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Research Article

Prevalence of Acute Poisoning Cases in Tertiary Care Hospital: A Descriptive Cross-sectional Study

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ABSTRACT

Background & Objectives: Poisoning with intention of self-harm is a leading cause for mortality in developing country like Nepal. Higher number of Organophosphate poisoning cases are being reported due to easy accessibility and low cost. Depression and Alcohol use disorder are the most common risk factor associated with intentional suicide. This study aims to quantify the prevalence of acute poisoning in tertiary care setting, identify the most affected age and sex groups, and assess key risk factors for intentional self-harm.

Materials and Methods: This was the cross-sectional study done in tertiary care hospital in Nepal. The study was conducted between 1st September 2022 to 30th March 2023 in patient with poisoning presenting at Emergency Department or the ICU. Convenience sampling was done. Total sample size for the study was 68. Preformed questionnaire was given for data collection and analysis was done in SPSS version 24.

Results: The prevalence of organophosphate poisoning was found to be 44.10%. Amongst all cases of poisoning, highest number of poisoning patients were prevalent in patients aged 20-30 (26.5%). Alcohol use disorder was common in male patients with poisoning whereas depressive disorder was common in female patients.

Conclusion: Organophosphate self-poisoning predominates in young Nepali adults, particularly women, underscoring urgent needs for stricter pesticide control and targeted mental-health support.

Keywords: Nepal; Organophosphate poisoning; Prevalence

INTRODUCTION

Poison is defined as any substance capable of causing harm to health or even death when introduced into the body or applied externally [1]. Acute poisoning refers to the adverse health effects resulting from short-term exposure (less than 24 hours) to toxic substances, which may include medications, drug overdoses, acute drug abuse, chemical exposures, occupational and environmental toxins, biological agents, and envenomation [2]. Poisoning, particularly with self-harm intent, remains a significant global public health concern and is a leading cause of morbidity and mortality. According to the World Health Organization (WHO), approximately 300,000 deaths annually are attributed to poisoning, with the burden being disproportionately higher in low- and middle-income countries (LMICs) such as Nepal [3].

A report by the North American Pesticide Action Network (PANNA) estimates that there are around 385 million cases of acute poisoning worldwide [4]. In adults, the primary causes of acute poisoning include drug overdose, carbon monoxide, and alcohol, while organophosphorus compounds are the most commonly implicated poisons. Similar trends have been observed in Nepal, likely due to the widespread availability of pesticides and rodenticides in local markets [5]. Around 1% of hospital admission in the emergency is due to intentional use of OP poisoning of which the mortality rate is 41 times higher than that of the US even with appropriate treatment [6,7]. Hospital-based studies in Nepal indicate that self-poisoning accounts for the vast majority (95.8%) of poisoning cases, with occupational poisoning being extremely rare (0.03%) [8]. Agricultural communities are particularly vulnerable due to easy access to pesticides, and common contributing factors for suicidal poisoning include financial difficulties and family conflicts. Limited access to mental health services further exacerbates the risk of intentional poisoning in Nepal [9].

While drug misuse is a more prevalent cause of poisoning in developed countries, LMICs account for 99% of global pesticide poisoning deaths. Notably, pesticide self-poisoning is responsible for about 20% of global suicides [9,10]. Despite a general decline in poisoning cases in other South Asian countries, Nepal has experienced an increasing trend in both intentional and unintentional poisoning from 1990 to 2019 [11].

This study aims to determine the prevalence of various types of poisoning in Nepal, identify the most affected age groups, and explore the factors contributing to the rising trend of suicide attempts related to medicine abuse among the younger population.

MATERIALS AND METHODS

This was a hospital based descriptive cross-sectional study conducted from 1st September 2022 to 30th March 2023 at Kathmandu Medical College and Teaching Hospital. An ethical approval was obtained from institutional review committee prior to the study with reference number 12082022/02.

Patients aged 10 to 80 years presenting to the emergency department, medical wards, or intensive care units of participating hospitals in Nepal with a confirmed diagnosis of acute poisoning-regardless of the toxic agent or intent-within 24 hours of exposure during the study period will be included. Inclusion requires availability of essential clinical data

in the medical records. Exclusion criteria comprise patients younger than 10 or older than 80 years; cases involving chronic or cumulative exposures, adverse reactions to therapeutic drug doses, or isolated acute alcohol intoxication. Similarly, patient who did not give the consent were not included in the study.

