Profile & Patterns of Poisoning Cases From Poison Detection Centre in Northen Karnataka- A One Year Retrospective Study

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KEYWORDS

Poisoning, insecticide, Poison detection centre, diagnosis, and treatment.

ABSTRACT

Background: Acute poisoning is a medical emergency and a severe public health concern, imposing a pressure on healthcare systems. Understanding the type and form of poisoning using a Poison Detection Centre aids in the development of efficient prevention and management strategies. **Aims and Objectives:** To evaluate poisoning trends, as well as different factors such as manner of poisoning, type of poison used, outcome of poisoning, the most vulnerable age and gender group, victim occupation, marital status, and geographical distribution. **Methods:** A one-year retrospective analysis in which 136 poisoning cases reported to the poison detection center were compared to determine the age, gender, season, manner & nature of poisoning. **Results & Discussion:** Insecticide poisoning was the leading cause of death among 136 cases, with a mean ±SD age of 3.74±1.44 years. The majority (55 cases) were between 21 and 30 years old, with 50% being female. Only 8 cases were fatal, with 5 falling victim to insecticide poisoning, 5 to rat poison, and 27 to negative pesticides. **Conclusion:** This study was conducted to determine the usefulness of a Poison Detection Centre(PDC), which will assist physicians in making diagnoses and managing cases efficiently and swiftly, hence lowering the mortality and morbidity rate of poisoning. As a result, we must raise awareness about the importance of establishing PDCs in each institution.

INTRODUCTION:

Poisoning is the top cause of hospitalization and death in both developed and developing countries. Fatality is determined by a variety of elements, including chemical and physical properties, dosage, mechanism, any underlying conditions, and, most importantly, initial therapy, all of which influence severity and prognosis in such cases. The type of poisoning is classed as accidental, suicidal, or homicidal. Suicidal poisoning is the most prevalent of them, with accidental and homicidal poisoning coming in last.[1] Poisoning is classified as fulminate,

acute, sub-acute, chronic, or sub-chronic based on the duration of toxin exposure and clinical presentation [2,3]. To handle poisoning patients in a timely and effective manner, it is critical to diagnose the poison utilizing a poison detection facility, which will lower the fatality rate. As a result, we conducted this study to assess poisoning trends as well as various factors such as the manner of poisoning, type of poison used, outcome of poisoning, the most vulnerable age and gender group, victim occupation, marital status, and geographical distribution, as well as to raise awareness about the need to establish a PDC in each institution.

MATERIALS AND METHODS:

Study Design: Record Based Retrospective study.

Study participants: All patients diagnosed with inhalational, ingestion, drug overdose poisoning admitted in KLE Hospital and samples received in PDC from 1st January 2023 to 31st December 2023.

Inclusion criteria: Patients exposed to drug overdose, inhalational and ingestion poisoning.

Exclusion criteria: Patients diagnosed with poisoning, drug overdose who are brought dead.

Sample size: A total number of patients admitted with poisoning and drug overdose from 1st January 2023 to 31st December 2023.

To test for a significant correlation between variables, the Chi-square test/ Fisher's Exact test was performed, and a p-value less than 0.05 was considered statistically significant. Results were entered into an excel spreadsheet and analysed with Jamovi version 2.4.11.

RESULTS:

There were 136 incidents registered in the PDC record. In table 1, we analyzed the association between age group and sex with PDC results. The majority (89 instances) belonged to the 21-40 years age group, with pvalue < 0.01. Additionally, 69 cases belonged to males and 67 cases to females, with pvalue < 0.01.As a result, age and gender were associated with the PDC outcome. In the current study, no association was found between seasonal change and PDC results, as they are equally distributed, as shown in table 2.

We examined the relationship between occupation and PDC results and discovered that the majority of cases (54) belonged to students, 32 cases to housewives, and 29 cases to farmers, with the remaining 19 instances belonging to others. As a result, there was no correlation between these two characteristics, as indicated in Table 3. Table 4 shows that more than half of the patients (76 cases) were married, 130 were from urban areas, and 128 were alive, indicating that there was no association between marital status, location of residence, or outcome status with PDC result. Figure 1 shows that out of 136 instances, 135 were poisoned in a suicidal manner.

