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Original Research Article

Profile of Poisoning Cases in a Tertiary Care Hospital in Tamil Nadu, South India – A 4 Year Retrospective Study

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Abstract

Background: In India the incidence of poisoning ranges between 4 and 6 for per lakh population, with poisoning being considered as the fourth most common cause of death in India. The socio-demographic and epidemiological factors are the factors that which influence the nature of the poisoning agent which have an impact in the clinical manifestations and the outcome of the poisoning patient. **Methodology:** A retrospective study was conducted in the department of forensic medicine for a period of 6 months by retrospectively analysing the data of the poisoning patients who got admitted in our hospital during the period between Jan 2015 and Dec 2019. **Results:** Among the various poisonous substances that were taken by the study subjects the most common substance used by them was cow dung powder followed by organo-compound substances, sedation tablets, rat poison and oleander seeds.76% of the patients were cured and discharged from the hospital after the treatment, 25 (8.5%) study subjects were expired, 41(14%) of them got discharged against medical advice and 3(1%) of them had absconded from the hospital during the treatment. **Conclusion:** The overall mortality rate due to poisoning was found to be 8.5%.With increasing rates of the incidence of suicide due to depression or work-related stress, there is a need for early detection and prevent further complications by creating more awareness through various help groups at the primary care level.

1. Introduction

Acute poisoning is one of the major causes of death particularly among young adults. Poisoning is a global problem although the associated morbidity and mortality depends on the type of poison which varies from country to country.[1] According to the medico-legal system of our country death due to poisoning is considered as an unnatural death and autopsy is being done on a routine basis.[2]

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Modern toxicology is a multi-disciplinary science that deals with identifying the exogenous chemical that is present in the biological specimen that was made available for medico-legal investigation.[3] Based on the reports of world health organization 0.4 million people die annually due to poisoning and among them more than two thirds are due to organo-phosphorous compound poisoning. The incidence is higher in developing and under-developed countries where the resources are limited.[4] In India according to the studies the incidence of poisoning ranges between 4 and 6 for per lakh population, with poisoning being considered as the fourth most common cause of death in India. Agriculture being a major occupation in India and the use of insecticides and other chemical fertilizers are very common and it is easily available and so poisoning with those agents are more common.[5]

Apart from the organophosphorus compound the other agents that are commonly used as poisoning agents are rat poison, cow dung and drugs such as benzodiazepine compounds. The socio-demographic and epidemiological factors such as geographical area, educational level, occupation, income, cultural and religious beliefs are the factors that which influence the nature of the poisoning agent which have an impact in the clinical manifestations and the outcome of the poisoning patient.[6,7] All patients with history of poisoning intake either with or without clinical manifestations needs admission in ICU(Intensive care Unit) either for organ support and further management or for observation.[8]

There are various factors that determine the course and outcome in a poisoning patient. The most important factor among them is the type of poison and apart from it, the time interval between the poison consumption and the patient presenting to the health system and the onset of multi-organ failure, as because the late presentation and the early occurrence of multi-organ failure are the important causes of mortality among poisoning patients.[9] The pattern of poisoning varies from region to region as it depends upon various factors such as availability, access to poison and socio-demographic status of an individual. Earlier studies showed organophosphates (OPs) as the most common agents of poisoning in India but recent studies have found change in the trends of poisoning with aluminium phosphate poisoning being more common.[10] Moreover periodic epidemiological studies are warranted to understand the pattern of poisoning in each region, which would help the health-care facilities to plan and reduce the poisoning-associated mortality rate the poisoning profile data would help in implementing preventive strategies in the near future. So, the present study was conducted with an objective to assess the pattern of acute poisoning cases and to study their socio-demographic determinant and the clinical outcome of victims of in a tertiary care hospital in Salem district.

2. Methodology:

The study was started after getting approval from the institutional ethics committee. It was a retrospective study done in the department of forensic medicine where the data of all the poisoning cases admitted in our hospital during the period of past 5 years from Jan 2015 to Dec 2019 collected from our medical records department.

All type of poisoning cases that includes chemical poisoning, drugs and pesticides were included in our study. We included patients of all age group those were got admitted in the emergency department with the history of poison intake either accidentally or intentionally. Data that were obtained from the case sheets were demographic details such as age, sex, marital status, educational qualification, and occupation. Details related to patients age, sex, marital status, occupation, type and mode of poison, place of consumption, cause of poison consumption and cause of death were taken from the hospital cases sheets.

