming harmful substances within their reach.

In this study, the most common agent that caused poisoning was organophosphorus compounds (44, 46.8%) followed by ingestion of multiple pharmaceutical agents (11, 11.7%). Studies done by other authors also showed that organophosphorus is the most common agent in Nepal.<sup>7,11,12,14</sup> However, there is a transition in the use of agents causing poisoning from organophosphorus compounds to medical over-the-counter drugs.<sup>7</sup> In this study, the prevalence of organophosphorus use was only 46.8% (44), but previous studies done in Nepal showed a higher prevalence of 62%<sup>11</sup> and 74.07%.<sup>12</sup> This shows that although organophosphorus compound is still the most common agent of poisoning, there is a decreasing prevalence in its use, especially in urban areas. This is because there is easy access to other medical drugs for the general people, which is widely unmonitored.<sup>3,7,13</sup> One of the studies done in Saudi Arabia showed that animal envenomation was the most common poisoning (66.2%) followed by pharmaceutical agents.<sup>12</sup>

In this study, 70 (74.5%) had access to an agent already present at their home and the act of consuming these poisons was impulsive in most cases. In only 24 (25.5%) of the case the agents were recently bought from local pharmacies or agro shops. This is consistent with other studies done in the western region of Nepal,<sup>6</sup> as agricultural chemicals/insecticides and over-the-counter drugs are generally stored in most of the homes in Nepal. This emphasises the fact that if the buying and selling of chemical agents can be monitored most of the poisoning can be prevented in the future.

This study showed that majority of poisoning cases were people with no formal education or with secondary school level education which is consistent with study done by Shakya et al.<sup>6</sup> This signifies that people with no or low education level will have more family disputes, and work- and study-related issues which can contribute to suicidal intention in such people. To prevent future risk of self-harm, psychiatry consultation was also done in every case.

The limitations of the study are: it was conducted at a single institution only; the sample did not include poisoning cases who died during treatment, so this study might not indicate actual picture of the overall poisoning cases.

## CONCLUSION

In this study, the most common agent causing poisoning was organophosphorus which was already present in their homes used for agricultural purposes, most poisoning were intentional and an act of impulsivity. The

cases of poisoning can be prevented if these commonly available agents can be properly monitored by concerned authorities. As females especially homemakers with no formal education or low education level are often the most common victims, awareness should be raised in

these vulnerable groups so that they seek help in time and proper psychiatric evaluation should be done.

**Conflict of interest:** None

**Source(s) of support:** None

## REFERENCES

- Reddy KS, Murty OP, The essentials of forensic medicine and toxicology. 33rd ed. New Delhi (India): Jaypee Brothers Medical Publishers (P) Ltd;2014. Chapter 24, General Consideration; p. 498. [Full Text]
- Nepovimova E, Kuca K. The history of poisoning: From ancient times until modern era. Arch Toxicol. 2019 Jan;93(1):11-24. [PubMed | Full Text | DOI]
- Chelkeba L, Mulatu A, Feyissa D, Bekele F, Tesfaye BT. Patterns and epidemiology of acute poisoning in Ethiopia: Systematic review of observational studies. Arch Public Health. 2018 Jul 2;76:34. [PubMed | Full Text | DOI]
- Dhakal AK, Shrestha D, Shakya A, Shah SC, Shakya H. Clinical profile of acute poisoning in children at a teaching hospital in Lalitpur. J Nepal Paediatr Soc. 2014;34(2):100-3. [Full Text | DOI]
- Rimal HS, Tiwari U, Ghimire K, Thapa M. Hospital based study of poisoning among children, 1 to 18 years of age in eastern Nepal. Birat J Health Sci. 2017;2(1):138-41. [Full Text | DOI]
- Shakya RP, Adhikari S, Bajracharya R. Pattern of acute poisoning attending a tertiary care hospital of western Nepal. J Lumbini Med Coll. 2016;4(2):90-3. [Full Text | DOI]
- Kishore P, Palaian S, Paudel R, Mishra D, Ojha P, Alam K, et al. Pattern of poisoning cases in a teaching hospital in Western Nepal. J Inst Med. 2008;30(1):26-4. [Full Text]
- Nistor N, Frasinariu OE, Rugină A, Ciomaga IM, Jităreanu C, Ștreanga V. Epidemiological study on accidental poisonings in children from northeast Romania. Medicine (Baltimore). 2018 Jul;97(29):e11469. [PubMed | Full Text | DOI]
- Millo T, Jaiswal AK, Bharadwaj DN. Medico-legal duties of doctor in poisoning cases. J Forensic Chem Toxicol. 2017;3(2):107-18. [Full Text | DOI]
- Gyenwali D, Vaidya A, Tiwari S, Khatiwada P, Lamsal DR, Giri S. Pesticide poisoning in Chitwan, Nepal: A descriptive epidemiological study. BMC Public Health. 2017Jul;17:619. [PubMed | Full Text | DOI]
- Karki N, Singh V, Verma VK. Pattern, management and outcome of poisoning in a tertiary care hospital. J Lumbini Med Coll. 2018 Jan-Jul;6:32-5. [Full Text | DOI]
- Paudyal BP. Poisoning: Pattern and profile of admitted cases in a hospital in central Nepal. J Nepal Med Assoc. 2005 Jul-Sep;44(159):92-6. [PubMed | Full Text]
- Abd-Elhaleem ZAE, Al Muqhem BAM. Pattern of acute poisoning in Al Majmaah region, Saudi Arabia. Am J Clin Experiment Med. 2014;2(4):79-85. [Full Text | DOI]
- Marahatta SB, Singh J, Shrestha R, Koju R. Poisoning cases attending emergency department in Dhulikhel - Kathmandu university teaching hospital. Kathmandu Univ Med J. 2009 Apr-Jun;7(26):152-6. [PubMed | Full Text | DOI]
- Acharya K, Kandel IS, Gupta S, Poudel SD. A study on incidence and pattern of acute poisoning cases in an emergency department of western region of Nepal. J Gandaki Med Coll Nepal. 2019 Jul-Dec;12(2):59-62. [Full Text | DOI]
- Singh DP, Acharya RP. Pattern of poisoning in Nepal. J Inst Med. 2006;28:306. [Full Text | DOI]