Table 1: Comparison of Age & Sex with PDC result

	Age in years								**Sex**		**Total**
Result	**<10**	**11 to 20**	**21 to 30**	**31 to 40**	**41 to 50**	**51 to 60**	**61 to 70**	**71 to 80**	**M**	**F**	
Insecticide	0	3	11	9	8	2	3	2	31	7	38
Alcohol	0	1	4	2	1	0	0	0	7	1	8
Alcohol & Antipsychotics	0	0	0	0	0	1	0	0	1	0	1
Alcohol & Insecticide	0	0	1	0	0	0	0	0	1	0	1
Rat poison	0	1	4	1	0	0	0	0	2	4	6
Drugs	0	1	9	4	0	0	1	0	4	11	15
Drugs&	1	0	0	0	0	0	0	0	0	1	1

Antipsychotics											
Antipsychotics	0	3	2	4	0	0	1	0	1	9	10
Phenol	0	3	2	2	0	0	0	1	1	7	8
Negative for all pesticides	0	3	12	7	3	0	2	0	13	14	27
Paraquat	0	1	3	0	0	0	0	0	1	3	4
Negative for given poison	0	2	7	5	0	2	1	0	7	10	17
Total	1	18	55	34	12	5	8	3	69	67	136

Table.2: Comparison of Season PDC result

	Season			
Result	**Winter**	**Spring**	**Summer**	**Autumn**
Insecticide	7	9	10	12
Alcohol	3	3	2	0
Alcohol & Antipsychotics	1	0	0	0
Alcohol & Insecticide	0	0	1	0
Rat poison	2	0	2	2
Drugs	5	5	1	4
Drugs& Antipsychotics	0	0	1	0
Antipsychotics	5	1	1	3
Phenol	0	2	5	1
Negative for all pesticides	6	8	6	7
Paraquat	1	0	1	2
Negative for given poison	4	6	3	4
Total	34	34	33	35

Table 3: **Comparison of occupation and PDC result**

Result	**Farmer**	**Housewife**	**Student**	**Private job**	**Labourwork**	**Nursing staff**
Insecticide	16	5	12	4	1	0
Alcohol	1	1	3	1	0	2
Alcohol & Antipsychotics	1	0	0	0	0	0
Alcohol & Insecticide	0	0	1	0	0	0

Rat poison	0	2	3	1	0	0
Drugs	2	5	8	0	0	0
Drugs& Antipsychotics	0	0	0	0	0	0
Antipsychotics	0	3	5	2	0	0
Phenol	2	1	4	0	1	0
Negative for all pesticides	6	7	11	2	0	0
Paraquat	0	2	2	0	0	0
Negative for given poison	1	6	5	5	0	0
Total	29	32	54	15	2	2

Table 4: Comparison of Marital status, place of residence, outcome status with PDC result

Result	Married	Unmarried	Urban	Rural	Live	Dead
Insecticide	26	12	36	2	33	5
Alcohol	3	5	7	1	8	0
Alcohol & Antipsychotics	1	0	1	0	1	0
Alcohol & Insecticide	0	1	1	0	1	0
Rat poison	3	3	6	0	5	1
Drugs	7	8	14	1	15	0
Drugs& Antipsychotics	0	1	1	0	1	0
Antipsychotics	5	5	9	1	10	0
Phenol	4	4	8	0	8	0
Negative for all pesticides	13	14	27	0	26	1
Paraquat	2	2	4	0	4	0
Negative for given poison	12	5	16	1	16	1
Total	76	60	130	6	128	8

