Original Article ISSN (O):2395-2822; ISSN (P):2395-2814

Profile of Poisioning Cases Attending a Tertiary Care Centre of Uttarakhand.

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Received: December 2017
Accepted: December 2017

ABSTRACT

Background: World Health Organization (WHO) estimated 0.3 million people die every year due to various poisoning agents. Poisoning is the fourth common cause of mortality in India. Acute poisoning accounts for 2-3% of all admissions to hospital in India. In India, as agriculture is the main occupation, insecticides and other agrochemical fertilizers are used to a greater extent and the poisoning with such products are more common. **Methods:** This prospective observational study was carried out in the Department of Medicine at Government Medical College and associated hospital Haldwani .172 patients who had taken some type of poison, who were more than 12 years of age included. A detailed clinical history and physical examination was performed and recorded on the predesigned proforma. All data were analyzed, documented and interpreted as per the standard laid down protocol. **Results:** Majority of patients lies were of organophosphate (42.4%) followed by rat killer poison (15.7%) , mosquito repellant (12.2%) , celphos (11.0%) and the least in drug overdose (0.6%). Majority patients survived (84.9%) followed by (15.1%) who expired. **Conclusion:** Organophosphorous poisoning is one of the most common poisoning in this region of Uttarakhand, predominantly in the young population with a male predominance, belonging to low socioeconomic class. The commonest motive of poisoning was suicidal.

Keywords: Poisoning, Organophosphorous, Insecticides.

INTRODUCTION

Poison is a substance that causes damage or injury to the body and endangers one's life due to its exposure by means of ingestion, inhalation or contact.[1] World Health Organization (WHO) estimated 0.3 million people die every year due to various poisoning agents.[2] Poisoning is the fourth common cause of mortality in India.[3]This may be suicidal, homicidal, stupefying and accidental. According to World Health Organization (WHO), globally more than three million of acute poisoning cases with 2, 20,000 deaths occur annually (WHO 1999). Over 5 million people are treated in USA every year on exposure to drugs. Only about 5% require hospitalization. Overall mortality rate is low, only 0.03% of all exposures, but 1-3% in suicidal cases. It has been estimated that, in India five to six persons per lakh of population die due to acute poisoning every year.[4] Pattern of poisoning in a region depends on various factors whichinclude availability and access to the poison, socioeconomic status of an individual, cultural and religious influences, etc.

Rapid industrialization, introduction of newer range of drugs for treatment and massive use of pesticides in agriculture has increased the incidence of poisoning. In advanced countries, it has been observed that poisoning deaths are mainly due to cleansing agents, detergents, paracetamol, carbon monoxide and other cosmetic products.[5] In India, as agriculture is the main occupation, insecticides and other agrochemical fertilizers are used to a greater extent and the poisoning with such products are more common.[6] According to various studies organophosphate forms the commonest poisoning agent.[7-11] A recent study pertaining to poisoning statistics demonstrated considerable difference between North India and South India.12 Since 1995, it has been found that the incidence of aluminium phosphide poisoning is increasing in north India.[13-15] In general accidental poisoning is more common in children and suicidal poisoning is more common in young adults.[16]

Acute poisoning accounts for 2-3% of all admissions to hospital in India. High incidence in the community reflects cases of availability of insecticides and pesticides and also stress of modern

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lifestyle. Insecticides, vegetable poisons, aluminum phosphide, alcohol, hypnotics and sedatives are the major poisons encountered in India. In rural areas, Insecticides, pesticides and vegetable poison, predominate whereas in cities and towns it is sedatives or other drug overdosage.[17,18]

MATERIALS AND METHODS

This prospective observational study was carried out in the Department of Medicine at Government Medical College Haldwani and associated Dr. Sushila Tiwari Government Hospital, Haldwani (Nainital). 172 patients who had taken some type of poison, who were more than 12 years of age who presented in emergency room or Medicine ward/ICUs were taken for consideration during the study period from September 2015 to September 2017.