The time of poisoning, time of hospital arrival, the lag time in reaching the hospital, and reasons for the same, and mode of transportation were noted. Data about diagnosis, any co-morbid illness, any previous history of poisoning, mode of poisoning, whether accidental/suicidal/ homicidal and any recent precipitating event were also recorded. The final outcome was measured in the form of either the patient got discharged after cure, death or patient left the hospital against the medical advice. If any of the above details were missing in a particular case those patients were excluded from the study.

All data were entered and analysed using SPSS version 24. Mean and standard deviation were calculated for all parametric variables and percentage for all frequency variables. Chi-square test was used for deriving the statistical inference between variables.

3. Results:

In the present study majority of the study subjects were in the age group between 10 and 30 years with only 4% of the subjects were above 30 years and 1.3% was below 10 years (table 1). Males and females were almost in equal numbers with a slight male predominance (53% vs 47%). Among these poisoning patients 56% were married with house wife constituting 27% (table 2).

Table 1: Age wise distribution of the study subjects

Age group	Frequency	Percentage	Mean ± SD
<10 years	4	1.3%	28.8 ± 13.2
10 – 20 years	70	24%	
21 – 30 years	136	46.7%	
31 – 40 years	38	13%	
41 – 50 years	20	6.8%	
51 – 60 years	11	3.7%	
>60 years	12	4.1%	
Total	291	100%	

Table 2: Socio-demographic variables among the study subjects

Socio-demographic variables		Frequency	Percentage
Gender	Male	155	53.2%
	Female	136	46.7%
Marital status	Married	164	56.3%
	Unmarried	127	43.6%
Occupation	Student	66	22.6%
	House wife	79	27.1%
	Farmer	53	18.2%
	coolie	39	13.4%
	Semi-skilled workers	32	10.9%
	Others	22	7.5%

Table 3: Profile of poisoning patients

Variables		Frequency	Percentage
Place of poisoning	Indoor	271	93.1%
	Outdoor	20	6.9%
Time of poisoning	<12 noon	80	27.4%
	>12 noon	211	72.7%
Type of poison	OPC	56	19.2%
	Oleander seed	35	12%
	Rat poison	39	13.4%
	Mosquito killers	8	2.7%
	Sedation tablets	45	15.4%
	Sani powder (cow dung)	61	20.9%
	Corrosive substances	21	7.2%
	Paraquat	14	4.8%
	Other and unknown agents	12	4.1%
Nature of poisoning	Suicidal	286	98.2%
	Accidental	5	1.8%
Route of administration	Oral	290	99.6%
	Inhalational	1	0.4%

Table 4: Duration of ICU stay, alcohol usage, psychiatric co-morbidity and outcome of the poisoning patients.

Variables		Frequency	Percentage
Duration of ICU stay	<5 days	226	77.6%
	5 and more days	65	22.4%
Alcohol usage along with poison	Yes	28	9.6%
	No	263	90%
Previous history of poisoning	Yes	20	6.8%
	No	271	93.1%
Associated psychiatric co-morbidity	Yes	7	2.4%
	No	284	97.5%
First AID measures given	Yes	103	35.3%
	No	188	64.6%
Outcome	Cured	222	76.2%
	Expired	25	8.5%
	Against medical advise	41	14%
	Absconded	3	1.03%

In our study more than 90% of the patients had consumed poison in their houses and majority (73%) had taken it in the evenings. Among the various poisonous substances that were taken by the study subjects the most common substance used by them was cow dung powder followed by organo-compound substances, sedation tablets, rat poison and oleander seeds. About 4% of poisonous agents used by the patients were found to be unknown. Oral route was the route of administration of the poison that was followed by almost all the patients (table 3). Majority (77.6%) of the patients required ICU admission for less than 5 days and the mean duration of ICU stay was 3.74 days. The alcohol consumption along with poisonous agent was present in less than 10% of the study subjects. In our study past history of poison intake was present in only 7% of the subjects and

2.5% of them had associated psychiatric illness. After consuming the poisonous substance 35% of the patients had received first aid measure before coming to our hospital and the commonest type of first aid received by them was stomach wash. In our study 76% of the patients were cured and discharged from the hospital after the treatment, 25 (8.5%) study subjects were expired, 41(14%) of them got discharged against medical advice and 3(1%) of them had absconded from the hospital during the treatment (**table 4**).