Convenience sampling was done and sample size was calculated as,

$n = Z^2 pq/e^2$

where n= sample size

Z= 1.96 for a confidence interval of 95%

p= Prevalence of poisoning in general population, 50%

q= 1-p

e= margin of error (Here, the value of e is taken 12%)

Calculated sample size was 67. Total sample size taken was 68. Selection and information bias were minimized as possible by collecting data via predesigned Performa. Data will be preserved confidentially and used for research purpose only. Data will be entered and analyzed in Statistical Package for social sciences (SPSS) version 24. Measures like frequency, percentage, Odds ratio, chi square test, P value (0.05) will be applied.

Details of each participant were filled by investigators in the emergency or in the ICU with patient presenting as cases of poisoning. Details of their age, type of poison, cause and nature of poisoning were recorded.

RESULTS

Out of the total 68 participants aged 14-72 years presenting at tertiary care center, 39 (57.4%) were female and 29 (42.6%) were male (figure 1) with no refusals; hence the response rate was 100%.

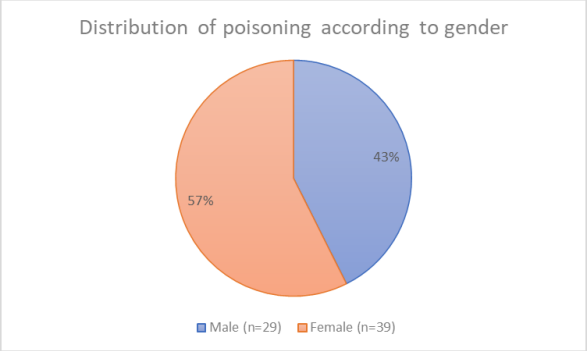

Figure 1: Distribution of poisoning according to Gender (n=68)

Of the all poison consumed, the prevalence was highest of organophosphate (44.1%) (Table 1).

Table 1: Prevalence of different kinds of Poisoning (n=68)

	Frequency	Percent
OP	30	44.1%
Zinc phosphide	5	7.4%
Deltamethrin	5	7.4%
Wild honey	4	5.9%
Cypermethrin	3	4.4%
Others	21	30.8
TOTAL	68	100%

Among patients with organophosphate poisoning, 16 (53.33%) were female whereas 14 (46.66%) were male. Of all the different age group as mentioned above, the prevalence of poisoning was more in age group 20-30 with 18 (26.5%) cases (Table 2). Moreover, 16 (23.5%) poisoning cases were among age group 10-20, 13 (19.1%) cases were among age group 30-40.

With regards to the nature of poisoning, 62 (91.2%) had consumed poison self deliberately with intention of self-harm and remaining 6 (8.8%) were accidental. However, there were no cases of homicidal. The study concluded that, case of poisoning was higher with female with depressive disorder than male with depressive disorder (Table 3). Moreover, the study showed, alcohol use disorder was present in about 8 (27.5%) male patients with poisoning whereas depressive disorder was present in 7 (17.94%) of female patients.

Table 2: Age wise distribution of cases of poisoning (n=68)

	Frequency	Percent
10-20	16	23.5
20-30	18	26.5
30-40	13	19.1
40-50	9	13.2
50-60	8	11.8
60-70	2	2.9
70-80	2	2.9
TOTAL	68	100

Table 3: Risk factors of poisoning (n=68)

	Alcohol use disorder	Depressive disorder	Schizophrenia
Female	3	**7**	**0**
Male	**8**	**0**	**1**
Total	**11**	**7**	**1**

DISCUSSION

Organophosphate poisoning has become a growing concern in the context of Nepal due to its easy availability and lack of awareness among people. This study was done to determine the prevalence and characteristics of acute poisoning cases presenting to a tertiary care hospital. The findings provide insights regarding the demographic patterns and types of poisoning agents, contributing to a better understanding of the burden of acute poisoning in a clinical setting.