A written consent was taken from all potentially eligible subjects or their attendants and excluded from the study if they did not match with inclusion criteria of the study. A detailed clinical history and physical examination was performed and recorded on the predesigned proforma. Patient's personal history, physical examination findings like name, age, sex, demographic profile (marital status, educational status, occupation, socio economic status), blood pressure, type of poison, hospital stay, conscious or unconscious condition, complications, survival or death were recorded in prescribed proforma. The Proforma was prepared in English and local language was used during interview to make it convenient for the patients. Data was analyzed using Statistical Package for Social Sciences, version 23 (SPSS Inc., Chicago, IL). Results for continuous variables were presented as mean ± standard deviation, whereas results for categorical variables were presented as number (percentage).The level $P < 0.05$ was considered as the cutoff value or significant.The poisoning incidents were also classified as per the social-economical classes on the basis of Modified B G Prasad Classification. As per the severity indicators of Glasgow coma scale, the data was collected and assessed to determine the severity score/level/grade of patients.

RESULTS

Majority of, 70 patients were in age group 21-30 years (40.7%) followed by age group 10-20 years comprising of 39 patients (22.7%). Majority of patients were male, 101 patients (58.7%) followed by 71 female patients (41.3%).Occupation wise majority of patients were housewives ie. 50 patients (29.1) followed by 43 patients who were students (25%) followed by 20 patients (11.6%) were unemployed. [Table1] Majority of patients (97, 56.39%) were in the lower socioeconomic status followed lower middle class (52, 30.23%).[Figure1]

Table 1: Distribution of patients as per occupation

	Number of patients (n=172)	Percentage
Agricultural workers	16	9.3
House Wives	50	29.1
Laborers	13	7.6
Students	43	25.0
Drivers	2	1.2
Businessmen	9	5.2
Unemployed	20	11.6
Employed	10	5.81
Others	9	5.2

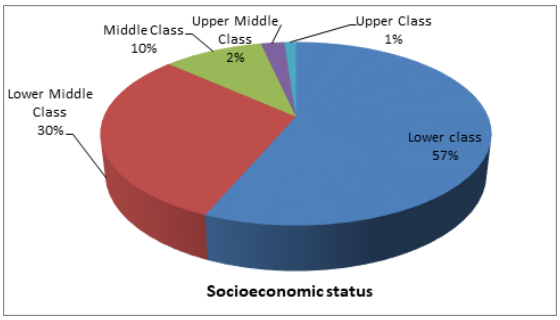

Figure 1: Pie chart showing distribution of patients as per socioeconomic status.

If we analyze according to marital status, majority of patients who a were affected were married (64.0%) followed by unmarried (36.0%) On analyzing education status majority of patients were illiterate ie. 83 patients (59.9%) followed by 48 patients who were educated up to high school(27.9%). If we talk about particular season, majority of patients were observed during monsoon season (36.0%) followed by summer (29.7%) and winter (23.8%).

The majority of patients ie. 65 patients (37.7%) were from hilly area and their mortality rate (65.4%) was also high. Majority of, 70 patients presented to the hospital within 6 – 12 hours of poison ingestion, it was observed that the maximum mortality 26.6% was seen in patients presenting to the hospital in >24 hours.[Figure 2]

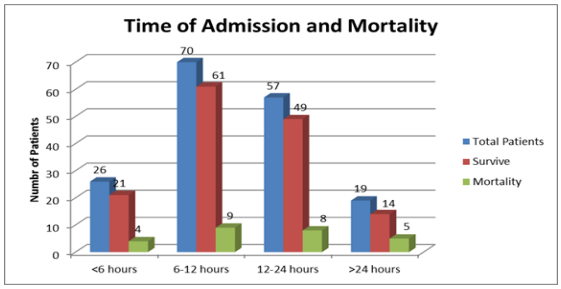

Figure 2: Bar diagram showing distribution of patients as per duration at presentation and their mortality rate.