Table 5: Multi-logistic regression analysis for the factors influencing the outcome among the poisoning patients

Factor		Outcome		Exp (B)	95% CI	P value
		Recovered	Death/AMA			
Age	<30 (n=210)	152 (72.3%)	52 (26.7%)	0.666	0.29 – 1.50	0.329
	>30 (n=81)	71 (87.6%)	16 (12.4%)			
Gender	Male (n=155)	104 (67%)	32 (33%)	1.11	0.56 -2.17	0.761
	Female (n=136)	119 (87.5%)	36 (12.5%)			
Marital status	Married (n=164)	129 (78.6%)	34 (21.4%)	1.091	0.52-2.25	0.814
	Unmarried (n=127)	94 (74%)	34 (26%)			
Stay in ICU	<5 days (n=226)	164 (72.5%)	63 (27.5%)	0.198	0.07-0.54	**0.002**
	>5 days (n=65)	59 (90.7%)	5 (9.3%)			
Presence of psychiatric illness	Yes (n=7)	7 (100%)	0	0.0003	0.0003-0.00032	**0.050**
	No (n=284)	216 (76%)	68 (24%)			
Nature of poisoning	Suicidal (n=286)	218 (76.2%)	68 (23.8%)	1874.4	0.0001-0.00014	0.070
	Accidental (n=5)	5 (100%)	0			
Alcohol consumption	Yes (n=28)	21 (75%)	7 (25%)	1.075	0.37-3.05	0.892
	No (n=263)	202 (76.8%)	61 (23.2%)			
First aid given	Yes (n=103)	78 (75.7%)	25 (24.3%)	1.52	0.79-2.90	0.202
	No (n=188)	145 (77%)	43 (23%)			
Previous history of poisoning	Yes (n=20)	14 (70%)	6 (30%)	2.98	0.91-9.75	0.070
	No (n=271)	209 (77%)	62 (23%)			
OPC poisoning	Yes (n=56)	49 (87.5%)	7 (12.5%)	3.52	1.14-10.82	**0.028**
	No (n=235)	174 (74%)	61 (26%)			
Oleander	Yes (n=35)	30 (85.5%)	5 (14.5%)	4.164	1.17-14.82	**0.028**
	No (n=256)	193 (75%)	63 (25%)			
Rat poison	Yes (n=39)	31(79.5%)	8 (19.5%)	2.128	0.68-6.64	0.193
	No (n=252)	192 (76%)	60 (24%)			
Sani powder	Yes (n=61)	42 (68.8%)	19 (31.2%)	1.409	0.52-3.80	0.498
	No (n=230)	181 (78.5%)	49 (21.5%)			
Sedation tablets	Yes (n=45)	37 (82.2%)	8 (17.8%)	3.467	1.04-11.54	**0.043**
	No (n=246)	186 (75.6%)	60 (24.4%)			
Corrosive agents	Yes (n=21)	16 (76%)	5 (24%)	1.255	0.3-5.24	0.756
	No (271)	207 (76.3%)	63 (23.7%)			

A multi-logistic regression analysis was done to assess the various factors influencing the outcome in the poisoning patients, by measuring the outcome in the form of either recovered, death or discharged against medical advice. Among the various factors, stay in ICU for less 5 days found to have a significantly favorable outcome compared to stay for more than 5 days and patients with associated psychiatric co-morbidity the rate of recovery was found to be more ($p<.05$). Among the various poisonous compounds used by our study subjects a favorable outcome was seen with OPC poisoning, oleander seeds and sedation tablets in which the death rates were lower compared to the death rate that was occurred due to rat poison or cow-dung powder and the difference was also found to be statistically significant ($p<.05$). All other demographic factors such as age, gender and marital status did not have statistically significant

difference with respect to the outcome of the poisoning patients, similarly other factors that were associated with consumption of poison such as associated psychiatric morbidity, influence of alcohol, previous history of poison intake, first aid given before arrival to our hospital and the nature of poison intake did not influence the outcome of the patient (p>.05) (**table5**).