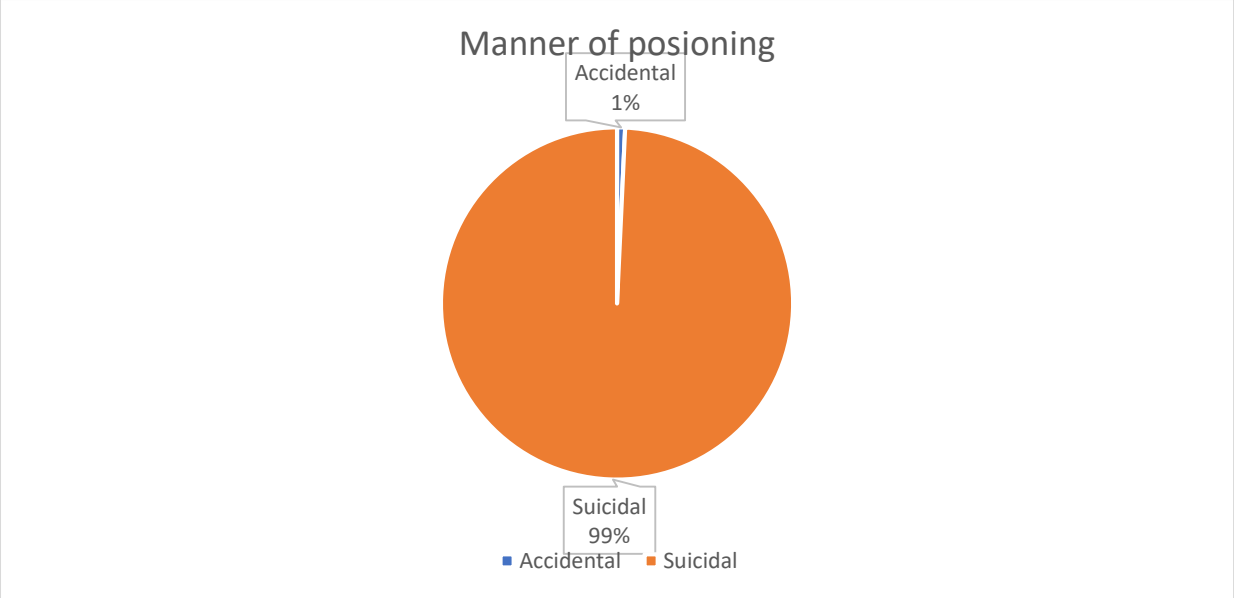

Figure.1: Manner of Poisoning

Figure.2: Analytical tests used in our poison detection tests are colour tests and thin layer Chromatography (TLC)

Discussion:

Poisonings are the biggest cause of hospitalization and death in India. The pattern of poisoning [demography, substance used, method of poisoning] varies by state in India. This is primarily because harmful compounds are more readily available or accessible in that region. Using a poison detection center, the current study evaluated poisoning trends as well as several factors such as the mode of poisoning, type of poison used, outcome of poisoning, the most vulnerable age and gender group, victim occupation, marital status, and geographical distribution.

In the current study, almost 50% of the participants were between the ages of 21 and 30. The gender distribution was nearly equal, with 69 males and 67 girls. The incidence of poisoning was higher among married (76) than unmarried (60) research participants. Similar socio-demographic patterns were found in the investigations undertaken by Srihari et al, Chaudhan et al, Jailkhani SM et al, Chatterjee S et al, and Dash SK et al. [4-8] The high frequency of poisoning recorded among young adults, both males and females who are married, could be attributed to increased stress, trouble balancing work and life, economic instability, and increased awareness of the availability of toxic chemicals.

In this study, 99% of instances were suicidal in nature. Our findings were consistent with Singh S's 10-year study in Chandigarh, as well as with studies undertaken in several locations of India. [9-13] The causes were related to an increase in unemployment, urbanization, the collapse of the family support structure, and economic instability, which are only a few of the elements that could be leading to an increase in self-poisonings (suicide) among the study cases.

The poison's lethality is determined by the amount of poison consumed, the nature of the compound swallowed, the availability of a health-care facility, and the start of treatment. In the current study, approximately 6% (8) of the patients died despite receiving effective treatment. The fatality rate was similar to that of Ramesha KN et al [14] in Bangalore, which was 16%, but Sarkar D et al [15] reported a lower mortality rate. Suicide can be prevented by enhancing effective clinical management, providing counselling services to vulnerable persons, and restricting access to dangerous harmful drugs in the community.

The bulk of research found that herbicides and pesticides were the most common sources of poisoning; however, their distribution varies by geography. [16-19] Similarly, research done in Andhra Pradesh by Kumar SV et al [20] and Saxena A et al [21] found that herbicides and pesticides such as organophosphorus were the most common causes of poisoning, followed by snake bites. This could be attributed to the widespread availability of agrochemicals, unregulated sales, and the use of these toxic compounds in India.

In the current study, we investigated the relationship between baseline features and PDC outcome instances. Baseline factors like season, occupation, and marital status have no correlation with PDC results ($p < 0.05$). This demonstrates that demographic characteristics do not play a role in predicting poisoning fatalities. However, in this study, the age ans sex component has strong significance (<0.01) when compared to the PDC result.

CONCLUSION:

Poisoning is a societal problem that should be taken seriously in all aspects. The current investigation has demonstrated this truth once more. Poisoning is on the rise and is projected to climb even more in the future as a result of uncontrolled human population expansion and our economy's reliance on agriculture. To lower the rate of self-poisoning (suicide) in the district, the government and other stakeholders should take steps to increase employment opportunities, improve urbanization, reduce economic instability, and strengthen the community's family support network. Furthermore, the availability of these poisons should be limited, and licensed use of these substances among handlers should be encouraged. Appropriate substance-handling guidelines must be addressed.

It is a blessing to have a poison detection center that analyzes poisoning situations and diagnoses them instantly, allowing physicians to manage the cases successfully. As a result, establishing a PDC in each institution will minimize poisoning mortality and morbidity rates in the future.

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None to declare

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CONFLICT OF INTEREST: The authors declare that they have no conflict of interest.

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