Distribution of patients on the basis of motive of poisoning , the majority of patients fall under suicidal category (78.5%) followed by accidental (20.3%) and the least in not known category (1.2%). Distribution of patients on the basis of their Glasgow

Coma Scale (GCS), the majority of patients lied in the range of 13-15 GCS (55.8%) and the least number of patients are in the range of 3-8 GCS (19.7%). Majority of patients required ICU care (63.4%) followed by the patients who did not require ICU care (36.6%).on analyzing hospital stay ,majority of patients have stayed in hospital for 1-2 days (55.2%) followed by 3-5 days (31.4%) and the least for more than 10 days (5.8%). Majority of patients did not have psychiatric illness (86.6%).
Distribution on the basis of various complications encountered in patients , the majority of patients fell under intermediate syndrome (29.4%) followed by shock (25.5%) and respiratory failure (23.5%) and the least in myocarditis , renal failure (2%), acute pancreatitis(2%) and acute kidney injury (2.0%).[Table 2]

Table 2: Distribution of patients as per various complications encountered.

Complications	Number of patients (n=51)	Percentage (%)
Intermediate syndrome	15	29.4
Respiratory failure	12	23.5
Shock	13	25.5
Multi organ failure	3	5.9
Aspiration pneuonitis	2	3.9
Myocarditis	1	2.0
Renal failure	1	2.0
Acute pancreatitis	1	2.0
Acute kidney injury	1	2.0
Bradycardia	2	3.9

On analyzing mortality, the majority patients survived (84.9%) followed by (15.1%) who expired. Patients on the basis of various type of poisoning and the majority of patients lies in organophosphate (42.4%) followed by rat killer poison (15.7%) and mosquito repellant (12.2%) and celphos (11.0%) and the least in drug overdose (0.6%).[Figure 3]

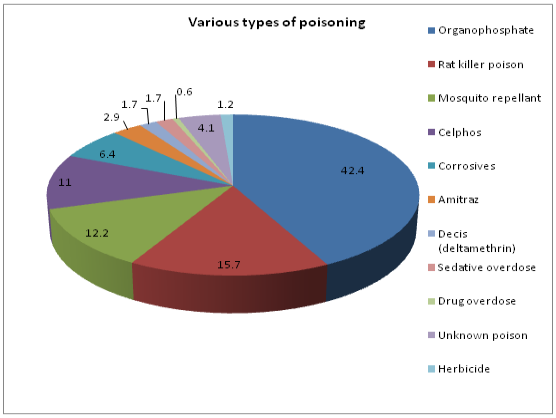

Figure 3: Pie diagram showing distribution of various types of poisoning.

Distribution of patients on the basis of poisoning and associated mortality, the majority of patients lie in organophosphate 14 patients(8.1%) followed by 7 patients ingesting Celphos (4.1%) and 2 patients took rat killer poison, 2 patients took herbicide (1.2%) and the least in mosquito repellant, corrosive, amitraz, decis, sedative overdose, and drug overdose each with (0%) mortality rate. [Table 3]

Table 3: Distribution of patients on the basis of poisoning and associated mortality rate.

Types of poisoning	Number of patients (n=172) (%)	Mortality (%)
Organophosphate	73 (42.4)	14 (8.1)
Rat killer poison	27 (15.7)	2 (1.2)
Mosquito repellant	21 (12.2)	0 (0.0)
Celphos	19 (11.0)	7 (4.1)
Corrosives	11 (6.4)	0 (0.0)
Amitraz	5 (2.9)	0 (0.0)
Decis (deltamethrin)	3 (1.7)	0 (0.0)
Sedative overdose	3 (1.7)	0 (0.0)
Drug overdose	1 (0.6)	0 (0.0)
Herbicide	2 (1.2)	2 (1.2)
Unknown poison	7 (4.1)	1 (0.6)

Patients who were required mechanical ventilation and the majority of patients lies in organophosphate (37) followed by celphos (14) and amitraz (3) and sedative overdose (2), herbicide (2) and unknown poison (2). Distribution of patients on the mean of their hospital stay and the study shows that the highest mean and standard deviation is of amitraz (10±7.55) and organophosphate (5.34±7.31) followed by decis (deltamerthrin) (3.33±0.577) and celphos (2.57±1.69) and rat killer poison (2.25±1.51).On analyzing symptomatology at the time of admission which shows that the majority of patients had neurological symptoms (61.05%) followed by gastrointestinal symptoms (24.42%), other symptoms (18.60%) and the least symptoms were of cardiovascular system (1.16%).

