

Sociodemographic Characteristics of Poisoning Cases Admitted in Tertiary Care Hospital, Dang, Nepal

Puja Sharma Dhital¹, Geeta Belbase¹

¹ School of Nursing, Rapti Academy of Health Sciences, Ghorahi, Dang, Nepal

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Corresponding Author:

Puja Sharma Dhital
Assistant Professor
School of Nursing, Rapti Academy
of Health Sciences, Ghorahi, Dang,
Nepal
Email: pujash789@gmail.com

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Abstract

Introduction: Poisoning is a significant global public health concern, with thousands of deaths occurring every year, mainly in the developing countries. The true extent of pesticide self-poisoning in Nepal is unclear, largely due to underreporting driven by stigma and fear of negative consequences related to suicide and attempted suicide, as well as shortcomings in the reporting system. The objectives of the study were to analyze the sociodemographic characteristics and types of poison they used.

Method: A retrospective cross-sectional study based on record review was used to find-out poisoning cases presenting to the ICU of Rapti Academy of Health Sciences (RAHS). All the patients presenting to the ICU department of RAHS following confirmed or suspected poisoning from July 2023 to June 2024.

Result: Finding of the study shows that out of the total 70 patients 51. 43% (36) were female and 48.57 (34) were male with a large portion of poisoned patients (38.6%) in the age group of 41-60. Whereas, 45.7 % (32) were from Janjati ethnic group. Likewise, majority 81.4 (57%) of the cases were from dang district and most of the subjects were consumed OP compound 74.3% (52).

Conclusion: There is a rising trend in the number of poisoning cases coming to the hospital and enhancing the regulation of pesticides and other toxic chemicals in the country is essential to help reduce the incidence of poisoning cases.

Keyword: Poison, Sociodemographic Characteristics

Introduction

Suicide is a major public health problem worldwide with at least 800,000 deaths each year ^{1,2} which occur in Low- and Middle-Income Countries (LMICs).³

In 2018–19 AD, Nepal reported 5,754 suicides—a notably high figure for a relatively small country.⁴ More than 24% of these cases involved poisoning, primarily through the ingestion of highly concentrated agricultural pesticides.⁴ Since 2001, Nepal has taken active steps to regulate pesticides in an effort to minimize their health impacts.⁴

Poisoning represents a major public health concern worldwide. According to World Health Organization (WHO) estimates, unintentional poisoning resulted in

106,683 deaths and led to the loss of 6.3 million Disability-Adjusted Life Years (DALYs) in 2016.⁵

Over the past few decades, significant advancements in agriculture, medical pharmacology, and industrial technologies have led to a notable shift in the pattern of acute poisoning, with new toxic substances emerging.⁶ In developed countries, household chemicals and prescription medications are the leading causes of poisoning, while in developing nations, agrochemicals—despite their vital role in boosting food production and controlling pests—remain the most common sources of poisoning.⁶

A poison is a chemical substance that can cause illness or

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harm to living organisms when introduced into the body or upon contact.^{7,8} It produces harmful or adverse effects and may be intentionally used for such purposes.^{7,8}

Pesticides are estimated to be responsible for about one-third of global suicides. Intentional pesticide ingestion as a means of suicide mainly takes place in rural regions of low- and middle-income countries across Africa, Central America, Southeast Asia, and the Western Pacific.⁹ It is estimated that pesticide ingestion causes approximately 300,000 deaths each year in Asia.⁹

The findings revealed that young adults, females, and socially disadvantaged ethnic groups such as lower caste communities (Dalits) face a higher risk of pesticide poisoning.¹⁰ Pesticide self-poisoning typically takes place at home and during the evening hours.¹⁰ The most common pesticides involved in these poisonings are widely available insecticides like organophosphates and pyrethroids, as well as rodenticides such as zinc phosphide.¹⁰