Among the various poisoning agents identified, organophosphate poisoning was found to be the leading cause. In our study of 68 patients, organophosphate was found to be the causative agent in 30 of them, making it by far the most common agent of acute poisoning with a proportion of 44.10%. In a similar study conducted in the Emergency Department of a secondary care center, the prevalence of organophosphate poisoning was 42%, which aligned with what we found in our study [12]. This is consistent with other studies across the country, which showed similar prevalence patterns of 47.54% [13] and 51.95% [14], indicating how organophosphate poisoning has become a growing concern in Nepal due to its easy availability and lack of awareness. The sizable proportion of poisoning due to organophosphate raises concerns regarding public health interventions and the need for stricter regulations.

Our study found that the age groups of 20-30 and 10-20 were the most affected, with 18 (26.5%) and 16 (23.5%) patients in those groups, respectively. This aligns with other studies done in similar settings. Other studies done at ICUs of tertiary care centers showed that the age group of 20-30 was the most affected in their cohort as well, with a prevalence of 38.9% [15] and 38.8% [16], which highlights the vulnerability of this age group to poisoning. The reason for the high prevalence in this age group might be the increased stress of social and professional aspects, increased emotional fluctuations, and inadequate psychological coping mechanisms [17]. The huge proportion of patients of adolescent age groups indicates the importance of screening for mental health disorders in the group.

The study revealed that a substantial number of cases were due to intentional self-poisoning. Of the total cases, 62 (91.20%) were intended for suicide, which emphasized the role of underlying psychosocial factors. A study done in 2021 in Nepal showed similar findings, where 95.8% of all organophosphate poisoning cases were of suicidal intention [10]. This alarming figure shows that intentional poison ingestion is a major public health concern that needs to be addressed promptly to decrease the event rate in the future. It further highlights the importance of promoting mental health education and implementing preventive strategies by conducting awareness and counselling campaigns.

The findings of this study demonstrate the urgent need for preventive measures, public awareness, and mental health promotion. Nepal's status as an agrarian society has made pesticides readily available, facilitating their misuse for self-harm. The use of pesticides for suicide has seen a dramatic rise, with a 13-fold increase in suicide by pesticide ingestion between 1980 and 2018, now accounting for nearly 23% of all suicides during this period [18]. In Nepal, the Drug Control Act 2038 and the Pesticide Act 2048 provide the legal framework for regulating narcotics and pesticides. However, effective implementation and enforcement of these laws, alongside public education, are crucial for addressing the ongoing challenges related to poisoning [19]. The establishment of poison control programs and addressing mental health issues can significantly reduce poisoning-related incidents. Training farmers and agricultural workers on safe pesticide handling and disposal can help prevent spillage of chemicals. Improved labelling and safe storage practices can limit incidents of accidental poisoning. The lack of mental health services and the stigmatization of mental health problems in Nepal have been driving forces behind the abuse of organophosphates as a means of suicide [9]. This highlights the need for comprehensive national suicide-prevention programs, improved mental health services, and better regulation of pesticide availability. Further research is necessary to explore the long-term outcomes and assess the effectiveness of preventive interventions.

While this study provides valuable comprehension into the prevalence of acute poisoning cases, certain limitations must be accounted for. As a single-center study, the findings may not be generalized to other regions. Increasing the sample size and involving multiple centers would increase the generalizability of the study. The study does not address the clinical features and outcomes of the patients. Moreover, the retrospective data collection method may have led to potential biases or missing information about the amount of poison consumed and the preceding cause of poisoning. Therefore, further studies involving multiple centers and addressing clinical implications could provide a more comprehensive understanding of acute poisoning trends.

CONCLUSION

Organophosphate poisoning accounted for 44.1% of all cases. The majority of poisonings involved organophosphate compounds and predominantly affected young adults, particularly those aged 20–30 years. Most cases were intentional self-harm. Females were more frequently affected than males and demonstrated a stronger association with depressive disorders, while approximately

one-quarter of male patients had alcohol use disorder. These findings highlight the importance of stricter regulation of organophosphate substances and the need to enhance mental health and alcohol misuse services, especially targeting young adults and women.

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