DISCUSSION

The aim of the study was to determine the various parameters of the poisoning such as mode of poisoning, relation to sex, occupation, marital status, age group, socioeconomic status (according to B.G. Prasad scale) of patient with the objective of final outcome of patients, to determine the different types of poison encountered and to determine the most commonly used poison in this region.
In study done by Joshi, S.C. et al,[19] total 372 cases of organophosphorus compound poisoning cases and reported the age of patients varied from 1- 70 years. The majority of patients, were male (43.81%) between the age group of 21-30 years. Male to Female ratio was 1.22:1. Another study done by B. Maharani and N. Vijayakumari20 reported males (92 cases, 61.33%) outnumbered females (58 cases, 38.66%) and the ratio was 1.58:1 and majority of the cases were in the age group of 11-30 years and among them 74 cases (49.33%) were in the age group of 21-30 years. Similar result was found in the present study according to study mentioned above,

total 172 patients were included; the age of patients varied from 10 to more than 60 years and mean age was 30.74 year with 12.9 of standard deviation. The majority of patients, were male (58.7%) between the age group of 21-30 years (38/101). Male to female ratio was 1.42:1. It was also found that the instances of poisoning decreased with increasing age.

Occupations status of patients in study by Joshi, S.C. et al19 were also reported persons occupation wise agricultural workers were on top of the list (51.07%) followed by house wives (27.68%) and labourers (12.90%). In study done by B. Maharani and N. Vijayakumari20 occupation wise, poisoning was commonly found among male laborers (28 cases, 18.66%) and farmers (20cases, 13.33%) followed by house wives (42 cases, 28%) and students (25 cases, 16.66%).Similarly in present study, majority of patients (occupations status) especially female were house wives 50 (29.1%) followed by student (25.0%) and unemployed person (11.6%).

Socio-economic status of patients of Joshi, S.C. et al19 were also reported persons of lower socio-economic status and lower middle class were the commonest patients (65.05%) and (31.98%) respectively. In present study, patients of lower socio-economic status and lower middle class were the commonest patients (56.39%) and (30.23%) respectively followed by middle class (9.88%). In study done by B. Maharani and N. Vijayakumari20 reported 101 cases (67.33%) married and rest was unmarried. In study of Patil A et al,[21] a higher frequency of poisoning was seen in unmarried cases (40.5%). In present study, majority of patients who all were married were 64.0% and unmarried 36.0%.

Educational level of patients in study of Joshi, S.C. et al,[19] were also reported persons most of the patients were either illiterate (60.21%) or educated up to high school (28.22%) and mainly belonging to rural areas (75.80%). In present study, most of the patients education status were illiterate (48.3%) followed by educated up to high school (27.9%), primary level education (11.6%) & upto intermediate (6.9%).

In study done by B. Maharani and N. Vijayakumari majority number of cases was reported during summer season (54 cases, 36%) followed by rainy and spring season.[20] This was similar to other study done by Jesslin et al.[22] But the incidence was high during the rainy season in a study by Pokhrel et al.[23] In present study, majority of patients were observed during monsoon season (36.0%) followed by summer (29.7%) and winter (23.8%). In study done by B. Maharani and N. Vijayakumari20 regarding social back ground of the victims, 136 cases (90.66%) were reported from rural area and 14 cases (9.33%) were reported from urban area. In present study, majority 65 (37%) of patients were from hilly area and their mortality rate 17 (65.4%) was also high.

In study done by Joshi, S.C. et al reported most common type of poisoning dichlorvos (40.86%),[19] followed by methyl parathion (18.54%), the least consumed compound was diazinon (9.67%). In the study done by B. Maharani and N. Vijayakumari,[20] as agriculture was the main occupation of the people and organophosphorus were commonly used pesticide in this locality, the most commonly used agent for poisoning was organophosphorus (88 cases, 58.66%) followed by rat killer poison and other agents. This was evident from other studies done in south India. Similar result was reported by Adalkha et al,[24] Jaiprakash et al,[25] Jesslin et al,[22] Vinay et al,[26] Ramesha et al.[27] Similarly accordance with above studies in present study, various type of poisoning and the majority of patient's lies in organophosphate (42.4%) followed by rat killer poison (15.7%) followed by mosquito repellant (12.2%) followed by celphos (11.0%) and the least in drug overdose (0.6%).