Acute poisoning is a frequent cause of emergency department visits and hospitalizations, resulting in significant morbidity and mortality.^{11,8} While poisoning exposures pose a serious public health challenge in Africa, only 10 out of 58 countries on the continent have established Poisons Information Centers (PICs).^{11,8} Acute poisoning requires prompt and effective treatment to prevent death or long-term complications in patients.¹² The majority of poisonings result from intentional self-ingestion.^{13,14} Organophosphorus (OP) compounds account for the highest share of poisoning-related illness and death.^{13,14}

Bans of Highly Hazardous Pesticides (HHP) reduce the number of suicides.¹⁴ The commonest pesticides include organophosphates, carbamates, chlorinated hydrocarbons, pyrethroids, and aluminum or zinc phosphide.⁸ The true extent of pesticide self-poisoning in Nepal remains unclear, partly due to underreporting driven by stigma and fears of negative repercussions related to suicide and suicide attempts, as well as gaps in the reporting system.¹⁵

Understanding the pattern, severity, and outcomes of acute poisoning cases is crucial for effective planning, prevention, and management strategies.⁸

Organophosphate poisoning is the leading method of suicide attempts in Nepal. Despite receiving appropriate treatment, mortality rates from organophosphate poisoning are 41 times higher than those in the United States.¹⁷ In low- and middle-income countries, organophosphate poisoning is more common than other forms of suicide, largely due to the easy availability of these chemicals in agricultural settings.¹⁷ Depression is the most frequent underlying cause of intentional

organophosphate poisoning.¹⁷ Implementing social reforms to reduce the stigma surrounding mental health issues and improving suicide data collection in the country could strengthen public health programs aimed at addressing the mental health challenges faced by this population.¹⁷

Most poisoning cases were intentional, with family disputes identified as the primary reason for ingesting poisonous substances.¹⁶ This highlights the need for increased focus on psychological and family counseling to address conflicts, alongside providing psychological support following medical treatment for poisoning.¹⁶ Additionally, stringent regulatory measures should be implemented to restrict easy access to toxic substances.¹⁶ Acute poisoning was more prevalent among females and frequently occurred in individuals under 30 years of age, posing a significant public health challenge in Ethiopia.¹¹ The most common causes of acute poisoning were identified as psychiatric disorders, conflicts, and substance abuse.¹¹

This study aimed to examine the sociodemographic characteristics and types of poisons involved and to find out association between type of poison and selected sociodemographic variable. Early diagnosis, treatment, and prevention are essential for reducing the impact of poisoning-related injuries in any country. Establishing baseline epidemiological data to identify vulnerable groups and high-risk situations within the community is vital. Additionally, strict regulations should be enforced for pesticide sales, requiring transactions to occur in the presence of a witness known to the buyer.

Methods

A retrospective cross-sectional study based on record review was used to find-out poisoning cases presenting to the ICU of Rapti Academy of Health Sciences (RAHS). Total of 70 patients presenting to the ICU department of RAHS following confirmed or suspected poisoning from July 2023 to June 2024. Data was collected in RAHS, Dang, Ghorahi. Ethical clearance for the research was taken from IRC, RAHS. Data was collected from admission charts of the patients admitted with poisoning from 17th July 2023 to 15th July 2024. Data regarding demographic variables like age, sex, ethnicity address, type of poison was recorded.

The collected data underwent a systematic process of editing and coding to ensure accuracy and consistency. Subsequently, it was entered into IBM SPSS Statistics version 20 for analysis. Descriptive statistical methods i.e. frequency, percentage, mean and standard deviation were employed to summarize and interpret the data, providing insights into the patterns and characteristics observed within the dataset. Chi square test was used

to determine association between different selected variables with type of poison, and P value <0.05 was set as the significance level.