4. Discussion:

This retrospective record analysis of patients who had consumed poison was intended to study the socio-demographic details of the patients and the factors that had influenced the subjects to consume poison and the factors which had influenced on the outcome of these patients. The present study revealed that majority of the patients were in the age group of less than 30 years, with males were slightly being more involved than females, and this was the pattern to be seen in most of the studies that were done earlier.[11,12] Suicidal type of poisoning (98%) was found to be much more common than accidental poison intake and considering the current trend, with more than 70% of the patients who tried committing suicide were in the age group of less than 30, being the most productive age group and men still being considered as the sole breadwinner inmajority of the Indian families and such a trend seems worrying. As mentioned by Kanchanand Roshan Mathew et al in the study conducted from south India and North India respectively, in our study also we found that increase stress in jobs, huge loss met the farmers due to their agriculture lands, lack of employment, pressure among the peer groups, and conflicts with in the family members were few of the reasons mentioned by the patients for taking this extreme step.[13,14]

In the present study the most common poisonous agents used by the patients are cow dung powder followed by organo-compound substances, sedation tablets, rat poison and oleander seeds.This finding was almost similar to the previous studies where they had mentioned pesticides were the most commonly used agents.[15] A recent study conducted in Tamil Nadu showed that organophosphorus compound poisoning constituting 58.6% followed by rat poison which was the second most common agent.[16] In our study consuming of excess of sedation tablets was also found to be the most common agent which shows that patients are able to get the hypnotic drugs directly from the pharmacy as over the counter medication without the prescription of doctors and so a more stringent law should be in place to monitor the pharmacy for not giving any sedation tablets over the counter without a doctor's prescription. Drug overdose constituted a significant number in recent studies even when pesticides were found to be the most common cause.[17,18]

A study in UK, in 2001, showed a substantial increase in self-poisoning with paracetamol and that with non-opiate analgesics, which rose from 48%, in 1985, to 60.6%, in 1997.[19] A recent study done by Vibah C Santosh in 2018 had found that the most common drugs that were used for committing suicide were paracetamol and analgesics which constitutes around 26.4% and the other drugs that were used are sedatives, antipsychotics, antiepileptic, antihistamines bronchodilators, and thyroxine.[20]Eddleston in his study in the year 2000 had reported that self-poisoning with drugs was being increasingly reported more in urban areas compared to rural areas.[21]A study recently done in a corporate hospital in New Delhi had reported benzodiazepines as a most common agent which is almost similar to the present study.[22]

The route of poisoning was oral in almost all the cases and it is similar to the results mentioned in other studies.[18-25]In the present study associated psychiatric illness was present in only 2.5% and it is much less when compared to other studies, the reason would be due to the retrospective design of the present study, where detailed questionnaire for assessing the psychiatric illness might have not administered. Similarly, the prevalence of alcohol abuse among the male patients was also less in our study when compared to the previous studies.[15-17]

The overall mortality rate in the present study was 8.5%and it was almost similar to the study done by Vibah C Santosh and in most of the other studies the death rate ranged between 1.5% and 15%.[20]The median time for the point of first medical contact among our patients was 1.15 hrs, it was time either the patient had come directly to our institute or they have received the first aid treatment outside and in our study only 35% of the patients had received the first aid care before coming to our hospital. The mean first contact time was between 1.00 and 1.30 hrs in most of the previous studies.[20-25]

In the current study all the patients reported to the emergency room with the history of poison intake were all admitted in ICU and were treated symptomatically and proper antidotes were given

after identifying the poisonous substance. Lesser the duration of stay in ICU, usage of poisonous substances such as OPC, oleander seeds and sedation tablets found to have a favourable outcome and patients who stayed in ICU for a longer duration and who had consumed poisonous agents such as cow-dung powder and rat poison showed a significantly poorer outcome and it is in sync with few other studies done earlier and in some of the studies worst outcome was seen in patients who had consumed pesticides such as organo-phosphorous compounds.[18-25]

With increasing trends in the suicide rate, there is a need of a holistic approach to manage common psychiatric illness at the primary care level which would help in preventing the people from taking extreme steps.

Limitations:

There were certain limitations in the present study: our study being a retrospective study we were not able to get the complete details pertaining to the poisoning patients and the patients who were discharged against medical advice were considered as not cured.

Another limitation was the sample size, still a bigger sample would be needed to further validate the trend. As the general public were worried about the compensation claim in case of snake bite and free supply of anti-snake venom in government hospitals, minimal snake bite poisoning cases were admitted in our hospital and so we were not able to see the trend in snake bite poisoning.

5. Conclusion:

The overall mortality rate due to poisoning was found to be 8.5%. Cow- dung powder poisoning was found to be most commonly used agent followed by OPC and sedation tablets. Patients who had stayed in ICU for more than 5 days and patients who had consumed cow-dung powder or rat poison showed a significantly poorer outcome. With increasing rates of the incidence of suicide due to depression or work-related stress, there is a need for early detection and prevent further complications by creating more awareness through various help groups at the primary care level.

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