Joshi, S.C. et al also reported the commonest motive of poisoning was suicidal in both males (50.80%) and females (43.01%),[19] followed by accidental (4.83%). Homicidal poisoning was observed in 5 (1.33%) cases only. In study done by B. Maharani and N. Vijayakumar among 150 cases,[20] intentional poisoning was found among 148cases (98.66%) and accidental poisoning was found in only two cases (1.44%).

Joshi, S.C. et al also reported that financial problem was one of the commonest reasons of poisoning (53.22%) and the mortality rate was 13.44%;[19] it was fairly low because the majority of patients reached hospital well within the fatal period. Respiratory failure was the leading cause of death in this study, followed by multi-organ failure. The mortality rate in study done by B. Maharani and N. Vijayakumari high toxicity and non-availability of any specific antidote is responsible for higher mortality with rat killer poison (six out of 17 cases) and endosulfan poison (two out of five cases) than organophosphate poisoning (six out of 88) this results were similar to Gurjar et al and Haddad studies.[20,28,29]

In the present study, various complications were encountered in patients and the majority of patients fell under intermediate syndrome (29.4%) followed by shock (25.5%) and respiratory failure (23.5%) and the least in myocarditis, renal failure, acute pancreatitis and acute kidney injury each with (2.0%). On the basis of final outcome the majority of patients survived (84.9%) according to study the mortality rate was 15.1%. On the basis of poisoning and associated mortality in present study majority of patients lied in the organophosphate 14 (8.1%) followed by celphos 7(4.1%) and rat killer poison, herbicide each with 2(1.2%) and the least in mosquito repellant, corrosive, amitraz, decis, sedative overdose, and drug overdose each with 0(0.0%) mortality rate.

In the study done by B. Maharani and N. Vijayakumari Co-morbid conditions of poisoning like adjustment disorder,[20] moderate to severe depression, schizophrenia, mood disorders, alcohol dependence, etc., were found in 35 cases (23.33%).Another study of Patil A et al most of the patients (78.4%) were hospitalized within less than 6 hours of toxic exposure.[21] The mean duration of hospital stay for hospitalized patients was 3.9 (6.1) days.

Similarly in the present study the majority of patients fell under Intermediate syndrome (29.4%) followed by shock (25.5%) and respiratory failure (23.5%) and the least in myocarditis, renal failure ,acute pancreatitis and acute kidney injury each with (2.0%). out of studied patients who required ICU were (63.4%) followed by the patients who did not required ICU care (36.6%). The majority of patients stayed in hospital for 1-2 days (55.2%) some for 3-5 days (31.4%) and a few patient for more than 10 days (5.8%). The maximum mean duration of stay was seen in amitraz poisoning (10±7.55) followed by organophosphorus poisoning (5.34 ±7.31).

In study of Patil A et al it was seen,[21] neurologic manifestations were the most common findings (64.8%) followed by gastrointestinal manifestations (37%). Similarly in our study the symptomatology at the time of admission of patients was of neurological symptoms (61.05%) followed by gastro intestinal symptoms (24.42%) and other symptoms (18.60%) and the least symptoms were of cardiovascular (1.16%).

CONCLUSION

Organophosphorus poisoning is one of the most common poisonings in this region of Uttarakhand, predominantly in the young population with a male predominance, belonging to low socioeconomic class. The commonest motive of poisoning was suicidal. Lack of education, poverty, cheap and readily easy availability of the organophosphorus compounds, unemployment and stressful life were the common reasons behind the reason of poisoning. Hence education amongst the regional population and youth about the harmful and deleterious effects of organophosphorus compounds and up gradation of the primary health centre facilities to render immediate management of organophosphorus compound poisoning, which is an important step in management of such poisonings, could go a long way in helping to reduce both mortality and morbidity due to organophosphorus compound poisoning.

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How to cite this article: Goyal S, Kanchan NG, Singh Y, Joshi A. Profile of Poisioning Cases Attending a Tertiary Care Centre of Uttarakhand. Ann. Int. Med. Den. Res. 2018; 4(2):ME04-ME09.

Source of Support: Nil, **Conflict of Interest:** None declared