Result

The socio-demographic characteristics of the victims of OP poisoning attending the ICU of RAHS are depicted in table 1. Out of the total 70 patients included in this study, 51.43% (36) were female and 48.57 (34) were male with a large portion of poisoned patients (38.6%) in the age group of 41-60. Among total poisoning cases, 45.7 % (32) were from Janjati ethnic group. Likewise, majority 81.4 (57%) of the cases were from dang district.

Table 1: Socio-demographic characteristics of patients

Category	No. of Cases	Percentage
Age in years		
<20	13	18.6
20-40	24	34.3
41-60	27	38.6
61-80	6	8.6
Mean ± SD=38.60±15.63Min:14 Max:72		
Sex		
Male	34	48.57
Female	36	51.43
Ethnicity		
Dalit	11	15.7
Janjati	32	45.7
Muslim	1	1.4
Brahmin/ Chhetri	24	34.3
Others	2	2.9
Residence		
Dang	57	81.4
Pyuthan	2	2.9
Rukum	1	1.4
Rolpa	10	14.3
Total	70	100

Min: Minimum Max: Maximum

Table 2 shows the different types of poisons consumed by the patient. Among 70 patients, the majority of subjects were consumed OP compound 74.3% (52).

Table 2: Types of Poison

Category	No. of Cases	Percentage
OP	52	74.3
Celphos	7	10
Paraquat dichloride	3	4.3
Other	8	11.4
Total	70	100

Table 3

The association between type of poison and selected demographic variables was assessed using the Chi-square test, and a P value <0.05 was set as the significance level. According to table 3, there is significantly association between types of poison and gender of patient (p value 0.04) and no any association between age).

Type of poison was categorized as OP and others whereas others mean Celphos, Zinc phosphate, Mushroom, Cypermethrin and Paraquat dichloride)

Table 3: Association between types of poison and different sociodemographic variables.

Category	Types of Poison		Total	P value
	OP	Others		
Sex				*0.04
Male	29	5	34	
Female	23	13	36	0.122
Age				
<20	7	6	13	
20-40	17	7	24	
41-60	22	5	27	
61-80	6	0	6	

* P value <0.05 was set as the significance level.

Discussion

In this study poisoning was more frequently observed in age group of 41-60 years which comes under middle adulthood. This finding is contradictory from study conducted in Ethiopia and China where maximum number were in the age group of young adulthood.^{12,19} Similarly, the finding also shows that mean age of the patients was 38.60 which is nearby similar of another study where mean age of the respondents was 29.9 years.¹⁸

Varying results have been found with sex predilection. More than half of patient (51.43%) were female in this study. But other studies have shown that the incidence of poisoning is more in males compared to females. Approximately, 194 (59.2%) patients were men and 130 were women (40.8%)²⁰ and Fifty-four patients were male (69.2%) and 24 were female (30.8%).²¹ Out of the total poisoning cases, 45.7 % (32) were from Janjati ethnic group. Likewise, majority 81.4 (57%) of the cases were from dang district.

Regarding type of poison, the majority of subjects were consumed OP compound 74.3% (52). This finding is in accordance with other studies where pesticides were the most commonly employed poison, notably organophosphorus compounds (22 patients, 32.8%)²² and 54 (45%).¹²

This study shows that, there is significantly association

between types of poison and gender of patient (p value 0.005). Whereas similar finding was shown in another study where the Chi-square value for gender distribution gave a value of 4.801, with P value <0.001.²⁰

Conclusion

In conclusion, we can say that there is a rising trend in the number of poisoning cases coming to the hospital. Pesticides were found to be the most common poisoning agents. The findings demonstrated that more women than men presented with poisoning, and the most vulnerable age group was the middle adult group aged 41–60 years. Poisoning due to organophosphate exceeded poisoning due to Celphos, Paraquat and others. Further investment is required to promote public health education on the rational use and safe storage of toxic agents as well as self-protection to reduce accidental poisoning.

Limitations of the study

This study is a retrospective study based on case records of ICU. All cases of OP poisoning who were admitted in other ward could not be studied as there were missing data in the case records.

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